

BBC CUTS, COAST GUARD, MILITARY FREQUENCIES,
WIRELESS M CS, YAESU VR-120 REVIEW

Volume 29, No. 7 July 2001

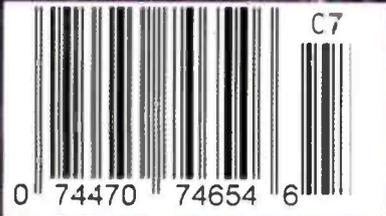
U.S. \$4.25
Can. \$6.50
Printed in the
United States

Monitoring Times

Monitoring Nature's Fury



EXPIRATION DATE: 04/01/2002
THOMAS J SOKIRA
69 HANOR DR
CHESHIRE CT 06410-2615



C7

0 74470 74654 6

610 P1

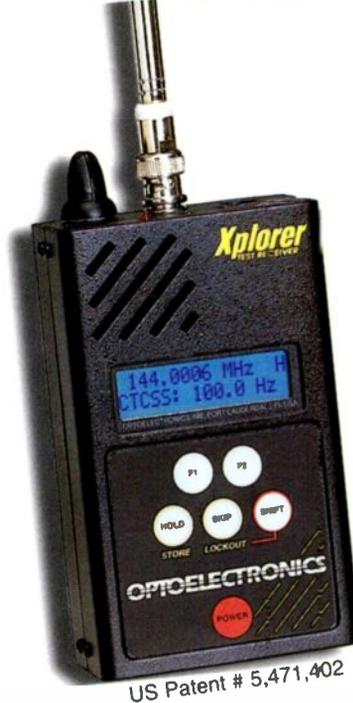
Discover the Unknown



The Xplorer Test Receiver is a handheld nearfield receiver that locks onto the strongest signal in the nearfield in one second.

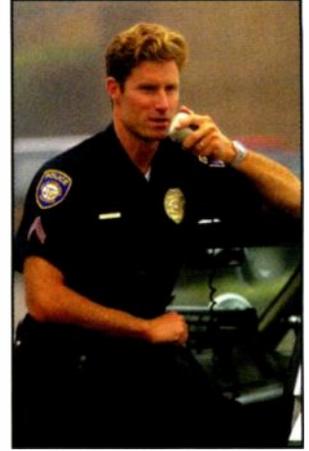
With its sensitive front end, the Xplorer is capable of locking onto a 5 watt UHF signal from as far away as 800 feet.

Once locked to a signal the Xplorer demodulates the FM audio and decodes any CTCSS, DCS, LTR or DTMF tones present.



US Patent # 5,471,402

Xplorer comes supplied with TA100S antenna, rapid charger, PC interface cable and software for memory download.



A unique feature of the Xplorer is its ability to lock out or lock in up to 10 different frequency ranges, like FM broadcast stations.

With 500 memories and an automatic time and date stamp you'll know exactly when the frequency was captured.

The Xplorer Test Receiver, ideal for checking out two-way radios or checking out the nearfield action.

OPTOELECTRONICS®

Order Direct 800-327-5912

5821 Northeast 14th Avenue • Ft. Lauderdale, FL 33334

Telephone: 954-771-2050 Fax: 954-771-2052

Email: sales@optoelectronics.com

www.optoelectronics.com

*Cellular frequencies blocked except for FCC approved users

SPECIAL!
\$699

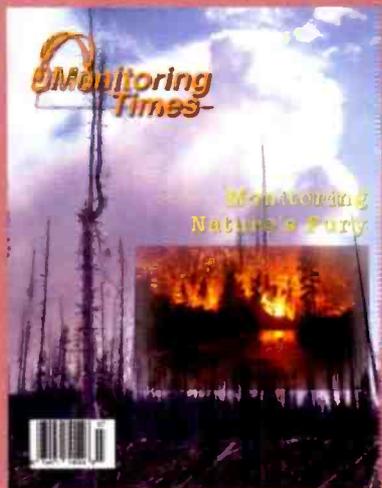
Save \$200

Hurry!! Limited Time Offer

Monitoring Times

Vol. 20, No. 7

July 2001



On our Cover

2001 Fire Season

Scanning

By Jon Van Allen

There is always a fire season the only question is, how bad will it be? During drought conditions, fires may not even wait for a season, but may spring up anytime, as they already have in Florida this year.

During last year's devastating fires in several western states, the author realized his frequency information was out-dated. The National Interagency Fire Center had made several changes to improve communication between agencies. Jon shares his discoveries and experiences as he and his wife monitor firefighting efforts near their camp in Yellowstone National Park. (Story starts on page 10.)

Cover photos: Charred wood from a fire near Grant Village, Yellowstone National Park; photographer Karen Van Allen. Inset: Elk in the Bitterroot River, courtesy of Alaska Type I Incident Management Team; photographer John McColligan, Bureau of Land Management, Alaska Fire Service.

A Monitor's Guide to Maps..... 12

By Bob Felton

You may be listening to pilots preparing to land or reporting waypoints on a long-distance flight; you may be following police chasing a suspect or reporting a traffic pile-up; you may be listening to search and rescue efforts to reach stranded hikers in a wilderness area; you may be tuning in to a remote broadcast from Zimbabwe . . . Whatever it may be, when you locate what you are hearing by seeing it on a map, you have introduced a new dimension into your listening.

Broadcasting in Zimbabwe 14

By Colin Miller

This ancient, landlocked African country has a sporadic history in radio. Shortwave broadcasting resumed in 1994 after a few years off the air, but only one of two transmitters appears to be active. This is a rare catch that would be a real gem in any DXer's log.

KJES 17

By Hans Johnson

Have you actually listened to KJES? This religious broadcaster has gotten a bad rap in the DX press, says Johnson, and it deserves a second look. You might be surprised.

A "folded" Folded Dipole..... 18

By Richard Q. Marris G2BZQ

Marris adapts this classic, simple antenna design for use as a portable or indoor VHF/FM antenna with directional qualities. Using simple twin feedline for construction, it's both easy and inexpensive.

Listening to the Grand Old Game 20

By Ken Reitz

Every Major League baseball team has its flagship radio station and a network of affiliate stations so its fans can hear out of town games. For those outside the reach of local broadcasts, the games have been available via internet audio, but MLB is now charging a seasonal fee for this audio feed. Check this article and the *Monitoring Times* website for the 2001 roster of ever-changing flagship and affiliate stations.

Memories from Baseball Broadcasts..... 21

By Harold Driscoll

Back in the '50s, when a team had an out of town game, the radio broadcast of the game may have sounded like live action reporting – and it was, sort of. Except the announcer was getting the play-by-play via teletype. It was Harold Driscoll's job as technical director to make it *sound* live. And thereby hangs a tale..

Hand held ERD* NOW available...



(Actual Size)

The *ERD-1500* * Electromagnetic Radiation Detector is an exceptionally efficient "RF Sniffer" developed to quickly and reliably locate sources of electromagnetic interference. The detector contains sophisticated circuitry including a miniature wide-band antenna with a high-performance amplifier and detection circuits for maximum sensitivity.

The detector features optical (LED) and acoustic (buzzer) indication. The brightness of the indicator LED and the pitch of the audible tone will increase proportionally with the strength of the detected signal, making it simple and easy to locate the radiation source. The *ERD-1500* covers a very wide frequency range from approximately 50 Hz to 1500 MHz.

Power is supplied by two 12V batteries (not included). The sliding switch on the side of the unit has three positions: off (middle position), high sensitivity (far field) and low sensitivity (near field).

Specifications

- Frequency Range 50Hz -1.5GHz
- Sensitivity 25 μ V/cm typical
- Visual and acoustic indication

Applications

- Tracing sources of electromagnetic interference (EMI)
- Surveillance countermeasures (detection of "bugs")
- EMC (electromagnetic compatibility) pre-testing
- Quick safety radiation check of transmitters and appliances
- Installation and set-up of computer-based radio monitoring systems

For further product information, please visit our website:

www.winradio.com

info@winradio.com



MONITORING TIMES
 (ISSN: 0889-5341);
 Publishers Mail
 Agreement #1253492)
 is published monthly by
 Grove Enterprises, Inc.,
 Brasstown, North
 Carolina, USA.

Copyright © 2001 Grove Enterprises, Inc.
 Periodicals postage paid at Brasstown, NC,
 and additional mailing offices. Short excerpts
 may be reprinted with appropriate credit.
 Complete articles may not be reproduced
 without permission.

Address: P.O. Box 98,
 7540 Highway 64 West,
 Brasstown, NC 28902-
 0098
 Telephone: (828) 837-9200
 Fax: (828) 837-2216 (24 hours)
 Internet Address: www.grove-ent.com or
 e-mail: mt@grove-ent.com
 Editorial e-mail: mteditor@grove-ent.com
 Subscriptions: order@grove-ent.com

Subscription Rates: \$25.95 in US; \$38.50
 Canada; and \$57.50 foreign elsewhere, US
 funds. Label indicates last issue of subscrip-
 tion. See page 90 for subscription information.

Postmaster:
 Send address changes to *Monitoring Times*,
 P.O. Box 98, Brasstown, NC 28902-0098.

Disclaimer:
 While *Monitoring Times* makes an effort to
 ensure the information it publishes is accu-
 rate, it cannot be held liable for the contents.
 The reader assumes any risk for performing
 modification or construction projects pub-
 lished in *Monitoring Times*. Opinion or
 conclusions expressed are not necessarily the
 view of *Monitoring Times* or Grove Enter-
 prises. Unsolicited manuscripts are accepted.
 SASE if material is to be returned.

Owners

Bob and Judy Grove
 judy@grove-ent.com

Publisher

Bob Grove, W8JHD
 bgrove@grove-ent.com

Managing Editor

Rachel Baughn, KE4OPD
 mteditor@grove-ent.com

Assistant Editor

Larry Van Horn, N5FPW

Art Director

Bill Grove

Advertising Svcs.

Belinda McDonald
 (828) 837-9200
 belinda@grove-ent.com

Reviews:

The *Yaesu VR-120* is a tiny, wide-coverage scanner so similar in features, size, and price to the Icom IC-R2 that Bob Parness does a head-to-head comparison between the two. One surprise is to find the VR-120's stock antenna excels at shortwave reception. See the review on page 84.

Jock Elliott is so taken with the *Icom IC-706MkII* amateur radio receiver, that he is making a case for new hams to consider jumping straight to an all-in-one transceiver when they get their license, instead of gradually accumulating an arsenal

of equipment for each meter band. He covers basic features in the first of this two-part review on page 88.

What is an internet "receiver" and is it really a radio? John Catalano reviews the *iRhythm* internet tuner and tries to answer this question (page 80).

Long-time subscribers will especially appreciate our index of all *Monitoring Times* reviews published between 1994 and the current issue. Not all reviews are available as reprints, but if you have the collection at home, this index will help you find what we reviewed and when (p.36).

TABLE OF CONTENTS

Departments:

Washington Whispers 4
Sealand to Operate Web Sites
 Letters 6
 Communications 8
 Stock Exchange 90
 Advertisers Index 90
 Department Staff 90
 Closing Comments 92
The BBC Should Reconsider

First Departments

Getting Started
 Beginner's Corner 24
\$10 Multi-Purpose Mobile Antenna
 Ask Bob 26
 Bright Ideas 27
 Scanning Report 28
Scanning for Wireless Microphones
 Service Search 30
Military VHF/URF Spectrum
 Utility World 32
US Navy MARS Reorganizes
 Utility Logs 33
 Digital Digest 35
Useful Modes - or Pits?
 Global Forum 36
Lose a Lot, Gain a Mile
 Broadcast Logs 39
 The QSL Report 40
QSLing International Amateurs
 Programming Spotlight 41
New Media, the BBC and Magazines

Listening Guide

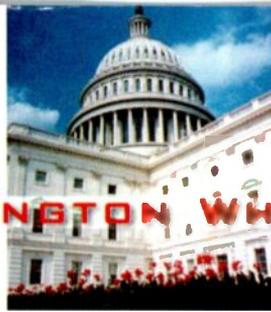
English Language SW Guide 42
 MT Satellite Service Guide 62
GE-1, G-Star 4, Anik F1, Anik E2

Second Departments

View from Above 63
Operational VEsas
 The Fed Files 64
Coast Guard on VHF/JHF
 Tracking the Trunks 66
Travel Tips
 Milcon 68
Airshow Update
 American Bandscan 70
Join the Club
 Outer Limits 71
Do we need an unlicensed BC band?
 Below 500 kHz 72
LF Receiving Antennas - II
 On the Ham Bands 74
Ragchewing and Other Fun
 Radio Restorations 76
Continuing the SW-4 Restoration
 Antenna Topics 78
Antennas for Medium and High Freqs

MT Reviews

Computers & Radio 80
What is an Internet tuner?
 SW Equipment 82
Synthesizers and How They Work - I
 Scanner Equipment 84
Yaesu VR-120 Portable Scanner
 MT Review 86
MT Index of Reviews 1994-2001
 Easy Access 88
Icom's IC-706MkII - Part I
 What's New 89



Sealand to Operate Internet Websites

The music and movie entertainment industry wants ISPs (Internet Service Providers) to be responsible for the file-sharing piracy actions of their subscribers. But new stealth platforms are emerging that make it impossible for ISPs to detect copyrighted file-sharing. These systems "hide" online data collection and transfer by scrambling information making it impossible for ISPs to police the activities of their users.

By far the most exotic of these operations is *HavenCo.com* which is locating its servers to the sovereign Royal Principality of Sealand. Sealand is a man-made island fortress in the North Sea off the coast of Great Britain, France and Germany. It is constructed of two hollow concrete cylinders and a steel platform very similar to a large sea-based oil-drilling platform.

Unbelievably, the 450 feet by 125 feet platform nation claims to be an independent country. See a photo at: <http://www.fruitsofthesea.demon.co.uk/sealand/gallery.html>. The Sealand government has their website at: <http://www.sealandgov.com/>. There is also another Sealand website at: <http://www.principalitysealand.net/> which is said to be a fake.

The history of Sealand

The entire history of Sealand is steeped in controversy and "cloudy" information. During World War II, the United Kingdom established a number of offshore military bases to defend England against German air raids. These sea forts housed enough troops to man and maintain artillery designed to shoot down approaching German aircraft and missiles.

One of these concrete and steel fortresses, called "Roughs Tower," was located about seven sea miles from the English coast in the international waters of the North Sea ...more than double the then-claimed three-mile range of territorial waters. It was occupied by 200 British servicemen. After the war ended, the troops were withdrawn and the fortresses torn down - all except Fort Roughs Tower.

From a legal point of view, (so the story goes) the deserted and abandoned island platform constituted extra-national territory. This paved the way for occupation. On September 2, 1967, Paddy Roy Bates, a former English major, settled there with his family. One version has it that he seized Roughs Tower from the operators of Radio Caroline, a pirate broadcast station.

With skillful legal help, Roy Bates had the man-made island declared a conquered territory and his own private state. He bestowed the title of Prince Roy of Sealand upon himself ...his wife became Princess Joan. In 1968, the independence of

Sealand was upheld in a British court decision where the judge held that Roughs Tower stood in international waters and did not fall under the legal jurisdiction of the United Kingdom. The Royal family and other loyal persons have occupied Sealand ever since ...for more than 30 years!

In 1975 the Sealand national Constitution was developed ...followed by the flag of the Principality of Sealand, a national anthem, and stamps. Gold and silver coins bearing Princess Joan's head (tied to the U.S. Dollar) were launched as Sealand Dollars. At one point, Prince Roy tried to license a Florida group and others, to start radio and television broadcasting from Roughs Tower.

Island "nation" leased to computer firm

In 1999, with the health of the Royal family failing, the founders of HavenCo began negotiations to take over control of the "country" as the location of its secure servers and datacenter operations. Last year, a deal was finalized between the Royal Family and HavenCo to exclusively lease all the physical territory of Sealand. HavenCo, Ltd., which is registered in the Caribbean nation of Anguilla, will be linked with the outside world using satellite links.

Haven Co. is as its name implies - a tax haven where (according to their website at <http://www.havenco.com/>) "...the customers' data will also be physically secure against any legal ac-

tion." They offer "Advanced cryptographic protocols to support access control, financial transactions, and secure transaction backup."

Their management team has a background in Internet sports betting, tribal gaming and Caribbean casino operation. MIT-trained Ryan Lackey, an expert in cryptographic electronic cash handling, is their Chief Technical Officer. HavenCo's Chief Logistics Officer is "Michael of Sealand." Michael, now 49, is the son of the reigning Prince Roy of Sealand whose age now approaches 80.

Michael has "...spent several years renovating and manning the Sealand fortress as well as arranging for all security and logistics. Michael has a good knowledge of firearms and is highly trained in combat shooting and small arms." That little bit of website information apparently means that the Principality of Sealand will be defended.

Sealand, which says it has de facto recognition by some governments, is attempting to obtain a greater level of world recognition. It wants to have more of a real world nation status rather than a strange legal curiosity. There has even been talk about "annexing" more land next to the island and setting up a casino.

In October 2000, the Radio Amateur Association of the Principality of Sealand was formed. Its headquarter's club ham radio station is ISL1A. RAAPS' charter says it will represent Sealand in international amateur radio affairs, will attempt to obtain IARU and ITU membership and have Sealand added to the ARRL-DXCC list. It was supposed to have been on the air from last December 9 to 12, 2000. But the operation was postponed, possibly because of the HavenCo., Ltd., deal. Theoretically, Sealand set aside ISL2 prefixed call signs for reciprocal operation. Check out its website at: <http://www.isl.org>.

It is no longer possible to develop a man-made country in the middle of the sea. A United Nations conference on the Laws of the Sea held in Montego Bay December 1982 agreed that a neighboring country is required to consent to the construction of any artificial island. Furthermore, the island must be dismantled and removed immediately after its intended use.

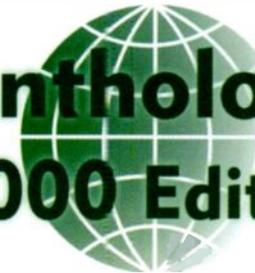
This is admittedly an unbelievable story ...one that we have been following for some time. We will just have to wait and see what happens. It is getting difficult to separate fact from fiction!

Two great new ways to get the most out of your favorite communications magazine.

MTX PRESS

&

Anthology 2000 Edition



*Now-Receive your subscription to **Monitoring Times** at nearly the speed of light! No delays due to mailing, no lost or torn copies. Be the first to receive breaking news from the frontier of communications!*

For less than the cost of a subscription in the U.S., you can be reading the entire *Monitoring Times* magazine anywhere in the world before U.S. subscribers receive their printed copies! Active utilities loggings, world hotbed frequencies, international broadcasting schedule changes, new product announcements! This is the exact same magazine that has gained a worldwide reputation for reliable radio information that's easy to understand, and products and projects of proven value.

For a mere \$19.95 U.S., **MT EXPRESS** gives you *Monitoring Times* magazine

- in PDF format viewable with free software
- delivered by FTP (10 MB file)
- viewable in brilliant color on your computer screen
- easily navigated by clicking on the Table of Contents
- printable using your own computer printer
- searchable to find every mention of a topic or station schedule
- importable into your frequency databases
- compatible with software to convert text to audio for sight impaired listeners

To find out if this new subscription is the delivery solution for you, you may download the August issue for free! Just go to <http://www.grove-ent.com> to find out how.

One year subscription to **MT EXPRESS**—only \$19.95 U.S., or for even greater savings, \$11 in addition to your printed subscription of \$25.95 in the U.S.

Imagine, your favorite MT articles and columns for an entire year on one searchable CD-ROM! Frequency lists, shortwave program guides, equipment reviews, construction tips, antenna projects, scanner and shortwave topics, even ads -- all on one powerful CD! And we even include Adobe Acrobat Reader 4.0 at no extra charge!



ORDER SFT-27-00

Only **\$19.95!** (\$14.95 for subscribers)
plus \$2.50 US Priority Mail or UPS

GROVE

800-438-8155

Grove Enterprises, Inc.

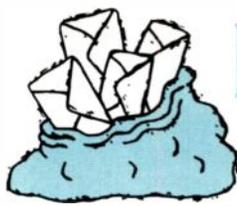
828-837-2216 (fax)

7540 Highway 64 West

Brasstown, NC 28902

email: order@grove-ent.com

WWW.GROVE-ENT.COM



LETTERS TO THE EDITOR

Fan Mail and More

"I have been into the scanning hobby for years. I became a ham (KB1EYR), just before restructuring and I got into shortwave listening prior to that. Recently I became interested in AM DXing. Two years ago I was "turned on" to *Monitoring Times* by John Sheldon of Sheldon's Furniture store in South Kingston, Rhode Island. I heard scanners behind the store's counter and we hit it off pretty well. I went across the street to Heeley's magazine stand and bought an issue of *MT*. My life has been much better for doing so, as I subscribed that week while on vacation.

"The magazine and staff writers are of the highest quality. I have never enjoyed a magazine so much as *MT*. When an issue arrives in the mail it brings joy. Please keep it going. Your web site is enjoyable also."

Raymond Chevalier (KB1EYR), East Hartford, CT

"My name is Hector E. Perez NP4FW a subscriber for *Monitoring Times*, a real great publication. This is a magazine I read from page to page. "Scout's Honor," I enjoy *MT* more than my *QST*. Radio for me is a very wide world. I have always said that as long as a person enters and enjoys the hobby, the horizon is wide and everybody fits in well. In terms of listening, SWL, BC I like it all. I am an avid SW Listener; however, I love to hear it all.

