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Monitoring Times

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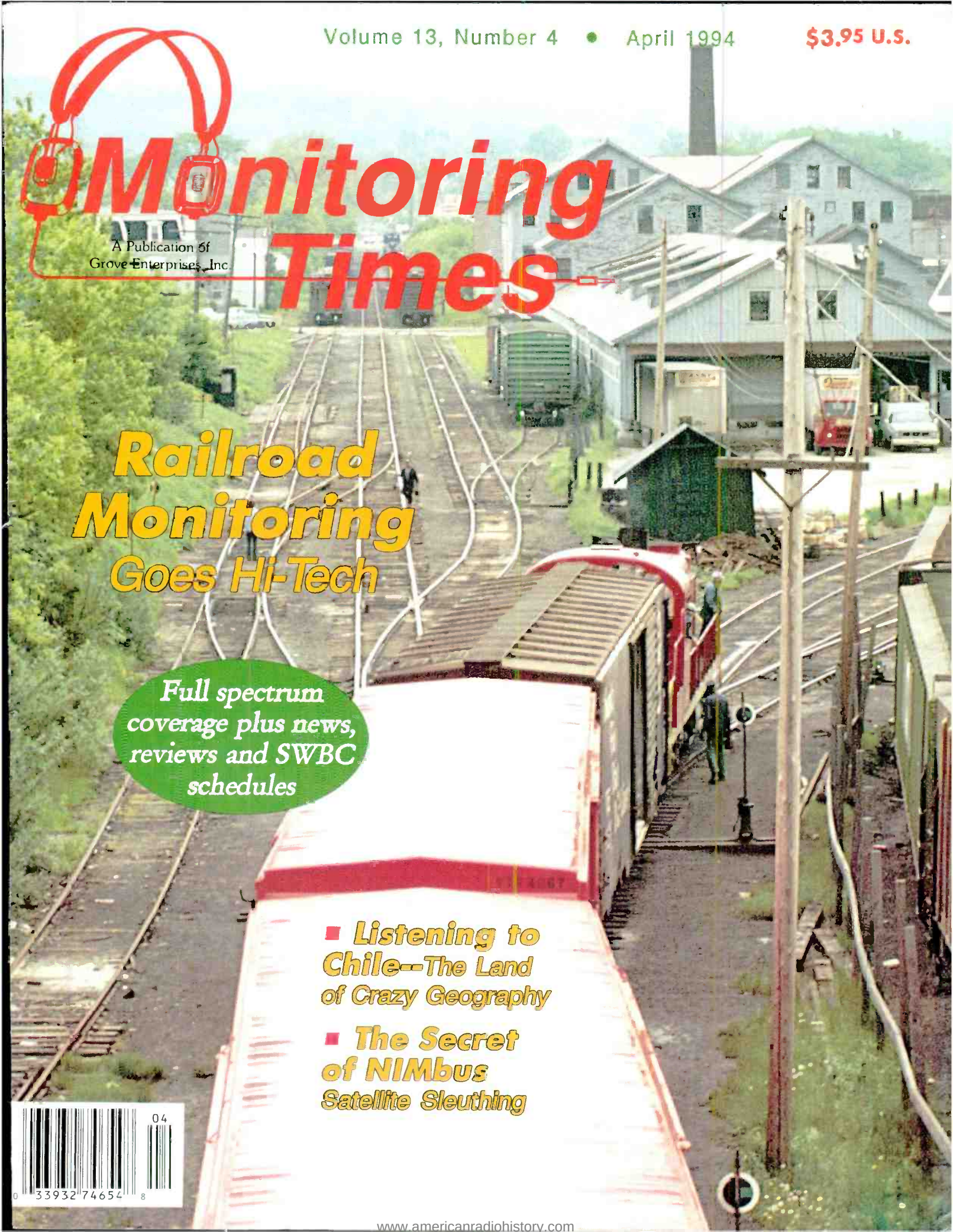

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April 1994

Monitoring Times

Jack Sullivan

Scanning the Big Railroads 8

By Jack Sullivan

For those who love trains, it would take a book to just scratch the surface of their favorite monitoring target. But, if you haven't tried train scanning lately, this article is a reminder that much has changed since the demise of the caboose. Trains may have gone hi-tech, but that doesn't mean you can't monitor! Everything you need to get started is right here.


Don Moore

Chile: The Land of Crazy Geography 14

By Don Moore

Imagine a strip of land 100 miles wide stretching down the West Coast from the Canadian border to the tip of Baja Mexico, and you will have an idea of what it is like to live in Chile. This phenomenal country used to be more of a presence on shortwave than it is today, but do not be surprised if its voice just keeps getting stronger.

The Secret of Nimbus 18

By Theo Pappan

Thomas knew he had logged a satellite, but it seemed an impossible task to determine which of the thousands of orbiting objects in space was emitting these particular signals. Not so, said his mentor. And step by step, Theo walks Thomas — and us — through the logical steps to a positive ID.

COVER PHOTO: *Vermont Railway, Rutland, Vermont. Photo credit: Bruce Heald.*

The RCI Monitoring Station 22

By Jacques d'Avignon

Chased around the Canadian countryside for a while by urban development and electrical noise, Radio Canada International's monitoring station finally found a quiet home in Carp, Ontario. This shortwave listener's paradise provides a valuable service and back-up for quite a few government and foreign entities.

Repercussions From the California Quake 26

By E.R. Haroldsen

Are you well-stocked on batteries? From Idaho to Illinois, power supplies experienced a major drain when electricity shut down in California. Read this account, if you're feeling too secure.

And More ... !

As we head into the low propagation dip in the solar sunspot cycle, readers are beginning to ask what to expect. So, for a brief overview of anticipated conditions, see the special report by Jacques d'Avignon on page 56. If you want to try your own hand at prognostication, **Computers & Radios**' John Catalano takes a look at six different software programs that will roll your own propagation forecast across the screen.

Magne is on vacation this month, and will return with his excellent shortwave receiver reviews in May. Meanwhile, Bob Grove looks at a new handheld scanner — the AR-1500 — in **Scanner Equipment**. This wideband scanner is cellular-capable, so get 'em while you can! As we are reminded by Bob's **Closing Comments**, although they can't be manufactured or imported after April 26th, they can be sold as long as stock holds out.

Tools for the hobbyist include a nifty RF detector Bill Cheek constructs (**Experimenter's Workshop**) inside a tiny flashlight, and accessories (books and maps) are recommended by **Plane Talk** to augment your aero monitoring, as well as good beginner's books from **Beginner's Corner**.

Don't forget two special columns that appear periodically: **Digital Digest** gives a very comprehensive overview of fax reception, and **Radio Reflections** answers some of the most-asked questions by beginners in vintage radio restoration.

DEPARTMENTS

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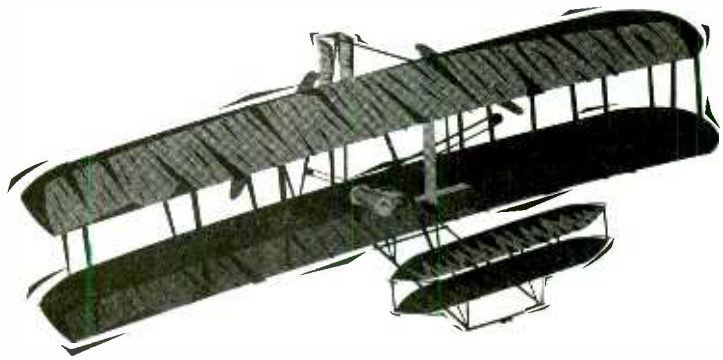
"THE WORLD IS FLAT"



"THAT THING WILL NEVER FLY"

"THAT ANTENNA IS TOO SMALL TO WORK"

There's one in every crowd—one that pushes the limits and proves the skeptics wrong. The world sailed into a new era of discovery with Columbus. The Wright brothers propelled us into the age of air travel. AEA advances into the ranks of these distinguished pioneers with the IsoLoop 10-30 HF antenna—a 35" loop antenna with low-angle performance that is better than many full-size HF antennas.

One IsoLoop 10-30 HF pioneer offers this: "Big-gun DXers will tell you nothing *that* small can work. They will continue to tell you this after you work a couple hundred countries with it. Ignore them. In 24 months, I have worked 213 countries and confirmed 198."

The reason you get such a big performance in a small package is the efficiency of the IsoLoop 10-30 HF; it's 72% on 20m, rising to 96% on 10m. The main loop serves as an inductor, tuned with a 10,000 volt variable capacitor. Frequency range is 10 MHz to 30 MHz with continuous coverage. The unique compact design is also ideal if you're facing space limitations—mount it in your attic, on a balcony, or go mobile.

With the optional IT-1 Automatic Antenna Tuner (below), tuning your IsoLoop 10-30 HF becomes an adventure in speed — 2 or 3 seconds is typically all the time it takes before you're tuned and ready to go. (Antenna comes standard with a manual tuner.)

Discover the world of big antenna performance in a small antenna. Call our literature request line at (800) 432-8873 and request the "Inside Story" on the IsoLoop 10-30 HF or call us direct at (206) 774-5554. For best pricing, see your favorite amateur radio equipment dealer.

AEA

Connect with us

LETTERS

They're Good Folks, Good Buddy!

Thanks to all of you who called with an offer of a Citizens Band radio for long-time subscriber Martin Thiele (Feb. issue). It reaffirmed our belief in the generosity and good citizenship of radio hobbyists, and a personal belief of mine that CB shouldn't be totally written off as a worthless band. (Otherwise, why would so many of you good folks still have one?)

Jock Elliott, a feature writer for us in the past, commented recently about a CB revival in his area of New York. He suggests that many folks who, like Martin, find themselves confined by age or ill health, would find CB a wonderful way to participate in the life of their community. It could even become a lifeline for those who live alone.

So, if you have a CB radio that's gathering dust, why not consider a donation to someone who would appreciate it? Who knows, you might soon overhear him or her playing chess with a friend over the air, as Jock did!

I also want to acknowledge the wonderful response of our readers whenever someone needs help affording an *MT* subscription—your generosity is itself a gift.

Spreading It Around

Jean Baker passes along another way to share your hobby. She has cultivated a friendship with the local Radio Shack store (who among us hasn't?!) and has given them her phone number as a resource person for people buying their first receiver. (Her friends at the store help screen the referrals.) Sometimes just a phone call is all that's needed to get over the initial hurdle of learning how to operate a scanner or shortwave receiver.

Jean says civic and community organizations are always looking for someone to speak at their meetings. (Larry Van Horn can testify to this, too!) She and Larry both report an excellent response. I suspect their own enthusiasm is infectious, but why not give these ideas a try yourself? Soon you may find you have more friends to talk radio with than you have time to handle—and suddenly you have the makings of a club!

New Focus for Columns

Two columns in *Monitoring Times* will be shifting their focus with a change in authorship. We say good-bye this month to Steve Douglass, who has authored the Federal File column since 1991. Steve's inspired speculations regarding stealth aviation projects have earned him the attention of several notable publications, and, in fact, he is expected to be undertaking a column on communications for *Popular Science* magazine.

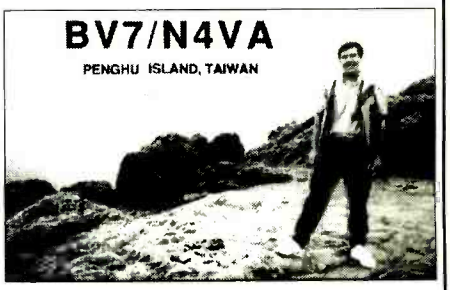
Those who wish to follow his investigations in that area are encouraged to subscribe to his newsletter, *Intercepts* (6303 Cornell, Amarillo, TX 79109). Send an SASE for a sample copy.

John Fulford, a popular speaker at *MT* conventions, brings his considerable expertise on federal monitoring to Federal File as its new editor. John has had a life-long fascination with monitoring across the spectrum, and he welcomes your input and information on the many changes taking place in today's communications systems.

This month is Karl Zuk's last American Bandscan column. After five years of writing wonderful station and personality profiles from the mediumwave broadcast world, he is moving on to other interests. Karl gave an inside glimpse into the issues and lives of those involved in broadcasting in a way that made them come alive. We hope someday Karl will be telling his own story!

Gearing up to address AM, FM, and TV topics in his place is Joe Eisenberg. Many of you who attended last year's *MT* Convention will remember Joe's dynamic and informative seminar. Joe will also be eager for your input and ideas on all three of these modes.

FAIRS Guyana Project



Larry Vogt, N4VA, a training director for the Foundation for Amateur International Radio Service, Ltd (FAIRS), is appealing for help in encouraging the growth of amateur radio in Guyana. An initial fact-finding group found "lots of enthusiasm, but not much equipment." Larry will be going there soon "to teach Morse code, help establish club stations, and do whatever possible to promote the growth of 8R-amateur radio."

He says the following items are needed:

- ***Training material:*** code practice oscillators, keys, training tapes, technical courses, technical books, license manuals.
- ***Supplies:*** soldering irons, VOMs, coax connectors, etc.
- ***Equipment:*** antenna kits, antennas, packet controller, dummy load, SW bridge, transceivers for HF and VHF, etc. Magazine and Newsletter subscriptions.

The intent is to first establish a technical library and a club station in Georgetown, capital of Guyana, which will provide access to those who can't afford their own.

If you can help with any funds, supplies, or equipment, please send to: FAIRS GUYANA PROJECT, P.O. BOX 341, FLOYD, VA 24091.

If you would like to contribute a subscription, it should be sent directly to: GUYANA AMATEUR RADIO ASSOCIATION, FAIRS TECHNICAL LIBRARY, GEORGE RICHMOND, SECRETARY, 22103 AUBREY BARKER STREET, GEORGETOWN, GUYANA.

Please notify FAIRS at the Virginia address when you contribute a subscription. *Monitoring Times* is already being sent.

Re-Runs

Speaking of the Weather: Joseph Cejka expressed thanks for the story on NOAA weather radio run in December; he adds that "one other source of weather information is via Internet. I check in daily with the University of Michigan's Weather Computer via Delphi's Gopher menu. You can also Telnet it directly. In addition to weather information, you can access goodies such as earthquake reports (important to us folks in Shaky-fornia)!"

Ken Reitz, who authored the article on weather, sent a response to one reader's inquiry: "No, I am not the former St. Louis Cardinals' third baseman who shares my name, though I do have a couple of his baseball cards. He was also kind enough to send a game jersey to me when we had brief correspondence during his better days in the league in the late 1970's. I don't think anyone has ever asked him if he was the same Ken Reitz who writes for *MT*!"

Continued on page 106

5th Anniversary

1994 MONITORING TIMES CONVENTION

October 21, 22, 23, 1994

Airport Hilton
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OVER $8000 IN ICOM PRODUCTS TO BE GIVEN AWAY!

Must be convention registrant in attendance to be eligible.

Enjoy accommodations at the ***Atlanta Airport Hilton*** and receive the special nightly rate of only **$71** (save 50% off the regular $140 per night rate!) which includes the following:

- **Same rate single or double!**
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REGISTER NOW!

Call the Hilton TODAY at 1-800-HILTONS to make your room reservation—SPACE IS LIMITED!

Be sure to mention Monitoring Times when making your reservation to receive the special room rate. Reservations must be made by September 21, 1994!

This three day weekend is full of activities for the radio enthusiast—*for only $50 registration:*

- ***Dozens of exhibitors*** with the latest equipment and accessories for radio monitoring, including: Christian Science Monitor, Grove Enterprises, ICOM America, Optoelectronics, Sony, and many more!
- Join your fellow monitors at a ***professional listening post*** featuring the Grove SDU-100 Spectrum Display Unit as well as other products designed to enhance your radio monitoring.
- A ***two hour international broadcasters forum*** starts off the weekend Friday evening and is hosted by moderator Ian McFarland.
- Attend any of ***over 20 seminars*** covering such topics as the future of shortwave broadcasting, choosing a scanner or shortwave radio, LOWFER monitoring, digital communications, spy numbers stations, surveillance, clandestine and pirate broadcasting, antenna theory, military and aero monitoring, and much more!
- Saturday evening's banquet will feature ***guest speaker international broadcaster Ian McFarland.***
- Get your scanner charged and ready for the ***"Bug Hunt"***—a highlight at each convention!
- Visit ***Delta Airline's Communication Center*** and ***Delta's Maintenance and Flight Operations Division***. Tours will be conducted on Friday.

SCHEDULE

Friday, October 21
11:00 am to 5:00 pm
Registration Open
12:00 to 5:00 pm
Exhibits and Listening Post Open
7:00 to 9:15 pm
"International Broadcasters Forum"

Saturday, October 22
8:00am to 3:00 pm
Registration Open
9:00 am to 12:30 pm
Exhibits Open and Morning Seminars
12:30 to 3:00 pm
Exhibits Open/Lunch Break

Saturday cont'd
3:00 pm
Exhibits Close
3:00 to 5:15 pm
Afternoon Seminars
7:00 to 9:00 pm
Banquet—Served at table
9:30 pm
Transmitter Bug Hunt

Sunday, October 23
9:00 am to 12:30 pm
Morning Seminars

MT PRE-REGISTRATION FORM MT

Deadline 9-21-94

[ ] Enclosed is my $50 registration fee!
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The Everything-but-the-Kitchen-Sink Band

The American Radio Relay League (ARRL) has filed a Petition for Rulemaking with the FCC, asking that the amateur service be granted primary status in the 902-904 and 912-918 MHz band. According to the *W5YI Report*, the ARRL wants hams to have primary status on the band "because new developments in the band could make ham usage more difficult there. The 902 to 928 MHz band has been available for amateur use since 1985. Since then it's been used primarily for weak signal propagation experiments and television operation."

The ARRL's proposed bandplan would be as follows:

902.0-903.0	Weak signal (902.1 calling frequency)
903.0-906.0	Digital (903.1 alternate calling frequency)
906.0-909.0	FM repeater outputs
909.0-915.0	Amateur TV (ATV)
915.0-918.0	Digital
918.0-921.0	FM repeater inputs
921.0-927.0	ATV
927.0-928.0	FM simplex and links

Selling the Spectrum

Meanwhile, the National Telecommunications and Information Administration has designated 200 MHz of frequencies that it says should be transferred from government to private hands. One-fourth of the frequencies will be turned over to the Federal Communications Commission immediately. Others are scheduled to be switched over gradually through the year 2004.

According to Associated Press writer Randolph E. Schmid, the following tentative schedule has been carved out.

Immediate transfer:

4660-4685 MHz from military airborne data transmissions and communications to possible fixed and mobile radio and satellite uses.

2390-2400 and 2402-2417 MHz from military radar testing systems and enemy radar simulations to radio location use and fixed and mobile communications.

January 1996 transfer:

2300-2310 MHz from military radar testing systems and enemy radar simulators to radio location and fixed and mobile communications use.

January 1997 transfer:

4635-4660 MHz from military airborne data transmissions and communications to fixed and mobile radio and satellite uses.

January 1999

1390-1499 MHz from long range air defense radars, military data transmissions, tactical radio relays and radio astronomy to fixed and mobile radio and radio location uses.

1427-1432 MHz from military tactical communications and test range data transmissions to mobile communications.

1670-1675 MHz from meteorological services to fixed and mobile communications.

3650-3700 MHz from Navy air traffic control radars on aircraft carriers to fixed and mobile non-satellite communications.

January 2004 transfer:

1710-1755 MHz from microwave communications and military tactical relays to fixed and mobile communications service.

New Jersey Censors *Police Call* Directory

While the headline calls up images of Nazi bookburnings and Ray Bradbury's *Fahrenheit 451*, it actually was inspired by a recent ruling by the New Jersey Attorney General's Division of Criminal Justice.

According to Deputy Director Michael Bozza, during mid-1993 New Jersey requested Radio Shack stores voluntarily remove four scanner model until it could be determined whether or not such scanners violated that state's Wiretap Act (NJ S.A.2A156-1 et. seq.).

Their conclusion was that no models were in violation and, as of December 1993, Radio Shack was allowed to resume selling their radios. But their books did not fare as well.

New Jersey has censored passages in Gene Hughes's popular *Police Call Radio Guide*, allowing for sale in that state only a specially printed edition which makes no mention of cordless or cellular telephone monitoring.

Beating The Ban: Scan

On January 19th, it became illegal to have a radar detector in trucks and other commercial vehicles. Those who continue to use the gadgets are being warned that authorities can detect the radar detectors.

Since the ban took effect, several dealers report that sales of radar detectors have been cut in half—except for a couple of models that now boast "stealth" features that allegedly make them undetectable. Meanwhile, others have attempted to get around the ban by purchasing scanners. Tony Mirabelli, Uniden VP, says scanner sales immediately jumped 15%.

Down with Dishes

Malaysia is following the example of China and cracking down on satellite dishes. According to a report on Radio Malaysia, the government there has given the roughly 20,000 dish owners on Sabah and Sarawak 30 days to dismantle their antennas or face legal action.

Fun Loving Swedes

Foreign journalists were amused when officials in Kinnevik, Sweden, announced the formation of a new TV station. The station, said proud officials, will be programmed for women. It will be called TV Sex.

Whoa. Everyone's jaw dropped.

No, no, no, said confused officials. "Sex" is how you pronounce the number "6" in Swedish. It's TV-6.

Oh.

COMMUNICATIONS

Radio White Hawk

If shortwave listeners think of Mongolian Radio as the quaintly backward, static-filled voice of this near-primitive nation, watch out. Radio Tsataan Shonkhor is now on the air. A private commercial venture utilizing Mongolian Radio's transmitters, Tsataan Shonkhor (Radio "White Hawk") operates on 4080 and 4850 kHz.

Along with a five minute English newscast, Radio White Hawk features disk jockeys playing — seriously — Mongolian rock music.

Radio White Hawk. Comin' at you.

"Welcome to Miami. Keep Your Heads Down..."

Miami, Florida, has a new radio station at 102.3 on the FM dial. Its job is to try and help keep foreign tourists alive in their crime-ridden metropolis. "Safety Radio" will target its 25 watt signal at overseas visitors driving to the city from the airport. Opening with a greeting, the station will also offer directions and "other information" in English, Spanish, German, French, Portuguese, and Italian. Signs will encourage motorists to tune in.

Selling Ice Cubes to Eskimos

A California firm that makes one of the Army's most sophisticated radio systems has been slapped with a $2 million fine. The hi-tech radios, which had their first battlefield testing during Operation Desert Storm, overheated so badly that soldiers had to hook them up to air conditioning units and don cold weather gear to operate them. The radios were pressed into service despite a 1989 report that the manufacturer, Aydin, was falsifying the results of environmental stress tests.

Later that year, an Army Communications Electronics Command report said that "...of the last 25 radios shipped to (Germany), 21 modules exhibited faults during initial checkout."

When the Army finally did complain, the company responded that the soldiers operating the equipment were not properly trained. Eventually, the Army had enough and Aydin — which was paid $29,000 each for the radios — was hit with the fine. In addition, the company has agreed to a $10 million recall. Two managers at the company also face 20 year prison terms.

It's not nice to fool Uncle Sam.

Ham Left Hanging?

In January we reported on Chris Boyer, KC6UQG, a ham from San Diego, CA, who called for help for an injured friend on a sheriff's channel, after trying unsuccessfully to raise at least four ham repeaters. The FCC asked him to relinquish his receiver, which was a modified Kenwood TH47A handheld, and Chris did, apparently signing the receiver over to the Sheriff's Department.

Recently that department made a gift of the receiver to the county. However, the county Board of Supervisors, who had honored Boyer in December as a Good Samaritan, refused the gift and recommended the receiver be returned to Boyer!

Rex Whetzel of Wolcottville, IN, had written his Senator regarding the case. Senator Richard Lugar reported on his discussion with the Office of Congressional Affairs for the FCC which assured him that all charges were dropped against Boyer in return for the surrender of his receiver. He also indicated that the sheriff's department had determined that other alternatives (not listed) had been available to Boyer.

Chris Boyer says this is all news to him — the FCC has not contacted him, nor has the Sheriff's Department taken the advice of the County Supervisors to return the handheld. Sheriff Roache is up for re-election, however, so anything is possible!

Ham Radio Scholarships

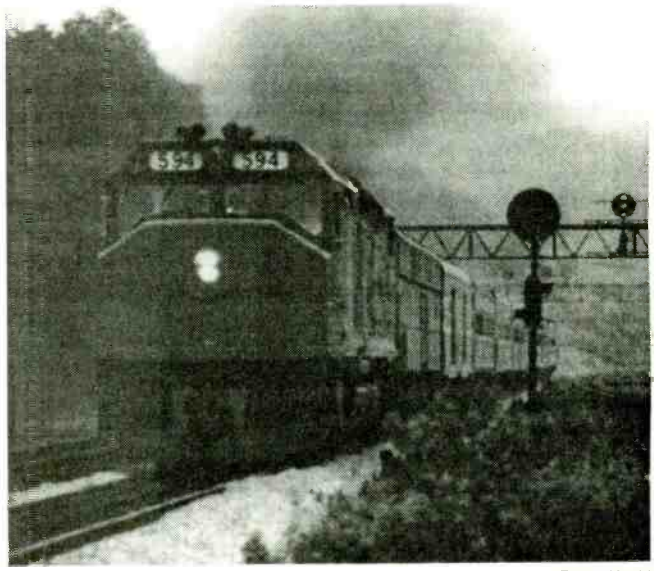
The Foundation for Amateur Radio, Inc. (FAR), wants to give you money for your education. The non-profit organization plans to administer 49 scholarships this year ranging from $500 to $2,000.

To compete for the awards, you must be a licensed amateur radio operator who is "enrolled in or has been accepted for enrollment at an accredited university, college or technical school."

FAR did not provide any further information on how winners are selected. Additional information and an application form can be requested by letter or QSL card, postmarked prior to April 30, 1994. The address: FAR Scholarships, 6903 Rhode Island Avenue, College Park, MD 20740. MT

"Communications" is produced through the contributions of the following fine people: David R. Alpert, New York, NY; Chris Boyer, San Diego, CA; Al Garms, Mabelvale, AR; Samuel Guzman, Brentwood, NY; Tim Main, Crockett, CA; Jack McCartan, Newark, DE; Ricardo Molinar, Fort Lee, NJ; Richard Sklar, Seattle, WA; Rex Whetzel, Wolcottville, IN. Also, the *W5YI Report, National Scaning, World Broadcasting Information.*

Scanning The Big Railroads



Bruce Heald

By Jack Sullivan

I have been interested in railroading for most of my life, but very little of my 30+ years of monitoring has been devoted to listening to railroad communications. With almost every form of railroading available for monitoring and observation in my immediate neighborhood, I decided this past summer to dig a little deeper into railroad monitoring. The results of my research both delighted and fascinated me and formed the basis for this introductory article.

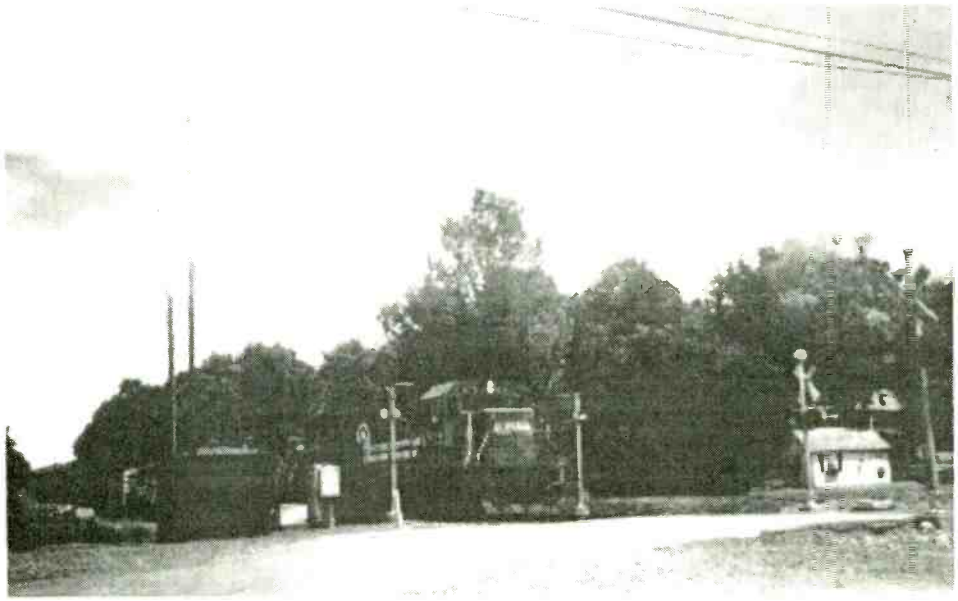
There are different types of railroads, each with its own unique communications system. Major long-haul railroads like CONRAIL, CSX and the Atcheson, Topeka & Santa Fe cover many states with a number of main and branch lines extending thousands of miles. Coupled with numerous facilities of various types along their right of ways, these big railroads have extensive and complex communications systems involving many radio frequencies.

AMTRAK operates intercity passenger trains across the entire country and has its own facilities and communications systems and radio frequencies as well as using those of the "host" railroads on whose tracks it operates.

Many major metropolitan areas have very busy commuter railroad systems using their own communications systems and frequencies. Large cities often have extensive subway systems, which are busy railroads in themselves.

Across the country are a large number of small independent railroads, many of which were created when the larger railroads of which they were once part of decided to close the trackage on which they now operate.

Photo 1



Getting Started

Before you can begin monitoring the railroads in your area you will need to determine which companies have operations near you, what these operations consist of, where they are located and what they are called by the people who operate the railroad. The best place to start is with detailed road maps of your area. Pick a map of sufficiently small scale (such as a county map) that it will show not only railroad lines but also other features such as switching yards, street grade crossings, overpasses, etc. Make a list of the railroads that have tracks within 30-40 miles of your home.

The principal radio frequencies used by the railroads in your list can be found by consulting the publications listed in the Bibliography at the end of this article. Make a list of these, program them into your scanner and start listening!

Most scanners around today are capable of receiving the typical railroad frequencies in the 160-161 MHz range. A good outside antenna and good feedline are also important unless you live very close to the railroad that you are primarily interested in monitoring.

Monitoring the Big Ones

I am lucky to have the mainline of the former Lehigh Valley Railroad (now the Lehigh line of CONRAIL) wind around the base of the hill on

Table 1: American Association of Railroads (AAR) Frequencies and Channel Numbers

Freq	Chan	Freq	Chan	Freq	Chan	Freq	Chan	Freq	Chan
158.810	02	160.440	22	160.740	42	161.040	62	161.340	82
159.930	03	160.455	23	160.755	43	161.055	63	161.355	83
160.050	04	160.470	24	160.770	44	161.070	64	161.370	84
160.185	05	160.485	25	160.785	45	161.085	65	161.385	85
160.200	06	160.500	26	160.800	46	161.100	66	161.400	86
160.215	07	160.515	27	160.815	47	161.115	67	161.415	87
160.230	08	160.530	28	160.830	48	161,130	68	161.430	88
160.245	09	160,545	29	160.845	49	161.145	69	161.445	89
160.260	10	160.560	30	160.860	50	161.160	70	161.460	90
160.275	11	160.575	31	160.875	51	161.175	71	161.475	91
160.290	12	160.590	32	160.890	52	161.190	72	161.490	92
160.305	13	160.605	33	160.905	53	161.205	73	161.505	93
160.320	14	160.620	34	160.920	54	161.220	74	161.520	94
160.335	15	160.635	35	160.935	55	161.235	75	161.535	95
160.350	16	160.650	36	160.950	56	161.250	76	161.550	96
160.365	17	160.665	37	160.965	57	161.265	77	161.565	97
160.380	18	160.680	38	160.980	58	161 280	78		
160.395	19	160.695	39	160.995	59	161.295	79		
160.410	20	160.710	40	161.010	60	161.310	80		
160.425	21	160.725	41	161.025	61	161.325	81		

which I live. This is a very busy single-track freight line handling many long trains per day of freight from the New York City area west and north to Allentown, Pennsylvania. After listening to their air horns night after night for nearly 10 years, it was a logical first place to start studying railroad communications.

Photo 1 was taken at a grade crossing about four miles from home. It shows a CONRAIL freight engine passing a pair of back-to-back block signals, and a communications equipment enclosure with two antennas supported on telephone poles. This is a typical remote communications installation for a major long-haul railroad. Such installations are spaced about 20 miles apart and are controlled remotely either by buried telephone lines or by point-to-point microwave.

Dispatchers many miles away can talk to individual trains by selecting these remote sites from their computer consoles. The dispatcher controlling particular this line is located about 60 miles away in Mount Laurel, New Jersey.

The communications enclosure in the photograph contains two radio transceivers: one on the Lehigh line "road" channel (161.07 MHz or F2) and the other on the system-wide CONRAIL maintenance-of-way/PBX channel (161.13T/R [F3] and 161.13T/160.71R [F4]).

A train passing within range of this installation that wants to talk to the dispatcher selects it by pushing two Touch-Tone® (DTMF) digits on the keypad in the locomotive. A few seconds later the connection is set up automatically and a 1 kHz "acknowledgement tone" is transmitted by the 161.07 MHz transmitter. (Occasionally the tones of a DTMF "speed dialer" are heard under the acknowledgement tone as the phone circuit to the dispatcher's console is established.) The dispatcher can then be heard answering.

At the end of the exchange the dispatcher clears the connection and the system resets. This system, typical of those in use with most large railroads, was established in order to minimize noise and confusion for the dispatcher. Only one train can be in communication with the dispatcher at any time.

The maintenance-of-way/PBX system works similarly. Normally, maintenance-of-way vehicles and crews operate on 161.13 MHz simplex between each other and with different vehicles. Maintenance headquarters can select specific trackside communications facilities to communicate with their work crews in remote areas. Using 12-key Touch-Tone® pad-equipped Motorola MT-1000 handie-talkies or the radios in the locomotives, any railroad employee can make a telephone call on F4. The base still transmits on 161.13 MHz, but the mobile unit now transmits on 160.71 MHz.

The base station uses VOX (voice operated keying) so that the base is only heard transmitting what comes over the telephone line (such as when the phone is ringing, someone is talking or there is some other sound, like a busy signal.)

The mobile side of the telephone call, unlike conventional mobile telephone systems, is not rebroadcast by the base station. This form of communications is called "half duplex," where only one side of the conversation talks at at a time, each on its own frequency. When the call is ended, the base transmits a three-tone sequence to indicate that the system has been reset.

Other major railroads use slightly different systems. Southern Pacific, for instance, makes more extensive use of PBX communications between trains and such facilities as towers, dispatchers, etc. In the Houston, TX, area I recently monitored two very active PBX chan-

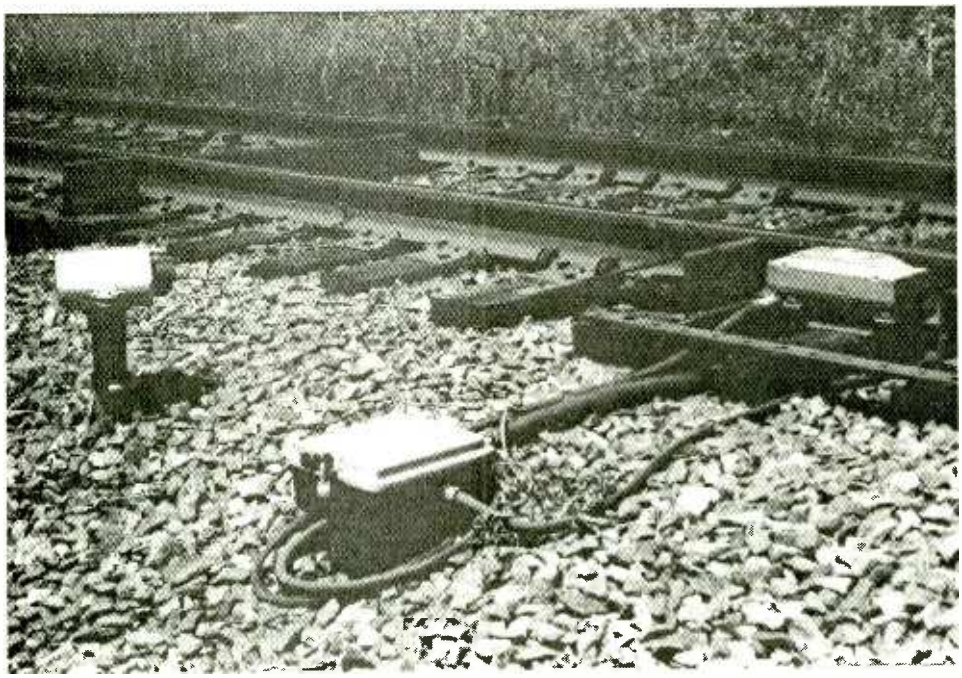


Photo 2

nels in use in the same area (160.80 and 160.95 MHz). "Full duplex" communications were in use, where both sides can be heard as in a conventional mobile telephone conversation. No "disconnect tones" were heard when calls were terminated on their system.

Railroads are authorized exclusive use of their frequencies in the areas in which they primarily operate, with some exceptions. This coordination service is provided by the American Association of Railroads (AAR). Thus CONRAIL uses 161.07, 161.13, 160.71 MHz and other frequencies systemwide, with alternatives used only when there is no way around interference conflicts with other railroads in a particular area. This exclusive use situation is one of the reasons that railroads do not generally use subaudible squelch keying systems (PL® or CTCSS) in order to minimize co-channel interference—the other reason being cost.

The size and complexity of today's giant, long-haul railroad systems (many of which were created by mergers of railroads that were already large), require communications flexibility. Trains routinely cross over from one system to another, creating a need for railroad radios that are capable of operating on any of the frequencies allocated to the Railroad Radio Service. Most locomotives today are equipped with AAR-compatible radios capable of operating on any transmit or receive frequency allocated to railroads.

Table 1 gives all of the allocated railroad frequencies and the AAR-designated channel numbers. Thus, a radio programmed to work on 161.07T/R is set to 64 64, while the same radio programmed to access the PBX on CONRAIL would be set to 40 68. The first number indicates the transmitting frequency. These channel settings, DTMF codes, place names, locations, etc., are found in books carried aboard the locomotives.

Automatic Inspectors

One of the most interesting parts of railroad communications is the use of telemetry. About every thirty miles, on CONRAIL lines, are placed automatic car inspectors (see photo 2). These tireless robots scan passing trains for two kinds of mechanical problems that could potentially cause major and/or expensive accidents if not corrected: hot boxes (overheated axle journal boxes without adequate lubrication), and dragging equipment. Either problem can cause derailments or the destruction of vital track equipment.

When a train passes, the equipment scans the journal boxes and waits for any dragging equipment. It also counts the number of axles of the train so that the correct location of a problem can be reported after the train passes. A few seconds after the train has cleared the detectors, the low-power UNIDEN transmitter inside the metal trackside enclosure is activated and a synthesized male voice announces the status of the train on the road channel along with its own location: CONRAIL. NESHANIC, NEW JERSEY. NO DEFECTS. TOTAL AXLE COUNT 548. OVER.

If trouble is detected, several different messages are possible: CONRAIL. NEW MARKET, NEW JERSEY. HOT BOX AXLE 24 RIGHT SIDE. (This message is then repeated.) Another type: CONRAIL. BELLE MEAD, NEW JERSEY. DRAGGING EQUIPMENT AXLE 71. (This message is repeated.)

Depending on the nature of the problem, a final warning message may be also transmitted at the end: INSPECT ENTIRE TRAIN. The train crew can then be heard acknowledging this information on the same channel. If there is a problem with the train, the dispatcher is automatically notified and the train crew can be subsequently heard talking with the dispatcher about resolving the problem.

Intrigued by this system, I dug a little deeper. How was the dispatcher automatically notified? Why was this system designed to talk directly with the passing train crew? The answers were very interesting.

First, the automatic car inspector transmissions are intended to be picked up both by the passing train crew (who obviously need to be alerted to a problem as soon as it is detected) and by the nearest trackside base station, which is equipped with dual CTCSS decoders. Because the train crew will be normally monitoring that frequency but the dispatcher will not, an alerting system for the dispatcher has been designed into the system.

The detector's transmissions are encoded with the CTCSS tone of 100.0 Hz if there are no defects and 155.0 Hz if there are defects. Either tone disables remote trackside transmitters within range so that this vital telemetry information does not get "stepped on" or blocked by error.

The defect tone (155.0 Hz is not a standard EIAA tone but probably can be decoded by using the adjacent standard 156.7 Hz tone) serves to alert the dispatcher of a problem at that site. The normal 100.0 Hz tone only alerts the dispatcher of a train passing the car inspector near that base station. The train crews repeat back the inspector's NO DEFECTS message along with the location and train number as a safeguard against inattention to these transmissions. Who knows if the dispatcher might not be listening?

With automatic car inspectors located so frequently along the main lines of major railroads, thousands of these installations must be active around the country. Other types of telemetry, such as "wide car" and "high car" detectors, are common in areas with tunnels and critical bridges with narrow clearances. Monitoring these devices with a scanner equipped to decode CTCSS tones, like the Bearcat 760XLT, can provide some interesting listening if a nearby train develops a problem, or if one simply wants to keep track of train movements without having to listen to all of the traffic on the channel.

Another way to use this telemetry is to determine the length of a train. An axle count below 20 indicates only a string of locomotives or a short work train. Since an average freight car has four axles and is about 40 feet long, the approximate length of a train can be found by

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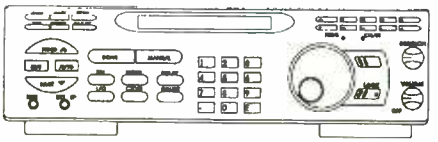
The new Bearcat 8500XLT gives you pure scanning satisfaction with amazing features like Turbo Scan. This lightning-fast technology featuring a triple conversion RF system, enables Uniden's best scanner to scan and search up to 100 channels per second. Because the frequency coverage is so large, a very fast scanning system is essential to keep up with the action. Other features include ***VFO Control*** - (Variable Frequency Oscillator) which allows you to adjust the large rotary tuner to select the desired frequency or channel. ***Counter Display*** - Lets you count and record each channel while scanning. ***Auto Store*** - Automatically stores all active frequencies within the specified bank(s). ***Auto Recording*** - This feature lets you record channel activity from the scanner onto a tape recorder. You can even get an optional ***CTCSS Tone Board*** (Continuous Tone Control Squelch System) which allows the squelch to be broken during scanning only when a correct CTCSS tone is received. ***20 banks*** - Each bank contains 25 channels, useful for storing similar frequencies in order to maintain faster scanning cycles. For maximum scanning enjoyment, order the following optional accessories: **PS001** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter $14.95; **PS002** DC power cord - enables permanent operation from your vehicle's fuse box $14.95; **MB001** Mobile mounting bracket $14.95; **BC005** CTCSS Tone Board $54.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached $19.95. The BC8500XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited warranty from Uniden. Order your BC8500XLT from Communications Electronics Inc. today.



CB/GMRS Radios

The Uniden GMR100 is a handheld GMRS UHF 2-way radio transceiver that has these eight frequencies installed: 462.550, 462.725, 462.5875, 462.6125, 462.6375, 462.675, 462.6625 and 462.6875 MHz. This one watt radio comes with flexible rubber antenna, rechargeable ni-cad battery, AC adapter/charger, belt clip, F.C.C. license application and more.

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Uniden PC76XL-H CB Mobile	$99.95
Uniden PC122XL-H SSB CB Mobile	$107.95
Uniden PRO510XL-H CB Mobile	$36.95
Uniden PRO520XL-H CB Mobile	$49.95
Uniden PRO538W-H CB & Weather	$69.95

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ICOM R7100-H base with 900 memory (add $49.00 shipping)	$1,289.95
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ICOM AH7000-H super wideband discone type antenna	$109.95
Grundig Satellit 700-H1 portable with 512 memory &AC adapt.	$389.95
Grundig Yacht Boy 400-H digital portable shortwave	$199.95
Grundig Yacht Boy 230-H portable shortwave	$139.95
Sangean ATS202-H ultra compact 20 memory shortwave	$79.95
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Sangean ATS606P-H shortwave with antenna & AC adapter	$169.95
Sangean ATS800-H1 portable 20 memory shortwave	$69.95
Sangean ATS803A-H portable with SSB reception & AC adapter	$159.95
Sangean ATS808-H portable 45 memory shortwave	$159.95
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ICOM GP22-H handheld global positioning system	$699.95
WR200-H weather radio with storm alert	$39.95
RELM WHS150-H VHF handheld 5 watt, 16 ch. transceiver	$339.95
RELM RH256NB-H VHF 25 watt synthesized transceiver	$289.95
Ranger RCI2950-H 25 watt 10 meter ham radio	$244.95
Ranger RCI2970-H 100 watt 10 meter ham radio	$369.95
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adding a 0 to the axle count. A train with an axle count of 640 is thus about 6400 feet long.

The communications system used by the automatic car inspectors can be viewed as telemetry, or "the remote transmission of data of non-human origin." Another interesting form of telemetry in use by railroads around the country is called the end-of-train marker. Over the years the railroad caboose has unfortunately disappeared from the end of American freight trains as a result of cost cutting. Apparently only two of the functions provided by the caboose were vital: presenting a rear-facing red light and monitoring the brake pressure at the end of the train.

These functions have been replaced by "markers," which are small boxes mounted on top of the coupler of the last car in the train. This box is connected to electrical power from the train and to the air brake line. It also has a blinking red light and a short whip antenna.

Periodically these boxes send digital "packets" (much like those used in ham radio) encoding the brake pressure. These packets are transmitted on 457.9375 MHz and are received and decoded by equipment in the locomotive cab. Markers are individualized by code numbers and this number has to be dialed into the cab receiver in order to pick up the correct transmission.

Here is a brief list of some of the major railroads licensed to operate on 457.9375 MHz:

Burlington Northern
Canadian Pacific
Southern Pacific
CSX Transportation
Illinois Central Gulf
Chicago & Northwestern
Central Vermont

(Other channels are also available for this type of telemetry. Check 452.9125, 452.9375 and 457.9125 MHz.)

Major railroads have more than one main line and therefore have more than one "road" frequency for communication between trains and dispatchers. In the CONRAIL system these channels are 160.80, 161.07, 160.86 and 160.98 MHz.

160.80 MHz was formerly a principal road channel. This was shared by AMTRAK trains when they operated on CONRAIL trackage. Because of the extreme congestion created, CONRAIL recently switched to 160.98 and AMTRAK switched to 160.92 MHz. In my area, 161.07 MHz serves the Lehigh line. From its terminal near New York City north to the yard at Selkirk, New York, is the River line, operating on 160.98 MHz.

Bibliography and Suggested Further Reading

Police Call - Edited by Gene Hughes. These excellent publications contain listings of railroads and their operating frequencies within each of nine regional editions. Available from Grove Enterprises.

Compendium of American Railroad Radio Frequencies - By Gary L. Sturm and Mark J.Landgraf. Another excellent resource devoted exclusively to railroad communications in the U.S. and Canada, including route maps. Available from Kalmbach Publishing, 800-533-6644 and Grove Enterprises.

Grove's 1993 FCC Database on Disk, *Version 3.2* - While not every transmitter you might hear is licensed and will appear in such a database (like the bulk of CONRAIL's), this computer-based information source contains information you will find nowhere else about railroads and just about everything else that's non-military or non-Federal government that you can hear on a scanner. Also available from Grove Enterprises.

Scanner Master Books, P.O.Box 428, Newton Highlands, MA 02161 - Write for their latest catalog of comprehensive frequency directories. These books typically contain a wealth of information not found in other directories, like CTCSS tones, 10-codes, operating areas and more.

In order to make sense out of much of what is communicated on railroad frequencies it is very helpful to figure out territorial and frequency distinctions in your area. In common with other many other major railroads, CONRAIL uses the road channel for communication between the train crews and the yardmaster. For in-yard switching operations, the other road channels not in service in that area are used for communication between switching crews and the yardmaster.

Security

The major railroads operate their own police forces who use separate frequencies within the 160-161 MHz segment. For CONRAIL, the principal dispatch channel in the New York City area is 160.68 MHz, with a powerful base station located on top of the World Trade Center. In the Philadelphia area the principal railroad police channel for CONRAIL is 160.56 MHz.

Most traffic concerns crime on railroad property, principally involving theft from freight cars stored in the yards. Frequency inversion scramblers are used on occasion. These are Selectone ST-25 Mobilecall® units that are described in Selectone's ads as being "digitally-controlled, high security modules that can be field programmed to provide over 4 billion code keys." (NOTE: The Electronics Communications Privacy Act prohibits the intentional monitoring of scrambled communications.)

While most of the activities of the railroad police are centered around high crime areas, they can show up anywhere and at any time. A recent derailment north of me brought out a contingent of CONRAIL police who did not bother to alert the local police of the situation! On another occasion, a train hailed the "CONRAIL police" on the road channel and was responded to instantly on the first call. The communication related to a near miss with a civilian who was trespassing on the railroad right of way. The police frequencies, like the others, are also used on a systemwide basis. Again, this communications format can be expected to be commonly used by major railroads around the country.

Monitoring AMTRAK

AMTRAK, which belongs to the National Rail Passenger Corporation, operates intercity passenger trains both over its own tracks between Washington, D.C. and Boston (the Northeast Corridor) and over tracks belonging to other major long-haul railroads around the country. Communications on AMTRAK are basically similar to those discussed in the first part of this article: systemwide road, maintenance-of-way and police channels are used as you would expect to find on any major railroad. As mentioned earlier, 160.92 MHz is now the main AMTRAK road channel.

All members of a train crew carry 5-channel Motorola handie talkies with this frequency set in F5. Communications include crewmember to crewmember, engineer to tower, engineer to dispatcher, engineer to station master, and even train to train. (On a trip to Washington, D.C. from Trenton, New Jersey, my AOR AR-33B receiver was tuned to this frequency. AMTRAK trains passing in opposite directions were heard to exchange "Looking good!")

AMTRAK trains utilize the dispatch frequencies of host railroads when operating outside of their own trackage. For example, AMTRAK trains operating on CSX tracks between Washington, D.C., and Chicago use CSX's road channel of 160.23 MHz for communications with CSX dispatchers. The 160.92 MHz channel appears to be used for in-train communications along all AMTRAK routes.

AMTRAK police use a repeater system for primary dispatch and operations purposes. These are generally located on high buildings in major cities along the AMTRAK routes. Output is 161.295 and input is on 160.365 MHz. Car-to-car police communications are on 160.815 MHz. Other AMTRAK frequencies can be found in the various books listed in the Bibliography. MT

CHILE

The Land of Crazy Geography

By Don Moore

In 1985 while traveling through South America, my wife and I crossed into Chile at the northernmost city of Arica, and as usual, one of our first stops was the local national tourism office. On one wall of the office was a long narrow poster with a cartoon map of Chile showing the different regions ranging from the desert of the north, the fertile valleys in the north-center, Alpine lakes and mountains of the south-center, and thick forests and glaciers of the south. The caption at the bottom read, "Chile - Geografia Loca," or "Chile - Crazy Geography." What better way to describe a country that is 2600 miles long, but averages only 100 miles wide?

Progressive and Prosperous

Since independence, Chile has been one of the most stable and progressive countries in Latin American. Democratically elected governments have been the norm in Chile and an influx of European immigrants in the late 1800s and early 1900s helped produce a strong middle class and further the country's economic development. Today Chile is the only Latin American country classified as developed, according to United Nations statistics.

Befitting Chile's advanced position in Latin America, in the early 1920s Chile became one of the first Latin American countries with radio broadcasting. The Chilean congress even briefly considered setting up a BBC-like public broadcasting monopoly before deciding to follow the U.S. model of private broadcasting.

Chile's strong economy and democratic traditions led to the establishment of a solid radio broadcasting industry. By the 1960s, several Chilean universities offered majors in broadcasting and journalism and Chile's mass-media education was considered a model for Latin America.

Instability and a Bloody Coup

Chilean politics took a fateful turn in 1970 when Socialist candidate Salvador Allende became president with a plurality of barely a third of the vote. Allende's Socialists had needed the support of Chile's small Communist Party for the crucial margin of victory and the two parties formed a unified governing front.

With Allende's victory, all aspects of politics and life became highly polarized between Allende's left on one side, and the centrist Christian Democrats and the Conservative Party on the other. The situation was made worse by the CIA, which in its determination to make Allende fall, played such dirty tricks as bribing union officials to arrange strikes and pumping the country with counterfeit currency to destablize the economy.

In 1971, Allende nationalized the country's major industries. This, combined with the general economic problems caused advertising revenues to bottom out at commercial radio stations across the country. Many failed and were sold; others sold part-ownership to avoid total bankruptcy. However, the only groups interested in buying stations in these economically troubled times were the political parties. The Socialists picked up 33, the Christian Democrats 29, and the Communists 28.

Other stations that remained in private hands likewise took political stances. Soon only ten of Chile's 156 stations were politically neutral and objective. Forty-four percent supported Allende and fifty percent supported the opposition. Supporters of each side harassed stations on the other by such means as cutting power lines.

During this period Chilean stations gave DXers a taste of Chile's political discord. Socialist station Radio Corporacion was an easy catch on 15150 kHz. Stations in 31 meters included Christian Democrat Radio President Balmaceda, 9590 kHz; and Socialist Radio Portales, 9570 kHz. Radio Mineria, still in private hands, was a voice of the Conservative party on 9750 kHz.

All through Allende's rule, starting before he had even taken office, there had been rumors that the military would take over. There had even been several small abortive uprisings by tiny groups in the military. However, on September 11, 1973, the military moved as a cohesive whole to take over the country quickly and completely.

The coup began in the early morning and by time Allende realized what was happening and hastily tried to speak to the country over radio, only the Communist Party's main station Radio Magallanes (1010 kHz MW) was on the air to broadcast his final speech. The army had closed down every other station in Santiago. Magallanes fought back for several hours before it, too, was silenced.

Fighting was intense in some places and Air Force planes were brought in to strafe and bomb the presidential palace. In early afternoon, as troops were storming the building in a final assault, Allende killed himself with his submachine gun.

Peaceful, democratic Chile had become the site of one of the bloodiest coups in Latin American history. Thousands of Chileans were killed in the fighting, and thousands more executed in massive death-squad detention camps in the days that followed. Many Allende supporters crowded into foreign embassies for safety and were eventually allowed to leave the country. Former staff members of Radio Magallanes moved to Moscow where they were given transmitter time for a special Radio Magallanes broadcast to Chile.

International Broadcasting

The new military dictatorship had a shortwave voice on 6150 kHz by afternoon of the coup day. Within a few days most of the former Chilean SW stations had returned to the air, but there had been a lot of changes in programming. For example, at one point former Socialist Radio Corporacion was noted relaying arch-conservative Radio Mineria. Many stations, however, were carrying a broadcast for foreign audiences called "Chile en el Mundo" (Chile in the World) explaining the reasons for the coup.

As it turned out, the generals had serious plans for international broadcasting and they had means to accomplish it. Just weeks before the coup, the USSR had shipped several 100 kW SW transmitters to Chile for a new Chilean external service. Allende never got to use them, but the dictatorship's "La Voz de Chile" was soon broadcasting in seven languages.

Ironically, Moscow's gift transmitters were also used to jam Spanish broadcasts from Radio Moscow and other East European stations, as well as Moscow's Radio Magallanes relays. At one point the generals even jammed Radio Sweden's Spanish broadcasts, finding the station too liberal for their liking.

Fortunately, few radio stations make DXers wait as long for a QSL card as La Voz de Chile

did. For several years the station answered almost none of their mail until 1979 they started cleaning out the files all at once. Some DXers received QSLs for reports that had been sent four or more years previously! But, the international service was not long to be.

The military government had become enamored with economic theories espoused by economists at the University of Chicago and turned control of the Chilean economy over to them. But the theories didn't work so well in real life, and soon the Chilean economy hit rock bottom and the economists were kicked out of the country. One of the casualties of the economic downturn was the international service, which closed in 1980. The so-called "Chicago Boys" have not been forgotten, however, as today Chileans tell University of Chicago economist jokes much the way people in North America tell ethnic jokes!

Perhaps because Chile had for so long been a stable and democratic country, few anticipated the strong dictatorship that followed Allende. Even most supporters of the coup expected the military to hold power only a few months and then hold elections, excluding the leftists. Few expected sixteen years of military rule. Finally, in December 1989, as freedom was returning to Eastern Europe, freedom also returned to Chile in the form of the first free elections since the coup.

Tired of military rule, the Socialists, Christian Democrats, and most of the liberal and moderate oppostion united under a moderate Christian Democratic candidate to defeat the conservative candidate sponsored by the military government. That brings us up to today's free and prosperous Chile, so let's take a look at Chile and its present-day shortwave stations region by region.

Driest Place on Earth

The northern third of Chile is the mineral-rich but bone-dry Atacama desert. It has a number of port cities and one main inland city, Calama, near the Chuquimata copper mine, which is the largest man-made hole in the world.

How dry is the Atacama? In Calama we asked a teenage girl if it had ever rained there. She thought for a few moments and then wittilly replied, "Yes ... I think about the year 1500."

In fact, in many parts of the Atacama no rain has been recorded since the arrival of the Spanish over 400 years ago, and geographical evidence indicates that there has been no rain for an even longer period. But, the Andes mountains with snow covered peaks and clear mountain lakes and streams are never more than 75 miles away, and the cities of the Atacama have water piped in from the mountains.

Radio Calama is a very irregular station on 6100 kHz.

The Atacama's endless drought, however, has made the region an archaelogist's paradise. Nothing left in the desert decays; it just dehydrates. The mountain Indians knew this and came down to the desert to bury their dead who were naturally mummified. This was thousands of years before the Egyptians discovered mummification, and the Atacama Indian bodies are much better preserved. The garbage and food waste the Indians left around the grave sites makes them even richer in historical importance. Near Calama is a world reknown archaeology museum filled with items from these ancient grave sites, including 11,000 year-old dehydrated human feces!

In Calama is a rarely heard shortwaver, Radio Calama on 6100 kHz. Through the late 1980s, SW was being used on Sundays only; it may or may not be still active. We arrived in Calama on the Wednesday morning preceding Easter, 1985. In the late afternoon I stopped by the station for a visit, but it was about to close down for the long holiday weekend so that the staff could all take a vacation to the coast. Everyone was busy trying to finish work by 6:00, and no one wanted to take time to talk to the gringo.

I returned to my hotel and tuned them in on MW. Sure enough, at 6:00 they signed off with a promise to return at 6:00 pm on Sunday night. They remained off the air the next three days until Sunday evening when they came back at 6:00 p.m. sharp. Unfortunately, we were leaving town early the next morning so I couldn't stop by for another visit. Now, if we could only get U.S. AM stations to take staff vacations like that ... think of how great MW DXing would be with the local stations off for three days!

The Central Valley

The heart of Chile is the Central Valley centering on Santiago, the capital. It is a land of major industrial cities such as Concepcion, Santiago, and Valparaiso and vast fruit and

vegetable farms. The Central Valley is also rich in minerals, and the Rancagua copper mine is the world's largest underground mine. Between Chuquicamata and Rancagua, every DXer's antenna system must contain some Chilean copper!

Chile's Central Valley is one of the world's major fruit growing regions and my wife and I were fortunate to be there during April, the southern hemisphere fall, as grapes and apples were abundant; countless varieties of both were available for around seven cents a pound. Somedays we would lunch in the park on rolls and three or four pounds of grapes. Cherries are said to be equally available in January.

In fact, much of the fresh fruit in North American supermarkets in late winter and spring comes from Chile. North American fruit growers have worked with their Chilean counterparts so that each take their seasonal turns at supplying the big U.S. consumer market. Unfortunately, the corporate leaders who decide what Americans eat, feel that Americans should have the same varieties of fruit available year 'round. So, rather than importing interesting Chilean types of grapes, apples, plums, etc, American ones have been introduced to Chilean fruit exporters. Having tasted Chile's own fruits, I can only say this standardization is a loss to the American palate.

With all those grapes, Chile is one of the world's top five wine exporting countries, and the largest one outside Europe. And, Chilean wines are good — at many "blind" competitions with wine experts, Chilean wines have beaten French, Italian, and German ones. Chileans claim that some of their wine is so good that the French import it and then rebottle it as French!

Radio in Santiago Today

Most of the stations of the Allende era are gone, although there is always hope that one of them might pull their shortwave transmitter out of mothballs someday. It is perhaps appropriate that the two most logged private Chilean stations today are named after the two mainstays of the Chilean economy: agriculture and mines.

Radio Agricultura, 9630 kHz, has affiliates in other parts of the country and focuses on news and programming of interest to Chile's farming community. Radio Mineria, the former conservative station on 9750 kHz, however, takes only its name from Chile's mining interests. The station has assumed a more moderate role since Allende's fall, and is today one of Chile's better sources of news.

Santiago's other shortwave station is Radio Nacional, which has continued to use the government's 100 kW shortwave transmitters of 15140 and 9550 kHz. All three of these stations

Radio Agricultura is targeted to the farming community in Chile.

are only irregularly active, so keeping current on DX news is necessary to catch them during a period of activity.

If you hear either Radio Nacional or Radio Agricultura, however, don't send your reception reports to the stations. Instead, send them to Carlos Toledo Verdugo at Casilla 296, San Fernando, VI Region, Chile. Carlos is the best known DXer in Chile and a collaborator with the *World Radio TV Handbook*. These two stations have appointed him their official QSL secretary to make sure that QSLing gets done right. A school teacher, Carlos once spent six months on an educational exchange program in Ashland, Wisconsin, so English reports are fine. However, be sure to include two IRCs or one U.S. dollar for return postage.

Carlos also runs the shortwave listening interest group in FEDERACHI, the Chilean association of radio amateurs. FEDERACHI has been very supportive in promoting shortwave listening around Chile, and the interest group has members throughout the country. In fact, FEDERACHI could serve as a role model for other radio amateur organizations around the world when it comes to treating shortwave listening seriously.

About 400 miles south of Santiago is Temuco, in the heart of what once was the Mapuche, or Araucanian, Indian empire. When the Spanish attempted to conquer this part of Chile, the Araucanians fought back hard. At one point they wiped out an entire settlement, including Chile's Spanish founder, Pedro de Valdivia. The Spanish learned to give the Araucanians a wide berth, and there was hole in their settlement between the cities of Concepcion and Valdivia where the Indians lived.

This pattern of co-existence continued until the 1870s when a French adventurer gained acceptance among the Araucanians and made himself their king. There was talk that France might make the region a protectorate, so Chile raised a massive army and marched in to subdue the Araucanians once and for all.

Today, Temuco is home to Chile's newest shortwave broadcaster, Evangelical station Radio Esperanza on 6088 kHz. Radio Esperanza is sometimes on the air 24 hours, especially weekends, so the early morning around 0700-0900 is a good time to check for this station. They have been widely heard despite using only 500 watts, and a new 6000 watt transmitter, which was to have been installed in early 1993, should make reception even easier. Station director American Ray Woerner has been a missionary in Chile for over thirty years, so English reports are fine on this one, too!

Between Temuco and Puerto Montt is Chile's lake country, a playground of deep blue lakes, clear mountain streams, pine forests, and snow topped mountains. This region is sometimes called Chile's Switzerland, and is an outdoor lover's paradise. Tourists from within Chile and dozens of foreign countries go here for fishing, skiing, hiking, camping, and just enjoying Mother Nature. It is truly one of the more beautiful areas on earth.

While Santiago is as far south as Atlanta is north, Puerto Montt is the southerly equivalent of Cleveland. Although the nearby ocean does moderate things a bit, central Chile has all four seasons, including winter. We don't often think of snow storms hitting South American cities, but much of Chile is that far south. Even Santiago gets snow on occasion. (But then, so does Atlanta.)

Land of Glaciers

The southern third of Chile, below Puerto Montt, is a sparsely populated archipelago of thickly forested islands, treacherous glacier-covered mountains, and deep coastal fjords, similar to the Norwegian coast or the Alaskan panhandle. There are two main population centers in this region. One is Punta Arenas on the Straits of Magellan, the southernmost city, with a population of 100,000, in the world. The other, further north, is Coyhaique and its port of Puerto Aysen.

In a region as remote as this, one would expect to find shortwave, and indeed, Coyhaique has two shortwave stations: Radio Patagonia Chilena on 6080, and Radio Santa Maria on 6030 kHz. Of course, small stations on 49 meters are always at the mercy of larger power stations, and while there have been times when these stations were in the open and easily received in North America, more often they are blocked by international broadcasters. But every once in a while as the big broadcasters shift their schedules, an open window on one of the frequencies will appear in the early morning around 1000 UTC and the station will be heard for a few months.

In the cold, wind-swept mountains of southern Chile, just a stone's throw from Antarctica, we come to the end of our radio journey. With its interesting culture and strong economy, Chile should remain a DX target for years to come, from one end of its crazy geography to the other! MT

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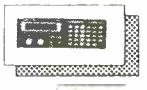

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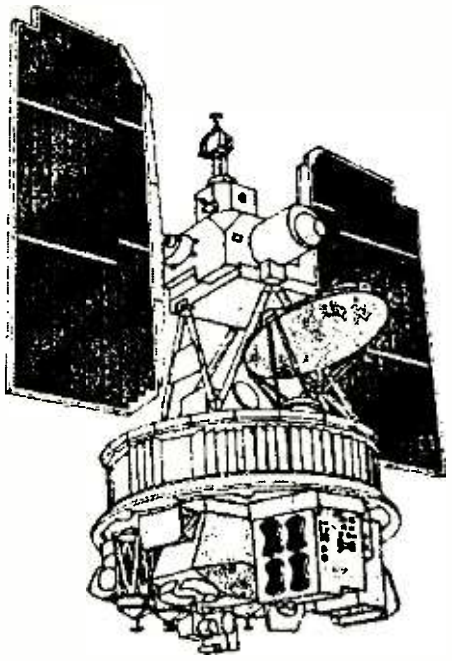


The Secret of Nimbus

By Theo Pappan

IT was a typical last day of May in Michigan, hot and dry with a cold rain forecast for later in the day to be followed by high winds and uncertain weather. It was almost 4:30 pm when Thomas entered my flat. He seemed a little hesitant to talk but I felt there was something he wanted to mention.

"Out with it!" I urged him, "You've heard something haven't you?".

He hemmed and hawed a bit and then admitted that he had heard a signal but had put off reporting it because he wasn't sure of what it was.

"But isn't that why we report these things? So we can figure out what they are?" He agreed and then said that he had copied a signal from 18:25:41 to 18:42:20 on 136.504 MHz. "We're talking GMT, right?" I looked warily at him.

"Of course," he shot back. "Do I look like a dolt? I know you can't refer to something that isn't on the Earth but in space above it using a time zone picked at random on the Earth. Nobody would know which of the 70 time zones you would be talking about!" He looked more smug than offended.

"Anything special about it? How did it sound?" I asked.

"Weak, but I'm pretty sure there were multiplexed data signals 3 or 4 kHz above and below the center carrier frequency."

"Good! Now you're talking," I said. "That's something we can look for again." It was 19:25 now and if that satellite was in a typical LEO (Low Earth Orbit) it would be around again in 90-113 minutes from its last pass. That would mean an AoS (Arrival of Signal) somewhere between 19:55 and 20:18. We passed the time talking about what it sounded like and if it had good "down Doppler," meaning its frequency seemed to go down with time in a nice steady fashion. Doppler shift, or the apparent change in the transmitter's frequency, is the best way to identify a satellite transmission from all the ground stations and even aircraft signals heard.

Both of us were listening to the ICOM R-7000, hardly speaking, when suddenly out of the background noise came the steady but weak signal typical of so many satellites. It was 20:11:10 (GMT) right in the window of possibility. As the signal grew stronger I tuned up from the main carrier looking for another signal associated with it. There was one 5 kHz up and there was data on the signal. I tuned down past the unmodulated center carrier and 5 kHz below was another identical data channel. I tried again to see if I could find yet another signal further above or below than 5 kHz, but the signal was weak and at 20:26:00 the satellite went "over the hill" and was gone.

"Was that it? Did it sound like the same satellite?" I inquired. "That was it," he replied confidently. "Sounded exactly like the one I heard before. No doubt about it."

"OK, Thomas," I said. "You have a real one here, but I can't be sure of the signal characteristics yet. Did you hear more than one set of subcarriers above or below?"

"No," he replied, "but I sure am glad you heard it too. Do you know what it is?"

"It's a little too early for that just now. I have heard the ± 5 kHz signals before. It's common enough, but this pass was short and weak and I can't be sure if there are more signals multiplexed on top of what we heard. When can we expect to hear it again?"

The lad opened his note/logbook and began scribbling. "Well, let's see. I take the mid point between the first AoS and LoS (Loss of Signal) which were 18:25:41 and 18:42:20 so that would be 18:34. And for the second pass it would be 20:18:35."

"Right," I said. "We use the mid point instead of either the AoS or LoS to cut any possible error in half. Now what is the interval between those passes?"

"That would be 1 hour and 45 minutes or 105 minutes," Thomas shot back.

"And what does that tell us?" I probed.

"Well, that it's a LEO and it's up there pretty far and not likely to come down soon," he responded.

"And how do you know that?" I pushed further.

"It's got a Mean Motion of 13.67 and that means ...".

"Wait a minute," I interrupted. "How do you know that?"

"Easy," he laughed back, "I divided 1436, which is the number of minutes in a solar day, by the period 105 minutes. 1436 ÷ 105 = 13.67 on my handy dandy little calculator." He opened his logbook and pointed to a chart. "Besides, it says so on this chart you gave me." *[see figure 1]*

"OK," I smiled. "What is Mean Motion anyway?"

His voice took on the tone of an advanced student who resented being quizzed on such simple stuff. "That's the number of orbits around the Earth it makes in a day." He was right, of course. Most Earth satellites go around our planet 13-16 times a day. If they have a Mean Motion of more than 16 they are going to reenter in the near future. If the MM is more than 16.3: duck, it's coming down now!

A satellite with a mean motion of 15 will stay up there for several months. One with a MM of 14 will stay up many years. *[see figure 2]* The smaller the MM, the higher the orbit is above the Earth. When the MM gets to 1, it means the satellite orbits the Earth once a day, and since

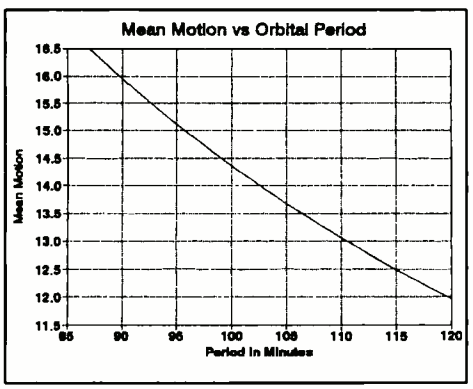


Figure 1

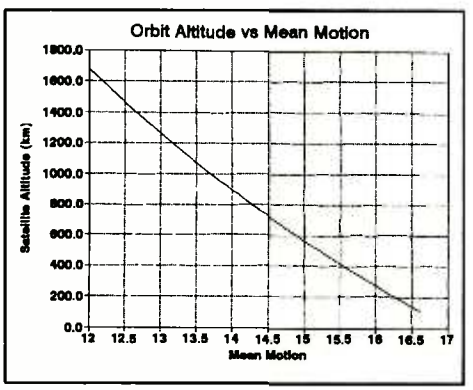


Figure 2

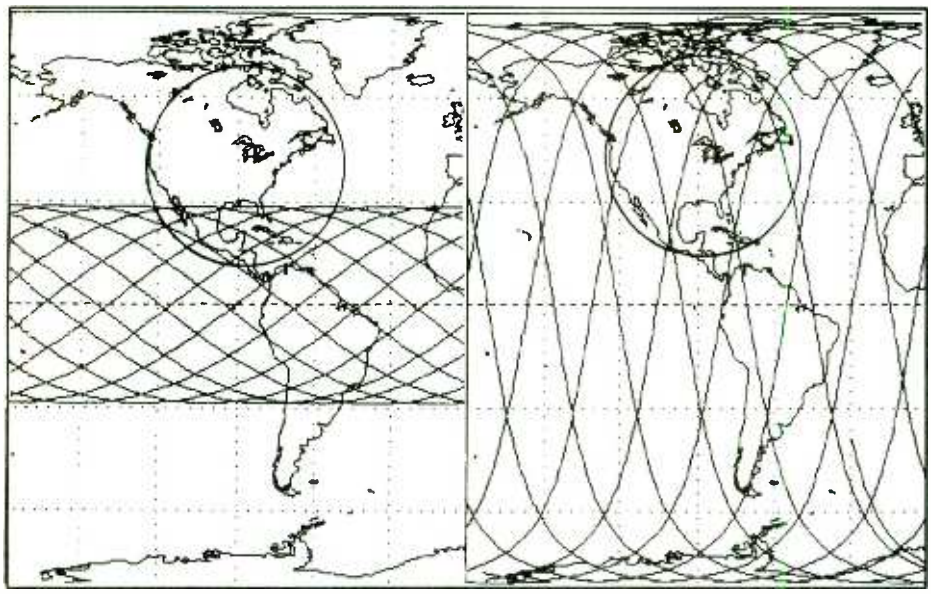


Figure 3a: Polar (90°)

Figure 3b: 28°

the Earth rotates once a day, it seems to hang motionless over some point on the equator.

We waited another hour and a half and then some but the signal did not return. Thomas got up to leave. "Shall we project the period and make a prediction as to when we should hear it again?" I inquired. "No, I can do that and I have to be going now."

It was a typical blustery day in June before Thomas appeared again. As he came up the steps, I could see that he was clutching his notebook, "Well, tell me, what news do you have about our mysterious friend in the night sky?"

He opened his logbook and scanned thru the pages of recorded observations. "I've copied it several times." He pointed out dates, AoS/LoS times, and notes describing the signals he had heard: whether they were strong or weak, had "up" or "down Doppler," had subcarriers and how far above and below the center carrier, if it carried any data, and if the signal fluctuated or changed strangely. Most of his loggings were only one pass a day, but in recent days he had recorded three passes a day about an hour and 45 minutes apart.

"Oh, by the way, when I started getting more and better timings, those initial times of 105 minutes became 107 minutes. But for some reason, some of the times don't coincide with the period of 107 minutes between orbits." He pointed at one and then another, "The times aren't right. This one is only 86 minutes from the previous pass and this one is almost two hours."

"What does that tell us?" I inquired. He looked at the book in his hands for a while and then a smile crossed his face and he turned to me "It's not the same satellite!"

"That's right," I said. "It's another one on the same frequency that you just happened to catch. Don't forget, there are hundreds of them up there." Using multiples of the 107 minute period, it was a simple task to eliminate three intercepts that didn't fit the orbit.

"So we have two polar satellites that just happen to be in the sky and are transmitting on the same frequency when were listening," Thomas summed up.

"What makes you think they're polar satellites?" I asked simply.

"I just assumed...," his voice trailed off as he realized he had taken an untenable position. Then he thought of something. "You can't tell if they are polar or not just by listening to them. You have to figure out what satellite it is first and then you can find its orbit."

I shook my head and fired up the computer. "Wrong. You not only can determine the orbit of a satellite, its inclination and altitude simply from listening to it, but you must determine its orbit before you can deduce which satellite it is. Look here, I've printed out the sub satellite ground tracks for two typical satellites. One a polar and the other a satellite that has an inclination of only 28½°." *[see figure 3]*

"As you can see I have made the plot for an entire 24 hour day. Here, let's draw a circle around our location to show our area of reception. Now let's look at those portions of each orbit that pass through our radio range. Do you see any pattern?" He looked at the curves of the orbital ground track that ran thru all of the circle in one case and only through the bottom of the circle in the other. "I don't see...," he was shaking his head.

"Look, here," I said. "I've listed the passes for each of these two hypothetical cases." *[see figure 4]* "Do you see a pattern in the printouts?" He looked at the times for each of the passes.

"Yes, I see now," he mused. "The polar makes six passes in range each day and the other one only makes four passes we can copy."