"I wonder if some day *Monitoring Times* could do a good article on radio at Puerto Rico?"

(With very little arm-twisting, Mr. Perez agreed to try writing the story himself. It was obvious he already knew more about the subject than those of us on the mainland. We look forward to this story on PR's past and present in radio - rb)

Websites to Recommend

"My name is James Rokitka, I have a subscription to *MT*. I have a BC245XLT scanner and I found a website for tricks and hints for that scanner, the website is http://www.icon-stl.net/~toddh/245xlt_tricks&hints.htm"

Marine DSC

"Apropos of the April *Communications* item on Digital Selective Calling Marine VHF registration, only new fixed Marine VHF radio designs need to be DSC-capable. Portable handheld marine VHF transceivers of new design are not covered by the FCC DSC requirement. Be warned, too, that if the user fails to enter the lengthy MMSI number correctly in the transceiver memory, the system will lock up, necessitating a factory repair sta-



tion reset. Some units allow only two chances to get it right by the user.

"Some new DSC rigs are the Raytheon RAY53DSC, Standard Horizon Intrepid/Intrepid LE, Standard Horizon Spectrum, Icom M502, SIMRAD RD68 GMDSS and Sea 157VHF. The Icom M-127 VHF has had a DSC board option for a number of years. Several of these rigs also have scrambler extra-cost options. Finally, the Icom M402 is pending FCC approval (may be now granted).

"I taught basic electronics in 1955-1957 in the Navy TAR (Training & Administration of Reserves) program. Now I teach marine electronics as a Ventura Power Squadron Senior Member, in my retirement years. *MT* is a superb class act!"

Doug Robertson, Oxnard, CA

Thanks, Doug - You're one of the reasons *MT* is so good, since you're one of the most prolific contributors to our Communications column. M/V Seeker is appropriately named for one who remains so active and interested in his retirement! - rb

Coincidence?

"As most of us know, The Counting Station (Spanish Version V5) has remained on a predictable schedule for a few years now, using three sets of frequencies, for a total of six broadcasts a week

"I revealed this schedule in the article I wrote for the March issue of *Monitoring Times*. As soon as the issue hit the streets; ALL six TCS/V5 transmissions went SK.

"A coincidence or?"

John Maky

"I've got one just as good, John. I wrote an *MT* exclusive feature in the October 1994 issue titled 'Drugs, Spies and Numbers' which exposed the origin and purpose of the Spanish 4-digit number stations widely heard at the time. These broadcasts were part of the US counter narcotics operations in Latin America and the whole operation was transmitted out of Warrenton, Virginia. After that article hit the street and within a short span of time, I never again received another 4-d SS numbers intercept for the Ute World log section in *MT* and to this day haven't any 4-d SS intercepts in any publication.



2.4.2000

Night Stand Monitoring Station

"My name is Dennis Parker from Kansas City, Missouri. Attached is a photograph of my unique monitoring post. It is all next to my bed. I can listen to anything anytime of the night and day with my earphones and not disturb anyone. With my four channel mixer I can listen to four different sources at once. It allows me to monitor my local fire, police, and ambulance frequency while listening to my favorite AM talk show or FM music. I am kept current on all activities within the city as I lay in the comfort of my own bed.

"Behind the scene, however, is a mess of wires. Under the bed is a series of power strips to provide power to my series of 12 AC adapters that run everything in the picture.

"Needless to say my wife is not pleased with my scanner hobby. She is embarrassed for anyone to see this brilliant set-up in the corner of our bed room."

- Dennis Parker



"Remember the ad that ran once in *MT*?
"The CIA subscribes to *MT*, shouldn't you?"

Larry Van Horn, N5FPW

Generator X

"Was glancing through the pages of the May *Monitoring Times* and saw Haskell Moore's great story about generators. I just wanted to let you know of a company who started manufacturing 5kW & soon to be 10kW units for pickups, and other utility vehicles. They had a lot of press recently about selling several hundred units to the government and other state agencies. I thought you might be interested in this unit since it puts out 'clean ac' power for the ham/scanner communities.

"Take a look at their web site: <http://www.aurasystems.com/> "

Jay Rosenberg

"There is a serious omission in Mr. Moore's otherwise excellent article on generators in the May issue. The omission is the voltage output/regulation of the generator. The less expensive (none are really cheap) generators in the 4000 to 5000 watt category often are terrible in this area with outputs of almost 140 volts (I know; I have one like this). With today's households having lots of sensitive solid state items (TV's, Microwaves, VCR's, other computer controlled appliances, and of course personal computers) these high voltages can cause expensive damage. Therefore, be sure you check out this area before you buy or you could be very sorry."

John Frank K3IC

"Not including information about voltage output/regulation was a decision I had to make for several reasons. First, was space limitations. Secondly, to properly address this issue would have opened up a can of worms that I wasn't prepared to address. For example, if you state that one generator is better than the other, which one is best? And if you start naming names, you'd better have done extensive testing to back up your claims. Then you have to qualify the criteria for the test to ensure objectivity.

"As you can see, this gets into a lot of detail, time and expense. I even considered addressing the issue in a few broad sentences, but didn't feel I could do it justice, and would probably just cause more confusion in the end.

"You are certainly right in your claims that voltage output varies significantly from one generator to the next. I've heard horror stories. Probably the best models for powering electronics (if you can trust the manufacturer's claims) is the Honda EU series. The EU1000i, EU3000i, and the newly introduced EU2000, use a circuit that converts DC (12 volts, I think) to 120 VAC with a computer-controlled inverter. It then varies the throttle in a linear manner depending upon the load, as opposed to having to run full throttle all the time.

"They are pretty pricey, with the new 2,000 watt model running about \$850. Also of interest is that two of these units can be connected with a proprietary cable which will then double the output wattage. It is also interesting to note that they are so well insulated that even when running at full throttle, they are barely louder than a conversational-level voice."

Haskell Moore, W5HLM

An Invitation to Participate

Letters and News:

We thank you for buying and reading *Monitoring Times*, and many of you have written to tell us how much enjoyment that brings you. Several others go the next step and clip out stories from local papers relating to radio to keep our columnists up to speed. Others send in letters to the editor or columnists with tips, information, corrections, and opinions. All this makes *MT* what it is – a wide-ranging community of radio lovers.

Features:

Do you find yourself frequently showing friends how to program their radios? How to decode digital modes? What the word propagation really means? How to understand what the EMS personnel or commercial pilots are saying? How to decide which radio to buy?

Then you have a gift for passing along what you know, and it's time for you to take the plunge and share your knowledge with a lot more people as an *MT* feature writer. We always need "how-to" articles over the entire range of *MT*'s coverage, from LF to satellites.

If you're not too good at prose but you keep excellent records, then consider a frequency profile of your local public safety system, a tutorial on how to organize shortwave loggings or QSL reports, or a quick bandscan of what can be heard from your location. Listeners have especially requested advice on shortwave reception from the West Coast.

Reviews:

Reviews are always popular with readers. *Monitoring Times* accepts free-lance reviews of accessories and shortwave receivers. These may be new or older equipment which is widely available, and may be brief or in-depth reviews.

In the case of reviews and features, contact the editor about your idea before proceeding. For more details about writing for *MT*, consult our guidelines at www.grove-ent.com/mtwritgd.html or send a self-addressed, stamped envelope to receive the Writer's Guidelines by mail.

Rachel Baughn, Editor
mteditor@grove-ent.com
P.O. Box 98, Brasstown, NC 28902

DAYTON HAMVENTION Happy 50th Anniversary

Bob Grove W8JHD

It was rather prophetic that Dayton's legend hamfest should celebrate its 50th anniversary this year; it's also my 50th anniversary in ham radio! I started out with a Novice Class license back in 1951, obediently tapping out Morse code with my surplus J38 key. At that time, vacuum tube equipment reigned supreme, with WWII surplus gear still available by the ton. The transistor was still a curiosity among those who could afford it.

As ham radio grew, so did the Dayton Hamvention. At its peak, claims were made as high as 35,000 in attendance over the three-day affair. Even torrents of rain couldn't keep eager enthusiasts out of the 14 acre flea market, I among them.

But, the advent of the Internet, CB, incentive licensing, and other factors signaled a slow reduction in the ham ranks. The average age of remaining hams climbs as their numbers fall, and few youngsters clamor to join the fraternity. A look through Dayton now is a visit to the future as much as a mirror to the past. Young visitors pore over the computer equipment, while we dinosaurs gently fondle the classic ham gear: Johnson, Heathkit, Globe, Gonset, Hammarlund, Hallicrafters, National....

In all fairness, modern solid-state gear kicks the pants of old vacuum-tube stuff, but I still love to see the filament light in a 6L6G! Equipment is smaller and lighter, too, and the bang for the buck is considerable. DSP, frequency synthesis, memory storage, and so many more features were undreamed of among the manufacturers when I cut my teeth on ham radio.

One thing hasn't changed: The warmth of friendship, the renewing of old acquaintances, and the anticipation of new products and bargain prices still echo through the exhibit halls.

The attendance may be down, and dealers may be at each other's throats with predatory pricing practices, but Dayton is a spectacle. Many consider it a mecca – a shrine to ham radio. I consider it just plain fun.

We welcome your ideas, opinions, corrections, and additions in this column. Please mail to *Letters to the Editor*, PO Box 98, Brasstown, NC 28902, or email mteditor@grove-ent.com. Happy monitoring!

-Rachel Baughn, KE4OPD, editor

BBC: International Outcry Expected

The BBC has announced plans to discontinue shortwave broadcasting to North America and Australia at the end of June. In an *LA Times* article by David Colker, Jerry Timmins, head of the Americas region for the BBC World Service, said "What we are not doing is saying shortwave is dead. The vast majority of our listeners still access us on shortwave. But a shift is happening, no question about it."

On-air announcements of the BBC shortwave cutbacks are scheduled to begin this month, Timmins said, and they are not likely to be received kindly by stalwart listeners. "The World Service generates enormous loyalty," Timmins said.

Voice of America director Sanford Ungar expects a similar trend to continue within the VOA. He says he feels no nostalgia in the face of its probable passing.

"I think that if the signal is clearer and easier to tune in, that's progress, whether it's on a radio station or a Web site," he said. "Maybe there are some people who think it's romantic to have trouble hearing the radio, but not me."

See page 41 and *Closing Comments* for more on this story.

Playa de Pals Transmitting Station Closed

On May-25, the US International Broadcasting Bureau closed its shortwave transmitting station at Playa de Pals, Spain. The site was originally owned by Radio Liberty and was used for RFE/RL and VOA transmissions to the former Soviet Union.

The US Government, through its Broadcasting Board of Governors, has monitored changing political conditions and re-examined its shortwave broadcasting requirements for Russia and Central Asia. In its opinion, the availability of new media and other transmitting locations to reach the former Soviet Union, along with the development of democratic institutions



Bob Padula at the controls of PALS. Photo courtesy of Bob Padula

and market-based economies in the region, created a situation in which its broadcast operations could no longer be operationally or financially justified. (*Communications World*, Voice of America)

Bob Padula of EDXP speculated that the facility could be taken over by the Spanish authorities for its own external services, as there is a lot of high-powered transmitting capacity there (six 250 kW). Visit <http://www.members.tripod.com/~bpadula/edxp.html> for a description, with photos, of a visit to the station in October 2000.

Radio Canada International to Cut Back

Despite a surplus from last year's budget, and an accord signed by the Ministry of Canadian Heritage, guaranteeing the service would continue at its present level of operations, RCI and CBC management have decided to make cuts to RCI operations. It appears the service has been spending above the \$15.52 million allotted for RCI operations, so a shortfall is being anticipated next year. In consultation with RCI staff, the following action plan has been adopted:

To continue daily broadcasts in seven languages. Production activities scheduled only during the week; no live newscasts on the weekend. All programs will be half hour long. Two English and French daily programs from Monday to Friday. Weekly English and French theme programs for target audiences on weekends: Canada in the world, International Trade and Technology, Meet the Press, Arts and Culture, Mailbag and chat.

Public Interest Wins over Privacy

The U.S. Supreme Court has ruled (in *Bartnicki v. Vopper*, *Communications* Feb 2001) that the news media may not be held liable for disclosing the contents of telephone calls that have been illegally intercepted and recorded by someone else, at least not in matters of public importance.

Justice John Paul Stevens said the privacy of communications was of strong government interest, but did not outweigh the interest in publishing matters of public importance. When a publisher has lawfully obtained information from a source who has obtained it unlawfully, the government may not punish the ensuing publication.

The ruling was a setback for the U.S. Justice Department, which had defended the law aimed at protecting the privacy of telephone and other electronic conversations.

FCC Rules on Appeal

The FCC has responded to a petition by Tandy and Uniden to modify some of the rules designed to enforce cellular privacy. The FCC

denied the request to exempt scanning receivers for the 30-512 MHz range from the circuitry inaccessibility requirement and the warning label requirement imposed to prevent reception of cellular signals.

The FCC did grant that, in those cases where the receiver is too small to affix the required permanent warning label, the information could instead be printed prominently on the outside box and in the instruction manual.

The petition had requested a change in the wording on the warning label, but since related legislation then pending was not acted upon by Congress, the FCC said there was no reason to change the wording.

The FCC did agree to a change in the definition of a scanning receiver to exclude receivers which scan weather channels, Part 73 devices, or which are part of a licensed service. It also clarified the level of cellular radiotelephone

BULLETIN BOARD

July 4: Harrisburg, PA

Harrisburg RAC 29th Firecracker Hamfest at Emerick Cibort Park, Bressler (Harrisburg Area) ; Talk In: 146.16/76, adm \$5 (\$10 carload). Free VE exams given at 9 AM in the Oberlin Fire House. Camping. PA State fireworks on riverfront. Info: w3uu@aol.com or <http://members.aol.com/w3uu/>

July 7: Oak Creek, WI

South Milwaukee ARC 33rd annual Swapfest, American Legion Post #434; 9327 S Shepard Ave; Oak Creek, WI, 6a.m.-8p.m. CDT. Talk-in 146.52 Simplex; adm \$5. Picnic area, camping. Hot and cold beverages, prizes. SMARC, P. O. Box 222, South Milwaukee, WI. 53172-0102

July 15: Kimberton, PA

Mid-Atlantic ARC 23rd Annual Valley Forge Hamfest and Computer Fair, Fire Co. Fairground (Rte 113 - S of intersection w/ Rte 23), Talk-in 146.835/-, 443.800/+ CTCSS 131.8; Adm \$6, 8 a.m. Dealers, flea market, Amateur Radio Bus Museum, Food vendors, door prizes. Information: Bill Owen - W3KRB 610-325-3995, E-mail: gern@op.net or visit <http://www.marc-radio.org/hamfest.html>

July 27-29: Boise, ID

WTFDA (Worldwide TV/FM DX Assoc) Convention, Super 8 Lodge, 2773 Elder St, Boise ID 83705. Host Frank Aden (4096 Marcia Pl, Boise ID 82704 - N7SOK@aol.com). For reservations (208) 344-8871 (mention Frank Aden). Rates \$62.10 (for a double). Registration \$20.

July 28: Cincinnati, OH

OH-KY-IN ARS 4th Annual Hamfest, Diamond Oaks Career Development Campus, 6375 Harrison Ave, east of I-275 and I-74. Adm \$6 (space free w/admission); talk-in 146.670(-) and 146.925(-). Seminars, hunts, vendors, VE exams (8am, walk-ins accepted). For more info Lynn Ernst, WD8JAW, 10650 Aspen Place, Union, KY 41091-7665; 859-657-6161; wd8jaw@arrl.net or <http://www.qsl.net/k8sch>.

signal which must be rejected in order for a scanner to meet FCC specifications.

If You Can't Beat 'em, Join 'em

In the north suburbs of Detroit, Michigan, communications problems just got solved by a little cooperation. Communications from the town of Madison Heights were often overwhelmed by those of its larger neighbor, Royal Oak, because both repeater systems output on 155.010 MHz. Royal Oak's repeaters broadcast at 100 watts. If Madison Heights were to apply for its own 100 W tower, it would require approval from both the FCC and Canada, which could take up to two years to get.

The solution? Madison Heights will share Royal Oaks' six repeaters and will add their two repeaters into the system. The agreement is a temporary, yearly renewable contract, as both communities are waiting for an 800 MHz system to be finalized by Oakland County.

In Memory

Ralph W. Burhans, 78, passed away April 27, 2001. In World War II he was a tech sergeant radio and radar operator in B-17s and

flew 33 combat missions over Nazi Germany. He held a position as a research associate at Sohio Research in Cleveland, originating eight patents. He was a research engineer and lecturer at the Ohio University Avionics Engineering Center, and had more than 70 papers, reports, and articles published in the NASA archives and various technical journals.

He was Station Manager of the mmwave radio telescope operated by the National Radio Astronomy Observatory at Kitt Peak, Arizona during its final construction phases in 1966-1967.

Jack A. McCullough, ex-W6CHE, co-founder of tube manufacturer EIMAC, of Cupertino, California, died April 28. He was 93. An ARRL Life Member, McCullough and Bill Eitel, W6UF (SK), paired up to start Eitel-McCullough - EIMAC - in the 1920s after building a tube for use as a grounded-grid amplifier.

A DXer and contester in his younger years, McCullough also was a QST author in the 1930s and 1940s, writing mostly about what he knew best - high-power amplifier tubes.

Dyrell "Dale" Marquis, WA4EZU, hamfest cap and badge vendor of Fairforest, South Carolina, died May 14 following an illness and hospitalization. He was 68. An ARRL member, Marquis ran Marquis Engraving and his booth marketing caps and badges bearing call signs or other legends was an institution at Amateur Radio conventions and gatherings throughout the Eastern US.

"Communications" is compiled by editor Rachel Baughn from news and clippings sent in by our readers. Thanks to this month's MT Reporters: Anonymous, Albany, NY; Fred Chappell, Windsor, ON; N.W. Hill, Arlington, VA; Ken Hydeman, Xenia, OH; Sterling Marcher, La Mirada, CA; Gregory May, Richwood, KY; Ira Paul, Royal Oak, MI; Doug Robertson, Oxnard, CA; Alan Stoddart, Brooklyn, NY. E-mail reporters: Howard Bailen, Bruce Blackburn, Harley Bogart Jr, Chet Copeland, Chanel Cordell, Robert Felton, William Harrison, Maryanne Kehoe, Jorge Rodriguez, Elsa Saldán, Doug Smith, Larry Van Horn, Peter Vieth, Dave White. VOA Communications World via Bob Padula EDXP; Ricky Leong, SW Programs, via John Figliozzi

DEDICATED TO THE SCANNING AND SHORTWAVE ENTHUSIAST, WE'RE MORE THAN JUST SOFTWARE!

SCANCAT® GOLD for Windows

Since 1989, The Recognized Leader in Computer Control

Once you use SCANCAT with YOUR radio, you'll NEVER use your radio again WITHOUT SCANCAT!

SCANCAT supports almost ALL computer controlled radios by AOR, DRAKE, KENWOOD, ICOM, YAESU and JRC (NRD) Plus PRO-2005/6/35/42 (with CS456/535), Lowe HF-150, and Watkins-Johnson

Announcing Scancat-Gold for Windows Version 8.0

We've added a lot of new features to our latest Scancat. AND...We have made it EASIER than EVER! Scancat-Gold for Windows-New Features for Ver 8.0



Completely redesigned Graphical Interface

- Two Scanning modules:
 - A Simple Basic Module - for beginners

Plus

- An Advanced Scanning System for the "experts".
- New "Folder Tabbed" GUI puts everything at your fingertips

• Faster scanning speeds

- Extensive on screen help
- Completely revised printed manual
 - Over 160 pgs.

• EXPANDED trunking support for BC780, BC895, BC245 and Pro2052

• Supports all radios in ONE program - share files with all radios.

• Monitor and log all TalkGroup activity - Export to other files.

• Completely revised trunking database management with expanded capabilities. Makes programming your radio a breeze!

• Expanded import from databases such as EXCEL.

• NO ONE supports your "Trunk Tracker" with more features!

STILL THE SAME GREAT PRICE:

Scancat-Gold for Windows\$99.95
 Scancat-Gold for Windows-SE\$159.95
 Upgrades: Scancat-Gold for Windows\$39.95 + S&H*
 Scancat-Gold for Windows-SE\$79.95 S&H*

*WITHIN 1 YEAR OF ORIGINAL PURCHASE S&H \$5 U.S. \$7.50 FOREIGN

Scancat-Gold for Windows-SE - Improved Features for Ver 8.0

All the features of our "Standard Scancat" plus these additional functions:

- Long term logging of frequencies to your hard drive.
- Record Audio to hard drive using your computer's soundcard.

- NEW - Records audio when "Trunktracking" or conventional scanning.
- Improved spectrum analysis with several great graphical analysis screens.

MAGIC for Windows

PUT SOME ORDER IN YOUR LIFE!

If You're Not Using MAGIC, You're Only Enjoying Half The Hobby.

Magic is a super conversion utility that will read and write to over 10 database formats:

- Creates databases from plain ASCII text
- Finds single or multiple frequencies located anywhere in source files and creates perfectly aligned database files.
- Converts: SCANCAT, ASCIItext, comma delimited, HTML, DBase, ScanStar, RadioManager and ScannerWare.
- WINRADIO, "WRM" files and PCR1000 "MCH" files.

MAGIC for Windows
\$34.95
 (plus \$5.00 S & H)

LIMITED TIME OFFER!

Limited Time Thru 01/2001

Scancat Gold for Windows \$99.95
 Magic for Windows 34.95
 Disk of Frequency Files 15.00
 Regular Price \$149.90
SPECIAL \$124.95
 For "SE" Add: \$59.95
"SPECIAL SCGM"

"UNI-VERSITILE" INTERFACE

- Supports ICOM/IC-R10, AR8000, AR16B, YAESU and SCOUT.
- Comes with 6 FOOT cables, and adapters to fit all units within a single package (Must Specify Yaesu).
- Unlike "single radio" adapters, can be used with ANY radio supported, simply change the adapter, then "Plug and Play."
- Expandable in future with a simple add on adapter.
- No external power required. Draws power from computer.
- "Reaction Time" scout with NO modifications to radio.

CAT-232C "UNIVERSITILE INTERFACE"
 \$99.95 + s & h



AR-8200B Cables/interfaces ---CALL!
 BC-895 Cables ---CALL!
 \$29.95

FREE FREQ FILES

WEBSITE - www.scancat.com

E-MAIL - info@scancat.com

FREE DEMOS

Order direct or contact your favorite dealer

COMPUTER AIDED TECHNOLOGIES P.O. Box 18285 Shreveport, LA 71138

Phone: (318) 687-4444

FAX: (318) 686-0449

Info/Tech Support: (318) 687-2555 (9 a.m. - 1 p.m. Central M-F)

Toll-Free Orders
888-SCANCAT
 888-722-6228

2001 Fire Season Scanning

By Jon Van Allen KF7YN



Smoke jumpers get ready to leave base at inter-agency fire center in West Yellowstone, bound for duty in Montana fires.

The spring and summer of 2000 brought the Western US some of the most devastating fires in recent history. After a dry and mild winter, conditions rapidly became tinder dry beginning in the southwestern US. The first of the major fires started in New Mexico and severe fire conditions spread to every western US state throughout the summer.

The governor of Montana closed nearly 20 million acres to human travel. This represents an area the size of Massachusetts, New Hampshire, Vermont and Connecticut combined. While this is an enormous area, the images displayed on television gave viewers the impression the entire western US was burning up, which certainly wasn't accurate reporting. But then again, that's why most of us love to monitor – to learn first hand what is really going on.

When the fire season began in earnest in my home state of Utah, I realized my frequency list was outdated. I discovered the National Interagency Fire Center (NIFC) had made some changes. This can be confusing, because the NIFC is a combined fire resource organization of several federal agencies such as BLM, Forest Service, etc., but NIFC is not all inclusive to these agencies nor vice-versa. BLM and Forest Service have many frequencies of their own in addition to NIFC frequencies. In other words, NIFC provides common frequencies for agencies involved in fire-fighting.

To add to the initial confusion, it was obvious there are common frequencies with differing names. For example, a particular frequency called "TAC" by one agency might be called "Command" by another.

Keep this in mind when you find duplications and discrepancies.

While it's impossible to predict how serious the fire season will be this year, it is a safe bet to say there will be fires somewhere. You can almost count on fires in most western states every year to one degree or another, and California seems to get more than their fair share. Already in early March 2001, there were several serious fires in California and Florida.

In addition to NIFC, BLM and Forest Service frequencies, keep on ear on your local fire department frequencies. I was monitoring a fire on US Forest Service land and noted BLM units (including aircraft from other states), County Fire, and the local town's fire department all involved

in the fire-fighting. Local law enforcement was also on scene to prevent people from getting too close and to warn residents of the possibility of evacuation. My scanners were hopping with activity from many different agencies and departments: federal, state, county and local. Table 1 lists NIFC frequencies used in the Western US.

For me, last year was a banner year for fire scanning, especially the fires that broke out in Idaho, Montana and Wyoming. My wife and I spent an entire afternoon at the Interagency Fire Cache located at the West Yellowstone airport. Here air tankers load fire retardant, and fire jumpers deploy to their next fire. As the Fire Cache is open to the public, we were invited to watch and take photos of these exciting operations.



Air Tanker 25 at Inter-Agency Fire Center, West Yellowstone, Montana

Air tankers landed, loaded and took off and came back to reload. Most of them were in action from 8 a.m. to dusk.

I have to say that listening to pilots plan and execute their routes and make their drops has to be some of the most exciting scanning I can recall in 30 years of scanning. There is no room for mistakes, and these pilots are impressive, especially the leader who calls the route and drop procedures. Some of the aircraft they fly are WW2 vintage: truly amazing.

When resources are committed to fighting a fire, a "Victor" VHF air band frequency is assigned so pilots can coordinate with other aircraft. The "FM" VHF (or UHF) frequency for NIFC, BLM, Park Service or Forest Service is also given to the aircraft so they can communicate with ground crews. (Since the VHF air band is AM mode, all other frequencies are "FM" to pilots, whether VHF or UHF).

With so many fires around us in every direction, we heard many more Victor frequencies assigned to new fires as well as ground frequencies. The list of VHF air band frequencies in Table 1 is not a complete list of frequencies which are available if needed, but start with these first.

What's in a name?

As reported in October 2000 *Monitoring Times* "Communications" news, Relm Wireless responded quickly to an urgent request from NIFC to provide 500 Bendix-King 2 way radios. More than once, I heard fire commanders ask specifically for Bendix-King handhelds for their fire crews if any were available. This says a lot for Bendix-King, and it also says a lot for the experienced fire crews who know what communications equipment they want.

Scanning resources

On the road and camping, I use my laptop computer, Percon CD FCC database, *Police Call* on CD and a binder notebook full of notes and frequencies. Updating database files and programming the scanners is a breeze with the laptop. I bought a converter so it will run from 12 volts in the car or the RV.

Portable antenna solutions

I spent a lot of time and effort trying to find the ideal portable scanner antenna that I could get up as high as possible. While camping over the last several years, I have experimented with base and mobile antennas, but it's not always possible to put up a tall mast at any given spot and how to anchor the mast is often a problem. It dawned on me to use trees for masts: the taller the better!

Many of us have put up HF wire antennas using trees as masts, but you can't very well haul a log periodic beam and rotor up a

tree! A simple design is required. I decided to try a coaxial antenna, the results were much better than I expected.

I took a 100 foot roll of RG-6U, stripped off 18 inches of the outer jacket, peeled the braid and foil back so that it went down the coax. I sealed it with electrical tape and heat shrink tubing. From the end of the coax, there are 18 inches of exposed center conductor and 19 inches of braid and foil going down the coax. I stripped off about 1 inch of the center conductor insulation, made a loop and soldered it. The loop is to attach fishing line to the antenna so it can be hauled up a tree. I use a fishing pole with a heavy enough weight so it will go high as possible and also allow it to drop down through the branches. Then I attach the line to the antenna and reel it up as far as I can and fasten the line to a branch. I like to wrap the line around a piece of rubber such as a bicycle inner-tube lining so it won't cut into the tree branch.

A word of caution about using fishing line to pull antennas up. Last summer my wife and I witnessed a raven get its foot tangled up in fishing line. It flew up into a tree and got caught on a branch. Luckily, it picked and gnawed at the line and after a couple of hours managed to free itself. The wildlife people who showed up to try to help the raven said fishing line is a major problem to wildlife, so please, *properly dispose of any leftover line.*

This coaxial antenna is essentially a quarter-wave vertical centered at about 150 MHz. This is a good compromise length for 118-174 MHz. I use a Grove Pre-5A preamp. Let me tell you, this antenna made a huge improvement over any other antenna I have taken on the road! Not because it's that great of an antenna – the added height made the real difference. A 1/4 wave at 100 feet kicks butt over a vertical or discone at 15 or 20 feet. It's cheap, easy, and very effective. An added benefit is that very often the antenna is not easy to spot unless you know it's there.

So, program in these frequencies in addition to your local forestry and fire frequencies, and you'll have what you need to monitor the fire season this year. I would be interested in what you are hearing. You can email me at: kf7yn@qwest.net



Firefighters at the Old Faithful "helibase" at Yellowstone National Park, August 200 (photo by Karen Van Allen)

Table 1

Frequency	Use	User Specifics
122.850	NIFC	VHF-4 Helicopter Ops
122.900	NIFC	VHF-2
122.925	NIFC	VHF-1
122.975	NIFC	VHF-3
123.025	NIFC	Helicopters - Air to Air, Air to Ground
123.050	NIFC	VHF-6
123.075	NIFC	VHF-5
122.925	NIFC	Helos & fixed wing - Air to Air, Air to Ground
135.975	NIFC	VHF-7 Low Altitude / Airtanker Bases
163.100	Govt	ALL-CALL (common calling channel)
166.6125	BLM/Forestry	Command-4 Repeater
166.675	NIFC	Air Tac-1
166.725	BLM	Tac-1
166.775	BLM	Tac-2
167.100	BLM/Forestry	Command-5 Repeater
167.950	NIFC	Air Tac-5
168.025	Forestry	Law Enforcement
168.050	Forestry	Tac-1
168.075	Forestry	Command-3 Repeater
168.100	Forestry	Command-2 Repeater
168.200	Forestry	Tac-2
168.250	BLM	Tac-3
168.350	Govt	ALL-CALL
168.400	NIFC	
168.475	BLM/Forestry	Command 6 Repeater
168.550	NIFC	Incident Command Callup
168.600	Forestry	Tac-3
168.625	NIFC	Air Net (guard)
168.650	NIFC	Flight Following
168.700	Forestry	Command-1 Repeater
169.150	NIFC	Air Tac-2
169.175	NIFC	Command Net
169.200	NIFC	Air Tac-3
169.350	BLM/FAA	
169.750	BLM	Air-Ground F-6
169.875	NIFC	Command Net
170.000	NIFC	Air Tac-4
172.600	NIFC	Safety
173.8125	NIFC	Command 6
408.400	Forestry	Common User
414.650	Forestry	Logistics-1
415.400	Forestry	Logistics-2
415.500	Forestry	Logistics-3
417.300	Forestry	Logistics-4
417.350	Forestry	Logistics-5
417.500	Forestry	Logistics-6
417.800	Forestry	Logistics-7
418.050	BLM	Common User
418.075	Forestry	Common User

A Monitor's Guide to Maps

By Bob Felton

At Fifth and Main, according to a Skywarn monitor, the wind is snapping-off 2-inch tree branches. Minutes later, a different monitor reports that aggie-sized hail is hurtling almost sideways at Church and Market. At the university, a ham reports, a dormitory window has blown out, the sirens are screaming, and everybody is making tracks for the basement. Across the street, the neighbors are wondering if the storm is going to beat their home to smithereens. But you've been tracking the reports, plotting them on a map, and you already know: the core of the storm has missed you.

A fancy antenna is nice, the latest electronic directories are helpful, but maps are indispensable. Not only do they provide information that can assist your monitoring, they sometimes allow you to see the otherwise hidden logic of an event. Shortly after moving to Wake Forest, for example, I was idling through the local frequencies and overheard a report of a police pursuit of an armed assailant. The street names were meaningless to me, so I reached for a local street map I'd picked up. For the next hour I monitored the chase, and as time went by I realized the police were deliberately steering their man toward a golf course – where K-9 units were

waiting. That experience taught me something I hadn't known about police work, and taught me something about monitoring, too: always keep good maps handy.

We're all acquainted with the familiar city street map, but there are many other types that are useful to monitors: topographic maps, nautical and aeronautical charts, even cooperative advertising maps of the sort used for place mats in diners. Maps aren't for just scannists, either; SWLs who make a habit of consulting an atlas while listening to the news will gain a better understanding of remote events.

Get street-wise

Every scannist should have a good local street map. Ideally, you should select a map that has not only street names, but land-

marks: schools, subdivisions, churches, police and fire stations and other municipal buildings and structures, water courses, and parks. Police often use those names in calls, and you don't want to be unable to locate Bushwhack Acres while listening in as every cop from miles around races there.

Fold-up maps are a poor choice for the shack, because it's a bother to flip from one side to the other while trying to locate someplace. Further, such maps are often out of date. A better choice is a bound book with detailed maps of small areas and a good index, of the sort prepared specifically for salesmen and other folk who spend a lot of time on the road. Most office supply stores carry them, at a cost of about \$15.

If you have a computer in your shack and are willing to spend a little more, Microsoft and DeLorme produce nationwide street atlases annually that cost about \$40. Since electronic maps will usually prepare alternative scenic, fastest or shortest trip routes (DeLorme even has an online service that allows you to check road conditions along your route, or interface with a GPS unit), they may actually pay for themselves and spare you a lot of aggravation. These maps usually will pinpoint a specific address for you, too.

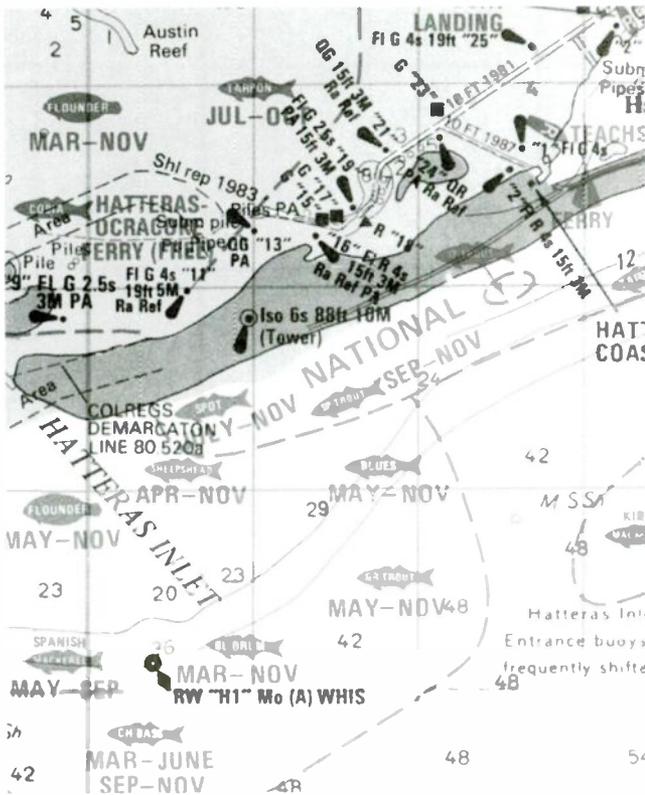
Brush up on topography

A second type of map that comes in handy is a topographic map, which shows the rises and dips in the earth's surface with lines that connect adjacent points having the same elevation. The maps may also show features that often don't appear on street maps: family cemeteries, old logging roads, swamp land, transmission towers, ravines, etc. These are good to have when monitoring searches for escapees and missing persons, or for forest service activities, because the radio traffic will reference landmarks that don't appear on an ordinary street map.

Outfitters sell these maps or, even bet-



A sample aeronautical chart of Cape Hatteras



A sample maritime chart Cape Hatteras

ter, you can download them at no charge from the Internet (<http://www.topozone.com>). They may also be bought directly from the United States Geological Service, at a cost of \$4.00 each. Not only are they useful, they look good hanging on the wall.

The birds-eye view

Yet another type of map worth keeping at hand is an aeronautical chart. These colorful maps show the location of every airport in the covered area, and provide detailed information about communications frequencies in use. For longwave buffs, they even show non-directional beacon locations and provide a dot-dash representation of the beacon's signal. Additionally, they delineate the air defense zones surrounding military bases that pilots must avoid.

Though street maps might go years without an update, aeronautical charts are updated every 56 days – and pilots stand to land in big legal and licensure trouble if they use out-of-date charts. You can, though, and it's likely that the frequencies enumerated on your chart will be valid for a long while to come. When purchased from Uncle Sam an aeronautical section costs \$7.50. Many states' transportation departments provide annually-updated non-navigation-grade charts to the public at no cost, however. It's worth a call to DOT headquarters.

If you spend a lot of time on the road, you might like to pick up the current Airport Facility directory for your part of the country. The size of a small phonebook, these handy

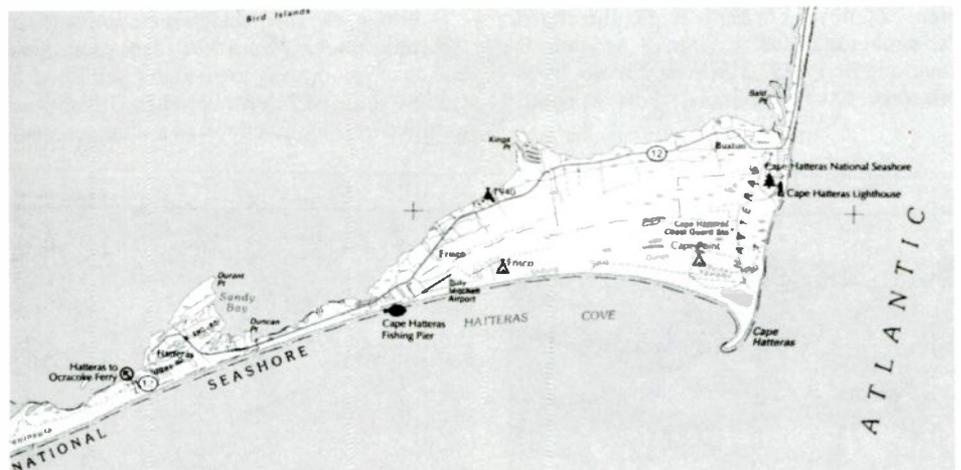
guides provide detailed communications information for every airport in a multistate area. Like aeronautical charts, they have a nominal life of 56 days, though in truth you can expect to glean useful information from them for years. The current cost for the directories is \$4.15 each.

This'll float your boat

If you live near navigable waterways, you should consider picking up the nautical chart that covers your area. The current chart will suit your purposes for years, even though, just like aeronautical charts, they quickly go out of date. They detail the locations of buoys, lights, navigation beacons and other reference points used by mariners. Odds are that your city map won't enumerate every ramp, canal, point and sandbar, and you won't have the slightest idea where the Coast Guard is going if you don't have a chart. The current cost of a nautical chart is \$17.00.

Not just for tourists

When vacationing, always ask for an extra copy of those cooperative advertising place mats used in the local restaurants, the sort that have a local map with the names of local businesses. Police in small towns, especially, often identify the location of an event according to the nearest business name, e.g., "The wreck is right in front of Mama's Barbecue." An advertising map might have just the information you need to get a great action photo or avoid a traffic jam that wrecks the last day of your too-short vacation time with the family.



A sample topographical chart Cape Hatteras

Get the big picture

If scanning's not your thing, but you really like listening to the shortwave bands, then you need a good atlas. The one that sits next to my radio is the *Essential World Atlas* from Dorling Kindersley; it's a handy desktop size, has beautiful digital maps that include relief, and costs \$14.95. Besides political boundaries and relief, there are maps that delineate time zones, language usage, predominant religions, population and life expectancy, climate, and ocean currents.

If you can't spend that much, think about picking up the current edition of *The World Almanac and Book of Facts*. The maps aren't nearly so nice, but this book provides good, brief descriptions of every country on earth: economics, agriculture, political structure, recent history, demographics. It can usually be purchased for under \$10 at places like Sam's Club.

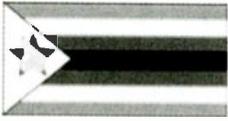
Listening in time and space

Past *MT* articles have emphasized the importance of maps in identifying distant signals that arrive at your scanner via skip propagation, and this summer will no doubt produce the usual crop. This makes it even more important to become familiar with your home territory so you'll know when you're hearing something exotic.

But, forgetting all the practical reasons for introducing maps into your monitoring – once you connect the voices you hear with where the action is taking place, you will have introduced an entirely new dimension to your hobby. The experience will forever alter how you listen to what you hear.

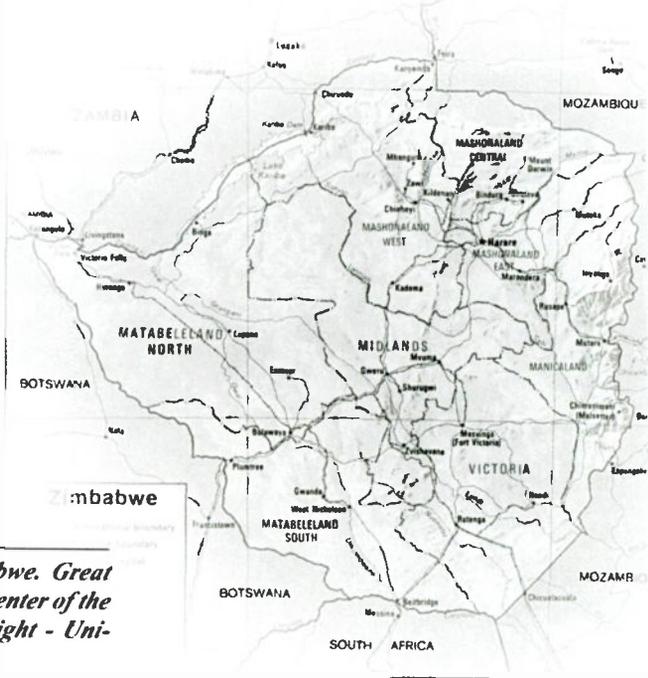
About the Author

Bob Felton is a Technical Editor for "InTech" magazine, and a freelance writer. He may be contacted at bob@bobfelton.com.