28½° Satellite			Polar (90°) satellite		
Time sat in range	pass dur	time since last pass	Time sat in range	pass dur	time since last pass
AoS 07:24			AoS 06:33		
LoS 07:31	7	(=19h)	LoS 06:46	13	(=10½h)
AoS 09:04			AoS 08:13		
LoS 09:14	10	1h41m	LoS 08:28	15	1h41m
AoS 10:46			AoS 09:56		
LoS 10:55	9	1h41m	LoS 10:05	09	1h40m
AoS 12:28			AoS 16:24		
LoS 12:35	7	1h41m	LoS 16:33	09	(=6½h)
			AoS 18:01		
			LoS 18:16	15	1h40m
			AoS 19:43		
			LoS 19:56	13	1h41m

Figure 4

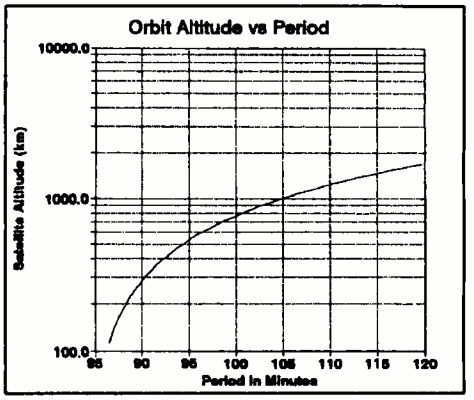


Figure 5

"Yes, but that's not all." I pointed at the printout, "Notice that the low inclination satellite makes four passes about 1h 45m apart every 24 hours. While the polar bird makes three passes about 1h 40m apart and then makes another three passes about 10 hours later. A total of two sets of three passes each every 24 hours. The low inclination satellite we hear only one time of the day over a period of 4-5 orbits, but the polar makes three passes during the day and three at night."

He nodded his head, having seen the difference. "So if we copy it three passes at a time in groups separated by half a day, it's a polar. And if we only copy it once a day but for four or five passes, then it's a low inclination satellite."

"Right," I agreed. "Except for one thing. If it's a polar and has dead batteries it may not transmit in one of those 12 hour spans because it's in solar eclipse, in the Earth's shadow, and won't have enough power from its solar cells to operate the transmitter." He began to look lost again.

I continued, "You will always be able to tell if it's a low inclination sat because you can copy it for 4-5 passes instead of the three for a polar. It may vary depending on your latitude or distance from the equator and the satellite's inclination."

"I'm with you now," he smiled with a look of understanding.

"Great!" I said. "Then what is this mystery satellite?" Confidently he quickly said "It's a polar," and without waiting for me to ask, continued "...because the passes come in groups of three, never more."

"I see your intercepts are always in the evening. Have you copied it during morning or midday?"

"Well no, I am at the beck and call of my boss Mr. Scrooge, as you know, during the day. But...," he continued, "I know it's a polar anyway from only three passes being heard."

"Sounds to me like you know what satellite it is then." I sat back and the cat immediately took possession of my lap.

His face took on a puzzled look. "We can't tell what satellite this is from the thousands up there with only the information we have now," he asserted, then added hesitantly, "Can we?"

"You already have the answer. All you need do is ascertain the correct name." The cat purred contentedly.

"What do you mean? We don't know anything about this gadget!" His hands waved the logbook and his papers wildly in the air.

"Quite the contrary; you know everything." I replaced the cat with a pad of paper. "What is the Mean Motion?"

"13.4 based on the new period of 107 minutes," he shot back. "That means if it's in a circular orbit—and for the moment we will assume it is—then it's at an altitude of..." He quickly opened his notebook and consulted a chart *[see figure 5]*. "1,100 km for 107 minutes."

"Right. Now, what is it's inclination?"

"Well, it could be almost anything. Satellites can be launched at any inclination."

"Yes," I agreed, "They can be, but in the real world satellites are put up there to do a specific job. Their mission and possible launch site determines what inclination they will use. There are an infinite possible number of inclinations, but less than a dozen are normally seen. Here, look at this computer plot." I sifted thru a pile of printouts and handed him one. *[see figure 6]* "This is a plot of the inclination for every transmitting communication satellite ever launched into orbit. Notice anything?"

He scanned the page and shook his head. "They're not all over the place. They're grouped into just a few places."

"Precisely. Notice that besides the Geosynchronous sats at 0°, there are several at 28½°. Those are all the birds flown out of Cape Canaveral because that's the latitude at the Cape: 28½°. Next notice the group at 51.6°; that's all the manned spacecraft from the Russian space program, because the CIS spaceport is at Baikonur and it's at 51.6 North. Then there are groups at 57°, 62°, 65°, 74°, 82.6° and 99°. This being the case, what is the inclination of our mystery satellite?"

"Well, actually," he reflected, "it could be anything between 82° and 99°, based on what's normally used for an orbit."

I smiled, the kid was catching on. "Precisely!" I exclaimed. "So we have a satellite at 1,100 km, at an inclination of about 82°-99° transmitting on 136.5 MHz. Now, what satellites fit that description?"

"Hundreds, maybe thousands!" he threw up his arms,

"Don't be too sure," I muttered and fired up the computer. "Here, call in to the CNESS BBS (517-743-5077) and find out what is known to be transmitting on that freq." I turned the keyboard over to him and in a few minutes the database on the BBS had responded with a list of known satellites using that frequency. *[see figure 7]*

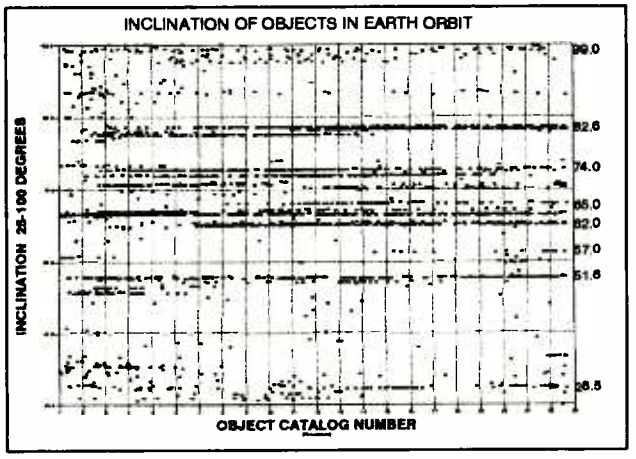
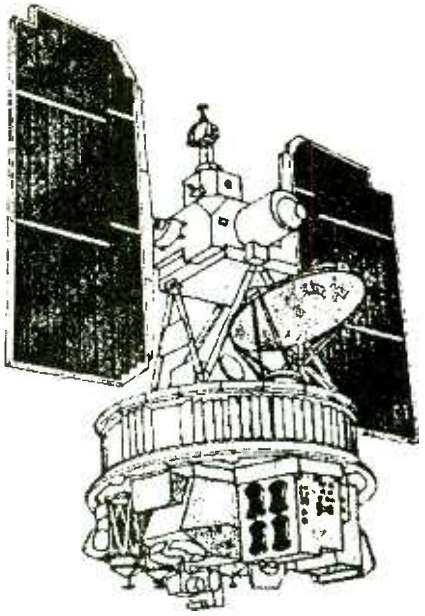


Figure 6

Searching for: 136.5

I.N.D.	Cat #	Common Name
1961 Omicron 002	117	Injun 1 Greb 3 SolRad 3
1962 Beta Tau 2	504	Injun 3
1966 110A	2605	ATS 1
1967 031A	2763	ATS 2
1967 111A	3029	ATS 3
1968 068A	3344	ATS 4
1969 037A	3890	Nimbus 3
1970 025A	4362	Nimbus 4
1972 097A	6305	Nimbus 5
1975 052A	7924	Nimbus 6

Figure 7



Nimbus 4, *the satellite that won't quit. Placed in orbit in 1970 and still transmitting 23 years later!*

I looked over his shoulder at the printout. "Looks like your hundreds turned into 10. As a matter of fact, make that six. Those four ATS birds are not up for consideration."

He turned and looked closer at the printout. "Why is that? The database has them listed as having transmitted on that frequency."

I leaned back and looked around for the cat, "Maybe so, but they're in Geosynchronous orbit, this is a LEO bird." He crossed them off the list.

"That leaves six possibles. Do you mean we have narrowed it down to only six satellites out of umpteen thousand just by taking timings on the transmissions and doing a little simple deduction? Can it really be one of these six?"

I smiled. "What are those catalog numbers? Let's look up the TLEs for them and put them in the computer. Then we can run a predict on all six for the dates and times of your observations and see which one matches."

A few minutes later we had located the most recent element sets in the mountains of printouts and typed them into a satellite tracking program. I went in search of my missing cat while Thomas printed out passes for the six satellites for the times he had heard them. I found my stupid cat sitting in front of her empty food dish, staring at it. "You think food will appear if you just sit there and look at it?" I reached for the bag of cat chow and poured some into the plastic bowl. "I guess you're not so stupid after all."

I returned to the computer room. Thomas didn't even look up as I entered. "1970 025A," he simply stated.

"You sure?" I asked taking a seat.

"No doubt about it. Every AoS/LoS time matches within a minute and none of the others come close. Nimbus 4 is what we have been hearing."

"Ah yes, Nimbus 4. That was an early polar weather satellite launched out of Vandenberg on April 8th, 1970, into a 99.9° orbit with a Long Tank Thrust-Augmented Thor booster and an Agena D upper stage. Sits up there in an almost perfect 1100 km circular orbit. Interesting thing about that mission. Sometime around the middle of October to the first part of November that year something let go in a terrific explosion. Probably the propellant tank had some fuel left over in it and exploded, adding over 370 pieces of debris in a cloud around Nimbus. It's been 23 years since we put that thing up. It was only expected to last 3-5 years and it's still trying to send back data to Earth. Pretty amazing, isn't it?"

Thomas turned and looked at me. "What's amazing is that we were able to identify this satellite by just listening to some weak signals on my radio. Is it really that simple?"

I leaned back in my chair and up jumped the cat. "Yes, it's just that simple..." Thomas got up and collected his papers into his log book.

"Well, I guess that wraps up another case for the record books!"

"Except for one thing," I added.

He hesitated as he was about to walk out the door, "Oh? What's that?"

I petted the now sleeping cat. "You heard another spacecraft on 136.5 that didn't fit this orbit didn't you? If that one wasn't Nimbus, what was it?" MT

AUTHOR'S NOTE: If you want to try tracking satellites by radio, check into our BBS. Use the databases online to help find your mystery bird. If you don't have a computer and a modem, give Theo a phone call and he will make a search of the computer and tell you what it finds. Call him with your observations any day, noon to 10pm at 517-743-5779 or fax it to 517-743-5077.

A Shortwave Listener's Paradise!

The RCI Monitoring Station

By Jacques d'Avignon

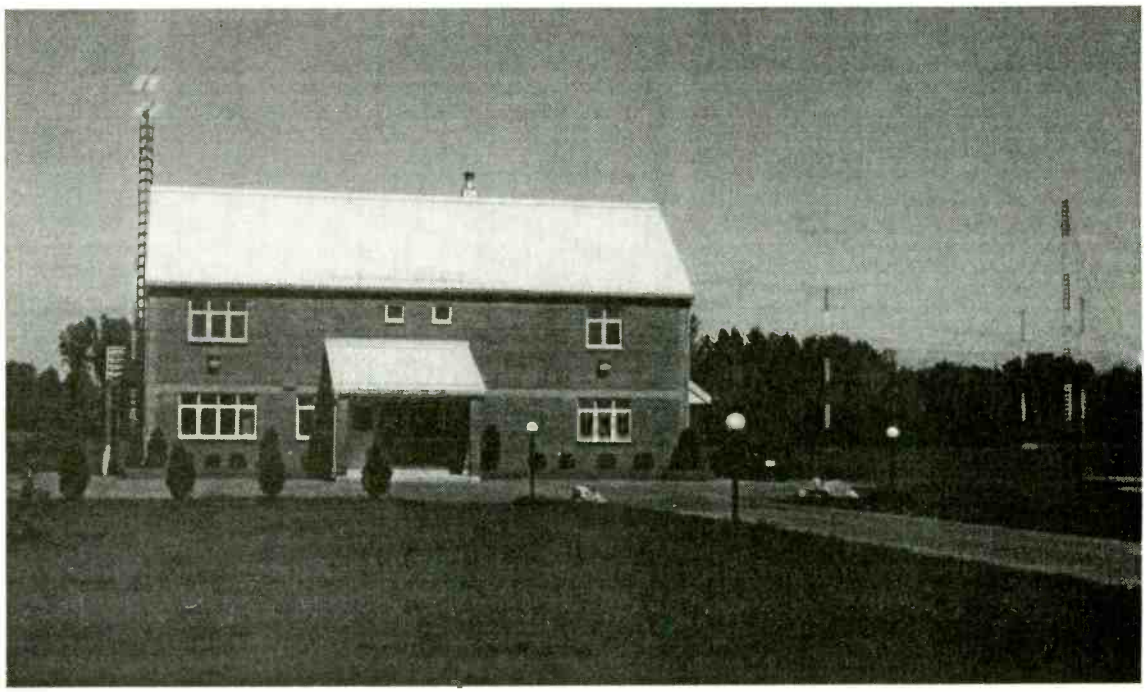
A few miles to the northwest of Ottawa, in Carp, Ontario, in a beautiful rural setting, sits a superb DX site where employees are actually being paid to listen to shortwave transmissions! When you read the list of equipment available to six operators and one supervisor who take turns at the station 24 hours per day, (16 hours on weekends), you will realize that this a DXer's dream!

This station has been operated by Radio Canada International (RCI) since the latter part of the 1930's. The original monitoring site was located in the suburbs of Ottawa. I made my first visit in 1951, to satisfy a desire to see what a professional monitoring station really looked like. The setting was pastoral and part of the antennae farm consisted of two big rhombics with 600 ohms open line feed.

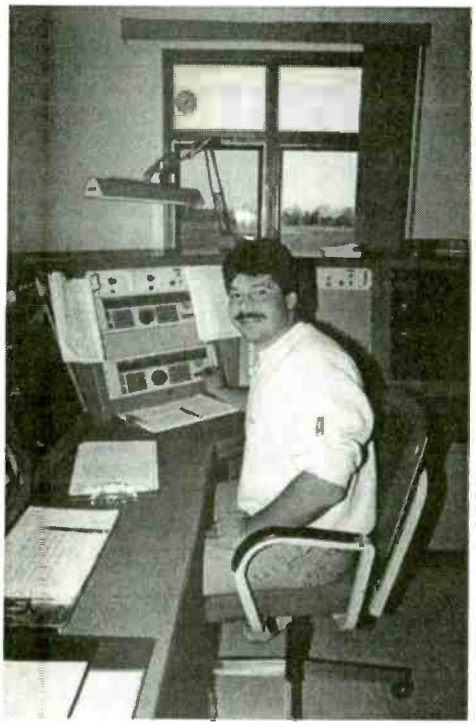
As the city slowly encroached on the suburbs and the noise level increased, (there is now a shopping centre across from the old Britannia Heights station), the monitoring facilities were moved to a less noisy environment.

This second location was not quiet for long! A hydro company was to erect a 200,000 V line not too far from the antennae site. Needless to say, the monitoring operation had to move again to a quieter location.

At Carp, the noise level is very acceptable and chances are that a new high voltage line will not be built in this area in the foreseeable future. The building resembles a single family dwelling, which could house a large family, and except for the antennae farm, it blends right in with the surroundings. When the time comes to cut the grass, you have to hop on the tractor and spend one week cutting while slapping the mosquitoes and the black flies off your neck! Not all the site is lawn, thankfully: only where the antennae are located. The rest of the property is wooded and is essentially a buffer zone between the station and possible noise sources.



Monitoring station building, fit for a large family.



The operator on duty the day I visited the station, Michel Parent, using two of the RACAL receivers at the station.

Functions

Carp station monitors the various shortwave broadcasts directed to North America. Every week a report is sent to over two dozen broadcasters around the world on the quality of their broadcasts to this continent. Most broadcasters reciprocate with RCI in supplying quality reports. In addition, the Carp station monitors the transmissions from the RCI transmitters to ensure that the signals transmitted from the Sackville site are of top quality.

A continuous band survey is conducted of all the broadcast bands available to the international broadcasters. The results of these surveys are made available to all international users and are invaluable for frequency management. The band survey normally takes five weeks before it starts over. Approximately 100 channels per band are monitored for signal quality and strength.

Foreign broadcasts in various languages are picked up and transmitted by landline or recorded on site to be sent later to the Montreal and/or Toronto newsrooms. For many years, when the BBC news was broadcast by the CBC national network across Canada, the feed came from the Carp site. Also for many years — no one really remembers when it began — the RCI Monitoring station provided a direct feed of the BBC programs to the British High Commissioner's office (British Embassy in Ottawa).

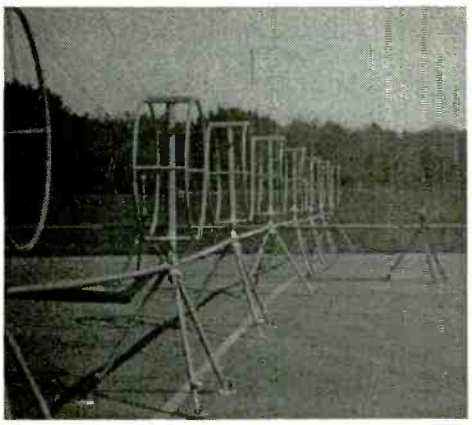
An unusual function of this station in the current era of satellite feeds, is to act as back up feed for broadcasters that use Sackville as a relay site for their transmissions. The day that I visited the station, a satellite feed did not function properly from an overseas broadcaster. The Carp station picked up the program off the air and sent it to Sackville on a broadband circuit for transmission on the RCI transmitters! Who says that SW is dead?!

In addition, the station is equipped to do field strength measurement for other broadcasters and various other types of measurements as required, and to make tape recordings and strip chart recordings of the received signals.

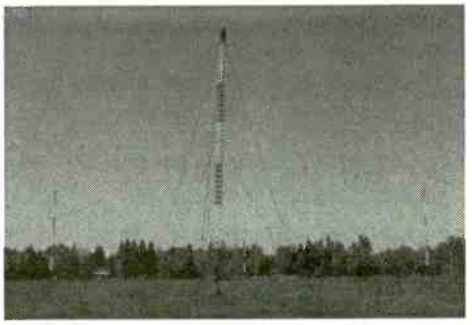
Equipment

Now for the goodies. The antenna farm consists of the following:

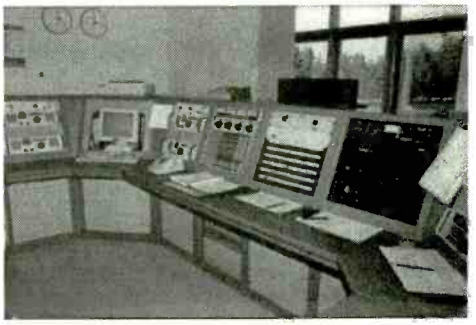
- Two vertical all band reference antennae approximately 25 feet high. Until you see the manual for these antennae you think that they are simply a piece of tubing. They are not! They are designed with various circuits inside and a



A view of one of the aperiodic loop array. Eight inline loops form an array.



Reference antenna. Even the position of the guy wire insulators is critical and is discussed in the installation manual.



Main operation room. The computer in the background controls the various receivers in this room.

specific gain curve is drawn for each. This same antenna design is used by most monitoring stations around the world so that all measurements can be compared on an equal basis.

- A large three wire terminated rhombic pointed to Europe: 055 degrees.
- A 4-30 MHz horizontal log periodic, also pointed to Europe.
- An omnidirectional vertical rosette of log periodic arrays operating on 3.5-30 MHz.
- Finally two rosettes of reversible aperiodic loops covering 2-32 MHz. These arrays point in the following directions: 055/235, 090/270 and 165/345 degrees.

View of one of the curtains on the vertical log periodic antenna.

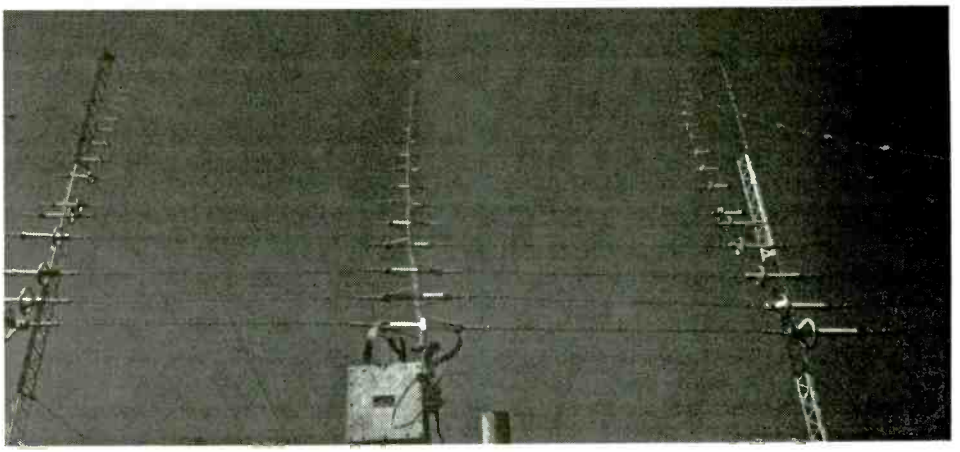
All these antennae are fed with underground 50 ohms heliax. All the feeders terminate at an antenna multicoupler rack, so that any receiver in the station can be fed from any of the antennae on the site and more than one receiver can be fed from the same antenna. (And we are always looking for a way of getting our small RG-58 into the shack!)

Now for the "pièce de résistance": the station is equipped with 20—yes twenty—Racal receivers consisting of RA-117, RA-6790 and RA-3701. Some of the latest models are computer controlled so that the frequency and the time of the feed can be programmed in the schedule and the receivers will know exactly what frequency to tune to and at what time to change frequencies. It is still necessary for the operator to decide whether the signal is of broadcast quality and possibly override the computer and manually make any changes, if necessary, to obtain the desired quality.

Because of the large space between antennae, it is possible to use space diversity on the same site, but I was told that this is now an infrequent practice due to the strength of the received signal. Obviously, it would be possible to combine space, polarization and frequency diversity reception on the same site, since the receivers and antennae are available for this type of operation.

During my visit I was shepherded around the station by the manager, Denis Casey, and around the antennae farm by Lloyd Thomas. Michel Parent was the operator on duty that day and all were very helpful with their explanations and comments. Denis has been at the monitoring site for the past 37 years. Can you imagine 37 years of listening to shortwave as your *job*? I must have missed my calling somewhere along the line. Thank you to all three for your patience and your invaluable help.

P.S. Our family recently moved to Kingston, Ontario, and after visiting Carp, my first priority was to find 50 acres of land with no noise. My wife Michelle and the children had other priorities! Before we made an offer on the house we have now purchased, however, I roamed the area with a portable shortwave receiver. I am glad to report the property is relatively clean of RFI: First priority satisfied! MT



Would you like one of these in your backyard? The supporting towers of this horizontal log periodic pointed to Europe are 75 ft. high.

On January 17th, an earthquake struck California. But then, something's always striking California. Unfortunate — but nothing to do with someone minding their own business in Idaho, right? After you read the following account, you may want to go check your battery supply.

Repercussions From the California QUAKE

By E. R. Haroldsen

No one thought that an earthquake in California could have a significant and immediate impact on someone living a thousand miles away, in eastern Idaho. We were wrong.

The first clue I had that something was happening was when the electrical power blinked off at 5:31 am Mountain Time. This was nothing to get excited about, so I wasn't in a hurry to turn on the portable radio to see what the local FM stations had to say.

When I did, I found that none of the ten FM stations in our area were working. The air waves were dead silent. Weird.

Brian Webb

You may not have an actual fissure like this one in the ground where you live, but an earthquake's reach can still affect you.

I switched to AM and found all stations in our area of the state were off. Obviously, this loss of electrical power was big.

Next I checked the 2 meter amateur band. Of the eight repeaters in our area, only one was working on battery emergency power (X7ENE). All others were silent.

Despite the early hour, the amateurs were already on the air, reporting conditions from their areas and relaying what information they had gathered. They also reported the frequencies they were using on the 40 meter band to get national information. That's when I learned about the earthquake.

I turned on the Sangree, with the 110 foot Windham antenna (modified dipole), and tuned to the nearest large AM station, KSL 1160 in Salt Lake City, Utah. Utah had electricity and KSL was getting reports from people in Idaho about the power outage. Some of these were announcers from commercial radio stations that couldn't get on the air. It didn't take long to learn that electrical power was out for western Wyoming, western Montana, parts of Washington, and eastern Idaho. This really was big!

I scanned the local police and city utilities frequencies. There was little to learn. Except for a police response to a woman who thought she heard someone downstairs, little was happening.

With little faith in finding anything, I turned on the 12 volt television at about 6:30 am. All four television stations were broadcasting. However, their transmissions were limited to network news. This was because the stations are located in town, but the transmitters are located on mountain tops, 30 miles away. These transmitters had their own emergency power but the stations couldn't get their local signal to the transmitter. The only signal the transmitters could put out was the direct network feed.

My children were elated when it became obvious that there would be no school. We gathered and watched live events in California. It was strange, watching television by candle light.

I later learned that the local station that served the EBS (Emergency Broadcast System) had an emergency generator for their transmitter but they could not get their signal from the station to the transmitter.

There were a few lessons learned from the event:

- Amateur stations were the fastest and most reliable source of local information.
- High power AM stations were the first source of national information followed by network television.
- Emergency plans should include the frequencies for high powered AM stations.
- Cordless telephones, electric garage doors, gas pumps, and cash registers don't work when the power is out.
- People on cable couldn't see the television, even if they had a 12 volt television.

Conclusion

Gradually, electrical power was restored, area by area during the next four hours. For us in the northwestern states, this event was an inconvenience rather than a tragedy. It served as a wake-up call to the complexities of our society and the way that a problem in one area can affect people many miles away.

We were very glad that we didn't live in California at this time. We were also glad that the outside temperature was 25 degrees above zero rather than 25 below, as it often is in Idaho in January. MT

Utility World

Larry Van Horn, N5FPW
c/o MT, P.O. Box 98
Brasstown, NC 28902

"Why do you listen to utility band stations?"

Over the years I have had the opportunity to talk to quite a few utility listeners and ask them their reasons for listening to utility band communications. While the listening interest for each individual is as varied as the utility spectrum itself, their basic reason for listening always strikes a common theme. That theme is the excitement of being on the scene (via radio) as international events unfold and news happens.

This was probably best summarized during a recent conversation I had with Bob Grove, the dean of utility listeners. When I asked him why he listens, Bob replied, "You get to share in the moment of an event."

Experts will tell you, the more "moments you share" as you tune the utility spectrum, the better feel you will get for what is called *normal* communications.

Normal communication is the day to day, routine traffic you will hear as you tune your radio. Normal communications can sometimes be boring, sometimes real interesting, and of course at times, even exciting. Normal communication parallels real life in the utility bands. Remember, that when we listen to the utility bands we are listening in on real life day-to-day conversations.

By monitoring normal utility traffic, that will help you to spot the *abnormal*. It's the abnormal that most utility listeners seek to hear. The abnormal signals possible news stories in the making. If you want a good example of abnormal communications right now, look no further than 90 miles south of the United States on the island of Cuba.

I have always chuckled when I hear announcers on Radio Havana call Cuba, "The Island Paradise." As you will see below, events in Cuba are far from my definition of paradise.

For some time now, I have been listening to communications from the island of Cuba with more than a passing interest. During my lifetime, I have watched Castro's revolution on the island, the Cuban missile crisis and now the decline of Castro's Cuba. The utility bands have given me a front row seat from which to observe events that are happening on the island which have not been mentioned in all the propaganda and rhetoric from the Cuban media.

At the *MT* convention last year, I made a rather bold prediction. I said that Castro would probably not be in power by the time the next convention rolled around at Atlanta in October 1994.

When I made that prediction, it was based on several factors. The economy in Cuba is a shambles. With our economic embargo still in place and the lack of Soviet aid to the island, Cuba is not real high on my vacation list. The U.S. media has reported that food riots in the Cuban streets are commonplace these days. One report heard via a shortwave broadcast station stated that the dog and cat population has dropped dramatically on the island. That doesn't leave too much to one's imagination.

Other press reports have repeatedly mentioned major power problems on the island, including brown and black outs due to fuel shortages. That should be something that any good radio buff could confirm or deny. Transmitters need power to operate. When transmitters don't get power, they stop working, When there are brown outs, weird signals emanate from transmitters. Brown outs normally cause poor power regulation to a transmitter. CW signals will be chirpy, RTTY signals would probably be distorted to the point of being unreadable and voice signals would be distorted severely.

A recent band scan of Cuban signals in the HF spectrum produced startling results. Every Cuban marine coastal CW station signal I could monitor was chirping wildly. The only other stations I have heard recently that were as bad as the Cubans were HKB and HKC in Colombia. CLA and CLS CW markers both had exceptional chirping signals. Additional monitoring in the radiotelephone duplex portion of the marine frequencies revealed that CLA voice USB signals were distorted almost to the point of not being intelligible.

Even more notable has been what appears to be a reduction in the number of Cuban RTTY embassy broadcasts from CLP1 in Havana. I have not received any recent reports of CLP1 RTTY activity. The utility bands used to be full of CLP1 signals, but now they appear to have either cut down their transmission schedules or they are possibly using CW a lot more. I have noted several chirpy CW signals passing 5-digit groups on CLP1 frequencies recently.

Aeronautical frequencies also have not escaped the wrath of Cuban power misers. While monitoring several Cuban regional aero channels recently, I noted these transmissions are also suffering from severe distortion. What is most interesting about these transmissions is that not all stations are affected at once. Some will be in the clear while others can hardly be heard. One could generally infer that rolling brown outs are fairly standard practice.

In recent years, the general consensus of number station enthusiasts has been that Spanish female 5-digit number stations are originating from the island of Cuba. So, if other Cuban utility band transmitters are having problems, one could assume the numbers would be having problems as well. Recently, I have received a flood of logs indicating poor modulation and distortion on Spanish female 5-digit number broadcast.

To support the above findings, over the last few years several hobbyist have been quietly using direction finding techniques to locate some of these Spanish female 5-digit sites. All of the transmissions DF'ed so far have come from the southern coastline of Cuba on the Peninsula de Zapata. This is in the vicinity of Bauta, Cuba.

If you would like to catch some of the action, here are some Cuban frequencies that have recently been reported:

In the Marine bands:

CLA-Havana Radio
CW: 8496.0 8573.0 8690.0 12673.5 13062.0 16961.0 22610.6
USB: 4408.0 8737.0 8743.0 8758.0 13116.0 13125.0 13158.0

CLS-Havana Fishery Radio
CW: 6403.0 8489.0 8609.0 16921.0

In the aeronautical bands:

Cuban Regional Aero Networks
USB: 5461.0 5562.0 6708.0

LDOC-Cubana Airlines, Boyeros
USB/CW: 3007.0 4885.0 5544.0 8876.0 8888.0 8927.0 11312.0 13330.0 13339.0 17934.0 17974.0 21985.0

LDOC-Cubana Airlines, Santiago
USB: 8876.0

Cuban embassy traffic has been recently reported on the following frequencies:

CLP1-MFA Havana (using 50 and 75 baud RTTY)
13919.8 14806.3 14815.0 14824.2 14815.2 17515.5 18196.0 18592.5
18628.0 18640.0# 19087.0 19180.0 19183.3 19775.5 19802.0 22127.0
23085.0 23125.0

To try your hand at Spanish female 5-Digit Number station monitoring try tuning some of the following frequencies:

3060	3292	3925	4020	4028	4445	4728	4730	5182	5417
5420	5760	5771	5772	5793	5851	5892	5898	5902	6240
6440	6578	6768	6773	6785	6796	6825	6826	6843	6850
6855	6867	6876	6889	6892	6940	7429	7482	7525	7540
7555	7628	7648	7655	7675	7700	7780	7846	7850	7860
7862	7864	7887	7975	8000	8042	8055	8066	8075	8088
8095	8107	8113	8136	8137	8140	8146	8180	8186	8240
8380	8484	8542	8544	8850	8873	8875	9124	9153	9155
9170#	9180	9222	9230	9238	9251	9238	9255	9260	9270
9290	9329	9331	9365	9430	9443	9445	9450	10126	10132
10190	10235	10240	10345	10440	10510	10525	10540	10547	10560
10588	10610	10665	10865	11125	11225	11462	11491	11545	11565
11633	11635	11740	12240	12355	12965	13374	13378	13434	13450
13565	13744	13775	13923	14029	14180	14270	14563	14825	15630
15844	16178	16395	16827	17555	18035	18236	18410	18880	20520
20735	21965	22222							

#-transmission mode LSB

In an interesting side note, I recently heard an unidentified station on 2854.0 sending the call LVD2 in CW. That signal sounded real chirpy like the Cuban stations noted above. Now I wonder if LVD2 is coming from Cuba?

As one can obviously see from the information presented above, Cuba has some problems. Maybe it is time for you to crank up the old receiver and try your hand at monitoring "Trouble in Paradise."

NAVY MARS Frequencies

Peggy Thompson of SPEEDX club fame recently checked in with the following Navy MARS frequencies she has found active for the ship's afloat network. Once ships leave the calling channels (14441.5 kHz) here is where Peggy has heard them move to. Thanks for the list, Peggy, and be sure to check in often.

7378.5	7391.5	10258.0	10463.5	11063.5	13826.0	14383.5
14385.0	14391.3	14391.5	14467.0*	1477.0	16298.5	20997.0

**Actual is often 14467.3 due to heavy RTTY interference*

Speaking of MARS, here is a list of recently monitored local and regional MARS nets monitored over the last month here in Brasstown.

3269.0	0200	USB	US Navy MARS 4W1B Net
3296.0	0230	USB	Regional USAF MARS Net
3308.0	0100	USB	Regional USAF MARS Net (Possible Midwest)
3349.0	0000	USB	US Navy MARS Net
	0230	USB	US Navy MARS Net
3390.0	0000	USB	US Navy 2E2B MARS Net
4003.0	1300	LSB	US Army 4 District MARS Net
4008.5	1300	CW	US Navy MARS slow speed CW net
4010.5	1300	USB	US Army 5 District MARS Net
4017.0	1300	USB	US Army 6 District MARS Net
4020.0	1300	USB	US Army 7 District MARS Net
4023.0	1300	USB	US Army 6 District MARS Net
4026.0	1300	USB	US Army 5 District MARS Net
4029.0	1300	USB	US Army 6 District MARS Net
4038.5	1300	USB	US Navy MARS 2A1B Net
4803.5	1300	USB	US Navy MARS Net
4825.0	2330	USB	US Navy Region 4 MARS Net
6988.0	----	LSB	US Army MARS Net (mentioned in message on another net)

Just the Fax Ma'am!

Jacques d'Avignon forwarded some interesting fax station information and several fax charts he has received recently. Jacques says that the NAM-US Navy station in Driver, VA, is going to shift its transmitter site to Cutler, Maine. A quick phone call to the Naval Eastern Oceanography Command in Norfolk confirmed that this will happen very soon, but no date has been set yet for start up. According to the official in Norfolk there will be no change in their schedule, callsign or frequencies when the move is made to Maine.

NAM currently transmits its fax products using the following schedule:

3357.0	Continuous	10865.0	Continuous
8080.0	On Call COMMSPOT	15950.0	On Call COMMSPOT
20015.0	On Call COMMSPOT		

NRK, also a US Navy fax broadcast station at Keflavik, Iceland, transmits on the following frequencies and times:

9318.0	Continuous	3820.5	On Call COMMSPOT
18486.0	On Call COMMSPOT		

Here is an interesting observation for military radio buffs. While I'm not sure what the COMMSPOT acronym above means, I have been told that the only time the 'On Call' frequencies will be pressed into service is when there is a military exercise or urgent need (i.e.-crisis). These exercises could either be US Navy, Latin America (such as the annual Unitas exercise), or NATO Naval exercise. Mil radio monitors might want to take note of this bit of intelligence.

Geoff Halligey, over in the UK, says that GFA/GFE-Bracknell Meteo (fax) have now amalgamated into one station called GFA. Frequencies are:

2618.5	1800-0600	4610.0	Continuous	8040.0	Continuous
14436.0	Continuous	18261.0	0600-1800		

Jacques d'Avignon also sent a new schedule for NMF-US Coast Guard station in Boston, MA, which follows:

3242.5 0300-0427/0700-0755/0905-1052

7530.0 1730-1801/1835-1956/2015-2212

A Tar Heel thank you to Jacques, Geoff and Jim Carson in Pleasantville, NJ, (who also sent in the new NAM schedule) for forwarding the above fax station information.

Pot Luck Frequencies for April (no fooling)

• Here's some real nice stuff from Steve George, Geoff Halligey, Ed Rausch

8690.0 FJY4-Martin de Vives Radio, Amsterdam & St. Paul Island, with CW CQ marker

19800.0 Speedbird Executive Aircraft using calls Mary 2 and Mary 3. Appear to be operating out of Doha, Qatar. Station call is A7A211 often abbreviated Alpha 211.

Tahiti Aeradio - SP MWARA on 3467.0 5559.0 5643.0 8867.0 10084.0 11327.0 13300.0 17904.0 (other stations here include Auckland, Sydney, Nandi, Fiji and Easter Island).

• Two sets of selscans like those mentioned in the February column have been monitored.

Set 1-	4058.0	4721.0	4913.0	4991.0	5058.5	6219.0	6693.0
	6803.0	7419.0	7778.5	8291.0	10171.0	10353.0	10423.0
	10494.0	11445.0	13240.0	15711.5	22124.0		
Set 2-	4675.0	6705.0	6735.0	6753.0	7624.0	9023.0	10493.0
	10515.0	10578.0	10661.0	11155.0	11402.0	11610.0	12139.0
	14671.0	17999.0	20110.0	20928.0			

Thanks to an unsigned contributor for that interesting set of frequencies.

• Does anybody out there know what the USAF term VOLANT Scorpion personnel means, and who those people might be?

And with that, it's time to see what our 20 log contributors have been hearing in the Utility World. Best of DX and 73 from B-town.

Utility World

Utility Loggings

Abbreviations used in this column

AFB	Air Force Base	LSB	Lower Side Band
AM	Amplitude Modulation	Meteo	Meteorology
ANSA	Agenzia Nazionale Stampa Associata	Metro	Pilot to METRO voice call
ARQ	Automatic Repetition on Request	MFA	Ministry of Foreign Affairs
ARQ-E3	Single channel ARQ teleprinter system	m/v	Motor Vessel
AUTEC	Atlantic Underwater Test Evaluation Center	Ops	Operations
AWS	Air Weather Service	PIAB	Presse- und Informationsamt der Bundesregierung
CG	Coast Guard	RCC	Rescue Control Center
Comms	Communications	RTTY	Radioteletype
CQ	General call for any station	SAM	Special Air Mission
CW	Continuous Wave (Morse Code)	SAR	Search and Rescue
DF	Direction Find	Selcal	Selective Calling
DyN	Diarios y Noticias	SITOR-A	Simplex teleprinting over radio system, Mode A
EAM	Emergency Action Message	SLHFM	Single Letter HF Marker
FAF	French Air Force	SUNA	Sudan News Agency
Fax	Facsimile	UHF	Ultra High Frequency
FEC-A	One-way traffic FEC teleprinter system	UN	United Nations
FEMA	Federal Emergency Management Agency	UNHCR	United Nations High Commission for Refugees
FF	French Forces	Unid	Unidentified
Freq	Frequency	USAF	United States Air Force
GHFS	Global HF System	USB	Upper Side Band
HF	High Frequency	USCG	United States Coast Guard
HMCS	Her Majesty's Canadian Ship	USCGC	United States Coast Guard Cutter
IDs/ID'ed	Identification	VNA	Vietnam News Agency
JTIDS	Joint Tactical Information Distribution System		

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

2018.5 Panther Shelter, Beach House Shelter and Greg talking about a systems test (mentioned weapons) and the performance conclusions reached so far for a meeting next day with the high brass. Both shelter stations were ships (coming into Wallops Island, VA) and Greg was a shore station. Lots of Navy jargon in comms in USB at 0422. (Fernandez-MA)

2270.0 English female 5-digit Israeli Mossad number station in AM at 0334. (Bill Fernandez-MA) *Interesting, Bill, I only show a call-up here that is not heard very often, RCH. Wonder what call-up is being used here now?-LVH.*

2296.0 IQM-Lampedusa Radio, Italy, working fisherman in USB at 2245. (Flavio Gori-Italia) *Welcome to the column, Flavio, please check in often-LVH.*

2716.0 AUTEC Ops at 0804 working vessel not heard for 0800 position check, possible Harvey Ranger in USB. (Richard Baker-Austintown, OH)

2722.0 ICB-Genova Radio, Italy, in USB with weather info at 2305. (Gori-Italy)

2824.0 PCH-Scheveningen Radio, Netherlands, with USB marine weather broadcast in English for North Sea area at 0343. (Fernandez-MA)

3051.0 Edinburgh RCC, Scotland, working Rescue 177 in USB at 2022. (Robin Hood-UK)

3120.0 Cape Radio working 21 with what sounded like radar tracking comms and setting up of HF/satellite links. Frequencies only mentioned as Net 7, Net 2, etc (This was Net 7). Other stations were Tristar and Barricks 21 in USB at 0146. (Fernandez-MA)

3210.0 LYK-Klaipeda Radio, Lithuania, working UPLM-*m/v Kapitan Panfilov* with greetings telex traffic in 50 baud RTTY at 1029. (Hood-UK)

3410.0 English female 5-digit number station in AM at 0403. (Femandez-MA)

3417.0 Israeli Mossad number station with English female 5-digit groups in AM at 0405. (Fernandez-MA)

4016.0 AE1KFD/AE1FGT with 300 baud Packet at 2232 also AE1FGT/AGA7RM at 2235. (Hood-UK)

4027.9 Spanish female 5-digit number station in AM at 0603. Very powerful but distorted to the point of being unusable. (Jeff Haverlah-Houston, TX)

4085.0 US Navy FT net on Charlie 33 with radar tracking and tactical comms at 1100 in USB (Milan Prokes-Rexburg, ID)

4088.3 Foxtrot Mike working various stations in USB at 1030, part of Operation Able Manner. (Neil Perdue-Madison, AL) Noted Foxtrot Hotel net at 0013. (Haverlah-TX)

4090.0 UNHCR message about food convoys from Metkovic to Sarajevo in SITOR-A at 2240. (Hood-UK) Foxtrot Mike net noted here at 0436. (Haverlah-TX)

4204.5 UBCI factory trawler *Kurskaya Kosa* working Kaliningrad Radio in 50 baud RTTY at 2253. (Hood-UK)

4282.0 LZL2-Bourgas Radio, Bulgaria, with CW marker at 1910. (Hood-UK)

4324.2 'R'-SLHFM Unknown location with continuous R sent in CW at 0315. (Dix-NY)

4426.0 Mike Oscar working USCGC *Papaw* on simplex USB at 0210. (Gordon Levine-Anaheim, CA)

4601.0 Spanish female 5-digit number station in AM at 0600. (Haverlah-TX)

4721.0 Foxtrot Hotel working Quebec with tactical comms in USB at 0424. (Fernandez-MA)

4725.0 Contender and Sulfide on X-209 at 0250 in USB. (Prokes-ID)

4735.0 Lobo working Foxtrot Tango during net ops in USB at 0136. Frequency Charlie 32. (Haverlah-TX)

4938.0 SAM 628 (also ID'ed as FEMA airborne) in comms with Andrews on F-405 in USB at 0255. (Jeffrey Jones-Tracy, CA)

5031.0 JSR-Israeli Mossad number station in AM at 2102. (Gori-Italy)

5091.0 CIO2-Israeli Mossad number station in AM at 2248. (Dix-NY)

5297.0 German female 3/2-digit number station in AM at 0437. (Fernandez-MA)

5369.0 Caribbean working Horizon Base in USB at 1110 discussing ship board generator problems. (Perdue-AL)

5400.0 Australian Antarctic base working Hobart Control in Tasmania with personnel report supply request at 0600 in USB. (Rausch-NJ)

5437.0 English female 5-digit Israeli Mossad station also heard on 2270, 3417, and 5091 at various times in AM. (Fernandez-MA)

5535.0 Flight 226 calling Speedbird London in USB at 0007. (Charles Funk-Baltimore, MD)

5556.0 Cali Aeradio working Manizales Aeradio, both in Colombia, using Spanish in USB at 1150. (Perdue-AL) *Regional air net; nice catch, Neil-LVH.*

5680.0 Plymouth RCC, UK, working Rescue helicopters 193/194/195/196. Navy 574 and P4A (unknown) in rescue operation off Land's End. Fisheries protection ship with call sign Watchdog 64 also offering help. All in USB at 0942. (Hood-UK)

5684.0 Weedpatch calling Aggregate and Telegram on P-380 in USB at 0040. (Jones-CA)

5696.0 Oscar 6 Foxtrot (Royal Navy aircraft) working Culdrose Naval Air Station, England, regarding frequency shift to UHF for SAR mission in USB at 0631. Possibly a discrete freq here to pass UHF freq, I have no listing for Royal Navy here. (Fernandez-MA) *Neither do I, Bill; Robin Hood in UK, do you wish to comment on this one?-LVH.*

5706.5 RFLI-FF Fort de France, Martinique, (circuit IRT) with Code de Voie at 0543 in ARQ-E3/96. (Baker-OH)

5791.0 Station repeating Foxtrot 05 ENINDEENIN in CW at 2134. (Dix-NY)

5804.0 FDC-FAF Metz-Frascaty, France, with V CW marker at 2258. (Dix-NY)

5908.0 Unid station sending part one of North American significant weather chart, 12-15,000 feet at 1155 using Fax in USB position. Map was labeled from KWGC but this is not a regular frequency for Elk Horn or Homestead. Quality was excellent. Part two was never transmitted. No RTTY on LSB. I have no listing for a USAF AWS station on this frequency. (Jacques d'Avignon-Kingston, ON Canada)

6336.3 GYA-Royal Navy, London, UK, with test tape using 75 baud RTTY at 0838. (Baker-OH)

6371.5 RKLM-Arkhangelsk Radio, Russia, calling 4LY in CW at 1143. (Dix-NY)

6693.0 274 Rear calling 274 Forward for radio checks. No reply, 234 Rear (same operator) calling 234 Forward for radio checks, no reply in USB at 1345. (Hood-UK) Canadian military rescue with phone patches during SAR ops in USB at 0219. (Charles Funk-Baltimore, MD)

6716.0 USCG Rescue 1500 working Vancouver and Halifax military stations in USB at various times in USB. (Norm Pihale-Northfield, MN)

6738.0 American 911 calling Panama in USB at 0549. Earlier heard unid station, deep male voice with a short burst of xxx barracks slang addressed to no one in particular. Definitely military, probably found a loose mike and keyed up with some GI barracks profanity.(Haverlah-TX)

6745.0 VLB2-Israeli Mossad number station in AM at 2045. (Gori-Italy) Noted same transmission at 0050. (Lonnie W. Bunn-Raleigh, NC) *New frequency for this one in my database, thanks guys-LVH.*

6901.7 RFTJ-French Forces, Dakar, Senegal, in ARQ-E3/192 idling at 0346. (Baker-OH)

6993.0 SAM 205 on F-199 asking Andrews operator if he knew of a GHFS callsign Bayonne which had worked them earlier on 11176. Andrews operator said he was not familiar with that callsign *(sic!-LVH).* SAM 205 said the station in question reported that they had been in operation since 8/93. In USB at 0225. (Jones-CA) *Guess they need a subscription to MT-LVH.*

7319.4 SUU-Cairo Meteo, Egypt, with 75 baud RTTY weather codes at 0335. (Robert Hall-Capetown, RSA)

7605.0 MIW2-Israeli Mossad number station in AM at 2016. (Dix-NY)

7741.0 USCGC *Harriett Lane* working USCGC *Dallas* and *Calvin 12* in USB at 2101. (Bunn-NC)

7920.0 Darkstar tracking and relaying bandit coordinates to Pablo 5 in USB at 0220. (Jones-CA)

7921.0 Goldbloom calling Acrobat on channel Alpha 7 in USB at 0255.(Jones-CA)

8127.0 CIO2-Israeli Mossad number station in AM at 1953. (Fernandez-MA)

8400.0 IAOA-Italian Navy vessel working Albanian Port Authority (not heard) in USB at 1427. (Gori-Italy) *IAOA is the Italian warship Minerva, a corvette-LVH.*

8437.0 UDH-Riga Radio, Latvia, at 0239 in SITOR-A sending selcal IPKC at 0242. (Baker-OH)

8446.0 UQK-Riga Radio, Latvia, with DE CW marker at 2139. (Dix-NY)

8494.8 'S'-SLHFM Arkhanglesk, Russia, with usual CW signal at 1233. (Dix-NY)

8495.0 'C'-SLHFM Moscow, Russia, with usual CW signal at 2240. (Dix-NY)

8495.2 'F'-SLHFM Vladivostok, Russia, with CW marker signal at 2241. Noted parallel with 13636.1 (Dix-NY)

8595.0 UFL/UDL-Vladivostok Radio, Russia, with CQ CW marker at 2104. (Dix-NY)

8705.5 PKC-Palembang Radio, Indonesia, with CQ CW marker at 1233. (Dix-NY)

9023.0 Head Dancer from Seymour Johnson to Mildenhall working Lajes GHFS with phone patch to Raymond 01 in USB at 0555. (Haverlah-TX)

9043.5 Ft. Drum/Scott Metro/Little Rock Metro all on a net with comms about setting up RTTY/satellite comms on another frequency in USB at 1610. Is this some kind of USAF regional weather net? (Fernandez-MA) *Bill, this is the first log I have seen of this kind on HF. Probably a discrete set aside for some sort of exercise or something. Nice log-LVH.*

9050.0 Sky King EAM broadcast from Offutt with McClellan following in USB at 2101. (Prokes-ID)

9241.4 LRO64-DyN Buenos Aires, Argentina, with Fax press photos at 2344. (Dix-NY)

9271.0 Andrews AFB on F-757 in comms with SAM 205 and SPAR 11 in USB at 2200. (Jones-CA)

10400.4 RFQP-FF Djibouti, with long crypto message using ARQ-M2 at 2023. (Hall-RSA)

10493.0 WUG (self-ID'ed as Vicksburg, MS, working WGY909 in USB at 1449. (Haverlah-TX) *WUG is Army Corps of Engineers-LVH.*

10599.9 XVN37-VNA Hanoi, Vietnam, with 50 baud RTTY English news at 1431. (Dix-NY)

11176.0 Quid 20 (KC-135) working Andrews requesting phone patch to Operations upon returning from overseas European duty in USB. (Pihale-MN) *Time, Norm?-LVH.* Rhody call sign working Andrews with phone patch to Providence, RI news person. Aircraft had been delivering flour to Saravejo when a mortar exploded on ramp. News person said she understand it took them 90 minutes to unload cargo and leave airport. Pilot replied, "Negative, ma'am, that was 90 seconds." (Doug Kramer-Dearborn, MI) *I bet you they got out in a hurry. Neat log, Doug-LVH.*

11179.0 SAR operation involving CG Rescue 1711, USCG San Juan, RCC Curacao and Rescue Pluto 1 in USB at 2030. (Bunn-NC)

11210.0 Navy Link 11 transmission noted here at various times. (Haverlah-TX)

11220.0 Red Wagon working McClellan GHFS in USB at 2029. (Bunn-NC)

11226.0 Protrude working Deckhand and Raindrop in USB at 2052. (Bunn-NC) SAM 201 working Andrews GHFS in USB at 1546. (Haverlah-TX)

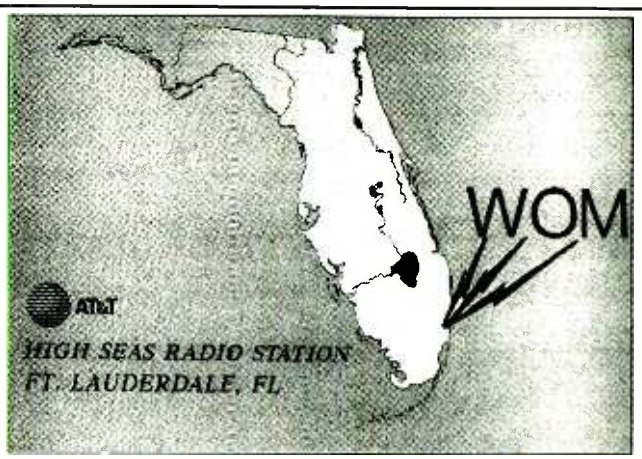
11229.0 Nose Cone working Improper moved to Sierra 311 (11494) in USB at 1624. (Bunn-NC)

11243.0 AFS-Offutt GHFS, NE, USA, working King 55 with a phone patch, 48th Rescue Squadron, Nellis AFB regarding arrival info at 0449 in USB. (Baker-OH)

12120.3 SUNA Khartoum, Sudan, with 50 baud RTTY English news at 1611. (Hall-RSA)

12282.0 8BY-Unid station sending V CW marker at 1956. (Dix-NY) *Jack, this one has been DF'ed to Indonesia, probably an Indonesian embassy station is my best guess-LVH.*

12283.0 DEA47-Unid station sending V CW marker at 1457. (Dix-NY)



Coast Station WOM is controlled from the receive site located at Ft. Lauderdale, FL.

12582.0 Long forecast in SITOR-A at 1500 for the Pacific and Indian Ocean. The only possible station I could find on this frequency is NOJ in Alaska. The transmission ended only with BT and no sign off. (d'Avignon-Canada) *Jacques, my best guess is VIP-Perth Radio, Australia-LVH.*

12660.0 YIR-Basrah Radio, Iran, with CW marker at 0800 (also 16906 at 1610). First time heard since 1991. (Hood-UK) *Same here, Robin, nice catch-LVH.*

12678.0 9MG-Penang Radio, Malaysia, with CW CW marker at 1909. (Dix-NY)

12697.0 USU-Mariupol Radio, Ukraine, working m/v *Kelme* with English text in 50 baud RTTY at 1113. (Hood-UK)

12723.0 ESA-Tallin Radio, Estonia, with CQ CW marker at 1932. (Dix-NY)

12971.0 SUH-Alexandria Radio, Egypt, with CQ CW marker at 1337. (Dix-NY)

13060.5 7OA-Aden Radio, Yemen, with DE CW marker at 1346. (Dix-NY)

13095.0 Boufarik Radio, Algeria, with receiver tuning call (in French) and traffic list in USB at 1000. Note: this station IDs as Boufarik, not as Skikda as Klingenfuss lists. The British Admiralty books also refers to 7TF as Boufarik, not Skikda. (Hood-UK) *Boufarik it is; thanks, Robin-LVH.*

13146.0 3AC12-Monaco Radio, Monaco, working ODDV-m/v *Al Salam 2* in USB at 0856. (Hood-UK)

13210.0 AFE8-MacDill GHFS, FL USA, working Duration with HF data at 1903, then calling Outplay in USB mode. (Baker-OH)

13211.0 Duration with EAM at 1909, then Outplay calling Duration on X-905 (thought that was 11226, wrong preset?). Duration had just worked MacDill on 13210. All in USB. (Baker-OH) *Definitely a wrong preset-LVH.*

13217.0 At 1803, SPAR 99 working Andrews GHFS for HF signal check in USB. (Baker-OH)

13848.2 Zaire bank circuit with with 50 baud RTTY French traffic at 0740. (Hall-RSA)

14352.0 Unid station sending 'H4W' in hand sent CW at 1603. (Dix-NY)

14412.0 Andrews AFB, MD USA, working Air Force One in USB at 1545. (Bunn-NC)

15015.0 Reach 709DA working Lajes GHFS with phone patch to Dover Meteo at 1924. (Pihale-MN)

15048.1 Bangor, Wrinkle, Nosebag, Worship, Recall and G1C33 with USB traffic at 1612. Traffic concerned a battle. Sounded like a wargame. (Tim Johnson-Galesburg, IL) *Tim, this is a USAF JTIDS Battlefield Air Interdiction Network-LVH.*

16906.0 YIR-Basrah Control, Iraq, with CW DE marker at 1347. (Dix-NY)

17016.0 'C'-SLHFM Moscow, Russia, in CW at 1351. (Dix-NY)

18009.0 F6G calling C8Q for a radio check in USB at 0055. (Jones-CA)

18319.0 OMZ66-MFA Prague, Czech Republic, with 100 baud RTTY CQ marker at 1604. (Dix-NY)

19870.0 4UZ-UN Geneva, Switzerland, at 1358 passing SITOR-A messages to unknown station to 1426 after resend. (Baker-OH)

20022.7 DFU20H3-PIAB Bonn, Germany, with FEC-A German news at 1526. (Dix-NY)

20505.0 Italian Army phone patches from Somalia in USB at 1340. (Gori-Italy)

20085.0 ISX20-ANSA Rome with RTTY French news at 1637. (Dix-NY)

20946.7 LN2A-Unid station sending LN2A in CW continuously at 1525. (Dix-NY) *Another 8BY frequency; interesting, see 12282/12283 entry-LVH.*

22493.0 UAT-Moscow Radio, Russia, working ESBY-m/v *Parila* in 50 baud RTTY at 1240. (Hood-UK)

The Scanning Report

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

Scanning with CTCSS

Your letters have indicated that the concept of CTCSS (Continuous Tone Coded Squelch System) technology is not fully understood. Many readers claim that CTCSS seems to defy common sense. The technology permits two or more agencies to use the exact same frequency with complete privacy. The radio transmissions from agency "A", for example, can't be heard by agency "B".

From a scanning standpoint, it does appear to be confusing. When we monitor a single frequency, we can hear every user that is transmitting. A typical example would be a fire alerting frequency. Suppose for a moment that your local fire board used a single frequency to alert several different fire companies. If you monitor that single frequency, you'll hear every dispatch call that is transmitted. But what if you only wanted your radio's squelch to open when your local fire department was dispatched? That's the idea behind CTCSS, and here's how it works.

A series of tones (they may be sub-audible), are transmitted on the main frequency. If the tones are recognized by the receiver's internal CTCSS decoder, the squelch opens and the user can hear the call. If the tones are not recognized, the radio's squelch never opens. Since each user is assigned to a unique set of tones, it's possible to select and dispatch fire companies on an individual basis—in complete privacy.

It would also be possible for company "A" to program their base and mobile radios to respond to a specific set of tones. Company "B" on the other hand, could use the exact same frequency, but with a different set of tones. By utilizing CTCSS technology, both companies could share the same frequency, but neither company would be disturbed by unrelated radio transmissions.

CTCSS technology is not foolproof. If two different agencies attempt to use the frequency simultaneously, their transmissions will cause severe interference. To prevent transmission problems, a "busy" light, on the transmitter, indicates when the frequency is in use. When the light is on, individual agencies must wait their turn.

In the scanning world, CTCSS technology can be used to monitor a single agency or user. A CTCSS capable scanner radio can be programmed to receive a particular set of tones. If your local fire department used the CTCSS tone of 136.5 Hz, your scanner radio's squelch would only open when your local fire company was dispatched—all other transmissions on the same frequency would be muted.

CTCSS technology can also be used to identify specific agencies. If you monitor a transmission on the tone frequency of 167.9 Hz, it will probably belong to the FBI. The DEA uses 103.5 Hz, and the Custom Service prefers to use 100.0 Hz. And as you probably already know, there are many additional government and non-government agencies that utilize CTCSS tones. A list of the available tone frequencies is shown in Table 1.

Table 1: Tone Table
All frequencies in Hertz.

67.0	100.0	141.3	203.5
71.9	103.5	146.2	210.7
74.4	107.2	151.4	218.1
77.0	110.9	156.7	225.7
79.7	114.8	162.2	233.6
82.5	118.8	167.9	241.8
85.4	123.0	173.8	
88.5	127.3	179.9	
91.5	131.8	186.2	
94.8	136.5	192.8	

Finding the CTCSS tones that are utilized in your neck of the woods isn't difficult. Frequency guides are beginning to publish CTCSS tones. Optoelectronics is one of a few companies that market a "tone finder." The DC-440 is connected to your scanner radio and will provide the exact CTCSS tone in use. For more information, contact Optoelectronics at (305-771-2050).

Don't forget that knowing the tone frequencies won't help if you don't have a scanner radio capable of receiving CTCSS tones. For more information on tone capable scanner radios and related equipment, check out the advertisers in the pages of *MT*.

Using CTCSS technology to identify specific users or to monitor a specific agency can be a lot of fun. As tone monitoring gains in popularity, additional equipment, tips and ideas will undoubtedly appear on the market. For the latest in CTCSS developments, keep your eye on *MT*. We'll do our best to keep you informed.

Treasure Hunt

This is your last chance to win the MAX system, 800.00 to 900.00 MHz Yagi beam antenna. The loop Yagi is an 11 element antenna that provides 15dB of signal gain. The antenna is approximately 36" long x 7" wide. It can be mounted in a fixed position or rotated with a standard TV antenna rotor. If you're serious about monitoring the 800 megahertz frequencies, you need a professional monitoring antenna. Here are the clues:

1. Check out the Dec 93 issue of *MT* and provide the name of the company that provides free cellular and cordless frequency charts with your order.
2. Since you already have the Dec 93 issue in your hand, what is a "Junghans Mega?"
3. The Realistic(G) Pro-2028 has 800 MHz capability. True or False?
4. What did Al Lovell invent in 1966?
5. What is the formula used to calculate the length of a half wave dipole antenna?

The loop Yagi is available from MAX System Antennas, 4 Gerring Rd. Suite 30, Gloucester, MA 01930, or call (508)-281-8892. The toll free order number is 1-800-487-7539.

Frequency Exchange

If you're looking for warmer weather and the arrival of spring, you won't find it in the state of Maine! It's still cold in ***Pittsfield, Maine,*** but that doesn't stop Don Hallenbeck from enjoying his favorite scanning frequencies.

39.62	Sheriff	154.65	State Police, Zone #2
47.14	Dept. of Transp. (DOT)	154.665	State Police, Zone #1
47.22	DOT	154.71	State-wide Police emerg.
47.26	DOT	154.905	State Police, Zone #3
47.34	DOT	155.505	State Police Repeater
47.32	DOT	156.15	State Police Traffic Detail
151.07	Turnpike Auth.	160.62	RR yard channel #1
151.13	Turnpike Auth.	161.25	RR yard channel #2

You'll find a "hint" of spring at our next stop. Welcome to ***Lynn, Massachusetts.*** John Sill has programmed the following frequencies into his Pro-43 and Pro-2006.

42.34	State Police, Troop A	470.4125	Bay Transit Authority
154.415	Lynn Police	470.6375	Bay Transit Authority
155.355	Lifeline Ambulance	470.6875	Bay Transit Authority
159.03	State Police Troop E	483.1365	Boston Fire
453.60	Boston Hosp. Security	483.187	Boston Fire
460.225	Boston Police	483.2125	Boston Fire
460.40	Boston Police	483.2375	Boston Fire
460.45	Boston Police	851.7125	Bay Cove jail
462.725	Metro Radio System		

Our search for warmer temperatures continues in ***Lackawanna, Pennsylvania.*** An anonymous contributor sent in the following:

31.36	Fisher Oil Co.	153.35	Scranton *Times*
35.06	Wayne Crushed Stone	154.515	Dive/Rescue specialists
37.62	PA Power Co.	154.54	Knight well drilling
37.74	PA Power Co.	155.295	St. Joseph Hospital
37.86	PA Power Co.	157.74	RCA Corp.
43.70	Frank Martz Coach Co.	161.40	Delaware & Hudson RR
47.76	PA Gas Co.	161.505	Steam Town USA
47.80	PA Gas Co.	173.30	Keystone Water
49.10	Mobile Pipe Line Co.	452.625	Purolater Courier
151.865	Marywood College	452.85	Halls Motor Transit
151.925	REDI Electric, Inc.	461.625	Scranton *Tribune*

If you want the complete list of 316 frequencies for Lackawanna, PA, send a #10 SASE to the Frequency Exchange, P.O. Box 98, Brasstown, NC 28902.

We'll find plenty of warm, Spring air in ***Carrollton, Georgia.*** Mike Denney lives nearby and here are his favorite frequencies.

30.85	Hardee's Rest stop	154.145	Fire Dept.
33.16	Long John Silver's	154.725	West Georgia College
35.02	McDonald's	155.205	West Georgia ambulance
152.27	City Taxi	157.53	City Taxi
154.025	Sheriff		
154.115	Carrollton Police		

Our next invitation is from Maryanne Kehoe. Maryanne lives in ***Atlanta, Georgia,*** and she has sent in the "top" four frequencies that are always active.

35.02	McDonald's	855.737	Fulton County Jail
469.012	Rally's hamburgers	858.262	DeKalb County Jail

The weather is really warm in ***Long Beach, California.*** The following frequencies were sent in by J.T. Roth.

153.77	Fire Dept.	460.125	Police
153.925	Fire Dept.	460.275	Police
153.95	Fire Dept.	460.35	Police
453.10	Police	460.45	Police
453.35	Police	935.225	School District

Don't get too comfortable. It's about to get cold again. Gary Moore lives in ***Salt Lake City, Utah,*** and according to Gary, the vice squad in Salt Lake City utilizes 460.05 to control the problem of prostitution. Salt Lake City "east" side police use 460.10 and "west" side traffic uses 460.15. Gary says the police frequently switch to 460.20 for sensitive discussions and to 460.30 for records checks.

Our final stop will remind everyone that Old Man Winter is still with us. Brian Niggemann works on the windy and cold baggage ramp for MidWest Airlines in ***Milwaukee, Wisconsin.***

118.00	Approach	460.70	Midwest Ramp & Operations
119.10	Tower	460.725	United
119.65	Departure	460.75	Midwest Express Gates
125.35	Depart	460.80	Northwest
126.50	Approach	460.825	Northwest
460.65	Skyway Airlines	460.875	Northwest

You can invite the Frequency Exchange to your home town. Send your favorite frequencies to the Frequency Exchange, P.O. Box 98, Brasstown, NC 28902.

Computer Corner

This month's railroad feature should have whetted your appetite for an extensive, nationwide listing of rail frequencies. I have a computer disk that contains railroad frequencies for cities throughout the nation. The frequencies are in two ASCII text files that can be printed from your screen. The first file is sorted by frequency and the second is sorted alphabetically. The combined data of both files contains more than 140 pages of railroad frequencies and information!

Since the files are in standard ASCII, they can be converted into most word processor software pro-

grams. I retrieved the files into Word Perfect 5.1 with ease. If you ever wanted a comprehensive list of nationwide railroad frequencies, this is it!

As in past offers, you can obtain the disk absolutely free by sending an IBM formatted disk (disk size and density is your choice), with return postage and the proper mailer to: Bob Kay, P.O. Box 173, Prospect Park, PA 19076. If you don't care to provide the disk, mailer and return postage, send $5.00 dollars to the above address and I'll provide everything that's needed. Lastly, I ask for your patience. As most of you know, copying disks is a time consuming process. Please allow five weeks for delivery.

Taping Technology

The FBI claims that cellular phones and fiber optic technology is threatening one of the FBI's most effective tools: the wiretap. FBI director, Louis J. French, said that "the technology is changing so rapidly that if something isn't done, we'll be out of the wiretap business." According to French, the break-up of AT&T spawned as many as 1,500 different producers of telephone communications software. And the software producers have not provided the FBI with a way to tap in. (News clipping from Robert Berggren.)

Wash and Wear Radio

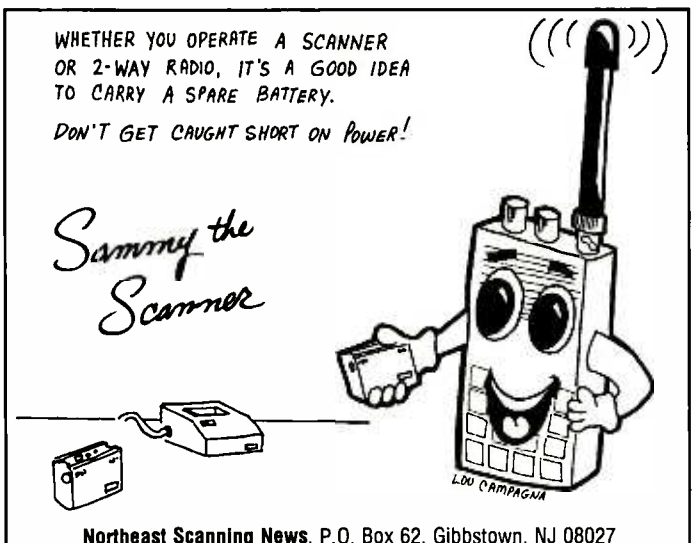
Although I've mentioned it in several columns, your interest in washing electrical parts continues to grow. Here are a few excerpts from the letters that were received:

"I was employed by the federal government and we cleaned radar and computer systems with liquid surgical soap and a parts brush..." *(John P. Schoendriff)*

"The secret to successful washing is to properly dry the items. A conventional oven is ideal..." *(Donald Bisbee)*

"I rinsed the computer in a sink full of water and left the circuit board hanging from the wash line for a couple of days..." *(Dan Hein)*

If you're hanging circuit boards on clothes lines, I'd like to hear from you. Send your wash and wear secrets to the Scanning Report, P.O. Box 98, Brasstown, NC 28902.



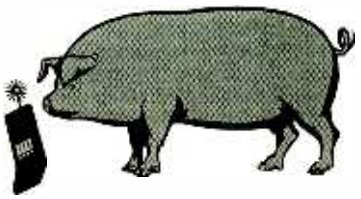
Northeast Scanning News, P.O. Box 62, Gibbstown, NJ 08027

Baby Monitoring

A Columbus, Ohio, woman used her baby monitor to tape record a mother screaming and swearing at a child. (As you know, baby monitors can "monitor" other baby monitors that are close by.) After filing a complaint with child welfare authorities, the sheriff's department searched door-to-door for a similar baby monitor capable of transmitting the sounds. Since there were no indications of physical abuse on a child, no charges were filed.

To hear baby monitors on your scanner radio, punch in the following: 49.83, 49.845, 49.86, 49.875 and 49.89 MHz.

Pig Calls



The sounds on Dave Rousselow's answering machine were familiar—snorts, grunts and squeals. One of farmer Rousselow's hogs had found Rousselow's cellular phone and had activated the redial button. Shortly before he lost the phone, Rousselow had dialed his home to check for messages.

Rousselow said that the phone must have fallen out of his pocket as he crawled over the various pig stalls. Prior to the fluke phone call, Rousselow had spent several hours searching for the lost cellular phone. (News clipping from Dan Stroller)

Trunking Tricks

Did you know that it's possible to eliminate the "buzz saw" and/or "anti-scanning tones" that are often utilized by trunked radio systems? According to Ricky Stein, International Editor of RCMA, a company called Comsec Associates produces a device that will eliminate the annoying features. The cost is approximately $50.00 dollars—installation included. For more information contact Comsec, at 2219 West Olive Avenue, #300 Burbank, California 91506.

Scanning the Great Escape

A 16 year old fugitive, who had escaped from a detention center, managed to elude the Bloomsburg, Pennsylvania, police for an entire day. The police had surrounded the youth in a stand of trees, but he got past the police by crawling through heavy underbrush. The police were out of clues until local residents, listening to their scanner radios, began to call in sightings of the youth. Police Chief, Doyle Winn, said, "If it hadn't been for the people listening to their scanners, we wouldn't have got him." (News clipping from Thomas McCrea)

Eastern Standard Time

Turning the clock ahead one hour in the spring and back one hour in the fall is common in many parts of the country. However, have you ever wondered how Daylight Savings Time and Standard Time affect train schedules?

What do you think? Do passenger trains time-shift their schedules to match the clock? Send your comments to the Scanning Report, P.O. Box 98, Brasstown, NC 28902. I'll print the answer in a future column. MT

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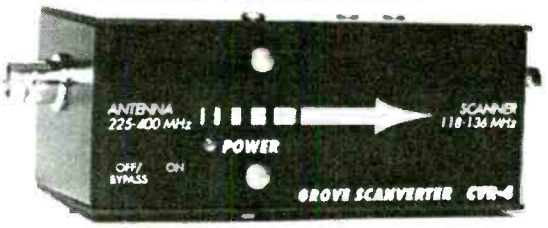

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The Grove CVR-4 Scanverter comes with a universal adaptor kit so that it can be connected directly to a handheld scanner for portability, or to the rear of a base or mobile scanner (BNC and Motorola adaptors included). Operates from standard 9-volt alkaline battery (not included).

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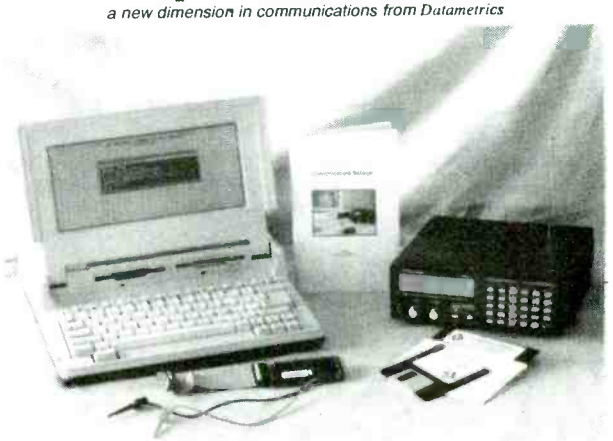

Now Radio Shack PRO 2006 owners for the first time have access to the exciting world of Computer Aided Scanning with the highly acclaimed Datametrics Communications Manager system. Computer Aided Scanning is as significant as the digital scanner was five years ago and is changing the way people think about radio communications.

- The Datametrics Communications Manager provides computer control over the Radio Shack PRO2006 receiver.
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- Computer Aided Scanning system $ 349
- PRO2006 receiver w/interface installed and CAS system $ 749
- Manual and demo disk $15

Requires Radio Shack PRO 2006 receiver and IBM PC with 360K memory (640K for full channel capacity) and parallel (printer) port.

Send check or money order to Datametrics, Inc., 2575 South Bayshore Dr. Suite 8A, Coconut Grove, FL 33133. 30 day return privileges apply.

The Beginner's Corner

"Uncle Skip" Arey, WB2GHA
GEnie T.AREY1

The Best Beginner's Books... *Until ...*

We have just come through the winter of "94". It's hard to believe that just three short years ago I spent the better part of the winter of "91" serving a grateful nation in Operation Desert Storm. Sadly, every war has casualties, both big and small. One of the very, very small casualties of this conflict was Uncle Skip's first full length beginner's book. Somewhere on my computer's hard disk exists about ninety pages of wit, wisdom and wonder that was going to go by the title of *The Shortwave World.*

Don't worry, I got over it. I returned to the civilian world with more responsibilities at my "real world" job and in other aspects of my life. *The Shortwave World* went on the back burner and then it eventually fell off the stove entirely.

Ahem ... If you're done crying in your beer, could we get on with the column, Uncle Skip?

Well, since it may be a while until I get up the nerve and the time to once again conquer the publishing world, I figure it might be a good idea to let folks know about a few of the many beginner's books out there in the radio hobby.

Shortwave Radio Listening for Beginners **$10.95**
by Anita Louise McCormick; 173 Pages
Tab Books, Blue Ridge Summit, PA 17294; ISBN 0-8306-4135-1

Being a beginner at anything can be a scary proposition. One of the things that always stands in the way of getting a beginner's book to work is getting into the beginner's mind set. *(This is why the rough draft of my "magnum opus" stalled on a five page explanation of how to solder an antenna connector.)* Many books labeled as "beginners" works suffer from throwing far too much technical stuff in the direction of folks who just wanted to listen to the radio. Modern low cost shortwave equipment has generated a whole new crop of enthusiasts and the market has been begging for books to meet their needs.

Instead of playing "Where's Waldo?" Uncle Skip went looking for pictures of Bob Grove.

Since Anita first sent me a copy of her book to review for the North American Shortwave Association's Listeners Library column, it has gone into its third printing. *(Another reason I never got my book done was that I have a lot of little writing gigs besides MT.)* Anita has found a formula for sharing information with beginners that leaves me green with envy.

Modern portable receivers such as those marketed by Sony, Sangean and Panasonic give the beginner access to real listening with little more effort than it takes to operate a traditional AM-FM broadcast receiver. Initially, many new hobbyists don't want to be bothered with antenna resonance and ground conductivity. They just want to tune in to the world around them.