Broadcasting in Zimbabwe

by Colin Miller



A map of contemporary Zimbabwe. Great Zimbabwe is located toward the center of the Victoria District, on the lower right - University of Virginia

One of the greatest mysteries on the African continent is of such significance, that the country in which it is located bears its name. The site was suitable for a king, an oasis in the wilderness of Africa, with pleasant breezes blowing up the valley to produce a mild and healthy climate. It was discovered in 1867, and opinions as to its age vary. Some think that it dates to the time of the Biblical King Solomon; others, to just a few centuries ago. However, radioactivity tests have determined that it is about 1,000 years old.

The mystery site is a complex of massive stone structures known as Great Zimbabwe, located about 20 miles southeast of Masvingo, formerly Fort Victoria. The civilization must have been quite large, as there is evidence of major trading activities within southeastern Africa. The name Zimbabwe is derived from the Shona *maZimbabwe*, meaning "a great stone building." The first Bantu are thought to have reached Zimbabwe from the north between the 5th and 10th centuries AD. The stone ruins of Zimbabwe date mainly from about the 9th century, and Great Zimbabwe appears to be Bantu in origin.

The Republic of Zimbabwe is a landlocked country, and lies in south central Africa. Zambia borders it to the north, Mozambique to the east, South Africa to the south and Botswana to the west. The northwestern corner touches Namibia, where the borders

of Botswana, Namibia, Zambia and Zimbabwe meet. The area is about 151,000 square miles, or somewhat larger than Japan or Montana, but smaller than California. The population is about 11-1/2 million, of which 98% are Africans and 2% Europeans or Asians. English is the official language; Shona and Ndebele are the main African languages.

The climate is tropical, with the lowveld being hot and humid. The highveld, along the central plateau where most of the major towns are situated, has more moderate temperatures. This forms the watershed for the two great rivers of Zimbabwe, the Limpopo along the border with South Africa, and the Zambezi along the Zambian border. The world's largest man-made lake, Lake Kariba, is situated on the Zambezi. The rainy season occurs during spring and summer, from September to March. Zimbabwe has seen droughts as well as severe flooding in recent years. Mining is a major industry, including coal, chromium, asbestos and gold. Other major industries include steel manufacturing, clothing and foodstuffs. Agriculture accounts for about 18% of the GDP. Recently there was a dispute between White farmers and the government following a decision to nationalize their farms.

Portuguese slave traders were active from the 16th century. About 300 years later, mineral concessions were granted to Cecil Rhodes (1853-1902) and the area became a British protectorate in 1888. Rhodes was a statesman and

financier, making his fortune in diamonds. Many consider him to be the man who has had the greatest influence on the history of the African continent. The British South Africa Company governed Rhodesia until 1923, when it was divided into Northern and Southern Rhodesia, now Zambia and Zimbabwe respectively.

In 1961 a constitution was promulgated, which provided for White rule in Rhodesia. On November 11, 1965, the then Prime Minister Ian Smith unilaterally declared independence from Britain. This was not recognized by the British government, which demanded voting rights for the African majority. The United Nations introduced sanctions, and a guerilla war followed that would ultimately claim the lives of thousands.

Broadcasting history

At the end of 1965, the BBC set up a relay station in Francistown, not far from the border in neighboring Botswana. This station used a 10 kW short-wave transmitter and relayed both the World and African Services. Whenever the current affairs program *The World and Rhodesia* was broadcast, the station was heavily jammed by the Rhodesian authorities. The BBC station eventually closed in 1968.

Broadcasting began in 1932, when stations were opened in Salisbury and Bulawayo, using call signs ZEA and ZEB respectively. During World War II, studios were built in the old Post Office building on Manica Road in Salisbury. Early editions of the *World Radio Handbook* indicate shortwave use by 1 kW stations at Salisbury and Bulawayo, and 1.5 kW transmitters at Gwelo and Umtali.

By 1954 the shortwave facilities had been upgraded to two transmitters of 7.5 kW and one of 300 watts at Salisbury. A chain of 2 kW medium wave stations was established in towns along the main railroad route. For economic reasons, these facilities were installed in existing Post Office buildings and linked to the main studios by telephone lines.

During the fifties, the Central African Fed-



The ruins at Great Zimbabwe. Photos Courtesy of George P. Landow

GROVE

UNIDEN

BC780XLT	SCN 49	\$349.95
BC245XLT	SCN 35	\$199.95
BC895XLT	SCN 9	\$194.95

ALINCO

DJ-X2T	SCN 3	\$269.95
DJ-X10T	SCN 1	\$349.95
DJX2000T	SCN10	\$499.95

AOR

AR8200IIB	SCN 50	\$559.95
AR3000AB	SCN 26	\$1062.95
AR8600	SCN 8	\$899.95

YAESU

VR-500	SCN 6	\$324.95
--------	-------	----------

ICOM

R10	SCN 4	\$289.95
R2	SCN 5	\$169.95
R3	SCN 7	\$424.95

ANTENNAS

Austin Condor	ANT 14	\$29.95
Grove Scanner Beam	ANT 1	\$74.95*
800 MHz Portable w/straight conn.	ANT 22	\$29.95
800 MHz Portable w/right-angle conn.	ANT 23	\$34.95
OMNI II Scanner	ANT 5	\$29.95*
Professional Wideband Discone	ANT 9	\$99.95*
2 1/2" Long Close Range	ANT 18	\$15.95
Scantenna + 50' coax	ANT 7	\$54.95*
Stealth Mobile Monitoring	ANT 30	\$34.95*
Universal Telescoping	ANT 19	\$14.95
H800 Skymatch Active	ANT 15	\$129.95
Active Duck	ANT 36	\$39.95
Select-A-Tenna	ANT21	\$59.95
Super Select-A-Tenna	ANT 40	\$189.95
AOR DA3000 Aerial Discone	ANT 11	\$129.00
AOR MA500 Wide Range	ANT 12	\$99.00
AOR SA7000 super-wide receiving	ANT 39	\$199.95

Shipping/Handling Charges

Total Order	Shipping Charges
\$1-\$99	\$5.95
\$100-\$399	\$7.95
\$400-\$899	\$11.95
\$900-\$1499	\$15.95
\$1500-\$1999	\$19.95
\$2000-\$2499	\$23.95
\$2500+	\$27.95

*price includes shipping within the US
Prices subject to change without notice.

ACCESSORIES

UNIDEN BC SCANNERS

Computer interface cable for BC895	ACC 15	\$29.95
Scanner Master Reaction Tuner	ACC 22	\$69.95
BP-180 Uniden battery pack	BAT 5	\$19.95
BP120 spare battery & charger	BAT 24	\$25.95
BC235/245 hard leather case	CAS 3	\$29.95
DC cord	DCC 7	\$15.95
BP1200 nickel hydride battery pack	BAT 1	\$29.95

ALINCO SCANNERS

EBP-34N Longlife NiCd battery	BAT 21	\$79.95
EBP-37N Standard battery	BAT 21A	\$39.95
EDH-16 battery case, 4 "AA"	BAT 22	\$9.95
DJ-X10T soft case	CAS 19	\$12.95
EDC-36 car lighter cable w/filter	DCC 14	\$23.95

AOR SCANNERS

Extended memory card for AR8200II	ACC 27	\$79.00
AR8200II leather case	CAS 21	\$24.95
AR8200II soft case	CAS 25	\$12.95
Tape recording lead for AR8200II	CBL 7	\$61.00
Computer control lead for AR8200II	CBL 8	\$109.00
AC adaptor for AR8200II	PWR 24	\$21.95
Interface cable for AR8200II	CBL 13	\$20.00

YAESU SCANNERS

VR-500 cloning software and cable	SFT 25	\$39.95
-----------------------------------	--------	---------

ICOM SCANNERS

R3 battery pack	BAT 4	\$46.95
R2 soft case	CAS 20	\$29.95
R3 leather case	CAS 2	\$19.95
R3 Cigarette Adaptor	DCC 18	\$24.95
R3 drop-in charger	PWR 15	\$69.95
R2 CS-R2 cloning software	SFT 7	\$12.50
R3 software for Windows 95/98	SFT 14	\$19.95

MISCELLANEOUS ACCESSORIES

50' of RG-6U cable	CBL 50	\$19.95*
100' of RG-6U cable	CBL 100	\$24.95*
Universal Cigarette Adaptor	DCC 3	\$12.95
GRE Super Amplifier	PRE 1	\$49.95
Scancat Gold for Windows	SFT 2W	\$99.95
Scancat Gold for Windows SE Upgrade	SFT 2SE	\$59.95
2001 Police Call CD-ROM	SFT 22-01	\$34.95

Grove Enterprises, Inc.
(800) 438-8155; (828) 837-9200
(828) 837-2216 fax
7540 Hwy 64 W; Brasstown, NC 28902
order@grove-ent.com
www.grove-ent.com



In the lowveld, agricultural potential is fairly limited and intense heat is constant. Great Zimbabwe probably developed in this area because it occupied the transit route between the Zimbabwean plateau and the Indian Ocean coastline - courtesy, University of Virginia

eration of Rhodesia and Nyasaland was created, consisting of present-day Zimbabwe, Zambia and Malawi. The Federal Broadcasting Corporation was set up in 1958 and was modeled on the BBC. It existed until the end of 1963 when the Federation was dissolved prior to the independence of Malawi and Zambia. Southern Rhodesia then became a separate country, and the Rhodesia Broadcasting Corporation was formed.

In the early sixties, all shortwave operations were centralized at the Guinea Fowl site near Gweru. This station is situated almost at the geographical center of Zimbabwe. The first transmitters were rated at 10 and 20 kW. High-powered Thomson transmitters of 100 kW were added in 1968. Vertical-incidence omnidirectional antennas served an area within a 200-mile radius of Gweru.

Also in 1968, the RBC expanded its services further with a number of local community stations. The first of these was known as Radio Jacaranda in Salisbury, named for the purple-blossomed trees that line its streets in

September and October. This was followed by Radio Matopos in Bulawayo. The Matopos is a hilly area near the city, and also the site of Cecil Rhodes' grave. The last local station, Radio Manica, was located in Umtali, a picturesque town situated on the Mozambique border.

In 1975 the first FM station opened in the Salisbury and Bulawayo areas and the network was gradually expanded to 22 stations covering the whole country.

Zimbabwe's changing social scene

Zimbabwe gained its independence on April 18, 1980, and Robert Mugabe was elected Prime Minister. He has been the country's only ruler since independence. Majority rule was established at last, following many years of White domination and the guerilla war.

After independence many towns had their names changed. Salisbury was called Harare, Gwelo became Gweru, and Umtali was renamed Mutare. The Zimbabwe Broadcasting Corporation (ZBC) was created, and is the sole broadcasting authority in the country. Shortly after independence the radio services were re-organized. The General Service was renamed Radio 1, while the African Service was known as Radio 2.

Today, the ZBC operates four radio channels. Radio 1 broadcasts for 19 hours a day in English, thus covering a broad spectrum of listeners. Programs include news and information, a variety of music, light entertainment, sport, comedy, quizzes and drama.

Radio 2 also broadcasts for 19 hours a day, in Shona, Ndebele and other vernacular languages. The station serves the majority of the rural and urban population that is largely Black. Two thirds of music played on Radio 2 is produced locally. The station's program lineup includes discussions, features and drama on social, cultural, sporting and economic issues.

Radio 3 is a 24-hour commercial music

station aimed at the youth. It provides fast-paced music, entertainment, information and education. The majority of its listeners are young people who are highly receptive.

Finally, Radio 4 is an educational channel, which broadcasts for 19 hours a day in Shona, Ndebele, English and the minority languages of Chewa, Tonga, Venda, Kalanga and Shangani. The audience demographics depend on the nature of the educational programs being broadcast at the time. Radio 4 works closely with the Ministry of Education's Audio Visual Services, as well as other relevant government ministries and non-governmental organizations.

Shortwave transmissions were temporarily discontinued in 1991, as it was felt that the country was adequately covered by FM transmitters. However, in October 1994 relays of Radio 1 and Radio 2 were resumed on a test basis, and on December 5 President Mugabe officially inaugurated the shortwave service at the Guinea Fowl site near Gweru. The site now consists of two log-periodic antennas and two Continental 100 kW transmitters.

The official shortwave schedule is as follows:

Radio 2 in Shona, Ndebele and English:

0300 - 0530	3306
0530 - 1630	6045
1630 - 2200	3306

Radio 4, an educational channel in English:

0300 - 0530	3396
0400 - 0530	4828
0530 - 1630	5975
1630 - 2200	4828 3396

However, according to monitoring observations made in February and early May at Sentech in South Africa, the only frequency in use is 6045, carrying Radio 2. It would appear that this channel is in use during the whole broadcast day from 0300 - 2200 UTC. So, ZBC must be having problems with one of its transmitters.

The Future

Today the country is facing a struggling economy, resulting partly from droughts, floods, its involvement in the war in the Democratic Republic of the Congo, and also the high incidence of AIDS. Inflation stood at about 60% in 1999.

In the year 2000 the Supreme Court passed a Bill that would end the government's monopoly on broadcasting. The ZBC is planning to commercialize more of its services in preparation for the competition which will arise. Under the new law, only one independent radio station will be allowed to compete with ZBC, as well as one new TV station. Pirate broadcasters would face a heavy fine.

Zimbabwe thus provides a challenge for DXers in North America. Your best bet would be at sign on 0300 on 6045, but RFI Paris in Russian to Europe might cause some QRM. Good luck!

ZIMBABWE
BROADCASTING CORPORATION

TO
NAME
4044 RUESSER

ADDRESS
P.O. Box 5
62 Abulot, M.-15

YOUR QSL CONFIRMED
DATE 05/10/99
FREQ 4835 kHz
SERVICE F-4
SIGNED [Signature]

ZBC QSL card from Roger Roussel, courtesy www.antique-corner.com/SWLQSL

KJES

By Hans Johnson

Mark Twain said, "It's not the things you don't know that hurt you, it's the things you think you know that just ain't so."

KJES, an American shortwave station in New Mexico, suffers from this. Listeners who have only briefly tuned into the station are quick to dismiss KJES as a cult. Just a few minutes of listening to the same bits of scripture repeated over and over again and some have already drawn a conclusion. Others assume this characterization to be true even though they have never heard the station themselves.

Yet the reality is much different. For openers, KJES isn't run by a cult, it is actually run by a Roman Catholic organization. In addition to the shortwave station, they have ministries in El Paso, Texas, and Juarez, Mexico.

Programmed to Suit

A staff of volunteers runs the day-to-day operation of KJES and the programming is actually quite low-key. There isn't any ranting and raving, and KJES certainly isn't badgering anyone for money. KJES puts out a fine signal with nice audio and is almost always free of any technical problems. Personally, I find the vocal music they offer to be quite nice.

The station has very good reasons for repeating the scripture over and over again. I asked them about this and their reply is worth quoting:

"We have found that this technique has worked when we take the Gospel to a Mexican jail and mental hospital that we visit every week. We have found that by frequently repeating certain Scriptures, the bondage over the jail, for instance, is lifted and we are able to evangelize successfully. We have experienced this for many years and so now we are trying to penetrate the darkness that envelops much of the world we experience."

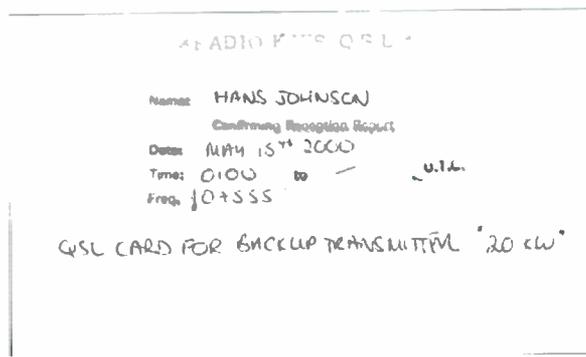
Another interesting aspect of KJES is who is allowed on the air at the station. With some American shortwave outlets, a fistful of dollars and a tape will get you on the air. On the one hand, this is great free speech. On the other hand, it has at a minimum let some awfully bad programming hit the airwaves. At the worst, it has stigmatized both the American shortwave broadcasters and listeners as doomsdayers and right-wing fanatics.

KJES will let you on for free. The catch is that you have to preach, can't give your name and/or address, and cannot ask for any money. I don't think they have had any takers so far.

On the Technical Side

KJES came on the air in June of 1992 with a 50,000 watt transmitter made by ELCOR in Costa Rica. This was matched with a Create Design rotatable log periodic antenna made in Japan. It's also worth noting that if you hear them with a weaker than normal signal, they might be on their 20,000 watt back up unit.

Transmitter problems caused a lot of frustration that first year as the transmitter was a prototype for ELCOR, the first 50 kW they had ever built. Things



A stamped index card filled in by hand serves as the KJES QSL card – this one for the backup 20 kW transmitter.

are a bit better now that all the bugs have been ironed out.

KJES can be heard as follows. English is at 1400-1600 UTC on 11715 kHz, 1900-2000 on 15385, and 0200-0330 on 7555. Spanish is at 1600-1700 on 11715 and 2000-2100 on 15385. All of their transmissions are heard fine in North America. In Europe, their 0200 broadcast is probably the most easily heard.

KJES' address is The Lord's Ranch, 230 High Valley Road, Vado, NM 88072. The station is just a few miles off of I-10 off the Vado exit if you happen to be in the area. The telephone number is (505) 233-2090 and the fax is (505) 233-3019. The station does not have a web site or email address.

Tune them in; you might just be in for a very pleasant surprise!



CELLULAR SECURITY GROUP
MAX System Antennas
MaxSystemAntennas.com
(978) 281-8892

A "folded" Folded Dipole Antenna for VHF/FM

By Richard Q. Marris G2BZQ

The folded dipole has been with us for many years. In the HF spectrum, it is usual to construct it using 300 ohm twin ribbon feedline. At higher frequencies tubing, rod and metal strip is often used.

The basic concept is shown in Figure 1, and its simplicity becomes clear. It consists of a half-wavelength of 300 ohm twin ribbon feedline, joined together at the ends. The middle of one side is broken, and the impedance at that point (x-x) is 300 ohms. So, the feedline can also be 300 ohms, which is taken to the receiver and/or transceiver. The bandwidth is broader than the conventional dipole. It is a quite docile antenna in use.

When it comes to reception of VHF/FM stations on 88.1 to 107.9 MHz, the folded dipole often appears in some of the multi-element arrays made of metal tubing, rod or strip.

However, for reception of the VHF/FM band indoors, or maybe on vacation, you can use a common variety of low-cost ribbon feedline (300 ohms), available from a number of suppliers and manufacturers. (See Figure 1.) The performance of this feedline can range from excellent to poor, depending on height,

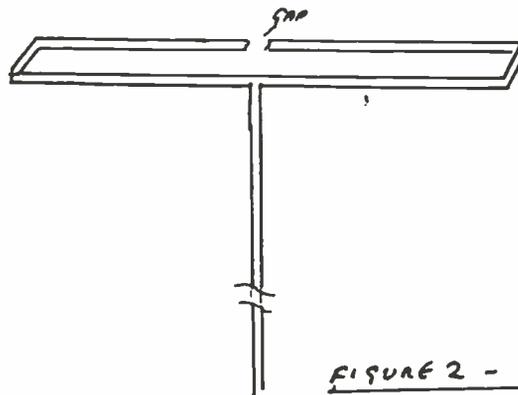


FIGURE 2 - THE "FOLDED" FOLDED DIPOLE

surrounding objects, and in-home interference. This feedline forms the basis of this project.

Construction

A typical 88.1 - 107.9 MHz dipole is around 57.5 inches long. It consists of 300 ohm twin feedline with a plastic molding at each end. In the center is a plastic "T" molding enclosing the feeder, which goes to the

RX. Each of the three moldings has a small pinhole through it, which could be used for pinning the antenna to a wall, or for connecting thin cord for support between two suitable supports. The cost of this device was about the price of 2 or 3 beers.

The general arrangement can be seen in Figure 1.

On connecting the antenna to a VHF/FM receiver, it may work extremely well or just

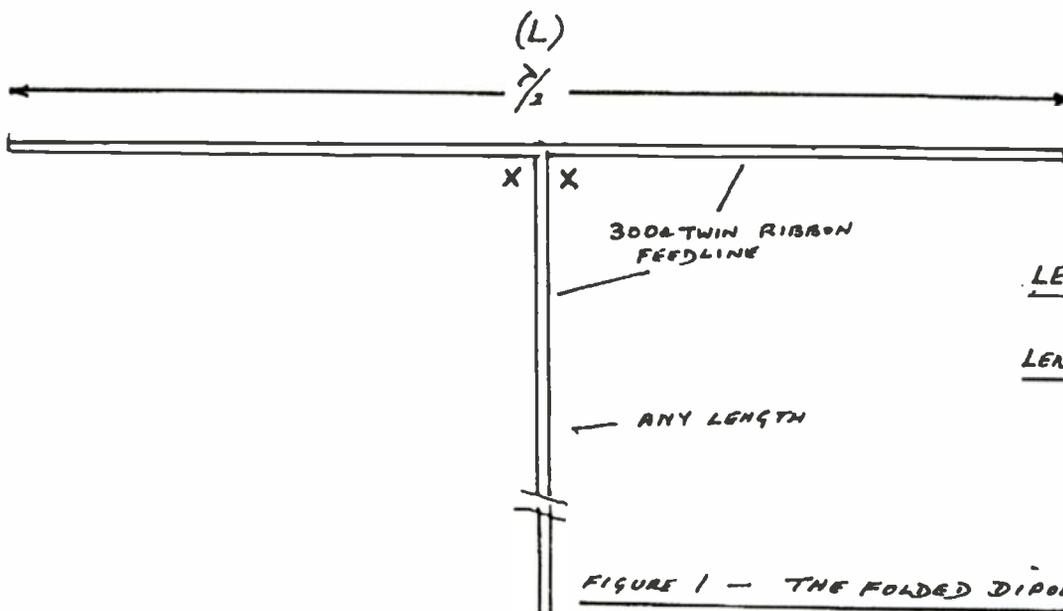


FIGURE 1 - THE FOLDED DIPOLE. (CONVENTIONAL)

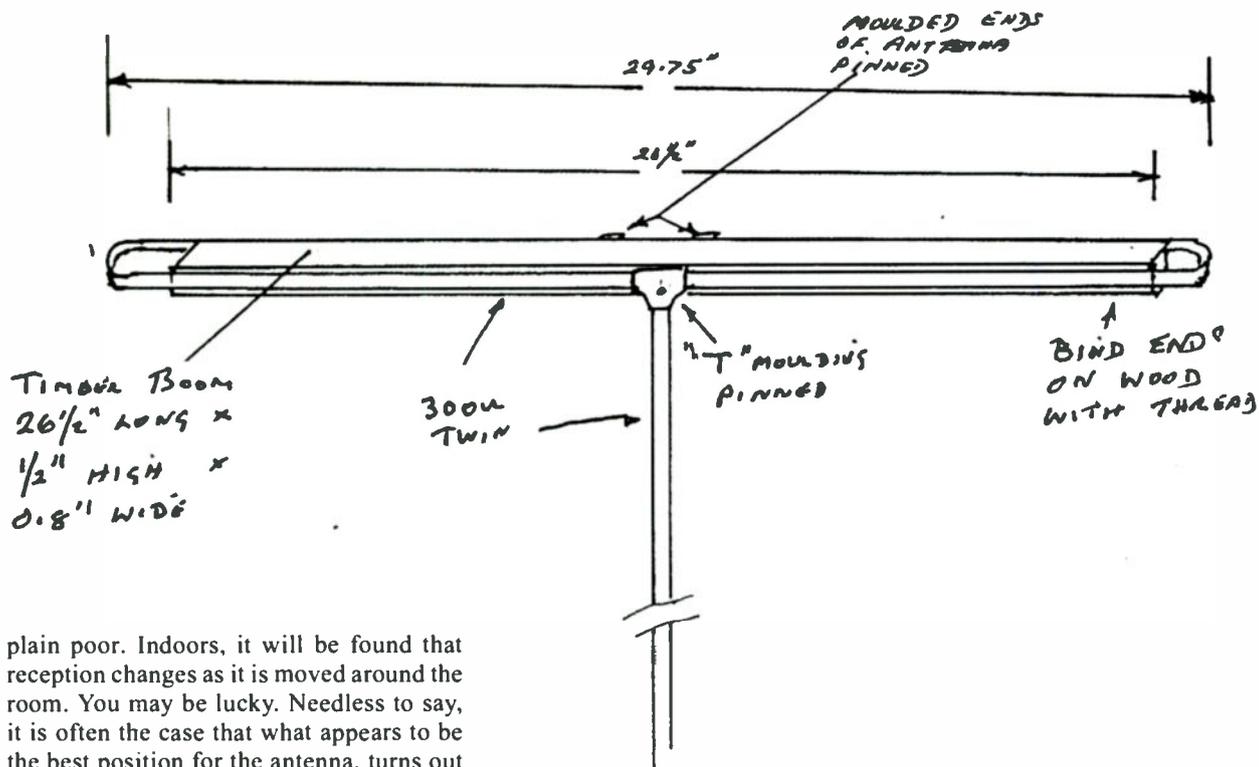


FIGURE 3 = THE RIBBON FOLDED DIPOLE VHF/FM (27.5 TO 108 MHz) ANTENNA.

plain poor. Indoors, it will be found that reception changes as it is moved around the room. You may be lucky. Needless to say, it is often the case that what appears to be the best position for the antenna, turns out to be the most inconvenient to support it. Again you may be lucky! Unfortunately, pinning it to a wall often results in interference from in-house wiring or just plain damping of signals.

A dipole antenna is a half-wavelength long. Of this, the center quarter wave is high current, with the ends being the high voltage points. So, in simple terms, it is the center quarter wave which does most of the work. Furthermore, the dipole is directional, with the maximum signals appearing on the long side and minimum signal at the ends.

So, if the ends were folded down or back, one could halve the antenna length, fasten it to a simple structure so that it could be rotated, and hopefully solve all the problems in one go.

Figure 2 shows the concept of the "folded" Folded Dipole. The end result produced a rotatable, simple antenna just 29-3/4 inches long, mounted on a simple timber framework. (See Figures 3 and 4.)

The mounting frame (Figure 4) consists of a simple timber boom arm 26-1/4" long x 1/2" deep x 0.8" wide. A length of wood dowel about 3/4" diameter is screwed and glued at the center, as shown. This can be any convenient length, and can be inserted into a heavy base, into which a 3/4" diameter hole has been drilled, so that the boom can be rotated.

Next the ribbon antenna is wrapped around the boom as shown in Figure 3. It can be held in place with a pin in the center molding, with the fold back ends bound on with thread or tape. The antenna end moldings should be pinned to the timber boom arm, as shown.

Operation and Results.

The results were far better than expected. The antenna had become a little more directional, and if there was any loss of signal strength, this was more than compensated for by the fact that the antenna could be rotated towards the station being received. Furthermore, by rotating the antenna through 180 degrees, the best possible signal could be received from stations all around the compass. In addition, any inhouse man-made noise could be eliminated.

Of course, it was no longer difficult to locate the antenna in a convenient place. It

could now be moved around, away from such offending items as house wiring, hidden metal pipes, hidden metal building structures and windows.

So, here is a simple, very low cost project which is worth trying out. It may solve some of your problems, if you are faced with a "no outdoor antenna" regulation or just need an antenna for vacations.

And, of course, you may well be able to rotate it, and receive that obscure VHF/FM station which is located in an inconvenient direction for the present antenna.

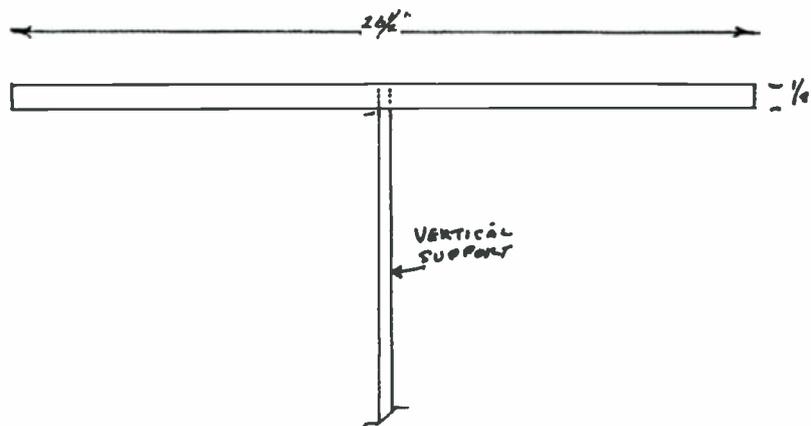


FIGURE 4 = MOUNTING BOOM FOR FIG 3

Listening to the Grand Old Game

By Ken Reitz

On the surface America's baseball industry looks as stable and solid as the buildings on Wall Street. During the off season dollar signs dominated baseball news as record salaries were lavished on a handful of players and the umpires decided to tweak the strike zone. To be sure, ominous clouds loomed as the season began. There's talk of "contraction" *i.e.* shrinking the current list of baseball cities; talk of a mid-season player strike; and, in a new twist on Internet baseball listening, fans were required for the first time to pay for on-line listening on their personal computers.

Last year each team hosted its own web site which gave both leagues a sense of individual and regional flavor. The sites were as varied and interesting as the teams they represented. This year Major League Baseball (MLB) has required all teams to submit to their own uniform web site design which is done by one company for all the teams of Major League Baseball. This scheme includes gathering all web broadcasts under one umbrella.

Now, for a one-time season fee of \$9.95, baseball fans are required to sign up in order to receive any MLB radio broadcast offered on the web. Last year all of such broadcasts were free of charge. Major League teams don't appear to be entirely happy with the new arrangement nor do the many network flagship stations who, until this year, were offering the product on their own

websites. A New York Yankees spokesman said questions about the League's Internet activities should be directed to the League itself.

Jim Gallagher, Sr. VP for Corporate Communications at MLB.com says they've signed up 125,000 fans as of mid-May, but won't talk about target numbers. Of the program he says, "We certainly believe it's a success and expect our subscription base to grow..." He says that "...it's really the dis-

A team such as the Atlanta Braves, which has the largest number of radio affiliates for its broadcast network, used to post their entire affiliate list on the web. At the beginning of the season they noted the list's absence and in an email wrote "...we hope to add that to our website as soon as MLB gives us the added page..." Two months later they still didn't have the space.

A few teams have posted their affiliates list, but fans wishing to see a complete list of radio stations for the 2001 Major League Baseball season can do so on the *Monitoring Times* website <http://www.monitoringtimes.com>. This list is of particular use for AM band DXers trying to confirm graveyard frequencies. A complete list of the flagship stations (English and Spanish) for all Major League teams is found below.

There are a number of changes in the broadcast list this year. A few flagship stations have changed; as of this writing the Montreal Expos still did not have an English broadcast affiliate; there are more Spanish language networks on the air

this year; and some networks have shrunk while others have grown.

In general, team prosperity is mirrored in the number of affiliates. Troubled Major League franchises such as Montreal (1), Tampa Bay (12), and Florida (11), have the shortest lists, while a nationally popular team such as the Atlanta Braves enjoys the longest affiliates list (160 stations). Coastal teams appear to have fewer radio outlets than teams in the nation's heartland which have a wide geographic



No matter where you are, there's a Major League Baseball game within earshot. By radio or by web, you can have a front row seat, but it may not be free. (Photo by Harry Baughn)

placed fan we're aiming at. The fan who can't get AM transmissions either because of distance or work environment." Gallagher points out that the \$9.95 fee includes a \$10 coupon which can be used at the *MLB.com* store for fan collectibles.

What happens in the post season? Gallagher was not sure, but fans may have to spend a little more for the playoffs and World Series.

Meanwhile, web space now allowed teams is fairly limited compared to last year.

By Harold Driscoll

area from which to draw, almost regardless of their ability to win. Perennial cellar-dweller Kansas City Royals (AL) has one of the biggest radio networks in baseball with 74 affiliates. While the Yankees (AL) have a only a moderate number (35) in their list, each station covers a more dense population, amounting to a larger listening audience than the Royals.

Tuning into the flagship stations listed below is relatively easy. Most are 50 kW power houses on clear channels which means they have little domestic frequency competition. There are some exceptions. Among the 5 kW flagship stations which will be a challenge for most listeners are WFLA Tampa; KMBZ Kansas City; WQAM Miami; KABL Oakland; KTAR Phoenix and KOGO San Diego. Milwaukee's WTJM transmits 50 kW during the day but switches to 10 kW at night, while Miami's WQAM starts the day at 5 kW and drops to 1 kW at night. The only station going up in power at night is Los Angeles' KXTA which is 5 kW during the day going to 44 kW at night. Probably the hardest catches will be the lower output Spanish language stations which are at the high end of the AM dial.

In all, well over a thousand radio stations are transmitting baseball to all three countries comprising North America. With a good antenna, a decent radio, and an electrically quiet listening post you may be surprised at all the stations you can receive. Here are a few tips to help you tune into the "grand old game."

Most games during the week are night games which start at about 7:00 p.m. local time. On the weekend, games can be either day or night games with most Sunday games being day games because most teams plan to have a three game series over the weekend and use Monday as a travel day going to the next city on the schedule. Day games usually have a start time of 1 or 3 p.m. local time. Your best chance of catching West Coast games if you live on the East Coast will be during the week with West Coast games starting at 10 pm ET. West Coast listeners will have a much harder time catching East Coast baseball action because most games will have finished before or just after local sunset Pacific Time.

If you're looking for a particular team, check out Chart #1 which lists the flagship stations by team. If you're dialing around the AM band at night looking to log the flagship stations, use Chart #2, which lists the flagships by frequency. Remember too that most baseball networks pause for local station ID at the top of each hour. This is the perfect time to log those rare AM catches.

These are a few memories from the 1950s, about broadcasting baseball games of the Rochester NY Red Wings – a triple A ball team one step down from major league baseball.

Broadcasting home games was the same back then as today. But, broadcasting Red Wing road games was a different matter. All broadcasts were done from information sent via Western Union teletype.

A teletype operator sent game information from the out of town ball park. A second Western Union teletype operator was stationed in our broadcast studio. (The studio being that of the once-local radio station WVET. Its call letters have long since faded into history.) This operator would hand teletype game info to our game play-by-play announcer, Tom Decker, who in turn cued me what play was coming up so I could have the right sound effect ready. My job was that of technical producer.

The Quest for Realism

Improvements were always in order. For one thing, we needed to change our general background fan sounds; ours had too many of the same sound repeats over and over.

The solution to this problem seemed easy enough: record fan sounds between games of a two-game double header, since there was always a twenty minute rest period between games. We'd take a tape machine atop Silver Stadium (our home stadium), and record the effects easy enough, or so it seemed.

But alas! It proved not easy enough. Not by a long shot. Quality broadcast tape recording machines of 1950s days were heavy and bulky, unlike those of these modern hi-tech days. Our recording mission proved to be a real chore.

Fortunately some helpful fans took pity on me – a skinny twenty three year old attempting to carry the two part Magnecord tape machine up the narrow, winding, and steep steps to the top of the grandstand. Thanks to them I finally got there.

But blast! The best of plans can go awry. It seems some fan went out to the parking lot with but one thought in mind: to lean on a car horn throughout the entire twenty minute break between ball games! Needless to say there was no background sound recorded that day. (I must give some credit. After over forty years have passed I still think of that fan, whoever he may have been, and get a chuckle.)

We tried it again a different time with success – again, with the assistance of helping fans.



MT contributor Harold Driscoll – as colorful today as when he was recreating baseball games for radio.

Foul Plays

Another memorable time comes to mind. When a crucial three ball, two strike pitch was about to be delivered, suddenly our studio's Western Union teletype machine stopped running.

The reason was quickly discovered. The cleanup lady! She would always go about her tasks quietly enough; but without her realizing it, the broom pulled loose the machine line cord. There followed a few grimacing moments; a scowling play by play announcer, a harried Western Union operator, and a bewildered clean up lady.

The batter saved the day, hitting foul balls!

Then there was that game from Montreal. Tied three up in the bottom half of the ninth, Montreal was at bat and needed but a score to win the game.

It happened! A home run! Montreal wins by a run! All that remained to do was just a wrap-up of this night's ball game, and another successfully recreated game would be history.

But history be damned! The teletype machine alarm sounded just as the game wrap-up was under way. That home run was not a home run; it was but an out of the ball park foul ball. Oops.....

Faces blushed. A few thoughts were unable to be aired. Then came that famous philosophical phrase so often quoted:

"Oh well"

The game went another six innings.

We worked late that night.

A footnote is in order. These have been a few memories that linger with humor; but at least ninety eight percent of recreated games went without incident, leaving no humor in their wake ...

"Oh well."

MAJOR LEAGUE BASEBALL FLAGSHIP STATIONS

*Denotes Spanish language flagship station

Team / Call Sign / Frequency

AMERICAN LEAGUE

Eastern Division

Baltimore Orioles WBAL-AM Baltimore, MD 1090 kHz
 Boston Red Sox WEEI-AM Boston, MA 850 kHz
 *WRCA-AM Boston, MA 1330 kHz
 New York Yankees WABC-AM New York City, NY 770 kHz
 *WADO-AM New York City, NY 1280 kHz
 Tampa Bay Devil Rays WFLA-AM Tampa, FL 970 kHz
 * -AM 760 kHz
 Toronto Blue Jays CHUM-AM Toronto, Ontario Canada 1050 kHz

Central Division

Chicago White Sox WMVP-AM Chicago, IL 1000 kHz
 Cleveland Indians WTAM-AM Cleveland, OH 1100 kHz
 Detroit Tigers WXYT-AM Detroit, MI 1270 kHz
 Kansas City Royals KMBZ-AM Kansas City, MO 980 kHz
 Minnesota Twins WCCO-AM Minneapolis, MN 830 kHz

Western Division

Anaheim Angels KLAC-AM Los Angeles, CA 570 kHz
 *XPRS-AM Tijuana, MX 1090 kHz
 Oakland Athletics KABL-AM Oakland, CA 960 kHz
 Seattle Mariners KIRO-AM Seattle, WA 710 kHz
 Texas Rangers KRLD-AM Dallas, TX 1080 kHz

NATIONAL LEAGUE

Eastern Division

Atlanta Braves WSB-AM Atlanta, GA 760 kHz
 *Spanish Network pending
 Florida Marlins WQAM-AM Miami, FL 560 kHz
 *WQBA-AM, Miami, FL 1140 kHz
 Montreal Expos CKAC-AM Montreal, Quebec, Canada 730 kHz

New York Mets WFAN-AM New York City, NY 660 kHz
 *WADO-AM New York City, NY 1280 kHz
 Philadelphia Phillies WPHT-AM Philadelphia, PA 1210 kHz
 *WSSJ-AM Philadelphia, PA 1310 kHz

Central Division

Chicago Cubs WGN-AM Chicago, IL 720 kHz
 Cincinnati Reds WLW-AM Cincinnati, OH 700 kHz
 Houston Astros KTRH-AM Houston, TX 740 kHz
 *KRTX-AM Houston, TX 980 kHz
 Milwaukee Brewers WTMJ-AM Milwaukee, WI 620 kHz
 Pittsburgh Pirates KDKA-AM Pittsburgh, PA 1020 kHz
 St. Louis Cardinals KMOX-AM St. Louis, MO 1120 kHz

Western Division

Arizona Diamondbacks KTAR-AM Phoenix, AZ 620 kHz
 *KSUN-AM Phoenix, AZ 1400 kHz
 Colorado Rockies KOA-AM Denver, CO 850 kHz
 Los Angeles Dodgers KXTA-AM Los Angeles 1150 kHz
 *KWKW-AM Los Angeles 1330 kHz
 + KYPAA-AM Los Angeles 1230 kHz (Korean)
 San Diego Padres KOGO-AM San Diego, CA 600 kHz
 *KURS-AM San Diego, CA 1040 kHz
 San Francisco Giants KNBR-AM San Francisco, CA 680 kHz
 *KZSF-AM San Francisco, CA 1370 kHz

MLB FLAGSHIP STATIONS LISTED BY DIAL

POSITION (kHz)

Frequency / Callsign / Location

560 WQAM Miami, FL
 570 KLAC Los Angeles, CA
 600 KOGO San Diego, CA
 620 KTAR Phoenix, AZ
 620 WTMJ Milwaukee, WI
 660 WFAN New York City, NY
 680 KNBR San Francisco, CA
 700 WLW Cincinnati, OH
 710 KIRO Seattle, WA

720 WGN Chicago, IL
 730 CKAC Montreal, Quebec, Canada
 740 KTRH Houston, TX
 760 WSB Atlanta, GA
 770 WABC, New York City, NY
 830 WCCO, Minneapolis, MN
 850 WEEI, Boston, A
 850 KOA, Denver, CO
 960 KABL Oakland, CA
 970 WFLA Tampa, FL
 980 KMBZ Kansas City, MO
 980 KRTX Houston, TX (Spanish)
 1000 WMVP Chicago, IL
 1020 KDKA Pittsburgh, PA
 1040 KURS San Diego, CA (Spanish)
 1050 CHUM Toronto, Ontario, Canada
 1080 KRLD Dallas, TX
 1090 WBAL Baltimore, MD
 1090 XPRS Tijuana, MX (Spanish)
 1100 WTAM Cleveland, OH
 1120 KMOX St. Louis, MO
 1140 WQBA Miami, FL (Spanish)
 1150 KXTA Los Angeles, CA
 1210 WPHI Philadelphia, PA
 1230 KYPAA Los Angeles, CA (Korean)
 1270 WXYT Detroit, MI
 1280 WADO New York City, NY (Spanish)
 1310 WSSJ Philadelphia, PA (Spanish)
 1330 WRCA Boston, MA (Spanish)
 1330 KWKW Los Angeles (Spanish)
 1370 KZSF San Francisco, CA (Spanish)
 1400 KSUN Phoenix, AZ (Spanish)

From Aeriola to Kerbango, America has whiled away radio's first hundred years with the summer ritual of tuning in to baseball. (Courtesy <http://members.aol.com/scottswim/> and Kerbango)



Pre-Publication Sale!

2002 EDITION PASSPORT TO WORLD BAND RADIO



The world's best selling shortwave guide is now bigger and better! Edited by Lawrence Magne, Passport is the ultimate shortwave hobbyist's listening reference. At a glance, Passport's exhaustive chart shows world broadcasters by frequency and time, indicating station power and language as well.

Passport includes extensive chapters on program profiles, English language listening, catching clandestine and pirate broadcasters, receiver reviews and ratings, planning your listening post, and Internet Web radio. A powerful listening tool at a low, low price!

Order now -- before the offer closes October 31, 2001 -- to receive your FREE SHIPPING in the US! Available at the end of October, 2001.