Ms. McCormick's well illustrated book draws on the beginner's curiosity about the world of radio and then broadens their understanding of what is available to the hobbyist. After a brief history of the roots of radio and the listening hobby, the book orients the beginner to long distance listening by starting out with the more familiar AM broadcast band. This use of AM radio principles as a foundation for shortwave listening is a tactic I have used myself in many *Monitoring Times* columns and in my forums at the *MT* Conventions. It allows newcomers to develop some skills using inexpensive, already purchased receiving equipment.

The book then moves on to helping beginners understand how worldwide radio works. There are station profiles, receiver guides and QSL tutoring sections. Chapter 8, "The Mysterious World of Radio Waves," gives a great basic understanding of propagation in terms that will not send a novice running for the hills.

Anita takes a few curious turns in that she devotes substantial space to both pirate broadcasting and amateur radio. Don't get me wrong, I am a life member of the ARRL and a dedicated A*C*E member (I even keep a DX-100 in the shack "just in case"). I'm just not sure these topics are in keeping with the overall spirit of the book and its intended audience. Pirate chasing can be frustrating and ham monitoring can seem confusing to somebody just wetting their radio whistle. *(Did I mention that monitoring pirates and chasing ham radio special events stations cuts into my writing time? Just another nail in the coffin of my book project, Bunkey)* Also, this book contains two great pictures of Bob Grove.

Shortwave Listening Guidebook **$19.95**
The Complete Guide to Hearing the World
Second edition by Harry Helms; 323 Pages
HighText Publications Inc., Solana Beach, CA; ISBN: 1-878707-11-6

Harry Helms has written many books and continues to write several columns in the hobby press. Of all his publishing efforts, I think it will be Harry's *Shortwave Listening Guidebook* that will find its way into the most hands.

The reason for a second edition is largely due to the many changes that have occurred in the world since the 1991 edition came out. One of the positive results of Operation Desert Storm is that a lot of folks discovered the shortwave monitoring hobby for the first time. About the same time that folks started to get excited about shortwave, however, the world's map changed. International shortwave broadcasting was changing drastically as well. New governmental and commercial broadcasting stations started appearing throughout what we once called the Soviet Union.

New commercial stations even began to appear in the United States of America, along with many other new developments. We now have a viable "No code" amateur radio licensing program. We are awaiting an expansion of the AM broadcast band. Pirate radio is flourishing. Digital communications monitoring is becoming easy and inexpensive. All of these shifts in the shortwave milieu have given Helms an opportunity to restring his prose in an updated and expanded manual for the radio hobbyist.

Harry Helms wrote this book for folks who have had no previous involvement with the shortwave radio hobby. He uses simple, non-technical language to let people in on the wonders of long distance radio reception. Harry gives beginners a clear and concise understanding of how shortwave radio works. He goes on to help newcomers pick their first receiver and decide on possible antenna solutions. His antenna selection section is sparse, but this may actually be of some benefit to beginners who can wallow in antenna lore and legend later in their listening careers.

Harry's real forte are his sections describing what a new listener might hear once he or she starts to tune in. Helms has always had an ability to turn the simple facts concerning the various broadcasters into truly enjoyable reading. This, I believe, is his key to helping someone discover the joys of monitoring. This technique continues beyond the more powerful international broadcasters into discussions of clandestine, pirate and numbers stations.

Interestingly, Harry has taken most of the traditional "hobby" aspects of shortwave listening and pulled them together in a single chapter. In this way he gives the reader a notion about logging, QSLing and the various clubs. This serves to remind us that there is a wider audience for shortwave listening than ever before. All this in spite of the fact that his book has no pictures of Bob Grove at all.

The Complete Shortwave Listener's Handbook $19.95
Fourth Edition by Hank Bennett, David T. Hardy, Andrew Yoder
Tab Books, Blue Ridge Summit, PA 17294; ISBN 0-8306-4347-8

Somewhere around my shack I have a copy of the original 1974 first edition of this book. Twenty years and several associate authors (including Mr. Harry Helms at one point) have honed this book into the most widely known beginner's radio text around.

This latest edition retains the overall flavor of the original. The initial chapters are an introduction to the hobby of shortwave monitoring including a detailed section on the terminology of the hobby. The abbreviations and jargon of our hobby can be very confusing to any beginner, so putting this information up front makes a lot of sense. Next, the book moves through a discussion of receivers and antennas. The antenna section still includes Hank's original drawings for an "aluminum foil" antenna that became the basis for Uncle Skip's grad school dorm antenna.

The "working" section of the book includes chapters on frequency allocation, propagation and reception by continental area and frequency. This last section is just the ticket to help any beginner run up their country totals in double quick time. As in previous editions, chapters on specialty signals, amateur radio, VHF and UHF are included. There are even special chapters devoted to FM and TV DXing.

The chapter on reporting and verification includes the basics of writing foreign language reports including form letters and phrases that are sure to get your point across. The ability to generate reports in languages such as Spanish, French, and Portuguese will easily double the size of your QSL card collection.

While not its primary thrust, this book has also launched quite a few people down the medium wave monitoring path (including Old Uncle Skip). The frequency allocation section gives detailed information about long distance listening on the AM broadcast band. As I stated earlier, BCB DX is a great way for someone to start out in the radio monitoring hobby without spending a lot of money. It is also a great way to start a kid down the road to a great hobby. *(Little wonder I gave Number Two Son an AM radio for his sixth birthday. He's already in the hunt — Yeah, trying to raise two boys can take up quite a bit of your writing time. Forget the nails; we've securely screwed the lid on the coffin of The Shortwave World until my nest is empty.)*

Hank Bennett has had his supporters and critics through the last twenty years. Reading through the fourth edition of his book is a lot like sitting down for an evening with a dear old friend. And I get this warm fuzzy feeling in spite of the absence of Bob Grove's likeness anywhere in the book. There is a picture of Ayatollah Khomheni, but it's just not the same.

So what's the bottom line, Uncle Skip?

Don't go calling me wishy-washy, but any of these three books can go a long way to getting you on the road to radio bliss. (Especially if you also stay tuned to Uncle Skip's "Beginner's Corner.") Give a list of all three to your relatives when your next birthday comes around. Maybe you'll score all three. If you have to limit the size of your bookshelf, check out your local public library and contact other radio friends; you may get a notion of which author's style and collection of information appeals to you most. In any case, each of these books will give back more than their cover price in knowledge. Remember, Compadre, knowledge is power.

All three books can be purchased from many of the radio booksellers who advertise in the pages of *MT*. Or, you can wait around for Old Uncle Skip to finish writing his beginner's book. You may have a bit of a wait, but I'm here to tell you it's going be a really great book . MT

Shortwave Broadcasting

Glenn Hauser
P.O. Box 1684-MT
Enid, OK 73702

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

ANGOLA VORGAN, 9550, *0446 with cock crowing, 0448 anthem, music, 0600 Portuguese news, weak // 4960, and 9550 heard past 0715; only full ID was at sign-on. Also on 7290 at 2000-2106* (Brian Alexander, PA) This UNITA station in Jamba announced that at 1050-1400 is on new 11850 (BBC Monitoring)

ANGUILLA Dr. Gene Scott's SW project here is in trouble; British government turned down for environmental reasons. Already purchased big antenna from KGEI, but may install it at KCBI Dallas instead (George Thurman, IL, *W.O.R.*)

ARMENIA Why do you refuse to list Armenia? Month after month I look forward to the listing only to find it omitted again. Please explain (Helen Takessian, Tucson, AZ) No news, no listing; if you're Armenian, why not establish direct contact with the station and keep us informed? It was mentioned in Feb. under DNESTROVIA (gh) R. Yerevan announced Dec. 15 that studios are not heated, without electricity, news was being prepared at a temperature of 5°C (BBC Monitoring) Maybe why the 0330 broadcast vanished from 7105? Summer time presumably at 0230; also 2145 and 2245?

AUSTRALIA VLW Perth closed down Jan. 21 for a one-month trial priod; 200 calls/faxes were received about discontinuing SW. Would cost US$3 million for new transmitters, antennas, not justified by listener numbers (David Martin, *OzDX*) Or $800K to fix old transmitters; may start up low power service from different location (Craig Tyson, WA, via Magne, *NU*, NASWA *Journal*) After antenna work at Shepparton, RA expected to be back on 5995 (Jerome van der Linden, FIDONET *SW Echo* via George Thurman)

BOLIVIA R. La Palabra better on new 4732.2, ex-4903.9 (Henrik Klemetz, Colombia, *Play-DX*)

BOSNIA-HERCEGOVINA R B-H varied 7059 down to 6890v (BBCM via British DX Club) (non:) via WHRI, Mon., Wed., Fri. 2330-2400 on 7315, first 10 minutes with English news phoned in from Sarajevo; gives St. Catharines, Ont., address and phone 416-988-1562.

BURUNDI R. Burundi gone from SW 6140 again since Jan. 25 (BBCM)

CHAD RNT opening later at *0455 on 4904.5 (Anker Petersen and Gaetano Domina, DSWCI *SW News*) Watch out for RFI Paris at 0530-0800 on 4902.5 = 1/2 x 9805 (Wolfgang Büschel, *ibid.*)

CHINA Yes, 0000 Sun. program on CPBS in Feb. issue is English lesson, also helpful to those like me learning Chinese. CNR Second Program has *Overseas Music Stage* daily 1330-1430 on 6890, 7516, wide variety of classical, EZL, exotic songs, also supposed to be on 4800, 11040. CRI claims 200 megalisteners worldwide, based on 554,122 letters; hard to believe, given quality (?) of programming (James E. Mahler, CA) Zhejiang PBS, Hangzhou, 4875 and 2475 has English lessons daily at 0030, 1430 (BBCM)

COLOMBIA Heard on 2nd harmonics of 6 MHz outlets in 1330-1355 period: R. Súper, 12130; La Voz del Llano, 12234v; CARACOL, 12300; and at 0025, R. Melodía, 12090 (Santiago San Gil, Venezuela, *World of Radio*) On 7300 at 1420-1500, R. Monumental, Villa del Rosario, 5 x 1460 though announcing 1480 (Fernando Viloria, Venezuela, via San Gil, *ibid.*) R. Yarima, Barrancabermeja, at 0000-0200 on 2020 = 2 x 1010, relaying Rdif. Nacional lessons (Santiago San Gil, Venezuela) R. La Voz de Cimitarra, Santander, tentative on 2805 = 2 x 1402.5 at 2310-2340 (Fernando Viloria via San Gil) R. Majagual, 5720.5 = 4 x 1430 at 0215 ID, deep fades (Hans Johnson, MD, *FT*)

COSTA RICA From March 31, all phone numbers here expand to seven digits, and ours start with 2, so voice +506-249-1821, fax +506-249-1095 (RFPI *Vista*) April 1 is the day for quarterly program schedule shifting. With increased usage of 9370 by U.S. stations, RFPI may shift from 9375 to 9400 ± 5 (gh) Lack of 3-phase power limits our output; can be more late at night when homes on same circuit are dark; not on national grid but from nearby hydro (James Latham, RFPI) New on RFPI is our *Far Right Radio Review* against KKK, neo-Nazis, far-right preachers; time TBA (RFPI via Diane Mauer)

CROATIA CRZ on 5890 ex-5895 at 0035-0112 (Tim Johnson, IL) Maybe temporary; watch out for Varna, Sofia, Bulgaria also on 5890 at times (gh) Varna 5889.6 at 0309 (Marlin Field, MI, *FT*)

CUBA RHC's folk music program *Cuba Campesina* expands to half an hour, Sundays at 1230 (*En Contacto*) on 6060, 9550, 11760. R. Victoria at 0655-0730+ on 4200 = 4 x 1050, strong here but nothing on 2x or 3x (David Gasque, SC, *W.O.R.*) (non) R. Caimán, reportedly from Guatemala, on 9965 at 1200-1500, repeated 0100-0400, sometimes longer and maybe one hour earlier during DST (BBCM)

CZECHIA R. Prague final English to us is at 0330, not 0430, on 9440, better on 7345, 5930 (Brian Alexander, PA)

DNESTROVIA R. Trans Dniestra International in English 2130-2200 on 9620 via Moscow, seems Mon., Tue., Wed., Sat. only (Kaj Bredahl Jørgensen, DSWCI *SW News*)

DOMINICAN REPUBLIC R. Clarín, super signal on 1720 = 2 x 860, at 0230 and 0340 ball game (Werner Funkenhauser, Ont., NRC *DX News*) Clarín booming in on 1819.06 at 0630-0705+; big hum, transmitter about to burst? R. Comercial at 0730-0806*v on 2020 = 2 x 1010 (David Gasque, SC, *W.O.R.*)

ECUADOR At 1959, HCJB English on 21455 USB also announces 6080; span on that frequency unknown (gh) Escuelas Radiofónicas Populares, Riobamba, gone since last May, heard again in Feb., on 5010.3 at 0037-0301*, later than listed, and from 1006, in Quechua (Hans Johnson, MD, HCJB *DX Partyline*) Monk who helped dismantle other SW services, such as Galápagos, is now manager of R. Paz y Bien, and selling their SW transmitter on 4819.7 (Henrik Klemetz, *Play-DX*)

EQUATORIAL GUINEA R. Africa, 7190.26, heard daily from *0500 with anthem and English religious programs to 0732*v, very strong, no mention of R. East Africa as in *WRTH-94* (Ernie Behr, Ont.)

ERITREA V. of the Broad Masses of Eritrea, former clandestine and now official radio, has two programs: 1) on 7020 and 5000, 0330-0600, 0930-1030, 1200-1400 Sat. and Sun., 1430-1700 (Sun. 1800) in Kunama, Tigrigna, Tigre; Tigrigna ID is *Ezi Kab Asmara Zemehalalef Medeber Radio Demtsi Hafash Eritrea Eyu*; 2) on 7380v, 4000 at 0300-0600, 0930-1030, 1200-1400 Fri. 1500-1530 Sun., Wed., Fri.; 1530-1700, in Afar, Arabic, Amharic. Amharic ID: *Yeh be Asmera ketema yemigegne yesifiw yeritrea hezeb demts yeamarigna agelgilot new*; Arabic: *Huna Asmara, Idha'at Sawt al-Jamahir al-Iritriyyah* (BBCM)

ESTONIA Reactivated 5925 includes English Mon. at 1620-1630, 2000-2030 (BBCM) English at 2000-2030 on Mon., Thu. (R. Tallinn via Mike Fanderys, SPEEDX) No, *Estonia Today* is Mon.-Fri. (Fanderys, elsewhere in SPEEDX *SW Radio Today*) Mon. and Thu. 2000-2030, hour earlier in summer (BBCM)

ETHIOPIA V. of Ethiopia, 9560, 1459 Jack-in-the-Box IS, 1500 English covered by Jordan (Brian Alexander, PA) Age-old conflict; why don't they resolve it? (gh) (non) V. of Tigray Revolution, 6770.1, from *0358 theme music, mentioned Tigray, 0405 long wild piece of local music (Dave Valko, PA, and Tony Orr, VA, *Fine Tuning*) Free R. Voice of Ethiopian Unity (see Feb.) last heard Jan. 26 (BBCM)

GERMANY Costs prompt DW to cut staff from 2100 to 1800 by early retirement (DPA via BBCM)

GOA High power 250 kW station at Bambolim near Panaji with two ABB transmitters is ready for use, testing off and on, but studios near Bombay are not ready; will also carry programs from Thiruananthapuram (Manosij Guha, *DX Grapevine* via *OzDX*)

HAITI (non) On a visit to Canada, Pres. Aristide discussed with Minister of Foreign Affairs establishing a radio station to break the rule of silence and disinfo imposed by military regime (Signal FM Radio, Port-au-Prince via BBCM) Shortwave from outside? Already as R. 16 Desanm via RMI via WHRI and WRNO (gh)

HAWAII KWHR carries *Sounds of Aloha*, successor to old *Hawaii Calls* program, Suns. 0800 on 9930; also on WHRI, Suns. 1800 on 9485 (*W.O.R.*) see also VIETNAM

HONDURAS R. Copán Internacional, HRJA, 15675, expands programming, including *Mailbag* with Jeff White, Mon.-Fri. 2330; uses 5-element beam 26° from Tegucigalpa. Half-hour blocks sell for $25, and 60-second spots are only $1; contact White at WRMI, Box 526852, Miami, FL 33152; or fax 305-267-9253 (WRMI)

INDIA Vividh Bharati service from Delhi, Madras and Bombay (and Guwahati soon) are likely to be synchronized on the single frequency 10330, presently used by Delhi (Manosij Guha, *DX Grapevine*, via *OzDX*) See also GOA

INDONESIA RRI Samarinda has new 5-10 kW transmitter on 3295.4, 1400 time signal and Kalimantan news, seems to replace 9614 (David Foster, *OzDX*)

IRAN VVIRI is expanding in a big way, new external site in south with 10 SW transmitters to be inaugurated in mid-March, adding languages ultimately to 40 (Richard Measham, BBCM, R. Netherlands *Media Network*) Called the *Sorush* (messenger) international network (*Hamshabri*, Tehran via BBCM) At Sirjan (VVIRI via BBCM) see also KURDISTAN

IRAQ (non) V. of the Iraqi People, Communist Party (Arabic: *Huna Sawt al-Sha'b al-Iraqi, sawt al-dimuqratiyah wa al-taqaddum, idha'at al-Hizb al-Shi'yu'i al-Iraqi*), 0300-0500 on 7095v, 3915v, 1700-1745 on 7095v, 3910v; also in Kurdish 1500-1645 on 7095v, 3915v; one hour earlier in summer. V. of Rebellious Iraq heard on new 5555 kHz at 1725-1823*, previously on 7090 (BBCM) see also KURDISTAN

JORDAN R. Jordan, 9830 puts strong spur on WWV 10000 and other frequencies at 170 kHz separation—9320, 9490, 9660, 10170, 10340, at 1840-2133+ in Arabic; see also ETHIOPIA (Brian Alexander, PA) Amman on new 6035 from 1800 past 2200 in Arabic // 9830 (Bob Padula, Australia) And 6035 0000-0300+ knocking out DW (Victor Goonetilleke, Shri Lanka, RN*MN*) 6035 at 1900-2200+ also has spurs ± 170 kHz at 6205, 5865 (Bob Padula, Australia) 6035 runs *1500-0200*, 11810 at *0200-1500* (Victor Goonetilleke, Shri Lanka, RN*MN*)

KOREA SOUTH R. "K'rea" has four new QSLs for 1994, showing the 400th anniversary of Seoul, a temple, a night scene and traditional court dance (R. Korea *SW Feedback*) Clandestines from South to North: R. Echo of Hope, now three hours each at 2000, 0800, 1100, 1400 on 3985; 0300 on 6348; 4th and 5th broadcast repeat the 3rd. V. of the People now two hours each at 0900, 1200, 1500, 2000 on 3912; 2300 and 0300 on 6600 (Tooru Yamashita, R. Japan *Media Roundup*)

KURDISTAN V. of Iranian Kordestan (Kurdish: *Ira Dangi Kurdistani Irana*), anti-American and anti-Islamic Republic, pro-democracy, in Kurdish and Persian on 4260v at 0230-0300, 1000-1030, 1630-1700; previously also used 7360, 7050, 5080, 4890, 4665, 4650, 4065, 3945-3965, 3935, some out of sync by several seconds, and all vary widely to avoid interference. V. of the Islamic Movement in Iraqi Kurdistan heard at 1250-1400 on 6410, 4320, 4105, at 1330 giving sked as Kurdish and Arabic daily 1230, repeated at 0500 on 77, 73, 69, 47 and 42 metres; then heard at 0500-0640 on same three; an hour of Kurdish, half an hour Arabic; added V. of Islam to name. V. of Iraqi Kurdistan, 4180v, shifted schedule to 0345-0500 and 1345-1600 in Kurdish except last 20-30 mins, in Arabic (BBCM)

LITHUANIA R. Vilnius swapped languages so that English on weekends, Lithuanian weekdays, 0000-0030 on 7150 via Russia; then inserted three minute of English news near start on weekdays too (Steven Cline, IN) Summer probably hour earlier, higher frequency.

MÉXICO R. Educación, 6185 announces this address: Box 21940, 04021 México, DF (Gigi Lytle, TX) Fax is +52-5-559-2301; phone 559-8075/3102 or 575-0919 (BBCM) Has new DX program *DX-6185*, Thu. 0400-0430, Sun. 0600-0630, Mon. 1030-1100; and mailbag at same hours Fri., Mon., Tue. (*Contacto DX* via José Elías Díaz Gómez via Santiago San Gil)

MOROCCO RTM on 15345, from 1500 Arabic program and music till 2100*, strong, on this frequency at least four years but still not in *WRTH-94*; suspect 250 kW at Nador, no longer heard on // 15330 and 15335 since VOA closed Tangier site (Ernie Behr, Ont.)

MOZAMBIQUE Maputo e Gaza program good on 6676 = 2 x 3338 listed as 10 kW where not audible, from 0247 xylo IS, past 0430 (John H. Cobb, Jr., GA, *W.O.R.*) Maputo in English 1833-1858 on 9617.6 (Mikhail P. Timofeyev, Russia, DSWCI *SW News*) Beira on 9641.2 at 1155-1215 (Vashek Korinek, South Africa, *ibid.*)

NEPAL Xinhua reported that China is willing to help R. Nepal shortwave transmissions (BBCM) Typically vague, anything from training personnel, to program exchanges to new transmitters to high-power relays via China possible (gh)

PAPUA NEW GUINEA New 9675 is permanent frequency for Karai program, 100 kW but running only about 50 (Steve Lowe, PNG, RN*MN*) Since 9675 went on, 49mb relays in Mt. Hagen, Rabaul, Keita, Alotau, Daru, Lae(?), Wewak not heard (Dean Mundy, Wewak)

PERÚ R. La Voz de Andamachay, 5547.1, new station at *2338-0112* from village of same name in Cortegana district, Celendín province, same owner as 4485 station (Henrik Klemetz, Colombia, *DXSF* via NASWA) R. Celendín, Rioja, 4012 at 0947 tropical music, ID says 4025 and 98.1 FM; not listed Frecuencia Popular, but tentative (Fernando Viloria, Venezuela, *DXPL*) R. Marañón, 4834.9 heard mornings with spurs on ± 53.6 kHz (Klemetz, *Play-DX*)

POLAND Polish R. Warsaw programs include: *DX Club* and *Letter from Poland*, Tue. 1620, 2050, Wed. 1320, 1820; *Postbag*, Fri. 1620, 2050, Sat. 1310, 1810. Fax (4822) 444123, phone (4822) 459262 (via Daryl Rocker, NY) Maybe one hour earlier for summer.

POLSKIE RADIO WARSZAWA
PROGRAM DLA ZAGRANICY

PORTUGAL R. Portugal has new daily hour for East Timor in Portuguese, Tetum at 1100; previously a program for Africa was also beamed here (BBCM) Still on 17595? (gh) English weekdays 2000-2030 on 15515, new 11975 to Africa, 9780 to Europe but UAE blocks (RVI *Radio World* via Steven Cline)

RUSSIA Ol'ga Troshina of the **RMWS** letters dept. writes me that Carl Yegorov, host of the popular *Jazz Show*, left RM for another job. The mass exodus from RMWS continues—somebody, stay put, please! (Maryanne Kehoe, GA) **V. of Assyria,** Moscow, Wed. and Sat.

1600-1700 on 12075, plus 7305 summer, 5905 winter, in Assyrian/Russian with announcements in Persian, Arabic, and one hour earlier in summer. **Rukhi Miras** (Spiritual Heritage), Moscow, Fri. 1600-1655 in Tatar, Arabic on 17890, 12075, 11630, 7160, 4055, one hour earlier in summer; phone +7 095 281 4904; write The Islamic Centre, Vypolzov pereulok 7, 129090 Moscow (BBCM) Peter Kulakov, **AWR** manager in Tula, visited Krasnodar site; it is two hours from the city in self-contained community, 1500 people in area as staff and support. Has 30 SW transmitters, all made in China; antenna farm of 60 curtains, half 4x4, the rest 4x8 and 8x8 (Adrian Peterson, *Radio News Bulletin*) AWR dropped Yekaterin'burg site, still using Samara, Novosibirsk, and near Moscow (Peterson, RN*MN*) **TWR,** Irkutsk, in Indian and Himalayan languages depending on day of week, on 7420 at 1230-1500, 9825 at 0030-0115 (Sat., Sun. 0200); address as in *WRTH-94* under Shri Lanka (David Martin, *OzDX*) **Green Music Radio International,** 3020 or 6990 with 200 watts, Sats. from 2200, address as last month, verie signer DJ Petrovich. Active at same hour is **R. Without Borders Int'l** on 3905 or 3920, 150 watts, Box 29, Moscow 109444, v/s Artyom Prohorov, phone +7 0953762027. Via RWBI on 3913 at 2300 was **Domashnese Radio. R. Black Sea Int'l,** 6860, Sat. eves, Box 10, Sevastopol', Crimea, Ukraine (Oleg Merkulov, Rostov/Don, *Play-DX*)

SERBIA (non) R. Yugoslavia, English to Pacific at 1330 on 11865 ex-11835 (Joe Hanlon, PA) And at 0100 to us on 6195 ex-6190 but 0200 still 6190 (Eugene, RVI *Radio World*) Beware half-hour shifts Mar. 27.

SEYCHELLES FEBA receives some 50 kiloletters per month from listeners (Adrian Peterson, *Radio News Bulletin*) Incredible load, mostly from India?

SINGAPORE R. Singapore International began new 250 kW external service Feb. 1, English on 9530 at 2300-2400, 1100-1300; about same times Chinese on 9635, Malay on 9590 but these were swapped; designed to cover SE Asia, replacing old MW transmitters. Fax 65 2591380, write P.O. Box 5300, Singapore 9128 (BBCM) Box 60, and voice phone 353-5300 (Jonathan Marks, RN*MN*) Has six 250 kW, one 100 kW at Kranji, same site as BBC (David Martin, *OzDX*) Chinese on 9550, not 9590; and Malay 9635 has jamming intended for Taipei 9630 (Bob Padula, Australia) English not at 23 but at 0000-0100 on 9530 (Victor Goonetilleke, Shri Lanka, RN*MN*)

SLOVAKIA Four 250 kW transmitters at Rimavska Sobota (meaning Romanian Sabbath) are designated 7 thru 10; AWR uses 9 and 10, R. Czechia and R. Slovakia use 7 and 8. As these are reduced, AWR may use a third one. AWR uses 7 of the 12 curtains, all of which are slewable horizontally and three of which are slewable vertically (Adrian Peterson, *Radio News Bulletin*) So R. Prague still has some usage of Slovakia facilities (gh) At 0615 on 13715 heard AWR with a box address in Abidjan, Ivory Coast; where is this from? (Ralph Famularo, Japan) Here

SOMALIA R. Mogadishu, 6810.0 USB only, 1723-1759* (Harald Kuhl, Germany, DSWCI *SW News*)

SWEDEN R. Sweden has cut back on the time allocated to me to write *MediaScan*. The program will only air on first and third Tuesdays, and will be even more Nordic than previously (George Wood, *SCDX* via *DX Ontario*) Do they really think worldwide audience cares a whit about domestic Swedish radio and satellite developments? Mid-Feb. switched 0330 from 6195 to 6040 (Joe Hanlon, PA, *W.O.R.*)

SWITZERLAND (non) From Feb. 1, SRI via Brasília at 0030-0300 299° on 5905 ex-17740 (Telecom) 17740 had not been propagating all winter, and Larry Nebron persuaded them to move (Joe Hanlon, PA) At first a disaster with RTTY 5904 blocking English at 0100; other nights OK with RTTY on high side, better than direct 6135 and often inaudible 9885. SRI's own French Guiana relay should soon improve our reception (gh)

TURKMENISTAN Asgabat's foreign service, V. of Turkmen, uses 5015 on Tue., Thu., Sat. 1900-2000, including 3-4 minutes of English news after Turkmen at times varying between 1908 and 1920 (Eugene, RVI *Radio World* via Mauer and Cline) English also at 0210 (BBCM via RN*MN*) Times may be one hour earlier for summer.

UKRAINE Ukrainian Radio, First Pgm. at 0400-2300 on 7235, 7245, 7285, and harmonics 9180 and 10710, exact times not established, and one hour earlier during summer; Lugansk local programs on 15260, 7245. First program is news and info. Second Pgm., *Promin*, music and entertainment with news on the hour, 24h on 9620, 6070. Third Pgm., partly in Russian with music, literature, culture, Mayak, VOA relays, irregularly on 13795; and 4940 (BBCM) Harmonics of what?

URUGUAY R. Integración Interamericana, Rivera, irregular and partly in English 0100-0200 on 6045.1, 1 kW (Takayuki Inoue Nozaki, *Relámpago DX* via *Radio Nuevo Múndo*)

USA R. Free Asia was approved by the U.S. Senate, for China, Burma, Cambodia, Laos, North Korea, Tibet, Vietnam; under USIA but separate funding required (Reuter via Patrick Crumhorn, TX) China, North Korea and Vietnam promptly denounced it (BBCM)

R. Free Europe's new Serbo-Croat service not as given last month but 1700-1800 and 2100-2200 on 5985, 7115, 7145, 9695, 11815, 15370, one hour earlier in summer, soon adding AM and FM (BBCM)

VOA scripts, news and most other English programming can now be accessed via Internet (VOA *Communications World*) GOPHER.VOA.GOV or FTP.VOA.GOV (Chris Kearn, VOA, RN*MN*)

La Voz de la OEA—see last month—replaced 9535 with 9670, now Greenville (John Vodenik) Ice storm Feb. 9 caused 4 of 5 S. American antennas at Bethany to burn down, maybe one African too, so transmissions shifted to Greenville (John Vodenik, VOA Bethany via Diane Mauer)

World of Radio on WHRI, available times, but not all used every week: Fri. 2229 on 13760, Sat. 0600 on 7315, Sun. 0130 on 7315, Mon. 0100 on 9495, 2229 on 13760. On WWCR, expected timeshifts April 3: Fri. 2115 on 15685, Sat. 0630 (or 0625 or 0635) on 7435, Sun. 0315 on 7435, 0600 on 5810, 2300 on 15685, Tue. 1230 on 15685. Also on KWHR, RFPI as before.

WJCR FM 90.1
WJCR World Wide
Reaching the Whole World With the Gospel!

WJCR's third 50-kW converted RCA transmitter should be in service now on 7490, and No. 1 will be retuned to 13595 for China service; No. 4 is due later this year, for 13595 and No. 1 then moved to 5920 (Adrian Peterson, IN) We will add three more super power stations to complete our worldwide network into EVERY nation in the world (Don Powell, WJCR via Diane Mauer) From three more sites, and one transmitter is being built in China (WJCR via Kenneth Vito Zichi, MARE via *DXPL*) Doubt this, misunderstanding?

FCC's press release on bust of *Fury V* never mentions Bro. Stair, but concentrates on Allan Weiner and RNI involvement, who are under permanent restraining order not to engage in illegal broadcasts. Stair had ignored advice from religious broadcasting colleagues not to get involved with RNI. Johnny Lightning called Stair on the air complaining that 75 of his valuable program tapes had been confiscated by another Brother and destroyed (via Diane Mauer, Bruce Elving) Weiner reported Scott Becker was "on vacation" at time of raid, but Stair said Becker had been expelled in early January for un-Christian behavior. Becker was known to have operated ham radio from on board. (See Outer Limits for more.)

VANUATU R. Vanuatu uses 3945 at 1900-2300, 0600-1115 (Sun. 1000), and 7260 at 2200-0700; address is Private Mailbag 049, Port Vila (Tetsuya Kondo, Vanuatu, R. Japan *Media Roundup*)

VIETNAM (non) R. Miami International began daily Vietnamese program via KWHR Hawaii Feb. 10, *Forum For Democracy*, sponsored by Vietnam Restoration Party, California, 1400-1430 on 9930 (RMI)

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

Broadcast Loggings

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

0012 UTC on 5930
CZECH REP: Radio Prague. Report on national housing mortgages. (Bob Fraser, Cohasset, MA) U.S. political news update at 2200. (Jim Moats, Ravenna, OH)

0015 UTC on 9540
SPAIN: Spanish National Radio. commentary on the Israeli-Palestine peace problems. (Fraser, MA) National and world news heard at 0500 on 9540, *Window on Spain* program and language lesson. (Paul F. Jablonowski, Greenfield, WI; Don Smith-N2PTF, Morrisville, NY)

0027 UTC on 6010
CUBA: Radio Havana. *Spotlight on the Americas*, Argentina's economic woes. (Fraser, MA) ID and preview heard on 6180 at 2200. (Moats, OH) Havana on 9510 at 0330 with *DXers Unlimited* //6010. (Smith, NY)

0035 UTC on 5900
BELGIUM: Radio Vlaanderen Int'l. *Belgium Today* featuring NATO Summit. (Fraser, MA; Tom Banks, Dallas, TX)

0123 UTC on 3380
GUATEMALA: Radio Chortis. Spanish. Marimba instrumentals. Local time check, ID and program preview. Special presentation of Mexican ranchera music program. (Banks, TX)

0149 UTC on 7165
RUSSIA: Radio Moscow Int'l. *Children Performing* music program. Kremlin bell tones to ID at 0200. International newscast. (Moats, OH) *Russian By Radio.* (Fraser, MA)

0300 UTC on 3255
LESOTHO: BBC relay. World and national newscast to sports roundup. (Errol Urbelis, Kings Park, NY)

0318 UTC on 6803.5
PERU: Ondas Del Mayo. Spanish. Talk to Peruvian huaynos music. ID, time check, and announcements. (Larry Van Horn, Brasstown, NC) Peru's Radio Atlantida on 4790, 1030-1110 with Andean music, time checks. (Urbelis, NY)

0330 UTC on 4990
SURINAME: Radio Apintie. Sranan Tongo. Actual frequency as 4.8914 MHz. Upbeat East Indian music. Rapid announcements and strong signal, usually very weak. An exceptional Latin American evening! (Washburn, ME)

0335 UTC on 9695
SWEDEN: Radio Sweden. *In Touch With Stockholm* program and // 11650 considerably better signal. (Smith, NY)

0422 UTC on 6115
PERU: Radio Union. Spanish. Announcer duo. Time check at 0430, two local commercials, and ID as, "Union Radio en Lima Peru" at 0435. Peru's Radio Tropical in Tarapoto, Peru, on 4935.1 at 0323-0349.(Garland Thomas, Cleveland, OH)

0602 UTC on 3222
TOGO: Radio Togolaise-Kara. French. Low audio for news, local information, and African hilife music. (Urbelis, NY) Radio Togolaise-Lome monitored on 5047.02 at 2015 in vernaculars. Interval signal, ID as "Radio Lome". (Giovanni Serra, Rome, Italy) Audible on 5047.5, at 2353 to 0002 sign-off. (Banks, TX)

0603 UTC on 3944.9
VATICAN STATE: Vatican Radio. Vatican news update to interview on Bosnia conflict. Heard on // 6245. Italian service audible on 5882 at 2008, interviews and classical music. (Serra, Italy) English to Africa on 11625, 15090, 17730 (Smith, NY; Banks, TX; Charlie Patterson, Mobile, AL)

0638 UTC on 17710
SOUTH AFRICA: Channel Africa. Features to reggae tune. Station ID, time check and *News Roundup* show. Sign-off 0655. Station monitored on 15240 at 1541 with feature on Nigeria. (Serra, Italy)

0730 UTC on 7275
MONROVIA: ELBC. English on Liberian politics. (Washburn, ME) Radio ELWA on 4760 from 2143-2200. Interesting programming of missionaries delivering messages throughout Africa. (Timothy Treble, Palm Harbor, FL) Religious programming on 4760 at 0602-0710. (Urbelis, NY)

0800 UTC on 9545
SOLOMON ISLANDS: SIBC. Station ID, local interest news and taped speech. (Jeff Woodard, Eureka, CA) Station monitored on 5020 at 0935-1010 // 9545 with local programming. (Urbelis, NY)

1000 UTC on 3290
ECUADOR: Radio Centro. Spanish. Local news and personal messages. Frequent time checks, station IDs. Ecuadorian La Voz del Napo audible on 3280 at 1045. (Washburn, ME) Also audible on 3279.8 at 1030-1110. (Urbelis, NY)

1116 UTC on 7210
SWITZERLAND: Red Cross Radio. Red Cross news to 1123 ID into French programming with ID as, "ici Geneve Service international." (Serra, Italy) Swiss Radio International heard on 6110 at 2007, with commentary on Swiss soldiers part of U.N. peacekeeping forces. (Serra, Italy)

1130 UTC on 2360
GUATEMALA: Radio Maya de Barillas. Marimba music to ID and local announcements in Quecha, weaker // 3325. (Washburn, ME) Guatemala's Radio Tezulutlan heard on 4835 at 0020-0040. (Wright, MS) & 1100-1200 on 4835. IDs and public service notices. (Urbelis, NY)

1200 UTC on 4926
INDONESIA: (Sumatra) RRI Jambi. Indonesian. Local Indonesian music to "Song of the Coconut Islands" interval signal. (Washburn, ME)

1347 UTC on 9930
UNITED STATES: KWHR Hawaii. Chinese to 1400, then English. Poor signal with heavy fading. Carrier off 1359-1400. (Mike Hardester, Jacksonville, NC)

1649 UTC on 4825
UKRAINE: Radio Ukraine Intl. Ukrainian. Folk music to international news topics. Signal, ID and frequency quote at 1700. (Serra, Italy)

1828 UTC on 9165
SUDAN: Sudan Nat'l BC. *Focus of National Development.* Vocal music to 1855 newscast. English service sign-off as "Sudan National Broadcasting Corporation in Omdurman." Frequency quote, Arabic programming at 1900 fading. (Hardester, NC)

1850 UTC on 9535
ALGERIA: RDTV Algerienne. Arabic vocals to Arabic announcers.No programming noted on // 17745 but interference from 9530 over modulation. Lady announcer's newscast at 1900. (GVH/NC)

1930 UTC on 15270
ECUADOR: HCJB. Studio 9 program featuring *What's Cooking in the Andes* with Karen Schmidt. *DX Party Line* heard on 21455 at 1935 featuring the 20th anniversary of Andex. (Fraser, MA)

2055 UTC on 4935
KENYA: Kenya BC. English newscast to local updates. Station IDs to "middle-of-the-road" music. Station sign-off 2108. (Urbelis, NY)

2059 UTC on 9575
MOROCCO: Radio Meditterranee Int'l. French. Rock music. "Medi Un" ID at 2100 by French DJ. American "hip hop" music to 2159. ID and world news past 2210. Very good signal. (Brian Bagwell, St. Louis, MO)

2145 UTC on 3316
SIERRA LEONE: SLBC. English newscast to local interest announcements. Time check to public service announcements and station ID. (Urbelis, NY)

2200 UTC on 5920
CROATIA: Croatian Radio. English. European news update to program announcements. Station audible on // 5895. (Washburn, ME) Station monitored on 9830 at 0759-0815. ID as "Hrvaski Radio." News, classical music program and features on // 5920. (Serra, Italy)

2200 UTC on 6005
CANADA: CFCX-Montreal. Station ID to news headlines. *Sports Talk* at 2203. (Fraser, MA) CKZN-St. John's Newfoundland heard on 6160 at 2200, with *World at Six* from CBC. CFRX-Toronto on 6070 at 2045. (Moats, OH; Hillton, SC; Sam Wright, Biloxi, MS)

2205 UTC on 5052
SINGAPORE: SBC-Radio One. Upbeat *Good Morning* program with pop music from British accented DJ. Numerous IDs as "Radio One" and "90.5 FM." (Washburn, ME)

2206 UTC on 17830
UNITED STATES: Radyo 16 Desanm via WHRI. Announcer in Creole to French vocals. News report and speech. La Voz de Alpha 66 via WHRI heard on 9495 at 2304 in Spanish. Commentary on Castro, Cuba and embargos. La Voz de la Fundacion via WHRI audible on 9495 at 0054 in Spanish. Announcer duo with news script. (GVH/NC)

2232 UTC on 4845
MAURITANIA: ORTM. Arabic. Islamic call to prayers to announcer break at 2236. Arabic musical vocals to ID announcement and news at 2300. (Frank Hillton, Charleston, SC; Urbelis, NY)

2240 UTC on 4870
BENIN: ORTM. African highlife music program. French DJ format with listener phone-in chats. Afro pops to station ID at 2300, national anthem and 2302 sign-off. (Hillton,SC) Vernacular language with long chat to ID on 5025 at 1750. Benin's Radio Parakou heard this frequency at 1809 in French. (Serra, Italy)

2310 UTC on 7475
TUNISIA: Radio Tunisia Int'l. Arabic. Holy Koran recitations to 2315. Programming intros to Arabic music. Station ID/ kilohertz quote. Station sign-off 2317, no national anthem. (Hillton, SC)

2338 UTC on 4830
VENEZUELA: Radio Tachira. Spanish. DJ style format of program news, and IDs. Two additional Venezuelans monitored; La Voz del Cinaruco on 4865 at 0415, Ecos del Torbes on 4980 at 0430. (Smith, NY)

2340 UTC on 2340
ECUADOR: Escuelas Radiofonicas Populares. Spanish. Guitar ballads at tune-in. Time check break at 2345 with "echo effect" station ID. Lady's evening program preview. Ecuador's Radio Quito heard on 4919.9 at 0224. (Banks, TX)

The Season Is Upon Us!

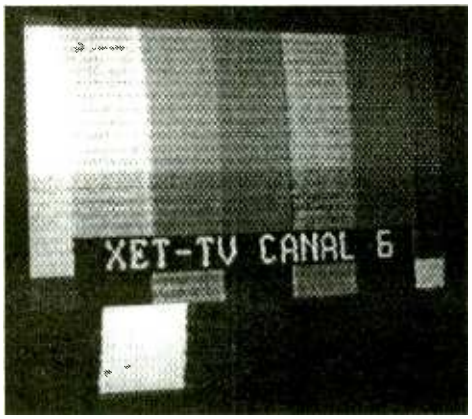
TV DX season, that is! With normal home receiving equipment, only an indoor antenna, and a basic understanding of VHF-UHF propagation, you can view distant television signals without a satellite earth station or microwave link.

Watch channels 2-6 for TV's Sporadic E skip signals; on rare occasions even channels 7 or 8 may be enhanced.

TV stations usually will QSL a report. Some even have printed QSL cards. Dedicated TV DXers photograph identification slides to include with the report. Film of 200 or 400 ASA does a fine job of reproduction for the Van Horn's. If a tripod is available, set it up in front of the TV!

If DXing TV sounds interesting, contact Universal Radio Inc., at 1-800-431-3939 for the 1994 edition of *TV Journal*. The 1994 version includes divisions by call letters, city and state.

The *VHF-UHF Digest* offers in-depth news and discussions in their monthly magazine of the Worldwide TV-FM DX Association. For more information write; P.O. Box 514, Buffalo, NY 14205-0514.



XET-TV, channel 6 in Saltillo, Mexico, was caught by the author in Brasstown with only an indoor antenna.

ALBANIA

Radio Tirana International, 9580 kHz. Full data station card signed. Handwritten note, station brochure, and Albanian flag. Received in 68 days for an English report. Station address: Radiotelevisione Shqitar, Internal Service, c/o Correspondence Section, Rrug Qemali, Tirana, Albania. (LeRoy Long, Edmond, OK)

BELGIUM

Radio Vlaanderen International, 7370/9930 kHz. Full data Bosch 1400 painting picture card, unsigned. Station stickers and brochures enclosed. Received in 63/74 days for an English report and souvenir postcard. Station address: P.O. Box 26, B-1000 Brussels, Belgium. (Long, OK; Charlie Patterson, Mobile, AL)

CANADA

VAU, 2598 kHz USB. Full data prepared card verified and station letter signed by Fred Webster-Telecom Ops Manager. Received in 20 days for an English utility report. Station address: c/o Yarmouth CG Radio Station, P.O. Box 37, Yarmouth, Nova Scotia BFA 4B1. Steve McDonald, Pt. Coquitlam BC Canada)

GREECE

Voice of Greece, 9420/9380/11645 kHz. Full data historical scenery card with illegible signature. Received in 56/348 days for an English report. Station address: ERT SA, Director of Engineering & Development. P.O. Box 600 19, 153 10 Aghia Paraskevi Attikis, Athens, Greece. (Thomas P. Risher, Whittier, CA; Long, OK; Brian Bagwell, St. Louis, MO)

NEW ZEALAND

ZLXA-Print Disabled Radio, 3935 kHz. Full data station logo card signed by Brian Stokoe-QSL/Station Manager. Received in 14 days for an English report, tape of broadcast, and two U.S. dollars for postage. Also received a personal letter and various station promo material. Station address: P.O. Box 360, Levin 5500, New Zealand. (David Gasque, Orangeburg, SC) *900 watts!*

NORWAY

LN2A-Norwegian Telecommunications Authority, 7870 kHz. No data form letter signed by Ayumu Ohta-Senior Engineer. Received in 343 days after 2nd followup report via Norwegian Embassy in Washington, DC. Station address: NTRA, Parkveien 57, P.O. Box 2592, Solli, N-0203 Oslo, Norway. (Hardester, NC)

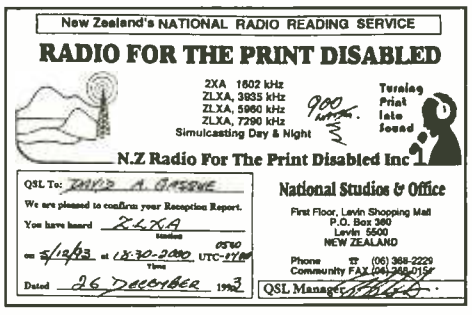
PAPUA NEW GUINEA

P2M-13042 kHz USB. Full data prepared QSL card verified and personal letter signed by J.B. Misirom-Sup. Received in 18 days for an English utility report. Station address: c/o Port Moresby Coastal Radio, P.O. Box 1378, Boroko NCD, Papua New Guinea. (McDonald, CAN) *Their first report from Canada!*

SHIP TRAFFIC

M/V SEA FOX-KBGK, 500 kHz (Container Cargo). Full data QSL signed by Mark A. Calderazzo WB4UOK-Radio Officer, while I was touring the ship in Dundalk Terminal, in Baltimore, Maryland, at their invitation. Radio Officer is also an *MT* subscriber who gave my wife and I a four hour tour of the ship and Radio Room, plus lunch at the captain's table with the Captain! A fantastic day and a QSL on the spot! Ship address: c/o Crowley American Transport Inc., P.O. Box 2110, Jacksonville, FL. (Hank Holbrook, Dunkirk, MD) *WOW!*

AFRICAN DAHLIA-ELAG6, 500 kHz (Bulk Carrier). Full data letter signed by Arie Bijl-Captain. Received in 1 year for an English utility report and mint postage. Ship address: c/o Seaboard Ship Management, Inc., 440 Sawgrass Corporate Parkway, Suite 210, Sunrise, FL 33325. (Holbrook, MD) *1,229 QSLs on 500 kHz.*


New Zealand's NATIONAL RADIO READING SERVICE

RADIO FOR THE PRINT DISABLED

2XA 1602 kHz
ZLXA, 3935 kHz
ZLXA, 5960 kHz
ZLXA, 7290 kHz
Simulcasting Day & Night

900 watts

Turning Print into Sound

N.Z Radio For The Print Disabled Inc

QSL To: DAVID A. GASQUE

We are pleased to confirm your Reception Report.

You have heard ZLXA

on 5/12/93 at 13:30-2000 UTC-17/18 0530 Times

Dated 26 DECEMBER 1993

National Studios & Office

First Floor, Levin Shopping Mall
P.O. Box 360
Levin 5500
NEW ZEALAND

Phone (06) 368-2229
Community FAX (04) 360-015

QSL Manager

David Gasque, Orangeburg, SC, received this QSL in just 14 days. See details above.

GLOBAL SENTINEL-WRZU, 156.65 MHz (AT&T Cable Laying & Repair). Full data prepared QSL card verified, and "Welcome Aboard" pamphlet. Received in 166 days for an English utility report and mint stamps. Ship address: c/o Transoceanic Cable Ship Co. Inc., 340 Mt. Kemble Ave., Ste # S-210, Morristown, NJ 07960. (Holbrook, MD)

SOUTH AFRICA

ZSC-2850 kHz USB. Full data QSL signed by Mr. Hadley. Frequency list and station history sheet enclosed. Received in 62 days for an English utility report. Station address: c/o Capetown Marine Radio, Private Bag, Milnerton 7435 South Africa. (McDonald, CAN)

ST. HELENA

Radio St. Helena, 11092.5 kHz USB. Full data station logo QSL card signed by Tony Leo-Station Manager. Received in 110 days for an English report, souvenir postcards and 3 IRCs. Station address: The Castle, Jamestown, St. Helena, South Atlantic Ocean. (Steven Cline, Indianapolis, IN)

TAIWAN

Voice of Asia, 7445 kHz. Full data QSL card unsigned. Magazine and station info sheet enclosed. Received in 30 days for an English report, tape of broadcast, and 3 IRCs. Station address: P.O. Box 880, Kaohsiung, Taiwan, Rep. of China. (Gasque, SC)

THAILAND

Radio Thailand, 9655 kHz. Full data Thai dancer card unsigned. Received in 97 days for an English report and one U.S. dollar. Station address: Ext. Service, Rajchadamnern Klang Rd., Nakhon Region, Bangkok 10200 Thailand. (Harold Frodge, Midland, MI)

TURKS & CAICOS ISLANDS

Radio Vision Cristiana International, 535-AM. Full data station card signed by Bob Janney KA4NYO-Chief Engineer. Received in 102 days for an AM report, mint stamp, address label (used). Station address: P.O. Box 2908 Paterson, NJ 07509. (Hardester, NC)

UNITED STATES

KTBN, 7510 kHz. Full data station logo/antenna card, unsigned. Received in 3 days for an English report. Station address: 2442 Michelle Dr., Tustin, CA 92680. (Risher, CA)

WNNZ, 640-AM. No data personal note on station letterhead, signed by Curt Hahn-President. Stickers, coverage map and info sheet enclosed. Received in 12 days for an English AM report and an SASE. Station address: P.O. Box 30064, Springfield, MA 01103, phone: 413-562-7666. (Frodge, MI)

WCPC, 940-AM. Full data letter signed by Robin H. Mathis- Manager. Received in 26 days for an English AM report and an SASE. Station address: Rte. # 2, Box 10C, Houston, MS 38851, phone: 601-456-3071; FAX 601-456-3072. (Frodge, MI)

WJIB, 740-AM. Full data station cards signed by Peter George-NIGGP. Received in 8 days for an English AM reports of two DX test, mint stamps and address label (unused). Station address: P.O. Box 848, Needham Heights, Boston, MA 02194. (Hardester, NC)

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 Savings Time) 4, 5, 6 or 7 hours for Eastern, Central, Mountain or Pacific Time, respectively.

Note that all dates, as well as times, are in UTC; for example, the BBC's "John Dunn Show" (0030 UTC Sunday) will be heard on Saturday evening (8:30 pm Eastern, 5:30 PM Pacific) in North America, not on Sunday.

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

Some selected programs appear on the lower half of the page for prime listening hours—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
na: North America
ca: Central America
sa: South America
eu: Europe
af: Africa
me: Middle East
as: Asia
au: Australia
pa: Pacific
va: various
do: domestic broadcast
om: omnidirectional

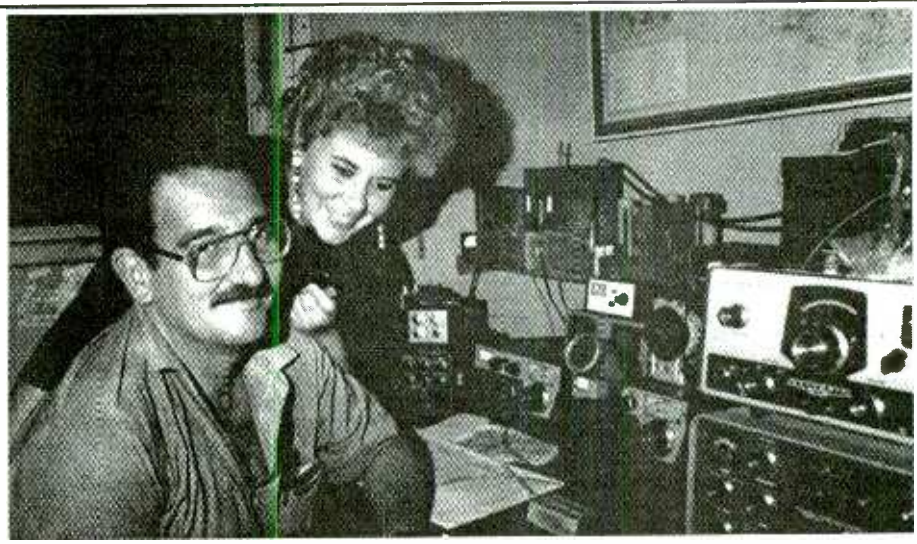
Consult the propagation charts. To further help you find the right frequency, we've included charts at the back of this section which take into account conditions affecting the audibility of shortwave broadcasts. Simply pick out the region in which you live and find the chart for the region in which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

Hot News and Hot Spots

Daylight Savings Time

Here is a "timely" reminder that this time of year some countries in the Northern Hemisphere, but not all, change to Daylight Savings Time, and some countries in the Southern Hemisphere, but not all, change back to Standard Time. Some countries change on the last Sunday in March, and others (the U.S. included) change on the first Sunday in April.

MT does not automatically change the frequency or program listings, but waits until it receives or monitors the new season's schedule. So, if you don't find your target program where you expected to find it, you may want to try for it an hour earlier (if in the Northern Hemisphere). We will appreciate your updates during this time of transition.



BBC

Coinciding with aforementioned time change, the BBC World Service jumbles some of its programming: The half-hour *Newsdesk* goes off 0000 and 0700 UTC, and comes on at 0400 and 2300, bumping feature slots at 0415, 2315. *British News* is daily at 0009 instead of 2209 UTC. *World Business Report/Review* can be found at 2205 instead of 2305. *Omnibus* moves to Tue. 2330 from Wed. 0030. *From Our Own Correspondent* will be Wed. 1515, not 2315. *On Screen,* Wed. 1730 ex-Mon. 2315. *Concert Hall,* Wed. 0015 ex-Tue. 2315. *Ray on Record*, Tue. 0015 ex-Sun. 2315.

Late March Specials: *An Ice Cream Sundae*, Sat. 26th 1901, Mon. 0101, 1515; *Black Pearls*—caviar, Sun. 27th 0230, 1615, Mon. 0730; *Hunting Mr. Homer*, Sun. 27th 1401, 2330, Mon. 0630, 1001. *Jazz Score*, 8 weeks from Mar. 27, Suns. 2030, Mons. 1215, Tues. 0230 (*BBC Worldwide*, compiled by Glenn Hauser)

CUBA

DXers Unlimited host Arnie Coro, CO2KK, sends a picture of himself and wife Olga "at the ham radio corner of my shack...I receive a lot of mail from US and Canadian listeners and many are interested in amateur radio. That is the reason I include ham radio as part of DXer's Unlimited's menu!

"*DXers Unlimited* is on the air two days in the week with several reruns to Europe, the Caribbean and North America. It is now on its 420th edition, of which I have made the last 380 or so. It takes a lot of time to select materials, write and tape the program. But it is really worth every minute as listener feedback is fantastic!" He adds, "Once again, keep that excellent magazine alive. Keep including simple technical articles and materials for beginners."

MT Monitoring Team

Gayle Van Horn, Frequency Manager
North Carolina

Dave Datko
California

B.W. Battin
New Mexico

Next Reporting Deadline
April 22, 1994

Jim Frimmel, Program Manager
Texas

Jacques d'Avignon
Propagation Forecasts
Ontario, Canada

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
China Radio Int I
Czech Republic
Monitor Radio Int I [T-F]
Radio Australia
Radio Canada Int I [S-M]
Radio Havana Cuba [T-S]
Radio Moscow
Radio New Zealand Int I [M-A]
Radio Norway Int I [M]
Radio Thailand
Radio Vilnius
Radio Vlaanderen Int I
Spanish National Radio
Voice of America (am/as/ca)
WWCR #3 [S-M]
0003
Radio Pyongyang
0008
China Radio Int I*
0010
Radio Havana Cuba [S-F]*
Voice of America (ca) [T-A]*
0030
HCJB
Radio Havana Cuba [T-A]
Radio Moscow
Radio Nacional de Venezuela [T-S]
Radio Netherlands Int I
Radio Sweden [T-A]
Voice of America (am/as) (Special English)
Voice of America (ca) [S-M] (Special English)
0045
Korean World News Service
0057
Spanish National Radio [F]

0100 UTC
(9:00 PM EDT, 6:00 PM PDT)
All India Radio
BBC
Czech Republic
Deutsche Welle
FEBC (Philippines)
Monitor Radio Int I [T-F]
R Slovakia Int I
Radio Australia
Radio Havana Cuba
Radio Japan
Radio Korea
Radio Moscow
Radio New Zealand Int I [M-A]
Radio Tashkent
Radio Thailand
Radio Ukraine Int I
Radio Yugoslavia
RAI Italy
Spanish National Radio
Swiss Radio Int I
Voice of America (am/as/ca)
Voice of Indonesia
WWCR #3 (5810) [S]
0103
Radio Bulgaria
0110
Radio Australia [M-F]*
Radio Havana Cuba [S-F]*
0123
Radio Sweden [T]
0130
Radio Austria Int I
Radio Havana Cuba [T-A]
Radio Moscow
Radio Netherlands Int I
Radio Sweden [T-A]
Radio Tirana
Voice of Greece [M-A]
0145
BBC (as) [M-A]*
BBC (ca) [T-A]*
0155
Vatican Radio [S-W-F]
Voice of Indonesia
0157
Spanish National Radio [F]

0200 UTC
(10:00 PM EDT, 7:00 PM PDT)
BBC (Newsdesk)
Christian Science Sentinel [A]
Deutsche Welle
KVOH [T-A]
Monitor Radio Int I [T-F]
Radio Australia
Radio Canada Int I
Radio Havana Cuba [T-S]
Radio Moscow
Radio New Zealand Int I [M-A]
Radio Norway Int I [M]
Radio Romania Int I
Radio Thailand
Radio Yugoslavia
Voice of America (am) [T-A]
Voice of America (as)
Voice of Myanmar (Burma)
0203
Voice of Free China
0210
Radio Havana Cuba [S-F]*
0215
Radio Cairo
Radio Nepal
0230
HCJB [M]
Radio Havana Cuba [T-A]
Radio Moscow [T-A]
Radio Netherlands Int I
Radio Pakistan
Radio Portugal Int I [T-A]
Radio Sweden [T-A]
Radio Tirana
0245
Korean World News Service

0300 UTC
(11:00 PM EDT, 8:00 PM PDT)
BBC
China Radio Int I
Christian Science Sentinel [A]
Czech Republic
Deutsche Welle
HCJB [T-S]
KVOH [T-A]
Monitor Radio Int I [T-F]
Radio Australia
Radio Budapest Int I
Radio Canada Int I
Radio Havana Cuba
Radio Japan
Radio Moscow
Radio New Zealand Int I [M-A]
Radio Norway Int I [M]
Radio Thailand
Voice of America (af)
WHRI #2 (7315) [T-A]
WWCR #1 (7435) [S]
WWCR #3 (5810) [T-A]
0303
Voice of Free China
0308
China Radio Int I*
0309
BBC*
0310
Radio Havana Cuba [S-F]*
0315
BBC (as) [S]*
Radio Cairo
0320
Radio Philipinas [M-A]
0330
BBC (af)*
Radio Austria Int I
Radio Dubai
Radio Havana Cuba []
Radio Moscow
Radio Nacional de Venezuela [T-S]
Radio Netherlands Int I
Radio Sweden [T-A]
0340
Voice of Greece [M-A]
0345
Radio Yerevan
0355
Radio Japan [M-W]

0400 UTC
(12:00 AM EDT, 9:00 PM PDT)
BBC (Newsdesk)
BBC (af)
Channel Africa
China Radio Int I
Christian Science Sentinel [A]
Czech Republic
Deutsche Welle
Monitor Radio Int I [T-F]
Radio Australia
Radio Canada Int I
Radio Havana Cuba [T-S]
Radio Moscow
Radio New Zealand Int I [M-F]
Radio Romania Int I
Radio Tanzania
Radio Thailand
Swiss Radio Int I
Voice of America (af/me)
Voice of Turkey
WHRI #2 (7315) [T-A]
WWCR #1 (7435) [T-S]
WWCR #3 (5810) [T-A]
0403
Radio Pyongyang
0408
China Radio Int I*
0410
Radio Havana Cuba [S-F]*
0411
Channel Africa [T]
0415
RAI Italy
0430
Channel Africa [A]
Radio Havana Cuba [T-A]
0431
Channel Africa [T/H/F]
0445
BBC (af) [T-F]*

0500 UTC
(1:00 AM EDT, 10:00 PM PDT)
BBC ("Newshour")
Channel Africa
Christian Science Sentinel [A]
Deutsche Welle
HCJB
Monitor Radio Int I [T-F]
Radio Australia
Radio Havana Cuba [S-F]
Radio Japan
Radio Moscow
Radio New Zealand Int I [A-S]
Radio New Zealand Int I [M-F]*
Radio Thailand
Spanish National Radio
Swiss Radio Int I (eu)
Vatican Radio [A]
Voice of America (af/me)
Voice of Israel
WWCR #1 (7435) [T-A]
0501
Channel Africa [A-S]
0503
Radio Bulgaria
0510
Radio Australia [M-F]*
Radio Havana Cuba [S-F]*
0530
Channel Africa [F-M/W]
Radio Austria Int I
Radio Dubai
Radio Finland [M-A]
Radio Havana Cuba [T-F]
Radio Moscow
Radio Romania Int I
Radio Thailand
Voice of Nigeria
0531
Channel Africa [T]
0548
Channel Africa [A]
0550
Radio Finland [S]

0600 UTC
(2:00 AM EDT, 11:00 PM PDT)
BBC
BBC (af) [A-S]*
BBC (af) [M-F]
Channel Africa
Deutsche Welle
Monitor Radio Int I [T-F]
Radio Australia
Radio Canada Int I [M-F]
Radio Havana Cuba
Radio Korea
Radio Moscow
Radio New Zealand Int I [M-F]*
Swiss Radio Int I
Swiss Radio Int I (eu)
Voice of America (af) [T-F]
Voice of America (me)
Voice of Kenya
Voice of Malaysia
WWCR #1 (7435) [W-H]
0603
Radio Pyongyang
0609
BBC*
0610
Radio Havana Cuba [S-F]*
0627
BBC (af) [M-F]*
0630
Channel Africa [W]
Radio Austria Int I [T-S]
Radio Havana Cuba [T-A]
Radio Moscow
Vatican Radio [H]
Voice of Nigeria [M-F]
0632
Radio Romania Int I
0640
Vatican Radio [T]
0645
Radio Romania Int I

Voice of Nigeria [M-F]*
0650
Radio New Zealand Int I [M-F]*
Voice of Med. (Malta) [M-F]
0653
Channel Africa [S]

0700 UTC
(3:00 AM EDT, 12:00 AM PDT)
BBC
Monitor Radio Int I [T-F]
Papua New Guinea
Radio Australia
Radio Ghana
Radio Japan
Radio Moscow
Radio New Zealand Int I [M-F]*
Radio New Zealand Int I [S]
Swiss Radio Int I (eu)
Voice of Myanmar (Burma)
WWCR #1 (7435) [S]
0703
Radio Pyongyang
Voice of Free China
0710
Radio Australia [W]*
0730
BBC (af) [A]*
Czech Republic
HCJB
Radio Moscow
Radio Netherlands Int I
Radio Vlaanderen Int I
Vatican Radio [M-A]
0740
Voice of Greece
0745
Radio Finland [M-A]
0755
Radio Japan [M-F]

0800 UTC
(4:00 AM EDT, 1:00 AM PDT)
BBC
Christian Science Sentinel [T/F]
KNLS
Monitor Radio Int I [T-F]
Radio Australia
Radio Korea
Radio Moscow
Radio New Zealand Int I [M-F]*
Radio New Zealand Int I [S]
Radio Norway Int I [S]
Voice of Indonesia [A-H]
Voice of Malaysia
0803
Radio Pyongyang
0830
R Slovakia Int I
Radio Austria Int I
Radio Moscow [M-A]
Radio Netherlands Int I
0855
Voice of Indonesia [A-H]

0900 UTC
(5:00 AM EDT, 2:00 AM PDT)
BBC
China Radio Int I
Christian Science Sentinel [T/F]
Deutsche Welle
Monitor Radio Int I [M-F]
Radio Australia
Radio Finland [M-A]
Radio Japan
Radio Moscow
Radio New Zealand Int I [S/M/A]
Swiss Radio Int I
0908
China Radio Int I*
0915
Korean World News Service
0930
FEBC (Philippines)
Radio Moscow
Radio Netherlands Int I
Radio New Zealand Int I [M-T]
0940
Voice of Greece
0945
Deutsche Welle [M-F]*
Radio Yerevan [S]
0955
Radio Japan [M-W]

1000 UTC
(6:00 AM EDT, 3:00 AM PDT)
BBC
China Radio Int I
Christian Science Sentinel [A-S]
FEBC (Philippines) [M-F]*
HCJB
Monitor Radio Int I [M-F]
Radio Australia
Radio Moscow
Radio New Zealand Int I [M-F]*
Radio New Zealand Int I [S]
Radio Norway Int I [S]
Radio Vlaanderen Int I [T-A]
Voice of America (as/ca)
Voice of Kenya
1005
Radio New Zealand Int I [M-F]*
1008
China Radio Int I*
1030
Radio Austria Int I [M-A]
Radio Dubai
Radio Moscow
Radio Netherlands Int I
Radio New Zealand Int I [M-F]*
Voice of Nigeria
1040
Voice of Greece
1045
Voice of Nigeria [A-S]*

1100 UTC
(7:00 AM EDT, 4:00 AM PDT)
BBC (Newsdesk)
Channel Africa
Christian Science Sentinel [A]
Deutsche Welle
Monitor Radio Int I [M-F]
Papua New Guinea [W]
Radio Australia
Radio Ghana [A-S]
Radio Japan
Radio Moscow
Radio Mozambique
Radio New Zealand Int'l ("BBC Newsdesk")
Radio Pakistan
Radio Singapore Int'l
Swiss Radio Int I
Swiss Radio Int I (eu)
Vatican Radio [M-A]
Voice of America (as/ca)
Voice of Israel
WYFR (Satellite Network) [M-A]
1103
Radio Pyongyang
1110
Radio Australia*
1115
Korean World News Service
1130
Czech Republic
Radio Korea
Radio Moscow
Radio Nacional de Venezuela [M-A]
Radio Netherlands Int I
Voice of Asia
1133
Radio Bulgaria
1135
Radio Thailand
1145
Deutsche Welle [S-F]*

1200 UTC
(8:00 AM EDT, 5:00 AM PDT)
BBC
China Radio Int I
Christian Science Sentinel [A]
Monitor Radio Int I [M-F]
Papua New Guinea [M-F]
Radio Australia
Radio France Int I
Radio Jordan
Radio Moscow
Radio New Zealand Int I
Radio Norway Int I [S]
Radio Singapore Int'l
Radio Tashkent
Radio Thailand
Voice of America (as)
WWCR #1 (15685) [M-F]
1203
HCJB [M-F]
Radio Korea
1208
China Radio Int I*
1209
BBC [W]*
1224
HCJB [M-F]
1225
WYFR (Satellite Network) [M-A]
1230
Radio Austria Int I
Radio Bangladesh [S-M]
Radio Cairo
Radio Canada Int I
Radio Finland [M-A]
Radio Moscow
Radio Netherlands Int I
Radio Sweden [W-F/T]
Voice of Vietnam
1240
Voice of Greece
1254
Radio France Int I

1300 UTC
(9:00 AM EDT, 6:00 AM PDT)
BBC ("Newshour")
China Radio Int I
Christian Science Sentinel [A]
KNLS
Monitor Radio Int I [M-F]
Radio Australia
Radio Canada Int I [M-F]
Radio Ghana
Radio Korea
Radio Moscow
Radio Romania Int I [M-A]
Radio Tanzania [A-S]
Radio Tashkent [S]
Swiss Radio Int I
Voice of America (as)
Voice of Kenya
WYFR (Satellite Network) [M-A]
1301
Radio Romania Int I [S]
1303
Radio Pyongyang
1308
China Radio Int I*
1310
Radiobrás [M-F]
1315
Radio Nepal
1324
HCJB [M-F]
1328
Radio Cairo
1330
All India Radio
FEBC (Philippines)
Korean World News Service
Radio Austria Int I
Radio Canada Int I
Radio Dubai
Radio Finland [M-A]
Radio Moscow [M-A]
Radio Netherlands Int I
Radio Sweden [M-F]
Radio Tashkent [M-A]
Radio Vlaanderen Int I [S]
Radio Yugoslavia
Voice of America (as) (Special English)
Voice of Turkey
Voice of Vietnam
WYFR (Satellite Network) [M-A]
1333
Radio Bulgaria

1400 UTC
(10:00 AM EDT, 7:00 AM PDT)
All India Radio [M/W/F]
BBC
BBC (as) [M-F]*
China Radio Int I
Christian Science Sentinel [A]
Monitor Radio Int I [M-F]
Radio Australia
Radio Canada Int I [S-F]
Radio France Int I
Radio Ghana
Radio Japan
Radio Korea
Radio Moscow
Radio Vlaanderen Int I [M-A]
Voice of America (as)
Voice of Israel [S-H]
WWCR #1 (15685) [M-F]
WYFR (Satellite Network) [M-A]
1408
China Radio Int I*
1423
Voice of Israel [S-H]
1424
HCJB [M-F]
1430
FEBC (Philippines)
Radio Canada Int I [S]
Radio Finland
Radio Moscow
Radio Nacional de Venezuela [M-A]
Radio Netherlands Int I
Radio Romania Int I [T-S]
Radio Sweden [M-F]
RTM Morocco [S]
Voice of Myanmar (Burma)
1431
Radio France Int I [T]*
Radio Romania Int I [M]
1435
Voice of Greece
1440
FEBC (Philippines) [S-F]*
1445
BBC (as) [M-F] (Special English)
Voice of Myanmar (Burma)
1450
All India Radio
Voice of Med. (Malta) [M-F]
1453
Radio France Int I [M-H/A]
1455
All India Radio

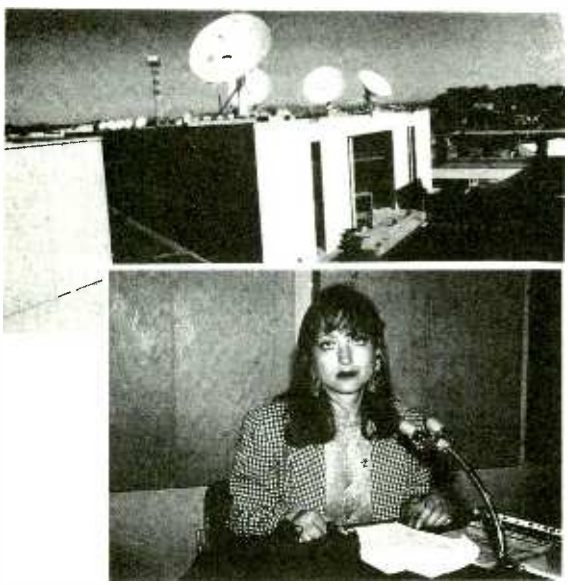
1500 UTC
(11:00 AM EDT, 8:00 AM PDT)
BBC
BBC (af) [M-F]
Channel Africa
China Radio Int I
Christian Science Sentinel [A]
Deutsche Welle
Monitor Radio Int I [M-F]
Radio Australia
Radio Canada Int I [S]
Radio Japan
Radio Jordan [A]
Radio Moscow
Radio Omdurman
Swiss Radio Int I
Voice of America (as/me)
WHRI #2 (9465) [A]
WWCR #1 (15685) [M-F]
1503
Radio Pyongyang
1505
Radio Algiers [M]
1508
China Radio Int I*
1518
Radio Bulgaria
1525
BBC (af) [S]*
Radio Veritas [T-F]
1530
All India Radio
Deutsche Welle [M-F]*
FEBC (Philippines)
Radio Austria Int I
Radio Moscow
Radio Netherlands Int I
Radio Portugal Int I [M-F]
Radio Tirana
Voice of Greece [M-A]
Voice of Nigeria [M-H]
WYFR (Satellite Network) [M-A]
1540
Radio Veritas [A-M]
1545
Korean World News Service
1555
Radio Japan [M-W]
Radio Veritas [A-M]

1600 UTC
(12:00 PM EDT, 9:00 AM PDT)
BBC
Channel Africa
China Radio Int I
Christian Science Sentinel [A]
Czech Republic
Deutsche Welle
Monitor Radio Int I [M-F]
Radio Australia
Radio Canada Int I [S]
Radio France Int I
Radio Jordan
Radio Korea
Radio Moscow
Radio Pakistan
Radio Tallinn
Radio Tanzania
Voice of America (af) [A-S]
Voice of America (as/me)
Voice of Kenya
Voice of Nigeria [M-F]
WWCR #3 (15610) [A]
1605
Radio Yemen
1608
China Radio Int I*

1609
BBC*
1611
Radio France Int I [T]*
1630
Radio Austria Int I
Radio Canada Int I
Radio Dubai
Radio Moscow
Voice of America (af) [S-F]
Voice of America (as/me) (Special English)
1652
Radio France Int I [M-F]

1700 UTC
(1:00 PM EDT, 10:00 AM PDT)
BBC
BBC (af)
BBC (as)*
Channel Africa
China Radio Int I
HCJB [M-F]
Monitor Radio Int I [M-F]
Radio Australia
Radio Japan
Radio Jordan
Radio Moscow
Radio New Zealand Int I [M-F]*
Radio Pakistan
RTM Morocco [A]
Swiss Radio Int I
Voice of America (af/as/me)
WRNO [M-F]
WWCR #1 (15685) [M-F]
1703
Radio Pyongyang
1708
China Radio Int I*
1710
Radio Australia*
1715
Korean World News Service
Radio Sweden [M-F]
1725
Radio New Zealand Int I [M-F]*
1730
Radio Moscow [S-F]
Radio Netherlands Int I
Vatican Radio [F]
Voice of America (af) [A-S]
1740
BBC (af)*
1745
All India Radio

1800 UTC
(2:00 PM EDT, 11:00 AM PDT)
All India Radio
BBC (Newsdesk)
Christian Science Sentinel [A]
Monitor Radio Int I [M-F]
Polish Radio
Radio Australia
Radio Moscow
Radio Mozambique
Radio New Zealand Int I [M-F]*
Radio Norway Int I [S]
Radio Omdurman
Radio Tanzania
Voice of America (af/me)
Voice of Israel
Voice of Kenya
WWCR #1 (15685) [M-F]
WWCR #3 (15610) [M-F]
1805
Radio New Zealand Int I [M-F]*
1830
Radio Kuwait [M/H/A]
Radio Moscow
Radio Nacional de Venezuela [M-A]
Radio Netherlands Int I
Radio Sweden [M-F]
Voice of America (af) [A-S] (Special English)
Voice of America (me) (Special English)



Satellites of RAI, the Italian public service station.

Inset: Violeta Panajotova, one of Radio Roma's Bulgarian announcers.