After October 31, BOK18-02 goes to \$19.95 plus \$3 mailing. Shipping to Canada & Mexico, \$8/book by Global Priority Mail. Other Countries are \$14/book Air Mail.

Order BOK18-02
\$19⁹⁵
free mailing
until 10/31/01

www.grove-ent.com



800-438-8155

828-837-9200; FAX 828-837-2216 7540 Highway 64 West, Brasstown, NC 28902 email: order@grove-ent.com



WiNRADiO WR-1550

New WR-1550, with improved dynamic range! Continuous 150 kHz - 1500 MHz frequency coverage (less cellular), multimode detection (AM, NFM, WFM, USB, LSB, CW). IF shift (+/- 2 kHz), sharp selectivity (2.5, 6, 17, 230 kHz). high sensitivity (0.3 uV SSB and NFM), built-in spectrum display, and triple superheterodyne conversion. This is the receiver that sets the standards!

Choose from two models: the WR1550i plugs into an unused ISA port in your desktop computer - \$499.95 plus shipping; or the WR1550e external module for convenient use with a portable computer - \$549.95 plus shipping.

RCV47-E - WiNRADiO 1550 External: \$549.95 plus \$11.95 shipping in the U.S.

RCV47-I - WiNRADiO 1550 Internal: \$499.95 plus \$11.95 shipping in the U.S.



Grove Enterprises, Inc.

800-438-8155

7540 Highway 64 West
Brasstown, NC 28902

828-837-9200 828-837-2216 (fax)
order@grove-ent.com

GROVE
WWW.GROVE-ENT.COM

The only authorized WiNRADiO repair center in North America.

The \$10 Multi-Purpose Mobile Antenna

It all started a few years ago when I noticed that FM reception in my car had deteriorated to the point that only the nearest powerhouse station could be received. It happens that mine is an older car (23 years old this month to be exact) which used an in-the-windshield folded dipole for an antenna. The connection, somewhere in the upper reaches of the dashboard between the lead-in and the radio, had finally given out. The solution was to trudge to Radio Shack seeking a replacement. What I bought was the "one-piece mini antenna" (RS#12-1334) for \$9.99 plus tax.

The problem with in-the-windshield antennas, aside from the fact that they were extremely directional, was that there was no mounting hole to put the \$10 replacement. Out came the drill and the largest bit I could find which would accommodate the antenna's swivel base. Now, I understand that this is not

a job for everyone. While I didn't hesitate to drill a hole in the surface of a car in bad need of a paint job, you might feel differently about your new Lexus or Suburban.

To mount the antenna I first examined the car to find an appropriate place to drill a hole. I chose the back of the right rear fender because I could easily access the installation from the rear window washer filler panel through which the 54" attached cable would be brought into the interior of the car. I found it wasn't enough to make the trip to the radio and that a 24" male-to-female extension (RS#12-1312) was required.

To start the drilling I first made a slight dimple in the metal surface with a nailset so the drill bit wouldn't wander around on the surface before biting into the metal. In my case, the slope of the surface was extreme (see photo) and the swivel of the base was just able to accommodate it. I finished the job with a generous amount of Coax-Seal to keep the installation waterproof.

◆ Great FM, What's Next?

I began to think about the antenna as I enjoyed my new-found FM reception. I was thinking about how important it was for the antenna to be vertical, to be outside the metal surface of the car and to be the right length for the frequencies I wanted to receive. I was musing about the fact that those were exactly the properties I would look for in, for example, a mobile scanner antenna.

The next day found me back at the Shack picking up a Motorola to BNC adaptor (RS#278-117) to outfit the Motorola plug from the FM antenna with a BNC plug to fit my hand held scanner. Sure enough, signals which were marginal at best with the scanner's rubber duck antenna inside the car came in quite well on the car FM antenna. As they say in the Radio Shack catalog: "Mobile use of scanners may be unlawful in some areas or may require a permit—check with local authorities." But, for ten bucks I now had an FM radio antenna and a "stealth" scanner antenna in one!

While I found that improved scanner reception was real plus for this antenna, I realized that a more permanent solution would

be to use a 3-way Motorola connector (RS#12-1313) which couples two radios to one antenna or vice versa. This way you could feed your FM car radio with one leg of the splitter and the scanner with the other. Not a bad setup for \$2 extra.

◆ The 2 Meter Gambit

The obvious next step was to think about this antenna in terms of amateur radio use. This could be the solution to the unsightly mag-mount with its trailing cable-across-the-trunk-or-roof problem. Clearly, using the FM antenna for transmitting would be more chancy. It's one thing to just receive signals, but transmitting brings in another set of requirements. What kind of Variable Standing Wave Ratio (VSWR) or amount of signal reflected back to the radio would be seen with this FM band car radio? What kind of power could be put through the unit without damaging the cable or the radio or the antenna?

Before I could conduct experimental transmissions I needed a 2 meter SWR/Power meter which could easily be used in a mobile (i.e. tight quarters) configuration. I found exactly what I needed in the MFJ catalog: the MFJ #844 Dual Band 144/440 MHz SWR/Wattmeter. Measuring about 3 inches square and about an inch thick, the 844 reads direct SWR and power in three ranges: 15, 60, and 200 watts. It seems perfect for hooking up to hand-helds which usually have under 10 watts output and most mobile/base units which typically have 40 to 50 watts out. If you use the FM antenna for transmitting, make certain you do not have the antenna coupler in line. You don't want to feed RF of any wattage into a radio or scanner.

The 844 is outfitted with SO-239 connectors to use as a bridge. You'll need a short piece of coax fitted with an SO-239 on one end and the proper transceiver antenna connector on the other. Some will use a BNC, others an SMA, and most higher wattage base/mobile transceivers use an SO-239 connector. For purposes of this test I used a series of adaptors to work down to the correct type of connector (see photo). For a permanent setup try to have as few adaptors as you can.



Take a deep breath and go ahead and drill a hole in your car. This mini FM car antenna from Radio Shack adapts to just about any slope.



The MFJ-844 SWR/Power meter can be used to check the SWR and the power output of your HT or mobile transceiver. Here, the mini antenna checks out at 1.2:1

With everything in place it was time to give the antenna the "smoke test." I tuned to an unused frequency on 2 meters. I keyed the mic with a certain amount of trepidation giving a proper ID and glancing at the SWR meter. It indicated 1.2:1, an excellent reading. I flipped the switch to indicate the power out and it correctly showed 10 watts. I used the meter on other factory designed and built 2 meter antennas to verify its proper operation. I also used the meter to check the power output of the transceiver I used in other antenna configurations. The MFJ-844 not only

works well in the car, but can be used in a base station configuration with an insertion loss of less than 0.3dB.

Using a meter such as the 844 is perfect for the antenna experimenter. Like most hams, I'm always playing with antennas and the 2 meter/440 MHz band is a great place to play. The frequencies on these bands require small antennas which are easy to build with

readily available materials. Now, I'm considering rebuilding my 2 meter bicycle antenna!

◆ Last Word

I like the idea of using "off-the-shelf" products for slightly "off-the-mark" use. While the Radio Shack mini-antenna was not designed to be used as a scanner or 2 meter transmitting antenna I found it worked fine with a relative gain similar to that of a 1/4 wave mag-mount. I wouldn't feel comfortable putting more than 15 watts into the antenna. Besides, the antenna is not very efficient and

I think that power output of more than that 15 watts would be wasted.

I found it worked fine for working repeaters in town, but it wasn't a great performer at large distances. If your 2 meter activities are mostly limited to in and around the local repeaters this little antenna will work fine. Since most of my 2 meter action is out of town, I'll keep my 5/8 wave antenna which will take the full 60 watts of my transceiver and gives a 3.4 dB gain over a 1/4 wave 2 meter antenna.

So, there you have it! Three antennas in one and all for \$10 in the Radio Shack mini-antenna. The MFJ-844 SWR/Power meter is widely available through most amateur radio mail order supply houses for \$70 or call MFJ Enterprises at 800-647-1800.

IT'S BACK AND BETTER THAN EVER

The Worldwide Shortwave Listening Guide

Edited by John Figliozzi

A "must" reference for every shortwave program listener!



Listening is only half the fun... POPULAR COMMUNICATIONS is the other half.

If you enjoy radio communications in all its variety, you'll love *Popular Communications*

Since 1982 *Pop'Comm* has delivered thousands of pages of great reading for both the radio enthusiast and the professional communicator.

Name your favorite interest... *Popular Communications* is there for you. Whether you're into Short-wave Listening, Scanner Monitoring, searching out Pirate Radio broadcasters, CB Radio, Satellite Broadcasting, ACARS, or Ham Radio; you name it, we cover it, every month.

Popular Communications

Subscribe today and save up to 58% off the newsstand price. Save even more with two or three year subs!

YES! Enter my Subscription to Popular Communications today!

Name _____

Address _____

City _____ State _____ Zip _____

() Check () MasterCard () VISA () AMEX () Discover

Card No. _____ Expires _____

Signature _____

	USA	Canada/Mexico	Foreign Air Post
1 Year	<input type="checkbox"/> 28.95	<input type="checkbox"/> 38.95	<input type="checkbox"/> 48.95
2 Years	<input type="checkbox"/> 51.95	<input type="checkbox"/> 71.95	<input type="checkbox"/> 91.95
3 Years	<input type="checkbox"/> 74.95	<input type="checkbox"/> 104.95	<input type="checkbox"/> 134.95

Allow 6 to 8 weeks for delivery

FOR FASTER SERVICE FAX 1-516-681-2926

MT 01

Popular Communications 25 Newbridge Road, Hicksville, NY 11801 Telephone (516) 681-2922

Q. Several questions about short-wave wire antennas:

(1) If I center-feed it at the apex of a "V" with both wires parallel to the ground, will it be directional?

(2) Do I need more than, say, 66 feet of wire?

(3) What is magical about 66 and 134 feet I've read so much about?

(4) Does plastic insulation on a wire affect reception? (Thomas Kline, email)

A. (1) Yes, depending on the lengths; the higher the frequency, the more directional toward the open ends.

(2) No, not with modern, high-sensitivity receivers. In most cases, 20-60 feet is plenty.

(3) Absolutely nothing for receiving short-wave signals. Those "magical" lengths provide the best impedance matching for 40 and 80/75 meter amateur radio transmitters when fed by coaxial cable.

(4) Absolutely not, although it can forestall corrosion. Besides weakening the wire, corrosion can add electrical resistance to the signal strength, as can very thin wire, and aluminum versus copper, but plastic insulation has virtually NO adverse effects on radio frequency energy at shortwave frequencies.

Q. I'm trying to find a pin-out diagram for a microprocessor chip used in Aiwa radios. Its four sides each have 16 pins, 64 total, and the printed legends are: 005HAL, IC 9318 FM, 046 Japan, and 297742. Can any of our readers help? Thanks. (Charles R. Stevens, Box 14 #26088, Concord, NH 03302-0014)

A. Let's ask them. I've included your mailing address so if anyone does have that pin-out he can send it.

Q. I have an Icom R75 receiver connected via a short length of coax to a metal window screen for an antenna, as suggested in a re-

cent article in MT. Do I also need a ground? (Tim M.)

A. Grounds are nowhere as important as they used to be for reception. They don't increase signal strengths, but in some cases they may reduce electrical noise interference and reduce the chance of electrical shock from faulty equipment. For the most part, the chassis/power supply interface acts as an adequate ground.

You can verify whether or not a ground will help reception by temporarily running a wire from the chassis ground screw to an earth ground pipe. It should be at least 8-ft. deep in moist, conductive soil, or it won't do anything. If you don't hear an improvement on various test frequencies, forget it.

By the way, there are other makeshift antennas you might try, such as connecting the antenna jack through a capacitor (virtually any value) to an unused telephone jack, bed springs, aluminum clotheslines, TV distribution cable, and even the round ground pin on an AC outlet! The capacitor is a voltage-blocking device to allow radio-frequency (RF) signals through without getting electrocuted or frying the radio. Use values in the .001-.1 microfarad range, and 600 working volts.

Q. I know that "UL Approved" stamped on products means that it meets standards of Underwriters Laboratories, but what does "CE" mean?

A. One of our astute readers, Phil Riba, forwarded this one. In the European Union, it's the "Conformité Européenne" (European Conformity) stamp ("CE") that endorses products sold in those member countries, while in Canada, it's CSA International, abbreviated "CSA."

Q. My house has aluminum siding, and my indoor Scantenna doesn't do well. Even a cellular mag-mount 3 dB gain antenna mounted on a cookie sheet doesn't work well for 860 MHz reception. Is the siding likely the culprit?

A. It sure is! That is an enormous reflective surface, and you need to get the antenna well

above it. Here are a couple possibilities to try:
(1) Put the Scantenna on a chimney mount for improved reception on all ranges, including 800 MHz.

(2) For 806-960 MHz only, select a UHF-TV antenna like a corner reflector or log periodic, and re-drill the U-bolt holes on the boom so that you can mount the elements vertically (90 degrees from the original horizontal pattern). Be sure to use coaxial cable, connecting to the antenna through a standard outdoor V/U TV balun transformer. The Grove Scanner Beam can also be used for its highly-directional gain at 800 MHz as well as other general-purpose VHF/UHF monitoring. Remember, though, that these are all beams, favoring a specific direction.

(3) You could also use your mobile cellular gain antenna on a pie plate for 800 MHz reception, or make it a little more professional and durable by substituting three or four three-inch metal rods, firmly attached to the antenna base. This will be omni-directional.

Q. With as much lightning as strikes each year, why have I never seen – nor heard of – lightning blasting a hole or burning a patch of grass where it strikes? (Mark Burns, Terre Haute, IN)

A. In the vast majority of cases, lightning is either between clouds or between a cloud and the highest conductive feature above ground. However, on a beach for instance, lightning does, indeed, strike the sand. When this happens it fuses the sand into a coarse, tubular "glass" called a fulgurite. This happens less frequently overland because of the presence of trees, building, power lines, and other structures that are more likely to be hit. In wide-open areas, however, lightning does strike the ground; ask a golfer!

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT, or e-mail to bgrove@grove-ent.com. (Please include your name and address.) The current Ask Bob is now online at our website: www.grove-ent.com

Getting Started

Bright Ideas

Gary Webbenhurst
ab7ni@arrl.net

Get out your highlight pen. Let's get going with more bright ideas.

46

A hot time for monitoring public safety agencies is July 3rd and 4th. Since the fourth is on a Wednesday this year, the entire week should be good listening. But the best time is always from noon on the 3rd through midnight of the 4th. Find a hill or high rise parking structure to view the night fireworks, and for optimal monitoring range.

47

Is there an airshow in your plans? Check these websites.
<http://www.airforce.com/thunderbirds/>
<http://www.airshows.org/schedules.htm>

48

July is vacation time for many. Two things I always take are the camera and a scanner. Preprogram your scanner with the correct traveling frequencies. I find that photography works well with the scanning hobby. Occasionally I happen upon a big accident or storm condition that is made memorable with a photo I took at just the right moment. While driving through Montana last summer, I came upon a 40-acre forest fire that was right beside the Interstate. I have vivid memories of the helicopter dropping water etc. but nothing is better than a photo to show the guys back home. I always find police and fire vehicles worthy of a snapshot or two. Antenna towers are also a favorite. If nothing else, get out and buy one of those one-time disposable cameras.

49

Chances are you will travel within driving distance of a retail store that sells radios. Here are some reasons you should pay them a visit. They stock many radios, both scanners and ham transceivers. They have antennas galore. They have the time to answer your questions. You get to feel the merchandise before you reach for your wallet. Coax, power supplies, frequency directories, and things you never even thought of till you see it on the display shelf jump out and say you gotta have one of these! Check out HRO, AES, and the independents. You can find their addresses on the web.

50

If you get a new or almost new radio with the box, etc., be sure to keep ALL the materials, including the receipt. You may decide to return the radio or sell it. If I buy a radio with an instruction manual, I secure the manual in a ziplock baggie to protect it. I make and keep photocopies of the manuals for all my radios in a large centralized binder. If you need an instruction manual for your ham transceiver there is a publication called "Lost Manuals" that's well worth the \$20. <http://www.artscipub.com/shopping/pricelist.asp?prid=520>

If it is a Radio Shack scanner, check their website. <http://www.radioshack.com/ProdSupport/ProductSupportDrillDown.asp?OID=RSSupport-Communications#>

You can contact other manufacturers for a new manual. Sorry, but they charge for it! Sometimes you can just figure it out; but the newer radios tend to be more complicated.

51

In past columns, I have offered to email the questions and correct answers for those wishing to study for their technician level, U.S. amateur ham license. I have reviewed my material and corrected a small mistake. (Like leaving out a graphic.) I now include a three-page study guide. I taught a class to the Spokane, Washington, Search and Rescue group. They now have 10 new hams. They have switched from the old 155.160 SAR frequency to ham repeaters for most operations. Let me know if you wish the materials via email.

52

Those of us with handheld scanners go through quite a few batteries. I have found that I can sometimes get a few final cycles on rechargeable batteries if I leave them overnight in the charger. But no more than that, or the result could be a fire. Alkaline and various other batteries contain caustic and dangerous chemicals. I think it is a very bright idea to properly dispose of old batteries. Not in the dumpster or weekly garage, but to a recycling center. Some Radio Shack stores will accept them; you can also call or check the web for a recycling center near you. Try 1-800-822-8837 or <http://www.rbrc.org>.

53

Do you use special outdoor antennas for field day, emergencies or camping trips? Purchase a small duffel bag/sports bag for the small parts. Use plastic ziplock freezer baggies for loose screws, etc. I even included a screwdriver and other tools with the parts. Most important, use the color-coded labels to mark your antenna elements. (Works well for tent poles, too.). Include some light rope or cord to get your antenna up into a tree or other high location.

54

Summertime is also good for checking out garage sales and ham swaps. If you get a "preowned" antenna, take an alcohol prep and a toothpick or cotton swab to clean up the inside of the BNC male connection. In fact, you should also clean your radio's female BNC connection right now! Look at the pins on the inside of the female connection. If necessary, you can use a needle to *gently* push the pins towards the center to insure a proper connection. As your collection of antennas grows, you can mark them with the colored labels!

A word of warning: constantly switching different antennas on and off your radio can be hazardous to the health of your BNC connection. Use great and tender care when removing and replacing your antenna.

I enjoy the privilege of writing this column. I hope you have found at least a few of my ideas helpful. I am always happy to hear from you, the faithful readers of *MT*.

RadioMap™

Transmitter sites in your area are researched and marked on a beautiful 11 x 17 full color plot. See FCC licensed sites from VLF through microwave plus selected FAA transmitter sites. Call signs, frequencies, and names provided. Ham radio stations excluded. You choose the map center location - anywhere within the United States. We adjust map coverage for best readability. Deluxe report includes additional index by frequency and local spectrum occupancy chart. Used by radio professionals and hobbyists since 1994 for identifying towers, sources of radio signals, interference, etc. Send nearest street intersection for map center and check for \$29.95 or \$39.95 (Deluxe report) payable to Robert Parnass. Robert S. Parnass, M.S. Radio electronics consulting 2350 Douglas Rd., Oswego, IL 60543-9794 www.megsnet.com/parnass

Universal Video Descrambler



For Free Information Package and Pricing:
www.rcdistributing.com

R.C. Distributing Co. Phone (219) 233-3053 Fax (219) 289-1566

Scanning for Wireless Microphones

Welcome back to the new Scanning Report column! Last month, I asked all the business travelers, government agents and other "connected" hobbyists to share their stories and suggestions. If you send me a bio and short narrative about your work and your radios, you may be featured in the "Who's Listening?" segment of this column. Send along a picture with it, and publication is almost guaranteed.

Let's start immediately by showcasing Chris Parris, a long-time hobbyist, *MT* subscriber and world-traveler!

❖ Who's Listening?

Chris Parris has a job that many will envy: he gets paid to play with communication systems as a broadcast engineer.

Chris first became interested in radio monitoring back in 1973, when his dad started taking flying lessons. Chris went along on some flights and soon wanted to listen-in at home if it was possible. A birthday gift solved the problem: a tunable, multi-band radio allowed him to sample the 118-136 MHz VHF aircraft band, although it was simply called "AIR" on the radio dial.

One night, when aircraft traffic was light and the AIR band was quiet, Chris explored the other bands on the tuning dial. He discovered the local police department on a VHF (simplex) channel. "After that, I was hooked," Chris told me. The police later switched to a multi-channel UHF repeater system, and Chris switched to a Radio Shack "Patrolman 4" UHF, crystal-controlled, four-channel scanner. "Things were great until I started realizing that other agencies were out there...and that I wasn't listening to them."

By the end of high school, the roof of his home and his car were covered with antennas, and he continued to search for the best scanners that he could afford. "I think I've purchased every 'breakthrough' radio over the years. Regency, Uniden, Radio Shack, Icom, OptoElectronics, AOR, and many others," Chris added.

His interests in radios and electronics steered him toward the television broadcast industry, where he currently serves as a remote broadcast engineer for Mira Mobile Television, a remote TV production vendor based in Portland, Oregon.

Chris is responsible for the television production trucks, satellite trucks and communication systems seen at many major sporting events, political conventions, live television shows and TV network events.

Chris has traveled extensively throughout the United States and the world. "Scanners have accompanied me on most of my journeys...I always travel with a couple of scanners in my briefcase, and try to find time to punch in a few frequencies of local interest."