1833
Radio Bulgaria
1835
Radio New Zealand Int I [F]*
1840
Voice of Greece [M-A]
1850
Africa No. 1 (Gabon)*
1855
Radio New Zealand Int I [M-H]*
1857
BBC (af) [M-F]*

1900 UTC
(3:00 PM EDT, 12:00 PM PDT)
All India Radio [W]
BBC
China Radio Int I
Christian Science Sentinel [A]
Deutsche Welle
HCJB
Monitor Radio Int I [M-F]
Radio Australia
Radio Japan
Radio Moscow
Radio New Zealand Int I [S-F]
Radio Portugal Int I [M-F]
Radio Romania Int I [T-S]
Radio Vlaanderen Int I
Spanish National Radio
Voice of America (af) [S-F]
Voice of America (as/me)
Voice of Greece [M-A]
WHRI #1 (9485) [M-F]
WWCR #1 (15685) [M-F]
WWCR #3 (15610) [M-F]
1901
Radio Romania Int I [M]
1908
China Radio Int I*
1910
All India Radio [W]
Radio Australia [M-F]*
1930
BBC (af) [S]*
Deutsche Welle [T-F]*
R Slovakia Int I
Radio Austria Int I
Radio Finland [S-F]
Radio Moscow
Radio Netherlands Int I
Radio Romania Int I
Radio Yugoslavia
Voice of America (af) [S]
1933
Deutsche Welle [M]*
1935
RAI Italy
1945
Radio Yerevan
1955
Radio Japan [M-W]

2000 UTC
(4:00 PM EDT, 1:00 PM PDT)
BBC
China Radio Int I
Deutsche Welle
KVOH [A-S]
Monitor Radio Int I [M-F]
Radio Australia
Radio Moscow
Radio New Zealand Int I [S-F]
Radio Norway Int I [S]
Radio Portugal Int I [M-F]
Radio Riga Int I [A-S]
Swiss Radio Int I
Swiss Radio Int I (eu)
Voice of America (af/me)
Voice of Indonesia
Voice of Israel
Voice of Nigeria [M-F]
WHRI #1 (9485) [M-W/F]
WWCR #3 (15610) [M-A]
2003
Radio Pyongyang
2008
China Radio Int I*
2010
Radio New Zealand Int I [S-H]*
2011
Voice of Israel [W]*
2024
Voice of Israel [T]
2025
RAI Italy
2028
Voice of Israel [M]
2030
HCJB [M-A]
Polish Radio
Radio Korea
Radio Moscow [A-S]
2031
HCJB [S]
2045
All India Radio [A]
Korean World News Service
2055
Voice of Indonesia [M]

2100 UTC
(5:00 PM EDT, 5:00 PM PDT)
All India Radio
BBC ("Newshour")
China Radio Int I
Deutsche Welle
KVOH [S]
Monitor Radio Int I [M-F]
Radio Australia
Radio Damascus [F]
Radio Havana Cuba [M-A]
Radio Japan
Radio Moscow
Radio New Zealand Int I [S-H]
Radio Romania Int I
Spanish National Radio
Voice of America (af/as/me)
Voice of Turkey
WWCR #3 (15610) [M-A]
2103
Radio Bulgaria
2105
Radio Yemen
2108
China Radio Int I*
2110
Radio Damascus [S-M]
Radio New Zealand Int I [S-W]*
2112
Radio Damascus [F]
2115
BBC (ca) [M-F]*
2120
Radio Cairo
2130
Radio Cairo
Radio Canada Int I
Radio Havana Cuba [M-A]*
Radio Havana Cuba [W/F]
Radio Moscow
Radio Nacional de Venezuela [M-A]
Radio Riga Int I [M-F]
Radio Sweden [M-F]
2145
Radio Damascus [W]
Radio Korea

2200 UTC
(6:00 PM EDT, 3:00 PM PDT)
All India Radio
BBC
China Radio Int I
Christian Science Sentinel [A]
Czech Republic
Monitor Radio Int I [M-F]
Radio Australia
Radio Budapest Int I
Radio Canada Int I
Radio Havana Cuba [M-A]
Radio Korea
Radio Moscow
Radio New Zealand Int I
Radio Ukraine Int I
Radio Vlaanderen Int I [M-F]
Radio Yugoslavia
RAI Italy
Voice of America (as)
WWCR #3 (12160) [M-F]
2203
Voice of Free China
2208
China Radio Int I*
2209
BBC*
2215
All India Radio [M/F]
Radio Cairo
2230
Radio Finland [S-F]
Radio Havana Cuba [M-A]*
Radio Moscow [S-F]
Radio Sweden [M-F]
Voice of America (as) (Special English)
Voice of Israel
2240
Radio Cairo
Voice of Greece [S-F]
2242
Voice of Israel [H]*
2245
Radio Yerevan
2248
Radio Bulgaria
2253
Voice of Israel [T]
2257
Voice of Israel [M]
2258
Voice of Israel [S/F]

2300 UTC
(7:00 PM EDT, 4:00 PM PDT)
BBC (Newsdesk)
Christian Science Sentinel [A]
Monitor Radio Int I [M-F]
Radio Australia
Radio Canada Int I
Radio Japan
Radio Moscow
Radio New Zealand Int I
Radio Norway Int I [S]
Radio Singapore Int'l
Radio Tirana
Voice of America (as)
Voice of Turkey
WWCR #3 (12160) [M-A]
2303
Radio Pyongyang
2330
Radio Austria Int I
Radio Moscow
Radio Netherlands Int I
Radio New Zealand Int I [S-H]
Radio Sweden [M-F]
SLBC (Sri Lanka) [M]
2335
Voice of Greece [S-F]
2345
Radio Yerevan
2355
Radio Japan [M-W]

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Lawrence Magne
Monitoring Times

"The best of the best for high-quality listening to news, music and entertainment from afar. Superb for reception of faint, tough signals."

Editor's Choice
Passport to World Band Radio
Tabletop Receivers for 1992

"The R8 is a like a breath of fresh air, with its ground-up engineering and up-to-date digital control from the front panel... a quality HF receiver of American manufacture that should successfully compete on the world market."

Bill Clarke
73 Amateur Radio Today

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U.S.A.

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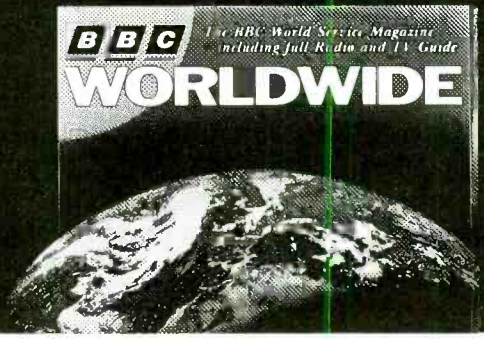

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Address _____

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Date _____ Signature _____

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BBC WORLD SERVICE

0000 UTC SHORTWAVE GUIDE 8:00 PM EDT 5:00 PM PDT

FREQUENCIES

0000-0100	Australia, Radio	13605as	15320pa	15365pa	15510as
		17750as			
0000-0100 vl	Australia, VL8A Alice Spg	4835do			
0000-0100 vl	Australia, VL8K Katherine	5025do			
0000-0100 vl	Australia, VL8T Tent Crk	4910do			
0000-0015	Bulgaria, Radio	7455eu	9700na		
0000-0015	Cambodia, Natl Voice of	11938as			
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			
0000-0100	Canada, RCI Montreal	5960na	5995eu	7250eu	9755na
0000-0100	China, China Radio Intl	9780na	11715na		
0000-0100	Costa Rica, AWR Alajuela	9725ca	11870ca		
0000-0100	Cuba, Radio Havana Cuba	6010na	9815na		
0000-0027	Czech Rep, Radio Prague	5930na	7345na		
0000-0045	India, All India Radio	9910as	11745as	11785as	15110as
		15145as			
0000-0030	Lithuania, Radio Vilnius	7150am			
0000-0100 vl	Malaysia, RTM Kota Kinaba	5980do			
0000-0100 vl	Malaysia, RTM Sarawak	4950do	7160do		
0000-0030	Netherlands, Radio	6020na	6165na		
0000-0100	New Zealand, R NZ Intl	15115pa			
0000-0050	North Korea, R Pyongyang	11335na	13760na	15130na	
0000-0030 m	Norway, Radio Norway Intl	9675na	11925sa		
0000-0100 mtwhfa	Palau, KHBN Voice of Hope	11980as			
0000-0100 vl	Papua New Guinea, NBC	9675do			
0000-0100	Philippines, FEBC Manila	15450as			
0000-0100	Russia, Radio Moscow Intl	7165na	7180af	7195am	7210af
		7295am	9480na	9620na	9885am
		10344as	11675am	11790am	11970as
		12050na	15425am	17570as	17610as
		17690na	17890as	21480na	21690na
0000-0100	Spain, Spanish Natl Radio	9540na			
0000-0100	Thailand, Radio	4830as	9655as	11905as	
0000-0100	United Kingdom, BBC London	5975na	6175na	6180na	7180eu
		7325na	9580na	9590na	9915na
		11750sa	11955as	12095sa	15260sa
		15310as	15360as		
0000-0100	USA, KCBI Dallas TX	13740na			
0000-0100	USA, KTBN Salt Lk City UT	7510am			
0000-0100	USA, KVOH Los Angeles CA	17775am			
0000-0100	USA, KWHR Naalehu HI	17555as			
0000-0100	USA, Monitor Radio Intl	5850na	9430ca		
0000-0100	USA, VOA Washington DC	5995am	6130am	7215au	7405am
		9455am	9770au	9775am	11580am
		11695am	11760as	15120am	15185as
		15205am	15290as	17735as	17820as
0000-0100	USA, WEWN Birmingham AL	7425am			
0000-0100 vl	USA, WHRI Noblesville IN	7315am	9495am		
0000-0100	USA, WINB Red Lion PA	11950am			
0000-0100	USA, WJCR Upton KY	7490na	13595na		
0000-0100	USA, WRNO New Orleans LA	7355am			
0000-0100	USA, WWCR Nashville TN	5810am	7435am	13845am	
0000-0100	USA, WYFR Okeechobee FL	6085am			
0030-0100	Australia, Radio	11720pa	11880pa	13605as	15240pa
		15365pa	15510as	17795pa	17880as
		21740pa			
0030-0055	Belgium, R Vlaanderen Int	5900na	9930sa		
0030-0100	Ecuador, HCJB Quito	9745am	15155am	17490am	21455am
0030-0100	Iran, VOIRI Tehran	9022na	11790na	15260na	
0030-0100	Netherlands, Radio	6020na	6165na	7305as	9840na
		9860as	11655na		
0030-0100	Sri Lanka, SLBC Colombo	6005as	9720as	15425as	
0030-0100	Sweden, Radio	6065sa	9850sa		

SELECTED PROGRAMS

Sundays

0000 BBC: *World News.* Broadcast on the hour.
0010 Radio Australia: *Study in Australia.* Jillian Hocking reports on educational opportunities in Australia for overseas students.
0010 VOA (as): *VOA Monday Morning.* News closeups in a magazine format.
0010 VOA (ca): *Agriculture Today.* A weekly program about food, farming, and agricultural research.
0011 Radio Moscow: *Moscow Mailbag.* Joe Adamov answers listener questions.
0015 BBC: *Good Books*
0030 BBC: *The John Dunn Show.* A melodic mix of songs old and new.
0030 Radio Australia: *Correspondents' Report.*. In-depth reports from around the world on a variety of topics.
0032 Radio Moscow: *Audio Book Club.* The best of Russian classic and contemporary literature.
0040 VOA (as/ca): *Words and Their Stories* (Special English). The origin and use of common words and phrases in American English.
0045 VOA (as/ca): *Tuning in the U.S.A.* (Special English). A program designed for those learning to speak English.

Mondays

0000 BBC: *World News.*
0000 Christian Science Sentinel: *Sunday from The Mother Church.*
0000 Radio Australia: *Network Asia* (Part 1). Brian Abott hosts this program of news, interviews, current affairs, and developments in the Asian/Pacific region.
0010 VOA (as): *Newsline.* News, correspondent reports, Inter views, and opinion.
0010 VOA (ca): *Encounter.* See S 1210.
0011 Radio Moscow: *Moscow Mailbag.* See S 0011.
0015 BBC: Music Feature: *Rock 'N Rice.* See M1445.
0030 BBC: *In Praise of God.* Weekly programme of worship and meditation.
0030 Radio Australia: *International Report.* Twenty minutes of information and comment on the half-hour every two hours.
0032 Radio Moscow: *Timelines.* See S 1432.
0040 VOA (as/ca): *Development Report* (Special English). Helpful information for developing nations.
0045 VOA (as/ca): *This is America* (Special English). Informative reports on life in the United States.

Tuesdays

0000 BBC: *World News.*
0000 Radio Australia: *Network Asia* (Part 1). See M 0000.
0010 VOA (as/ca): *Newsline.* See M 0010.
0011 Radio Moscow: *Focus on Asia and the Pacific.* News and comments on events in the region.
0015 BBC: *Ray on Record.* Robin Ray presents some of the best in classical music.
0030 Radio Australia: *International Report.* See M 0030.
0030 VOA (ca): *Music U.S.A.* (Standards). See M 1130.
0032 Radio Moscow: *Music.* See S 0532.
0040 VOA (as/ca): *Development Report* (Special English). See M 0040.
0045 VOA (as/ca): *This is America* (Special English). See M 0045.

Wednesdays

0000 BBC: *World News.*
0000 Radio Australia: *Network Asia* (Part 1). See M 0000.
0010 VOA (as/ca): *Newsline.* See M 0010.
0011 Radio Moscow: *Focus on Asia and the Pacific.* See T 0011.
0015 BBC: *Concert Hall.* Classical recitals.
0030 Radio Australia: *International Report.* See M 0030.
0030 VOA (ca): *Now Music U.S.A.* See T 1130.
0032 Radio Moscow: *Music.* See S 0532.
0040 VOA (as/ca): *Science Report* (Special English). Developments in the world of science and technology.
0045 VOA (as/ca): *Space and Man* (Special English). Reports about outer space or about the human body.

Thursdays

0000 BBC: *World News.*
0000 Radio Australia: *Network Asia* (Part 1). See M 0000.
0010 VOA (as/ca): *Business Report.* See M 0510.
0011 Radio Moscow: *Focus on Asia and the Pacific.* See T 0011.
0030 Radio Australia: *International Report.* See M 0030.
0030 VOA (ca): *Now Music U.S.A.* See T 1130.
0032 Radio Moscow: *Interview.* See T 1232.
0039 Radio Moscow: *Music.* See S 0532.
0040 VOA (as/ca): *Science Report* (Special English). See W 0040.
0045 VOA (as/ca): *The Making of a Nation* (Special English). Chapters from U.S. history in special English.

Fridays

0000 BBC: *World News.*
0000 Radio Australia: *Network Asia* (Part 1). See M 0000.
0010 VOA (as/ca): *Newsline.* See M 0010.
0011 Radio Moscow: *Focus on Asia and the Pacific.* See T 0011.
0015 BBC: *Music Review.* A weekly magazine reflecting the major international musical trends and events.
0030 Radio Australia: *International Report.* See M 0030.
0030 VOA (ca): *Now Music U.S.A.*. See T 1130.
0032 Radio Moscow: *Interview.* See T 1232.
0039 Radio Moscow: *Music.* See S 0532.
0040 VOA (as/ca): *In the News* (Special English). Focus on a person, organization, or issue in news reports.
0045 VOA (as/ca): *American Stories* (Special English). Readings of short stories by American authors in slow English.

Saturdays

0000 BBC: *World News.*
0010 Radio Australia: *Feedback.* See S 0410.
0010 VOA (as/ca): *Newsline.* See M 0010.
0011 Radio Moscow: *Focus on Asia and the Pacific.* See T 0011.
0030 BBC: *From the Weeklies.* Review of the British weekly press.
0030 Radio Australia: *Indian Pacific.* Weekly program of news and analysis of events in the Pacific and Asia.
0030 VOA (ca): *Country Music U.S.A.* See F 1130.
0032 Radio Moscow: *Interview.* See T 1232.
0039 Radio Moscow: *Music.* See S 0532.
0040 VOA (as/ca): *Words and Their Stories* (Special English). See S 0040.
0045 BBC: *The Learning World.* See M 0615.
0045 VOA (as/ca): *Tuning in the U.S.A.* (Special English). See S 0045.

Thank You...

Additional contributors to this month's Shortwave Guide:

Bob Fraser, Cohasset, MA; Clyde Harmon, Anniston, AL; Stephen Hunter, Drexel Hill, PA; Jean Lafaurie, Bordeaux, France; LeRoy Long, Edmond, OK; Jim Moats, Ravenna, OH; Robert E. Thomas, Bridgeport, CT; Jeff Woodard, Eureka, CA; NASWA *Journal*; BBC *Summary of World Broadcasts*; Grove Enterprises BBS; Internet Shortwave Newsgroup via Larry Van Horn.

FREQUENCIES

0100-0200	Australia, AAF Radio	13525af			
0100-0200	Australia, Radio	11720pa	11800pa	15240pa	15320pa
		15365pa	15510as	17630as	17715pa
		17750as	17795pa	17880as	21595as
		21740pa			
0100-0200 vl	Australia, VL8A Alice Spg	4835do			
0100-0200 vl	Australia, VL8K Katherine	5025do			
0100-0200 vl	Australia, VL8T Tent Crk	4910do			
0100-0200	Bulgaria, Radio	7455na	9700na		
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, R Peace Intl	7375am	9375am	15030am	21465am
0100-0200	Cuba, Radio Havana Cuba	6010na	9815na		
0100-0127	Czech Rep, Radio Prague	7345na			
0100-0200	Ecuador, HCJB Quito	9745am	15155am	17490am	21455am
0100-0150	Germany, Deutsche Welle	6040na	6085na	6120na	6145na
		9565na	9670na	9700na	
0100-0200 mwf	Guam, KSDA AWR Agat	15610as			
0100-0200 m	Guatemala, Radio Cultural	3300do			
0100-0200	Hungary, Radio Budapest	5970na	9835na	11910na	15220na
0100-0200	Indonesia, Voice of	9675as	11752as		
0100-0130	Iran, VOIRI Tehran	9022na	11790na	15260na	
0100-0120	Italy, RAI Rome	6005na	7275na	11800na	
0100-0200	Japan, NHK/Radio	11860as	15195as	17775as	17810as
		17845as			
0100-0130	Laos, National Radio of	7116as			
0100-0200	Netherlands, Radio	7305as	9860as		
0100-0125	Netherlands, Radio	6020na	6165na	9840na	11655na
0100-0200	New Zealand, R NZ Intl	15115pa			
0100-0200 vl	Papua New Guinea, NBC	9675do			
0100-0200	Philippines, FEBC Manila	15450as			
0100-0200	Russia, Radio Moscow Intl	5980na	7150na	7165na	7180na
		7210na	7295na	9620na	9675me
		9695me	9885me	11675am	11875as
		12050na	15425na	17570na	21480na
		21690na			
0100-0130	Serbia, Radio Yugoslavia	6190eu			
0100-0200	South Korea, Radio Korea	7550na	15575na		
0100-0200	Spain, Spanish Natl Radio	9540na			
0100-0200	Sri Lanka, SLBC Colombo	6005as	9720as	15425as	
0100-0130	Switzerland, Swiss R Intl	6135am	9885am	17740am	
0100-0200	Thailand, Radio	4830as	9655as	11905as	
0100-0200	Ukraine, R Ukraine Intl	4825na	6010na	7195eu	7205eu
		7240eu	9505na	9685na	9745na
		9860na	10344na		
0100-0200	United Kingdom, BBC London	5975na	6175na	6180na	7325na
		9590na	9915sa	11750sa	11955sa
		15260sa	15280as	15310as	15360as
		17790as	21715na		
0100-0200	USA, KCBI Dallas TX	13740na			
0100-0200	USA, KTBN Salt Lk City UT	7510na			
0100-0200	USA, KVOH Los Angeles CA	17775am			
0100-0200	USA, KWHR Naalehu HI	17555as			
0100-0200	USA, Monitor Radio Intl	5850na	9430ca		
0100-0200	USA, VOA Washington DC	5995am	6130am	7115as	7205as
		7405am	7651as	9455am	9740as
		9775am	11580am	11705as	15120am
		15205am	15250as	17740as	21550as
0100-0200	USA, WCSN Scotts Corner ME	7465am			
0100-0200	USA, WEWN Birmingham AL	7425na	9825as	9885as	
0100-0200 vl	USA, WHRI Noblesville IN	7315am	9495am		
0100-0200	USA, WINB Red Lion PA	11950am			
0100-0200	USA, WJCR Upton KY	7490na	13595na		
0100-0200	USA, WRNO New Orleans LA	7355am			
0100-0200	USA, WWCR Nashville TN	5810am	5935am	7435am	
0100-0200	USA, WYFR Okeechobee FL	6065am	9505am	15440am	
0100-0130	Uzbekhistan, R Tashkent	7190as	9715as		
0130-0200	Albania, R Tirana Intl	9580na	11840na		
0130-0200	Austria, R Austria Intl	9655na	9870sa	13730sa	
0130-0150	Greece, Voice of	5970na	9380na	9420na	
0130-0200	Netherlands, Radio	9845as	9860as	11655as	
0130-0200	Sweden, Radio	9695au	11695as		
0145-0200	Vatican State, Vatican R	5975as	9650as		

SELECTED PROGRAMS

Sundays

0100 BBC: *News Summary.* One minute news update.
0100 Christian Science Sentinel: *Bible Lesson.*
0101 BBC: *Play of the Week. The School for Husbands,* Moliere (10th); *Macbeth* (17th, 24th)
0110 Radio Australia: *Book Reading.* Serialized readings of the best Australia novels.
0110 VOA (as): *VOA Monday Morning.* See S 0010.
0110 VOA (ca): *Communications World.* A look at the people, technologies, economics, and politics involved in modern telecommunications.
0111 Radio Moscow: *Music and Musicians.* World-famous per formers and composers play for you.
0129 Christian Science Sentinel: *Christian Science Sentinel Radio Edition.*
0130 Radio Australia: *The Europeans.* A weekly in-depth look at European issues and their impact on world affairs.
0130 VOA (ca): *Press Conference U.S.A.* Reporters Interview an interesting personality on a subject In the News.
0145 BBC: *Truth to Tell* (3rd) Does the Earth bulge at the Equator?

Mondays

0100 BBC: *News Summary.* See S 0100.
0100 Christian Science Sentinel: *Sunday from The Mother Church.*
0100 Guatemala: *Words of Hope.*
0100 Radio Australia: *Network Asia* (Part 2). See S 2300.
0100 Voice of Historic Adventism (via WCSN): *Steps to Life World Radio.*
0110 VOA (as): *Newsline.* See M 0010.
0110 VOA (ca): *New Horizons.* See S 1110.
0111 Radio Moscow: *Music and Musicians.* See S 0111.
0120 Radio Australia: *Sports Report.* See S 1310.
0130 Guatemala: *Music in the Post Meridian.*
0130 VOA (as): *VOA Tuesday Morning.* See S 0010.
0130 VOA (ca): Issues *In the News.* See S 1130.

Tuesdays

0100 BBC: *World News.* See S 0300.
0100 Radio Australia: *Network Asia* (Part 2). See S 2300.
0100 Voice of Historic Adventism (via WCSN): *Steps to Life World Radio.*
0105 BBC: *Outlook.* See M 1405.
0110 VOA (as): *Newsline.* See M 0010.
0110 VOA (ca): *Report to the Americas.* The latest news affecting the region, as well as a roundup of sports, financial news, and the weather forecast.
0111 Radio Moscow: *Commonwealth Update.* Commonwealth of Independent States (CIS) developments.
0120 Radio Australia: *Sports Report.* See S 1310.
0130 BBC: *Folk Routes.* Ian Anderson extends the range of folk music to include country, cajun and blues.
0130 VOA (as): *VOA Wednesday Morning.* See S 0010.
0132 Radio Moscow: *Folk Box.* See M 1432.
0145 BBC: *Health Matters.* Keeps track of new developments in the world of medical science, as well as ways of keeping fit.
0155 VOA (ca): *VOA Editorial.* See S 1455.

Wednesdays

0100 BBC: *World News.* See S 0300.
0100 Radio Australia: *Network Asia* (Part 2). See S 2300.
0100 Voice of Historic Adventism (via WCSN): *Steps to Life World Radio.*
0105 BBC: *Outlook.* See M 1405.
0110 VOA (as): *Newsline.* See M 0010.
0110 VOA (ca): *Report to the Americas.* See T 0110.
0111 Radio Moscow: *Commonwealth Update.* See T 0111.
0120 Radio Australia: *Sports Report.* See S 1310.
0130 BBC: Special Feature. *Playing a Part* (20th,27th). NEW. Actors take the stage to explore and explain some major Shakespearean roles.
0130 BBC: Special Feature. *Truth to Tell* (6th,13th). NEW. Two extraordinary true stories about a huge prehistoric fish and an extinct flightless bird.
0130 VOA (as): *VOA Thursday Morning.* See S 0010.
0132 Radio Moscow: *Music At Your Request.* See M 1132.
0145 BBC: *Country Style.* With David Allan.
0155 VOA (ca): *VOA Editorial.* See S 1455.

Thursdays

0100 BBC: *World News.* See S 0300.
0100 Radio Australia: *Network Asia* (Part 2). See S 2300.
0100 Voice of Historic Adventism (via WCSN): *Steps to Life World Radio.*
0105 BBC: *Outlook.* See M 1405.
0110 VOA (as): *Newsline.* See M 0010.
0110 VOA (ca): *Report to the Americas.* See T 0110.
0111 Radio Moscow: *Commonwealth Update.* See T 0111.
0120 Radio Australia: *Sports Report.* See S 1310.
0130 BBC: *Waveguide.* See W 0415.
0130 VOA (as): *VOA Friday Morning.* See S 0010.
0132 Radio Moscow: *The Jazz Show.* See M 0432.
0140 BBC. *Book Choice.* See W 0425.
0145 BBC: *The Farming World.* Reports on new developments from around the world.
0155 VOA (ca): *VOA Editorial.* See S 1455.

Fridays

0100 BBC: *World News.* See S 0300.
0100 Radio Australia: *Network Asia* (Part 2). See S 2300.
0100 Voice of Historic Adventism (via WCSN): *Steps to Life World Radio.*
0105 BBC: *Outlook.* See M 1405.
0110 VOA (as): *Newsline.* See M 0010.
0110 VOA (ca): *Report to the Americas.* See T 0110.
0111 Radio Moscow: *Commonwealth Update.* See T 0111.
0120 Radio Australia: *Sports Report.* See S 1310.
0130 BBC: *On the Move.* A weekly program about travel and transport with Malcolm Billings.
0130 VOA (as): *VOA Saturday Morning.* See S 0010.
0132 Radio Moscow: *Music At Your Request.* See M 1132.
0145 BBC: *Global Concerns.* Update on environmental issues.
0155 VOA (ca): *VOA Editorial.* See S 1455.

Saturdays

0100 BBC: *World News.* See S 0300.
0100 Voice of Historic Adventism (via WCSN): *Steps to Life World Radio.*
0105 BBC: *Outlook.* See M 1405.
0110 Radio Australia: *Jazz Notes.* See T 1330.
0110 VOA (as): *VOA Sunday Morning.* See S 0010.
0110 VOA (ca): *Report to the Americas.* See T 0110.
0111 Radio Moscow: *Commonwealth Update.* See T 0111.
0130 BBC: *Short Story.* See S 0430.
0130 Radio Australia: *Lane's Company.* See H 1130.
0132 Radio Moscow: *The Jazz Show.* See M 0432.
0145 BBC: *Jazz Now and Then.* George Reid presents a mixture of jazz for all ages.
0155 VOA (ca): *VOA Editorial.* See S 1455.

0200 UTC SHORTWAVE GUIDE 10:00 PM EDT 7:00 PM PDT

FREQUENCIES

0200-0300 twhfa	Argentina, RAE	11710am			
0200-0300	Australia, Radio	11880pa	15320pa	15365pa	15510as
		17630as	17750as	17795pa	17880as
		21525as	21595as	21740pa	
0200-0300 vl	Australia, VL8A Alice Spg	4835do			
0200-0300 vl	Australia, VL8K Katherine	5025do			
0200-0300 vl	Australia, VL8T Tent Crk	4910do			
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, RCI Montreal	6120na	9535am	9755na	11845na
		11940am			
0200-0300	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
0200-0300	Cuba, Radio Havana Cuba	6010na	9510na	9815na	
0200-0300	Ecuador, HCJB Quito	9745am	15155am	17490am	21455am
0200-0300	Egypt, Radio Cairo	9475na	11600na		
0200-0250	Germany, Deutsche Welle	6035as	6130as	7265as	7285as
		7355as	9615as	11865as	
0200-0300 as	Guam, KSDA AWR Agat	13720as			
0200-0300	Guam, KSDA AWR Agat	9835as			
0200-0300 m	Guatemala, Radio Cultural	3300do			
0200-0230 mtwhfa	Kenya, Kenya BC Corp	4935do			
0200-0300 smtwh	Malaysia, RTM Radio 4	7295do			
0200-0230	Myanmar, Radio	7185do			
0200-0300	Netherlands, Radio	9845as	9860as	11655as	
0200-0300	New Zealand, R NZ Intl	15115pa			
0200-0230 m	Norway, Radio Norway Intl	6120na	7165as		
0200-0300 vl	Papua New Guinea, NBC	9675do			
0200-0230 mtwtf	Philippines, FEBC Manila	15450as			
0200-0300	Romania, R Romania Intl	6155na	9510na	9570na	11830na
		11940na			
0200-0300	Russia, Radio Moscow Intl	5940am	7130na	7165na	7180na
		7295na	9620na	9695af	9775af
		11675as	11875as	12050as	15425na
		17570as	17605na	17655au	17690na
		21480na	21690as		
0200-0230	Serbia, Radio Yugoslavia	6190na			
0200-0300	Sri Lanka, SLBC Colombo	6005as	9720as	15425as	
0200-0300	Taiwan, VO Free China	5950na	9680na	9765au	11740ca
		11860as	15345na		
0200-0300	Thailand, Radio	4830as	9655as	11905as	
0200-0300	United Kingdom,BBC London	5975na	6175na	6195me	7135me
		7155me	7325na	9410eu	9590na
		9630af	9915am	11705sa	11730af
		11750sa	11955me	15260sa	17790as
0200-0230	USA, KCBI Dallas TX	13740am			
0200-0300	USA, KTBN Salt Lk City UT	7510am			
0200-0230	USA, KVOH Los Angeles CA	17775am			
0200-0300	USA, KWHR Naalehu HI	17510as			
0200-0300	USA, Monitor Radio Intl	5850na	9430ca		
0200-0230 twhfa	USA, VOA Washington DC	5995am	7405am	9775am	15120am
		15205am			
0200-0300	USA, VOA Washington DC	7115as	7651as	9740as	11705as
		15250as	17740as	21550as	
0200-0300	USA, WCSN Scotts Corner ME	7465am			
0200-0300	USA, WEWN Birmingham AL	7425na	9825me		
0200-0300 vl	USA, WHRI Noblesville IN	7315am	9495am		
0200-0300	USA, WINB Red Lion PA	11950eu			
0200-0300	USA, WJCR Upton KY	7490na	13595na		
0200-0300	USA, WRNO New Orleans LA	7355am			
0200-0300	USA, WWCR Nashville TN	5810am	5935am	7435am	
0200-0300	USA, WYFR Okeechobee FL	6065am	9505am	15440am	
0215-0255	Nepal, Radio	3230do	5005do	7165do	
0230-0245	Albania, R Tirana Intl	9580na	11840na		
0230-0300	Hungary, Radio Budapest	5970na	9835na	11910na	15220na
0230-0300 s	Kenya, Kenya BC Corp	4935do			
0230-0245	Pakistan, Radio	9515as	15190as	17705as	21730as
0230-0300	Philippines, R Pilipinas	17760as	17840as	21580as	
0230-0300 mtwhf	Portugal, Radio	9555na	9570na	9600na	9705na
0230-0300	Sweden, Radio	6195na	9850na		
0245-0300	United Kingdom,BBC London	6110sa	9515sa	9895sa	11965sa
		15390sa			

SELECTED PROGRAMS

Sundays

0200 BBC: *Newsdesk*. World news and dispatches from overseas and UK correspondents.
0200 Christian Science Sentinel: *Bible Lesson*.
0210 Radio Australia: *Study in Australia*. See S 0010.
0210 VOA (as): *VOA Sunday Morning*. See S 0010.
0211 Radio Moscow: *Moscow Mailbag*. See S 0011.
0229 Christian Science Sentinel: *Christian Science Sentinel Radio Edition*.
0230 Radio Australia: *Correspondents' Report*. See S 0030.
0232 Radio Moscow: *Your Top Tune*. Win a prize by guessing which song of the three is the most popular.

Mondays

0200 BBC: *Newsdesk*. See S 0200.
0200 Christian Science Sentinel: *Sunday from The Mother Church*.
0200 Guatemala: *Unshackled*.
0200 Radio Australia: *Network Asia* (Part 1). See M 0000.
0200 Voice of Historic Adventism (via WCSN): *Biblical Studies Institute*.
0210 VOA (as): *Newsline*. See M 0010.
0211 Radio Moscow: *Moscow Mailbag*. See S 0011.
0230 BBC: *Composer of the Month*. Johannes Brahms.
0230 Guatemala: *Music in the Post Meridian*.
0230 Radio Australia: *International Report*. See M 0030.
0230 Voice of Historic Adventism (via WCSN): *Modern Manna*.
0230 VOA (as): *VOA Monday Morning*. See S 0010.
0232 Radio Moscow: *Timelines*. See S 1432.

Tuesdays

0200 BBC: *Newsdesk*. See S 0200.
0200 Radio Australia: *Network Asia* (Part 1). See M 0000.
0200 Voice of Historic Adventism (via WCSN): *Biblical Studies Institute*.
0210 VOA (as): *Newsline*. See M 0010.
0210 VOA (ca): *Focus*. See M 1110.
0211 Radio Moscow: *Newmarket*. This program tells where and how to invest in Russia, how to sell your product, or start a business.
0230 Radio Australia: *International Report*. See M 0030.
0230 Radio Moscow: *Audio Book Club*. See S 0032.
0230 Voice of Historic Adventism (via WCSN): *Modern Manna*.
0230 VOA (as): *VOA Tuesday Morning*. See S 0010.

Wednesdays

0200 BBC: *Newsdesk*. See S 0200.
0200 Radio Australia: *Network Asia* (Part 1). See M 0000.
0200 Voice of Historic Adventism (via WCSN): *Biblical Studies Institute*.
0210 VOA (as): *Newsline*. See M 0010.
0210 VOA (ca): *Focus*. See M 1110.
0211 Radio Moscow: *Science and Engineering in the CIS*. See S 0511.
0230 BBC: *Development '94*. Aid and development issues.
0230 Voice of Historic Adventism (via WCSN): *Modern Manna*.
0230 VOA (as): *VOA Wednesday Morning*. See S 0010.
0232 Radio Moscow: *Russian by Radio*. See S 1432.

Thursdays

0200 BBC: *Newsdesk*. See S 0200.
0200 Radio Australia: *Network Asia* (Part 1). See M 0000.
0200 Voice of Historic Adventism (via WCSN): *Biblical Studies Institute*.
0210 VOA (as): *Newsline*. See M 0010.
0210 VOA (ca): *Focus*. See M 1110.
0211 Radio Moscow: *Moscow Mailbag*. See S 0011.

0211 Radio Moscow: *Science and Engineering*. Developments in Russian science and technology.
0230 BBC: *Sports International*. Live commentaries and Interviews, features and discussions.
0230 Radio Australia: *International Report*. See M 0030.
0230 Voice of Historic Adventism (via WCSN): *Modern Manna*.
0230 VOA (as): *VOA Thursday Morning*. See S 0010.
0232 Radio Moscow: *Audio Book Club*. See S 0032.

Fridays

0200 BBC: *Newsdesk*. See S 0200.
0200 Radio Australia: *Network Asia* (Part 1). See M 0000.
0200 Voice of Historic Adventism (via WCSN): *Biblical Studies Institute*.
0210 VOA (as): *Newsline*. See M 0010.
0210 VOA (ca): *Focus*. See M 1110.
0211 Radio Moscow: *Mailbag*. See M 0511.
0230 BBC: Special Feature. *Shakespeare's Globe*. See H 1130.
0230 Radio Australia: *International Report*. See M 0030.
0230 Voice of Historic Adventism (via WCSN): *Modern Manna*.
0230 VOA (as): *VOA Friday Morning*. See S 0010.
0232 Radio Moscow: *Russian by Radio*. See S 1432.

Saturdays

0200 BBC: *Newsdesk*. See S 0200.
0200 Christian Science Sentinel: *Monitor Radio News*.
0200 Voice of Historic Adventism (via WCSN): *Biblical Studies Institute*.
0206 Christian Science Sentinel: *Christian Science Sentinel Radio Edition*.
0210 Radio Australia: *Feedback*. See S 0410.
0210 VOA (af/as): *VOA Saturday Morning*. See S 0010.
0210 VOA (ca): *Focus*. See M 1110.
0211 Radio Moscow: *Science and Engineering in the CIS*. See S 0511.
0230 BBC: *People and Politics*. Background to the British political scene.
0230 Radio Australia: *Indian Pacific*. See A 0030.
0230 Voice of Historic Adventism (via WCSN): *Modern Manna*.
0232 Radio Moscow: *Audio Book Club*. See S 0032.

FREQUENCIES

0300-0400	Australia, Radio	11720pa	11880pa	15240pa	15320pa
		15365pa	15510as	17750as	17795pa
		17880as	21525as	21595as	21740pa
0300-0400 vl	Australia, VL8A Alice Spg	4835do			
0300-0400 vl	Australia, VL8K Katherine	5025do			
0300-0400 vl	Australia, VL8T Tent Crk	4910do			
0300-0400	Bahrain, Radio	6010do			
0300-0330 mtwtf	Canada, CanForce Network	6000eu	9725eu		
0300-0400	Canada, CFCX Montreal	6005do			
0300-0400	Canada, CFRX Toronto	6070do			
0300-0400	Canada, CFVP Calgary	6030do			
0300-0400	Canada, CHNX Halifax	6130do			
0300-0400	Canada, CKZN St John's	6160do			
0300-0400	Canada, CKZU Vancouver	6160do			
0300-0400	Canada, RCI Montreal	6010am	9725am	9755am	
0300-0400	China, China Radio Intl	9690na	9780na	11715na	
0300-0400	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
0300-0400	Costa Rica,Faro del Carib	5055do			
0300-0400	Cuba, Radio Havana Cuba	6010na	9510na		
0300-0327	Czech Rep, Radio Prague	5930na	7345na		
0300-0400	Ecuador, HCJB Quito	9745am	15155am	17490am	21455am
0300-0330	Egypt, Radio Cairo	9475na	11600na		
0300-0350	Germany, Deutsche Welle	6045na	6085na	6120na	9535na
		9545na	9640na		
0300-0400	Guatemala, Radio Cultural	3300do			
0300-0400	Japan, NHK/Radio	5960am	11875am	11885am	15210am
		15230am	15325am	17810am	21610am
0300-0400	Kenya, Kenya BC Corp	4935do			
0300-0400 smtwh	Malaysia, RTM Radio 4	7295do			
0300-0325	Netherlands, Radio	9845as	9860as	11655as	
0300-0400	New Zealand, R NZ Intl	15115pa			
0300-0330 m	Norway, Radio Norway Intl	6115na			
0300-0400 vl	Papua New Guinea, NBC	9675do			
0300-0330	Philippines, R Pilipinas	17760as	17840as	21580as	
0300-0400	Russia, Radio Moscow Intl	5940am	7130na	7150na	7165na
		7180na	7295na	9675me	9755me
		11675na	12050na	15425na	17570as
		17605na	17655as	17690na	
0300-0400	S Africa, Channel Africa	5960af	9730af		
0300-0400	Sri Lanka, SLBC Colombo	9720as	15425as		
0300-0400	Taiwan, VO Free China	5950na	9680na	9765au	11740as
		15345na			
0300-0400	Thailand, Radio	9655as	11905as		
0300-0400 vl	Uganda, Radio	4976do			
0300-0330	United Kingdom,BBC London	11750sa	15260sa	15310as	15380as
0300-0400	United Kingdom,BBC London	3955af	5975na	6005af	6175na
		6180eu	6195eu	7230eu	7325na
		9410eu	9600af	9630af	9915am
		11730af	11760me	11955me	12095ca
		15310me	15420af	21715as	
0300-0400	USA, KCBI Dallas TX	9815am			
0300-0400	USA, KTBN Salt Lk City UT	7510am			
0300-0400	USA, KVOH Los Angeles CA	9785am			
0300-0400	USA, KWHR Naalehu HI	17510as			
0300-0400	USA, Monitor Radio Intl	5850na			
0300-0400	USA, VOA Washington DC	7105af	7265af	7280af	7405af
		9575af	9885af	11965af	
0300-0400	USA, WEWN Birmingham AL	7425am			
0300-0400 vl	USA, WHRI Noblesville IN	7315am	9495am		
0300-0400	USA, WINB Red Lion PA	11950eu			
0300-0400	USA, WJCR Upton KY	7490na	13595na		
0300-0400	USA, WRNO New Orleans LA	7355am			
0300-0400	USA, WWCR Nashville TN	5810am	5935am	7435am	
0300-0400	USA, WYFR Okeechobee FL	6065am	9505am		
0300-0315	Vatican State, Vatican R	6095na	7305na		
0315-0330 sh	Greece, Voice of	5970na	9380na	9420na	
0330-0400	Austria, R Austria Intl	9870sa	13730sa		
0330-0357	Czech Rep, Radio Prague	5930eu	7345eu	9440eu	
0330-0400	Netherlands, Radio	6165na	9590na		
0330-0400	Sweden, Radio	6195na	9850na		
0330-0400	Tanzania, Radio	5050af			
0330-0400	UAE, Radio Dubai	11945na	13675na	15400eu	17890eu
		21485na			
0340-0350	Greece, Voice of	5970na	9380na	9420na	
0345-0400	Armenia, Radio Yerevan	7105na	10344na	17605na	17690na
0345-0400	Tajikistan, Radio	7245as			

SELECTED PROGRAMS

Sundays

0300 BBC: *World News.* Broadcast on the hour.
0300 Christian Science Sentinel: *Bible Lesson.*
0300 Guatemala: *Back to the Bible.*
0309 BBC: *British News.* Also during *Newsdesk* (:20) and *Newshour* (:40).
0310 Radio Australia: *Book Reading.* See S 0110.
0310 VOA (af): *VOA Sunday Morning.* See S 0010.
0311 Radio Moscow: *News and Views.* Russian views on news developments.
0315 BBC: *Sports Roundup.* The latest sports news.
0329 Christian Science Sentinel: *Christian Science Sentinel Radio Edition.*
0330 BBC: *From Our Own Correspondent.* BBC correspondents comment on the background to the news.
0330 Guatemala: *Thru the Bible Questions.*
0330 Radio Australia: *At Your Request.* Dick Paterson plays requests and dedications.
0330 Radio Moscow: *Radio Aum Shinrikyo.* Paid religious program by a Japanese sect.
0350 BBC: *Write On.* Air your views about World Service: write to PO Box 76, Bush House, Strand, London WC2B 4PH.

Mondays

0300 BBC: *World News.* See S 0300.
0300 Christian Science Sentinel: *Sunday from The Mother Church.*
0300 Guatemala: *Radio Bible Class.*
0300 Radio Australia: *Network Asia* (Part 2). See S 2300.
0300 Voice of Historic Adventism (via WCSN): *Printed Page.*
0309 BBC: *British News.* See S 0309.
0310 Radio Australia: *Sports Report.* See S 1310.
0310 VOA (af): *Daybreak Africa.* Correspondent reports, news, features, and backgrounders.
0311 Radio Moscow: *News and Views.* See S 0311.
0315 BBC: *Sports Roundup.* See S 0315.
0330 BBC: *Anything Goes.* See S 1430.
0330 Guatemala: *Music.*
0330 Radio Moscow: *Radio Aum Shinrikyo.* See S 0330.
0355 VOA (af): *VOA Editorial.* See S 1455.

Tuesdays

0300 BBC: *World News.* See S 0300.
0300 Guatemala: *Back to the Bible.*
0300 Radio Australia: *Network Asia* (Part 2). See S 2300.
0309 BBC: *British News.* See S 0309.
0310 Radio Australia: *Sports Report.* See S 1310.
0310 VOA (af): *Daybreak Africa.* See M 0310.
0311 Radio Moscow: *News and Views.* See S 0311.
0315 BBC: *Sports Roundup.* The start of cricket season in the northern hemisphere.
0330 BBC: *John Peel.* Tracks from newly released albums and singles from the contemporary music scene.
0330 Guatemala: *Thru the Bible.*
0330 Radio Moscow: *Radio Aum Shinrikyo.* See S 0330.
0355 VOA (af): *VOA Editorial.* See S 1455.

Wednesdays

0300 BBC: *World News.* See S 0300.
0300 Guatemala: *Back to the Bible.*
0300 Radio Australia: *Network Asia* (Part 2). See S 2300.
0309 BBC: *British News.* See S 0309.
0310 Radio Australia: *Sports Report.* See S 1310.
0310 VOA (af): *Daybreak Africa.* See M 0310.
0311 Radio Moscow: *News and Views.* See S 0311.
0315 BBC: *Sports Roundup.* See S 0315.
0330 BBC: *Discovery.* In-depth look at scientific research.
0330 Guatemala: *Thru the Bible.*
0330 Radio Moscow: *Radio Aum Shinrikyo.* See S 0330.
0355 VOA (af): *VOA Editorial.* See S 1455.

Thursdays

0300 BBC: *World News.* See S 0300.
0300 Guatemala: *Back to the Bible.*
0300 Radio Australia: *Network Asia* (Part 2). See S 2300.
0309 BBC: *British News.* See S 0309.
0310 Radio Australia: *Sports Report.* See S 1310.
0310 VOA (af): *Daybreak Africa.* See M 0310.
0311 Radio Moscow: *News and Views.* See S 0311.
0315 BBC: *Sports Roundup.* See S 0315.
0330 BBC: Assignment. A weekly examination of a topical issue.
0330 Guatemala: *Thru the Bible.*
0330 Radio Moscow: *Radio Aum Shinrikyo.* See S 0330.
0355 VOA (af): *VOA Editorial.* See S 1455.

Fridays

0300 BBC: *World News.* See S 0300.
0300 Guatemala: *Back to the Bible.*
0300 Radio Australia: *Network Asia* (Part 2). See S 2300.
0309 BBC: *British News.* See S 0309.
0310 Radio Australia: *Sports Report.* See S 1310.
0310 VOA (af): *Daybreak Africa.* See M 0310.
0311 Radio Moscow: *News and Views.* See S 0311.
0315 BBC: *Sports Roundup.* See S 0315.
0330 BBC: *Focus on Faith.* Comment and discussion on the major issues in the worlds of faith.
0330 Guatemala: *Thru the Bible.*
0330 Radio Moscow: *Radio Aum Shinrikyo.* See S 0330.
0355 VOA (af): *VOA Editorial.* See S 1455.

Saturdays

0300 BBC: *World News.* See S 0300.
0300 Guatemala: *Back to the Bible.*
0309 BBC: *British News.* See S 0309.
0310 Radio Australia: *Jazz Notes.* See T 1330.
0311 Radio Moscow: *News and Views.* See S 0311.
0315 BBC: *Sports Roundup.* See S 0315.
0330 BBC: *The Vintage Chart Show.* Each week a classic Top 20 from the past with Paul Burnett.
0330 Guatemala: *Thru the Bible.*
0330 Radio Australia: *Music Deli.* See F 1330.
0330 Radio Moscow: *Radio Aum Shinrikyo.* See S 0330.

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

FREQUENCIES

0400-0500	Australia, Radio	11720pa	11800pa	15240pa	15320pa
		15365pa	17630pa	17700pa	17750as
		17795pa	21525as	21595as	21740pa
0400-0500 vl	Australia, VL8A Alice Spg	4835do			
0400-0500 vl	Australia, VL8K Katherine	5025do			
0400-0500 vl	Australia, VL8T Tent Crk	4910do			
0400-0500	Bahrain, Radio	6010do			
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, RCI Montreal	6150me	9505me	9670me	
0400-0500	China, China Radio Intl	11680na	11840na		
0400-0500	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
0400-0500	Cuba, Radio Havana Cuba	6010na	6180na	9510na	
0400-0430	Ecuador, HCJB Quito	9745am	15155am	17490am	21455am
0400-0450	Germany, Deutsche Welle	6015af	6065af	7150af	7225af
		7275af	9565af	9765af	
0400-0500	Guatemala, Radio Cultural	3300do			
0400-0500	Kenya, Kenya BC Corp	4935do			
0400-0500 mtwhf	Lebanon, Wings of Hope	9960me			
0400-0500 smtwh	Malaysia, RTM Radio 4	7295do			
0400-0425	Netherlands, Radio	6165na	9590na		
0400-0500	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	6155na	9510na	9570na	11830na
		11940na			
0400-0500	Russia, Radio Moscow Intl	5940eu	7105na	7130eu	7165eu
		7180eu	7270na	7295eu	9465na
		9480na	9580na	9865na	11765af
		15320me	15375me	15385me	15425me
		17590af	17610af	17655af	21585af
0400-0455	S Africa, Channel Africa	5955af	9585af		
0400-0430	Sri Lanka, SLBC Colombo	9720as	15425as		
0400-0500	Swaziland, Swazi Radio	6155af			
0400-0430	Switzerland, Swiss R Intl	6135na	9860na	9885na	12035na
0400-0430	Tanzania, Radio	5050af			
0400-0430	Thailand, Radio	4830as	9655as	11905as	
0400-0500	Turkey, Voice of	9445na			
0400-0500 vl	Uganda, Radio	4976do			
0400-0430	United Kingdom,BBC London	6175na	6180na	7105na	7325na
		9630af	9915am	11760me	11955me
		12095eu	15310as	15575me	21725as
0400-0500	United Kingdom,BBC London	3255af	3955eu	5975na	6005af
		6180af	6195eu	9410af	9600af
		11760af	11820af	21470af	21715as
0400-0500	USA, KCBI Dallas TX	9815am			
0400-0500	USA, KTBN Salt Lk City UT	7510am			
0400-0500	USA, KVOH Los Angeles CA	9785am			
0400-0500	USA, KWHR Naalehu HI	17510as			
0400-0500	USA, Monitor Radio Intl	7465na	9840af		
0400-0500	USA, VOA Washington DC	5995me	6040me	6140eu	6873eu
		7170eu	7265af	7280af	7405af
		9575af			
0400-0500	USA, WEWN Birmingham AL	7425am			
0400-0500 vl	USA, WHRI Noblesville IN	7315am	9495am		
0400-0500	USA, WINB Red Lion PA	11950eu			
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	5810am	5935am	7435am	
0400-0500	USA, WYFR Okeechobee FL	6065am	9505am	11825eu	
0415-0440	Italy, RAI Rome	7275eu	9575eu		
0430-0500	Australia, AAF Radio	13525as			
0430-0457	Czech Rep, Radio Prague	5930na	7345af	9440me	
0430-0500	Nigeria, Radio	3326do	4770do	4990do	
0430-0500	Swaziland, Trans World R	5055af	7200af	7215af	
0445-0500 t	Sri Lanka, SLBC Colombo	9720na	15425na		

SELECTED PROGRAMS

Sundays

0400 BBC: *Newsdesk*. World News and dispatches from overseas and UK correspondents.
0400 Christian Science Sentinel: *Bible Lesson.*
0400 Guatemala: *Music.*
0409 BBC: *British News*
0410 Radio Australia: *Feedback*. Dennis Gibbons answers letters and discusses new programs and reception problems.
0410 VOA (af/me): *VOA Sunday Morning*. See S 0010.
0411 Radio Moscow: *Top Priority*. A weekly panel discussion of key events.
0429 Christian Science Sentinel: *Christian Science Sentinel Radio Edition.*
0430 BBC: *Seeing Stars* (3rd) Focus on Jupiter.
0430 BBC: *Short Story*. (10th, 17th, 24th) Stories center around death.
0430 Radio Australia: *Correspondents' Report*. See S 0030.
0430 Radio Moscow: *Kaleidoscope*. A variety of topics ranging from science and ecology to cultural matters.

Mondays

0400 BBC: *Newsdesk*. See S 0400.
0409 BBC: *British News*
0410 Radio Australia: *Variable Feature*. These are repeat programs (or music) which are used as program fillers.
0410 VOA (af/me): *Newsline*. See M 0010.
0411 Radio Moscow: *Top Priority*. See S 0411.
0430 BBC: *Off the Shelf*. Daily readings: *The Confessions of St. Augustine* (4th, ten parts); *The House of the Spirits* (19th, ten parts).
0430 Radio Australia: *International Report*. See M 0030.
0430 VOA (af/me): *VOA Monday Morning*. See S 0010.
0432 Radio Moscow: *The Jazz Show*. The world of Russian jazz.
0445 BBC: *Andy Kershaw's World of Music*. Recordings of diverse music from around the world.

Tuesdays

0400 BBC: *Newsdesk*. See S 0400.
0400 Guatemala: *Insight for Living.*
0409 BBC: *British News*
0410 Radio Australia: *Variable Feature*. See M 0410.
0410 VOA (af/me): *Newsline*. See M 0010.
0411 Radio Moscow: *Commonwealth Update*. See T 0111.
0415 BBC: *Health Matters*. See T 0145.
0430 BBC: *Off the Shelf*. See M 0430.
0430 Radio Australia: *International Report*. See M 0030.
0430 VOA (af/me): *VOA Tuesday Morning*. See S 0010.
0432 Radio Moscow: *Music*. See S 0532.
0445 BBC: *Sounds of Gospel:* Gospel music from around the world.

Wednesdays

0400 BBC: *Newsdesk*. See S 0400.
0400 Guatemala: *Insight for Living.*
0409 BBC: *British News*
0410 Radio Australia: *Variable Feature*. See M 0410.
0410 VOA (af/me): *Newsline*. See M 0010.
0411 Radio Moscow: *Commonwealth Update*. See T 0111.
0415 BBC: *Waveguide*. Hear World Service better.
0425 BBC: *Book Choice*. Short book reviews every week.
0430 BBC: *Off the Shelf*. See M 0430.
0430 Radio Australia: *International Report*. See M 0030.
0430 VOA (af/me): *VOA Wednesday Morning*. See S 0010.
0432 Radio Moscow: *Music At Your Request*. See M 1132.
0445 BBC: *Country Style*. See W 0145.

France

RFI English programming to us at 1200-1300 on 13640 is from new rotary antenna, parallel to 21645; features are: Mon., *RFI Europe, North/South* or *Planet Earth, Sports*. Tue., *France Today, RFI Europe, Books, Science*. Wed., *RFI Europe, Counterpoint, Land of France*. Thu., *Sports, RFI Europe, The Americas, Arts in France*. Fri., *RFI Europe, Film Reel, Made in France*. Sat., *Focus on France, Spotlight on Africa, French Lesson*. Sun. *Report on Asia, Club 9516* (RFI via Glenn Hauser)

Thursdays

0400 BBC: *Newsdesk*. See S 0400.
0400 Guatemala: *Insight for Living.*
0409 BBC: *British News*
0410 Radio Australia: *Variable Feature*. See M 0410.
0410 VOA (af/me): *Newsline*. See M 0010.
0411 Radio Moscow: *Commonwealth Update*. See T 0111.
0415 BBC: *The Farming World*. See H 0145.
0430 BBC: *Off the Shelf*. See M 0430.
0430 Radio Australia: *International Report*. See M 0030.
0430 VOA (af/me): *VOA Thursday Morning*. See S 0010.
0445 BBC: *From Our Own Correspondent*. See S 0330.

Fridays

0400 BBC: *Newsdesk*. See S 0400.
0400 Guatemala: *Insight for Living.*
0409 BBC: *British News*
0410 Radio Australia: *Variable Feature*. See M 0410.
0410 VOA (af/me): *Newsline*. See M 0010.
0411 Radio Moscow: *Commonwealth Update*. See T 0111.
0430 BBC: *Off the Shelf*. See M 0430.
0430 Radio Australia: *International Report*. See M 0030.
0430 VOA (af/me): *VOA Friday Morning*. See S 0010.
0432 Radio Moscow: *Music*. See S 0532.
0445 BBC: *Folk Routes*. See T 0130.

Saturdays

0400 BBC: *Newsdesk*. See S 0400.
0400 Christian Science Sentinel: *Monitor Radio News.*
0400 Guatemala: *Insight for Living.*
0406 Christian Science Sentinel: *Christian Science Sentinel Radio Edition.*
0409 BBC: *British News*
0410 Radio Australia: *Book Reading*. See S 0110.
0410 VOA (af/as/me): *VOA Saturday Morning*. See S 0010.
0411 Radio Moscow: *Commonwealth Update*. See T 0111.
0415 BBC: *Good Books*. See W 1445.
0430 BBC: *Jazz Now and Then*. See A 0145.
0430 Radio Australia: *Indian Pacific*. See A 0030.
0432 Radio Moscow: *Music*. See S 0532.
0445 BBC: *Worldbrief*. See F 2315.

FREQUENCIES

0500-0530	Australia, Radio	17750as			
0500-0600	Australia, Radio	11720pa	11800pa	15240pa	15320pa
		15365pa	17630pa	17715pa	17795pa
		21525as	21595as	21740pa	
0500-0600 vl	Australia, VL8A Alice Spg	4835do			
0500-0600 vl	Australia, VL8K Katherine	5025do			
0500-0600 vl	Australia, VL8T Tent Crk	4910do			
0500-0600	Bahrain, Radio	6010do			
0500-0600	Bulgaria, Radio	9700na	11720eu		
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	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
0500-0600	Cuba, Radio Havana Cuba	9510na			
0500-0600	Ecuador, HCJB Quito	11925am	21455am		
0500-0600 as	Eqt Guinea, R East Africa	9585af			
0500-0550	Germany, Deutsche Welle	5960na	6045na	6120na	6185na
0500-0600	Guatemala, Radio Cultural	3300do			
0500-0515	Israel, Kol Israel	7465eu	9435na	11605na	17545na
0500-0600	Japan, NHK/Radio	6025na	6085me	7230eu	9610as
		11740as	15410as	17810as	
0500-0600	Kenya, Kenya BC Corp	4935do			
0500-0600 mtwhf	Lebanon, Wings of Hope	9960me			
0500-0600	Malaysia, RTM Radio 4	7295do			
0500-0600	New Zealand, R NZ Intl	15115pa			
0500-0600	Nigeria, Radio	3326do	4770do	4990do	
0500-0600	Nigeria, Voice of	7255af			
0500-0600 vl	Papua New Guinea, NBC	9675do			
0500-0600	Russia, Radio Moscow Intl	5940na	7105na	7130af	7150na
		7165na	7180na	7330na	9890eu
		11675af	12050me	15465af	17570af
		17590af	17610me	17655af	17835af
		21690af			
0500-0600	S Africa, Channel Africa	7275af	11745af	11900af	
0500-0553 f	Seychelles, FEBA Radio	17750me			
0500-0600	Spain, Spanish Natl Radio	9540na			
0500-0515 t	Sri Lanka, SLBC Colombo	9720na	15425na		
0500-0600	Swaziland, Swazi Radio	6155af			
0500-0530	Swaziland, Trans World R	5055af	7200af	7215af	
0500-0530 mtwhf	Switzerland, Swiss R Intl	3985eu	6165eu		
0500-0600	Thailand, Radio	4830as	9655as	11905as	
0500-0600 vl	Uganda, Radio	4976do			
0500-0600	United Kingdom,BBC London	3955eu	5975na	6005af	6180eu
		6195eu	7325af	9410af	9600af
		11735eu	11760me	11820as	12095af
		15070me	15310as	15400af	15420af
		15575me	17830as	21470af	21715as
0500-0600	USA, KCBI Dallas TX	9815am			
0500-0600	USA, KTBN Salt Lk City UT	7510am			
0500-0600	USA, KVOH Los Angeles CA	9785am			
0500-0600	USA, KWHR Naalehu HI	17510as			
0500-0600	USA, Monitor Radio Intl	9840af			
0500-0600	USA, VOA Washington DC	6035af	7405af	9665af	12080af
		15600af			
0500-0530	USA, VOA Washington DC	5995eu	6140eu	6873eu	7170eu
		9530eu	9700eu	11825me	15205me
0500-0600	USA, WEWN Birmingham AL	7425am			
0500-0600 vl	USA, WHRI Noblesville IN	7315am	9495am		
0500-0600 vl	USA, WINB Red Lion PA	11950eu			
0500-0600	USA, WJCR Upton KY	7490na	13595na		
0500-0600 mtwhfa	USA, WMLK Bethel PA	9465eu			
0500-0600	USA, WRNO New Orleans LA	7395am			
0500-0600	USA, WWCR Nashville TN	5810am	5935am	7435am	
0500-0600	USA, WYFR Okeechobee FL	5985am	9850eu	11580af	
0500-0530	Vatican State, Vatican R	9695af	11625af	15090af	
0510-0520	Botswana, Radio	3356af	4830af	7255af	
0525-0600	Ghana, GBC Radio 2	3366do			
0530-0600	Austria, R Austria Intl	6015na	6155eu	13730eu	15410me
		17870me			
0530-0540	Finland, YLE/Radio	9635me	11755af		
0530-0600	Romania, R Romania Intl	15340af	15380af	17720af	17745af
		17790af			
0530-0600	Swaziland, Trans World R	6070af	11740af		
0530-0600	UAE, Radio Dubai	15435as	17830as	21700as	

SELECTED PROGRAMS

Sundays

0500 BBC: *Newshour.* A comprehensive look at the major topics of the day, plus up-to-the-minute international and British News.
0500 Christian Science Sentinel: *Monitor Radio News.*
0506 Christian Science Sentinel: *Christian Science Sentinel Radio Edition.*
0510 Radio Australia: *Music of RA.* Selections by Radio Australia announcers.
0510 VOA (af/me): *VOA Sunday Morning.* See S 0010.
0511 Radio Moscow: *Science and Engineering* in the CIS. The latest developments in science and technology.
0530 Radio Australia: *At Your Request.* See S 0330.
0532 Radio Moscow: *Music.* Music as selected by Radio Moscow staff.

Mondays

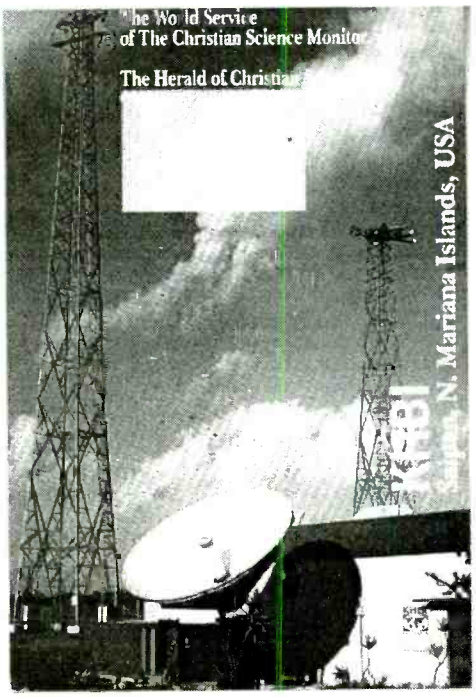
0500 BBC: *Newshour.* See S 0500.
0510 VOA (af/me): *VOA Business Report.* News from around the world affecting business and finance.
0511 Radio Moscow: *Mailbag.* Answering listener questions.
0520 Radio Australia: *Sports Report.* See S 1310.
0530 Radio Australia: *Pacific Beat.* A magazine which provides a *Focus* on the people and issues of the region.
0530 VOA (af/me): *VOA Monday Morning.* See S 0010.
0532 Radio Moscow: *Pacific Ocean Region.* Economic and political developments in the Asia/Pacific Ocean Region.
0545 Radio Moscow: *Your Top Tune.* See S 0232.

Tuesdays

0500 BBC: *Newshour.* See S 0500.
0510 VOA (af/me): *VOA Business Report.* See M 0510.
0511 Radio Moscow: *Focus on Asia and the Pacific.* See T 0011.
0520 Radio Australia: *Sports Report.* See S 1310.
0530 Radio Australia: *Pacific Beat.* See M 0530.
0530 VOA (af/me): *VOA Tuesday Morning.* See S 0010.
0532 Radio Moscow: *Music.* See S 0532.
0546 Radio Australia: *Speaking Out.* News about the indigenous people of Australia.

Wednesdays

0500 BBC: *Newshour.* See S 0500.



One of the three dipole antenna arrays rises behind the front entrance to Christian Science Monitor's, KHBI, Saipan, Mariana Islands.

0510 VOA (af/me): *VOA Business Report.* See M 0510.
0511 Radio Moscow: *Focus on Asia and the Pacific.* See T 0011.
0520 Radio Australia: *Sports Report.* See S 1310.
0530 Radio Australia: *Pacific Women.* Conversations with *Pacific Women about their lives and the issues which affect them.*
0530 VOA (af/me): *VOA Wednesday Morning.* See S 0010.
0532 Radio Moscow: *Interview.* See T 1232.
0539 Radio Moscow: *Music.* See S 0532.

Thursdays

0500 BBC: *Newshour.* See S 0500.
0510 VOA (af/me): *VOA Business Report.* See M 0510.
0511 Radio Moscow: *Focus on Asia and the Pacific.* See T 0011.
0520 Radio Australia: *Sports Report.* See S 1310.
0530 Radio Australia: *Pacific Beat.* See M 0530.
0530 VOA (af/me): *VOA Thursday Morning.* See S 0010.
0532 Radio Moscow: *Interview.* See T 1232.
0539 Radio Moscow: *Music.* See S 0532.

Fridays

0500 BBC: *Newshour.* See S 0500.
0510 VOA (af/me): *VOA Business Report.* See M 0510.
0511 Radio Moscow: *Focus on Asia and the Pacific.* See T 0011.
0520 Radio Australia: *Sports Report.* See S 1310.
0530 Radio Australia: *Pacific Beat.* See M 0530.
0530 VOA (af/me): *VOA Friday Morning.* See S 0010.
0530 VOA (me): *VOA Friday Morning.* See S 0010.
0532 Radio Moscow: *Music.* See S 0532.

Saturdays

0500 BBC: *Newshour.* See S 0500.
0510 Radio Australia: *Jazz Notes.* See T 1330.
0510 VOA (af/me): *VOA Saturday Morning.* See S 0010.
0511 Radio Moscow: *Focus on Asia and the Pacific.* See T 0011.
0530 Radio Australia: *One World.* Carolyn Court reports on environmental issues important to the Pacific.
0532 Radio Moscow: *Music.* See S 0532.

0600 UTC SHORTWAVE GUIDE

2:00 AM EDT
11:00 PM PDT

FREQUENCIES

0600-0700	Australia, Radio	6020pa	11720pa	11800pa	15240pa
		15320pa	15365pa	17630pa	17670as
		17715pa	17880as	21525as	21595as
		21740pa			
0600-0700 vl	Australia, VL8A Alice Spg	4835do			
0600-0700 vl	Australia, VL8K Katherine	5025do			
0600-0700 vl	Australia, VL8T Tent Crk	4910do			
0600-0700	Bahrain, Radio	6010do			
0600-0630	Bulgaria, Radio	9700na	11720eu		
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 mtwtf	Canada, RCI Montreal	6050eu	6150eu	7155af	9740af
		9760af	11905af		
0600-0700	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
0600-0700	Cuba, Radio Havana Cuba	9510na			
0600-0700	Ecuador, HCJB Quito	11925am	15155am	21455am	
0600-0700 as	Eqt Guinea, R East Africa	9585af			
0600-0650	Germany, Deutsche Welle	5965af	9565af	11765af	13790af
		15185af	17820af	21705af	
0600-0630	Ghana, GBC Radio 1	4915do			
0600-0615	Ghana, GBC Radio 2	3366do			
0600-0700 vl	Italy, IRRS Milano	7125eu			
0600-0700	Japan, NHK/Radio	11860as	21610as		
0600-0625	Kenya, Kenya BC Corp	4935do			
0600-0700 vl	Kiribati, Radio	9825do			
0600-0630	Laos, National Radio of	7116as			
0600-0700 mtwhf	Lebanon, Wings of Hope	9960me			
0600-0700	Liberia, Radio ELWA	4760do			
0600-0700 smtwha	Malaysia, RTM Radio 4	7295do			
0600-0700	Malaysia, Voice of	6175as	9750as	15295as	
0600-0700	Malta, V of Mediterranean	9765me			
0600-0700	New Zealand, R NZ Intl	15115pa			
0600-0700	Nigeria, Radio	3970do	4770do	4990do	
0600-0700	Nigeria, Voice of	7255af			
0600-0650	North Korea, R Pyongyang	15180as	15230as		
0600-0700 vl	Papua New Guinea, NBC	9675do			
0600-0630	Romania, R Romania Intl	7225eu	9510eu	9665eu	11810eu
0600-0700	Russia, Radio Moscow Intl	5905eu	5940eu	7165eu	7180eu
		7270eu	7330eu	9890eu	11765eu
		13650eu	15190eu	15480me	15550me
		17805me	21610af		
0600-0700	S Africa, Channel Africa	7230af	17710af		
0600-0630 vl	Solomon Islands, SIBC	5020do	9545do		
0600-0700	South Korea, Radio Korea	7275na	11945na	15155as	
0600-0700	Swaziland, Swazi Radio	6155af			
0600-0700	Swaziland, Trans World R	5055af	6070af	11740af	
0600-0630	Switzerland, Swiss R Intl	9885af	13635af	15430af	
0600-0615 mtwtf	Switzerland, Swiss R Intl	3985eu	6165eu		
0600-0700 as	Thailand, Radio	4830as	9655as	11905as	
0600-0700	United Kingdom,BBC London	3955eu	5975ca	6180af	6195af
		7325af	9410eu	9600af	9640na
		11780eu	11820af	11940af	12095eu
		15360as	15420af	15575eu	17790as
		17830as	17885af	21470me	
0600-0700	USA, KCBI Dallas TX	9815am			
0600-0700	USA, KTBN Salt Lk City UT	7510na			
0600-0700	USA, KVOH Los Angeles CA	9785am			
0600-0700	USA, KWHR Naalehu HI	9930as			
0600-0700	USA, Monitor Radio Intl	7465eu	7535eu		
0600-0700	USA, VOA Washington DC	6035af	7405af	9530af	9665af
		11950af	12080af	15080af	15600af
0600-0630	USA, VOA Washington DC	3980eu	5995eu	6040eu	6060eu
		6140eu	6873eu	7170eu	7325eu
		11805me	11825me	15205me	
0600-0700 vl	USA, WHRI Noblesville IN	7315am	9495am		
0600-0700 vl	USA, WINB Red Lion PA	11950na			
0600-0700	USA, WJCR Upton KY	7490na	13595na		
0600-0700 smtwhf	USA, WMLK Bethel PA	9465eu			
0600-0700	USA, WWCR Nashville TN	5810am	5935am	7435am	
0600-0700	USA, WYFR Okeechobee FL	5985am	7355eu	9680am	11580af
0600-0620	Vatican State, Vatican R	6245eu	7250eu		
0625-0700	Kenya, Kenya BC Corp	4935do			
0630-0700	Austria, R Austria Intl	6015na			
0630-0700	Vatican State, Vatican R	9625af	11625af	15090af	
0632-0641	Romania, R Romania Intl	7225eu	9510eu	9665eu	11810eu
0645-0700	Romania, R Romania Intl	11775pa	15250pa	15335pa	17720pa
		17805pa			

SELECTED PROGRAMS

Sundays

0600 BBC: *World News.* See S 0300.
0609 BBC: *British News.* See S 0309.
0610 Radio Australia: *Feedback.* See S 0410.
0610 VOA (af/me): *VOA Sunday Morning.* See S 0010.
0615 BBC: *Letter from America.* Alistair Cooke shares his inimitable view of contemporary American life.
0630 BBC: *Jazz for the Asking.* Record requests with Malcolm Laylock.
0630 Radio Australia: *Correspondents' Report.* See S 0030.

Mondays

0600 BBC: *World News.* See S 0300.
0609 BBC: *British News.* See S 0309.
0610 Radio Australia: *Pacific Beat.* See M 0530.
0610 VOA (af): *Daybreak Africa.* See M 0310.
0610 VOA (me): *Newsline.* See M 0010.
0615 BBC: *The Learning World. News and Views* about world wide education.
0630 BBC: *Developing Health.* NEW. Health issues in developing countries.
0630 Radio Australia: *International Report.* See M 0030.
0630 VOA (me): *VOA Monday Morning.* See S 0010.

Tuesdays

0600 BBC: *World News.* See S 0300.
0609 BBC: *British News.* See S 0309.
0610 Radio Australia: *Pacific Beat.* See M 0530.
0610 VOA (af): *Daybreak Africa.* See M 0310.
0610 VOA (me): *Newsline.* See M 0010.
0615 BBC: *The World Today.* See M 1645.
0630 Radio Australia: *International Report.* See M 0030.
0630 VOA (me): *VOA Tuesday Morning.* See S 0010.

Wednesdays

0600 BBC: *World News.* See S 0300.
0609 BBC: *British News.* See S 0309.
0610 Radio Australia: *Pacific Beat.* See M 0530.
0610 VOA (af): *Daybreak Africa.* See M 0310.
0610 VOA (me): *Newsline.* See M 0010.
0615 BBC: *The World Today.* See M 1645.
0630 BBC: *Meridian Documentary.* One of three topical programmes weekly about the world of the arts.
0630 Radio Australia: *International Report.* See M 0030.
0630 VOA (me): *VOA Wednesday Morning.* See S 0010.

Steve Edwards presents the latest dance music on BBC's "The Dance Selection."

Thursdays

0600 BBC: *World News.* See S 0300.
0609 BBC: *British News.* See S 0309.
0610 Radio Australia: *Pacific Beat.* See M 0530.
0610 VOA (af): *Daybreak Africa.* See M 0310.
0610 VOA (me): *Newsline.* See M 0010.
0615 BBC: *The World Today.* See M 1645.
0630 BBC: *Sports International.* See H 0230.
0630 Radio Australia: *International Report.* See M 0030.
0630 VOA (me): *VOA Thursday Morning.* See S 0010.

Fridays

0600 BBC: *World News.* See S 0300.
0609 BBC: *British News.* See S 0309.
0610 Radio Australia: *Pacific Beat.* See M 0530.
0610 VOA (af): *Daybreak Africa.* See M 0310.
0610 VOA (me): *Newsline.* See M 0010.
0615 BBC: *The World Today.* See M 1645.
0630 BBC: *Meridian Books.* See W 0630.
0630 Radio Australia: *International Report.* See M 0030.
0630 VOA (me): *VOA Friday Morning.* See S 0010.

Saturdays

0600 BBC: *World News.* See S 0300.
0609 BBC: *British News.* See S 0309.
0610 Radio Australia: *Pacific Beat.* See M 0530.
0610 VOA (af/me): *VOA Saturday Morning.* See S 0010.
0615 BBC: *The World Today.* See M 1645.
0630 BBC: *Meridian Reports.* See W 0630.

0700-0730	Australia, Radio	15320pa	17715pa	21740pa	
0700-0800	Australia, Radio	6020pa	9710pa	11720pa	11880pa
		11910pa	15240pa	15365pa	17695as
		17790as	21525as	21595as	
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	Bahrain, Radio	6010do			
0700-0800	Canada, CFCX Montreal	6005do			
0700-0800	Canada, CFRX Toronto	6070do			
0700-0800	Canada, CFVP Calgary	6030do			
0700-0800	Canada, CHNX Halifax	6130do			
0700-0800	Canada, CKZU Vancouver	6160do			
0700-0800	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
0700-0727	Czech Rep, Radio Prague	5930do	7345do	9505do	
0700-0800	Ecuador, HCJB Quito	6205eu	9600eu	9745au	11835eu
		21455eu			
0700-0800 as	Eqt Guinea, R East Africa	9585af			
0700-0715	Ghana, GBC Radio 1	4915do			
0700-0715	Ghana, GBC Radio 2	3366do			
0700-0800	Italy, AWR Europe	7230eu			
0700-0800 vl	Italy, IRRS Milano	7125eu			
0700-0800	Japan, NHK/Radio	6050as	7230au	11740au	15170as
		15325au	15410au	17765as	17810as
		17860as	21575me	21610me	
0700-0800	Kenya, Kenya BC Corp	4935do			
0700-0800 vl	Kiribati, Radio	9825do			
0700-0800 mtwhf	Lebanon, Wings of Hope	9960me			
0700-0800	Liberia, Radio ELWA	4760do			
0700-0800 smtwha	Malaysia, RTM Radio 4	7295do			
0700-0800	Malaysia, Voice of	6175as	9750as	15295as	
0700-0730	Myanmar, Radio	9730do			
0700-0758	New Zealand, R NZ Intl	15115pa			
0700-0800	Nigeria, Radio	3326do	4770do	4990sk	
0700-0800	Nigeria, Voice of	7255af			
0700-0750	North Korea, R Pyongyang	15340as	17765as		
0700-0800 vl	Papua New Guinea, NBC	9675do			
0700-0715	Romania, R Romania Intl	11775pa	15250pa	15335pa	17720pa
		17805pa			
0700-0800	Russia, Radio Moscow Intl	5905eu	5930eu	7130af	7165eu
		7180na	7270na	7345na	7370eu
		9890eu	11765me	13650eu	15190eu
		15480me	15550me	17725af	17835af
		21610af			
0700-0715 vl	Sierra Leone, SLBS	3316do			
0700-0800 vl	Solomon Islands, SIBC	5020do	9545do		
0700-0800	Swaziland, Swazi Radio	6155af			
0700-0800	Swaziland, Trans World R	6070af	11740af		
0700-0715 as	Switzerland, Swiss R Intl	3985eu	6165eu		
0700-0800	Taiwan, VO Free China	5950na			
0700-0800 as	Thailand, Radio	4830as	9655as	11905as	
0700-0800	United Kingdom,BBC London	3955eu	5975ca	6190af	6195eu
		7150af	7325eu	9410eu	9600af
		9640na	9660eu	9760eu	11760me
		11780ca	11940af	12095eu	15070eu
		15310as	15400af	15575me	17790af
		17885af	21470af		
0700-0800	USA, KCBI Dallas TX	9815na			
0700-0800	USA, KTBN Salt Lk City UT	7510na			
0700-0800	USA, KVOH Los Angeles CA	9785am			
0700-0800	USA, KWHR Naalehu HI	9930as			
0700-0800	USA, Monitor Radio Intl	7520eu			
0700-0800	USA, WEWN Birmingham AL	7425am			
0700-0800 vl	USA, WHRI Noblesville IN	7315am	9495am		
0700-0800 vl	USA, WINB Red Lion PA	11950na			
0700-0800	USA, WJCR Upton KY	7490na	13595na		
0700-0800 smtwhf	USA, WMLK Bethel PA	9465eu			
0700-0800	USA, WWCR Nashville TN	5810am	5935am	7435am	
0700-0800	USA, WYFR Okeechobee FL	7355eu	9680am	11580af	
0700-0710 mtwtfa	Vatican State, Vatican R	3950eu	6245eu	7250eu	9645eu
		11740eu	15210eu		
0730-0800	Australia, Radio	9580pa	17750as		
0730-0755	Belgium, R Vlaanderen Int	5910eu	9925au		
0730-0757	Czech Rep, Radio Prague	17535as	21705af		
0730-0745 sh	Greece, Voice of	9425eu	11645eu	15650eu	
0730-0745 mtwhf	Iceland, Natl BC Service	9265am			
0730-0800	Netherlands, Radio	9630pa	9720pa		
0740-0800	Monaco, Trans World Radio	7385eu			
0745-0800	Finland, YLE/Radio	6120eu	9560eu	11755eu	
0745-0800	Guam, KTWR Agana	15200as			

0800-0900	Australia, Radio	6020pa	6080pa	7240pa	9580pa
		9710pa	11720pa	11910pa	15240pa
		17695as	17750as	21525as	21595as
0800-0830 vl	Australia, VL8A Alice Spg	4835do			
0800-0830 vl	Australia, VL8K Katherine	5025do			
0800-0830 vl	Australia, VL8T Tent Crk	4910do			
0800-0900	Bahrain, Radio	6010do			
0800-0900	Canada, CFCX Montreal	6005do			
0800-0900	Canada, CFRX Toronto	6070do			
0800-0900	Canada, CFVP Calgary	6030do			
0800-0900	Canada, CHNX Halifax	6130do			
0800-0900	Canada, CKZU Vancouver	6160do			
0800-0900	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
0800-0830	Ecuador, HCJB Quito	6205eu	9600eu	9745pa	11835eu
		11925pa	17490au	21455eu	
0800-0900 as	Eqt Guinea, R East Africa	9585af			
0800-0805 s	Ghana, GBC Radio 1	4915do			
0800-0805 s	Ghana, GBC Radio 2	3366do			
0800-0900	Guam, KTWR Agana	15200as			
0800-0900	Indonesia, Voice of	9675as	11752as		
0800-0900 vl	Italy, IRRS Milano	7125eu			
0800-0900	Kenya, Kenya BC Corp	4935do			
0800-0900 mtwhf	Lebanon, Wings of Hope	9960me			
0800-0830	Liberia, Radio ELWA	4760do			
0800-0900 smtwha	Malaysia, RTM Radio 4	7295do			
0800-0825	Malaysia, Voice of	6175as	9750as	15295as	
0800-0900	Monaco, Trans World Radio	7385eu			
0800-0825	Netherlands, Radio	9630pa	9720pa		
0800-0900	New Zealand, R NZ Intl	9700pa			
0800-0900	Nigeria, Radio	3326do	4990do		
0800-0850	North Korea, R Pyongyang	15180as	15230as		
0800-0830 s	Norway, Radio Norway Intl	15175as	17740pa		
0800-0900	Pakistan, Radio	17900eu	21520eu		
0800-0900 vl	Papua New Guinea, NBC	9675do			
0800-0900	Russia, Radio Moscow Intl	7130af	7165eu	9680eu	11690eu
		12010eu	12055af	12070eu	13650eu
		15190eu	15210eu	15485eu	15540eu
		17595eu	21515eu		
0800-0815 vl	Sierra Leone, SLBS	3316do			
0800-0900 vl	Solomon Islands, SIBC	5020do	9545do		
0800-0900	South Korea, Radio Korea	7550af	13670me	15155eu	
0800-0900	United Kingdom,BBC London	3955eu	6195eu	7150au	7325eu
		9410eu	9640na	9660eu	9760eu
		11760me	11940af	15070eu	15400eu
		15575me	17790AS	17885af	21470af
		21660af			
0800-0900	USA, KCBI Dallas TX	9815am			
0800-0900 vl	USA, KNLS Anchor Point AK	7365as			
0800-0900	USA, KTBN Salt Lk City UT	7510am			
0800-0900	USA, KWHR Naalehu HI	9930as			
0800-0900	USA, Monitor Radio Intl	13615pa			
0800-0900	USA, WEWN Birmingham AL	9350am	9985am		
0800-0900 vl	USA, WHRI Noblesville IN	7315am	7355am		
0800-0900 vl	USA, WINB Red Lion PA	11950na			
0800-0900	USA, WJCR Upton KY	7490na	13595na		
0800-0900 smtwhf	USA, WMLK Bethel PA	9465eu			
0800-0900	USA, WWCR Nashville TN	5810am	5935am	7435am	
0830-0900 vl	Australia, VL8A Alice Spg	2310do			
0830-0900 vl	Australia, VL8K Katherine	2485do			
0830-0900 vl	Australia, VL8T Tent Crk	2325do			
0830-0900	Austria, R Austria Intl	6155eu	13730eu	15450as	17870au
0830-0900	Ecuador, HCJB Quito	9745pa	11925pa	21455pa	
0830-0900	Netherlands, Radio	9720pa			

Two Announcers for Radio Bulgaria.

0900-1000	Australia, Radio	6020pa	9510as	9580pa	9710pa
		13605as	15170as	21745as	
0900-1000 vl	Australia, VL8A Alice Spg	2310do			
0900-1000 vl	Australia, VL8K Katherine	2485do			
0900-1000 vl	Australia, VL8T Tent Crk	2325do			
0900-1000	Bahrain, Radio	6010do			
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	17710pa	
0900-1000	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
0900-1000	Ecuador, HCJB Quito	9745pa	11925pa	17490pa	21455pa
0900-1000 as	Eqt Guinea, R East Africa	9585af			
0900-0930	Finland, YLE/Radio	15330as	17800au		
0900-0950	Germany, Deutsche Welle	6160as	9565af	11715as	12055as
		15410af	17780as	17800af	17820as
		21600af	21650as	21680as	21705af
0900-0915 mtwtf	Ghana, GBC Radio 1	4915do			
0900-0915	Ghana, GBC Radio 2	3366do			
0900-1000	Guam, KTWR Agana	11805au			
0900-0915	Guam, KTWR Agana	15200as			
0900-0915 vl	Italy, IRRS Milano	7125eu			
0900-1000	Japan, NHK/Radio	9610as	9750as	11740as	11815as
		15190as			
0900-1000 mtwhf	Lebanon, Wings of Hope	9960me			
0900-1000	Malaysia, RTM Radio 4	7295do			
0900-0920 mtwhf	Monaco, Trans World Radio	7385eu			
0900-0935 a	Monaco, Trans World Radio	7385eu			
0900-0945 s	Monaco, Trans World Radio	7385eu			
0900-0930	Netherlands, Radio	9720pa			
0900-1000	New Zealand, R NZ Intl	9700pa			
0900-1000	Nigeria, Radio	3326do	4990do		
0900-1000 mtwtfa	Palau, KHBN Voice of Hope	9830as			
0900-1000 vl	Papua New Guinea, NBC	9675do			
0900-1000	Russia, Radio Moscow Intl	9680eu	12070eu	13650eu	15190eu
		15210eu	15345eu	15380eu	15440eu
		15495eu	15540eu	17595eu	17605eu
		17760eu	21515eu	21540eu	
0900-1000 vl	Solomon Islands, SIBC	5020do	9545do		
0900-0930	Switzerland, Swiss R Intl	9885au	13685au	21820au	
0900-1000	United Kingdom,BBC London	6190af	6195eu	7180as	9410eu
		9660eu	9750eu	9760eu	11760me
		11940af	12095eu	15070eu	15190sa
		15310as	15400af	15575me	17640eu
		17705eu	17790af	17885af	21470af
		21660af			
0900-1000	USA, KCBI Dallas TX	9815am			
0900-1000	USA, KTBN Salt Lk City UT	7510am			
0900-1000	USA, KWHR Naalehu HI	9930as			
0900-1000	USA, Monitor Radio Intl	7395ca	9840pa	13615pa	17555as
0900-1000	USA, WEWN Birmingham AL	7425am	7465am	9350am	
0900-1000 vl	USA, WHRI Noblesville IN	7315am	7355am		
0900-1000 vl	USA, WINB Red Lion PA	11950na			
0900-1000	USA, WJCR Upton KY	7490na	13595na		
0900-1000 smtwhf	USA, WMLK Bethel PA	9465eu			
0900-1000	USA, WWCR Nashville TN	5935am			
0910-0940 smha	Mongolia, R Ulaanbaatar	11850as	12015as		
0915-1000	Ghana, GBC Radio 2	6130do	7295do		
0920-0935 sh	Greece, Voice of	15650au	17525au		
0930-1000	Australia, AAF Radio	11465as			
0930-1000	Canada, CKZN St John's	6160do			
0930-1000	Netherlands, Radio	7260as	9720pa	9810as	9865pa
0930-1000	Philippines, FEBC Manila	11690as			
0940-0950	Greece, Voice of	15650au	17525au		
0945-1000 s	Armenia, Radio Yerevan	15455eu	15485eu	15510eu	

1000-1100	Australia, Radio	9580pa	15170as	21745as	
1000-1100 vl	Australia, VL8A Alice Spg	2310do			
1000-1100 vl	Australia, VL8K Katherine	2485do			
1000-1100 vl	Australia, VL8T Tent Crk	2325do			
1000-1100	Bahrain, Radio	6010do			
1000-1025 mtwtfa	Belgium, R Vlaanderen Int	9925eu	17515eu	21815af	
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	8450au	11755pa	15440pa	17710pa
1000-1100	Costa Rica, AWR Alajuela	9725ca			
1000-1100	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
1000-1100	Ecuador, HCJB Quito	9745pa	11925pa	17490pa	21455pa
1000-1100 as	Eqt Guinea, R East Africa	9585af			
1000-1100	Ghana, GBC Radio 2	6130do	7295do		
1000-1100	India, All India Radio	15050as	17387au	17895as	21735au
1000-1100	Italy, AWR Europe	7230eu			
1000-1100 vl	Italy, IRRS Milano	7125eu			
1000-1100 mtwhf	Lebanon, Wings of Hope	9960me			
1000-1100 vl	Malaysia, RTM Kota Kinaba	5980do			
1000-1100 mtwh	Malaysia, RTM Radio 4	7295do			
1000-1100	Netherlands, Radio	7260as	9810as		
1000-1030	Netherlands, Radio	9720pa	9865pa		
1000-1100	New Zealand, R NZ Intl	9700pa			
1000-1030 s	Norway, Radio Norway Intl	17840eu	21705af		
1000-1100 mtwhfa	Palau, KHBN Voice of Hope	9830as			
1000-1100 vl	Papua New Guinea, NBC	9675do			
1000-1100	Philippines, FEBC Manila	11690as			
1000-1100	Russia, Radio Moscow Intl	7205eu	9750eu	11675na	12015eu
		12020eu	12070eu	13650eu	15175eu
		15210eu	15320na	15380eu	15435na
		15465na	15470na	17710na	17760eu
		21515eu	21540eu		
1000-1100	S Africa, Channel Africa	17810af			
1000-1100	United Kingdom,BBC London	6190af	6195af	9410eu	9660eu
		9750eu	9760eu	11760me	11940af
		12095eu	15070eu	15190sa	15310as
		15400af	15575me	17640eu	17705eu
		17790af	17885af	21470af	21660af
1000-1100	USA, KCBI Dallas TX	9815am			
1000-1100	USA, KTBN Salt Lk City UT	7510am			
1000-1100	USA, KWHR Naalehu HI	9930as			
1000-1100	USA, Monitor Radio Intl	7395ca	7465am	9430as	13625pa
1000-1100	USA, VOA Washington DC	5985as	7405am	9590am	11915am
		15120am			
1000-1100 vl	USA, WHRI Noblesville IN	7315am	7355am		
1000-1100 vl	USA, WINB Red Lion PA	11950na			
1000-1100	USA, WJCR Upton KY	7490na	13595na		
1000-1100	USA, WWCR Nashville TN	5935am			
1000-1100	USA, WYFR Okeechobee FL	5950am			
1000-1030	Vietnam, Voice of	9840as	12020as	15010as	
1030-1100 mtwtfa	Austria, R Austria Intl	6155eu	13730eu	15450au	17870as
1030-1100 vl	Malaysia, RTM Sarawak	4950do	7160do		
1030-1100	Sri Lanka, SLBC Colombo	11835au	15120as	17850as	
1030-1100	UAE, Radio Dubai	13675eu	15320eu	15395eu	21605eu
1040-1050	Greece, Voice of	15650as	17525as		

What is Happening to Cycle 22?

By Jacques d'Avignon

Sun cycle #22 is definitely on the decline. Anyone that has been doing some monitoring over the last few months has already realized what is happening. The general knowledge is that the sun cycle is "approximately" 11 years. But over the years the real length of the cycle has varied. So let's have a look at the life story of the present cycle.

Cycle 22 started in September 1986 and over the next few years the sunspot numbers have increased very rapidly. In October 1989, a decline started that lasted 'til February 1991. A new maximum was recorded for this cycle, then we see a new decline and suddenly in January 1992 another maximum was recorded. I feel like I'm on a roller-coaster! Since January 1992 the decline has been constant and rapid with the exception of a few months in mid 1993 where the sun attempted to be more active.

The experts are now predicting that cycle #22 may be one of the shortest on record and that it may reach the bottom of the cycle late in 1995 or mid 1996.

What will be the effects of this decline for the shortwave listener? Obviously, the Optimum Working Frequency (that is, the middle curve) plotted on the monthly graphs will be lower for all circuits. This means that the shortwave broadcasters will relinquish the upper bands and migrate to the lower shortwave broadcasting frequencies.

It will be interesting to observe these frequencies being used more and more, and obviously the broadcasters will, in some cases, be transmitting over each other. Hopefully, some of the world "powerhouses" will insure that their signals are clean and that the splatter, sometimes heard all over the band, will be cleaned up by these stations. The shortwave listeners may have to resort to listening to the overseas broadcasters on a satellite frequency; now *that* is real DX!

For the utility listeners, some of the stations that only have a very few frequencies to choose from and are not frequency-agile like the broadcasters, will not be heard for a while. Probably lost to Eastern North America for a while will be the possibility of hearing the fishing fleet off the coast of England or the airliner over Africa. These signals were never designed to be heard all over the world like they are now. So if you are trying to get a QSL from one of those stations, better listen carefully now and get that card soon!

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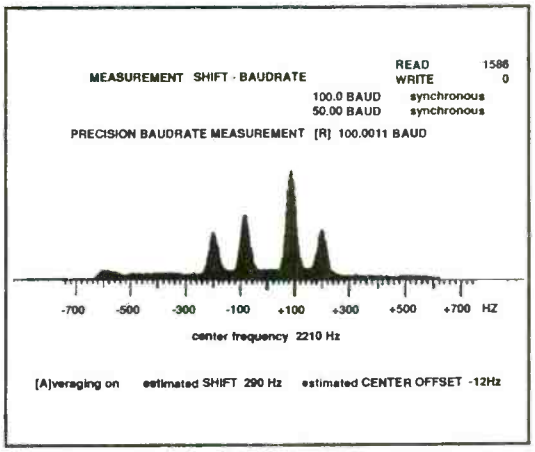

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- SWED-ARQ-ARQ-SWE
- ARQ-E/ARQ1000 Duplex
- ARQ-N-ARQ1000 Duplex Variant
- ARQ-E3-CCIR519 Variant
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- TDM342/ARQ-M2/4
- FEC-A FEC100A/FEC101
- FEC-S • FEC1000 Simplex
- Sports info 300 baud ASCII
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1100 UTC SHORTWAVE GUIDE 7:00 AM EDT 4:00 AM PDT

FREQUENCIES

1100-1200	Australia, Radio	5995pa	6020pa	6080as	7240pa
		9510as	9580pa	9710as	13605as
		15170as	17910as		
1100-1200 vl	Australia, VL8A Alice Spg	2310do			
1100-1200 vl	Australia, VL8K Katherine	2485do			
1100-1200 vl	Australia, VL8T Tent Crk	2325do			
1100-1200	Bahrain, Radio	6010do			
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, AWR Alajuela	9725ca	11870ca		
1100-1200	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
1100-1130	Ecuador, HCJB Quito	9745pa	11925pa	21455pa	
1100-1150	Germany, Deutsche Welle	15370af	15410af	17765af	17800af
		21600af			
1100-1115	Ghana, GBC Radio 1	4915do			
1100-1130	Israel, Kol Israel	15640eu	15650as	17575eu	
1100-1200 vl	Italy, IRRS Milano	7125eu			
1100-1200	Japan, NHK/Radio	6120na	9610as	15445as	
1100-1200 mtwhf	Lebanon, Wings of Hope	9960me			
1100-1200 vl	Malaysia, RTM Kota Kinaba	5980do			
1100-1200	Malaysia, RTM Radio 4	4950do	7295do		
1100-1200 vl	Malaysia, RTM Sarawak	4950do	7160do		
1100-1200	New Zealand, R NZ Intl	9700pa			
1100-1150	North Korea, R Pyongyang	6576na	9977na	11335na	
1100-1200 mtwhf	Palau, KHBN Voice of Hope	9830as			
1100-1200 vl	Papua New Guinea, NBC	9675do			
1100-1200	Russia, Radio Moscow Intl	7205eu	11675eu	12015eu	12020eu
		12055eu	12070eu	15150as	15175as
		15210eu	15280as	15320as	15345eu
		15380eu	15435as	15480as	15585eu
		17605eu	17690eu	17710as	17760eu
		17805as	17880eu	21515eu	
1100-1200	S Africa, Channel Africa	9730af			
1100-1200	Singapore,R Singapore Int	9530as			
1100-1130	Sri Lanka, SLBC Colombo	11835au	15120as	17850as	
1100-1145	Switzerland, Swiss R Intl	9535as	9885as	13635as	15505as
1100-1200	United Kingdom,BBC London	5965na	5975na	6190af	6195na
		9410eu	9515na	9660eu	9740na
		9750eu	9760eu	11770me	11940af
		12095eu	15070eu	15220na	15310as
		15400af	17640eu	17705eu	17790sa
		17885me	21470af	21660af	
1100-1200	USA, KCBI Dallas TX	5815am			
1100-1200	USA, KTBN Salt Lk City UT	7510na			
1100-1200	USA, KWHR Naalehu HI	9930as			
1100-1200	USA, Monitor Radio Intl	7395am	7465am	9425pa	
1100-1200	USA, VOA Washington DC	5985as	6110as	7405am	9590am
		9760as	11720au	15120am	15160au
		15425as			
1100-1200 vl	USA, WHRI Noblesville IN	7315am	9850am		
1100-1200	USA, WJCR Upton KY	7490na	13595na		
1100-1200	USA, WWCR Nashville TN	5935am	15685am		
1100-1200	USA, WYFR Okeechobee FL	5950am	7355am		
1100-1115 mtwhfa	Vatican State, Vatican R	6245eu	11740eu	15210eu	21665eu
1130-1200	Bulgaria, Radio	11645na	13645me		
1130-1157	Czech Rep, Radio Prague	7345eu	11990eu	15355eu	
1130-1200	Ecuador, HCJB Quito	11925am	15115am	17890am	21455am
1130-1200	Iran, VOIRI Tehran	9525me	11715me	11790as	11910as
		11930as			
1130-1200	Netherlands, Radio	5955eu	9850eu		
1130-1200	South Korea, Radio Korea	9650na	11715na		
1130-1200	Thailand, Radio	4830as	9655as	11905as	
1130-1200	Vietnam, Voice of	6115as	10059as	12025as	15010as

SELECTED PROGRAMS

Sundays

1100 BBC: *Newsdesk*. See S 0200.
1100 Christian Science Sentinel: *Bible Lesson*.
1110 VOA (as): *New Horizons*. The world of science, medicine, and technology.
1110 VOA (ca): *Critic's Choice*. News from the world of the arts.
1111 Radio Moscow: *News and Views*. See S 0311.
1120 Radio Australia: *The National Country Hour*. Reports, analysis and comment on the major national and international issues of the day.
1129 Christian Science Sentinel: *Christian Science Sentinel Radio Edition*.
1130 BBC: *The John Dunn Show*. See S 0030.
1130 Radio Australia: *Fine Music Australia*. The best Australian fine music performances and compositions.
1130 VOA (as): Issues *In the News*. Members of the Washington press corps discuss current topics.
1130 VOA (ca): *Studio One*. Dramatized, semi-dramatized, and narrative documentaries. Subjects range from personality profiles to reviews of historic events.
1132 Radio Moscow: *Kaleidoscope*. See S 0430.

Mondays

1100 BBC: *Newsdesk*. See S 0200.
1110 VOA (as): *Development Report* (Special English). See M 0040.
1110 VOA (ca): *Focus*. The major figures and issues that shape our world.
1111 Radio Moscow: *News and Views*. See S 0311.
1115 VOA (as): *This is America* (Special English). See M 0045.
1120 Radio Australia: *Variable Feature*. See M 0410.
1130 BBC: *Composer of the Month*. See M 0230.
1130 Radio Australia: *The Compleat Life of William Innovations*. Desley Blanch reports on Australian inventions and innovative practices.
1130 VOA (as): *Music U.S.A.* (Standards). Classics of American popular Music.
1130 VOA (ca): *VOA Monday Morning*. See S 0010.
1132 Radio Moscow: *Music At Your Request*. Music as requested by listeners.

Tuesdays

1100 BBC: *Newsdesk*. See S 0200.
1110 VOA (as): *Agriculture Report* (Special English). Developments in agriculture.
1110 VOA (ca): *Focus*. See M 1110.
1111 Radio Moscow: *News and Views*. See S 0311.
1115 VOA (as): Science *In the News* (Special English). The latest developments in science.
1120 Radio Australia: *Variable Feature*. See M 0410.
1130 BBC: *Megamix*. Compendium of music, sport, fashion, health, travel, News and Views for young people.
1130 Radio Australia: *Arts Australia*.
1130 VOA (as): *Now Music U.S.A.* Rock and soul music from old favorites to the latest hits with performer profiles.
1130 VOA (ca): *VOA Tuesday Morning*. See S 0010.
1132 Radio Moscow: *Folk Box*. See M 1432.

Wednesdays

1100 BBC: *Newsdesk*. See S 0200.
1110 VOA (as): *Science Report* (Special English). See W 0040.
1110 VOA (ca): *Focus*. See M 1110.
1111 Radio Moscow: *News and Views*. See S 0311.
1115 VOA (as): *Space and Man* (Special English). See W 0045.
1120 Radio Australia: *Variable Feature*. See M 0410.
1130 BBC: *Meridian Documentary*. See W 0630.
1130 Radio Australia: *Science File*. Ian Wood examines science, medicine and technology news for the Asian/Pacific region.
1130 VOA (as): *Now Music U.S.A.* See T 1130.
1130 VOA (ca): *VOA Wednesday Morning*. See S 0010.
1132 Radio Moscow: *Music*. See S 0532.

Thursdays

1100 BBC: *Newsdesk*. See S 0200.

1110 VOA (as): *Science Report* (Special English). See W 0040.
1110 VOA (ca): *Focus*. See M 1110.
1111 Radio Moscow: *News and Views*. See S 0311.
1115 VOA (as): *The Making of a Nation* (Special English). See H 0045.
1120 Radio Australia: *Variable Feature*. See M 0410.
1130 BBC: Special Feature. *Shakespeare's Globe*. NEW. Exploring the question of whether the bard was an Englishman.
1130 Radio Australia: *Lane's Company*. Terry Lane in conversation with people from all walks of life.
1130 VOA (as): *Now Music U.S.A.* (Top Ten). Top ten pop music hits of the week in the U.S.A.
1130 VOA (ca): *VOA Thursday Morning*. See S 0010.
1132 Radio Moscow: *The Jazz Show*. See M 0432.

Fridays

1100 BBC: *Newsdesk*. See S 0200.
1110 VOA (as): *Environment Report* (Special English). A five-minute report on a specific environmental subject.
1110 VOA (ca): *Focus*. See M 1110.
1111 Radio Moscow: *News and Views*. See S 0311.
1115 VOA (as): *American Mosaic* (Special English). Reports about music, books, movies, and student life in the U.S.A.
1120 Radio Australia: *Variable Feature*. See M 0410.
1130 BBC: *Meridian Books*. See W 0630.
1130 Radio Australia: *The Parliament Program*. Roundup of events in the Australian Parliament presented by Jenny Hutchison.
1130 VOA (as): *Country Music U.S.A.* Currently popular tunes with a generous sprinkling of old favorites. On Friday broadcasts of Music, U.S.A.
1130 VOA (ca): *VOA Friday Morning*. See S 0010.
1132 Radio Moscow: *Yours for the Asking*. See T 2332.

Saturdays

1100 BBC: *Newsdesk*. See S 0200.
1100 Christian Science Sentinel: *Monitor Radio News*.
1106 Christian Science Sentinel: *Christian Science Sentinel Radio Edition*.
1110 VOA (as/ca): *Agriculture Today*. See S 0010.
1111 Radio Moscow: *News and Views*. See S 0311.
1130 BBC: *Meridian Reports*. See W 0630.
1130 Radio Australia: *Business Weekly*. Business and finance developments in the Asia/Pacific region.
1130 VOA (as): *Press Conference U.S.A.* See S 0130.
1130 VOA (ca): *Music U.S.A.* (Standards). See M 1130.
1132 Radio Moscow: *Music At Your Request*. See M 1132.

FREQUENCIES

1200-1230	Australia, Radio	6080as	9710as		
1200-1300	Australia, Radio	5995pa	6020pa	6080pa	7240pa
		9580pa	17910as		
1200-1300 vl	Australia, VL8A Alice Spg	2310do			
1200-1300 vl	Australia, VL8K Katherine	2485do			
1200-1300 vl	Australia, VL8T Tent Crk	2325do			
1200-1300	Bahrain, Radio	6010do			
1200-1300	Brazil, Radiobras	15445na			
1200-1300	Bulgaria, Radio	11645na	13645me		
1200-1215	Cambodia, Natl Voice of	11938as			
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	7405na	9655na	9715as	11660as
		11795as			
1200-1300	Costa Rica, AWR Alajuela	9725ca	11870ca		
1200-1300	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
1200-1300	Ecuador, HCJB Quito	11925am	15115am	17490am	17890am
		21455am			
1200-1300	France, Radio France Intl	9805eu	13640na	15155eu	15195eu
		21645na			
1200-1230	Iran, VOIRI Tehran	9525me	11715me	11790as	11910as
		11930as			
1200-1300 vl	Italy, IRRS Milano	7125eu			
1200-1300	Jordan, Radio	9560eu			
1200-1300 vl	Malaysia, RTM Kota Kinabalu	5980do			
1200-1300	Malaysia, RTM Radio 4	7295do			
1200-1230 smwha	Mongolia, R Ulaanbaatar	11850as	12015as		
1200-1206	New Zealand, R NZ Intl	9700pa			
1200-1300 mtwhf	Palau, KHBN Voice of Hope	9830as			
1200-1230 a	Palau, KHBN Voice of Hope	9830as			
1200-1300 vl	Papua New Guinea, NBC	9675do			
1200-1300	Russia, Radio Moscow Intl	7205me	7295me	9635af	11675me
		11980eu	12020eu	12030eu	12055eu
		12070eu	13670eu	15175af	15280af
		15380na	15440eu	15465af	15480me
		15495eu	15525af	15540eu	15585eu
		17605eu	17710eu	17760na	17880eu
		21540eu			
1200-1300	Singapore,R Singapore Int	9530as			
1200-1300	South Korea, Radio Korea	7180as			
1200-1230	Thailand, Radio	4830as	9655as	11905as	
1200-1300	United Kingdom,BBC London	5965af	6190af	6195am	9410eu
		9515na	9660eu	9740na	9750eu
		9760eu	11760me	11940af	12095eu
		15070eu	15220na	15310as	15400af
		15575me	17640eu	17705eu	17790af
		17885af	21470af	21660af	
1200-1300	USA, KCBI Dallas TX	9815am			
1200-1300	USA, KTBN Salt Lk City UT	7510am			
1200-1300 vl	USA, KWHR Naalehu HI	9930as			
1200-1300	USA, Monitor Radio Intl	7465am	9425pa	9455am	13625as
1200-1300	USA, VOA Washington DC	6110as	9560as	9760as	11715au
		15160as	15425as		
1200-1300	USA, WEWN Birmingham AL	9350am	15695am		
1200-1300 vl	USA, WHRI Noblesville IN	7315am	9850am		
1200-1300	USA, WJCR Upton KY	7490na	13595na		
1200-1300	USA, WWCR Nashville TN	5935am	15685am		
1200-1300	USA, WYFR Okeechobee FL	5950am	7355am	11830am	11970am
1200-1230	Uzbekhistan, R Tashkent	7285as	9715as	15295as	17745as
1200-1300	Vietnam, Voice of	6115as	10059as	12025as	15010as
1207-1300 ocasnal	New Zealand, R NZ Intl	9700pa			
1215-1300	Egypt, Radio Cairo	17595as			
1220-1230 vl	Ghana, GBC Radio 1	4915do			
1230-1300	Austria, R Austria Intl	6155eu	13730na	15450as	
1230-1300	Bangladesh, Radio	13615eu	15220eu		
1230-1300	Canada, RCI Montreal	6150as	11730as		
1230-1255 mtwhfa	Finland, YLE/Radio	11735na	15400na		
1230-1300	Ghana, GBC Radio 2	6130do	7295do		
1230-1300	Netherlands, Radio	5955eu	9650eu		
1230-1300	Sri Lanka, SLBC Colombo	6075as	9720as	15425as	
1230-1300	Sweden, Radio	13765as	15120as	15240as	
1240-1250	Greece, Voice of	9425af	11645af	15650af	

SELECTED PROGRAMS

Sundays

1200 BBC: *News Summary*. See S 0100.
1200 Christian Science Sentinel: *Bible Lesson*.
1201 BBC: *Play of the Week*. See S 0101.
1210 Radio Australia: *Study in Australia*. See S 0010.
1210 VOA (as): *Encounter*. A discussion program presenting opinions on the issues facing America and the world.
1211 Radio Moscow: *Music and Musicians*. See S 0111.
1229 Christian Science Sentinel: *Christian Science Sentinel Radio Edition*.
1230 Radio Australia: *Report from Asia*. Weekly roundup of Asian events by Helene Chung.
1230 VOA (as): *Studio One*. See S 1130.

Mondays

1200 BBC: *World News*. See S 0300.
1209 BBC: *Words of Faith*. People of all faiths share how their scripture gives authority and meaning to their lives.
1210 Radio Australia: *Variable Feature*. See M 0410.
1210 VOA (as): *Newsline*. See M 0010.
1211 Radio Moscow: *Top Priority*. See S 0411.
1215 BBC: Quiz. *Jazz Score*. Benny Green as quiz host.
1230 Radio Australia: *International Report*. See M 0030.
1230 VOA (as): *Magazine Show*. Features about culture, science, sports, medicine, and the arts in America.
1232 Radio Moscow: *Russian by Radio*. See S 1432.
1245 BBC: *Sports Roundup*. See S 0315.

Tuesdays

1200 BBC: *World News*. See S 0300.
1209 BBC: *Words of Faith*. See M 1209.
1210 Radio Australia: *Variable Feature*. See M 0410.
1210 VOA (as): *Newsline*. See M 0010.
1211 Radio Moscow: *Focus on Asia and the Pacific*. See T 0011.
1215 BBC: *Multitrack 1: Top 20*. See M 2330.
1230 Radio Australia: *International Report*. See M 0030.
1230 VOA (as): *Magazine Show*. See M 1230.
1232 Radio Moscow: *Interview*. Talks with individuals about various subjects of current interest.
1239 Radio Moscow: *Music*. See S 0532.
1245 BBC: *Sports Roundup*. See S 0315.

Wednesdays

1200 BBC: *World News*. See S 0300.
1209 BBC: *Words of Faith*. See M 1209.
1210 Radio Australia: *Variable Feature*. See M 0410.
1210 VOA (as): *Newsline*. See M 0010.
1211 Radio Moscow: *Focus on Asia and the Pacific*. See T 0011.
1215 BBC: *New Ideas*. See M 1615.
1230 Radio Australia: *International Report*. See M 0030.
1230 VOA (as): *Magazine Show*. See M 1230.
1232 Radio Moscow: *Music*. See S 0532.
1235 BBC: Special Feature. *Shakespeare's Sonnets* (27th). See M 1635.
1245 BBC: *Sports Roundup*. See S 0315.

Thursdays

1200 BBC: *World News*. See S 0300.
1209 BBC: *Words of Faith*. See M 1209.
1210 Radio Australia: *Variable Feature*. See M 0410.
1210 VOA (as): *Newsline*. See M 0010.
1211 Radio Moscow: *Focus on Asia and the Pacific*. See T 0011.
1215 BBC: *Multitrack 2*. See W 2330.
1230 Radio Australia: *International Report*. See M 0030.
1230 VOA (as): *Magazine Show*. See M 1230.
1232 Radio Moscow: *Commonwealth News*. News about the countries of the Commonwealth of Independent States (CIS).
1239 Radio Moscow: *Music*. See S 0532.
1245 BBC: *Sports Roundup*. See S 0315.

Fridays

1200 BBC: *World News*. See S 0300.
1209 BBC: *Words of Faith*. See M 1209.
1210 Radio Australia: *Variable Feature*. See M 0410.
1210 VOA (as): *Newsline*. See M 0010.
1211 Radio Moscow: *Focus on Asia and the Pacific*. See T 0011.
1215 BBC: Special Feature. *A Childhood Apart* (22nd). Orphans from Bosnia generate reflections of experiences during World War II.
1215 BBC: Special Feature. *High Resolution* (29th). The shocking story of phosphorus, a poisonous element that glows in the dark.
1215 BBC: Special Feature. *Rough Guide to the Bible* (1st,8th,15th). Revealing the Passion, the Resurrection, and the beginnings of the early church.
1230 Radio Australia: *International Report*. See M 0030.
1230 VOA (as): *Magazine Show*. See M 1230.
1232 Radio Moscow: *Interview*. See T 1232.
1239 Radio Moscow: *Music*. See S 0532.
1245 BBC: *Sports Roundup*. See S 0315.

Saturdays

1200 BBC: *World News*. See S 0300.
1200 Christian Science Sentinel: *Monitor Radio News*.
1206 Christian Science Sentinel: *Christian Science Sentinel Radio Edition*.
1209 BBC: *Words of Faith*. See M 1209.
1210 Radio Australia: *Ockham's Razor*. Robyn Williams introduces straight, sharp talk about science.
1210 VOA (as): *Communications World*. See S 0110.
1211 Radio Moscow: *Focus on Asia and the Pacific*. See T 0011.
1215 BBC: *Multitrack 3*. See F 2330.
1230 Radio Australia: *Background Report*. Interviewing an expert on international affairs.
1230 VOA (as): *Weekend Magazine*. A look at people and places in the U.S., featuring music and popular culture.
1232 Radio Moscow: *Your Top Tune*. See S 0232.
1245 BBC: *Sports Roundup*. See S 0315.
1250 Radio Moscow: *Interview*. See T 1232.

1300 UTC SHORTWAVE GUIDE 9:00 AM EDT 6:00 AM PDT

FREQUENCIES

1300-1400	Australia, Radio	7240pa	9580pa	11800pa	
1300-1400 vl	Australia, VL8A Alice Spg	2310do			
1300-1400 vl	Australia, VL8K Katherine	2485do			
1300-1400 vl	Australia, VL8T Tent Crk	2325do			
1300-1400	Bahrain, Radio	6010do			
1300-1320	Brazil, Radiobras	15445na			
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, RCI Montreal	11855na	17820am		
1300-1400	China, China Radio Intl	9715as	11660as	15440pa	
1300-1400 vl	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
1300-1400	Ecuador, HCJB Quito	11925am	15115am	17490am	17890am
		21455am			
1300-1330	Egypt, Radio Cairo	17595as			
1300-1330	Ghana, GBC Radio 1	4915do			
1300-1400 vl	Italy, IRRS Milano	7125eu			
1300-1400 mtwhf	Lebanon, Wings of Hope	9960me			
1300-1400 vl	Malaysia, RTM Kota Kinaba	5980do			
1300-1400	Malaysia, RTM Radio 4	7295do			
1300-1400 ocasnal	New Zealand, R NZ Intl	9700pa			
1300-1350	North Korea, R Pyongyang	13760as	15230as		
1300-1400 mtwhf	Palau, KHBN Voice of Hope	9830as			
1300-1400 vl	Papua New Guinea, NBC	9675do			
1300-1400	Philippines, FEBC Manila	11995as			
1300-1355	Poland, Polish R Warsaw	6135eu	7145eu	7270eu	9525eu
		11815eu			
1300-1400	Romania, R Romania Intl	11940eu	15365eu	17720eu	17850eu
1300-1400	Russia, Radio Moscow Intl	7205as	7295as	9560as	9635as
		9830af	9890eu	11675eu	11980eu
		12030eu	12065eu	15150eu	15320na
		15345eu	15380eu	15440eu	15455me
		15480me	15495eu	15540eu	17760eu
		17880eu	21540eu	21610af	21785af
1300-1330	South Korea, Radio Korea	9570as	13670as		
1300-1400	Sri Lanka, SLBC Colombo	6075as	9720as	15425as	
1300-1330	Switzerland, Swiss R Intl	7480as	11690as	13635as	15505as
1300-1400	United Kingdom,BBC London	5965af	6190af	6195am	7180as
		9410eu	9515na	9660eu	9740na
		9750eu	9760eu	11750as	11760me
		11820na	11940af	12095eu	15070eu
		15220na	15310as	15400af	15420af
		15575me	17640eu	17705eu	17790af
		17885af	21470af	21660af	
1300-1400	USA, KCBI Dallas TX	9815am			
1300-1400	USA, KJES Mesquite NM	11715am			
1300-1400 vl	USA, KNLS Anchor Point AK	7355as			
1300-1400	USA, KTBN Salt Lk City UT	7510am			
1300-1400 vl	USA, KWHR Naalehu HI	9930as			
1300-1400 mtwhf	USA, Monitor Radio Intl	7465am	13625as		
1300-1400	USA, VOA Washington DC	6110as	9560as	9760as	11715au
		15160as	15425as		
1300-1400	USA, WEWN Birmingham AL	9350am			
1300-1400 vl	USA, WHRI Noblesville IN	9465am	15105am		
1300-1400	USA, WJCR Upton KY	7490na	13595na		
1300-1400	USA, WWCR Nashville TN	5935am	15685am		
1300-1400	USA, WYFR Okeechobee FL	5950am	9705am	11550as	11830am
		11970am	13695am		
1300-1330	Vietnam, Voice of	6115as	10059as	12025as	15010as
1330-1400	Austria, R Austria Intl	15450as			
1330-1355 mtwtfa	Belgium, R Vlaanderen Int	17555na	21810na		
1330-1400	Bulgaria, Radio	11630as			
1330-1400	Canada, RCI Montreal	6150as	9535as		
1330-1400 mtwhf	Finland, YLE/Radio	15400na	17740na		
1330-1400 tw	Ghana, GBC Radio 1	4915do			
1330-1400	India, All India Radio	11760as	15120as		
1330-1400	Laos, National Radio of	7116as			
1330-1400	Netherlands, Radio	9895as	13700as	15150as	15530as
1330-1400	Sweden, Radio	15240na	17870na		
1330-1400	Turkey, Voice of	9675as			
1330-1400	UAE, Radio Dubai	13675eu	15320eu	15435as	21605as
1330-1400	Uzbekhistan, R Tashkent	7285as	9715as	15295as	17745as
1345-1400 vl	Myanmar, Radio	7185do			
1345-1400	Vatican State, Vatican R	15090as	17525au		

SELECTED PROGRAMS

Sundays

1300 BBC: *Newshour*. See S 0500.
1300 Christian Science Sentinel: *Bible Lesson*.
1310 Radio Australia: *Sports Report*. Results and reports from the Asia/Pacific region, and international events.
1310 VOA (as): *Critic's Choice*. See S 1110.
1311 Radio Moscow: *Science and Engineering in the CIS*. See S 0511.
1329 Christian Science Sentinel: *Christian Science Sentinel Radio Edition*.
1330 Radio Australia: *The Europeans*. See S 0130.
1332 Radio Moscow: *Your Top Tune*. See S 0232.
1340 VOA (as): *Words and Their Stories* (Special English). See S 0040.
1345 VOA (as): *Tuning in the U.S.A.* (Special English). See S 0045.
1346 Radio Moscow: *Transcription Review*. A review of Radio Moscow programs available in recorded form.

Mondays

1300 BBC: *Newshour*. See S 0500.
1310 Radio Australia: *Sports Report*. See S 1310.
1310 VOA (as): *Focus*. See M 1110.
1311 Radio Moscow: *Mailbag*. See M 0511.
1330 Radio Australia: *The World of Country Music*. Graham Bell presents the latest chart makers and top albums.
1332 Radio Moscow: *Audio Book Club*. See S 0032.
1340 VOA (as): *Development Report* (Special English). See M 0040.
1345 VOA (as): *This is America* (Special English). See M 0045.

Tuesdays

1300 BBC: *Newshour*. See S 0500.
1310 Radio Australia: *Sports Report*. See S 1310.
1310 VOA (as): *Focus*. See M 1110.
1311 Radio Moscow: *Newmarket*. See T 0211.
1311 Radio Moscow: *Transcription Review*. See S 1346.
1330 Radio Australia: *Jazz Notes*. The best of Australian jazz introduced by Ivan Lloyd.
1332 Radio Moscow: *Music*. See S 0532.
1340 VOA (as): *Agriculture Report* (Special English). See T 1110.
1345 VOA (as): Science *In the News* (Special English). See T 1115.

Wednesdays

1300 BBC: *Newshour*. See S 0500.
1310 Radio Australia: *Sports Report*. See S 1310.
1310 VOA (as): *Focus*. See M 1110.
1311 Radio Moscow: *Mailbag*. See M 0511.
1311 Radio Moscow: *Moscow Mailbag*. See S 0011.
1330 Radio Australia: *Blacktracker*. Traditional and contemporary aboriginal *Music*.
1332 Radio Moscow: *Russian by Radio*. See S 1432.
1340 VOA (as): *Science Report* (Special English). See W 0040.
1345 VOA (as): *Space and Man* (Special English). See W 0045.

Thursdays

1300 BBC: *Newshour*. See S 0500.
1310 Radio Australia: *Sports Report*. See S 1310.
1310 VOA (as): *Focus*. See M 1110.
1311 Radio Moscow: *Culture and the Arts*. See M 1511.
1330 Radio Australia: Australian *Country Style*. Graham Bell goes up country.
1332 Radio Moscow: *Audio Book Club*. See S 0032.
1340 VOA (as): *Science Report* (Special English). See W 0040.
1345 VOA (as): *The Making of a Nation* (Special English). See H 0045.

Fridays

1300 BBC: *Newshour*. See S 0500.
1310 Radio Australia: *Sports Report*. See S 1310.
1310 VOA (as): *Focus*. See M 1110.
1311 Radio Moscow: *Mailbag*. See M 0511.
1330 Radio Australia: *Music Deli*. Paul Petran and Stephen Snelleman present music from a variety of cultures.
1332 Radio Moscow: *Russian by Radio*. See S 1432.
1340 VOA (as): *Environment Report* (Special English). See F 1110.
1345 VOA (as): *American Mosaic* (Special English). See F 1115.

Saturdays

1300 BBC: *Newshour*. See S 0500.
1300 Christian Science Sentinel: *Monitor Radio News*.
1300 Voice of Historic Adventism (via WCSN): *Rolling Hills SDA Church*.
1306 Christian Science Sentinel: *Christian Science Sentinel Radio Edition*.
1310 Radio Australia: *Sports Report*. See S 1310.
1310 VOA (as): *Focus*. See M 1110.
1311 Radio Moscow: *Newmarket*. See T 0211.
1311 Radio Moscow: *Transcription Review*. See S 1346.
1330 Radio Australia: *The Parliament Program*. See F 1130.
1332 Radio Moscow: *Audio Book Club*. See S 0032.
1340 VOA (as): *In the News* (Special English). See F 0040.
1345 VOA (as): *American Stories* (Special English). See F 0045.

FREQUENCIES

1400-1500	Australia, Radio	7240pa	9580pa	11660pa	11695pa
		11800pa			
1400-1500 vl	Australia, VL8A Alice Spg	2310do			
1400-1500 vl	Australia, VL8K Katherine	2485do			
1400-1500 vl	Australia, VL8T Tent Crk	2325do			
1400-1500	Bahrain, Radio	6010do			
1400-1425 mtwhfa	Belgium, R Vlaanderen Int	17555na	21810as		
1400-1500	Bulgaria, Radio	11630as			
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, RCI Montreal	11955na	17820am		
1400-1500	China, China Radio Intl	7405na	9785na	11815as	15165as
1400-1500 vl	Costa Rica, R Peace Intl	7375am	9375am	15030am	
1400-1430	Ecuador, HCJB Quito	11925am	15115am	17490am	17890am
		21455am			
1400-1500	France, Radio France Intl	11910as	12035as	17650me	
1400-1420	Ghana, GBC Radio 1	4915do			
1400-1500	Ghana, GBC Radio 2	6130do	7295do		
1400-1500	India, All India Radio	11760as	15120as		
1400-1500	Iraq, Radio Iraq Intl	15250as			
1400-1425 mtwh	Israel, Kol Israel	15640na	15650as		
1400-1500 vl	Italy, IRRS Milano	7125eu			
1400-1500	Japan, NHK/Radio	9535na	9750as	11705as	11735am
		11815as	11865am		
1400-1500 mtwhf	Lebanon, Wings of Hope	9960me			
1400-1500 vl	Malaysia, RTM Kota Kinaba	5980do			
1400-1500	Malaysia, RTM Radio 4	7295do			
1400-1500 vl	Malaysia, RTM Sarawak	4950do			
1400-1500	Malta, V of Mediterranean	11925eu			
1400-1500 mtwhf	Morocco, RTV Marocaine	17595af			
1400-1500 vl	Myanmar, Radio	7185do			
1400-1500	Netherlands, Radio	9895as	13700as	15530as	
1400-1500 ocasnal	New Zealand, R NZ Intl	9700pa			
1400-1430 mtwhf	Palau, KHBN Voice of Hope	9830as			
1400-1500	Philippines, FEBC Manila	11995as			
1400-1500	Russia, Radio Moscow Intl	5930as	5960as	6055eu	6065eu
		7105na	7135na	7195af	7205as
		7250na	7345as	9550na	9560as
		9890eu	12030eu	15210na	15320na
		15345af	15380na	15440eu	15455eu
		15540eu	17595eu	17685eu	17760eu
		21610eu			
1400-1500 vl	Rwanda, Radio Rwanda	9610do			
1400-1500	South Korea, Radio Korea	5975as	6135as		
1400-1500	Sri Lanka, SLBC Colombo	6075as	9720as	15425as	
1400-1500	United Kingdom,BBC London	6195as	7180as	9410eu	9515na
		9660eu	9750eu	9760eu	11750as
		12095eu	15070eu	15260af	15310me
		15400af	15575me	17640af	17705eu
		17790af	17840af	17880af	21660af
1400-1500	USA, KCBI Dallas TX	15725am			
1400-1500	USA, KJES Mesquite NM	11715na			
1400-1500	USA, KTBN Salt Lk City UT	7510na			
1400-1500	USA, KWHR Naalehu HI	9930as			
1400-1500 mtwhf	USA, Monitor Radio Intl	9355as	9455am		
1400-1500	USA, VOA Washington DC	6110as	7125as	9645as	9760as
		11705au	15160as	15205au	15395au
		15425as			
1400-1500	USA, WEWN Birmingham AL	9350am			
1400-1500 vl	USA, WHRI Noblesville IN	9465am	15105am		
1400-1500	USA, WJCR Upton KY	7490na	13595na		
1400-1500	USA, WWCR Nashville TN	13845am	15685am		
1400-1500	USA, WYFR Okeechobee FL	11550as	11830am	15215am	17760am
1400-1415	Vatican State, Vatican R	15090as	17525au		
1415-1425	Nepal, Radio	3230do	5005do	7165do	
1430-1500	Australia, Radio	6060pa	6080as	7260as	9510as
		9580pa	11660pa	11680as	11695pa
		11800pa			
1430-1500	Canada, RCI Montreal	9555eu	11915af	11935me	15315eu
		15325me	17820af		
1430-1500	Ecuador, HCJB Quito	11925am	17490am	17890am	21455am
1430-1500	Finland, YLE/Radio	15400na	17740na		
1430-1500	Myanmar, Radio	5990do			
1430-1500	Netherlands, Radio	15150as			
1430-1500	Romania, R Romania Intl	11775as	15335as	17720as	
1430-1500	Sweden, Radio	15240na	17870na		
1435-1445	Greece, Voice of	15630na	17535na		
1445-1500	Guam, KTWR Agana	15610as			
1445-1500 smha	Mongolia, R Ulaanbaatar	7260as	7780as		

SELECTED PROGRAMS

Sundays

1400 BBC: *News Summary.* See S 0100.
1400 Christian Science Sentinel: *Bible Lesson.*
1410 Radio Australia: *Study in Australia.* See S 0010.
1410 VOA (as): The *Concert Hall.* Classical music and *Inter views* with America's great artists and conductors.
1411 Radio Moscow: *News and Views.* See S 0311.
1429 Christian Science Sentinel: *Christian Science Sentinel Radio Edition.*
1430 BBC: *Anything Goes.* A variety of music and much more with Bob Holness.
1430 Radio Australia: *Report from Asia.* See S 1230.
1432 Radio Moscow: *Russian by Radio.* A course in the Russian language.
1432 Radio Moscow: *Timelines.* A variety program with an upbeat flair and an insight into Moscow life.
1455 VOA (as): *VOA Editorial.* Comments expressing the official position of the U.S. Government on various subjects.

Mondays

1400 BBC: *World News.* See S 0300.
1405 BBC: *Outlook.* An up-to-the-minute mix of conversation, controversy and color from around the world.
1410 Radio Australia: *Variable Feature.* See M 0410.
1410 VOA (as): *Asia Report.* Major news developments in the region and throughout the world.
1411 Radio Moscow: *News and Views.* See S 0311.
1430 BBC: *Off the Shelf.* See M 0430.
1430 Radio Australia: *International Report.* See M 0030.
1432 Radio Moscow: *Folk Box.* One of the top ten entertainment programs (Passport to World Band Radio).
1445 BBC: Music Feature. *Rock 'N Rice.* The New pop music explosion in Malaysia, Japan, China, Thailand and other eastern countries.
1448 Radio Australia: *Stock Exchange Report.* Financial news from Sydney and other exchanges.
1455 VOA (as): *VOA Editorial.* See S 1455.

Tuesdays

1400 BBC: *World News.* See S 0300.
1405 BBC: *Outlook.* See M 1405.
1410 Radio Australia: *Variable Feature.* See M 0410.
1410 VOA (as): *Asia Report.* See M 1410.
1411 Radio Moscow: *News and Views.* See S 0311.
1430 BBC: *Off the Shelf.* See M 0430.
1430 Radio Australia: *International Report.* See M 0030.
1432 Radio Moscow: *Music.* See S 0532.
1448 Radio Australia: *Stock Exchange Report.* See M 1448.
1455 VOA (as): *VOA Editorial.* See S 1455.

Wednesdays

1400 BBC: *World News.* See S 0300.
1405 BBC: *Outlook.* See M 1405.
1410 Radio Australia: *Variable Feature.* See M 0410.
1410 VOA (as): *Asia Report.* See M 1410.
1411 Radio Moscow: *News and Views.* See S 0311.
1430 BBC: *Off the Shelf.* See M 0430.
1430 Radio Australia: *International Report.* See M 0030.
1432 Radio Moscow: *Music.* See S 0532.
1445 BBC: *Good Books.* Recommendation of a book to read.
1448 Radio Australia: *Stock Exchange Report.* See M 1448.
1455 VOA (as): *VOA Editorial.* See S 1455.

Thursdays

1400 BBC: *World News.* See S 0300.
1405 BBC: *Outlook.* See M 1405.
1410 Radio Australia: *Variable Feature.* See M 0410.
1410 VOA (as): *Asia Report.* See M 1410.
1411 Radio Moscow: *News and Views.* See S 0311.
1430 BBC: *Off the Shelf.* See M 0430.
1430 Radio Australia: *International Report.* See M 0030.
1432 Radio Moscow: *Yours for the Asking.* See T 2332.
1445 BBC: *The Learning World.* See M 0615.
1448 Radio Australia: *Stock Exchange Report.* See M 1448.
1455 VOA (as): *VOA Editorial.* See S 1455.

Fridays

1400 BBC: *World News.* See S 0300.
1405 BBC: *Outlook.* Shakespeare's birthplace, Stratford-on-Avon.
1410 Radio Australia: *Variable Feature.* See M 0410.
1410 VOA (as): *Asia Report.* See M 1410.
1411 Radio Moscow: *News and Views.* See S 0311.
1430 BBC: *Off the Shelf.* See M 0430.
1430 Radio Australia: *International Report.* See M 0030.
1432 Radio Moscow: *Music At Your Request.* See M 1132.
1445 BBC: *Global Concerns.* See F 0145.
1448 Radio Australia: *Stock Exchange Report.* See M 1448.
1455 VOA (as): *VOA Editorial.* See S 1455.

Saturdays

1400 BBC: *News Summary.* See S 0100.
1400 Christian Science Sentinel: *Monitor Radio News.*
1401 BBC: *John Peel.* See T 0330.
1406 Christian Science Sentinel: *Christian Science Sentinel Radio Edition.*
1410 Radio Australia: *Ockham's Razor.* See A 1210.
1410 VOA (as): *Music U.S.A.* (Jazz). Willis Conover hosts the VOA jazz hour.
1411 Radio Moscow: *News and Views.* See S 0311.
1430 BBC: *Sportsworld.* The weekly sports magazine.
1430 Radio Australia: *Background Report.* See A 1230.
1430 Voice of Historic Adventism (via WCSN): *Rolling Hills SDA Church.*
1432 Radio Moscow: *Timelines.* See S 1432.
1455 VOA (as): *VOA Editorial.* See S 1455.

1500 UTC SHORTWAVE GUIDE 11:00 AM EDT 8:00 AM PDT

FREQUENCIES

1500-1600	Algeria, R Algiers Intl	11715af	15205me	17745eu	
1500-1600	Australia, Radio	6060pa	6080pa	7240pa	7260as
		9510as	9580pa	9770as	11660as
		11680as	11695pa	11800pa	
1500-1600 vl	Australia, VL8A Alice Spg	2310do			
1500-1600 vl	Australia, VL8K Katherine	2485do			
1500-1600 vl	Australia, VL8T Tent Crk	2325do			
1500-1600	Bahrain, Radio	6010do			
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, RCI Montreal	11955na			
1500-1600	China, China Radio Intl	7405na	9785na	11815as	15165as
1500-1600 vl	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
1500-1600	Ecuador, HCJB Quito	11925am	17490am	17890am	21455am
1500-1600	Ethiopia, Voice of	7165do	9560do		
1500-1550	Germany, Deutsche Welle	7195af	9735af	11965af	15145af
		17765af			
1500-1600	Guam, KTWR Agana	15610as			
1500-1600	Iraq, Radio Iraq Intl	15250as			
1500-1600 vl	Italy, IRRS Milano	7125eu			
1500-1600	Japan, NHK/Radio	9535na	9750as	11915na	15355af
1500-1600	Jordan, Radio	9560eu			
1500-1600 mtwhf	Lebanon, Wings of Hope	9960me			
1500-1600 vl	Malaysia, RTM Kota Kinaba	5980do			
1500-1600	Malaysia, RTM Radio 4	7295do			
1500-1600 vl	Malaysia, RTM Sarawak	4950do	7160do		
1500-1600	Malta, V of Mediterranean	11925eu			
1500-1513 smha	Mongolia, R Ulaanbaatar	13780as			
1500-1600	Netherlands, Radio	9895as	13700as	15150as	
1500-1600 ocasnal	New Zealand, R NZ Intl	9700pa			
1500-1600	North Korea, R Pyongyang	9325eu	9640af	9977af	13785eu
1500-1600	Philippines, FEBC Manila	11995as			
1500-1530	Romania, R Romania Intl	11775as	15335as	17720as	
1500-1600	Russia, Radio Moscow Intl	5930as	6055eu	7105na	7115na
		7195na	7260na	7345na	9735eu
		9890eu	11965eu	12045as	12065eu
		15320as	15345eu	15380as	15440eu
		15465as	15540eu	15550eu	17760eu
		17780eu			
1500-1600 vl	Rwanda, Radio Rwanda	9610do			
1500-1600	S Africa, Channel Africa	7270af	15240af		
1500-1600 mtwhfa	Seychelles, FEBA Radio	9810as	15330as		
1500-1600	Sri Lanka, SLBC Colombo	6075as	9720as	15425as	
1500-1530	Switzerland, Swiss R Intl	9420af	9455as	13635as	15505as
1500-1600	United Kingdom, BBC London	6190af	6195eu	7180as	9410eu
		9515na	9660na	9740me	9750eu
		9760eu	11750as	11940af	12095eu
		15070af	15260na	15310as	15400af
		17640af	17705eu	17760na	17840na
		17880af	21470af	21490af	21660af
1500-1600	USA, KCBI Dallas TX	15725am			
1500-1600	USA, KTBN Salt Lk City UT	7510na			
1500-1600	USA, KWHR Naalehu HI	9930as			
1500-1600 mtwhf	USA, Monitor Radio Intl	9355as			
1500-1600	USA, VOA Washington OC	6110as	7125as	9645as	9700as
		9760as	11705as	15205as	15395as
		19379me			
1500-1600	USA, WEWN Birmingham AL	9350am			
1500-1600 vl	USA, WHRI Noblesville IN	9465am	15105am		
1500-1600	USA, WJCR Upton KY	7490na	13595na		
1500-1600	USA, WRNO New Orleans LA	15420na			
1500-1600	USA, WWCR Nashville TN	13845am	15685am		
1500-1600	USA, WYFR Okeechobee FL	11830am	15215am	17760am	
1500-1600	USA, WCSN Scotts Corner ME	15665eu			
1515-1600	Bulgaria, Radio	12085as			
1530-1600	Albania, R Tirana Intl	7155eu	9760eu		
1530-1600	Austria, R Austria Intl	6155eu	9880me	11780as	13730eu
1530-1545	India, All India Radio	7412as	9910as	11740as	
1530-1600 mtwhf	Portugal, Radio	21515me			

SELECTED PROGRAMS

Sundays

1500 BBC: *World News.* See S 0300.
1500 Christian Science Sentinel: *Bible Lesson.*
1500 Voice of Historic Adventism (via WCSN): *Step to Life World Radio.*
1510 Radio Australia: *Music of RA.* See S 0510.
1510 VOA (as/me): *New Horizons.* See S 1110.
1511 Radio Moscow: *Top Priority.* See S 0411.
1515 BBC: *Concert Hall.* Classical music concerts.
1529 Christian Science Sentinel: *Christian Science Sentinel Radio Edition.*
1530 Radio Australia: *Fine Music Australia.* See S 1130.
1530 VOA (as/me): *Studio One.* See S 1130.
1532 Radio Moscow: *Contacts and Contracts.* Commercial and business activities and developments.
1550 Voice of Historic Adventism (via WCSN): *Rolling Hills SDA Worship.*

Mondays

1500 BBC: *World News.* See S 0300.
1500 Voice of Historic Adventism (via WCSN): *Steps to Life World Radio.*
1510 Radio Australia: *Asia Focus.* Reporting on the commercial interrelationships of the Asia/Pacific Region.
1510 VOA (me): *Newsline.* See M 0010.
1511 Radio Moscow: *Culture and the Arts.* An overview of a Russian cultural activity.
1515 BBC: Special Feature. *Laundry and bourbon* (4th).
1515 BBC: Special Feature. *Lone Star* (11th).
1515 BBC: Special Feature. *The Compleat Life of William Shakespeare* (25th). The story of the bard.
1515 BBC: Special Feature. *Tommy* (18th). The pinball wizard.
1530 Radio Australia: *The Compleat Life of William Innovations.* See M 1130.
1530 VOA (as/me): *Magazine Show.* See M 1230.
1532 Radio Moscow: *Timelines.* See S 1432.

Tuesdays

1500 BBC: *World News.* See S 0300.
1500 Voice of Historic Adventism (via WCSN): *Steps to Life World Radio.*
1510 Radio Australia: *Asia Focus.* See M 1510.
1510 VOA (as/me): *Newsline.* See M 0010.
1511 Radio Moscow: *Focus on Asia and the Pacific.* See T 0011.
1515 BBC: *A Jolly Good Show.* Dave Lee Travis presents your record requests and dedications in his own unique way.
1530 VOA (as/me): *Magazine Show.* See M 1230.
1532 Radio Moscow: *Audio Book Club.* See S 0032.

Wednesdays

1500 BBC: *World News.* See S 0300.
1500 Voice of Historic Adventism (via WCSN): *Steps to Life World Radio.*
1510 Radio Australia: *Asia Focus.* See M 1510.
1510 VOA (as/me): *Newsline.* See M 0010.
1511 Radio Moscow: *Focus on Asia and the Pacific.* See T 0011.
1515 BBC: *From Our Own Correspondent.* See S 0330.
1530 BBC: Special Feature. *Stories in Verse* (6th,13th,20th). Britain's leading actors read narrative classics of poetry.
1530 Radio Australia: *Science File.* See W 1130.
1530 VOA (as/me): *Magazine Show.* See M 1230.
1532 Radio Moscow: *Interview.* See T 1232.
1539 Radio Moscow: *Music.* See S 0532.

Radio Netherland's Rina Miller.

Thursdays

1500 BBC: *World News.* See S 0300.
1500 Voice of Historic Adventism (via WCSN): *Steps to Life World Radio.*
1510 Radio Australia: *Asia Focus.* See M 1510.
1510 VOA (as/me): *Newsline.* See M 0010.
1511 Radio Moscow: *Focus on Asia and the Pacific.* See T 0011.
1515 BBC: *Ray on Record.* See S 2315.
1530 Radio Australia: *Lane's Company.* See H 1130.
1530 VOA (as/me): *Magazine Show.* See M 1230.
1532 Radio Moscow: *Interview.* See T 1232.
1539 Radio Moscow: *Music.* See S 0532.

Fridays

1500 BBC: *World News.* See S 0300.
1500 Voice of Historic Adventism (via WCSN): *Step to Life World Radio.*
1510 Radio Australia: *Asia Focus.* See M 1510.
1510 VOA (as/me): *Newsline.* See M 0010.
1511 Radio Moscow: *Focus on Asia and the Pacific.* See T 0011.
1515 BBC: *Music Review.*
1530 Radio Australia: *The Parliament Program.* See F 1130.
1530 VOA (as/me): *Magazine Show.* See M 1230.
1532 Radio Moscow: *Music.* See S 0532.

Saturdays

1500 BBC: *World News.* See S 0300.
1500 Christian Science Sentinel: *Monitor Radio News.*
1506 Christian Science Sentinel: *Christian Science Sentinel Radio Edition.*
1510 Radio Australia: *Variable Feature.* See M 0410.
1510 VOA (as/me): *Newsline.* See M 0010.
1511 Radio Moscow: *Focus on Asia and the Pacific.* See T 0011.
1515 BBC: *Sportsworld.* See A 1430.
1530 Radio Australia: *Business Weekly.* See A 1130.
1530 VOA (as/me): *Press Conference U.S.A.* See S 0130.
1532 Radio Moscow: *Music.* See S 0532.
1550 Voice of Historic Adventism (via WCSN): *Rolling Hills SDA Church Business.*

FREQUENCIES

1600-1700	Australia, Radio	7240pa	7260as	9510as	9580pa
		9770as	11660pa	11695pa	11800pa
1600-1700 vl	Australia, VL8A Alice Spg	2310do			
1600-1700 vl	Australia, VL8K Katherine	2485do			
1600-1700 vl	Australia, VL8T Tent Crk	2325do			
1600-1700	Bahrain, Radio	6010do			
1600-1645	Bulgaria, Radio	12085as			
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, RCI Montreal	11955na	17820am		
1600-1700	China, China Radio Intl	11575af	15110af	15130af	
1600-1700 vl	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
1600-1627	Czech Rep, Radio Prague	5930as	7345me	11630eu	
1600-1700	Ecuador, HCJB Quito	21455am			
1600-1700	France, Radio France Intl	6175eu	11705af	11975me	12015af
		17620af	17795af	17850af	
1600-1650	Germany, Deutsche Welle	6170as	7225as	7305as	9585as
		9815as	13680as	15105as	
1600-1700	Guam, KSDA AWR Agat	7455as			
1600-1700	Guam, KTWR Agana	15610as			
1600-1627	Iran, VOIRI Tehran	11790eu			
1600-1700	Iraq, Radio Iraq Intl	15250as			
1600-1700 vl	Italy, IRRS Milano	7125eu			
1600-1700	Jordan, Radio	9560eu			
1600-1630 mtwhf	Lebanon, Wings of Hope	9960me			
1600-1615 mha	Mongolia, R Ulaanbaatar	7560as	7780as		
1600-1700	Netherlands, Radio	9895as	13700as	15150as	
1600-1649 ocasnal	New Zealand, R NZ Intl	9700pa			
1600-1630	Pakistan, Radio	4895me	9470me	11570me	13590me
		15515af	15675me	17725af	
1600-1655	Poland, Polish R Warsaw	7285eu	9525eu		
1600-1700	Russia, Radio Moscow Intl	6055eu	7105na	7115eu	7150eu
		7205eu	7250na	7260na	7345na
		9540na	9550na	9560eu	9890eu
		12045eu	15320na	15380eu	17760eu
1600-1700 vl	Rwanda, Radio Rwanda	9610do			
1600-1700	S Africa, Channel Africa	7270af	15240af		
1600-1700	Saudi Arabia, BSKSA	9705eu	9720eu		
1600-1700	South Korea, Radio Korea	5975as			
1600-1700	Sri Lanka, SLBC Colombo	6075as	9720as	15425as	
1600-1700	Swaziland, Trans World R	9500af			
1600-1645	UAE, Radio Dubai	11795af	13675eu	15435eu	21605eu
1600-1700	United Kingdom, BBC London	6190af	6195eu	7180as	9410eu
		9515na	9630af	9740me	9750eu
		9760eu	11750as	11940af	12095eu
		15070af	15260na	15400af	17640af
		17705eu	17860af	17880af	21470af
		21660af			
1600-1700	USA, KCBI Dallas TX	15725am			
1600-1700	USA, KTBN Salt Lk City UT	15590am			
1600-1700	USA, KWHR Naalehu HI	7425as			
1600-1700 mtwhf	USA, Monitor Radio Intl	13625af			
1600-1700	USA, VOA Washington DC	6110as	6180eu	7125as	9645as
		9700as	9760as	11855eu	11930af
		12040af	13710af	15205as	15255af
		15320af	15395as	15410af	15445af
		17790af			
1600-1700	USA, WEWN Birmingham AL	13615am	17510am		
1600-1700 vl	USA, WHRI Noblesville IN	9465am	15105am		
1600-1700	USA, WINB Red Lion PA	15715eu			
1600-1700	USA, WJCR Upton KY	7490na	13595na		
1600-1700	USA, WRNO New Orleans LA	15420am			
1600-1700	USA, WWCR Nashville TN	13845am	15610am	15685am	
1600-1700	USA, WYFR Okeechobee FL	11830am	15215am	15355eu	17760am
		21525af	21615af		
1600-1700	USA, WCSN Scotts Corner ME	15665eu			
1600-1630	Vatican State, Vatican R	11640af	15090af		
1600-1630	Vietnam, Voice of	9840af	12020af	15010af	
1620-1630 mtwtf	Estonia, Estonian Radio	5925eu			
1630-1700	Australia, Radio	6060pa	11660pa	11880pa	
1630-1700	Austria, R Austria Intl	11780as			
1630-1700	Canada, RCI Montreal	7150as	9550as		
1630-1700	Ecuador, HCJB Quito	15270me	17790me	21455me	
1630-1700	Egypt, Radio Cairo	15255af			
1630-1700	Liberia, Radio ELWA	4760do			
1645-1700	Tajikistan, Radio	7245as			
1650-1700 mtwtf	New Zealand, R NZ Intl	6035pa			

SELECTED PROGRAMS

Sundays

1600 BBC: *World News.* See S 0300.
1600 Christian Science Sentinel: *Bible Lesson.*
1600 Voice of Historic Adventism (via WCSN): *Biblical Studies Institute.*
1609 BBC: *British News.* See S 0309.
1610 Radio Australia: *Sports Report.* See S 1310.
1610 VOA (as/me): *Encounter.* See S 1210.
1629 Christian Science Sentinel: *Christian Science Sentinel Radio Edition.*
1630 Voice of Historic Adventism (via WCSN): *Modern Manna.*
1640 VOA (as/me): *Words and Their Stories* (Special English). See S 0040.
1645 BBC: *Letter from America.* See S 0615.
1645 VOA (as/me): *Tuning in the U.S.A.* (Special English). See S 0045.
1657 VOA (af): *VOA Editorial.* See S 1455.

Mondays

1600 BBC: *World News.* See S 0300.
1600 Voice of Historic Adventism (via WCSN): *Biblical Studies Institute.*
1609 BBC: *British News.* See S 0309.
1610 Radio Australia: *Sports Report.* See S 1310.
1610 VOA (as/me): *Focus.* See M 1110.
1615 BBC: *New Ideas.* Window on the world of technology, innovation and new products.
1630 Radio Australia: *International Report.* See M 0030.
1630 Voice of Historic Adventism (via WCSN): *Modern Manna.*
1635 BBC: Special Feature. *A dip in the Paint Pot* (4th,11th,18th). Three short features on consecutive weeks in which contemporary painters meditate on the challenges and fascinations of their art.
1635 BBC: Special Feature. *Shakespeare's Sonnets* (25th). NEW. Each program in this series presents one sonnet as seen through the eyes of a contemporary poet.
1640 VOA (as/me): *Development Report* (Special English). See M 0040.
1645 BBC: *The World Today.* Examines thoroughly a topical aspect of the international scene.
1645 VOA (as/me): *This is America* (Special English). See M 0045.
1655 VOA (af): *Sports Journal.* Complete sports news for Afri can listeners.

Tuesdays

1600 BBC: *World News.* See S 0300.
1600 Voice of Historic Adventism (via WCSN): *Biblical Studies Institute.*
1609 BBC: *British News.* See S 0309.
1610 Radio Australia: *Sports Report.* See S 1310.
1610 VOA (as/me): *Focus.* See M 1110.
1615 BBC: *Megamix.* See T 1130.
1630 Radio Australia: *International Report.* See M 0030.
1630 Voice of Historic Adventism (via WCSN): *Modern Manna.*
1640 VOA (as/me): *Agriculture Report* (Special English). See T 1110.
1645 BBC: *The World Today.* See M 1645.
1645 VOA (as/me): Science *In the News* (Special English). See T 1115.
1655 VOA (af): *Sports Journal.* See M 1655.

Wednesdays

1600 BBC: *World News.* See S 0300.
1600 Voice of Historic Adventism (via WCSN): *Biblical Studies Institute.*
1609 BBC: *British News.* See S 0309.
1610 Radio Australia: *Sports Report.* See S 1310.
1610 VOA (as/me): *Focus.* See M 1110.
1615 BBC: Music Feature. *Showtime for Shakespeare* (20th,27th). Songs and musicals based on Shakespeare.
1630 Radio Australia: *International Report.* See M 0030.
1630 Voice of Historic Adventism (via WCSN): *Modern Manna.*
1640 VOA (as/me): *Science Report* (Special English). See W 0040.
1645 BBC: *The World Today.* See M 1645.
1645 VOA (as/me): *Space and Man* (Special English). See W 0045.
1655 VOA (af): *Sports Journal.* See M 1655.

Thursdays

1600 BBC: *World News.* See S 0300.
1600 Voice of Historic Adventism (via WCSN): *Biblical Studies Institute.*
1609 BBC: *British News.* See S 0309.
1610 Radio Australia: *Sports Report.* See S 1310.
1610 VOA (as/me): *Focus.* See M 1110.
1615 BBC: *Network UK.* Issues and events affecting the lives of people throughout the UK.
1630 Radio Australia: *International Report.* See M 0030.
1630 Voice of Historic Adventism (via WCSN): *Modern Manna.*
1640 VOA (as/me): *Science Report* (Special English). See W 0040.
1645 BBC: *The World Today.* See M 1645.
1645 VOA (as/me): *The Making of a Nation* (Special English). See H 0045.

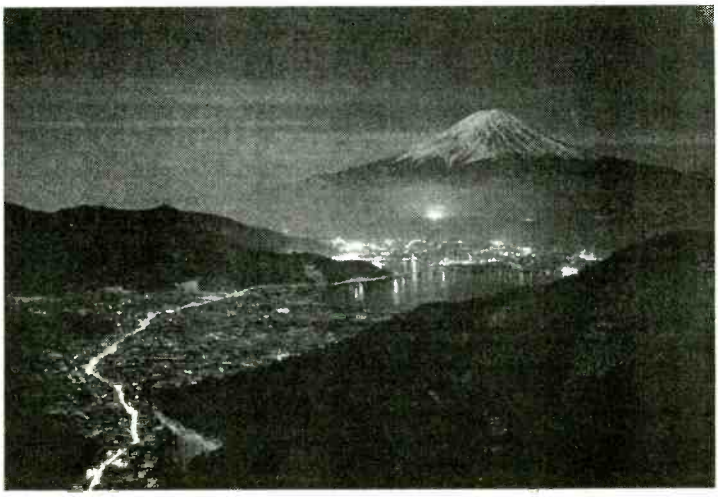
Fridays

1600 BBC: *World News.* See S 0300.
1600 Voice of Historic Adventism (via WCSN): *Biblical Studies Institute.*
1609 BBC: *British News.* See S 0309.
1610 Radio Australia: *Sports Report.* See S 1310.
1610 VOA (as/me): *Focus.* See M 1110.
1615 BBC: *Science in Action.* The latest in science and technology.
1630 Radio Australia: *International Report.* See M 0030.
1630 Voice of Historic Adventism (via WCSN): *Modern Manna.*
1640 VOA (as/me): *Environment Report* (Special English). See F 1110.
1645 BBC: *The World Today.* See M 1645.
1645 VOA (as/me): *American Mosaic* (Special English). See F 1115.