During long airport layovers, Chris passes time – and adjusts his travel schedule – by listening in. "Nothing beats the times when I have been able to hear radio transmissions concerning the flight I'm waiting to board, alerting me to weather or air traffic delays, and having the satisfaction of knowing what's going on behind the scenes."

As a broadcast engineer, Chris has a commanding knowledge of frequency allocations and licenses. From local police and fire agencies to the most obscure wireless microphone channel, Chris can find interesting frequencies in every city he visits.

"My favorite monitoring targets vary...when I'm in an area with an active military presence, MilCom is at the top of the list. In metropolitan areas where trunking systems abound, they are the favorite flavor of the day. I

always try to keep an ear on federal frequencies wherever I go, as you can never tell what you might hear."

Chris enjoys sharing his travel and monitoring adventures by contributing to *MT* and participating in several Internet mailing lists. He still looks for those "breakthrough" radios as new models are introduced each year, and he also has a growing collection of scanner-control software for his newer units.

So, the next time you see a televised game of basketball, football, or baseball, or maybe a live TV network show west of the Rockies, look in the show's credits for a member of our monitoring family: Chris Parris, radio professional and radio hobbyist.

❖ Bank Number One

Is this a new financial institution? No, it's the segment of the column where new and exciting frequencies are listed. Try 'em out in bank #1 of your scanner and see if you get any hits in your area. Chris Parris sends along this extensive list of broadcast wireless microphone channels. Be honest: how many of you know that a wireless microphone band exists *just below* the 800 MHz band?

These channels may be heard at sporting events, movie filming locations and other venues. I personally heard a few of them at a televised golf tournament, where they were set up as "crowd mics" along the fairways. Older scanners can usually receive the portion of these frequencies between 760 MHz and 806 MHz; newer scanners can probably get all the frequencies listed (Narrow FM mode). Note: Microphone companies sell their products worldwide, and since channel plans vary in some countries, every frequency listed will not be available for use in every country.

When used at a local event, wireless microphone channels are selected so not to interfere with local UHF TV channels, other wireless microphones, or other communication systems. They are used for "talent" microphones (announcers, reporters and guests), crowd microphones and production communications. Each manufacturer has its own channel numbering plan, and some frequencies appear in multiple channel plans. Sennheiser and Sony products are listed below; to avoid confusion, only the frequencies and manufac-



When traveling, Chris takes with him a Yupi MVT-7100, Alinco DJ-X10, Radio Shack PRO-94, Yaesu VX-1R, Mayfair AR-108, Optoelectronics Optocom and a Toshiba Libretto to run the Opto radio. And yes, his briefcase is heavy!

turer names are listed (not the manufacturer's channel numbers).

As a footnote to Chris' comments and for the younger hobbyists and radio historians – tunable radios with separate dials for the AM broadcast band, FM broadcast band, "Short-wave" band, VHF Aircraft band, and VHF/UHF "Public Safety" bands preceded the scanning radios we enjoy today. Most of the multi-band radios were large, bulky and heavy. Analog dials, tuning knobs and band selector switches allowed the listener to choose one band and one channel to monitor. There were no internal

memories, digital displays or signal-capturing circuits.

In fact, most of the linear display windows also had a secondary identification marking called "LOG." This was a ruler of sorts, with graduations running from 0 to 10. Since listeners could not identify the exact frequency being heard, the LOG was used to note where the dial-pointer was located within the window. The purpose? To allow the user to go back to that same frequency at a later date. Imagine telling your friends that you heard the police at (LOG) 9-1/2 on the dial!

◆ On the Keyboard

You guessed it! Here's the "teaser" for next month's column. We're going to spotlight a hobbyist who has flown with the U.S. Customs Air Branch and currently interprets aerial photographs for the legal community. We'll also look at some special event frequencies and local systems.

Remember to send *your* information to me at the e-mail address listed above.

Table 1: Wireless Microphone Frequencies

519.600 Sennheiser	750.400 Sony	765.600 Sony	774.625 Sony	781.200 Sony	790.500 Sony	800.250 Sony
520.525 Sennheiser	750.600 Sony	765.800 Sony	774.750 Sony	781.250 Sony	790.625 Sony	800.375 Sony
521.550 Sennheiser	750.700 Sennheiser	766.000 Sony	774.800 Sony	781.375 Sony	790.750 Sony	800.500 "Sennheiser, Sony"
522.725 Sennheiser	750.800 Sony	766.200 Sony	774.875 Sony	781.400 Sony	790.875 Sony	800.625 Sony
523.125 Sennheiser	751.000 Sony	766.400 Sony	775.000 Sony	781.500 Sony	791.000 Sony	800.750 Sony
525.175 Sennheiser	751.200 Sony	766.600 Sony	775.125 Sony	781.600 Sony	791.125 Sony	800.875 Sony
526.450 Sennheiser	751.400 Sony	766.800 Sony	775.200 Sony	781.625 Sony	791.250 Sony	801.000 "Sennheiser, Sony"
529.475 Sennheiser	751.600 Sony	767.000 Sony	775.250 Sony	781.750 Sony	791.375 Sony	801.125 Sony
534.750 Sennheiser	751.800 Sony	767.200 Sony	775.375 Sony	781.800 Sony	791.500 Sony	801.250 Sony
536.500 Sennheiser	752.000 Sony	767.400 Sony	775.400 Sony	781.875 Sony	791.625 Sony	801.375 Sony
537.100 Sennheiser	752.200 Sony	767.600 Sony	775.500 Sony	782.000 Sony	791.750 Sony	801.500 Sony
539.925 Sennheiser	752.400 Sony	767.800 Sony	775.600 Sony	782.125 Sony	791.875 Sony	801.600 Sennheiser
541.300 Sennheiser	752.600 Sony	768.000 Sony	775.625 Sony	782.250 Sony	792.000 Sony	801.625 Sony
543.150 Sennheiser	752.800 Sony	768.200 Sony	775.750 Sony	782.375 Sony	792.125 Sony	801.750 Sony
548.625 Sennheiser	753.000 Sony	768.400 "Sennheiser, Sony"	775.800 Sony	782.500 Sony	792.250 Sony	801.875 Sony
549.325 Sennheiser	753.200 "Sennheiser, Sony"	768.600 Sony	775.875 Sony	782.625 Sony	792.375 Sony	802.000 Sony
630.300 Sennheiser	753.400 Sony	768.800 Sony	776.000 Sony	782.750 Sony	792.500 Sony	802.125 Sony
631.500 Sennheiser	753.600 Sony	769.000 Sony	776.125 Sony	782.875 Sony	792.625 Sony	802.250 Sony
632.400 Sennheiser	753.800 Sony	769.200 Sony	776.200 Sony	783.000 Sony	792.750 Sony	802.300 Sennheiser
632.850 Sennheiser	754.000 Sony	769.400 Sony	776.250 Sony	783.125 Sony	792.875 Sony	802.375 Sony
634.350 Sennheiser	754.200 Sony	769.600 Sony	776.375 Sony	783.250 Sony	793.000 Sony	802.500 Sony
635.100 Sennheiser	754.400 Sony	769.800 Sony	776.400 Sony	783.375 Sony	793.125 Sony	802.625 Sony
636.150 Sennheiser	754.600 Sony	770.000 Sony	776.500 Sony	783.500 Sony	793.250 Sony	802.750 Sony
636.750 Sennheiser	754.800 Sony	770.125 Sony	776.600 Sony	783.625 Sony	793.375 Sony	802.875 Sony
637.250 Sennheiser	755.000 Sony	770.200 Sony	776.625 Sony	783.750 Sony	793.500 Sony	803.000 Sony
641.200 Sennheiser	755.200 Sony	770.250 Sony	776.750 Sony	783.875 Sony	793.625 Sony	803.125 Sony
644.150 Sennheiser	755.400 Sony	770.375 Sony	776.800 Sony	784.000 Sony	793.750 Sony	803.250 Sony
647.200 Sennheiser	755.600 Sony	770.400 Sony	776.875 Sony	784.125 Sony	793.875 Sony	803.300 Sennheiser
651.350 Sennheiser	755.800 Sony	770.500 Sony	777.000 Sony	784.250 Sony	794.125 Sony	803.375 Sony
654.750 Sennheiser	756.000 Sony	770.600 Sony	777.125 Sony	784.375 Sony	794.250 Sony	803.500 Sony
657.900 Sennheiser	756.200 Sony	770.625 Sony	777.200 Sony	784.500 Sony	794.375 Sony	803.625 Sony
661.400 Sennheiser	756.400 Sony	770.750 Sony	777.250 Sony	784.625 Sony	794.500 Sony	803.750 Sony
674.125 Sennheiser	756.600 Sony	770.800 Sony	777.375 Sony	784.750 Sony	794.625 Sony	803.875 Sony
675.000 Sennheiser	756.800 Sony	770.875 Sony	777.400 Sony	784.875 Sony	794.750 Sony	804.000 Sony
677.575 Sennheiser	757.000 Sony	771.000 Sony	777.500 Sony	785.000 Sony	794.875 Sony	804.125 Sony
679.875 Sennheiser	757.200 Sony	771.125 Sony	777.600 Sony	785.125 Sony	795.000 Sony	804.250 Sony
680.500 Sennheiser	757.400 Sony	771.200 Sony	777.625 Sony	785.250 Sony	795.125 Sony	804.375 Sony
682.650 Sennheiser	757.600 "Sennheiser, Sony"	771.250 Sony	777.750 Sony	785.375 Sony	795.250 Sony	804.500 Sony
683.775 Sennheiser	757.800 Sony	771.375 Sony	777.800 Sony	785.500 Sony	795.375 Sony	804.625 Sony
684.250 Sennheiser	758.000 Sony	771.400 Sony	777.875 Sony	785.625 Sony	795.500 Sony	804.750 Sony
692.200 Sennheiser	758.200 Sony	771.500 Sony	778.000 Sony	785.750 Sony	795.625 Sony	804.875 Sony
692.700 Sennheiser	758.400 Sony	771.600 Sony	778.125 Sony	785.875 Sony	795.750 Sony	805.000 Sony
693.600 Sennheiser	758.600 Sony	771.625 Sony	778.200 Sony	786.000 Sony	795.875 Sony	805.125 Sony
694.200 Sennheiser	758.800 Sony	771.750 Sony	778.250 Sony	786.125 Sony	796.000 Sony	805.250 Sony
695.200 Sennheiser	759.000 Sony	771.800 Sony	778.375 Sony	786.250 Sony	796.125 Sony	805.375 Sony
696.400 Sennheiser	759.200 Sony	771.875 Sony	778.400 Sony	786.375 Sony	796.250 Sony	805.400 Sennheiser
697.100 Sennheiser	759.400 Sony	772.000 Sony	778.500 Sony	786.500 Sony	796.375 Sony	805.500 Sony
697.500 Sennheiser	759.600 Sony	772.125 Sony	778.600 Sony	786.625 Sony	796.500 Sony	805.625 Sony
740.100 Sennheiser	759.800 Sony	772.200 Sony	778.750 Sony	786.750 Sony	796.625 Sony	805.750 Sony
740.600 Sennheiser	759.900 Sennheiser	772.250 Sony	778.800 Sony	786.875 Sony	796.750 Sony	805.875 Sony
741.200 Sennheiser	760.000 Sony	772.375 Sony	778.875 Sony	787.000 Sony	796.875 Sony	805.975 Sony
741.900 Sennheiser	760.200 Sony	772.400 Sony	778.975 Sony	787.125 Sony	797.000 Sony	809.400 Sennheiser
742.700 Sennheiser	760.400 Sony	772.500 Sony	779.000 Sony	787.250 Sony	797.125 Sony	811.400 Sennheiser
743.600 Sennheiser	760.600 Sony	772.600 Sony	779.125 Sony	787.375 Sony	797.250 Sony	812.400 Sennheiser
744.600 Sennheiser	760.800 Sony	772.625 Sony	779.200 Sony	787.500 Sony	797.375 Sony	813.600 Sennheiser
745.800 Sennheiser	761.000 Sony	772.750 Sony	779.250 Sony	787.625 Sony	797.500 Sony	816.100 Sennheiser
746.000 Sony	761.200 Sony	772.800 Sony	779.375 Sony	787.750 Sony	797.625 Sony	816.900 Sennheiser
746.200 Sony	761.400 Sony	772.875 Sony	779.400 Sony	787.875 Sony	797.750 Sony	819.600 Sennheiser
746.400 Sony	761.600 Sony	773.000 Sony	779.500 Sony	788.125 Sony	797.875 Sony	821.150 Sennheiser
746.600 Sony	761.800 Sony	773.125 Sony	779.600 Sony	788.250 Sony	798.000 Sony	821.600 Sennheiser
746.800 Sony	762.000 Sony	773.200 Sony	779.625 Sony	788.375 Sony	798.125 Sony	838.100 Sennheiser
747.000 Sony	762.200 Sony	773.250 Sony	779.750 Sony	788.500 Sony	798.250 Sony	839.400 Sennheiser
747.200 Sony	762.400 Sony	773.375 Sony	779.800 Sony	788.625 Sony	798.375 Sony	841.100 Sennheiser
747.400 "Sennheiser, Sony"	762.600 Sony	773.400 Sony	779.875 Sony	788.750 Sony	798.500 Sony	849.100 Sennheiser
747.600 Sony	762.800 Sony	773.500 Sony	780.000 Sony	788.875 Sony	798.625 Sony	854.100 Sennheiser
747.800 "Sennheiser, Sony"	763.000 Sony	773.600 Sony	780.125 Sony	789.000 Sony	798.750 Sony	854.600 Sennheiser
748.000 Sony	763.200 Sony	773.625 Sony	780.250 Sony	789.125 Sony	798.875 Sony	855.300 Sennheiser
748.200 Sony	763.400 Sony	773.750 Sony	780.375 Sony	789.250 Sony	799.000 Sony	856.200 Sennheiser
748.400 Sony	763.600 "Sennheiser, Sony"	773.800 Sony	780.500 Sony	789.375 Sony	799.125 Sony	857.300 Sennheiser
748.600 Sony	763.800 Sony	773.875 Sony	780.600 Sony	789.500 Sony	799.250 Sony	859.700 Sennheiser
748.800 Sony	764.000 Sony	774.000 Sony	780.750 Sony	789.625 Sony	799.375 Sony	861.150 Sennheiser
749.000 Sony	764.200 Sony	774.125 Sony	780.800 Sony	789.750 Sony	799.500 Sony	861.600 Sennheiser
749.200 Sony	764.400 Sony	774.200 Sony	780.975 Sony	789.875 Sony	799.625 Sony	863.100 Sennheiser
749.400 Sony	764.600 Sony	774.250 Sony	781.000 Sony	789.900 Sony	799.750 Sony	863.900 Sennheiser
749.600 Sony	764.800 Sony	774.375 Sony	781.125 Sony	790.125 Sony	799.875 Sony	864.500 Sennheiser
749.800 Sony	765.000 Sony	774.400 Sony	781.250 Sony	790.250 Sony	800.100 Sennheiser	864.900 Sennheiser
750.000 Sony	765.200 Sony	774.500 Sony	781.375 Sony	790.375 Sony	800.125 Sony	
750.200 Sony	765.400 Sony	774.600 Sony				

The Military VHF/UHF Spectrum

Military communications activity can be found in the VHF-Low Band (30-50 MHz) in the following frequency ranges:
30.00-30.55 36.00-36.99
32.00-32.99 40.00-41.99
34.00-34.99 49.61-49.99

Military communications can also be found in the following government bands mixed in with various government agencies communications: 162.00-173.9875 and 406.00-420.00 MHz

VHF-High Band Bandplans

The primary military-only bands in the VHF high band are 138.00-144.00 and 148.00-150.775. Basic spacing between channel is 25 kHz (USN/USAF). The Army uses 12.5 kHz spacing in their segments of the band. The primary communications mode is narrowband FM, but some AM is used by air units of the various services for tactical air-to-air comms.

Air Force

138.000-138.500	143.750-143.925
138.875-138.925	148.050-148.250
139.600-140.000	148.450-148.550
140.375-140.425	149.150-149.325
141.525-151.925	149.475-149.550
142.125-142.300	149.925-150.050
143.425-143.475	150.150-150.350

Naval

138.525-138.850	143.500-143.725
138.950-138.875	148.275-148.425
139.475-139.575	148.950-149.125
140.025-140.350	149.350-149.450
140.450-141.000	150.075-150.125
141.950-142.100	150.375-150.400
142.500-142.850	

Army

139.000-139.450	148.000-148.025
141.025-141.500	148.575-148.925
142.325-142.475	149.575-149.900
142.875-143.400	150.425-150.775
143.950-143.975	

UHF Military Aircraft Bandplan

The military has a BIG (175 MHz) military aircraft band in the 225-400 MHz range. Basic spacing between channels is 25 kHz. You will find not only oddball spacing (especially in segments of the band with military satellite uplink/downlink channels), but a variety of modes and bandwidths. The primary mode in this band is AM, but FM and digital modes are used extensively on satellite channels.

Some other federal agencies will be found within this frequency range, notably the Coast Guard, NASA, Federal Aviation Administration (FAA), and the Department of Energy (DOE). All agencies use 243.000 MHz. It is a worldwide emergency channel. Military satellite uplinks are in the 240-270 MHz range. For specific satellite downlink frequencies see *Satellite Times*, Vol 1, issues 4-6 and Vol 2 issue 1.

Air Force

225.000-226.275	259.000-261.200
227.300-227.350	261.400-262.575
227.800-229.275	263.200
233.400-233.650	264.600-264.975
234.600-235.225	265.400
235.500-236.150	266.000-266.600
236.500-237.150	267.800-267.850
238.200-239.200	268.000-268.175
239.400	268.750
239.650-240.800	269.900-270.200
243.300-243.750	270.400
251.000	271.000-271.350
251.175-251.275	271.800-272.150
251.800-253.000	273.400
253.375-253.700	273.500
254.200	274.400
254.400-254.800	275.000
255.500-256.150	275.800-276.200
256.300	276.400-276.975
256.600	277.600
257.075-257.525	278.200
258.000	278.400
258.125-258.575	278.600

279.400	344.000
279.700-280.150	344.600-344.900
280.500	346.200
281.600	347.000-347.400
282.400-282.750	348.200-348.500
283.250	348.800-349.700
283.650-284.150	350.450
284.800	350.900-351.600
286.250-286.500	352.600-352.975
286.675-287.800	354.200-354.575
288.400-289.700	355.200
290.600-291.150	357.000-357.200
291.800-296.650	357.500
296.800-298.800	358.200-358.450
299.000	359.000-359.300
300.600-300.925	359.800-360.075
301.400-301.750	361.400-361.750
302.400	363.800-364.700
303.000-303.325	369.000-369.700
303.800-304.000	371.000-371.800
304.800-304.900	372.150-373.225
305.400-305.750	374.000
306.400	375.100-376.200
308.600-308.950	377.000
309.400-309.600	377.550
311.000-311.375	377.800-377.850
313.600-313.650	378.000-379.000
314.200-314.500	379.300-379.700
315.000-315.250	381.000-381.175
315.800-315.900	381.300
316.200-316.450	383.000-383.375
316.700-316.900	384.000
317.850-318.400	384.600-384.900
319.400-319.700	385.700-386.200
320.000-320.200	387.200-387.225
320.600-321.250	387.800
321.350-321.400	388.100-388.500
322.250	388.850-389.200
322.600-322.950	389.800-390.200
323.700-324.700	390.975-393.150
325.500-326.400	394.200-395.100
327.175-327.700	395.800-395.900
327.900-328.075	396.000-396.200
335.700-336.100	396.800-397.250
336.600-336.800	397.800
337.400-337.725	398.000-398.200
338.400-339.400	398.500
340.600-340.900	398.800
341.400-342.500	399.800-399.975
343.000-343.550	

Naval

233.700-233.975	281.700-281.075
235.250-235.475	282.900-283.500
236.200-236.450	284.200-284.550
237.825-238.175	284.900-285.375
249.875-250.950	285.700-286.200
251.350-251.750	289.800-290.100
253.050-253.350	290.050-290.100
253.750-254.175	291.200-291.500
254.850-255.550	299.300-299.775
256.200-256.550	300.200-300.550
258.600-258.975	301.000-301.375
262.600-262.975	301.800-302.100
263.300-264.575	303.400-303.750
265.000-265.350	304.100-304.250
265.800-265.900	305.000-305.300
266.675-266.950	305.800-306.175
267.400-267.700	306.450-306.800
268.200-268.950	306.400-307.850
269.650-269.850	308.100-308.500
270.500-270.950	309.000-309.350
271.400-271.700	309.700-310.950
272.200-272.600	311.400-313.500
272.800-273.300	313.700-314.125
273.700-274.300	314.700-314.975
275.500-275.750	315.300-315.700
277.000-277.300	318.500-318.975
277.700-278.175	320.250-320.500
278.200	321.800-322.150
278.400	323.300-323.500
278.400-278.700-279.300	324.800-325.400
280.200-280.700	326.500-326.950
281.000-281.350	

328.100-328.500	360.900-361.300
336.200-336.500	361.800-362.200
336.900-337.375	362.400-362.900
337.800-337.150	363.300-363.750
339.400-339.725	364.800-364.875
340.200-340.500	369.900-369.950
341.000-341.350	374.800-375.075
342.600-342.900	376.800-376.900
344.100-344.500	377.900
345.000-345.200	380.400-380.950
345.800-346.100	381.900-382.950
346.500-346.900	383.400-383.800
347.800-348.100	384.050-384.550
349.800-350.125	385.000-385.350
350.400-350.800	386.800-386.900
352.100-352.550	387.400
353.000-353.450	388.600
354.600-356.250	390.275-390.625
357.700-358.100	396.300-396.400
358.600-358.950	398.525-398.750
359.400-359.725	399.000
360.125-360.500	