Saturdays

1600 BBC: *World News.* See S 0300.
1600 Christian Science Sentinel: *Monitor Radio News.*
1606 Christian Science Sentinel: *Christian Science Sentinel Radio Edition.*
1609 BBC: *British News.* See S 0309.
1610 Radio Australia: *Sports Report.* See S 1310.
1610 VOA (as/me): *Communications World.* See S 0110.
1615 BBC: *Sportsworld.* See A 1430.
1630 Radio Australia: *Background Report.* See A 1230.
1640 VOA (as/me): *In the News* (Special English). See F 0040.
1645 VOA (as): *American Stories* (Special English). See F 0045.
1645 VOA (as/me): *American Stories* (Special English). See F 0045.
1655 VOA (af): *VOA Editorial.* See S 1455.

1700-1800	Algeria, R Algiers Intl	7155eu			
1700-1800	Australia, Radio	5995pa	6060pa	6080as	7240pa
		7260as	9510as	9580pa	11660pa
		11695pa	11880pa		
1700-1800 vl	Australia, VL8A Alice Spg	2310do			
1700-1800 vl	Australia, VL8K Katherine	2485do			
1700-1800 vl	Australia, VL8T Tent Crk	2325do			
1700-1800	Bahrain, Radio	6010do			
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	7405af	9570af	11575af	
1700-1800	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
1700-1800	Ecuador, HCJB Quito	15270me	17790me	21455me	
1700-1800	Egypt, Radio Cairo	15255af			
1700-1800 vl	Eqt Guinea, Radio Africa	7200af			
1700-1800 as	Guam, KSDA AWR Agat	13720as			
1700-1800 vl	Italy, IRRS Milano	7125eu			
1700-1800	Japan, NHK/Radio	9535na	9750as	11915as	17870af
1700-1730	Jordan, Radio	9560eu			
1700-1713 mtwhfa	Lebanon, Voice of	6550eu			
1700-1800	Liberia, Radio ELWA	4760do			
1700-1800 a	Morocco, RTV Marocaine	17815af			
1700-1800 mtwtf	New Zealand, R NZ Intl	6035pa			
1700-1750	North Korea, R Pyongyang	9325eu	9640af	9977af	13785af
1700-1800	Pakistan, Radio	7485eu	9855eu		
1700-1800	Russia, Radio Moscow Intl	7105na	7170eu	7205eu	7260na
		7330eu	7340eu	7345na	9540na
		9890eu	13670eu	15380eu	17760eu
1700-1800 vl	Rwanda, Radio Rwanda	9610do			
1700-1800	S Africa, Channel Africa	7270af	15240af		
1700-1800	Saudi Arabia, BSKSA	9705eu	9720eu		
1700-1730	Sri Lanka, SLBC Colombo	6075as	9720as	15425as	
1700-1715	Swaziland, Trans World R	9520af			
1700-1730	Switzerland, Swiss R Intl	9885af	13635me	17635af	
1700-1730	United Kingdom,BBC London	6005af	17860af		
1700-1800	United Kingdom,BBC London	3955eu	6180eu	6190af	6195eu
		7160me	9410eu	9515eu	9630af
		9740me	11940af	12095af	15070af
		15260af	15400af	15420af	17880af
		21470af	21660af		
1700-1800	USA, KCBI Dallas TX	15725am			
1700-1800	USA, KTBN Salt Lk City UT	15590am			
1700-1800	USA, KWHR Naalehu HI	7425as			
1700-1800 mtwhf	USA, Monitor Radio Intl	13625af			
1700-1800	USA, VOA Washington DC	6040eu	6110as	7125as	9645as
		9700eu	9760eu	11855as	11920af
		12040af	13710af	15205eu	15320af
		15395as	15410af	15445af	17790af
		19379me			
1700-1800	USA, WEWN Birmingham AL	13615am			
1700-1800 vl	USA, WHRI Noblesville IN	13760am	15105am		
1700-1800	USA, WINB Red Lion PA	15715eu			
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	USA, WWCR Nashville TN	13845am	15685am		
1700-1800	USA, WYFR Okeechobee FL	21500af			
1715-1730 mtwhf	Swaziland, Trans World R	9520af			
1715-1745	Sweden, Radio	6065eu			
1715-1730	Vatican State, Vatican R	6245eu	7250eu	9645eu	
1730-1800	Netherlands, Radio	6020af	9605af	21515af	21590af
1730-1800	Romania, R Romania Intl	15340af	15365af	17745af	17805af
1730-1800	Vatican State, Vatican R	9645af	11625af	15090af	
1745-1800	India, All India Radio	7412eu	9950me	11620eu	11860eu
		11935af	15080af		
1800-1900	Argentina, RAE	15345eu			
1800-1900	Australia, Radio	5960as	5995pa	6060pa	6080as
		7240pa	7260as	9580pa	11660pa
		11695pa	11855as	11880pa	
1800-1900 vl	Australia, VL8A Alice Spg	2310do			
1800-1900 vl	Australia, VL8T Tent Crk	2325do			
1800-1900	Bahrain, Radio	6010do			
1800-1900	Brazil, Radiobras	15268eu			
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, R Peace Intl	7375am	9375am	15030am	21465am
1800-1827	Czech Rep, Radio Prague	5930af	7345me	9420eu	
1800-1900	Ecuador, HCJB Quito	21455am			
1800-1830	Egypt, Radio Cairo	15255af			
1800-1900 vl	Eqt Guinea, Radio Africa	7200af			
1800-1815	Ghana, GBC Radio 1	4915do			
1800-1815	Ghana, GBC Radio 2	3316do			
1800-1900 as	Guam, KSDA AWR Agat	13720as			
1800-1900	India, All India Radio	7412eu	9950me	11620eu	11860eu
		11935af	15080af		
1800-1815	Israel, Kol Israel	7465eu	11587na	11675na	
1800-1900 vl	Italy, IRRS Milano	7125eu			
1800-1900	Kuwait, Radio	13620na			
1800-1900	Liberia, Radio ELWA	4760do			
1800-1900	Netherlands, Radio	6020af	9605af	21515af	21590af
1800-1900 mtwtf	New Zealand, R NZ Intl	6035pa			
1800-1830 s	Norway, Radio Norway Intl	9590eu	11860af		
1800-1855	Poland, Polish R Warsaw	5995eu	7270eu	7285eu	
1800-1830 mtwhf	Portugal, Radio	9780eu			
1800-1900	Russia, Radio Moscow Intl	7105eu	7170na	7190eu	7205eu
		7250na	7260na	9540eu	9550eu
		9890eu	12050na	13670eu	15380eu
		17760eu			
1800-1900	Saudi Arabia, BSKSA	9705eu	9720eu		
1800-1900	Sudan, Radio Omdurman	9170af			
1800-1900	Swaziland, Trans World R	3200af	9500af		
1800-1900	United Kingdom,BBC London	3255af	3955eu	6005af	6180eu
		6190af	6195eu	7160me	9410eu
		9630af	9740me	11940af	11955as
		12095af	15070af	15400af	15420af
		17880af			
1800-1900	USA, KCBI Dallas TX	15725am			
1800-1900	USA, KJES Mesquite NM	9510na			
1800-1900	USA, KTBN Salt Lk City UT	15590am			
1800-1900	USA, KWHR Naalehu HI	13625as			
1800-1900 mtwhf	USA, Monitor Radio Intl	9355pa	21640af		
1800-1900	USA, VOA Washington DC	6040eu	9700eu	9760eu	11920af
		12040af	13675af	13710af	15410af
		15580af	17800af	19379me	
1800-1900	USA, WEWN Birmingham AL	13740am			
1800-1900 vl	USA, WHRI Noblesville IN	9485am	13760am		
1800-1900	USA, WINB Red Lion PA	15715eu			
1800-1900	USA, WJCR Upton KY	7490na	13595na		
1800-1900	USA, WMLK Bethel PA	9465eu			
1800-1900	USA, WRNO New Orleans LA	15420am			
1800-1900	USA, WWCR Nashville TN	13845am	15610am	15685am	
1800-1900	USA, WYFR Okeechobee FL	21500eu			
1800-1830	Vietnam, Voice of	9840eu	12020eu		
1815-1900	Bangladesh, Radio	9570me	12030eu		
1830-1900	Bulgaria, Radio	7455eu	9700na		
1830-1900	Sweden, Radio	6065af	9655me	15145eu	
1840-1850 mtwhfa	Greece, Voice of	15630af	15650af	17525af	
1845-1900 irreg s	Mali, RDTV Malienne	4783do	4835do	5995do	
1850-1900	New Zealand, R NZ Intl	11735pa			



Ron Tamburello, Magalia, CA, sends in this QSL from NHK Radio Japan. This picturesque card shows Mt. Fuji viewed from the Mikasa Pass in Yamanashi.

1900-2000	Australia, Radio	5960as	5995pa	6060pa	6080as
		7240pa	7260as	9580pa	11680pa
		11695pa	11720pa	11880pa	
1900-2000 vl	Australia, VL8A Alice Spg	2310do			
1900-2000 vl	Australia, VL8K Katherine	2485do			
1900-2000 vl	Australia, VL8T Tent Crk	2325do			
1900-2000	Bahrain, Radio	6010do			
1900-1925	Belgium, R Vlaanderen Int	5910eu	13685af		
1900-1918	Brazil, Radiobras	15268eu			
1900-2000	Bulgaria, Radio	7455eu	9700na		
1900-2000	Canada, CFCX Montreal	6005do			
1900-2000	Canada, CFRX Toronto	6070do			
1900-2000	Canada, CFVP Calgary	6030do			
1900-2000	Canada, CHNX Halifax	6130do			
1900-2000	Canada, CKZN St John's	6160do			
1900-2000	Canada, CKZU Vancouver	6160do			
1900-2000	China, China Radio Intl	9440af	11515af		
1900-2000	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
1900-2000	Ecuador, HCJB Quito	15270eu	17490eu	17790eu	21455eu
1900-2000 vl	Eqt Guinea, Radio Africa	7200af			
1900-1930	Georgia, Radio Georgia	6080eu			
1900-1950	Germany, Deutsche Welle	9665af	9765af	11740af	11785af
		13610af	13790af	15145af	15425af
1900-1910 mtwhfa	Greece, Voice of	7450eu	9380eu		
1900-1930	Hungary, Radio Budapest	6110eu	7220eu	9835eu	11910eu
1900-1945	India, All India Radio	7412eu	9950me	11620eu	11860eu
		11935af	15080af		
1900-2000 vl	Italy, IRRS Milano	7125eu			
1900-2000	Japan, NHK/Radio	6150as	9535as	9640am	9750as
		11815pa	11865pa	11875pa	11915pa
1900-2000	Kuwait, Radio	13620na			
1900-2000	Liberia, Radio ELWA	4760do			
1900-2000 s	Morocco, RTV Marocaine	11920as			
1900-1925	Netherlands, Radio	6020af	9605af	21515af	21590af
1900-2000	New Zealand, R NZ Intl	11735pa			
1900-2000	Nigeria, Radio	3326do	4770do	4990do	
1900-2000	Nigeria, Voice of	7255af			
1900-2000 vl	Papua New Guinea, NBC	9675do			
1900-2000	Romania, R Romania Intl	9750eu	11810eu	11940eu	15365eu
1900-2000	Russia, Radio Moscow Intl	7170na	7180na	7205eu	9470na
		9550eu	9685eu	10344eu	12045eu
		12055eu	13670eu	15580af	17710na
		17760eu			
1900-2000	Saipan, KFBS Marpi	9465as			
1900-2000	Saudi Arabia, BSKSA	9705eu	9720eu		
1900-2000 vl	Slovakia, AWR	9455eu	11610eu		
1900-2000	Spain, Spanish Natl Radio	11775af			
1900-2000	Swaziland, Trans World R	3200af	3240af	9500af	
1900-2000 vl	Uganda, Radio	4976do			
1900-2000	United Kingdom,BBC London	3255af	3955eu	6005af	6180eu
		6190af	6195eu	7160me	9410eu
		9630af	9740me	12095af	15070af
		15400af	17880af		
1900-2000	USA, KCBI Dallas TX	15725am			
1900-2000	USA, KTBN Salt Lk City UT	15590am			
1900-2000	USA, KWHR Naalehu HI	13625as			
1900-2000 mtwhf	USA, Monitor Radio Intl	9355eu	15665eu	21640af	
1900-2000	USA, VOA Washington DC	3980eu	6040eu	9525as	9700eu
		9760eu	11870as	11920af	12040af
		13710af	15180au	15410af	15580af
		17800af	19379me		
1900-2000	USA, WEWN Birmingham AL	9985am	13740am	18930am	
1900-2000 vl	USA, WHRI Noblesville IN	9485am	9590am		
1900-2000	USA, WINB Red Lion PA	15715eu			
1900-2000	USA, WJCR Upton KY	7490na	13595na		
1900-2000	USA, WMLK Bethel PA	9465eu			
1900-2000	USA, WRNO New Orleans LA	15420am			
1900-2000	USA, WWCR Nashville TN	13845am	15610am	15685am	
1900-2000	USA, WYFR Okeechobee FL	15355af	21615af		
1900-1930	Vietnam, Voice of	9840eu	12020eu	15010eu	
1910-1920	Botswana, Radio	3356af	4830af	7255af	
1930-2000	Austria, R Austria Intl	5945eu	6155eu	9880eu	13730af
1930-2000	Finland, YLE/Radio	6120eu	9730eu	11755af	
1930-2000	Iran, VOIRI Tehran	9022me	15260eu		
1930-2000	Netherlands, Radio	17605af	21590af		
1930-2000	Slovakia, R Slovakia Intl	5915eu	7345eu	9440eu	
1935-1955	Italy, RAI Rome	7275eu	11800eu		
1940-2000 mha	Mongolia, R Ulaanbaatar	11790eu	11850eu		
1945-2000	Armenia, Radio Yerevan	4810me	4990me	6065me	

2000-2100	Australia, Radio	5960as	6060pa	6080as	7240pa
		7260as	9580pa	11695pa	11720pa
		11880pa			
2000-2100 vl	Australia, VL8A Alice Spg	2310do			
2000-2100 vl	Australia, VL8K Katherine	2485do			
2000-2100 vl	Australia, VL8T Tent Crk	2325do			
2000-2100	Bahrain, Radio	6010do			
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	9440af	9920eu	11500eu	11715af
		15110af			
2000-2100	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
2000-2100	Ecuador, HCJB Quito	21455am			
2000-2100 vl	Eqt Guinea, Radio Africa	7200af			
2000-2030 mt	Estonia, Estorian Radio	5925eu			
2000-2050	Germany, Deutsche Welle	5960eu	7285eu		
2000-2030	Ghana, GBC Radio 1	4915do			
2000-2030	Ghana, GBC Radio 2	3366do			
2000-2100	Indonesia, Voice of	9675as	11752as		
2000-2030	Iran, VOIRI Tehran	9022me	15260eu		
2000-2030	Israel, Kol Israel	7465eu	9435eu	11585na	11603na
		11675na	17575af		
2000-2100 vl	Italy, IRRS Milano	7125eu			
2000-2010 mtwhf	Kenya, Kenya BC Corp	4935do			
2000-2100	Kuwait, Radio	13620na			
2000-2030 as	Latvia, Radio	5935eu			
2000-2100	Liberia, Radio ELWA	4760do			
2000-2030	Lithuania, Radio Vilnius	9400eu	9710eu		
2000-2010 smwha	Mongolia, R Ulaanbaatar	11790eu	11850eu		
2000-2025	Netherlands, Radio	17605af	21590af		
2000-2100	New Zealand, R NZ Intl	11735pa			
2000-2100	Nigeria, Radio	3326do	4770do	4990do	
2000-2100	Nigeria, Voice of	7255af			
2000-2100	North Korea, R Pyongyang	6576eu	9345eu	9640af	9977af
2000-2030 s	Norway, Radio Norway Intl	9590eu			
2000-2100 vl	Papua New Guinea, NBC	9675do			
2000-2100	Russia, AWR Europe	7140eu			
2000-2100	Russia, Radio Moscow Intl	7170eu	7180na	7205eu	7250na
		9450na	9470na	9550na	9685na
		9890eu	10344eu	12050na	12055na
		15425na	17605na		
2000-2100	Saudi Arabia, BSKSA	9705eu	9720eu		
2000-2100 vl	Solomon Islands, SIBC	5020do	9545do		
2000-2100	Sri Lanka, SLBC Colombo	9720eu	15120eu		
2000-2045	Swaziland, Trans World R	3200af	3240af		
2000-2030	Switzerland, Swiss R Intl	6110af	9885af	12035af	13635af
		15505af			
2000-2100 vl	Uganda, Radio	4976do			
2000-2030	United Kingdom,BBC London	6190af	6195eu	7160me	9630af
		9740me	15070af	17880af	
2000-2100	United Kingdom,BBC London	3255af	3955eu	4570af	5975am
		6005af	6180eu	6195af	7325eu
		9410eu	12095af	15070af	15260sa
		15400af			
2000-2100	USA, KCBI Dallas TX	15725am			
2000-2100	USA, KJES Mesquite NM	15545am			
2000-2100	USA, KTBN Salt Lk City UT	15590am			
2000-2100 as	USA, KVOH Los Angeles CA	17775am			
2000-2100	USA, KWHR Naalehu HI	13720as			
2000-2100 mtwhf	USA, Monitor Radio Intl	13770af	15665eu		
2000-2100	USA, VOA Washington DC	3980eu	6040eu	7415af	9700eu
		9760na	11820af	13710af	15160af
		15410af	15580af	17800af	19379me
		21485af			
2000-2100 vl	USA, WEWN Birmingham AL	13740eu			
2000-2100 vl	USA, WHRI Noblesville IN	9485am	13760am		
2000-2100	USA, WINB Red Lion PA	15715eu			
2000-2100	USA, WJCR Upton KY	7490na	13595na		
2000-2100	USA, WMLK Bethel PA	9465eu			
2000-2100	USA, WRNO New Orleans LA	15420am			
2000-2100	USA, WWCR Nashville TN	13845am	15610eu	15685am	
2000-2100	USA, WYFR Okeechobee FL	7355eu	15355eu	15566eu	17750af
		21525af			
2000-2030	Vatican State, Vatican R	9645af	11625af	15090af	
2005-2100	Syria, Radio Damascus	12085eu	15095eu		
2010-2100 sa	Kenya, Kenya BC Corp	4935do			
2015-2045 s	Swaziland, Trans World R	3200af			
2025-2045	Italy, RAI Rome	7235me	9575me	11800me	
2030-2100	Egypt, Radio Cairo	15375af			
2030-2100 mtwhfa	Palau, KHBN Voice of Hope	11980as			
2030-2100	Poland, Polish R Warsaw	5995eu	6135eu	7285eu	
2030-2100	South Korea, Radio Korea	5975as	6035af	9640me	9870eu
2030-2100	Vietnam, Voice of	9840eu	12020eu	15010eu	
2045-2100	India, All India Radio	7412eu	9910au	9950eu	11620eu
		11715pa	11880pa	15265pa	
2050-2100	Vatican State, Vatican R	3950eu	5885eu		

2100-2200	Australia, Radio	9645as	11720pa	11855as	
2100-2130 vl	Australia, VL8A Alice Spg	2310do			
2100-2130 vl	Australia, VL8K Katherine	2485do			
2100-2130 vl	Australia, VL8T Tent Crk	2325do			
2100-2106	Bahrain, Radio	6010do			
2100-2200	Bulgaria, Radio	6085eu	9700eu		
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	China, China Radio Intl	9920eu	11500eu		
2100-2130	China, China Radio Intl	11715af	15110af		
2100-2200	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
2100-2200	Cuba, Radio Havana Cuba	15165eu			
2100-2127	Czech Rep, Radio Prague	5930na	7345na	9420au	
2100-2130	Ecuador, HCJB Quito	21455am			
2100-2200	Egypt, Radio Cairo	15375af			
2100-2150	Germany, Deutsche Welle	6185as	9670as	9690af	9715af
		9765as	11785as	15425af	
2100-2130	Hungary, Radio Budapest	6110eu	7220eu	9835eu	11910eu
2100-2200	India, All India Radio	7412eu	9910au	9950eu	11620eu
		11715pa	15265pa		
2100-2115 mtwtf	Italy, IRRS Milano	7125eu			
2100-2200	Japan, NHK/Radio	6035as	6185as	9640pa	9660as
		11915as	11925eu		
2100-2200	Liberia, Radio ELWA	4760do			
2100-2137	New Zealand, R NZ Intl	11735pa			
2100-2200	Nigeria, Radio	3326do	4770do	4990do	
2100-2200	Nigeria, Voice of	7255af			
2100-2200 mtwhfa	Palau, KHBN Voice of Hope	11980as			
2100-2200 vl	Papua New Guinea, NBC	9675do			
2100-2125	Poland, Polish R Warsaw	5955eu	6135eu	7285eu	
2100-2130 mtwhf	Portugal, Radio	15250af			
2100-2200	Romania, R Romania Intl	7195eu	7225eu	9690eu	9750eu
		11940eu			
2100-2200	Russia, Radio Moscow Intl	4795eu	4860eu	5950eu	6055eu
		7150na	7170eu	7180eu	7205eu
		7330eu	7390eu	9470eu	9550eu
		9620eu	9685eu	9750na	9795eu
		9885eu	12050na	15425na	17605na
		17690na			
2100-2115 vl	Sierra Leone, SLBS	3316do			
2100-2200 vl	Solomon Islands, SIBC	5020do	9545do		
2100-2200	Spain, Spanish Natl Radio	6125eu			
2100-2130	Sri Lanka, SLBC Colombo	9720eu	15120eu		
2100-2105	Syria, Radio Damascus	12085eu	15095eu		
2100-2200	Turkey, Voice of	9445eu	11895		
2100-2200	United Kingdom,BBC London	3255af	3955eu	5975am	6005af
		6180eu	6195eu	7325eu	9410eu
		9590na	11955as	12095na	15260sa
		15400af	15575eu		
2100-2200	USA, KCBI Dallas TX	15725am			
2100-2200	USA, KTBN Salt Lk City UT	15590na			
2100-2200	USA, KWHR Naalehu HI	13720as			
2100-2200 mtwhf	USA, Monitor Radio Intl	13770af	13840pa	15665eu	
2100-2200	USA, VOA Washington DC	6040eu	6095eu	9760eu	11870as
		15185au	15410af	17735as	19379me
2100-2200	USA, WEWN Birmingham AL	13740eu	18930eu		
2100-2200 vl	USA, WHRI Noblesville IN	13760am	17830am		
2100-2200	USA, WINB Red Lion PA	15715eu			
2100-2200	USA, WJCR Upton KY	7490na	13595na		
2100-2200	USA, WMLK Bethel PA	9465eu			
2100-2200	USA, WRNO New Orleans LA	15420am			
2100-2200	USA, WWCR Nashville TN	13845am	15610am	15685am	
2100-2200	USA, WYFR Okeechobee FL	7355eu	15355eu	15566eu	17750af
		21525af			
2100-2110	Vatican State, Vatican R	5885eu	7250eu		
2105-2135 as	Yemen, Rep of Yemen Radio	9780eu			
2110-2200	Syria, Radio Damascus	12085na	15095na		
2115-2200	Egypt, Radio Cairo	9900eu			
2115-2130 mtwhf	United Kingdom,BBC Carib	6110am	15390am	17715am	
2130-2200	Australia, Radio	15240pa	15320pa	15365pa	17795pa
		21740pa			
2130-2200 vl	Australia, VL8A Alice Spg	4835do			
2130-2200 vl	Australia, VL8K Katherine	5025do			
2130-2200 vl	Australia, VL8T Tent Crk	4910do			
2130-2200	Canada, RCI Montreal	5995eu	7260eu	11945eu	13650eu
		13690af	15140af	15325af	17820af
2130-2200	Ecuador, HCJB Quito	11835eu	15270eu	17490eu	17790eu
		21455eu			
2130-2140 mtwhf	Latvia, Radio	5935eu			
2130-2200	Sweden, Radio	6065eu	9655eu		
2138-2200	New Zealand, R NZ Intl	15115pa			
2145-2200	South Korea, Radio Korea	6480eu	15575eu		

2200-2300	Australia, Radio	9645as	11720pa	11855as	15240pa
		15320pa	15365pa	17795pa	21740pa
2200-2300 vl	Australia, VL8A Alice Spg	4835do			
2200-2300 vl	Australia, VL8K Katherine	5025do			
2200-2300 vl	Australia, VL8T Tent Crk	4910do			
2200-2225	Belgium, R Vlaanderen Int	5910eu			
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, RCI Montreal	5995eu	7260eu	11705af	11945eu
		13650eu	13690af	15140af	15325af
		17820af			
2200-2300	China, China Radio Intl	7170eu			
2200-2230	China, China Radio Intl	3985eu			
2200-2300	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
2200-2300	Cuba, Radio Havana Cuba	6180na			
2200-2230	Czech Rep, Radio Prague	5930na	7345af	9420eu	
2200-2245	Egypt, Radio Cairo	9900eu			
2200-2300 vl	Eqt Guinea, Radio Africa	7200af			
2200-2230	India, All India Radio	7412eu	9910au	9950eu	11620eu
		11715pa	15265eu		
2200-2225	Italy, RAI Rome	5990as	9710as	11800as	
2200-2300 vl	Malaysia, RTM Kota Kinaba	5980do			
2200-2300 smtwha	Malaysia, RTM Radio 4	7295do			
2200-2300	New Zealand, R NZ Intl	15115pa			
2200-2300	Nigeria, Radio	3326do	4770do	4990do	
2200-2300	Nigeria, Voice of	7255af			
2200-2300 mtwhfa	Palau, KHBN Voice of Hope	11980as			
2200-2300 vl	Papua New Guinea, NBC	9675do			
2200-2300	Russia, Radio Moscow Intl	7115eu	7150eu	7180eu	7185eu
		7205eu	7295eu	7380eu	9550eu
		9620na	9695eu	9725eu	9750na
		9885eu	10344eu	12050na	15425na
		17605na	17655na	17690na	21655na
2200-2215 vl	Sierra Leone, SLBS	3316do			
2200-2235 vl	Solomon Islands, SIBC	5020do	9545do		
2200-2245	South Korea, Radio Korea	6480eu	15575eu		
2200-2230	South Korea, Radio Korea	7275as	9640as		
2200-2210	Syria, Radio Damascus	12085na	15095na		
2200-2300	Taiwan, VO Free China	9850eu	11915eu		
2200-2300	UAE, Radio Abu Dhabi	9605na	9770na	11885na	
2200-2300	Ukraine, R Ukraine Intl	4825eu	5960eu	6010eu	6020eu
		6055eu	7195na	7240eu	9505eu
		9685eu	9745eu	9860eu	
2200-2300	United Kingdom,BBC London	3955eu	5975am	6195eu	7325eu
		9410eu	9590na	9915am	11750sa
		11955as	12095af	15260sa	15400af
		15575eu			
2200-2300	USA, KCBI Dallas TX	15725am			
2200-2300	USA, KTBN Salt Lk City UT	15590am			
2200-2300	USA, KWHR Naalehu HI	17510as			
2200-2300 mtwhf	USA, Monitor Radio Intl	9355na	9430as	13625as	17555ca
2200-2300	USA, VOA Washington DC	6035as	7215as	9770as	11760as
		15185au	15290as	15305as	17735au
		17820as			
2200-2300	USA, WEWN Birmingham AL	13740am			
2200-2300 vl	USA, WHRI Noblesville IN	13760am	17830am		
2200-2300	USA, WINB Red Lion PA	15715eu			
2200-2300	USA, WJCR Upton KY	7490na	13595na		
2200-2300	USA, WRNO New Orleans LA	15420am			
2200-2300	USA, WWCR Nashville TN	12160am	13845am	15685am	
2200-2300	USA, WYFR Okeechobee FL	17750eu	21525af		
2200-2230 s	USA,KGEI San Francisco CA	15280sa			
2230-2300	Finland, YLE/Radio	9615na	9740eu		
2230-2300	Israel, Kol Israel	7465eu	9435eu	11585na	11603na
		11675na	17575sa		
2230-2300	Lithuania, Radio Vilnius	9710eu			
2230-2300	Sweden, Radio	6065eu			
2240-2250 smtwhf	Greece, Voice of	11645au			
2245-2300	Armenia, Radio Yerevan	7440eu	9480eu	9705eu	10344eu
		11920eu			
2245-2300	Bulgaria, Radio	7455eu	9700na		
2245-2300	Ghana, GBC Radio 1	4915do			
2245-2300	Ghana, GBC Radio 2	3366do			
2245-2300	India, All India Radio	9910as	11745as	11785as	15110as
2245-2300	USA, WINB Red Lion PA	15145eu			
2245-2300	Vatican State, Vatican R	9600au	11830as		

FREQUENCIES

2300-2315	Albania, R Tirana Intl	9760eu	11825eu		
2300-2400	Australia, Radio	11720pa	11855as	15240pa	15320pa
		15365pa	17795pa	21740pa	
2300-2400 vl	Australia, VL8A Alice Spg	4835do			
2300-2400 vl	Australia, VL8K Katherine	5025do			
2300-2400 vl	Australia, VL8T Tent Crk	4910do			
2300-2400	Bulgaria, Radio	7455na	9700na		
2300-2400	Canada, CFCX Montreal	6005do			
2300-2400	Canada, CFRX Toronto	6070do			
2300-2400	Canada, CFVP Calgary	6030do			
2300-2400	Canada, CHNX Halifax	6130do			
2300-2400	Canada, CKZN St John's	6160do			
2300-2400	Canada, CKZU Vancouver	6160do			
2300-2330 mtwhf	Canada, RCI Montreal	5960na	5995eu	7250eu	9535am
		9755na	11845na	11940am	
2300-0000 as	Canada, RCI Montreal	5960na	5995eu	7250eu	9535am
		9755na	11845na	11940am	
2300-2400	Costa Rica, AWR Alajuela	5030ca	9725ca	11870ca	
2300-2400	Costa Rica, R Peace Intl	7375am	9375am	15030am	21465am
2300-2400	Ecuador, HCJB Quito	9745am	21455am		
2300-2400	Guam, KSDA AWR Agat	15610as			
2300-2400	India, All India Radio	9910as	11745as	11785as	15110as
		15145as			
2300-2400	Japan, NHK/Radio	6060eu	6125eu	7140eu	9660eu
		15430as	17810as		
2300-2400 vl	Malaysia, RTM Kota Kinaba	5980do			
2300-2400 smtwha	Malaysia, RTM Radio 4	7295do			
2300-2400	New Zealand, R NZ Intl	15115pa			
2300-2350	North Korea, R Pyongyang	11700am	13650am		
2300-2330 s	Norway, Radio Norway Intl	6120na			
2300-2400 mtwhfa	Palau, KHBN Voice of Hope	11980as			
2300-2400 vl	Papua New Guinea, NBC	9675do			
2300-2400	Russia, Radio Moscow Intl	7110eu	7170eu	7210na	7295na
		9450na	9480na	9620na	9695na
		9750na	11675as	12050na	15425na
		15470as	17570as	17610as	17675as
		21480na			
2300-2400	Singapore,R Singapore Int	9530as			
2300-2400	Turkey, Voice of	7185me	11895eu		
2300-2400	UAE, Radio Abu Dhabi	9605na	9770na	11885na	
2300-2400	United Kingdom,BBC London	3955eu	5975na	6175na	6195na
		7180eu	7325na	9410eu	9590na
		9915am	11750sa	11955as	15260sa
		15280as	15370as	15400af	
2300-2400	USA, KCBI Dallas TX	15725am			
2300-2400	USA, KTBN Salt Lk City UT	15590na			
2300-2400	USA, KWHR Naalehu HI	17510as			
2300-2400 mtwhf	USA, Monitor Radio Intl	9355na	9430as	13625pa	17555ca
2300-2400	USA, VOA Washington DC	7215as	9770as	11760as	15185as
		15290as	15305as	17735as	17820as
2300-2400	USA, WEWN Birmingham AL	7425am	11820am		
2300-2400 vl	USA, WHRI Noblesville IN	7315am	9495am		
2300-2400	USA, WINB Red Lion PA	15715eu			
2300-2400	USA, WJCR Upton KY	7490na	13595na		
2300-2400	USA, WRNO New Orleans LA	7355am			
2300-2400	USA, WWCR Nashville TN	12160am	13845am		
2300-2315	Vatican State, Vatican R	9600au	11830as		
2330-2400	Austria, R Austria Intl	9870sa	13730sa		
2330-2400	Canada, RCI Montreal	5960na	9755na		
2330-2400	Netherlands, Radio	6020na	6165na		
2330-2400 m	Sri Lanka, SLBC Colombo	15425na			
2330-2400	Sweden, Radio	11910eu			
2330-2400	Thailand, Radio	4830as	9655as	11905as	
2330-2400 vl	USA, R Bosnia via WHRI	7315am	9495am		
2330-2400	Vietnam, Voice of	9840as	12020as	15010as	
2335-2345 smtwhf	Greece, Voice of	9425sa	11595sa	11645sa	
2345-2400	Armenia, Radio Yerevan	9480eu	11920eu	12010eu	

SELECTED PROGRAMS

Sundays

2300 BBC: *World News*. See S 0300.
2300 Christian Science Sentinel: *Sunday from The Mother Church*.
2300 Radio Australia: *Network Asia* (Part 2). The second half of this program of news, interviews, current affairs, and developments in the Asian/Pacific region.
2310 Radio Australia: *Sports Report*. See S 1310.
2310 VOA (as): *VOA Monday Morning*. See S 0010.
2311 Radio Moscow: *News and Views*. See S 0311.
2330 BBC: *Developing Health*. See M 0630.
2332 Radio Moscow: *Transcription Review*. See S 1346.

Mondays

2300 BBC: *Newsdesk*. See S 0200.
2300 Radio Australia: *Network Asia* (Part 2). See S 2300.
2305 BBC: World *Business Report*. Latest news from the markets in the Far East, Europe and the USA.
2310 Radio Australia: *Sports Report*. See S 1310.
2310 VOA (as): *Newsline*. See M 0010.
2311 Radio Moscow: *News and Views*. See S 0311.
2330 BBC: *Multitrack 1: Top 20*. World Service Top 20.
2330 VOA (as): *VOA Tuesday Morning*. See S 0010.
2332 Radio Moscow: *Folk Box*. See M 1432.

Tuesdays

2300 BBC: *Newsdesk*. See S 0200.
2300 Radio Australia: *Network Asia* (Part 2). See S 2300.
2310 Radio Australia: *Sports Report*. See S 1310.
2310 VOA (as): *Newsline*. See M 0010.
2311 Radio Moscow: *News and Views*. See S 0311.
2330 BBC: *Omnibus*. Each week a half-hour program on practically any topic under the sun.
2330 VOA (as): *VOA Wednesday Morning*. See S 0010.
2332 Radio Moscow: *Yours for the Asking*. A 30-minute musical request program.

Wednesdays

2300 BBC: *Newsdesk*. See S 0200.
2300 Radio Australia: *Network Asia* (Part 2). See S 2300.
2310 Radio Australia: *Sports Report*. See S 1310.
2310 VOA (as): *Newsline*. See M 0010.
2311 Radio Moscow: *News and Views*. See S 0311.
2330 BBC: *Multitrack 2*. New pop records, *Interviews*, news and competitions.
2330 VOA (as): *VOA Thursday Morning*. See S 0010.
2332 Radio Moscow: *The Jazz Show*. See M 0432.

Thursdays

2300 BBC: *Newsdesk*. See S 0200.
2300 Radio Australia: *Network Asia* (Part 2). See S 2300.
2310 Radio Australia: *Sports Report*. See S 1310.
2310 VOA (as): *Newsline*. See M 0010.
2311 Radio Moscow: *News and Views*. See S 0311.
2330 BBC: *Stories in Verse*. (*Two Cheers for April*-28th)
2330 VOA (as): *VOA Friday Morning*. See S 0010.
2332 Radio Moscow: *Music At Your Request*. See M 1132.
2345 BBC: *Sports Roundup*

Fridays

2300 BBC: *Newsdesk*. See S 0200.
2300 Radio Australia: *Network Asia* (Part 2). See S 2300.
2310 Radio Australia: *Asia Focus*. See M 1510.
2310 VOA (as): *Newsline*. See M 0010.
2311 Radio Moscow: *News and Views*. See S 0311.
2330 BBC: *Multitrack 3*. Latest developments on the British music scene.
2330 Radio Australia: *Blacktracker*. See W 1330.
2330 VOA (as): *VOA Saturday Morning*. See S 0010.
2332 Radio Moscow: *The Jazz Show*. See M 0432.

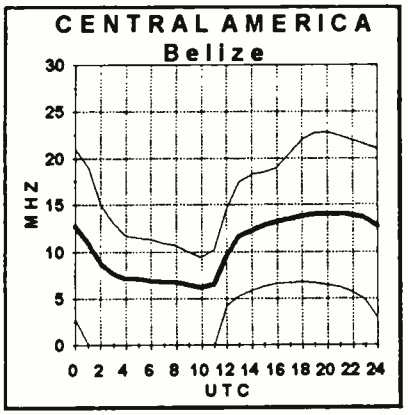
Saturdays

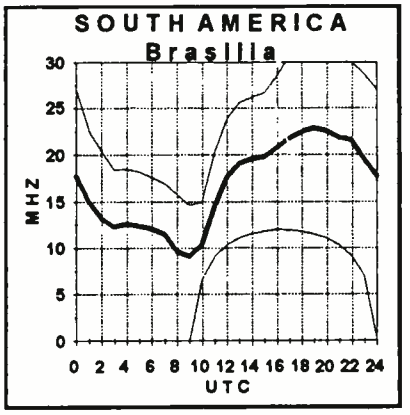
2300 BBC: *Newsdesk*. See S 0200.
2300 Christian Science Sentinel: *Monitor Radio News*.
2306 Christian Science Sentinel: *Christian Science Sentinel Radio Edition*.
2310 Radio Australia: *Asia Focus*. See M 1510.
2310 VOA (as): *VOA Sunday Morning*. See S 0010.
2311 Radio Moscow: *News and Views*. See S 0311.
2330 BBC: *Sounds and Sweet Airs*. The importance of music in Shakespeare's work.
2330 Radio Australia: *At Your Request*. See S 0330.
2332 Radio Moscow: *Folk Box*. See M 1432.

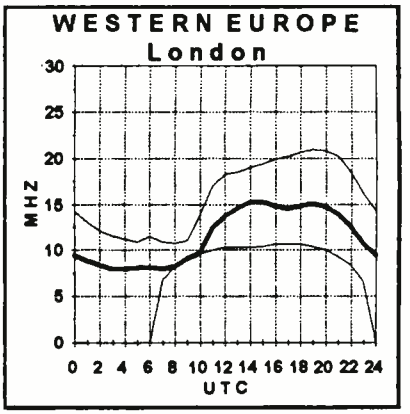
Propagation conditions: Eastern United States

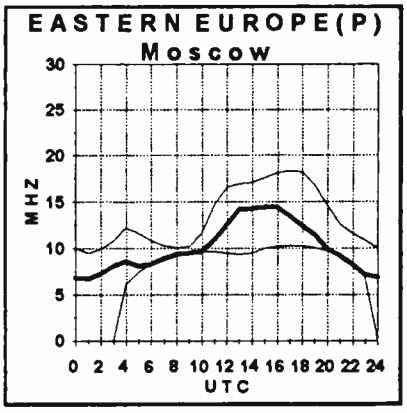
How to use the propagation charts: Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location. Then look for the one most closely describing the geographic location of the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

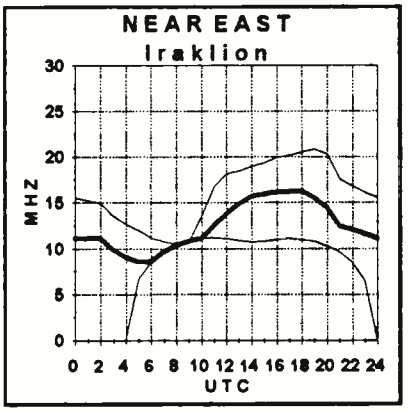
Once you've located the correct charts, look along the horizontal axis of the graph for the time you are listening. The top line of the

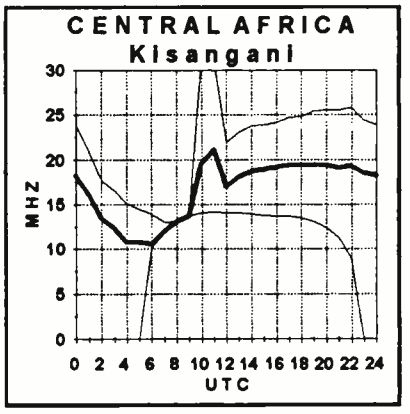


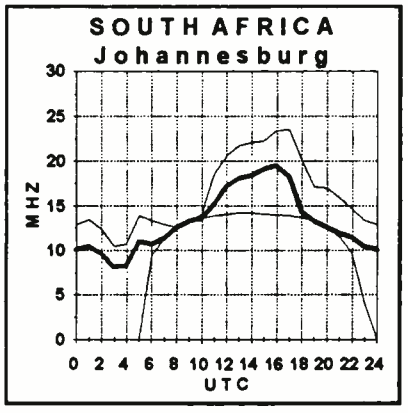


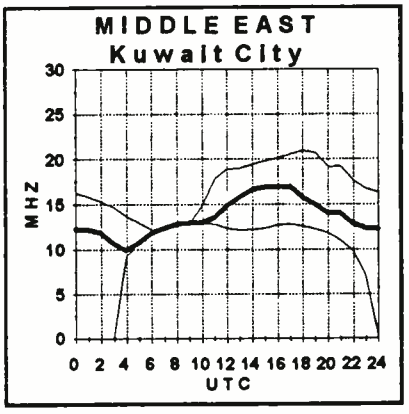


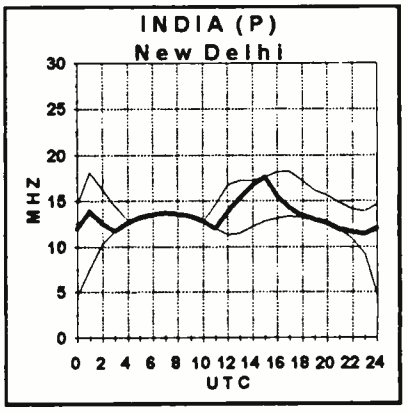


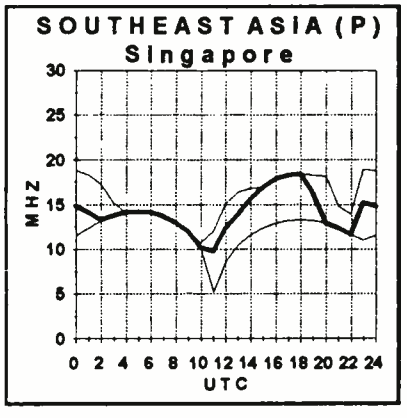


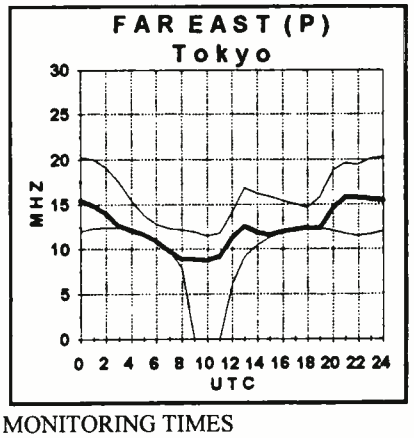


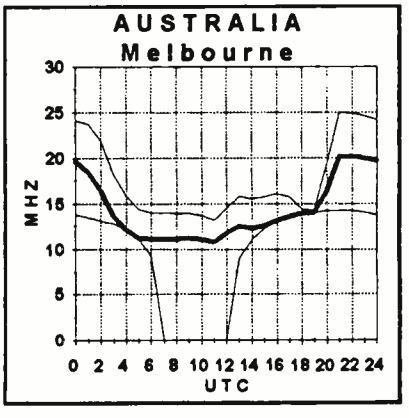






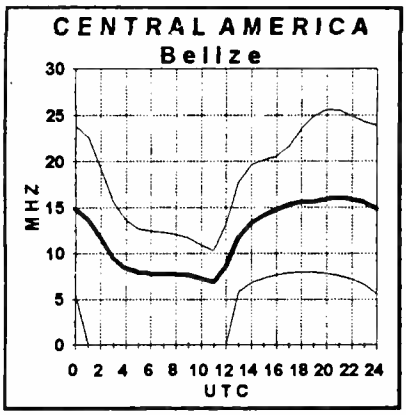


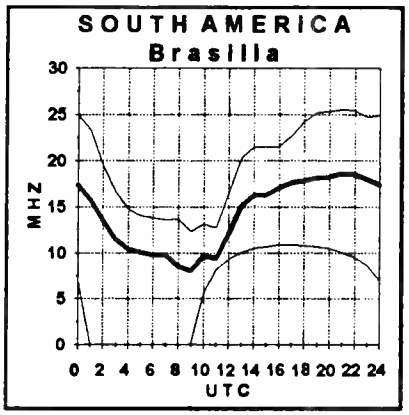


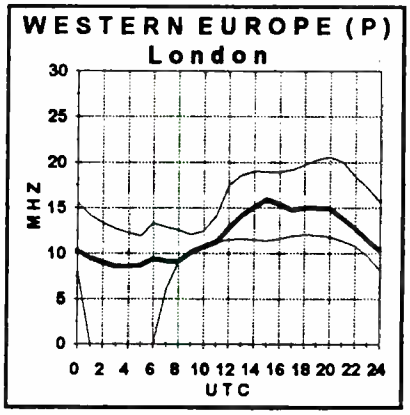


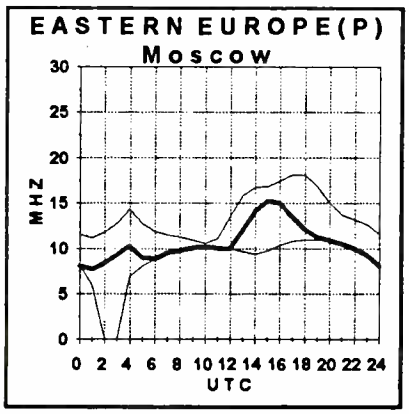
Propagation Conditions: Western United States

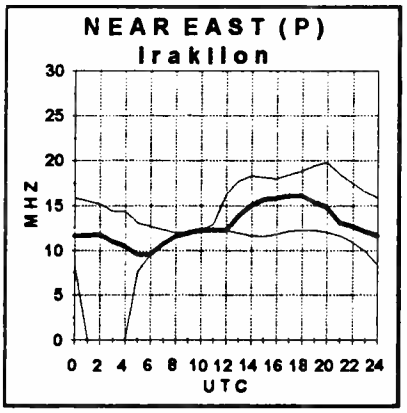
graph shows the maximum usable frequency (MUF), the heavy middle line is the frequency for best reception, or optimum working frequency (OWF), and finally, the bottom line is the lowest usable frequency (LUF). You will find the best reception along the heavy middle line. Circuits labeled (P) cross the polar auroral zone. Expect poor reception on these circuits during ionospheric disturbances.

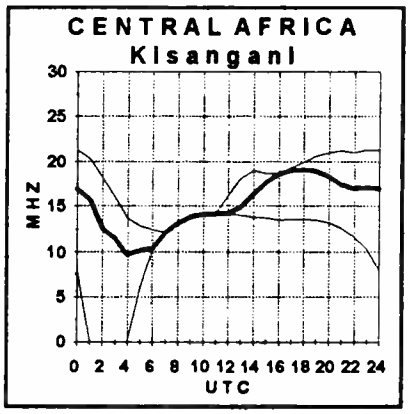


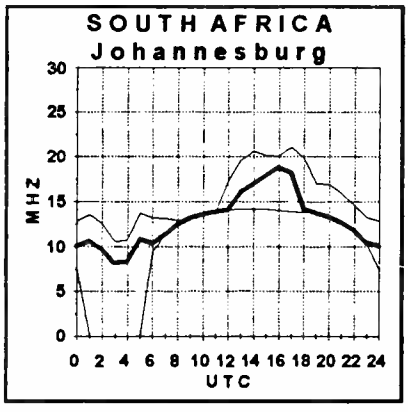


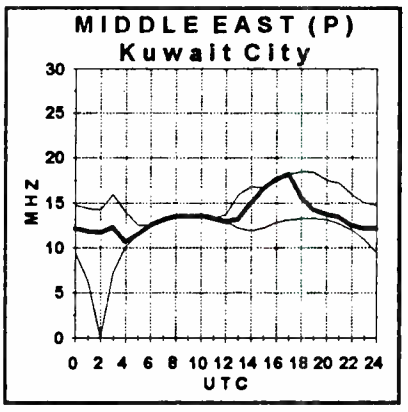


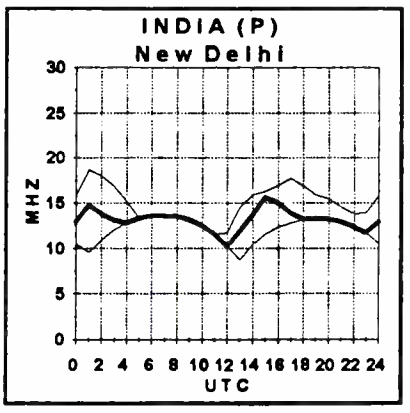


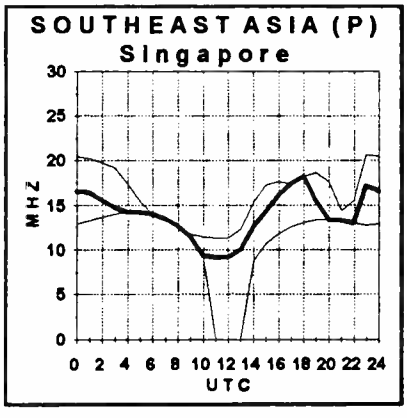


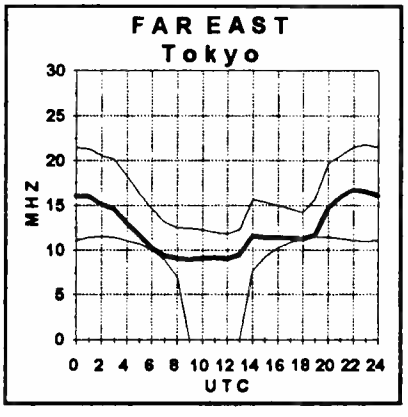


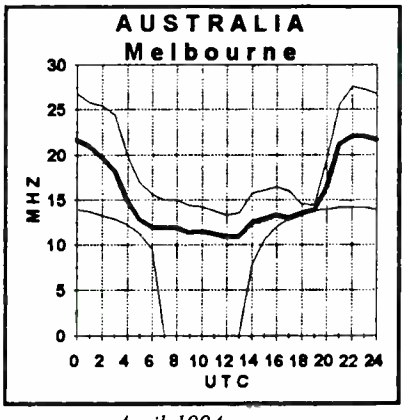












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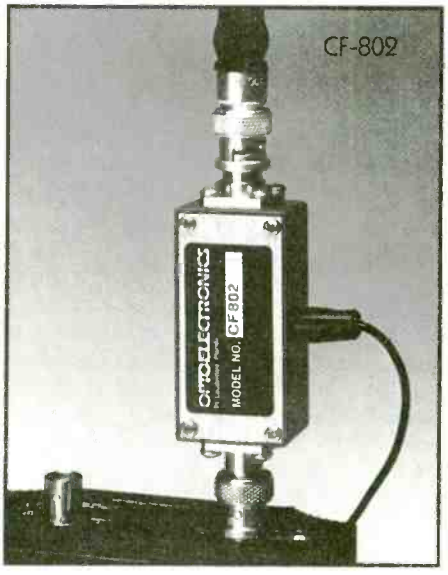

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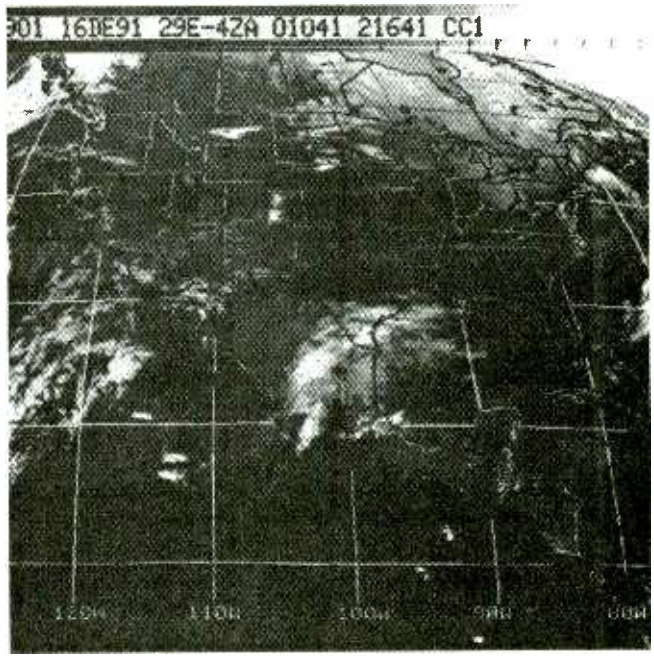


USNAVX, Stockton, CA, on 6453 and 9090 MHz.

Facsimile (FAX) is a digital mode used to transmit pictures, charts, maps, press photos, marine information and other documents over radio and satellite.

FAX pictures/charts are transmitted and received line-by-line. The transmitting station mounts the picture/chart on a revolving drum and the image is scanned by an optical sensor. Each pixel (picture element) is converted to an electrical voltage proportional to the lightness/darkness of the pixel. The data for each pixel is stored, and once the entire line has been scanned, it is then transmitted.

FAX MODULATION

FM modulation is used to transmit FAX images on shortwave. The tone of the frequency corresponds to the electrical voltage (lightness/darkness) of the pixel. AM modulation is used for satellite FAX transmission. The tone of the frequency is constant, but the amplitude (loudness) is proportional to the intensity of the pixel.

A typical scanned line contains 960 dots (pixels) of information. There can be up to 226 lines per inch. Weather charts are normally transmitted at 120 lines per minute (LPM) or about 2000 bits per second. A standard weather chart takes about 13 minutes to transmit and receive.

QRM (noise) and fading show up as lines and loss of detail on the received image. Every half-second of interference will obliterate one full line of the image at a speed of 120 LPM.

DRUM SPEED

Various drum speeds may be used for FAX transmissions. The most common are:

60 LPM	1 beat per second
90 LPM	1.5 beats per second
120 LPM	2 beats per second
240 LPM	4 beats per second

By listening to the cadence of the signal, you can easily determine the drum speed of the scanning unit. Drum speeds of 60, 90, and 120 are commonly used for weather charts and maps, with 120 being used exclusively for North American and major international weather centers. Drum speeds of 60 and 90 are common for Russian meteorological stations. A drum speed of 60 is also used by most international news services in transmitting press photos.

INDEX OF COOPERATION

The Index of Cooperation (IOC) determines the relationship between the width of the image and the number of lines per inch that make up the image. In effect, the IOC determines the ratio of the image's height to its width.

The two standard IOC values are 288 and 576. The value of 576 is generally used by meteorological stations, while 288 is normally used by press stations.

POLARITY

FAX images may be sent in Positive or Negative (reverse) polarity. The user must choose which format is required. Press photos are generally intended to be received in the negative mode.

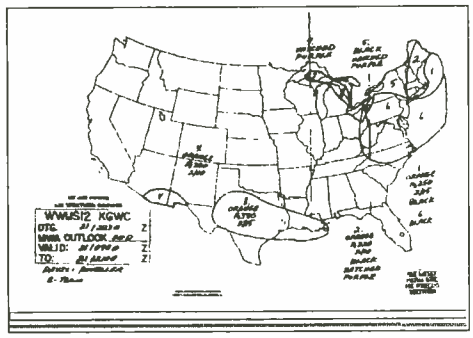
DIRECTION

The direction of the received image can be controlled by the FAX receiving equipment. Normally images are processed from left-to-right. The exception to this is press photos, which are received right-to-left. Unless they are received in this fashion they will appear inverted (as if you held a newspaper up to a mirror).

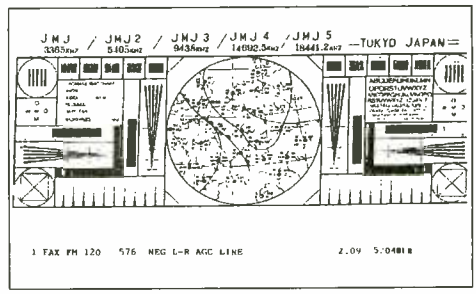
FORMAT

Two formats exist for printing FAX charts and photos. LINE is used to print weather maps and charts which are basically line drawings. GRAY is used for photographs and produces an even gray tonal scale.

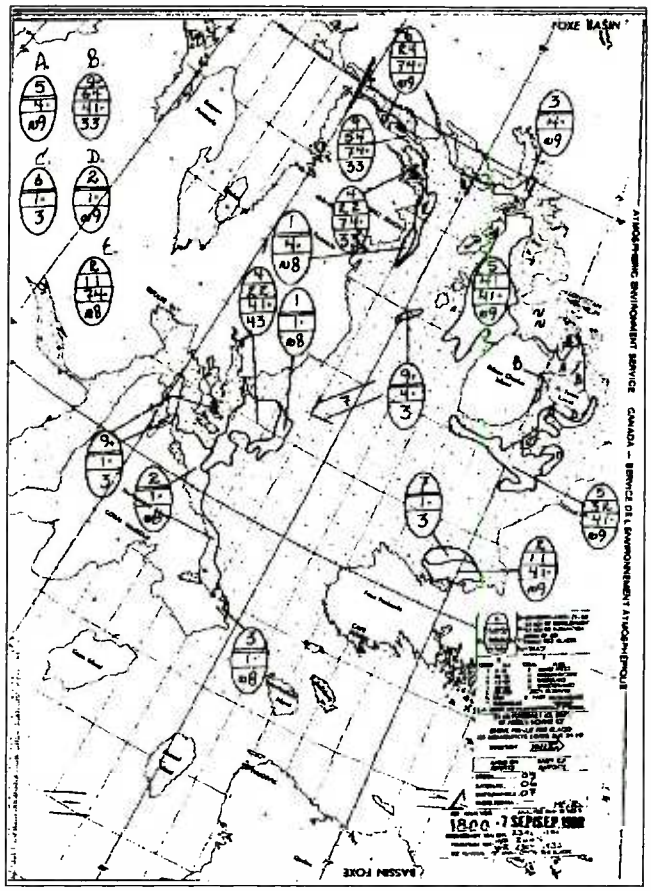
EPA photo copied on 139 kHz.



U.S. Air Force Automated Weather Service (AWS) on 19.3240, 11.1180, and 6.9040 MHz.



Test pattern FAX from JMJ Tokyo.



Ice chart for Foxe Basin copied at 2301 UTC on 10536 kHz.

FRAMING

Many FAX stations transmit signal tones at the beginning of a FAX transmission which automatically sets the correct IOC for your decoder and also properly centers the image. In the absence of these tones, you must manually frame left or right to center the image.

VIDEO FAX

Television monitors generally lack the resolution to display a true FAX image. In addition, they are capable of only displaying about 70% of the actual transmitted image. Computer VGA monitors now offer excellent resolution.

A printer is required to do proper justice. Nine pin printers work well, but you will obtain a better image if a 24 pin dot matrix printer is used. Many outboard and computer-based decoders now support laser printers, which offer the best printed picture possible.

SATELLITE FAX

Orbiting NOAA and METEOR satellites transmit FAX photographs on frequencies of 137.500 and 137.650 MHz. These satellites orbit the earth about every 100 minutes. During some of their orbits, they may pass over your listening post. The trick, if there is one, is to have some means of predicting when they will pass within your range of reception. AMSAT has programs available for several computers which can be used for this purpose.

Unlike Shortwave (HF) FAX broadcasts, Satellite FAX uses AM Mode modulation.

A typical satellite window lasts about 15 to 20 minutes. A VHF scanner/receiver tuned in SSB or FM narrow mode with a suitable VHF antenna is all that is required for reception.

FAX DECODING EQUIPMENT

Several external FAX decoders are now available for the shortwave monitor. The audio signal from the receiver is fed to the decoder. Most decoders allow for the connection of both a video screen and a printer. Several FAX programs (with appropriate "black box" hardware) are available at reasonable cost for PC and PC-clone computers. In addition to superb gray-level displays on a VGA monitor, the pictures and charts can be saved to disk for later recall. MT

Sample FAX Frequencies

137.5	NOAA Wx Satellites
6918.5	ECA Madrid Meteo, Spain 120/576
8080.0	NAM Norfolk 120/576 (// on 10865)
9241.0	AP News, Buenos Aires 60/288
10536.0	CFH Halifax Military 120/576
11118.0	USAF Automated Weather Service 120/576
16025.0	BAF9 Beijing Meteo, China 120/576
16340.0	ZKLF New Zealand Meteo 120/576
20647.0	JMH5 Tokyo Meteo, Japan 120/576

WOJB 89FM Their Voices Will Be Heard!

Five hundred years ago, they were the only people living on our continent. Soon, the voices of Native Americans will end their silence. An exciting new renaissance has begun. Indian cultures and languages are about to be discovered by a new generation of Americans. Indian organizations across North America are harnessing the power of both radio and satellite communications.

One of the emerging leaders of Native American broadcasting is Sararesa Begay, a producer and operations assistant at WOJB, 88.9 MHz, on the Lac Courte Oreilles Ojibwe (la-coo-tu-ray oh-jib-way) Reservation in Northwestern Wisconsin. Each week, Sara hosts *Drum Song*, a program of Indian news and events mixed with Pow-Wow music, heard every Tuesday evening between 7:00 pm and midnight. Although her program serves this community of The Lake Superior Chippewa, Sara is a Navajo, with some Hopi blood, who grew up in Tuba City, Arizona.

"Unpredictable" is the only way to describe Sara's life. When she reached high school age, her family moved north to Page, Arizona, near Lake Powell. Her father, Reuben Begay, Sr., found work there as a chemist.

"In my senior year, I had to come up with a paper that said 'In a year from now, this is what I'm going to do.' I knew I was going to college, and I thought I should major in something I could make money at, like writing. I knew there were a lot of starving writers, so I thought: 'I'll major in journalism, because at least I can make a living if I don't get married or have a really complicated life.'"

Sararesa Begay, host of WOJB's "Drum Song."

"I decided on Journalism, but my advisor said 'You know, you won't make much money on it. Do you know what's fun? Public relations!' So, I wrote my paper on that, and when I entered Northern Arizona University, I already knew my major: public relations."

"In my senior year, I needed more credits to graduate, and one of my professors said 'You speak really well. You should go into broadcasting.' I had already been a PR major! I already had clippings published and stuff like that, and I was set. But the recession had set in, and all the writing internships had been cut back. But there were a lot of radio internships, so I went into radio, and it just snowballed into a job."

"First, I wrote newscopy and did production work for the morning show at KMGN in Flagstaff, Arizona. I was getting five dollars an hour. My deadlines were real stiff: 5:00 am every morning. And I had class at nine! I was very dedicated, but I really wanted the experience. That's what drove me."

"Later, I got an offer from KRCK (the Northern Arizona University station in Flagstaff,) in my graduating semester. They said 'We'll pay your tuition if you'll become news director.' I think they really wanted me because I was a Native American and I was a woman." After graduation, Sara landed a job in her home town of Tuba City at their public radio station KGHR. She quickly became program director; and when the General Manager got fired, she was promoted to fill his shoes.

"I had a morning country show, because Navajos really enjoy country music. We also had rock and classic rock shows, and reggae, because a lot of Hopis like reggae. In the summer, a young person came to me who really wanted to get into radio. He was eighteen, and his name was Johnny Valdo, and we did a top 40 rock show in the afternoons, and the kids really enjoyed that. We had one person do a Native American show."

Sara enjoyed being home, but her job became increasingly difficult. "When the General Manager got fired, I got all his problems! A lot of people were there because they were friends of the Board. These people were not competent, but they wouldn't listen to me, because, at the time, I was 23 years old." Sara was also the only woman working at KGHR. "They were all male, so they weren't going to listen to me!"

It was time for a change! Sara began to send out her resume, looking for another job. "I mailed it to Alaska, Nebraska, and then, just by a fluke of nature, I received this little newsletter from The National Federation of Community Broadcasters. Inside, there was a tiny announcement: 'WOJB seeks Native American producer and operations assistant.' I said 'Oh, I'm Native American!' So, I just put my resume in the mail, along with my letter of Indian blood, as proof that I'm Indian. And I forgot about it totally!"

Reviewing the messages on her answering machine one day, she heard a surprising reply. "WOJB? Where is this place? I totally did not know." Research revealed that WOJB was located in the deep woods of Northwestern Wisconsin, about 80 miles from Duluth and Superior. The closest big town was Rice Lake.

By this time, Sara knew how to handle a telephone interview, and she returned WOJB's call. "They called me back a week later and said 'You're one of our finalists' and they'll send me information about the area. And I said 'Oh, my God! Wisconsin!'" She packed her suitcase and headed north. For Sara, it was like entering another world! "It's very green and very wooded. There's lots of snow and it's very cold. It's very different, but I love what I do and it's fun."

"WOJB is owned and operated by the Lac Court Oreilles Ojibwe tribe, and its studios are on their reservation next to the tribal office. So, a lot of the Lac Court Oreilles people listen to me. They come up to me and say 'Oh, I just love your show. I record it.' They really love pow-wow music. I run things like pow-wow news: 'Upcoming pow-wows in Indian country are...' I run National Native News and features.

"I'm also working with elders, trying to get them on tape and have them tell stories; but it's a very slow process, because you have to be very careful what you broadcast. There are some things I can broadcast and some things I can't. I have to be very respectful."

Even though WOJB is owned and operated by an Indian tribe, *Drum Song* is their only Native American show. "It's not only just for Natives, but it helps our non-Indian listeners to understand Indian people. We try to bridge the stereotypes and bring cultural understanding between Indians and non-Indians."

Pow-Wow music is not easy to find, but Sara knows where to look. Her main source of material is Canyon Records and Indian Art in Phoenix, Arizona (602-266-4823). She also draws from outlets in Albuquerque, New Mexico, and Saskatchewan, Canada. Most recorded Pow-Wow music is on cassette, but some CDs are produced occasionally.

Enhance your mediumwave DXing ... Check out DX Radio Tests on page 111!

Satellite Delivery

Soon, Indian programming will not be so scarce. A new service, called AIROS (American Indian Radio On Satellite), is being developed to distribute Native American programming to many stations across the nation. One of its founders, Ray Cook, explains: "It's a project that is co-directed by Indigenous Communications Association—that's my organization—and the Native American Public Broadcasting Consortium, which is an outfit at the University of Nebraska's Educational Telecommunications Building in Lincoln, Nebraska. They've been around for quite a few years. Their main thing is film and video production and distribution, but they've been dabbling in radio production over the last couple of years.

"So, we've started working together about two years ago and we received funding from The Corporation for Public Broadcasting to explore the possibility of a satellite distribution system for Native American radio stations.

"It's going to be available to the whole public radio satellite system. We're going to charge for programming like APR or NPR does. We're working with the CBC in Canada who produce a lot of hours per week of Native programming for the CBC Northern Service. So, there's some cross border action going on between the Natives."

Ray's goal is to bring Native programming to the general public. At the moment, access is poor. "There are only two (Indian) stations east of the Mississippi. One of them is CKON up here on our reservation, the Mohawk Reserve (on the U.S./Canadian border in Akwesasne, Ontario, on 97.3 MHz). And then there's WOJB. There are 26 Native American stations on the air right now in the United States, and ICA is assisting 11 other project stations to come on the air, but none of them are east of the Mississippi.

"One of the things that the CPB liked about AIROS was that there was such a great potential for cross-cultural communications. Already there are 180 stations that air National Native News that aren't Native owned and operated. So that's a pretty solid potential market. If people want to hear the news, chances are they want to hear more in-depth stuff, too, whether it's entertainment or documentaries. I think they ought to hear our contemporary musicians. They ought to hear about what our authors are doing and thinking. We have a lot of academics right now in the big Ivy League colleges. A lot of our people have earned their stripes in different fields, but we never hear them. This is our chance, and CPB really helped us out a lot."

Each tribe has its individual customs and culture, but there are many common threads that hold Native Americans together. Sara notes: "There are a lot of similarities, like in their mannerisms. Of course, there are differences. I don't think I am related to them (The Lake Superior Chippewa). Navajos are related to the Apaches. We're cousins. To me, even though I'm not related, that doesn't mean there's no camaraderie. There is."

Who knows what the future holds for Sara! Her philosophy of life is inspiring: "Someone once told me: 'If you want to tell God a joke, tell him your plans!' So, I've quit planning. And I'm spontaneous. I trust that it will work out, and it has! I guess it's like an Indian value. Just be spontaneous and trust that your road will be OK. I hope (later on in life) that I'll be in mass communications in some way or another. It doesn't have to be in radio. I mean, I would still love to write."

Both Sara and Ray have strong spirits and wills. Their work will preserve traditions and cultures that have existed for centuries. The voices of their people will soon be heard!

Bits 'N' Pieces

American Public Radio has decided to begin marketing their programming globally and has changed the name of their network to Public Radio International. According to their President and CEO Stephen Salyer, PRI has embarked on a ten year plan to provide expanded coverage of world news, current events, and culture to public radio listeners around the globe. You'll hear improved news coverage and classical music programs in the next few months, along with more youthful and culturally diverse programming. Salyer feels that "repositioning will help the network better meet tomorrow's challenges." The new name and corresponding logos will be introduced at a public radio conference in San Antonio, Texas on April 9.

Mailbag

If you can't live without Country and Western music, you'll love *MT* reader Henry Studebaker's *The Traveller's Country Music Radio Atlas*. The newly published 1994 edition is a concise road atlas that pinpoints every Country station around the nation for you to enjoy. It's a perfect companion when driving the Interstates. At $4.95 and $1.25 for shipping and handling, Studebaker's book is a steal! It's available from Hanalei Publishing, P.O. Box 369, Port Hueneme, CA 93044-0369.

Many thanks to Dr. Bruce Elving, publisher of the *FMedia!* newsletter and the *FM Atlas*, for the information and inspiration necessary to complete this month's column. Until next month, happy trails! That's all folks! MT

John Fulford

Federal Monitoring in the 1990's

A Brave New World

I started monitoring the feds back in the middle 1960's with a tunable Regency MonitorRadio. There were two versions—both tube types. One was for the house and the other was vibrator driven and was in the car. I still have them both in my garage. After college, I ended up with a major law enforcement agency in South Florida until 1985. When there, I worked as the chief technical agent for the narcotics and organized crime unit, doing wiretaps and electronic surveillance. I was also assigned to diplomatic security functions where I got to interface with the various federal agencies and work with their communications equipment.

Listening to all parts of the spectrum, monitoring from DC up towards light, I hear a lot of strange things on the federal bands. And it is evident that new radio systems are showing up in all frequency ranges.

Conventional Monitoring Slowly Draws to an End

Less and less clear voice traffic is being heard on the "old" federal bands. Increasingly, agencies are going to either encrypted radios or are reducing their radio traffic. Nearly every FBI and Secret Service vehicle, and even the DEA (Drug Enforcement Administration) are going to cellular (!?) phones. Now that the ECPA (Electronic Communications Privacy Act) is in force, more and more tactical traffic is being done on the cellular bands—the feds use group B (the Bell System) for their cellular carrier—so we can be careful *not* to listen there for them and violate the law.

It has been rumored that some federal agencies are using SMR (Specialized Mobile Radio) systems for their communications (translate: *trunked*). I have heard this not only here in South Florida but also out in the midwest. Cellular and SMR radios look a lot alike—and so do the vehicular antennas. Perhaps some of you can help me on this.

Down here in Florida, the DEA and the Florida Department of Law Enforcement, along with various military agencies such as the National Guard, have been reported on a trunked system conducting their statewide anti-narcotics task force. They are reported on the following trunked system frequencies:

BASE	MOBILE	PL/DPL	SITE
861.8125	816.8126	None	Statewide Florida
862.8125	817.8125	None	Statewide Florida
863.8125	818.8125	None	Statewide Florida
864.8125	819.8125	None	Statewide Florida
865.8125	820.8125	None	Statewide Florida

Also, the DEA and the FDLE have been reported using a stand alone single channel repeater using the frequency pair of 853.3875/ 808.3875 MHz using clear voice and digital scrambling.

Another joint federal/state anti-narcotics program has also been confirmed in use in Florida. The following frequencies are registered to the State of Florida Joint Task Force:

CHANNEL DESIGNATION	BASE XMIT	BASE RX	PL
Mutual aid calling channel	866.0126	821.0125	None
National Guard Operations	866.4250	821.4250	None
Operations-Channel 1	866.4750	821.4750	None
Tactical 1	866.5125	821.5125	None
Operations-Channel 2	866.9750	821.9750	None
Tactical 2	867.0125	822.0125	None
National Guard Operations	866.9250	Simplex	None
National Guard Operations	867.4250	Simplex	None
Operations-Channel 3	867.4750	822.4750	None
Tactical 3	867.5125	822.5125	None
National Guard Operations	868.4250	Simplex	None
Military Judicial Police	868.4500	Simplex	None
Surveillance	868.4750	Simplex	None
Tactical 4	868.0125	823.0125	None
National Guard Operations	868.5000	Simplex	None
National Guard Operations	868.9250	Simplex	None

To effectively monitor federal agencies in the future, we are going to have to get away from the scanner mentality and get into more exotic systems. I heard clear voice on an FBI channel *for the first time in over a year* near the end of January 1994. It was on 167.2125 MHz (the agent identified the channel as Bravo-3). He was calling in tags in the clear. The base station was responding with DES format encryption—they will never learn. This channel was also in use in Atlanta during last year's *MT* convention. We heard some *verry* interesting surveillance traffic from the convention site—all in the clear.

While we are discussing the FBI, I need input from you readers as to what is evolving with the FBI radio system. The old system is being changed as we read this. As mentioned in this column last month, repeater inputs and outputs are being flipped around. Simplex channels are now in repeater use. Though some of this information may be repetitious, the following break-down may make the frequency usage more understandable. The FBI has used the following channels for their Resident agencies (R/A) in the past:

CHANNEL DESIGNATION	BASE XMIT	BASE RX	PL
R/A Group 1	165.6525	Simplex	167.9 Hz
R/A Group 2	165.9250	167.9250	167.9 Hz
R/A Group 3	165.9000	Simplex	167.9 Hz
R/A Group 4	165.5875	167.2875	167.9 Hz
R/A Group 5	165.9500	Simplex	167.9 Hz
R/A Group 6	162.7375	167.2875	167.9 Hz
R/A Group 7	162.7625	Simplex	167.9 Hz
R/A Group 8	163.9125	167.7250	167.9 Hz

The FBI Narcotics Task Force has been reported on the following:

CHANNEL DESIGNATION	BASE XMIT	BASE RX	PL
One	170.8000	Simplex	167.9 Hz
Two	170.8250	Simplex	167.9 Hz
Three	170.8500	Simplex	167.9 Hz

Down here in South Florida, the following FBI frequencies have been reported in use within the past few months:

CHANNEL DESIGNATION	BASE XMIT	BASE RX	PL
Organized Crime	164.0500	Simplex	167.9 Hz
Counterintelligence	163.8375	Simplex	167.9 Hz
Organized Crime	163.9875	167.2625	167.9 Hz
Organized Crime	163.9250	Simplex	167.9 Hz
Organized Crime	163.9375	Simplex	167.9 Hz
Government Crimes	163.9500	Simplex	167.9 Hz
Fugitive Program	163.9625	Simplex	167.9 Hz
Alpha 1 Program	163.9625	167.2375	167.9 Hz
Government Crimes	163.9875	Simplex	167.9 Hz
Unknown use	165.2875	Simplex	167.9 Hz
Classified use	165.3625	Simplex	167.9 Hz
Body surveillance	166.4625	Simplex	167.9 Hz
Bravo 3	167.2125	Simplex	167.9 Hz
Car to car	167.4125	Simplex	167.9 Hz
Organized crime	167.2875	Simplex	167.9 Hz
Room surveillance	167.3425	Simplex	167.9 Hz
Tactical 1	167.3875	Simplex	167.9 Hz
Administration	167.4750	Simplex	167.9 Hz
Room surveillance	167.4850	Simplex	167.9 Hz
Organized crime	167.4375	Simplex	167.9 Hz
Car to car	167.5000	Simplex	167.9 Hz
Vehicle tracking	167.5600	Simplex	167.9 Hz
Tactical-Ch 4	167.5625	Simplex	167.9 Hz
Operations-Alpha	167.5750	Simplex	167.9 Hz
Car to car	167.6000	Simplex	167.9 Hz
Operations-Bravo	167.6875	Simplex	167.9 Hz
Surveillance	167.6500	Simplex	167.9 Hz
Embezzelment	167.9375	Simplex	167.9 Hz

Until the Department of Justice can finish with the switching of the FBI frequencies, it will be difficult to publish a complete list; however, we will publish current updates as they become available. For you Federal File monitors up in the New York City area, check the frequency range of 148-151 MHz. I have a confirmed report of 150 MHz activity there. Some frequencies in the 171-174 MHz range are also being used.

There are a few standard frequencies for the FBI:

National Common Channel-Channel 4 167.5625
National Special Case Incident Repeater:
163.8625 Repeater out/167.5375 Repeater in
167.5375 Repeater out/163.8625 Repeater in

The Department of Justice (FBI) has been issued the following frequency ranges for their *exclusive* use:

163.8375 to 163.9875 MHz inclusive
167.2125 to 167.7875 MHz inclusive

If you intercept a signal in these ranges and you can determine that the subaudible PL tone is 167.9 Hz, you can pretty well assume that it is the FBI.

The following bands are assigned for radio control and point-to-point links:

412.0000-412.9750 MHz	414.0000-414.9750 MHz
419.0000-419.9750 MHz	1710.000-1850.000 MHz
14500.00-14714.5 MHz	

These frequencies are assigned to the Department of Justice for the use by all of its agencies. For example, there are numerous links in the 406-420 band here in South Florida. Most of them are for the Border Patrol and Immigration Services. Some of them are for the FBI. Example, there was a link from Miami to West Palm Beach for many years. It went from Miami north on 414.500 MHz. It ended in West Palm Beach where the R/A in WPB monitored Miami communications. It went back south on 419.450 MHz. By monitoring either side, one could hear all of the Miami and WPB traffic.

This was one of the first federal channels I started listening to back in the early 1970's. It is gone now, but there are still many of these point-to-point links in use throughout the country. By monitoring any of the dozen or so audible links here at my QTH, I can hear all of the traffic on the 162-163 MHz Border Patrol channels. These links criss-cross the State of Florida, so it should not be hard to hear one.

Just a quick note to those of you visiting South Florida: The Border Patrol becomes active almost every night around 0001 hours, local time on 163.725 MHz. The alternate channel is 163.625 MHz. They are using a boat with a surface radar docked just off the coast of Palm Beach to look for illegal alien smuggling vessels from the Bahama Islands. They generally give their latitude/longitude over the air for the land units. Real entertaining.

I can predict that in the near future, however, the federal monitor will not only have to have the capability to monitor point-to-point links, but a lot of them use will multiplexed systems. It's not particularly difficult or expensive to extract the information from these links; it's just a matter of proper equipment.

A lot of federal communications use satellite systems, both military and commercial. We are going to have to look for the satellites, find the transponders, and make sense of the information. Did you know that the National Crime Information Center (NCIC) computer is up there on one of the satellites for anyone to copy it?

Feedback, Please

As you did for the previous columnist, I ask for your continuing support for the Federal File. This is a two-way street. Forward your questions, replies, and information to me in care of *MT* in Brasstown, or leave me E-Mail: Compuserve 73527,1033. I will have my Internet address for you next month.

I have two challenges for information from you to start off the exchange. First: on the roof of nearly every Federal building that has a Secret Service office in it, there is a satellite dish. They are Ku band and are full transmit and receive. They seem to be looking towards the southwest (at least here in Florida they do). My sources tell me that the Secret Service and the IRS use this system. What satellite are they on, what transponder, what format, etc.? This could make for some interesting listening.

Next, I just saw a news story taped over in Nassau in the Bahamas. There is a Ku dish on the roof of the American Embassy. It, too, is full transmit and receive. I understand this is part of the Diplomatic Communications Service. What satellite, transponder—you know the drill—are they using? When the American Embassy in Beruit was bombed several years ago, there was a very short news take on a brave soul going back into the building to retrieve the satellite terminal, which was the size of an attache case. The news said it was the DCS system and could not fall into enemy hands.

That's it for this month. Let me know that you want to see in this column—it can only make monitoring more enjoyable for all. MT

73's John

Jean Baker, KIN9DD

To add new pizzazz to an old routine ...

Accessorize!

Welcome aboard! During the '93 Convention in Atlanta, quite a few attendees asked me about activities and accessories to enhance aero monitoring. While we've previously discussed how to send reception reports, there are quite a few other things you can do to add some zest into your monitoring. So don't just sit there....

Keep a **log** of what you hear. There are many logbooks on the market for monitors of all different types of radio services, including aero comms. If you can't find what you want in your local electronics outlet, make up your own log sheets. Here's an example of a simple one:

TIME
FREQUENCY
AIRLINE
SELCAL
REMARKS
RECPT. RPT. SENT?
DATE
FLIGHT #

These can be as simple or as elaborate as you want to make them. Some monitors like to have a separate space for points of departure, destination, etc. But remember, it's purely an individual's choice as to how he/she wants to set it up. There are no hard-and-fast rules. You can use a typewriter to make up your sheets or utilize your PC to help you keep a log, but we'll go into that a bit later.

Maps, charts and other related guides can lend a new depth to your listening. Well, what exactly is available, you ask? Start with an Airport Diagram of your local or nearest airport, which can help you follow an aircraft's progress as the pilot talks to ground control while taxiing. It will also list frequencies for the ATIS, Tower, Ground, and Clearance Delivery.

Use Area Arrival charts of your locale to follow the flights monitoring as they make their approach. Enroute Low and High Altitude charts make following a coast-to-coast flight much more realistic and immediate if you use Oceanic Planning charts while monitoring high frequency air/ground communications, it will be much easier to visualize where a flight actually is, because you can actually see the waypoints listed from which the pilot is reporting or how about an Enroute chart that covers the Pacific, Australasia, and the Antarctic?

A *Global Flight Handbook* is especially helpful for USAF High Frequency Systems. It also contains civil and military weather and emergency frequencies.

Perhaps a Jet Navigation chart to hang on your wall would interest you. These are really great full-color charts that contain navigation beacons, military special use airspace and full geographic information. They cover the USA in three charts: One for west, one for central, and one for the eastern region.

The DOD IFR Supplement provides frequencies and info for all U.S. military airfields, ATC centers, navigation beacons, and civilian airports. It also lists major airfields in Canada and Mexico. If you're seriously into military aero monitoring, the Military Training Route Handbook is for you! In it, you will find very detailed listings of low-level military training routes and air refueling tracks near your location, as well as route descriptions and frequencies.

All of the above maps and charts and more can be obtained from Aerial Development of New England, P.O. Box 661, Bangor, ME 04402-0661. Their prices are low and the selections are vast! Tell them you saw it in *Monitoring Times!*

Jean Baker

Partial view of Delta's radio room at the Communication Center in Atlanta, GA.

Do You Have a Computer?

If you're an aero monitor with a PC, you can either make up your own logbooks with the aid of any word processing program, or you can buy a logbook software program. They are available in both shareware and commercial versions.

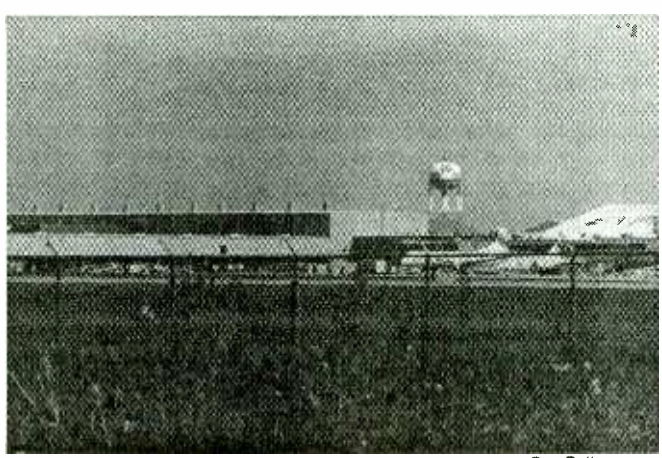
With a PC, you can fulfill that desire to try flying a 747, a 737, an F-14, a Zero; or, how about a Lear Jet or a Sopwith Camel? In addition to flying the big birds, you can try your hand at being an air traffic controller. Most flight programs are **not** games, but are instead very realistic simulations made to give you the feeling of being in the left seat of an airliner or controlling a sky full of planes. As a matter of fact, there's a professional version of one simulation that's used as a training aid for air traffic controllers.

If you have a modem, don't forget that there are quite a few BBSs which cater to aeronautical buffs.

Visit An ATC Facility

Living within a reasonable distance from an airport with a control tower, an air traffic control center, or flight service station can lend itself to the possibility of a tour. Simply call the facility's Air Traffic Manager and just explain that you're an aviation comms monitor and would be very interested to see what controllers actually do. Most Air Traffic Managers are extremely helpful and more than pleased to arrange for you to see the controllers in action. Please call well in advance of when you would like to come and don't just show up on the doorstep expecting a tour!

If you're not close enough to an ATC facility or are otherwise unable to visit one, find out which one is closest and write to them (if you're not sure of the nearest one, drop me an SASE with



Don Dettenmayer

Airborne Express home base in Wilmington, OH.

your request and I'll find out for you). Here again, explain that you monitor aero comms and would like to have a frequency sector chart of their control area.

Join A Club

With the plethora of monitoring clubs listed in the back of *Monitoring Times* each month as well as each of their specialty areas covered, you can have your pick of some mighty good clubs and associations. Clubs can be an excellent place to trade frequencies, listening tips, and best of all, it's a chance to meet others who are also "plane crazy"!...

So you see, there's a lot more to do with monitoring other than just sit with your ear glued to your receiver. How much enjoyment you get out of it also depends on how much you put into it!...and I'm not talking dollars here.

Frequencies

Although most airlines will use a different company frequency in each city they service, there are some companies who use the same one everywhere. Here are some for your collection:

FEDERAL EXPRESS: 131.825 and 131.925
USAIR: 130.100 (460.700 on the ramp freq)
BLUE STREAK USAIR's commuter service): 130.050
RYAN: 130.150
UPS: 130.525
AMERICAN AIRLINES: Uses 129.200 and 129.225 in many cities. To contact their maintenance base in Chicago, they call on 130.250. Their ramp frequency is usually 460.775.
UNITED AIRLINES: 129.300 and 460.725
GOODYEAR BLIMP: 123.050, 132.000, 464.500, and 464.550
SOUTHWEST AIRLINES: 130.125
AMERICAN TRANS AIR: 131.525
AIR-TO-AIR CHIT-CHAT: 123.450
(This is an *unofficial* frequency for pilots to use, and in some instances, they've been fined when caught. The conversations can be quite spicy and explicit and **rarely** pertain to flying!)

Photos

A picture is worth a thousand words, and we always appreciate photos from our readers. They were contributed by Bob Burdick (CT) showing an aircraft at Delta's Maintenance Center; Don Dettenmayer (OH) sent the shot of Airborne Express' (ABEX) Home Base in Wilmington, OH; and the photo of Delta Air Lines' Radio Room was one I took during our Convention tour.

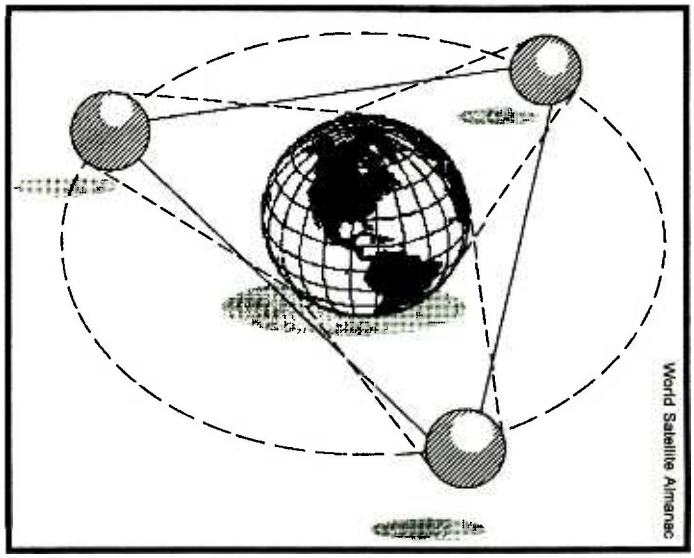
That's all for now. Next time we'll have some more airline addresses, company frequencies, military tail numbers, and learn how to get the best results when monitoring the shortwave (HF) aero bands. Until then, 73 and out Jean Baker.

MT

Delta 727

Bob Burdick

DBS Era Arrives



After its successful launch on December 17, 1993, DBS-1 was positioned into geosynchronous orbit and two media giants positioned themselves into orbit around America's checkbooks.

One would have to have spent the last six months in a media-free zone not to be aware that the era of Direct Broadcast Satellite service has been on the march. This month DirecTv, a division of General Motors-Hughes Electronics, will begin sending 75 channels of programming direct to homes. Reception will be via an 18-inch dish into a Digital Satellite System (DSS) receiver. Retail cost is pegged at around $700 and will be available in many large national chain stores all over the country.

Additionally, United States Satellite Broadcasting (USSB), a broadcasting giant in its own right, will be offering a similar service. How similar? Well, they'll be on the same satellite and use the same DSS reception system (built by Thomson Consumer Electronics and carrying the RCA label) and carry basically the same programming.

If you are currently a dinosaur-style land-based cable viewer, you're already familiar with the standard programming fare. If you're a C-band based viewer you're probably wondering what all the fuss is about. Well, the fuss has to do with that little 18-inch dish.

"So, just how is the old-time TVRO industry taking this?"

Being able to place this little, unobtrusive antenna on virtually any out-of-the-way place on a house, apartment, condo, high-rise or, indeed, office building, is nothing short of revolutionary. Swept away forever are the restrictive covenants and zoning obstacles which had bedeviled the TVRO market for so long. The fact that this is a non-steerable dish with no other moving parts, makes it essentially trouble free, eliminating costly service calls from satellite dealers.

So, just how is the old-time TVRO industry taking this? In some quarters there is a brave "We can take 'em" attitude, and in others it's wholesale panic. Many dealers have rushed to qualify for the rights to sell and install the new DBS systems and see the opportunity as simply a new market niche which had up 'til now been unavailable to them. The less sophisticated are wringing their hands and counting the days until their inevitable appearance before a bankruptcy court. Both DirecTv and USSB have actively courted the current universe of TVRO dealers.

Flexibility is a key to DBS's hoped for success. The DSS hardware is said to be adaptable to the 16:9 aspect ratio HDTV screen; extra hardware will allow independent DBS viewing from a second household TV set; low priced hardware investment makes it a deep challenge for the C-band sales competition; and program packages are competitive with any offered by old-fashioned cable TV.

Still, it's too early to predict the impact these new kids on the block will have on the current TVRO and cable markets. It is, however, easy to predict its effect on the unserved areas of the country and the zoned and covenant restricted. Before it's over, millions of customers will be on the DBS billing list. And that's good news to RCA which has exclusive rights to produce the first one million DSS units.

After nearly a decade of vigorous campaigning the TVRO market amounts to a little under two million installations. The two DBS players just now hitting the market could exceed that figure in their first year. Even so, that compares with the tens of millions of homes now wired for cable.

Now for a look at the bottom line. As of early February, working production models of any DBS reception equipment had yet to be seen. Assuming that it's possible for the manufacturers to meet their deadlines, here's how the costs break down: Retail cost of the entire unit is said to be $700. Additional equipment to allow subscribers to have two independently tuned receivers will be another $200. Professional installation of the antenna and receiver is projected to cost an additional $150 to $200. That means the basic DBS system will cost $900. Basic programming packages start at $23.95 per month. The top programming package from USSB is $34.95 per month.

If you are in an area which is unserved by cable and does not allow C-band sized dishes, this system is what you've been waiting for. If you are on a cable system with primitive channel capability (25 channels or less) or unsympathetic selection (fails to carry programming you'd like to subscribe to) DBS should be for you. But, DBS may still not be what you want. Even with its highly touted 75 channels, DBS may not have the kind of programming you're looking for.

I have yet to see any indication that either USSB or DirecTv will carry the dozens of small but interesting channels (including remote sports and news feeds) available to TVRO users with steerable dishes, to say nothing of the hundreds of audio subcarriers both FM and SCPC which C-band dish owners have always enjoyed. As noted many times in this column, off-the-shelf C-band systems can be had for as little as $1,500 installed or less than $1,000 if you do it yourself and know just a little about satellite TV. This still gives you the option to subscribe to anything available to the DBS market at comparable prices.

And what about C-band satellite subscribers: will they be abandoned? Not at all. The 1.6 million current subscribers represents a nice paycheck for cable programmers and the new crop of powerful C-band birds have a lifespan of at least twelve years.

The Mysterious Disappearance of Anik E2

January 20 at 9:35 AM PT, Canada's Anik E2 satellite began spinning out of control. Efforts by ground controllers were thwarted when a back up system apparently failed as well. The effect was not only the disruption of video programming, but radio and data transmissions were lost as well. Canadian Press, Canada's wire service,

was also lost. A powerful geomagnetic storm was the apparent cause, according to several sources.

The event was to Canada's electronic superhighway what the January earthquake was to California's freeway system. Without warning, a ten year old system of communications is destroyed. Most services have found temporary homes on Anik E1 and there is talk of bringing out one of the more recently retired American C-band birds to take the place of E2. Still, it's a bit unnerving to see what can happen in an instant to the expensive telecommunications plans of an entire country. I'm sure it has crossed the minds of more than one executive of the abovementioned DBS services what *they* might face if their one satellite, serving millions of customers, should tumble out of control.

The Arrival of Telstar 401

The speed with which events happen in the world of satellite TV was made quite apparent when Telstar 401 went into service in early February. Channel 8 is now the home for the PBS network as viewed by the home dish owner, and it marks an official recognition of the backyard dish as a real part of the PBS market. The powerful 16 watt transponders make this the best looking PBS picture ever. The Ku band side of T401 still has all the different PBS feeds we have been used to but they will "disappear" in the fall when PBS implements their compression transmission techniques.

MAILBAG

• Long time *MT* reader Bill Perrelli of Hamden, CT, writes that he put together a neat weather satellite receiving system and enjoys monitoring SCPC signals with his PRO-2006 scanner. He would like to know more about monitoring other modes on the satellites.

Bill, all paths to experimental voice and data reception seem to lead to Tom Harrington. All publications and products with which he is associated are sold through the Grove catalog or through many of the other *MT* advertisers. Publications of interest in this area are: *Tune In the Hidden Signals on Satellite Television; Tune to Satellite Radio On Your Satellite System; The RTTY Listener* (Special Edition Compilation). The first two titles are by Harrington and the last one is edited by Fred Osterman, a close Harrington associate. All the neat hardware for such reception, such as the M-1200, SCPC 300-C and more, are built by Universal Electronics: you guessed it, a Harrington company.

• Ray Smith of Sulphur, LA, is concerned about the Fox network getting the NFL broadcast rights for next year's football season. It seems there's a certain NFL team in his state whose games he may miss. He writes, "...It occurs to me that a satellite dish may provide a solution to my problem..."

Ray, it's possible that there are a number of NFL fans who could be missing the action of their favorite teams with the Fox Network development. You're right that a dish could be the solution to the problem. For the last 15 years TVRO sports fans have enjoyed picking their favorite NFL matchups and, unless the NFL sees fit to change its policy, the broadcasts will continue to be transmitted in the clear on a variety of satellites. If you've been reading this column for any length of time you'll have learned lots of tips on setting up a nice cheap, workable TVRO system for under $500.

• Ralph Hart, from North Los Angeles, CA, is an *MT* subscriber who is also a long time satellite TV dealer. Having put in systems for many "household names," Ralph had a number of excellent comments for the TVRO hobbyist. His recommended system consists of the following: A Winegard Quadstar dish, a Chapparal IRD receiver, a California Amplifier LNB (25 degrees C band and .6 dB Ku band LNB) and HTS actuator.

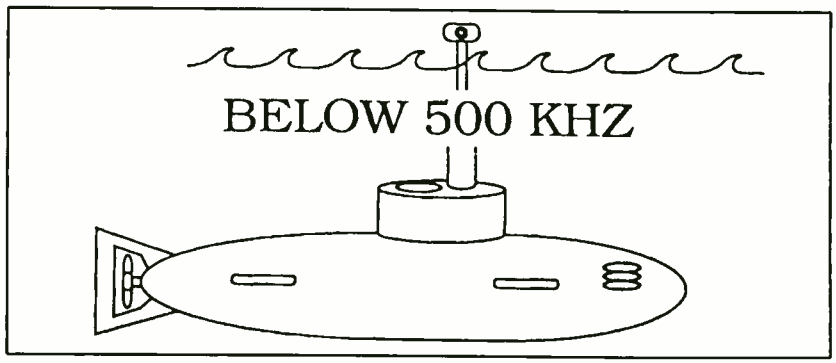
He reminds me that RG-6 cable for the LNB to the receiver is no longer available in solid copper braid but is routinely found with a full aluminum braid. The important thing, he says, is that the cable is "swept to 1500 MHz." This insures that the cable will be able to handle the 950 to 1450 signals from the LNB. He also notes that running all cables from the house out to the dish in a stretch of PVC pipe eliminates the chance of rodents eating through the insulation of the wire bundle, requiring new runs of wire to be laid.

For SCPC reception he recommends feeding the baseband output from the satellite receiver to a scanner which covers the 950-1450 MHz band. He uses an AR1000 or an AR3000. Using this, he says, some SCPC signals appear to be very low. This is because it's actually too strong and overloading the front end of the scanner. To eliminate this problem he recommends putting a 20 dB variable attenuator between the receiver and the scanner to reduce the overloading signal. He also recommends an A/B switch to allow switching between the satellite receiver and your outdoor scanner antenna.

My thanks to all the readers who send in their comments, clippings, photographs and even corrections on things they read in this column. It all makes for a more informed readership. MT

Kevin Carey, WB2QMY

Shifty Tactics



A sketch by Brian Gadbois, Rochester, NY.

Would you like to double the number of beacons you hear? This month we'll discuss a tuning technique that can help you do it—I call it the **IF Shift** method. It will improve weak signal reception and also help you separate U.S. and Canadian beacons that are transmitting on the same frequency.

The ability to separate stations is possible because of a key difference that exists between U.S. and Canadian beacons. That distinction is **Identifier Pitch**. As a general rule, Canadian beacons use a low-pitched (400 Hz) tone, while U.S. beacons transmit a 1020 Hz tone. (You can easily tell them apart by ear.) The protocol in other countries may differ, *but virtually all beacons will use one of these two tones.*

The trouble occurs when a 400 Hz beacon and a 1020 Hz beacon share the same carrier frequency. Under these conditions, tremendous interference can result, making copy very difficult for the DXer. Here's where the IF Shift method can help. We can use it to selectively hear *only* 400 Hz tones or *only* 1020 Hz tones, thereby ignoring (for the moment) a competing station.

To use the IF Shift method, your receiver must have an **IF Passband** control (or "IF Shift"), and a **narrowband filter** (500 Hz or less). I have used a Drake R8 with excellent results, but other tabletop receivers should work just as well.

Table 1: Beacon Loggings

FREQ	ID	Location	By
230	AQE	Greenville, NC	P.C.
274	CYH	Springerville, AZ	P.W.
275	CJY	Utica, NY	P.C.
283	IML	Imperial, NB	P.W.
284	MXR	Raton, NM	P.W.
286	GD	Goderich, ONT	P.C.
298	HL	Cape Henlopen, DE	R.B.
316	C	Crescent City, CA	P.W.
329	CH	Charleston, SC	R.B.
344	CL	Cleveland, OH	R.B.
355	TCO	Tumaco, Colombia	P.C.
356	ME	Meridan, MS	P.C.
362	BF	Seattle, WA	P.W.
368	L	Toronto, ONT	R.B.
385	EMR	Augusta, GA	R.B.
390	BR	Burlington, IA	P.C.
391	DDP	San Juan, PR	R.B.
394	OR	Chicago, IL	P.C.
396	ZBB	Bimini, BAH	R.B.
404	HEQ	Holyoke, CO	P.W.
405	YXL	Sioux Lookout, ONT	P.W.
413	OEG	Yuma, AZ	P.W.
421	EF	McKinney, TX	P.C.
521	INE	Missoula, MT	P.W.
521	TVX	Greencastle, IN	R.B.
526	ZLS	Stella Maris, BAH	P.W.

Follow these steps to use the IF Shift method:

1) Set the receiver's mode switch to **USB.**
2) Tune to the exact carrier frequency ("zero beat") of a beacon sending 1020 Hz modulation. Fortunately for us, finding the exact carrier frequency is easy to do since beacons are assigned to exact 1 kHz multiples (344.00 kHz, 345.00 kHz, and so on).
3) Select a narrowband filter setting (500 Hz or less).
4) Starting with the IF Passband control at the 12 o'clock (center) position, slowly turn it until a sharp peak in the keyed beacon signal is obtained. Make a note of this setting. (On my R8, this occurs just to the left of the 12 o'clock position.)

   Tune to the exact carrier frequency of a beacon sending 400 Hz modulation and repeat the peaking procedure. (On my R8, the peak for 400 Hz occurs near the 10 o'clock position.)

You should now have two IF Passband settings established: one for 400 Hz and one for 1020 Hz. Armed with this information, you can now dial up any beacon frequency and check both settings of the IF Passband control for hidden signals. You might be surprised at what's lurking beneath some of the locals!

Omega Update

Omega may be in trouble. As I reported last month, Australia, one of the eight host countries for Omega, has notified the United States that they will end the bilateral agreement concerning their participation.. At this writing, negotiations for their continued participation have been unsuccessful. Here's an excerpt on the subject from a recent Coast Guard bulletin:

"Should Omega station Australia cease operations, the remaining seven Omega stations will continue to operate. A seven station system should provide satisfactory global Omega coverage when all stations are on-air. When individual stations require off time for routine and emergency maintenance, global coverage will be degraded. This will potentially affect all Omega users, since coverage degradation will be regional, depending on which station is off-air at any given time. The Omega partner nations will work to develop revised operating procedures that will minimize the impact of necessary off-air time, however some degradation is inevitable."

On-The-Air

There are a lot of loggings to pass along this month, and I'd like to thank Ray Backus (VA), Perry Crabill, Jr. (VA), and Peter Warncke (CA) for their contributions. All contributors are identified in by their initials in Table 1. New loggings and especially beacon photos are always welcome. Send yours to *Below 500 kHz, c/o Monitoring Times,* P.O. Box 98, Brasstown, NC 28902.

Longwave Intrigue

There have been a few reports of RTTY-style, digital transmissions being heard in parts of the regular beacon band. Rick Sealey (NC) heard one of these signals on 293 kHz and was kind enough to send a cassette recording along to me. He reported hearing the signal for several hours, but strangely, the next day it disappeared.

One theory is that these are test signals for DGPS, a souped-up addition to standard GPS which uses existing beacons to send out correction data. Normally, the correction tones are sent in step with the beacon's Morse ID, but during installation, the data may be turned on continuously for test and alignment purposes. Any other information or actual loggings of these signals would be appreciated.

End Notes

Spring is a good time to check your outside antennas for winter damage and make any necessary repairs. With a good antenna system in place, the warmer weather will still give you the best of monitoring times. *See you next month!* MT

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HP-400	400-1500 MHZ Usage	69.
HP-800	800-2000 MHZ Usage	69.
BP-3	Above 3 filters *(SAVE $30)*	$177. ~~207.~~

Accessories

A	*CC-90*	Case for all models	12.
B	*TA-90*	Telescope BNC antenna	12.
C	*TA-90-L*	Telescope elbow antenna	16.
D	*RD-150*	150 MHZ rubber duck	16.
E	*RD-2750*	27-50 MHZ rubber duck	28.
F	*RD-800*	800 MHZ rubber duck	29.
G	*M-207-IC*	Interface cable for MFJ-207	10.
H	*P-110*	200 MHZ, 1x, 10x probe	39.
J	*LP-22*	Lo-Pass, audio usage probe	25.
K	*DC-10*	Direct, 50 OHM probe	20

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Ike Kerschner, N3IK

Put Your Radio to Work

Last month we looked into some fun activities that can be carried out at little or no expense. Our adventures this month explore some fairly esoteric and sometimes more expensive activities.

Ever see radio signals perform real work? Well, they can, and a lot of hams employ this radio muscle as a regular part of their hobby. The most common form of radio muscle is Radio Control in which a mechanical device (typically, a model airplane, boat or car) is operated by a radio signal.

Briefly, a radio transmitter sends a signal that contains digital information to a receiver which decodes it and sends the various commands to the mechanical device (servo mechanism), which in turn provides the power to steer, increase speed, or perform any number of mechanical operations. A set of sticks or a steering wheel and some switches on the transmitter (fig 1) connect the operator to the remotely controlled device. (The *ARRL Handbook* has an excellent section on Radio Control).

While there are many ready-to-fly model planes and cars available on the market, the average radio control operator (R/Cer) builds his own from a kit or plans. If you want to get into R/C, I suggest you find a local group of modelers who can help you learn to use your radio gear, and assist you in your model construction efforts. A visit to any hobby shop will put you in contact with your local group.

In model aviation there are several different types of models to consider. First is the gas powered model which may be as small as 18 inches in wingspan up to 12 or 15 feet or more. A newer method of propulsion is the electric motor. Electric power is becoming increasingly popular as motors become more efficient and batteries lighter. The electric model does not create a lot of noise so is more readily accepted in populated areas.

The original silent model is the sailplane or glider. Model sailplanes use no engine and take advantage of air currents to stay aloft. They are usually sent aloft with a good hard hand toss, a device called a high start (surgical tubing connected to strong fishline) or a winch (electric motor cranking a drum loaded with heavy fishline).

Once aloft, sailplane pilots use radio control to try to find air currents that will keep them in the air. There are two basic currents. Ridge lift is generated by air flowing against a hill, building or other high obstruction. Ridge flyers usually launch their model from the top of the hill and fly back and forth in the lift generated as the wind strikes the hill. Thermal flyers launch the plane using hand, high start or winch and then search for rising air currents created by warm areas on the surface of the earth.

Either type of flying is a lot of fun, and planes can be kept aloft for hours in good conditions. Special high tech devices are now being employed to send data about thermals back to the pilot (telemetry) so he can maintain altitude.

In a new twist, advanced flyers are beginning to mount TV cameras in their models. When the received image is used to control the model, it has become a true RPV (Remote Piloted Vehicle). Many flyers are also taking photos from their planes, which sometimes prove useful for scientific research or for providing information about roads and rivers, etc. So you see, besides being fun, R/C can be a productive hobby.

Going Higher

A number of years ago, I worked for a firm that built television repeaters (translators). One interesting project could well be applied to amateur radio. We built a repeater which received TV microwave transmissions and rebroadcast them on Channel three (VHF). The repeater, along with a generator and 60 day supply of fuel, was carried aloft to ten thousand feet by an aerostat balloon (balloon with fins that kept it facing into the wind), where it provided TV for the entire country of Saudi Arabia.

It seems to me that such a device could be built to carry amateur repeaters aloft and provide reliable long distance communication. Using solar power, it would be possible to operate over extremely long periods of time. The only difficulty, though not insurmountable, would be to ensure safety to aviation. Of course, such a device would not work well in cold climates (at least during winter).

At any rate, it would be an interesting project to consider. Something of this nature has been tried by several groups of amateurs who provide VHF/UHF FM and Amateur FSTV repeaters via free flying balloons. Most of the amateur publications carry information on such activities.

Vanity Callsigns

For a brief period in the late 70's, Extra class amateurs were permitted to choose a specific 1 x 2 callsign (that is how N3IK came about). If you wished to apply for one, the FCC asked you to list alternative calls in case the one you wanted was already taken.

Looks like we are headed back in that direction, only this time any class license will be able to request a vanity call. The call must be in your assigned call block. So start thinking about what call you would really like and be ready to jump on it as soon as the program is announced, perhaps before the end of 1994. Keep watching your local PBBS and the various ham magazines and newsletters for updated information.

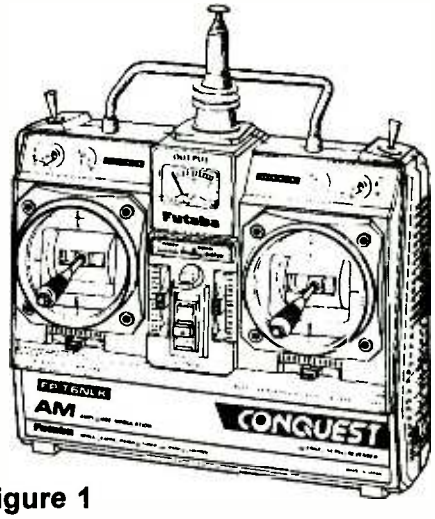


Figure 1
Radio control is at your fingertips.

Band of the Month: 30 Meters

Last month's column was a bit long, so I dropped my overview of the amateur bands. Let's pick it up with the 30 meter band, which is one of our newer ham bands, created in 1979 at the WARC conference.

The 30 meter band extends from 10,100 to 10,150 kHz. Only narrow band modes are permitted. CW only is allowed on 10,100 to 10,140, and RTTY and CW on 10,140 to 10,150 kHz.

Thirty meters exhibits some of the better characteristics of both 40 and 20 meters. DX is easily worked using fairly low power. In fact, power is limited to 200 watts for all hams on this band.

Antennas for 30 meters are of modest size; a half wavelength being only 42 feet 6 inches in length. Most amateurs use dipoles or verticals on this band, although a few beam type antennas are in use.

Contest activity is not permitted (by general agreement) on this or any of the WARC bands, which makes 30 meters a real haven for the rag chewer. In some instances I have engaged in two hour and longer rag chews on 30 with overseas hams. So it is a great place to make new friends and carry on long distance skeds.

One of the more unusual contacts I have had on 30 meters was a three way with a station in England and another in Australia. The VK station was extremely weak, but perfectly readable. Normal range on this band during daylight will be on the order of 1000+ miles and during the evening hours intercontential contacts are common fare.

Novice/Technician operation is not permitted on 30 meters.

Rob Leonard's

Ham DX Tips

Spring is upon us in the Northern Hemisphere, and so is amateur radio's "second season" of DX. This is the time when VHF and UHF conditions improve to their peak in May and June, so be sure to check the frequencies of 144.200 and 50.125 MHz SSB. Also, on the HF bands warmer temps in the Northern Hemisphere mean an increase in Special Events operations and remote operations. So, let's get started on this month's 'round the world DX tour.

ARMENIA The new prefix in use from here is now EK and 4J, replacing the old prefixes RG and UG. ***AZERBAIJAN*** Another country with new prefixes for amateur callsigns, 4K5 to 4K9 and 4J will replace the old prefixes of RD and UD. ***ANGOLA*** D2EGH is on or near 14225 kHz SSB at 2000 UTC most days. His QSL address is: CT1EGH, Nuno Vasco Matias Sousa, Rua A 13-B Quinta Nova, P-2460 Alcohaca, Portugal. ***BANGLADESH*** Look on 14185 kHz for S21AM starting at 1200 UTC daily. QSL to Manju, P.O. 4000, Dhaka, Bangladesh. ***BELARUS*** The new prefixes of EU through EW are in use by amateurs located here, replacing the RC and UC prefixes which some hams here are still using at present. ***DX NETS*** There is a new Islands On The Air DX net which meets on 14220 kHz SSB at 1100 UTC daily. ***GEORGIA*** No, not the US state, the country has a new prefix for amateurs, 4L, replacing the old prefixes of RF and UF. ***INDIA*** As I am sure most of you know, VU2 is the prefix predominately used by Indian hams, so you might wish to add a more rare one to your log. Look for VU3BRC on 14195 kHz SSB daily at 1200 UTC. QSL to: Rajkumar Chelwani, Piot 181 opp Girls High School, Jaripatka, Nagpur 440014, India. ***KAZAKHSTAN*** Another country with a new set of prefixes, UN to UQ replace the old RL and UL. ***KYRGYZSTAN*** The new prefix in use here is EX replacing the old RM and UM prefixes. ***MALAWI*** 7Q7LA (QSL to GOIAS, A.R. Hickman, Conifers, High St., Elkesley, Retford Nottingham, Notts, DN22 8AJ, England, United Kingdom) is on 21335 kHz SSB or on RTTY on 21065 kHz at 1545 UTC most days. ***MOLDOVA*** The new prefix ER replaces the old RO and UO prefixes here. ***PENGUIN ISLANDS*** S. Africa has ceded these uninhabited S. Atlantic islands to Namibia at the end of February, and this will end their separate DXCC status. ***RUSSIA*** Yet another country with a new set of amateur prefixes. R, UA to UI and 4K0 to 4K4 for arctic stations replace old RV-RZ and UV-UZ. ***TADJIKSTAN*** More new prefixes, EY replaces the old RJ and UJ for this country. ***TURKMENISTAN*** New prefix is EZ, replacing RH and UH prefixes. ***UKRAINE*** Also has new prefixes, UR-UZ, EM-EO replace RB, UB, RT, UT, RY and UY. ***USA*** Palatine, IL, a suburb of Chicago on the NW side, is the site of a new 6 meter FM repeater. The transmit frequency is 52.050 MHz and the output or receive frequency is 53.050 MHz. The operator is WB9QZB (Mark Thompson, 5356 Glenwood Ave., #3, Chicago, IL 60640). The repeater is on top of a 10 story building and its range, when conditions are right, should be most of northern Illinois, southern Wisconsin, northwest Indiana, and maybe southwest Michigan. I am sure that Mark would like to know how far out his repeater is getting, so if you hear it, write him. ***UZBEKISTAN*** The final country this month with a new set of prefixes, with UJ to UM replacing the old RI and UI callsigns used by amateurs here. ***WALVIS BAY*** Like the Penguin Islands, this S. African enclave has been ceded to Namibia at the end of February, and thus its separate country status will soon cease to exist.

Well, that does it for another month and let's hope those April showers don't bring electrical storms your way. But if they do, make sure your equipment has been disconnected and antennas are grounded. While getting the new ones is nice, doing it safely is nicer! 73 de Rob.

Oops...

My February column carried an article on the 40 meter ham band in which I stated the Novice portion of the band was 7050 to 7075 kHz. Well, that is WRONG! I do apologize for any confusion. The Novice band was and still is 7100 to 7150.

Help Needed: Bamboo

I have several antenna designs using bamboo that I would like to present to my readers. While in some cases 1x2 lumber can be used, some of the designs must utilize bamboo or fiberglass poles only. The required lengths and thickness of bamboo are greater than what can be found in garden supply houses. Since bamboo is a much cheaper alternative to fiberglass, I would appreciate hearing of any sources for it. If you know of any, please drop me a note c/o "MT" P.O. Box 98, Brasstown, NC 28902.

That wraps it up for April, see you next month. 73 de Ike, N3IK MT

Brother Stair Responds to FCC Bust

The January 20 FCC raid of the m/v *Fury* was obviously the biggest pirate radio news of 1994. Glenn Hauser's article in the March issue of *MT* detailed many interesting implications of this major bust. We now have additional information.

The *Fury* was equipped with shortwave transmitters financed by Brother R. G. Stair's Overcomer Ministry of Faith Cathedral Fellowship, Inc. in Walterboro, SC. The FCC confiscated four transmitters during the bust, alleging that they had been used for unlicensed pirate transmissions on 7415 kHz.

WJPL Broadcasts

Allan Weiner was aboard the *Fury* when the FCC raided the vessel. With Scott Becker of Voyager Broadcast Services, Weiner was managing the ship transmitter project for Brother Stair (see the November 1993 issue of *MT*). Veteran pirate DXers will remember Weiner from his prior confrontations with the FCC over the operations of **KPF-941** in Yonkers, NY and the bust of **Radio New York International** on the m/v *Sarah* in international waters off the coast of Long Island.

Other *MT* readers will remember Weiner's interesting forum on pirate radio at one of the Knoxville Monitoring Times conventions. As Glenn Hauser accurately reported last month, Weiner denies FCC allegations that the *Fury's* shortwave transmitters were used for unlicensed broadcasting.

It is now clear that lengthy broadcasts were heard over a wide area of North America in late December 1993 from a pirate identifying itself as **WJPL**. The February 1994 issue of *The ACE* documents transmissions from WJPL on December 25 from 0709-1037 UTC, as well as on and off December 29 broadcasts between 0726-0945 UTC. Decent signals were reported in *The ACE* by DXers in widely scattered locations, including Kirk Trummel of Springfield, MO, Yolanda Lewis of Elgin, IL, Marina Pappas of Huron, SD, and Joe Filipkowski of Warwick, RI.

Some WJPL programming included relays of old **RNI** tapes. At other times the station featured talks by a male announcer identifying himself as Johnny Lightning of RNI. Although the *Fury* ship transmitter allegations remain unproven, the FCC alleges that additional January broadcasts precipitated the raid.

Brother Stair's Reaction

As listeners to his radio program on **WWCR** and **WRNO** can attest, Brother R. G. Stair has not been bashful about commenting on the FCC raid. In an exclusive release to *Monitoring Times*, he clarifies several points about this incident:

- Brother Stair had no involvement in any alleged unlicensed broadcasts. He says that "there was never an intention on our part to do this (project) as a pirate radio. I had insisted all along that it be done legal or not at all... We are God fearing and law abiding folk."
- Brother Stair "was told time and time again" (presumably by Weiner and Becker) that all transmitter testing on the ship would use a dummy load.
- The 40 kilowatt transmitters aboard the *Fury* were designed to support Brother Stair's "deep desire to broadcast more on SW." He says that "I am a preacher of the Word of God and seek to declare the times in the light of Bible prophesy." Stair invested $125,000 in the transmitter installation.
- Voyager Broadcast Services is a St. Kitts corporation. The *Fury* is registered under the flag of Belize. But, DX hobby rumors that the *Fury* would transmit from Nevis or Belize waters were premature. Stair says that he did not finalize a transmitter destination agreement with either country.
- At the request of Brother Stair, Becker disposed of his interests in the project prior to the FCC incident. However, citing information from Becker, Stair identifies two apparently unlicensed transmissions. One was an "accident" caused by a malfunctioning dummy load installed within the transmitter. A second broadcast was referenced by the FCC in its successful request to a judge for a seizure warrant covering the *Fury* radio equipment.
- Stair is critical of the FCC's confiscation tactics. He alleges that some local officials were hoping to issue only a warning or fine, but that they were overruled "by Washington."
- Faith Cathedral Fellowship has abandoned the maritime transmitter project. But, Brother Stair is attempting to recover his transmitters from the FCC. During his regular radio show, Stair has said that he is formulating new and different transmitter plans. He promises that an announcement would be forthcoming. Stay tuned.

La Voz Popular

In February we covered the full current schedule of the anti-Colombian clandestine **La Voz Popular.** *MT* reader Robert Ross of London, Ontario, sends in the copy of this station's official logo that we picture here. The Guatemalan National Revolutionary Unity organization (UNRG) says that the station's first transmission was on May 22, 1987. I wonder how many DXers heard this first broadcast? They claim that their current 2,000 watt transmitter provides reception within a 700 mile radius of Guatemala.

Pirate QSL's

Every month we print maildrop addresses used by pirates for correspondence and reception reports. Most pirates are excellent verifiers, and we have the evidence. Seven of our readers wrote in to report 21 recent QSL's from 17 different pirates, all of which were profiled in recent *MT* issues. The average verification arrived in 41 days, although the range was between one week and five months. Pirates welcome letters from listeners, so feel free to mail off your report!

Our readers who happily plucked the 21 veries from their mailboxes included Scott Krauss (Cleveland, OH), Harold Frodge (Midland, MI), Doug Merkel (St. Louis, MO), Skip Arey (Waterford Works, NJ), Mark Spat (West Swanzey, NY), Gayle Van Horn (Brasstown, NC), and Robert Ross. Congratulations!

What We Are Hearing

In addition to the big WJPL story, once again this month we have reports on more than two dozen North American pirates that have been heard by our readers. We'd love to see your loggings next month. Feel free to send them to this column via the *Monitoring Times* address in Brasstown. We list frequencies in kHz, with times in UTC.

Correspondence maildrop addresses used by pirate stations listed this month include PO Box 452, Wellsville, NY 14895; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 146, Stoneham, MA 02180; PO Box 605, Huntsville, AL 35804; PO Box 293, Merlin, Ontario N0P 1W0; PO Box 963, London SW20 8XL, England; and PO Box 220342, 5600 Wuppertal 22, Germany.

Altered States Radio- 7413 at 2230. This drug advocacy station normally programs rock music. When conditions are poor, they can sometimes be identified by their interval signal of music from the old "Outer Limits" television show. Addr: Merlin. (Michael LeClerc, Somers, CT)

Christmas Day Radio- 7467 at 0315. We probably won't hear this one again until December for obvious reasons. But, it has been heard for two years in a row with entertaining seasonal holiday shows. Addr: Wellsville. (LeClerc)

CSIC- 7413 at 2345. Canadian Pirate Rambo, with his "Psycho Chicken" interval signal, remains one of the most active North American shortwave pirates. He has

Charlie Loudenboomer gets his MTV.

two addresses; one for USA residents, and another for Canadians. Addrs: Merlin and Blue Ridge Summit. (Rick Havner, Matthews, NC; Tommy Sprinkle, Winston Salem, NC; Frodge)

Happy Hanukkah- 7435 at 2015. This station is usually active in late December for obvious reasons, but it is not just a seasonal operation. Their Jewish programming is occasionally heard at other times of year. Addr: Merlin. (Frodge)

KMCR- 7465 at 0300. Magic Mike at "Magic Carpet Radio" is generally well heard on the West Coast, but this one is a real DX catch for East Coast listeners. His format is typically oldies rock music. Addr: Blue Ridge Summit. (Norm Alexander, Diamond Springs, CA)

Oasis- 7415 at 0000. This new one sometimes appears to identify itself at "The Oasis" or "Oasis Radio." Since only a few have logged it, Rick had a good catch. Addr: Wellsville. (Havner)

Pirate Radio Boston- 7414 at 1415. Charlie Loudenboomer says that he features a "station run by DXers for DXers." In addition to a recent joint broadcast with **WREC,** Charlie has a new QSL that we picture here. Addr: Stoneham. (Direct from the station)

Pirate Radio Insanity- 7444 at 0230. So far this new operation has featured very slick announcements that promote pirate radio. It has gone on the air on multiple occasions, often relaying other pirates. Addr: None yet. (LeClerc)

Radio Airplane- 7465 at 0145. Pirate Captain Eddy operated one of the most active pirates of 1993, and he has already been heard on a nationwide basis in 1994. All shows are transmitted from an airplane in flight. Addr: Wellsville. (Arey, Alexander, Sprinkle, LeClerc)

Radio Caroline- 6295 at 0230. We still hear occasional North American relays of this famous offshore Europirate; sometimes their signal makes it here from Europe also. The announced location for their slick commercial rock programming is from the *M/V Ross Revenge*. Addr: London. (LeClerc)

Radio Cyclops- 7415 at 2200. Mike Fright and Null N. Void combine punk and other rock music, funny comedy, commentary on the pirate scene, and underground news. Addr: None. (Frodge, LeClerc)

Radio DC- 7476 at 2345. This remains a distinctive pirate because it regularly transmits in two modes. They have Morse code marker broadcasts with station identifications and a "Don't Vote Republican" slogan. They also have regular programming in upper sideband mode, such as a recent program about Oliver North's alleged relationship with the CIA. Addr: None, but verifies loggings in *The ACE* bulletin. (Janet Whitney, Alexandria, VA)

Radio Doomsday- 7445 at 0145. Nemesis continues his rock music shows, and his QSL's are rapidly arriving in listeners' mailboxes everywhere. Addr: Wellsville. (Jim Keeling, Overland Park, KS, Sprinkle; Arey; Havner; LeClerc)

Radio Fluffernut- 7445 at 0300. Although their station name is certainly unusual and distinctive, the format on this station is standard classic rock tunes. Addr: Merlin. (Keeling)

Radio Free Euphoria- 7413 at 2245. Captain Ganja's pro-marijuana station has confused some listeners with a new segment hosted by a subcontinental guru. The slogan of the "Voice of the Runaway Maharishi" is actually Euphoria. Addr: Wellsville. (Havner, LeClerc, Frodge)

Radio Garbanzo- 7420 at 2015. Fearless Fred's veteran pirate has been relatively inactive in recent years. But, his recent return with fast paced comedy and rock programming was appreciated by his listeners. Addr: Wellsville. (Frodge, Havner)

Radio Navidad International- 7417 at 1730. Like Christmas Day Radio (see above), this seasonal station might return at the end of the year. Its obvious distinction is its Spanish language programming, which is unusual for a pirate. Addr: Wellsville. (LeClerc)

Radio Titanic International- 7412 at 2300. This slick Europirate rocker usually operates on frequencies like 11417 and 6295 kHz, but they have been relayed this year in North America via Richard T. Pistek of **NAPRS.** Addr: Wuppertal. (George Zeller, Cleveland, OH)

Radio USA- 7414 at 2315. Mr. Blue Sky's punk rock and comedy are still regularly heard. Despite this station's confrontation with the FCC in 1992, he has operated from a leaky bathtub off the North American coast for more than a decade. Addr: Wellsville. (Frodge)

Southern Music Radio- 7436 at 2145. One of the most interesting items of the year so far has been this New Zealand pirate, which has acquired a relay via the **North American Pirate Relay Service.** Harold characterizes their format as "obscure rock music." They use European addresses in addition to their USA maildrop. Addr: Blue Ridge Summit. (William T. Hassig, Mt. Prospect, IL, Frodge)

The Great Southland- 7425 at 2000. Oceania checks in twice this month, this time with the new pirate featuring an Australian announcer. Like **Radio Australia,** their rock is heavily dominated by Australian artists. Addr: Merlin. (LeClerc)

UNID- 7445 at 0430. During the mid-1980's there was a station with these call letters, which are a parody of the DX abbreviation for "unidentified." A different operation is now using the call, with a mix of rock and comedy programming such as "stupid people's court." Addr: None. (Arey, LeClerc)

Voice of Laryngitis- 7375 at 2030. The Huxleys bill this one as "the best damn radio station you'll ever hear." This isn't an exaggeration. Their shows are more entertaining and better produced than most *licensed* shortwave stations. Addr: Wellsville. (Frodge)

WEED- 7445 at 0530. Some feel that this slickly produced pro-marijuana station may generate the best signal of any North American pirate. It has consistently been heard throughout all of North America. Addr: Huntsville. (Keeling, LeClerc, Frodge)

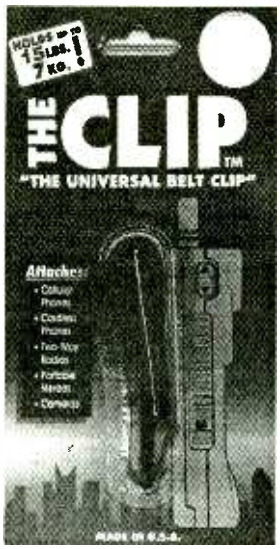
WJLR- 7408 at 2245. Despite its "John Lennon Radio" slogan, this station plays classic rock music by a variety of artists. Addr: Blue Ridge Summit. (Keeling, LeClerc)

WLIS- 7417 at 2045. Jack Boggan always plays interval signal "hits" from licensed shortwave broadcasters. He supplements them with rock music. During one show he featured a profile of Richard T. Pistek of **NAPRS.** Addr: Blue Ridge Summit. (LeClerc, Frodge)

WPIG- 7415 at 2345. Also known as Radio Pig, Ira's new station has created a stir. His offbeat shows discuss pigs riding through the slums in the BunndyMobile. Ira "sings" (?) pig songs, sometimes with African drums in the background. Addr: Wellsville. (Hassig, Sprinkle, Frodge)

what's new?

Larry Miller



THE CLIP™

If you've ever heard that sickening "crack" as your handheld radio drops from your belt onto the pavement, you'll immediately recognize the benefits of "THE CLIP™." This gadget is a universal belt clip that's the perfect replacement for your tired, old belt hanger.

Made of the finest plastic and utilizing the toughest adhesive in the world, THE CLIP™ will, according to the manufacturer, "hold more weight than you would ever want on your belt." To test out this claim, we attached the clip with the bonding agent to the back of Bill Grove's head. Unfortunately, the entire experiment failed when Bill refused to hold still.

Later, we found the weight limit of THE CLIP™ to be around 15 lbs.

Now that the nice weather is here again and you'll be taking your scanner outside, be ready. Keep one as a back up or use it for your camera, cordless phone, or cassette player — your imagination is the limit. THE CLIP™ is available from Grove Enterprises (P.O. Box 98, Brasstown, NC 28902, 1-800-438-8155) for a mere $4.95 plus $2 shipping.

By the way, the clip removed from Bill's head with a quick twist, leaving no residue and no damage that we could discern.

Interesting Possibilities

If you're a scanner listener with a growing fear of being shut out of the hobby by digital communications, you may want to look into a copy of *Incredible Audio and Video Projects You Can Build.*

While the book is billed as "opening up a world of exciting new opportunities for electronics enthusiasts who want to learn how radio, TV, IR, carrier current and other communications systems work," something else caught my eye. Included in the book is plans for building a digital audio scrambler/descrambler.

There are other interesting projects as well. You can build a carrier-current transmitter, a multiplex transmitter, a shortwave converter, and an FM SCA broadcast receiver. I have not seen a copy of this book. I'm only working from the publisher's promotional material. And, of course, there's no way to judge the applicability — or legality — of the digital scrambler plans. Still, there could be gold in those hills. Or maybe just an opportunity to learn about digital technology.

Those who want to forge ahead on their own can get a copy of this 224 page book from Tab at $16.95 plus shipping. If you're more cautious, wait for a month or two and we'll try to check it out for you. Tab's phone number is 717-794-2191.

FM Atlas

I didn't get a review copy of the 15th edition of Bruce Elving's *FM Atlas* when it was released around the first of the year, but I was able to pick one up on my own, and would like to recommend it to anyone who DXes, travels or simply likes to keep up on the world of FM broadcasting. Elving's book is unique in that it features state maps that pinpoint the location of every FM station in the country.

In addition, there's a list of stations arranged by state (including frequency, call sign, and other information) and by frequency (including state, city, call sign, power, and more). There's also a list of FM translators and data on Canadian and Mexican FM stations as well.

As the number of FM stations in the United States grows, *FM Atlas* has tended to become a little more cluttered; a little harder to use. That certainly doesn't take anything away from the accuracy of the book or its excellent value as a tool for anyone who listens to FM radio. *FM Atlas* is $14.95 plus shipping from Bruce Elving, Box 336-MT, Esko, Minnesota 55733-0336 (or from Grove Enterprises, $14.95 plus $4 shipping).

Propagation Primer

In 1991, Dr. Leo McNamara, a 20 year veteran in HF communications, published an up-to-date, professional book on *The Ionosphere: Communications, Surveillance, and Direction Finding.* Now, with the encouragement of many amateur operators and shortwave listeners, he has released a special edition which contains the most important chapters from the original book with some revisions made especially for amateurs. Entitled, *Radio Amateurs Guide to the Ionosphere*, each chapter has its own bibliography and a series of questions to help review the content of the chapter.

Yes, there are mathematical equations, but fear not; they are already solved for you. And yes, the answers to the review questions are in the back of the book!

Jacques d'Avignon, who reviewed the book for us, says the book will answer most of your questions on the ionosphere, "normal" and "abnormal" propagation modes and propagation forecasting. "I found the book clearly answered many questions that I am asked frequently," says Jacques. So if you've been meaning to ask Jacques some questions lately, buy the book and you'll have the answers to those and more.

Radio Amateurs Guide to the Ionosphere is available from Krieger Publishing Company, Malabar, FL 32950, for $39.50, plus $9 shipping and handling.

Low-Cost Laser Pointer

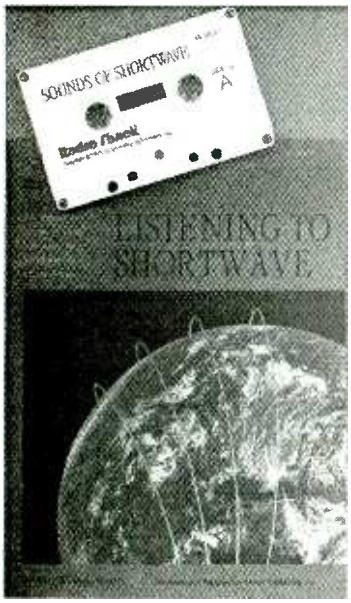
Most of us find fascination with those tiny, intense beams generated by lasers. But up until now, the cost of a handheld laser has been prohibitive, often several hundred dollars. Recently, however, prices have dropped

dramatically, and one in particular — the Americraft — is exceptionally affordable.

A bright (3 mill), solid-state, GaAlAs laser is housed in a sturdy, matte aluminum, pocket-penlight case. Powered by two AAA cells (included), the tiny pointer projects a brilliant spot of light 200 yards.

The little pen really highlights (literally!) a lecture, and is great for meetings, sales presentations, educational classes or other situations where other pointers would be awkward to use.

The Americraft Laser Pen is $69.95 plus $5 shipping from Grove Enterprises (address given above).



Sounds of Shortwave

Writing about shortwave has always been a difficult task. If you were writing about cats, it would be different. The cat is black, 24 inches long, has whiskers, etc., etc. But try to explain to someone in print what one of the old Soviet jammers sounded like: "r-r-r-r-er-er-er-er-r-r-r-r." It just doesn't work real well.

Years ago, Bob Grove produced an audio tape called "The Sounds of Shortwave." It was an audio tour of the bands and quite a help to thousands of newcomers who could read all they wanted about shortwave but who still didn't know a jammer from RTTY. On the tape Bob could say, "here's what radioteletype sounds like" and then play an actual recording of it. The tape was very popular at the time, but somewhere along the way it got dropped from the Grove lineup — a mistake in my humble opinion.

"Sounds of Shortwave" is back, this time as a part of a book/tape combo now available in Radio Shack stores. This is not a Grove tape; it's produced by Ken Winters, N5AUX, and it's a nice job, well balanced and informative. This is basic stuff, perfect for the beginner. Included is a discussion of the technical foundations of shortwave, a look at the different users of spectrum, and a little "audio tour" stuff: This is what Slow Scan TV sounds like; This is a jammer; Maybe you'll hear jazz on Radio Moscow.

There is one bone to pick. Let's play an excerpt from the second side of the tape: "If you want to keep up on European events, from a European perspective, Radio Deutsche Welle at 6.040 will give you news and commentary on a whole variety of topics. Of course it helps if you speak German. This is a German-language station." That's either a very unfortunate choice of words, or a gross error hard to excuse in an introductory-level tape — Winters has just negated the primary reason most people buy a shortwave radio: to listen to foreign news and viewpoints in English!

Other than this one sticking point, Winters did a superb job. The idea of combining a tape with a book is an increasingly popular idea and especially appropriate for shortwave. If you're new to radio monitoring, we recommend this "mini course" on shortwave radio. Pick up a copy at your local Radio Shack store.

Sensible Software

Amiga computer owners who are aspiring hams now have a helping hand in learning Morse code through CopyCode 2.0 from Sensible Software Solutions. CopyCode 2.0 provides a myriad ways to learn and practice copying Morse code in hundreds of combinations and under a variety of conditions, adjustable by the user. The price for new users is $25 plus $3 S&H.

For more information write Sensible Software Solutions, 4951-D Clairemont Square, Suite 262, San Diego, CA 92117-2798; 619-453-9446.

Consumer Alert

We have been informed by the *Monitoring Times* business staff that Electronics Outlet of America is not responding to mail sent to its post office box in Hanover, Virginia. In addition, the company's phone has been disconnected and there is no forwarding number. EOA has apparently closed its doors, leaving at least one unpaid bill. Electronics Outlet of America last advertised in *MT* during February.

Back From the Dead?

It doesn't seem like all that long ago: The Heathkit company was over. There was a great deal of well-deserved wailing and gnashing of teeth. Heath had its roots deep in the radio hobby community and for many, the closing was not only the end of an era but almost like the passing of a childhood friend.

Last week, we received a catalog from — Heathkit. This time it's called Heathkit Educational Systems. It's heavy on electronics "hands on"-type courses but there are still kits for weather stations, audio amplifiers, speaker phones, infrared motion detectors, portable radios, and more.

Is it just a clearance of remaining merchandise? Or is this a change of heart — a resurrection? Ask for your copy of the catalog and judge for yourself. The phone number is 800-253-0570.

A life-size PC board from a Rainbow kit.

Beyond the Zapper

Last issue we told you about a 10 GHz transmitter that can be used to trigger radar detectors. Called the Zapper, you use it while driving to fool other motorists into thinking there is a radar trap up ahead. While we did not avail ourselves of a Zapper, we did purchase a couple of the manufacturer's other kits.

Rainbow Electronics offers several that range from a $3.95 "Blinkey Light" that does nothing more than blink two LEDs, to an FM Wireless Microphone kit for $14.95. The price of the kits is very low. And they seem to work very well. However, our advice is to hold off from ordering for the time being.

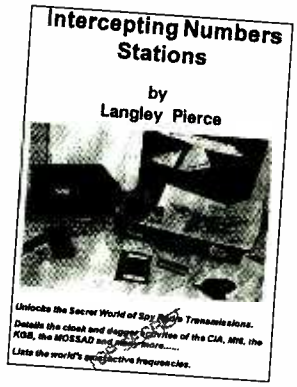
There are two reasons: First, the assembly instructions are beyond poor, consisting of a schematic and a bad photocopy of the printed circuit board with dozens of confusing lines weaving in and out. Second, the printed circuit boards are small — *very* small. Unless you have considerable experience in soldering full-size components into near miniature PC boards, steer clear.

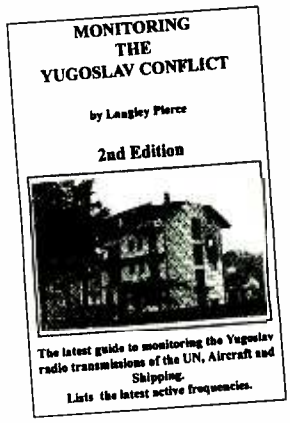
When we mentioned this to Rainbow sales manager Hal Mandery, he told us that, if anything, their main audience (private investigators and the like) want the PC boards even smaller. We gasped. He did promise, however, that the company was planning to upgrade the instruction sheet into an instruction booklet.

The bottom line? Wait. If you're an experienced kit builder or experimenter with a solid ability to interpret schematics and work in near subminiature conditions, write for a catalog. Meanwhile, the company says it is planning a line of "deluxe" kits. Mandery promised to let us know when they would be available. We'll check them out for you then. You can reach Rainbow Electronics at 6254 LaPas Trail, Dept. MT, Indianapolis, IN 46268; phone 317-291-7262.

Howling At the Moon

Over the years, the so-called "numbers" stations have been the subject of an incredible amount of speculation. Just who is/was behind those mysterious countdowns of seemingly random numbers? There have been flashy pretenders to the position of numbers "expert," whose information tended as much toward entertainment as fact. Likewise, there were several unsung heros (*MT's* own Larry Van Horn, for one) whose solid research and informed speculation were often covered over by misinformation.





Today, 32 years after the first numbers station made its debut during the Cuban Missile Crisis, author Langley Pierce has written a clear, limited-hype book that attempts to sift through the muck. The result is an entertaining and informative 93 pages that'll be interesting to both newcomer and grizzled veteran. You'll learn what a numbers station is, how numbers codes work, and explore the various transmissions originating from the CIA, MOSSAD, KGB and others. There's even a frequency list (which, although it lacks information on the type of transmission, does identify the supposed source).

We recommend *Intercepting Numbers Stations* by Langley Pierce. It's available for £9.95 from Interproducts, 8 Abbot St., Perth, PH2 0EB, Scotland. Tell them *MT* sent you.

Monitoring Yugoslavia

Less impressive but also from the pen of author Langley Pierce, comes the 2nd edition of *Monitoring the Yugoslav Conflict*. A fairly sparse 32 pages, it could be helpful to those who have been unable to glean this information from other sources. Included is information on United Nations transmissions (the UN Naval Blockade, Air Exclusion Zone, UN High Commission on Refugees, etc.), Diplomats and Propaganda (primarily RTTY), amateur radio operators, and broadcast stations. A combined frequency list follows. In fact, you could probably do away with the rest of the book. *Monitoring the Yugoslav Conflict* is available for £4.95 also from Interproducts. Be sure to mention *MT* if you buy.

Reviews

By Bob Grove

Optimus Accessory Speaker

For many years, the Realistic® Minimus 7 speaker system dominated the bookshelf stereo systems, lauded by authorities as a leading sound reproducer at a most affordable price. But recently the Minimus was replaced by an upgraded version, the new Optimus, and we were eager to try it.

Hooking the Optimus to one of our test radios, the sound fidelity was unbelievable. Our engineering department sat in awe, feeling the same as we did years ago when the Minimus first came out. How can so much sound come out of such a little box?

Specified for low distortion from below 100 to above 20,000 hertz and rated at 50 watts (at 8 ohms), the die-cast-aluminum speaker packs a wallop! We would recommend it for scanners, shortwave receivers, tape recorders, CB radios, ham transceivers — any accessory that has an outlet for an external speaker.

Measuring only 7-1/8"H x 4-1/2"W x 4-1/2"D and weighing a hefty 4.6 pounds, the Optimus will definitely sound better than any internal speaker packaged in your radio, and probably better than any receiver accessory presently sold for communications equipment.

The Optimus Speaker is available through Radio Shack outlets or may be bought for $59.95 plus $6.50 shipping from Grove Enterprises, P.O. Box 98, Brasstown, NC 28902; phone orders 800-438-8155.

Select-A-Tenna Medium Wave Loop

If you are one of the millions of tabletop radio owners who have no external antenna jack for medium wave AM broadcast band enhancement, this new loop antenna will make a remarkable improvement in reception.

Measuring 11" in diameter, the loop is simply placed close to the side of the radio and tuned to peak the signal frequency to which you are listening.

In a mobile home or surrounded by metal? No problem. This new model includes an external antenna jack which can also be used to attach to receivers equipped with an external antenna connector.

Since the unit requires no power and works by inductively coupling its intercepted signal energy to the radio's own internal ferrite loop antenna, we were eager to try it out on a small portable radio.

Results were astounding. Placing the loop alongside the radio, AM broadcasters that were barely audible through the background din suddenly came to life like locals! We also discovered that we could, in some cases, place the loop behind the radio and null out sources of interference!

Designed for 530-1700 kHz reception, the loop is specified to give up to 30 dB boost to incoming signals.

The Select-A-Tenna is $65.95 plus $6 shipping from Grove Enterprises, P.O. Box 98, Brasstown, NC 28902; phone orders 800-438-8155.

AM/FM Mobile Antenna from C. Crane

A series of high-performance automotive replacement antennas has been introduced by C. Crane Company (558 10th St., Fortuna, CA 95540-2350; phone 800-522-8863). Intended to replace the conventional 31" factory whips, the center-loaded Crane units telescope from 24"-54".

Spring loaded at the base and made of sturdy stainless steel, a variety of adaptors makes the antenna suitable for Ford, GM, Chrysler, Dodge, Nissan, Hyundai, and many other models, even complete new installations and old CB mounts.

In road tests our sample improved weak medium wave reception when fully extended, although the wind load, as expected, caused progressively greater spring tilt at road speeds above 30 miles per hour. Reports from other users suggest that shortwave reception is also enhanced with the longer whip.

DC440 Update

We mentioned in the February issue that a review of the Optoelectronics DC440 would be forthcoming. A revised unit is on its way to us, and we will publish a complete review in the near future.

Bob Grove, WA4PYQ

AOR AR1500 Wide Coverage, Handheld Scanner

Some years ago, AOR Limited, a Tokyo-based manufacturer, introduced their AR1000, a handheld scanner with extremely wide frequency coverage which gained considerable popularity in spite of its many shortcomings.

Recently, a newer model, the AR1500, was introduced with considerably improved performance. Covering 500 kHz through 1300 MHz and including single sideband reception, the compact, feature-packed radio weighs less than a pound and is under six inches in height. How long this cellular-capable scanner will be available with the new anti-cellular-scanner law remains a question.

1000 memory channels can be stored in the radio's 10 banks, and any one of those channels may serve a priority function to be sampled every two seconds for activity. Scan and search move along at 20 channels per second.

Ten separate search ranges may be programmed for different parts of the spectrum. One bank of 100 channels is reserved for automatic memorization of active channels discovered during unattended search.

The scan-resume delay is all channel, not channel-selective. A lockout key, however, does allow the user to choose which channel(s) he wishes to temporarily skip during the scan sequence. To accommodate the various channelization spacing plans found throughout the spectrum, the radio allows custom selection of any step from 5 through 995 kilohertz, just so long as it is a multiple of 5 or 12.5 kilohertz.

BC890XLT Tone Squelch Limits

In our December column we noted that Uniden confirmed that the optional CTCSS subaudible tone squelch board for their BC890XLT did not have the complete range of standard tones. A sharp *MT* reader has discovered that the range is more complete than Uniden thought, 67 through 250.3 Hz, missing only seldom-used 254.1 Hz.

The 1500 is operated from its rechargeable battery or four optional AA alkalines; an AC wall charger is provided. A cigarette lighter cord is also provided for mobile charging, as is a random wire antenna for shortwave monitoring. An earphone (3.5 mm/1/8" plug), sturdy stainless steel belt clip, thin flex whip, and soft vinyl carrying case are also included.

Reception modes are AM, narrow FM, wide FM, and SSB via a tunable BFO. Audio output is 100 milliwatts (10% total harmonic distortion), providing ample sound from the internal speaker.

The rubberized keypad is well spaced for klutzy male fingers; the absence of an annoying function key is welcome, considerably simplifying programming. A keyboard lock switch can be activated to prevent accidental resets of key settings.

Sensitivity is about 0.5 microvolts on narrow FM, decreasing to around 3 microvolts for AM. A DX/LOCAL switch can be used to decrease signal intensities when intermod becomes a problem.

The top knob cluster is rather cramped. The BNC antenna connector makes a firm grip of the volume/on-off knob impossible, but it can be turned. The squelch knob is concentric with the BFO knob, and both are separated from the adjoining volume and tuning knobs by only 1/4" maximum. But they, too, can be turned by fingertips.

Unlike many other Japanese manuals—like the predecessor AR1000—this one is well written and easy to follow without having to enroll in a crash course in Japanese/English translation. It is written in a pleasant conversational style from a user's point of view, providing examples for more difficult operations.

The edge-lit display is contrasty and easy to read straight on and from above, but visibility drops out when viewed from below. A protective film covers the display; when ours was removed, it left a residue which was easily removed by lighter fluid, somewhat less easily removed by rubbing alcohol, but not at all removed by Windex®.

A Few Criticisms

The AR1500 offers a great deal for the money, but there are some observations which should be noted:

(1) On our sample, the tuning knob occasionally moved 3-4 increments without changing the display

(2) Restricted dynamic range results in severe intermodulation (overload interference) and desensitization under strong signal conditions

(3) Some AGC pumping is noted on strong SSB signals, and the BFO drifts for the first few seconds after turn-on

(4) Audio frequency response changes considerably when switching between AM (crisp) and FM (muffled)

(5) The default tuning step is 12.5 kHz no matter what mode or frequency range you are tuning, requiring frequent resetting

(6) The 5 kHz minimum steps are still too coarse for SSB, especially with the tiny BFO (clarifier) tuning control

(7) The manual doesn't mention that frequencies above 1000 MHz must be entered without using the decimal key.

Most readers will recognize that the majority of these shortcomings are acceptable, especially in view of the true flexibility of such a feature-packed handful at such a reasonable price. The AOR AR1500 handheld scanner is $458.95 plus $8 UPS shipping from Grove Enterprises, P.O. Box 98, Brasstown, NC 28902; phone orders 800-438-8155. MT

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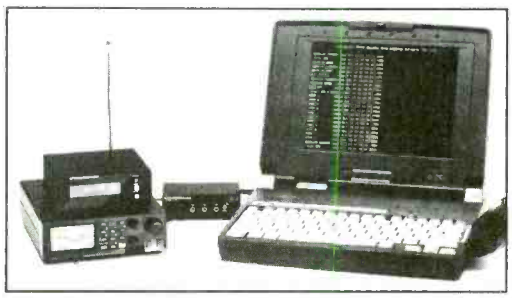

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Larry Magne and "Magne Tests" are taking a well-deserved vacation this month!

A Beginner's Guide to Vintage Radio

By Linton G. Robertson

Many persons just getting into the hobby of collecting and restoring old-time AM radios and communications sets frequently have many questions about their new pursuit. Here are some answers to frequent questions and a few handy hints that may save you a lot of hair pulling as you explore the wonderful world of vintage radio!

1. "How much is my radio worth—restored and unrestored?"

This is a *very* complicated question, but generally, the value of any restored set can be fixed by adding its retail price of acquisition (the antique store price) in a non-working or substandard condition (the state I find 90% of all vintage radios in) to its cost of restoration. Naturally, current market conditions play a large role, too. When I do an appraisal, this usually nets me very close to what is the true dollar value of the set, should it become an insurance casualty and have to be replaced with a set of like type from an antique dealer, and then restored to the same level.

Non-working radios are *usually* not very valuable. There are exceptions: Third Reich sets, one-of-a-kinds, higher end Scotts and McMurdo Silvers, novelty radios, limited runs, "craze" sets, very early sets from the spark-gap or post-spark gap era, etc. Market conditions in the private collector arena play a large part, too, and have to be understood before appraising a set accurately. Always remember that an appraisal is an *opinion.*

Courtesy of the Margaret Woodbury Strong Museum

An old portable like this Zenith model (circa 1946-1951) may well be worth the time and money required for restoration.

2. "Can I buy a radio from an old-time radio dealer?"

Yes. Just make sure that you know what you're getting! "Unrestored-but-works" is a term you can drive a battleship through, it's so wide. Make sure that, if you buy a radio in this condition, that you ascertain *how well* it works; very often this means, "it makes some noise and gets one station fuzzily."

Make sure the set has a guarantee, and make sure what the guarantee covers. If you buy one that's "restored," make sure that the chassis has been completely overhauled. This means that all the old wax-and-paper capacitors, defective and out-of-tolerance resistors and leaky old electrolytics have been replaced, and that the set works to original specs. Other questions you might want to ask are:

* Are all the parts above the chassis line and on the outside of the set original? (This is very important—"restored" does not mean that the 30's radio you've been looking at has knobs from the 40's, tubes from the 50's, and the tube shields missing!)

* If the set has been refinished, has it been done by someone familiar with old radios? Has it been done as close as possible to original colors, finish and tones? Many old sets had two or more color and tone schemes; I've seen too many sets that had been stripped, "mono-stained" and sold as looking original.

* If I am unhappy with the set, can I return it for refund or credit within a reasonable amount of time?

You may conclude that you may save a bit of money if you shop around a bit and acquire the set from a traditional source (swap meet, Aunt Katy's attic) and then go and try and learn how to do it yourself. It's going to take a while, though! This goes for refinishing too; a coat of stain and polyurethane to cover scratches and a piece of someone's old pajama bottom for a speaker grill cloth does not constitute a restoration.

You may decide that you'd rather get professional help. It's a two-edged question; I've seen people get great deals from vintage radio dealers, and I've seen sets purchased from them described as "restored" that would make you weep.

3. "How can I tell if my set is a good candidate for restoration?"

About 5-15% of all sets attempted fail to respond to restoration; there are many reasons for this: concealed, non-reversible damage of non-generic parts is one, corrosive deterioration of delicate parts another, and previous substandard "hatchet jobs" performed by servicing personnel barely qualified to hold a soldering iron the third, and most prevalent, reason.

As this possibility does exist, if you're doing the work yourself, order parts in two stages: first order only those that are required to get the set to a stage where you can tell if the results are going to be what was expected. If all goes well, the rest of the parts required to complete the restoration can be ordered. This includes all the cosmetic details, grill cloth, knobs, etc. This saves everyone a load of trouble if a set proves non-responsive due to some hidden fault that didn't reveal itself at the first look. But the numbers are on your side: 85-95% of all sets make it!

Still, this *does* take specialized knowledge to do the job right; if you have a nice set, maybe you don't want to learn on it! Take it to a respected restorationist and learn on a low-end set! There are persons who specialize in restoration without engaging in sales, if you want to go that route. Your more generalistic vintage radio dealer may be able to help you as well. Just be cautious and ask a lot of questions!

4. "Is my set worth fixing?"

This is a very personal call, and can only be answered by the owner. If you're going to try and make some money selling the set, that's one thing. If it was your father's or mother's set, that's another thing entirely; such items cannot be valued in monetary terms to the owner. Again, the set may be one that really "put the hook in you." That's reason enough! I always tell my clients that they *must like the set, regardless of its dollar value.*

Many years ago a fellow brought me a small, humble wooden table radio in a very advanced state of deterioration; the estimate was rather high for a set of that sort due to its very poor condition. The owner insisted on restoration, saying, "the feelings it brought back of sitting with gramps and hearing the shows of the day cannot be estimated in dollars." Again, a client

Resources

For an excellent catalog of vintage radio parts, contact:
Antique Electronic Supply
6221 S. Ample St.
Tempe, AZ 85283
602-820-5411

A wonderful place to get info and make great contacts is:
The Antique Wireless Association
Joyce Peckham, Secretary
P.O. Box E
Breesport, NY 14816

For a monthly magazine on antique radio, try:
Antique Radio Classified
P.O. Box 802-P8
Carlisle, MA 01741
(508-371-0512

could not make up her mind whether or not to have a very valuable 1928 RCA restored, because she wasn't sure if she could live with it or not. Despite the value of a restored '28 RCA, she eventually declined and sold the set, saying, "To me, it's ugly as all get-out, and not worth it!"

5. *"Am I going to make a big profit off my set's appreciation?"*

In general, sets *do* appreciate over time; I mean years! Get-rich-quick-in-the-short-term schemers have consistently been thwarted by the fickleness of public fads. If you're thinking of speculating in sets, consider what has happened to those persons who have tried this with fine art; a very few have prospered, and most have lost their shirt.

On this note, I always think of the great Japanese artist, Toshi Yoshida, who said, "Collecting should not be taken up solely as a means to wealth. This degrades the collection by bringing it down to the level of mere gambling. A good collection reflects the owner's taste, theme, and sensibility."

6. *"Why restore a set anyway?"*

Besides the personal reasons, you'll be doing future generations a huge favor. The communications art developed very quickly over a matter of a very few years. Technical discoveries promptly made last year's set obsolete, and many sets went into the landfill just as promptly. We could never have too many saved and brought back to life!

7. *"How do you get these parts?"*

It's not easy! Generally speaking, though, having been in this business for more than a few years, one learns who has what. As a beginner, try to contact established, respectable collectors; you'll frequently find what you need from them. Join a club. The Antique Wireless Association is a wonderful place to start; anyone who's been anything in radio has belonged to this organization, at one time or another. Also, there is a marvelous parts supplier in Arizona; their address and telephone is given in the sidebar, along with the AWA's contact address.

8. *I am thinking about collecting, but don't have the room for a lot of sets. Is this a problem?"*

Collecting is not a numbers game. My personal collection is small, but everything in it is 100%, works like new, and is top-notch. One well-cared-for fully restored set is better to have than 500 rotting in a damp basement.

9. *"What's a restoration of a vintage set going to cost me?"*

Every manufacturer had his own ideas about how an early radio or TV should have been built. As such, they can vary quite a good deal in design, especially radios from the 20's. This can throw a wrench into shoot-from-the-hip estimation. It all depends on condition, too; rust and corrosion are very insidious, and can add a lot of time to a job. Set complexity has a lot to do with it too; a small, simple tabletop set can run in the $65-$150 range. Larger and more complex sets can run from $200 and up. If you elect to do the work yourself, you can shave a great deal of money off these figures.

In any case, it's safe to say that this hobby will change your life. At the very least, your living space will never be the same!

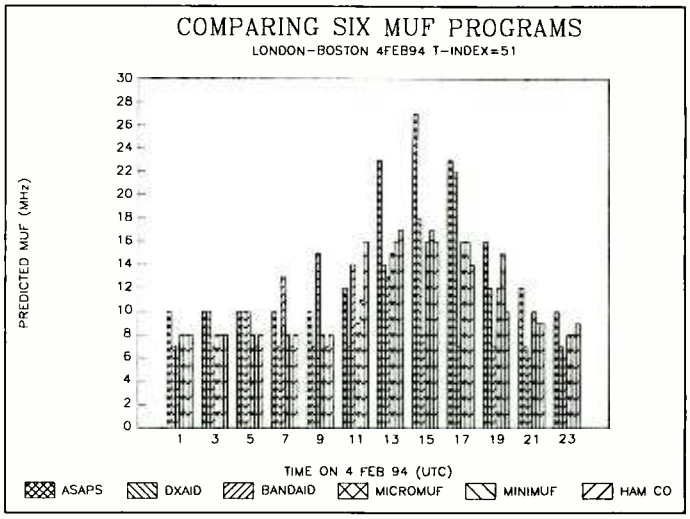
Biographical Notes

Lin Robertson has been actively involved in radio communications since 1966, when, at the age of 15, he received his first radio, a Hallicrafters SX-130 shortwave receiver. Lin went on to work over the next two decades in the electronics industry as an electronics technician, buyer, and finally as a technical writer.

He holds an Advanced Class FCC Amateur Radio License (callsign: KJ6EF), is active in local Amateur Radio affairs, lectures on Vintage Radio, and belongs to the Antique Wireless Association. His fascination with vintage radios began in 1976. He currently has a vintage radio restoration service in San Diego called American Radio Revival, and works with collectors and other clients interested in preserving our radio heritage. MT

John Catalano

Comparing Six Propagation Prediction Programs



If you're like me you are always looking for monitoring accessories and software. But no matter how many new gadgets we get, we are still limited by the characteristics of an electromagnetic wave. It's true: radio waves are part of the electromagnetic spectrum which culminates in light. In fact, radio waves and light exhibit similar behavior. A light shone through a glass window will pass through it, but if the glass is backed by a certain type of material, it will act as a mirror, and the light will be reflected instead.

In a similar manner, the layers of particles which lie above the earth, called the ionosphere, sometimes act as mirrors, bouncing radio waves around the earth, and sometimes act like glass, letting most of the waves pass into space with very little reflected back to us..

Why are these layers so fickle? Without getting into a physics lesson, the factors are many, such as the frequency of the radio wave, the amount and motion of charged particles in the layers and between the layers, and the location of the transmitter and receiver.

Most of the behavior of the layers is affected by the Sun, that big charged particle generator in the sky. Simplistically, three situations can occur. The frequency of the radio wave can give its energy to the charged particles, thereby becoming totally absorbed: not a good condition for DXing. The second possibility is that the radio wave's frequency does not affect the layers at all: Still not too cool, because the radio wave will go right through the layers ending up as great DX for Martians. The third condition is one in which most of the radio wave is reflected by the layers with very little of it being lost through absorption. Here we have a perfect radio mirror and the possibility of many reflections, or "hops." Generally, these layers exhibit a complex combination of all these situations.

The frequency of the radio wave is a key factor in whether the signal is absorbed, passed through, or reflected, which explains why there is a maximum usable frequency (MUF), above which we shouldn't expect that rare DX. Although I am a physicist, when I get in front of the radios I don't want theories any more than you do. I just want to know where to try tuning.

Why not let computers give us the answer? Just tell us on a given day, at a given time, what's the highest we should tune to listen to a shortwave broadcast transmitted from a particular location.

I found that I had ready access to six different MUF type prediction programs. To compare them, I ran each one for February 4th, 1994, to see what it predicted for the MUF at each hour during that day. The path was between London, England, and Boston, USA.

Since sunspots are indications of the Sun's fusion activity, and may indicate the release toward Earth of all sorts of junk from X-rays to Alpha particles, the number of visible sunspots is another key factor. WWV (found on 2.4, 5, 10, 15, and 20 MHz), airs this information at eighteen minutes after the hour: we'll pretend it has told us the number is 51, typical for early February.

All the programs we'll look at run on a basic PC compatible with a minimum of 512K of RAM. The six programs range from propagation only programs such as ASAPS and MINIMUF, to programs which do much, much more. In Ham Companion version 3.0, for example, the propagation feature is only one small part. Some of these programs are shareware, and some cost over $200: A pretty wide range! How do they compare? Take a look at Figure 1. Here we've plotted the propagation conditions predicted by each program for every other hour of February 4th.

Look at 1 at the bottom left of the Figure. This is 0100 hours UTC and the six bars above the 1 are the MUF predicted by the six programs. ASAPS v2.21 is first and Ham Companion v3.0 is the last bar. Each is listed at the bottom of the Figure in the order shown on the graph.

We can see immediately that ASAPS, the first bar in each hour, is higher than the rest. ASAPS predicts a higher MAXIMUM USABLE FREQUENCY (MUF), than the other programs. In hour 15 most of the other programs are predicting a MUF around 17 MHz. But ASAPS is predicting a value of 27 MHz! That's a big difference.

The ASAPS program is impressive in displaying the data in a wide variety of ways and has longitude and latitude already loaded for many cities around the world. The path that is being predicted can be switched from long, short or district. ASAPS also predicts the result if the "reflections" are not simple, but occur between different layers, or modes. OWF, MUF ALF, are calculated as well as EMUF! (We'll ignore this alphabet soup, since we are only comparing MUF.)

The third bar, BANDAID I, gets a bit above the rest from hour 7 to 13. In fact, BANDAID always seems a little out of sync with the rest. Micromuf follows the same curve but seems to predict a lower MUF than the rest for most times of day.

Who's Right, and Who MUFfed It?

Who knows?! That wasn't the purpose of the exercise, remember? All the programs agree that the maximum usable frequency for the day will be over 15 MHz and occur between 1500 and 1700 UTC on February 4th, 1994, for the chosen path. They all agree that the MUF will fall to between 7 and 8 MHz at both 0100 and 2300 UTC.

So, no matter which program we use, we have a better idea of when and where to tune for BBC on that day. We are no longer blindly spinning our dials! This makes ALL of the programs extremely useful. Of course, that is assuming that Mr. Sun and Mother Nature behave according to the prediction models. (And they are about as reliable as the Tooth Fairy!)

However, from our MUF results, ASAPS is either the only correct one in predicting a MUF of 27 MHz, or it's way out of line. Now some may argue that ASAPS provides similar results somewhere in its alphabet soup of three letter parameters and modes. Maybe. But we want one valid conclusion reached easily, without the need of a degree in physics to read the tea leaves.

I'm not saying ASAPS is flawed. In fact the physicist in me is attracted to the flexibility of the program and the multitude of variables. But as we said, it's not immediately obvious which of the variables is giving a numerically correct MUF. The complexity of ASAPS is well expressed in the program's full name: Advanced Stand Alone Prediction System.

For ease of use and presentation, Ham Companion 3.0 comes in near the top, in my opinion.

It also does lots more than just propagation. MINIMUF v4.1 is one in a long list of classic propagation MINIMUFs—one of the first readily available computer MUF programs. Like MINIMUF, Micromuf (also called Propplus, and originally from Radio Netherlands), and ASAPS are propagation only programs, with ASAPS being the more advanced.

MINIMUF is simple and excellent value for money along with Micromuf, BandAid and DXAID, all of which are part of CD-ROM collections. Figure 2 shows the origin of each of the programs and their cost. By the way, more useful data, in addition to MUF, is predicted by each program. Check with the sources listed in Figure 2 for the latest versions.

Figure 2: Source List of MUF Programs Compared

PROGRAM	SOURCE NAME & ADDRESS	PRICE
ASAPS v2.21	Jacques d'Avignon 965 Lincoln Drive Kingston, ON Canada K7M 4Z3	$275
DXAID v3.0	Peter Oldfield 251 Chemin Beaulne Piedmont, Quebec Canada J0R 1K0	US$25,CAN$30,UK15ps Post Paid
Ham Companion v3.0	Brinson Microware Corp. 114 S.E. 4th Street Mooreland, OK 73852 1-800-874-0771	$79.95 + S/H
MINIMUF v4.1	AMSOFT-World of Ham Radio CD-ROM Jan 94 P.O. Box 666 New Cumberland, PA 17070 Tel. (717) 938-8249	$40.00 S/H in USA $3 Elsewhere $5
BandAid I v1.1	AMSOFT-World of Ham Radio CD-ROM Jan 94 P.O. Box 666 New Cumberland, PA 17070 Tel. (717) 938-8249	$40.00 S/H in USA $3 Elsewhere $5
MicroMuf	AMSOFT-World of Ham Radio See above	

Note: Bandaid III available from : Base(2)Systems, 3747 Pettis N.E., Ada, MI 49301 Tel. (616)874-8894 - $25 registration

BYTES of BITS

• From Roger West of Wisconsin comes news that could unshackle us from the maximum of eight character file name. Usually, when I save a frequency file I wish that the name of the file could be more descriptive. Then, at a later date, when I am browsing my files, I would know what data it contained. However, the architects of the IBM PC limited file names to eight characters (plus three extender characters).

Now, according to Roger, a software package called I.D.F. by Alman Software, gives the user the possibility of using 31 characters. If anyone knows Alman's address, pass it along, or have them contact me, and we'll see if we can do a review.

• On a follow-up to the discussion we had about Commodore C-64 computers, back in May 1993, Sherwood Clough of New York asks where SWL cartridge software can be purchased. Well, Sherwood, because the C-64 is "long in the tooth" the only advertisements I've seen for cartridge software in this country are from G & G Electronics, 8524 Dakota Dr., Gaithersburg, MD 20877, (301) 258-7373. Check the original C-64 column for other "last-known" sources.

• Holy Hoka! Michael Fry of Indiana is not only a Hoka believer, he is a Hoka OWNER! Michael writes that Hoka is alive in Holland and is in the process of "revamping" its organization in the US. He says that he obtained the Hoka Code 3 with the latest version of the software V4.02, in a trade for a Jupiteru 7100 handheld. Michael comments on the wide range of data types that it is capable of decoding and compares it to a "poor man's WaveCom 4100..." which is many times the cost of the Hoka.

On the negative side, he reports that the Hoka 3 is "primarily a software decoder with no filtering ...". Well Michael, you showed us it exists. And in late breaking Hoka news, I can tell you that the people who make ScanCat will be the new US agents and will be providing yours truly with one for review. Soon we'll all see if this is a Dutch treat!

• Update. In the February column we looked at PC Shortwave Monitor, a database only program. We understand that a new version, 2.2, has recently been released and is available from Scott Gitlin (86-29 155th Ave., Howard Beach, NY 11414; 718-738-8943). The blurb says that using the new version with old files does not require re-entry. Also, in that same issue we inadvertently printed a phone number for DataFile that is not a business number; all dealings with DataFile (P.O. Box 20111, St. Louis, MO 63123) must be by correspondence.

• Winter colds and virus season over? A news item sent in by Lisa Herder of New Hampshire, reminds us that computer viruses can be present in the most unlikely places. According to a December 9th *Rolling Stone* magazine article, when President Clinton's Health plan was sent out by the White House on computer disks, at least one recipient claimed they were contaminated with the Stoned III virus. Maybe a joke after recent comments made by Clinton's Surgeon General!?

Maybe not! The first column this author sent into Brasstown was contaminated by a earlier strain of the same virus. I traced it to word processing disks that my daughter had brought home from her university's computer center! It's a good idea to scan your system with a virus detection program regularly; especially if you are a regular BBS user or use a computer center. These anti-virus clean and detect programs are available from a number of commercial and public domain/shareware sources. Check your local computer stores.

Thanks Lisa for that "sick" news. Don't worry, Brasstown, this column has been scanned. AAAchew! April Fool! MT

Doug Demaw, W1FB

The Broadband Sloping-V Antenna

Have you been wishing for an effective gain type of wire antenna that is broadly directional? If so, perhaps cost is a factor that has kept you from constructing or purchasing an antenna that fits this general description. The sloping-V antenna may be just the low-cost system you need for effective short-wave listening in the high frequency part of the spectrum. Let's learn what's involved in the mechanics of this simple antenna.

The sloping V has received little attention among radio amateurs in the past few decades, even though it offers good performance and simplicity of erection. Perhaps the lack of interest can be associated with the requirement for two terminating resistors that must be capable of dissipating one half the transmitter power. Large noninductive 300-ohm resistors (a necessity) are not only hard to find, but they are very expensive. However, if this antenna is used only for reception we can use ordinary 1/2- or 1-watt carbon or carbon-film resistors for terminating the two wires seen in Figure 1.

Almost any type of wire you elect to use is satisfactory for this antenna. It need only be of sufficient strength to support itself without breaking during icing or periods of strong wind.

A Practical Sloping V

You need a mast or tower that is 40-60 feet high for the dimensions given in Figure 1. A tall tree may be used in lieu of a metal support. Terminating resistors are used to make the antenna directional off the slope of the wires. These resistors must be attached to an earth ground so that signal energy can flow through them. Although 6-foot ground stakes are specified, they will not, by themselves, provide an adequate ground in terms of high antenna performance.

The efficiency of the V is enhanced by running a wire from each ground stake to the support structure. These two wires may be buried a few inches in the soil, or you may simply let them lie on the surface. Two more wires of the same length may be extended from the ground posts outward from the antenna to further improve performance, but they are not essential.

R1 and R2 are 300-ohm carbon resistors, as discussed earlier. They should be protected from the the sun and rain by enclosing them in 1-1/2 inch pieces of 1/2-inch OD PVC pipe or an equivalent insulating cover. PVC pipe caps are cemented in place on the tubing after they have been equipped with terminals to which the antenna and ground wires can be attached. I use no. 8-32 screws and nuts for this purpose. See Figure 2 for details.

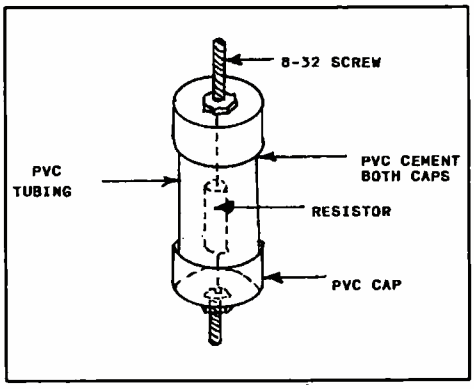


Figure 2: Construction method for protective covers that house the antenna terminating resistors of Figure 1. See text for further information.

Antenna Characteristics

In the favored direction (see arrow in Figure 1) you can expect several dB of antenna gain, especially at the upper end of the design frequency (30 MHz). The effective gain declines somewhat as we approach the lower frequency range of the system.

The antenna has a relatively broad lobe that favors the chosen part of the world to be monitored. If you are interested in listening to European DX you should slope the two wires NE if you live in the USA. The wires need to slope in a southerly direction for monitoring signals in Central and South America, and so on. But, just because the antenna is erected to favor a given direction it does not restrict reception of signals from other parts of the globe. The tradeoff is that incoming signals will be somewhat weaker off the sides and back of the system.

The characteristic impedance of the sloping V is roughly 600 ohms, owing to the value of R1 and R2. This suggests that R1 and R2 could be

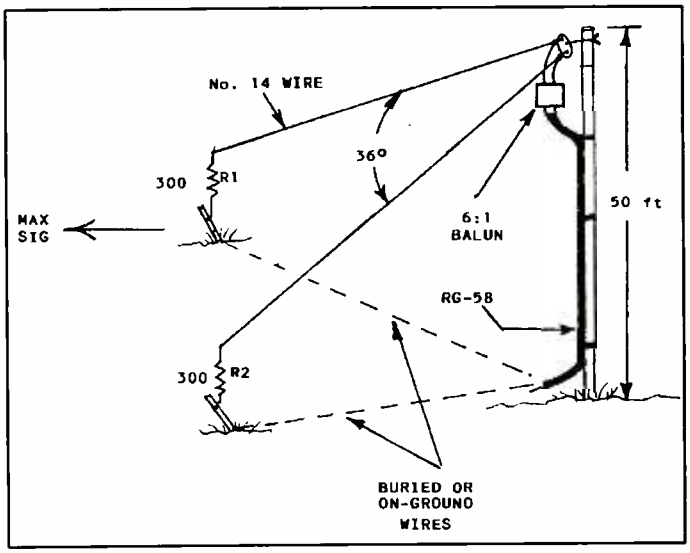


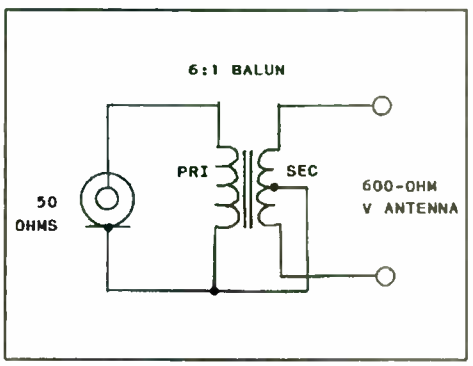
Figure 1: Details of the broadband sloping V antenna for DX reception. The apex angle is 36 degrees for the wire length given here. The optimum apex angle for longer wires can be calculated from data provided for V-beam antennas (see *The ARRL Antenna Book*, chapter 13).

changed to 100 ohms each to obtain a 200-ohm feed impedance. This would permit the use of a small 4:1 balun transformer at the feed point so that 50-ohm coax could be used for the feed line. If you maintain the 300-ohm resistors (600-ohm feed impedance) you will need to use a balanced antenna tuner at your receiver to accommodate the balanced feed line. You may use 450-ohm ladder line or 300-ohm TV ribbon line for the feeder if you retain the balanced feeders. Alternatively, the home-made broadband transformer in Figure 3 can be used at the feed point to allow 50-ohm coax to be used for the feeder.

Each of the antenna wires should be at least 1 wavelength long at the lowest receiving frequency for best results, although good reception is possible somewhat below that frequency with a loss of gain and directivity resulting. Thus, for reception from 7 to 30 MHz we would make each wire 135 feet long. They would be shortened to 94 feet each for use from 10 to 30 MHz [L(feet) = 936/f(MHz)]. The greater the number of wavelengths per wire the higher the antenna gain.

In a like manner, the greater the antenna height the better the performance. The rule of thumb for height is that the support should be 1/2 to 3/4 the length of the wires. The sloping V

Figure 3: Data for building a 12:1 balun transformer. It is used at the antenna feed point to allow the use of 50-ohm coaxial feed line. See text for information about using a standard 4:1 balun.



The toroid core for this balun is available from Amidon Assoc., 2216 E. Gladwick St., Dominguez Hills, CA 90220. The core is an FT-82-43. The primary uses 6 turns of no. 26 enamel wire. The secondary winding has 36 turns (center tapped) of no. 26 enamel wire. Enclose the transformer in a weatherproof plastic enclosure and install it at the antenna feed point.

responds to both horizontal and vertical signal energy. This can be beneficial in minimizing signal fading (QSB).

Tag Ends

SWLs sometimes avoid the effort of erecting a quality receiving antenna. They try to make do with a short piece of wire that is only a few feet above ground or strung up in an attic. Others rely on the short whip antennas that come with some receivers. None of the foregoing antennas are effective for pulling in those weak, distant signals. An antenna of the type described in this article can open the door to reception you have never experienced, and only a few hours of work are needed to construct this DX-getter! I hope you will give it a try.

Bill Cheek

Old and New Technology — Test Equipment

Here's a slick little project for dedicated radioists of all types and kinds, from hams to CB'ers; from SWL's to scannists; and from engineers to technicians on a budget. The key word here is ***b-u-d-g-e-t.*** Electronic test equipment can be very expensive but our RF VOLTAGE PROBE this month will cost very little, if anything. You might already have everything you need laying around your shack. So what's an RF Voltage Probe?

In a word, an RF probe is a "detector": a simple circuit that samples radio frequency voltage and converts it to a proportional DC level that can be measured with almost any high impedance voltmeter! Professional RF voltmeters basically fit this description, but unless your needs are for absolute measurements down to the millivolt, this month's RF probe will satisfy virtually all needs. Even demanding professionals generally need only an indication of RF rather than an absolute value. RF voltages can be extremely difficult to measure by the casual hobbyist and expensive to measure by the professional. Using some old technology and an old circuit, we'll show you a slick new way of putting it all together! Figure 1 shows the schematic diagram of the detector. Figure 2 depicts the mechanical approach.

The really slick part of this project involves the use of the body and light bulb of a pocket penlight, such as Radio Shack's #61-2626. The only part of this flashlight not used is the push-button end and the internal spring "guts" of the penlight. The metal body of the penlight serves as a shielded housing for the detector circuit and something to grasp when making measurements.

FIG - 1: RF DETECTOR PROBE SCHEMATIC

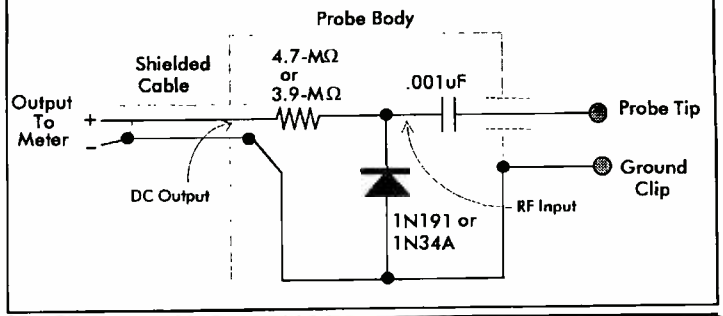
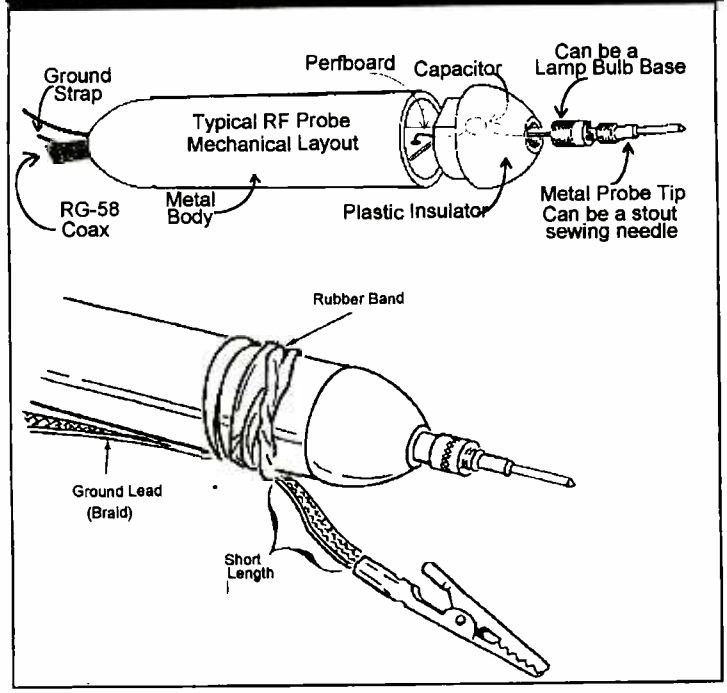


FIG 2 - RF PROBE - MECHANICAL



If you choose to use the penlight as the basic building block, then first remove the push-button end and the spring inside. It will probably just push out through the tube if you apply a little force. Next, unscrew the lamp bulb from the white plastic head and carefully break the glass and clean out its threaded base without damaging it.

Get a very stout sewing needle or something comparable to serve as the probe tip and solder it to the ***center conductor*** of the bulb's threaded base from ***inside the shell*** so that the point sticks out in the same direction as the glass formerly did. Fill in the hollow base of the bulb around the needle with epoxy or hot glue to give the assembly some strength. Screw it back into the white plastic head. Finish up that part of the operation by filling in the rest of the white plastic head with either expoxy or hot glue. Then solder one ***shortened*** lead of the 0.001-µF capacitor to the outside (back side) of the ***center conductor*** of the bulb's threaded base.

Build the simple detector circuit in Figure 2 on a narrow piece of perf board that can slide down inside the metal tube. Insert a 3-ft section of RG-58 or RG-59 coax into the hole left by removal of the push button. Prepare the end of that coax so that the center conductor can be soldered to the back end of the resistor (DC OUTPUT) and the shield of the coax to the ground on the board. Solder the free end of the 0.001-µF capacitor to the junction of the diode cathode and the front end of the resistor (RF INPUT).

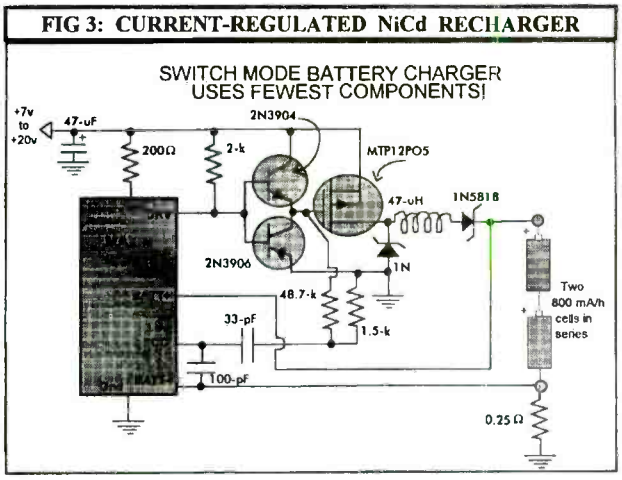
Carefully slide the whole assembly into the tube and gently screw the white head into the metal tube like it came out. Install some sort of a connector on the distant end of the coax to mate with the connector requirements of your high impedance voltmeter—usually a dual-banana plug, but this can vary from one meter to the next. I'll leave that up to you.

Assembly of the RF probe is not particularly critical, but if you plan on measuring RF much above 25 MHz or so, you should be particularly observant of keeping all leads very short, especially those of the diode, capacitor and the front end of the resistor. Nothing is very important from the back end of the resistor down through the coax.

If you want your RF probe to be reasonably accurate, then the choice of the resistor can be critical. Check the specs of your meter; most have an input impedance of either 10Ω or 11-MΩ. If 10-MΩ, use a 3.9-MΩ resistor. If your meter has 11-MΩ input impedance, then select a 4.7-MΩ resistor. If your meter has some oddball input impedance other than 10-MΩ or 11-MΩ, then select a resistor approximately 35%-45% of that value. The resistor converts the peak-to-peak (P-P) value of the RF signal to a DC RMS (Root Mean Square) value, generally more useful than P-P. *(RMS equals 0.707 times P-P, and P-P voltage equals 1.414 times RMS voltage.)*

Connect your RF probe to any high input impedance DC voltmeter. The output voltage of the probe is a positive DC, and the voltmeter should be set accordingly. The RF probe can be used as a signal tracer and gain analyzer, as well as an RF voltage measuring device. It can also be used as a general purpose RF detector for emissions up to around 100-MHz or so. (Great for hidden transmitter hunts and debugging operations!) Its sensitivity will be enhanced with an "antenna" connected to the probe tip, if you're sampling signals from the air.

FIG 3: CURRENT-REGULATED NiCd RECHARGER



You can also connect an antenna to the input of a wideband RF preamp and then sample the output of the preamp with the RF probe for even greater sensitivity! (When a preamp is used for this purpose, it would be good to connect a 50-ohm resistor across the preamp's output to simulate the 50Ω input of a receiver.) Because this probe is designed primarily for RF applications, signals below 10,000 Hz will read low. Forget the RF probe and use the AC section of the voltmeter for frequencies below 10 kHz.

If your receiver is not functioning properly, the RF probe can be used as a signal tracer: First, connect the probe to the output of the second detector stage and note the amount of RF energy present there. If no indication, move the probe back to the output of the last IF stage and observe the meter again. If still no indication, move the probe to the input of this stage and, if necessary, further forward toward the RF input in this step-by-step manner. The point at which RF energy first appears will indicate that the trouble is in the circuit immediately following this point. (Local oscillator operation can be checked by connecting the probe to the oscillator.)

The probe sensitivity is limited by the sensitivity of the voltmeter, so it is unlikely that you will obtain satisfactory measurements in the RF and mixer stages of a receiver where signals are in the microvolt range. The RF probe will be good for signals of a couple millivolts (0.002-v) up to the break-down voltage of the diode (30-v). Use this same procedure to check RF or IF amplifier gain. Write down the readings obtained and divide the output voltage by the input voltage. The answer you obtain will be the gain of the stage or stages. RF voltages from transmitters can also be measured, providing the ratings of the diode are not exceeded.

30 volts P-P will be about maximum for a single diode as shown in Figure 2. If your needs for an RF probe include transmitters above 15-watts, then use two or more diodes in series to extend the ratings. One diode is good for 15 watts RF; two for 70-watts and three for 150-watts. Depending on the voltage rating of the 0.001-µF capacitor, DC voltages up to 1000 volts can be safely connected to the probe as long as the superimposed RF voltage does not exceed the RF voltage limit of about 30-volts, P-P, per diode.

For measurements in circuits where the RF frequency is lower than 25 MHz, the ground lead length and position is generally not critical. For measurements of higher frequency signals, the frequency response of the probe can be maintained "flat" by securing the ground lead firmly to the probe body with a rubber band as shown in Figure 2. This provides a short length ground return with a low inductance. The RF probe is an indispensible tool around the serious monitoring shack.

Fast-Charge NiCd and NiMH Batteries in Less Than 1 Hour

Safe, Reliable, and Low Cost Solution

Two or three issues back, I gave you a neat circuit to let you safely recharge your NiCd battery packs. Here is another one, better than ever....and "smart," too!

The MAX-712 and MAX-713 chips are complete battery charging systems in a single IC (integrated circuit). Each contains an A/D converter, analog power-control circuitry, and all the intelligence necessary to safely and reliably fast-charge and trickle-charge nickel-cadmium (NiCd) or nickel-metal-hydride (NiMH) batteries. Automatic switchover from fast-charge to trickle-charge protects batteries, as do user-set charge rates, temperature detection points, and timeout periods. Both devices come in 16-pin narrow SOIC and DIP packages. Fig 3 shows the most complicated circuit!

The MAX712 and MAX713 charge from 1 to 16 cells connected in series. They use a combination of voltage-slope, temperature, and timeout detection to terminate charging. The MAX712 detects zero voltage slop; the MAX713 detects negative voltage slope. They can fast-charge at rates of 4C to C/3 (20 minutes to 4 hours), or trickle-charge at a C/16 rate.

These devices can be configured as either a linear regulator or a switch-mode regulator to control the charging current. Each application is designed to use low-cost components. For example, the linear application needs only a PNP transistor, diode, and low-cost passive components.

Contact the maker of these "smart" recharger chips below, but don't expect to buy direct in low quantities. Instead, act very professional, and ask for the distributor of their chips nearest you. You can also ask for a data sheet on these and other chips in the Maxim line: ***Maxim Integrated Products, Inc.; 120 San Gabriel Drive; Sunnyvale, CA 94086; (408) 737-7600.*** Well, that will do it for this month. As always, my ears are open for what you want. MT

W. Clem Small, KR6A, CET

More Effects of the Earth on Antenna Performance

Some Help With Your DX Work

In January, we discussed the fact that the earth can reflect radio waves somewhat like a mirror reflects light waves. This reflection causes waves traveling earthward from an antenna to "bounce" off the earth under and around the antenna in a more-or-less upward direction. The interaction of these reflected waves with the other waves from the antenna are important in determining the shape of the antenna's radiation and reception pattern (R-R pattern).

In figs. 1a and 1c, note the different angles of signal radiation with relation to the horizon. Fig. 1c, in which a half-wave antenna is sited 1/2 wavlength above the ground, shows a lower angle radiation than the same antenna 1/4 wave-length above the ground (fig. 1a). As you may know, low angle radiation allows HF signals to strike the ionosphere farther from the transmitting antenna. Thus, low angle signal radiation (and reception) means longer distance communications (DX) than higher angle radiation. For DX work horizontal dipoles should be mounted at least 1/2 wavelength high.

On the other hand, being close to the earth has a different effect on other antennas mounted in other configurations. For instance, the earth interacts with a quarterwave grounded vertical antenna (fig. 1D) to produce a greater proportion of low angle radiation than is true for either of the horizontally mounted dipoles. This is the main reason vertical antennas are popular with those interested in DX communications.

Fickle Feedpoint Impedance?

A centerfed halfwave dipole has a 72-ohm feedpoint impedance, right? Not necessarily. Those waves reflected from the ground do more than affect the antenna's radiation pattern. Look at fig. 1B and note that the feedpoint impedance of a halfwave dipole is not always 72 ohms. In practice it can be any value from about 45 ohms to approximately 100 ohms, depending on the antenna's height above "radio ground" (which in dry ground can be considerably below the surface).

Note that in fig. 1B the antenna's height is measured in terms of wavelength. Consider a trap dipole designed for both 7 MHz and 21 MHz. If this antenna is hung 23 ft above radio ground it presents the traditional 72 ohms to the feedline at at 21 MHz, yet the same antenna presents nearly 100 ohms at 7 MHz!

Thus, for many antenna installations we have some degree of mismatch between antenna and feedline with the standard feedline impedances available. Of course it is possible to adjust the antenna's height to provide the correct impedance, but changing the height will also affect the vertical radiation pattern as discussed above.

On the other hand, such mismatches for receive-only HF antennas are not usually any problem because the listenability of an HF signal is generally determined by the signal-to-received-noise ratio rather than by signal strength.

Getting Grounded

There are situations in which, although we may want the benefits of a well-grounded antenna; it turns out to be difficult to accomplish, as when installing an antenna in an upstairs apartment or where the earth is dry and lossy. In such cases we often rely on radials or counterpoises, as discussed briefly in January's column. Let's explore how one can put these ideas into practice.

When using radials as part of a grounded vertical antenna (fig. 1D) they may be from .1 to .25 wavelength long. A common recommendation is to use as many radials as you can afford. It is customary to use three or four, but the more you use the better. Radials can buried a short distance below the surface of the ground, radiating out from the antenna base like spokes of a wheel. Some reports indicate that radials above the ground and insulated from ground may lead to a more efficient antenna than buried radials.

When a coaxial feedline has RF flowing on its outer conductor, the feedline becomes a part of the antenna; this generally changes the antenna's radiation and reception pattern. If the antenna is used for transmitting, then RF on the feedline can also lead to RF burns or RF bites for the radio operator. Radials a quarter wavelength long can be used to isolate an antenna's RF energy from the feedline's exterior. One to four such radials are attached to the point of the antenna system which would otherwise be grounded, usually the outer braid or shield of the coaxial feedline.

A counterpoise is essentially a conductor or even a screen of conductors directly under an antenna, something like a shadow of the antenna at high noon. It can be as simple as a single wire stretched under the antenna, insulated from the earth and connected to nothing. When working over poorly conducting ground, a counterpoise will sometimes help, especially for close-in HF communications.

Incidentally, Lee DeForest, the self-styled "American Father of Radio," told the following story of a situation in which, as you will see, the use of radials would have come in handy. One of his assistants was helping him in an experiment to show how well wireless would work from a hot-air balloon in flight. During preparations for

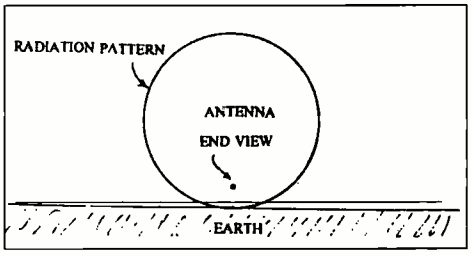


Fig. 1A: Vertical radiation pattern for a horizontal halfwave antenna 1/4 wave above ground.

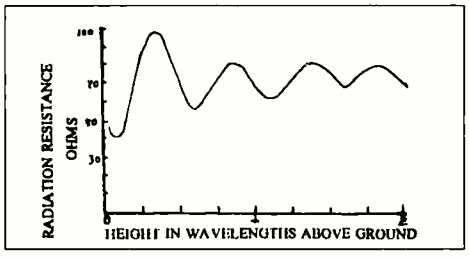


Fig. 1B: Same antenna's feedpoint impedance as its height above ground is varied.

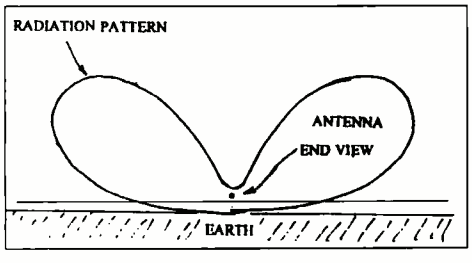


Fig. 1C: Vertical radiation pattern for a horizontal halfwave antenna 1/2 wave above ground.

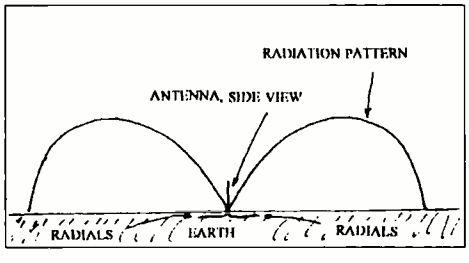


Fig. 1D: Vertical radiation pattern for a 1/4 wavelength grounded antenna.

the flight, the assistant realized that, during the flight, there would be no means to connect the wireless set to the ground. Pausing only a moment the assistant raced away and quickly returned with a potted flower, quickly inserting the wireless set's ground lead into the bit of earth in the flower pot! (No, it didn't help.)

Humming Along

Reports continue to come in on the mysterious low-pitched humming sound reported several months ago in this column. For instance, one man in southwestern Utah has sold his home and moved away to escape from the unusual, low-pitched hum which was driving him to distraction.

Overseas, *MT* reader Norman Lynagh of Buckinghamshire, England, writes that this phenomenon has been reported for some years around his home town of Largs in the west of Scotland. According to a newspaper report which Norman sent to *MT*, government scientists have brought in high-tech equipment to try to locate the sound's source. Here in the U.S.A. the team of scientists at work studying the humming sound heard around Taos, New Mexico, has failed so far in its efforts to locate its source. And so, as yet, no one has a clue as to what is going on! Hmmm.

RADIO RIDDLES

Last Month

Last month I asked: If you were inside a radio tower which was essentially a tall, vertical metal tube, and the tower was being used as an antenna for a 100 kilowatt broadcast transmitter, what effect would the radio-frequency current flowing on the antenna likely have on your body?

Well, according to theory, RF penetrates a conductor only "skin deep." At HF the current flow should be limited to the surface, and very near the surface, of the tube. There should be essentially no current flow inside the tube and you should be safe from harm. On the other hand, if the signals were a really short wavelength and got accidentally coupled to the tube's interior, the tube might act as a waveguide and you might get fried!

This Month

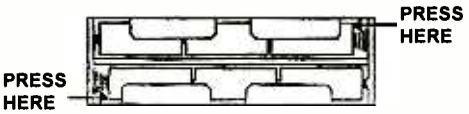
If you were an earthworm under the surface of the ground very near the base of the antenna tower referred to above, would the radiation from the tower have any effect on your little body?

We'll have the answer to this month's riddle in next month's issue of *Monitoring Times*. 'Til then, Peace, DX, and 73. MT

Bob Grove, WA4PYQ

Bob's Tips of the Month

Drake SW-8 Battery Fix



Some users of the popular, new Drake SW-8 receiver have complained that it won't work on batteries. A discussion with the factory revealed the problem; fortunately it is easy to fix.

The battery compartment is very tight; some brands of D cells (Mallory "Copper Tops" seem to be reported most often) stick to the walls and won't easily seat against the top center post contact in spite of the spring pressure against the bottom cell.

If you are experiencing this problem, try inserting the cells firmly against the top center post contact (the other end of the compartment, away from the spring). After inserting the last D cell, press the entire stack tightly against the top contact; the spring will make firm contact with the bottom of the last D cell on its own.

You may even wish to select another (slimmer) brand that slips in the trough more easily. In spite of the promotional hype, most alkaline cells are pretty much alike!

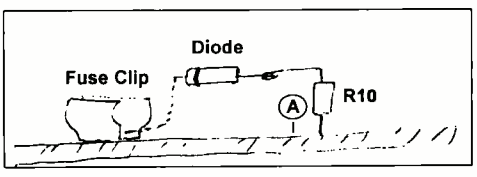
ICOM R72 Clock Fix

Some owners of the ICOM R72 have experienced an erratic clock reset to zero when they switch their receivers off, or unplug the power cord, requiring resetting when they want to use their clocks.

A call to ICOM revealed that the problem is simple to fix, but it does involve acquiring a diode and soldering it into place. ICOM service stations will perform the procedure as a warranty service, but many owners with soldering experience will prefer to do the mod themselves to avoid the delays and possible damage of shipping.

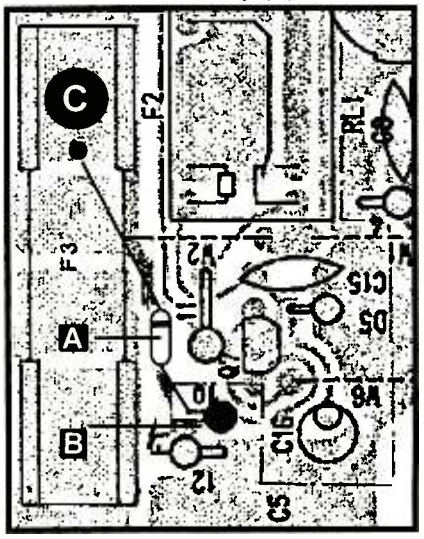
Tools required: Philips screwdriver, small soldering iron, rosin core solder, wire cutters, IN4148 or IN914 diodes, 1/2" length of wire insulation, sharp knife, safety goggles.

1. After disconnecting the AC power cord, remove the eight screws holding the top cover; remove the cover carefully without stretching the speaker wires. Unplug the speaker connector from the circuit board.
2. Locate the power supply module at the rear center of the radio; if yours is a model with a battery pack, carefully unplug the battery. Remove the glass fuse (F3) from its clip as well.
3. Locate resistor R10 (labelled "10") and, leaving as much length of its top (visible) lead as possible, clip that lead from the circuit board. Scrape the paint off this lead and bend it into a small loop.
4. Select your IN914 or IN4148 diode and clip the anode lead (the unmarked side of the diode; the other side will have a stripe) to a length of approximately 1/4 inch; thread that lead through the loop of resistor R10 and loop the diode lead as well.
5. Pinch the two loops gently closed and carefully solder the connection.
6. Place a 1/2" length of insulation over the remaining (cathode) lead and guide it to the inside base of the farthest (not closest) fuse clip. Solder it securely after removing excess wire length.
7. Reverse steps 1 and 2 and test the radio before tightening the cabinet screws.



Interconnect detail showing how R10 lead is cut from board (A) and attached to anode (unmarked) end of diode, remaining lead is covered by insulation and soldered to inside base of fuse clip.

Circuit board showing how diode (A) is added to cut lead of resistor R10 (B) and soldered to fuse clip (C)



***Q.** When our local police department dispatcher directs an officer to "go to 2" (cop-to-cop communications), the frequency remains the same; how come? (Name withheld, Salem OR)*

***A.** It is common for repeater users to switch their radios to the repeater output frequency for direct communications to restrict range.*

***Q.** Can a frequency counter be used to determine the frequencies assigned to an 800 MHz trunking station? Are there monitoring tricks to find the frequencies? (Rodney Souza, Maui, HI)*

***A.** You can use a frequency counter to determine the frequency of any steady, unmodulated signal of reasonable signal strength. For reliable measurement you should be within 50-100 feet of the base transmitter or within 10-50 feet of a mobile unit.*

If you know any one frequency of the trunked system, you can often predict the others. Licensees are usually granted blocks of five frequencies (5, 10, 15, etc.), often separated by exactly 1 MHz. Enter four frequencies higher and four frequencies lower than the one you know, separated by exactly 1 MHz, and you may well hit more. Use the search mode to find other frequencies that don't follow the plan; they will be close.

Finally, remember that base station frequencies will be 45 megahertz higher than mobile frequencies.

***Q.** Is there a simple way to determine the optimum length of a telescoping whip antenna for my scanner? (Anders Hager, Sweden)*

***A.** For most applications, a quarter wavelength is considered optimum, but since scanners cover such wide frequency ranges, no single length will work optimally throughout the range.*

For any particular band (VHF-high, UHF land mobile, etc.), you can choose a good center frequency length by using the following formula: 2808 divided by the frequency in megahertz gives you the length in inches. In metric, 7125 divided by the frequency in megahertz gives the length in centimeters.

***Q.** How does one decide which antenna connectors on the backs of receivers like the Drake R8*

should be used for various antennas? (Rex Whetzel, Wolcottville, IN)

A. For transmitting purposes, the correct choice of feedline impedance is much more important than for receiving. Theoretically, the term "high impedance" (often labelled "HI-Z") is reserved for single-wire feedlines, or even long random wire antennas hooked directly to the receiver. A pair of high impedance terminals may be used for twin lead.

Low impedance ("LO-Z") refers to coaxial cable lines and almost always has a jack, usually an SO-338 female chassis connector to attach to a PL-259 male coax plug. On smaller portables the connector may be a mini phone plug. Older tube radios often had nothing more than two screws (antenna and ground—the coax shield).

There is still one hitch. Many manufacturers assume that you won't be using a coax-fed antenna for long and medium wave reception, anticipating a random wire instead. On these radios, signals above 1.8 MHz are brought into the coax jack, while lower frequency signals are fed to the high impedance connection.

Alert manufacturers may include a rear-panel switch to combine the two ports, but some radios require a jumper wire to allow one antenna to be used on both frequency ranges.

***Q.** I recently compared the relative senstivities of my Uniden BC200XLT and Realistic® PRO-43 scanners. I had heard that Realistic® scanners had less sensitivity; I didn't find that at all. What accounts for the differences? (Rodney Souza, Maui, HI)*

A. Company philosophy. Unless a receiver is carefully (expensively) designed, high sensitivity often brings with it strong-signal overload vulnerability. Because city dwellers frequently complain about Bearcats' overload vulnerability, Tandy took the less-sensitivity approach. The tiny differences aren't always noticeable, yet may afford considerable overload immunity.

For example, every 1 dB less sensitivity given a scanner, intermodulation overload is reduced by 3 dB. It is often a valuable tradeoff since the majority of scanner users will be in populated areas with plenty of signals.

One more thing: not all specifications are measured the same way. They should be, but they aren't. There are hard and fast rules that engineers use for accurate comparisons, but by the time marketing gets hold of the specs, they may not resemble what the engineers had in mind. MT

Airborne Scanning: In the December issue, we printed a list of which electronic devices are banned on various airlines. Several readers noted that Delta's policy changed last summer. A copy of Delta's in-flight magazine, sent to us by Wayne Townsend of Greenville, SC, specifies: "The following may be operated when the aircraft is not in the taxi, take-off, initial climb, approach, or landing phases: ... VHF scanner receivers..."

We also saw a message from Curt Phillips which originated on a BBS in Saratoga, NY, in which he noted the same thing. Though he hasn't tried taking a scanner, he says, "I took my 2-meter handheld on my USAir flight from Albany to Orlando and back. Did a little scanning during the on-ground waits, though the pushing and shoving of some airplanes in the line for takeoff was a bit unsettling in Washington. They wouldn't behave, or even obey the traffic controller. I turned the radio off!

"Once in the air, though, the fine print in the [US Air] magazine had no complaints about AM/FM radios or whatever, as long as you didn't transmit. [Delta still prohibits AM/FM radios at all times.-ed] If you bring along Walkman-type headphones, you won't attract any attention either. I spent most of the flight back north listening to 2-meter repeaters underneath me. Really amazing to hear how many things you can hear from up there!"

Steve Donnell of Newmarket, NH, had so much fun taking advantage of Delta's new policy, we forwarded his lengthy account on to Jean Baker. He does add, however, "If your total flight time is more than a couple of hours long, you might want to take an extra battery pack along. When you purchase the tickets for your flight, be sure to reserve a seat next to a window. Sitting even a few feet away will seriously reduce the signals that you can receive, due to shielding from the aircraft's metal body."

NJ Scanning: Irvin Sanders (Harrisburg, PA) had some very enjoyable comments to make about the new plastic mailer and how it thwarted those at his local Post Office who wanted to read it first... and goes on to say, "As I read 'Scanning New Jersey's Garden State Parkway' by Bob Kozlarek, I noticed he didn't include the repeater at Cape May Courthouse, 146.61-600; one of the greatest repeaters in the southern New Jersey shore area. I use it while vacationing in Stone Harbor."

For the Record: Bob Grove clarifies, for the sake of reader Silas Cole, a statement he made in a January book review. In the review Bob mentioned his association with the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP). Bob acknowledges that he is a subscriber to CSICOP's magazine *Skeptical Inquirer*, not a member of the organization. While such a distinction may seem petty, its purpose is no doubt to protect CSICOP from possible lawsuits, and Bob apologizes for any confusion.

Shuttlebutt: Here are two items related to February's Space Shuttle article: One is a clarification that classified DoD payloads are no longer carried on the Shuttle. The other is a newsclipping passed on by Harry Baughn regarding the terrible audio quality of shuttle communications. Atlanta *Constitution* columnist Joel Achenbach passed on a report from engineer Eddie Burrell, subsystem manager for the Shuttle Audio Distribution System, who says, "The interior of the shuttle is noisy as heck. So they have to use a special noise canceling microphone that blocks out background noise. The problem is, it can also block out your voice." The Shuttle audio was also designed back in the 70s with a narrow frequency range, and worse yet—it's built into the spacecraft and can't easily be redesigned.

April Foolishness?

The following letters (names omitted) may not be strictly apropos for April, but it's as good an excuse as any to air a few unusual points of view.

- "If I had known that there would be two photos of that repulsive Fascist R.L. (Rush Limbaugh) included in *Passport to World Band Radio 1994*, I never would have purchased it. As it is, I don't like having it in my house. I was able to obliterate the pictures with black magic marker and that helped some, but I do believe you should put warning labels on publications that contain pornographic images."

- "I wonder if your community has encountered ads similar to the enclosed (above). I can see this creating a whole new hobby specialty: How about the 'Association for the Monitoring of 666'?! Just what is on .666, 6.660, 66.600 and 666.000, anyway? Is this really the frequency of evil?

"I'm so glad God isn't encumbered by frequencies. He's multilingual, polyphased, broadbanded and multiplexed...and he doesn't overload your front end, either. Now that's DX!"

- "We have enjoyed your magazine immensely and consider it the best in the business. Our decision to not renew our subscription has nothing to do with the magazine's quality. The decision is based solely on last week's passage of NAFTA (The North American Fraud and Treason Act) by the 234 traitors in the House of Representatives. We have decided to eliminate all of our non-essential expenses in order to set our affairs in order before the imminent collapse of the country's economy."

Not Poetic Justice

To balance the above, here is an appeal to reason from Joseph Lynn of Algonquin, IL.

"I feel I have to comment on your item, 'The Grim Reaper is Reaped' (regarding Arbitron's exit from the TV ratings business) in your February 'Communications' column.

"Arbitron and A.C.Nielson provide radio and television stations with data that the stations have commissioned to be collected. Your article incorrectly implies that the ratings companies are the ones responsible for the career setbacks of many people in the broadcasting industry: I believe the problem lies with the industry itself.

Continued on page 111

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Club Circuit

Club Listings M-Z

Club Circuit is a service to our readers to help radio hobbyists connect with other enthusiasts. If you belong to a monitoring club which is not listed, write for a listing form today. (No amateur radio clubs, please.)

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: Bob Walker, P.O. Box 81621, Rochester, MI 48308. E-mail via Internet MARE/Ken Zichi ab415@leo.nmc.edu. Great Lakes Region. All bands. *Great Lakes Monitor.* $9.50 US & Canada. $1 sample.

Minnesota DX Club: Al Samson, P.O. Box 10703, White Bark Lake, MN 55110, 612-822-1186 for meeting info. Minnesota. All bands. *MDXC Newsletter.* $10.

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. Cincinnati/Dayton area; Full spectrum SW and scanning.

Mountain NewsNet: James Richardson, P.O. Box 621124, Littleton, CO 80162-1124, (303) 933-2195. 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. Worldwide; AM/FM. *DX News* 30 times yearly. $24 in U.S.; sample for a 29 cent stamp. Annual Labor Day convention.

National Radio Club - DX Audio Service: Ken Chatterton, P.O. Box 164, Mannsville, NY 13661, (315) 387-3583. Worldwide. North American Broadcasters. *DX-Audio Service* (90-min. tape, 12 yearly). $25 in U.S.

NYC Radio Fre(ak)Qs: Joe Alverson, 199 Barnard Ave., Staten Island, NY 10307, 718-317-5556. NY boros & LI; VHF/UHF/HF utilities. *NYC Radio FRE(ak)Qs.* No dues.

New Zealand Radio DX League: P.O. Box 3011, Auckland, New Zealand. MW, SW, FM, TV. *New Zealand DX Times.*

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

North American SW Assoc.: Bob Brown, 45 Wildflower Road, Levittown, PA 19057, (215) 945-0543. Worldwide; Shortwave broadcast only. *The NASWA Journal.* $25 in U.S. Regional meetings.

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. Meet 3rd Tuesdays.

Northeast Scanner Club: Les Mattson, P.O. Box 62, Gibbstown, NJ 08027, (609) 423-1603 evenings. Maine thru Virginia; UHF/VHF, public safety, aircraft, military. *Northeast Scanning News (NESN).* $29 annual; $3 sample.

Ontario DX Association: Harold Sellers, General Mgr., P.O. Box 161, Station A, Willowdale, Ontario M2N 5S8, Canada, (416) 853-3169 voice & fax, (416) 444-3526 DX-Change information svce; (905) 841-6490 BBS. Predominantly Province of Ontario; All bands. *DX Ontario.* $30.76 Canadian, $26 in U.S. Meet 3rd Wednesdays, Toronto; bi-monthly, Ottawa.

Pacific NW/BC DX Club: Phil Bytheway, 9705 Mary NW, Seattle, WA 98117, (206) 356-3927. Pacific NW and BC Canada. DXing all bands. *PNBCDXC Newsletter.* Irregular meetings.

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

Pitt Co SW/Scanner Listeners Club: L. Neal Sumrell, Rt. 1 Box 276, Sumrell Rd., Ayden, NC 28513-9715. Eastern NC; All bands. *The DX Listener.* Irregular meetings.

Puna DX Club: Jerry Witham, P.O. Box 596, Keaau, HI 96749, (808) 982-9444; Puna, HI; SW and MW. Meet 1st Tuesdays. No dues.

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

Radio Monitors of Maryland: Ron Bruckman, P.O. Box 394, Hampstead, MD 21074. Maryland, (410) 239-7366; VHF/UHF/HF utilities. *Radio Monitors Newsletter of MD.* Meet irregularly.

RCMA (Radio Communications Monitoring Assn.): Carol Ruth, Gen'l Mgr., P.O. Box 542, Silverado, CA 92676. North America, Europe, Australia; All modes above 30 MHz. *RCMA Journal.* $24 in U.S. Regional meetings.

Regional Communications Network (RCN): Jay Delgado or Public Information Unit, Box 83-M, Carlstadt, NJ 07072-0083. 50 mile radius of NY City; 2-way Radio Public safety notification group.#10 SASE for info.

Rocky Mountain Radio Listeners: Mike Curta, P.O. Box 470776, Aurora, CO 80047-0776. Metro Denver, Colorado. All bands. Meets monthly 2nd or 3rd Sundays 1-4pm, Aurora Central Library.

Scanning Wisconsin: Ken Bitter, Dept. MT, S. 67 W. 17912 Pearl Dr., Muskego, WI 53150-9608, (414) 679-9442. Wisconsin. VHF/UHF. *Scanning Wisconsin* ($2 for sample)

Southern California Area DXers (S.C.A.D.S.): Don R. Schmidt, 3809 Rose Ave., Long Beach, CA 90807-4334, (310) 424-4634. California area; AM, FM, TV, scanner and shortwave broadcasting.

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

SPEEDX (Society to Preserve the Engrossing Enjoyment of DXing): Bob Thunberg, Business Mgr., P.O. Box 196, DuBois, PA 15801-0196. Worldwide; SWBC, utilities. *Shortwave Radio Today.* $23 annual in US. Sample $2 or 6 IRCs. $2 for info on award program open to all.

Susquehanna Co Scanner Club: Alan D. Grick, P.O. Box 23, Prospect St., Montrose, PA 18801-0023. PA area. Scanning. Meets irregularly.

Toledo Area Radio Enthusiasts: Ernie Dellinger, N8PFA, 6629 Sue Lane, Maumee, OH 43537. NW Ohio and SE Michigan; Shortwave, scanning, amateur. Meets 3rd Tuesdays 7pm Holland Big Boy.

Triangle Area Scanner/SW Listening Group: Curt Phillips, KD4YU, P.O. Box 28587, Raleigh, NC 27611. Central NC.

Wasatch Scanner Club: Jon Van Allen, 2872 West 7140 South, West Jordan, UT 84084. State of Utah. VHF/UHF. Newsletter/directory.

World DX Club: Arthur Ward, 17 Motspur Drive, Northampton, England NN2 6LY (in USA-Richard D'Angelo, 2216 Burkey Drive, Wyomissing, PA 19610). Worldwide. All bands with emphasis on SW. *Contact.* $20 overseas airmail. Meets every 6 weeks in Reading, UK.

Worldwide TV/FM DXers Association (WTFDA): P.O. Box 514, Buffalo, NY 14205-0514. Worldwide membership; TV DX, FM BC, VHF utilities. *VHF-UHF Digest.* Annual convention. $20 annual in U.S. $2 for sample.

New Listings:

British Columbia Shortwave Listening Club (BCDX): Box 500, 2245 Eton St., Vancouver, BC, V5L 1C9, (604) 255-8987 fax. Shortwave. *LOGJAM.* Meeting 3rd Thursdays 7pm at 920 Davie St.

International 11 Meter Alliance: Allen Newton, Rt. 1 Box 187-A, Whitney, TX 76692, (817) 694-4047. Public safety, traffic handling, all bands espec. 11 meters.

SPECIAL EVENT CALENDAR

Date	Location	Club/Contact Person
April 10	**New Castle, DE**	Penn-Del Hamfest/P.O. Box 1964, Boothwyn, PA 19061, 302-798-7270 Location: Nur Temple on Route 13, 8am-2pm, $5 admission, talk-in on 147.225 (+) and 224.220/R
April 10	**Madison, WI**	Madison Swapfest and Computer Fair/Madison Area Repeater Assoc. Box 8890, Madison, WI 53708-8890. Location: Dane County Expo Center Forum Building, doors open 8 am, $5 admission, talk-in on 147.15 repeater.
April 16	**Clinton, TN**	Oak Ridge Hamfest '94/Oak Ridge ARC, Gene Muncy, KB4UMM Route 5, Pine Circle, Clinton, TN 37716. Location: National Guard Armory, 8 am to 5 pm, $5 admission, talk-in on 146.88.
April 17	**Rockford, IL**	Rockford Hamfest/Joe, P.O. Box 6931, Rockford, IL 61125 815-399-6995. Location: Metro Center, 8 am to ??, $5.50 admission, talk-in on 146.61.
April 17	**Cambridge, MA**	MIT Radio Society and Harvard Wireless Club Flea Market Albany and Main Sts., 9 am to 2 pm, $2 admission, talk-in on 146.52 and 449.725/444.725. More info: W1GSL, P.O. Box 82 MIT BR., Cambridge, MA 02139.
April 23-24	**Abilene, TX**	Key City ARC Hamfest/Peg Richard, KA4UPA, P.O. Box 2722, Abilene, TX 79604, 915-672-8889.
April 29-May 1	**Dayton, OH**	Dayton Hamvention/Dayton Amateur Radio Assoc., Dave Grubb, KC8CF, Chairman, PO Box 964, Dayton, OH 45401, 513-276-6930.
April 29-30	**Dayton, OH**	Special Event Station W8BI/8 operating from Dayton Hamvention flea market. Open to the public and operating during flea market hours: 1200-2200z 29 April; 1000-2100z 30 April; 1000-1600z April 1994. Usually be operating in the general and novice phone and CW portions. QSL to: W8BI/8, PO Box 44, Dayton, OH 45401. For further info contact chairman, Charles Cotterman, KA8OQF, 26 Mello Ave., Dayton, OH 45410.
May 1	**Burlington, IA**	Burlington Hamfest/Valley Emergency Communications Assoc., P.O. Box 911, Burlington, IA 52601-0911; (319) 752-3000. Location: Burlington Drive-In Theatre, 7:30 am to 3 pm, $4 admission, talk-in on 146.790 and 146.520 simplex.
May 7	**Cedarburg, WI**	Ozaukee Radio Club Swapfest/Chairman, W70N1018 Hampton Ct., Cedarburg, WI 53012; (414) 377-7468. Location: Circle-B Recreation Center, Hwy 60 and County I, 8am to 1 pm, $3 admission, talk-in on 146.37/.97 and 146.52.
May 14-15	**Birmingham, AL**	BirminghamFest/Birmingham ARC, P.O. Box 10521, Birmingham, AL, 35202-0521; (205) 979-7039. Location: South Exhibition Hall of the Birmingham-Jefferson Civic Center, $6 admission, doors open 9 am both days.
May 15	**Cambridge, MA**	MIT Radio Society and Harvard Wireless Club Flea Market See April 15 above.
May 15	**Wheeling, WV**	Wheeling Hamfest and Computer Show/Triple States RAC, Box 240, RR #1, Adena, OH 43901; (614) 546-3930. Location: Wheeling Park, 8 am to 3 pm, $3 admission, talk-in on 146.910 and 146.715.
May 20-23	**Paris, France**	European DX Council Conference
May 21-22	**New Ulm, MN**	The New Ulm ARC will operate KB0IWV 1600Z-0400Z May 21 and 1600Z-2300Z May 22 to celebrate Hanska's 10th annual Syttende Mai to commemorate the anniversary date of the constitution of Norway in 1814. Look for us around 7.250, 14.250 MHz and the club repeater at 147.33+. For a certificate, send a QSL and a 9x12 SASE with two first class stamps or a #10 SASE for a folded certificate to KB0IWV, NUARC, Pat Mathiowetz, RR4 Box 14-A, New Ulm, MN 56073.
May 22	**Hagerstown, MD**	Great Hagerstown Hamfest/Antietam Radio Assoc, W3CWC, P.O. Box 52, Hagerstown, MD 21741. Location: Hagerstown Jr. College Rec. Ctr., 8 am to 3:30 pm, $5 admission, talk-in on 146.34/146.94 repeater.
May 22	**Sun Prairie, WI**	The Communications Research Group will be holding its spring meeting from 12 pm to 5 pm. For more information contact Scott Miller at (608) 837-7666 evenings.
May 22	**Wheaton, IL**	GMRS of Illinois May Fest '94/2077 W. Roosevelt Road, Wheaton, IL 60187; (708) 690-1492. Location: DuPage County Fairgrounds, 8 am to 1 pm, $5 admission, talk-in on 146.52.
May 28	**Springhill, LA**	Springhill and Arkla ARC Hamfest/David Smith, KF5BF, P.O. Box 812, Springhill, LA 71075; (318) 539-3226. Location: Springhill Civic Center, talk-in on 146.73 and 147.39.
May 28-29	**Poughkeepsie, NY**	Poughkeepsie ARC/Donald Stein, W2PTF, 3 Little Road, Wappingers Falls, NY 12590; (914) 297-9608. Location: Young/Morse House, South Road, free admission to Special Event station. See May *QST* for callsign, times and frequencies of operation.
May 29	**Chicago, IL**	Chicago ARC Hamfest/5631 W. Irving Park Road, Chicago, IL 60634; (312) 666-1606 or (312) 545-3622. Location: DeVry Institute of Technology, 3300 N. Campbell, 8 am to 3 pm, $4 admission, talk-in on 147.255 and 444.825.

Monitoring Times is happy to run brief announcements of radio events open to our readers. Send your announcements at least 60 days before the event to:

Monitoring Times Special Event Calendar
P.O. Box 98, Brasstown
NC 28902-0098

INDEX OF ADVERTISERS

STOCK EXCHANGE

Ads for **Stock Exchange** must be received 45 days prior to publication date. All ads must be paid in advance to *Monitoring Times*.
Ad copy must be typed for legibility.

Monitoring Times assumes no responsibility for misrepresented merchandise.

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SHORTWAVE SALE: PANASONIC RF-B60 $100; JRC NRD-525 with NVA 88 speaker $800; SONY AN-1 ACTIVE ANTENNA $60. All mint, original boxes. Hall Acuff, 6833 Dartmoor Way, San Jose, CA 95129; (408)252-1319.

THE ANARCHIST'S BBS is a resource for anarchists, investigators, researchers, computer hackers and phone phreaks. Categories include: Computer hacking, Investigation techniques, Telecommunications technology and Surveillance. Call (214)289-8328 for free trial access.

WANTED: SONY 5900W and MAGNAVOX D2999. Call Don at (806)763-0044.

Take heed SHORTWAVE LISTENERS. Are you planning to deal with Mike Papagorgio's coin show "Money Makes Money"? Please contact me before you buy from him. George DiPrinzio, 837 E 232 St., Bronx, NY 10466; or call collect (718) 231-5638.

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MC INTOSH MR-78 FM TUNER in original walnut case, best offer over $1000. Matching C32 and MC2300 amp and preamp also available. Bill (412) 243-1569.

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DRAKE R8 Mint condition in original box with manual, under warranty through August. $750 includes UPS shipping. Will include Alpha-Delta DX Sloper Antenna (with 70 RG8X coax installed and weatherproofed with instructions) and Radio Shack Minimus 77 Speaker for $825. Call Mike at (810) 651-2757.

PRO-39 HANDHELD SCANNER with all modifications. Comes with AC charger/NiCd batteries. Best 800 MHz in the business. As new; mint $300 shipped. (407) 898-4152.

FOR SALE: YAESU FRG-8800 RECEIVER with matching FRT-7700 Antenna Tuner. Both in excellent condition, with manuals and original shipping cartons. $375 includes shipping. Steve (916) 333-1550.

REGENCY TS-2 full 800 MHz, 75 ch fast 40 ch sec scan mint condition. Uniden Corp. gave it a thorough check-up recently. Has 60 day warranty, $200; REALISTIC® PRO-37 portable 800 MHz 200 ch with NiCds, DC adaptor, $160; PRO-36 20 ch portable, $85; PRO-2023 base, $80. Price includes shipping and insurance. Ron (909) 698-0455.

SHORTWAVE TRANSMITTER. Ship-to-shore 135 Watts voice $75; 1.8 Amp 12VDC Power Supply $35; SWL Microlog Morse/RTTY Decoder for Commodore 64/128 $40. Chuck (702) 746-5692 evenings.

PANASONIC RF-B65 $160; REALISTIC® DX-340 $180. With boxes (410) 658-2260 evenings.

JRC NRD 515 with 96 channel memory unit, all Sherwood mods including 1.2, 2.4, 4.0, 8.0 kHz filters, IF mod for SE-3 synchronous detector, ultimate selectivity mod, operating and service manuals, dust cover, near mint condition, $850. Dean Bianco (914) 961-8477.

FOR SALE: ZENITH TRANS OCEANIC CLIPPER MODEL 8G005, complete, appearance fair, good operation, photos available, $400 or best offer. Phone (619) 549-4243.

LETTERS *Continued from page 106*

"It is the broadcasting industry that has accepted the words of Arbitron and Nielsen as gospel; it is the broadcasting industry that bases its rate books on the data these companies provide; it is the broadcasting industry that comes up with the knee-jerk format changes or DJ reshuffling every time a 'book' comes out. And it is the broadcasting industry that continues to pay millions of dollars to the ratings services, all the while becoming increasingly afraid to try anything new for fear of a 'bad showing,' resulting in 'safe' formats that have less excitement than a bottle of paste.

"There are notable exceptions to this. One cannot dispute the popularity of Rush Limbaugh and Howard Stern, who have made names for themselves by not fitting into the traditional formats: they stand out because they're different. Someone had to take the risk and put them on the air in the first place. While I am not a fan of either, I applaud the fact that they have not conformed to the blandness that covers the dial.

"The moral of the story is this: market research firms provide data, and those who purchase the data are free to do as they wish with it, whether it means firing an entire on-air staff and changing a format overnight, or saying 'to Heck with the ratings, we'll do what we want because we believe in it.' Unfortunately precious few broadcasters are willing to place themselves in the latter category.

"Then again, if they did, I wouldn't be such an avid SWBC listener."

That's it from here; more next month as we look again at your letters and opinions on the world of monitoring times.

Rachel Baughn
Monitoring Times Editor

DX RADIO TESTS and DX NEWS

Information on more tests such as these can be found in *DX Monitor*, the publication of the International Radio Club of America (IRCA) and *DX News*, the publication of the National Radio Club. Both clubs are devoted to the hobby of hearing distant stations on the standard AM broadcast band.

For a sample copy of *DX Monitor*, send one 29 cent stamp ($1 US or 1 IRC overseas) to: IRCA, P.O. Box 70223-MT, Riverside, CA 92505, USA.

For a sample copy of *DX News*, send one 29 cent stamp to: NRC, P.O. Box 5711, Topeka, KS 66605-0711.

This month's tests were arranged by J.D. Stephens for the IRCA.

Monday, April 4, 1994: KCCR-1240, 106 W. Capitol, Pierre, SD 57501, will conduct a DX test between 1:00 and 1:30 am EDT. The test will include big band music and Morse code IDs. Reception reports may be sent to: Mr. Dan "D.T." Meyer, Music Director.

Monday, April 11, 1994: WQPM-1300, P.O. Box 106, Princeton, MN 55371, will conduct a DX test between 1:30 and 2:00 am EDT. The test will include Morse code, test tones, voice IDs and songs about radio. Reception reports may be sent to: Mr. Chris London, WDX0FBJ. Mr. London will accept fax reception reports at (612) 389-1359. After the machine picks up, dial *2.

Monday, April 11, 1994: KVOW-1450, 603 E. Pershing Street, Riverton, WY 82501-3605, will conduct a DX test between 2:10 and 2:20 am EDT. The test will include test tones and Morse code IDs. *This test will be repeated on the second Monday of each month at this time.* Reception reports may be sent to: Mr. Lonny A. Fairfield, N7TSP, Chief Engineer.

Closing Comments

April 26th:

The Deadline is Here

In 1986, the Cellular telecommunications Industry Association successfully bought Congressional support outlawing listening to mobile telephones. But the effort backfired—the enormous media publicity that surrounded CTIA's move piqued the curiosity of the public who began to listen to what they had previously overlooked.

In 1992 the CTIA bought additional legislation to restrict the frequency ranges of newly-manufactured scanners so that only the millions of scanners already in use, along with countless older TV sets, VCRs and tunable receivers, could hear cellular telephone calls. That won't work either, but the cutoff date is here. So what does that mean?

As stipulated by the Telephone Disclosure and Dispute Resolution Act, after April 26, 1994, no manufacturer can make in the U.S., or export to the U.S., scanning receivers or frequency converters that are designed, or can be readily altered, to receive cellular telephone frequencies.

Americans may no longer even import up to three cellular-capable scanners for their own use by filing an FCC form 740. In fact, a visitor to the U.S. may well be stopped at customs and required to surrender the contraband scanner.

Any quantity of cellular-capable scanners in this country on April 26 can be sold indefinitely, and anyone can buy, sell, repair, own and use this equipment indefinitely. Scanners with poor image rejection will still receive cellular calls—legally; users will simply tune their scanners a little higher to the image frequencies (typically 894-916 MHz).

But the damage has been done. In what has been perceived by many as an effort to deceive its customers, the cellular industry has created an illusion of privacy by successfully lobbying to restrict the American right to monitor radio signals passing uninvited into our homes and through our bodies.

Previously, the law stipulated that in the case of interference, an aggrieved party could tune in a cellular transmission long enough to determine whether it was the cause of interference. Now, even if a cellular telephone tower is built adjacent to your home, you are denied the right to acquire inexpensive equipment to determine whether its radiations are causing interference to your household electronic appliances, or even to what extent they are penetrating your body.

Bob Grove
Publisher

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