Army

226.300-227.250	356.300-356.950
227.400-227.750	357.350-357.500
229.300-233.375	364.900-368.900
234.000-234.575	369.800-369.850
237.200-237.800	370.000-370.750
239.450-239.550	373.300-374.700
240.850-242.750	376.300-376.750
243.800-248.850	377.500
251.300	377.600
261.250-261.350	386.300-386.750
265.500-265.750	387.500
267.000-267.350	387.875-388.050
277.450-277.575	389.300-389.750
280.800-280.950	393.300-394.175
299.050-299.150	395.150-395.750
299.800-300.150	395.975
302.125-302.300	396.450-396.600
304.300-304.750	397.300-397.750
321.450-321.750	398.500
339.825-340.150	399.100-399.375
345.500-345.600	399.500-399.750
347.450-347.750	

FAA

239.250-239.450	307.800-307.900
240.300	309.200
251.050-251.150	316.050-316.150
254.250-254.350	317.400-317.800
255.400	319.000-319.300
256.700-256.900	319.800-319.950
257.600-258.100	321.300
263.000-263.150	322.300-322.550
267.900	323.000-323.250
269.000-269.600	327.000-327.150
270.250-270.350	327.800
272.700-272.750	335.500-335.650
273.450	338.200-338.350
273.550-273.600	339.800
276.300	343.600-343.950
277.400	346.250-346.400
278.300-278.325	348.600-348.750
278.450-278.550	350.200-350.350
278.300-278.325	351.700-352.050
278.450-278.550	353.500-354.150
279.500-279.650	357.600
281.400-281.550	360.600-360.850
282.100-282.300	362.300-362.350
284.600-284.750	363.000-363.250
285.400-285.650	369.900
286.600	370.850-370.950
287.850-288.350	371.850-372.100
290.200-290.500	377.050-377.200
291.600-291.750	379.100-379.250
296.700	379.800-380.350
298.850-298.950	381.200-381.650
299.200	385.400-385.650
306.200-306.300	387.000-387.150
306.900-307.375	388.800

390.800-390.900	398.850-398.950
397.850-397.950	399.400

Coast Guard

282.800 (Multiagency)	381.800
381.700	383.900

Department of Energy

239.400	316.500
257.000	370.000

Non-Government

314.600	
345.400	

ILS Glope Slope Transmitters

Spacing 150 kHz between channels: 329.000-335.000

Discrete Frequency Holes

225.200	293.900	360.100
237.100	298.200	369.300
239.600	306.500	369.600
244.200	312.600	370.800
246.100	316.000	373.200
246.400	322.200	374.600
246.600	323.600	375.400
246.900	336.700	379.600
254.100	337.300	382.300
256.100	342.000	386.100
257.300	345.700	390.700
283.600	357.300	396.700
288.500	358.500	399.900
293.300		

Holes in Spectrum to Identify

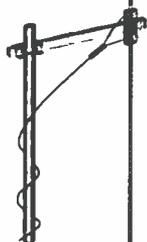
230.275-230.675	372.525-372.775
235.325-235.650	377.225-377.475
240.300-240.775	377.525-377.775
242.775-242.975	378.525-378.775
243.025-243.775	387.225-387.475
246.850-247.125	387.525-387.775
252.250-252.675	388.225-388.475
328.525-328.975	388.525-388.775
335.025-335.475	391.225-391.475
364.225-364.475	391.525-391.775
364.525-364.775	392.225-392.475
371.225-371.475	392.525-392.775
371.525-371.775	398.225-398.475
372.325-372.475	398.525-398.775

Wideband Frequencies

229.800	293.350	359.950
230.500	300.250	361.500
235.500	300.750	364.500
235.850	301.750	366.000
240.500	304.000	367.600
243.500	305.550	369.400
246.950	315.150	370.300</

Did your Antenna System Survive the Harsh Weather? Do Your Signals Seem a Little Weak?

It's Time to Upgrade Your Reception with These Fine Grove Products!



Grove OMNI II

Designed by Bob Grove, this exclusive Grove product offers 25-1300 MHz coverage; lightweight, compact design, high performance, and low cost! Designed especially for wide-area metropolitan listeners, the 68" Omni can be mounted on a mast, in an attic crawl space, against a wall—just about anywhere convenient.

BONUS FEATURE! Although the Omni is essentially non-directional, a metal mast gives it useful directional properties. Overload interference from paging transmitters, weather stations, FM or TV broadcasters, or other sources may be reduced or eliminated when positioning the antenna on the mast at the time of installation! Similarly, a distant, weak signal may be peaked by the same technique!

Balun transformer with F connector, offset pipe, mounting hardware and full instructions included.

Order ANT 5

\$29.95

includes shipping
in the US

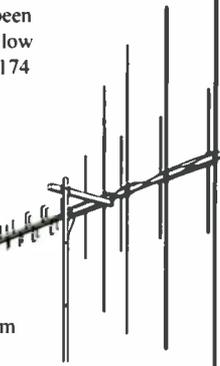
SCANNER BEAM

Our world-renowned Scanner Beam has been improved to provide unexcelled 30-50 MHz low band reception, 108-137 MHz aircraft, 137-174 MHz high band, 225-400 MHz military aircraft and satellites, 406-512 MHz UHF, and 806-960 MHz microwave mobile.

HAMS NOTE—can be used for transmitting up to 50 watts on 144, 220, and 420 MHz bands. 50/75 ohms nominal impedance.

May be used with inexpensive TV antenna rotator or fixed in favored direction. Local signals still come in loud and clear from all directions.

Balun transformer, offset pipe and all mounting hardware included (requires TV type F connector on your coax). Approximate size 8'H x 5'W.



Order ANT 1

\$74.95

includes shipping
in the US

THE SCANTENNA

This omnidirectional scanner antenna will equal or outperform any competitor on the market. Its dipole-cluster design utilizes broadband techniques to provide continuous frequency coverage from 25-1300 MHz, offering superb reception of public safety, civilian and military aircraft, hams, personal communication devices, maritime, CB—anything in its frequency range!

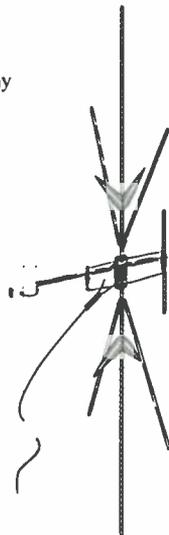
Approximate size 7-1/2'H x 4-1/2'W.

ORDER ANT 07

\$54.95

includes shipping
in the US

SPECIAL: Now includes 50' of coax cable plus Motorola and BNC connectors!



Professional Wideband Discone

The discone antenna is used by government and military agencies worldwide because of its wide bandwidth characteristics and non-directional coverage. Now Diamond offers a professional grade discone at a popular price.

Designed for use with wide-frequency coverage VHF/UHF scanners and receivers, the Diamond D130J discone consists of 16 rugged, stainless steel elements and is capable of transmitting up to 200 watts in the amateur 50, 144, 220, 432, 900, and 1200 MHz bands.

As a receiving antenna, the D130J is omnidirectional for continuous 25-1000 MHz (and above) coverage. A base-loaded, vertical top element is used as a low band (30-50 MHz) frequency extender.

The elements are arranged on a 24-inch support pipe equipped with two strong mounting brackets to accommodate any standard mast-pipe (1" to 2-1/8" diameter).



Order ANT 9

\$99.95

includes shipping
in the US

GROVE

GROVE ENTERPRISES, INC.
1-800-438-8155 US and Canada;
828-837-9200; FAX 828-837-2216

7540 Highway 64 West
Brasstown, NC 28902-0098
email: order@grove-ent.com
web: www.grove-ent.com

Call
Today!

Additional Products

- CBL 50 50' RG-6U \$19.95
- CBL 100 100' RG-6U \$24.95

includes shipping in the US

US Navy/Marine Corps MARS Reorganizes

MARS stands for Military Affiliate Radio System. It is a military support radio group, with three branches serving active-duty personnel in the United States Army, the Air Force, and the Navy/Marine Corps. All members are radio amateurs who have volunteered to aid in national emergency preparedness, and in the handling of routine traffic such as "MarsGrams" and morale patches for personnel in the field.

With the coming of Internet and other modern communications, the routine traffic has greatly declined. The emergency mission, called NS/EP for National Security/Emergency Preparedness, has become more important. Meanwhile the Navy-Marine Corps MARS has entered the digital age by setting up a complete e-mail system for the US Coast Guard. Some, however, think that even these functions are no longer relevant, and that MARS has simply outlived its time.

As the service has evolved, or at least tried to evolve, it has made periodic attempts to cut duplication, better utilize resources, and increase interoperability. This latter buzzword is US government-speak for what is actually a desirable goal. It means that all the various groups of people with radios in the NS/EP mission should actually be able to talk to one another and to pass meaningful information.

In 1997, the Army and Air Force MARS reached total interoperability on all nets and circuits. They could check into other services' nets and pass traffic, using a systemwide message form with 16 lines. The Navy-Marine Corps MARS, however, only complied on a very limited basis, due to its lack of nationwide frequency allocations.

This stayed pretty much the status quo until April of 2001, when Navy-Marine Corps MARS command announced a full reorganization, which will take place over the next two or three years. Ultimately, Navy-Marine Corps MARS will have four regions instead of its current ten. These will divide work load more evenly. They will also correspond a little more closely with the regions used by the Federal Emergency Management Agency (FEMA). Mars and



FEMA participate in quarterly drills, as well as actual emergencies.

The new Region one, for the Northeast and Mid-Atlantic, will have its control station in Groton, Connecticut. Control for Region 2 (Southeast and Midwest) will be in Great Lakes, Illinois. Region 3 (South Texas and North Central US) will be in Oklahoma City, Oklahoma, and Region 4 (West and Hawaii) will be in San Diego, California.

In order to implement the changes quickly, they are being issued in MARS bulletins called Advance Change Notices. These are transmitted on various bands and modes, and are also sometimes available on Web sites. At some point we'll probably see a new frequency plan for the Navy-Marine Corps MARS, but it has not been issued at press time.

Almost immediately, one of these notices rewrote "Annex J" of the regulations to allow full interoperability with the other two branches. Stations in the other two services can now enter Navy-Marine Corps nets and pass traffic, within their corresponding regions. In an emergency, anyone can talk to anyone. Not affected, though, are the remaining phone patches, as these use a separate authorization.

◆ Scratch Incirlik, Welcome Sigonella

On May first, the US Air Force Global High Frequency (GHFS) station at Incirlik Air Base in Turkey left the air. It was immediately replaced by a new one at Sigonella Air Base in Italy.

Sigonella's times and frequencies are different from Incirlik's. They are on 4709 kilohertz (kHz) upper sideband (USB) from 1600 to 0400 Coordinated Universal Time (UTC). They also use 6724, 9007, and 11271 kHz, for all 24 hours, and 15038 kHz from 0400 to 1600. This schedule is the same in winter and summer.

Some of these new Sigonella frequencies are also used by Canadian Forces. This may be an attempt to improve interoperability in joint operations. Jeff Haverlah, a listener in Texas, has already heard coded military

The Navy-Marine Corps MARS has just begun a major reorganization to make it the last MARS command to achieve total interoperability. The plan will convert the current ten regions into four.

broadcasts on the new Sigonella channels, as well as on the new Lajes frequencies of 9025 and 11181.

◆ RTTY Harmonics

Every so often, one will encounter a radioteletype (RTTY) signal with very strange characteristics, such as a shift that can be measured in kilohertz instead of hertz. These huge shifts are generally a result of hearing a harmonic of the frequency-shift-keyed fundamental. For example, the second harmonic of an 850-Hz shift signal is shifted 1700 hertz, and the third harmonic by a boggling 2.55 kHz!

Just to add some more confusion, the channel offset, or the difference between the frequency shown by your radio and the authorized channel center, will also grow in the same manner. However, the speed stays the same. This means it's often possible to decode and identify these harmonic signals, if one's equipment and software are up to it. One can also, of course, divide the shift until coming up with a common value such as 850 and 170 hertz, then hunt for something that sounds the same when conditions permit on the lower frequencies.

Day Watson, a listener in the UK as well as a mainstay on the Internet's Worldwide Utility News mailing list, found an excellent example. He picked up MGJ, the British Royal Navy in Faslane, England, on 10168.7 at 75 baud. Only the mark tone was audible, as this was apparently a spurious harmonic affecting the two RTTY tones differently. Watson was able to decode it treating the mark as an on-off keyed signal.

Later, though, at 1927, the space tone finally turned up. It was also by itself, but exactly 2.55 kHz lower. Bingo. This was similarly decoded by on-off keying, and this MGJ signal was thus identified as the third harmonic of 3390 kHz.

A similar technique has been used to snare the culprits when HF surface radars turn up in places where they really should not be. An unusually wide sweep range on one of these should be investigated for subharmonics that might be the true signal.

That's dizzy enough for one month. See you!



ABBREVIATIONS USED IN THIS COLUMN

AFB	Air Force Base
ALE	Automatic Link Establishment
ARQ	Automatic Repeat Request teleprinting system
CAMSLANT	Communication Area Master Station, Atlantic
CAMSPAC	Communication Area Master Station, Pacific
CW	Continuous Wave (Morse telegraphy)
DEA	Drug Enforcement Administration
DX	Distant Transmitter
EAM	Emergency Action Message
FAX	Radiofacsimile
FEC	Forward Error Correction teleprinting system
GHFS	Global High Frequency System
M21	Russian CW time-stamped coded datagrams
M22	4XZ, Israeli encrypted CW
MARS	Military Affiliate Radio System
Meteo	Meteorological (weather office)
MFA	Ministry of Foreign Affairs
Pactor	Packet Teleprinting Over Radio
RAF	Royal Air Force
RSA	Republic of South Africa
RTTY	Radio Teletype
SITOR-A	Simplex Telex Over Radio, ARQ mode
SITOR-B	Simplex Telex Over Radio, FEC mode
UK	United Kingdom
Unid	Unidentified
US	United States
USS	United States Ship

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations (encrypted, usually unidentified, broadcasts thought to be intelligence-related) are identified in () with their ENIGMA station designators, as issued by the European Numbers Intelligence Gathering and Monitoring Association.

68.0	GBY20-Royal Navy Submarine Command, UK, with an RTTY exercise broadcast for Swedish Navy, Ostergotland, at 0800. (Day Watson-UK)	6739.0	Andrews-US Air Force GHFS station at Andrews AFB, MD, with a 20 character EAM, immediately echoed by Hickam AFB, HI, at 0528. (Davenport-CO)
81.0	GYN2- Royal Navy Submarine Command, UK, with an RTTY exercise broadcast for Swedish Navy, Ostergotland, at 0809. (Watson-UK)	6897.0	Cape Radio-US Air Force Eastern Test Range, working King 1, USS Underwood, Cape Osbourne, and others, for a space shuttle launch, at 1738. (Allan Stern-FL)
2829.5	SPB28-Szczecin Radio, Poland, telling a ship to "type or quit please," in SITOR-A, at 2045. (Watson-UK)	7753.0	322-Moroccan military, calling 222 in ALE, at 2102. (Boender-Netherlands)
3690.0	RBV70-Tashkent Meteo, Uzbekistan, with FAX weather charts (60/576), at 2312. (Ary Boender-Netherlands)	7813.0	DP2-Moroccan Army, calling GLOBHO ZYM in ALE, at 1955. O2-Moroccan Army, ALE calls to D1 at 2102 and 2105, then K2 at 2112. (Boender-Netherlands)
4015.0	Unid-Probably Russian Air Defense "Time Stamp Station" (M21), with strange CW messages like 990306??0????, at 2306. (Boender-Netherlands) These are unknown observations or instrument readings in a peculiar, one-line format. Times like the "0306" are local somewhere in Russia, and the ? is a place holder for a missing item. -Hugh	7845.0	Bangkok Radio, testing in RTTY and with messages to many Russian sounding addresses, at 1820. Unid-Spanish speakers using voice to set up RTTY, then sending a test tape ("cinta de pruebas"), at 1830. (Watson-UK)
4015.5	AE1USA-US Air Force MARS, working AEM1WF in Pactor, at 1914. (Boender-Netherlands)	7903.5	BA1-US Federal Bureau of Investigation, Baltimore, MD, working QT1, FBI, Quantico, MD, in ALE at 2104. (MADX-MD)
4610.0	GYA-Royal Navy, Northwood, UK, with new FAX service, parallel on 11086.5, at 1125. (Watson-UK)	7966.0	2222-Moroccan military, calling 3333 in ALE, at 0406. (Boender-Netherlands)
5696.0	CAMSLANT-US Coast Guard, Pt. Reyes, CA, advising helicopter Coast Guard 6031 on the status of a crash victim, at 0001. (Ron Perron-MD) Rescue 2135-US Coast Guard aircraft with ops-normal report for CAMSLANT, at 0557. (Mid-Atlantic DXer-MD)	7969.0	HR- Sonatrach Oil Company, Algeria, sounding at 0221, then RNS at 0243, ALG (Algiers) at 0305 and 0403, and GT at 0445. (MADX-MD)
6628.0	Iberia 6650-Airliner with a position report for Santa Maria, at 0721. (Brent Davenport-CO)	7981.4	KZN 508-Sail Mail, Rockhill, with CW identifier and a special PACTOR mode, at 0237. (MADX-MD)
6694.0	T78F-Canadian Forces, in a patch via Halifax Military to Rescue Coordination Center Halifax, reporting completion of flare training, at 0043. (Ron Perron-MD)	8040.0	GYA- Royal Navy, Northwood, UK., adding this frequency to the new FAX service along with 4610 and 11086.5, at 1143. GYA, with schedule changes at 1436. (Watson-UK)
6697.0	Mama Bear-US Strategic Command, with an EAM echoed from the GHFS stations, simulcast on 8992, 11244, and 13907, at 0207. (Jeff Haverlah-TX)	8047.0	LAT-US National Guard, Latham, NY, sounding in ALE at 1854. (MADX-MD)
		8188.0	9MR-Royal Malaysian Navy, Johor Baharu, with "unclass" (unclassified) RTTY traffic in English and Malay, to "all RMN ships," at 1923. (Watson-UK)
		8298.0	VTP-India Navy, Vishakhapatnam, with encrypted RTTY traffic to "W-U-K" and others, at 1749. (Bob Hall-RSA)
		8334.0	2222-Moroccan military, calling 3333 in ALE, at 0403. (Boender-Netherlands)
		8335.0	Unid-Two males in the usual rather "salty" fishing boat chatter, both with New England accents, at 0025. (Perron-MD)
		8397.0	UHCO-Russian Vessel Pioneer Sedevodwinska, working Arkhangelsk in SITOR-A, at 1556. (Watson-UK)
		8499.8	VTH- India Navy, Mumbai, with encrypted RTTY traffic to "X-I-E" and others, at 1746. (Hall-RSA)
		8530.0	IAR-Rome Radio, Italy, with CW navigational warnings at 2043. (Boender-Netherlands)
		8686.0	IRM-CIRM, International Radio Medical Center, Italy, accepting free medical and position plot traffic, with a CW marker at 2036. (Boender-Netherlands)
		8875.0	O2-Moroccan Army, calling D1 in ALE at 2047. (Boender-Netherlands)
		8906.0	Air France 671-Airliner with a position report for New York, at 0629. (Davenport-CO)
		8992.0	533-Unknown US military aircraft, asking US Air Force McClellan Global for a "selcall" [Civil aero Selective Calling tones, not used on GHFS -Hugh]. The confused Global operator said she was sorry but McClellan did not have a "cell phone," after which 533 thanked her and was gone, at 0730. (Donald Storck-MI) Reach 5106-US Air force C-17, enroute from Guam to Hickam AFB, HI, with the freed EP-3 crew back from China, patching the US Defense Department via Hickam, then sent to 11181 kHz (Zulu-200), at 1406. (Cliff Watts-TX)
		9016.0	Iron Fist-US Strategic Command, with EAM simulcast on 8992 and 11244, at 0105. (Haverlah-TX)
		9031.0	Ascot 3201-Royal Air Force, UK, transport on the weekly shuttle to the Falkland Islands, working RAF Brize Norton at 0006. (Perron-MD)
		9044.0	RIW-Russian Navy. Calling RJF94 in CW, at 2117. (Boender-Netherlands)
		9045.0	5YE-Nairobi Meteo, Kenya, with FAX weather charts (180/576), at 1914. (Boender-Netherlands)
		9150.0	RCH73-Tashkent Meteo, Uzbek, with FAX weather charts (60/576), at 1543. (Boender-Netherlands)

- 9164.0 Unid-Probably Russian Air Defense "Time Stamp Station" (M21), with CW messages like 99?2255?9?9?9?9?, at 1855. (Boender-Netherlands)
- 9165.0 HLL2-Seoul Meteo, Korea, with FAX weather charts at 1903. (Boender-Netherlands)
- 9340.0 RCH72-Tashkent Meteo, Uzbek, with FAX charts (60/676), at 1432. (Boender-Netherlands)
- 9371.0 222-Moroccan Army, sounding in ALE at 1746. (Boender-Netherlands)
- 10033.0 Arrow 44A-Aircraft telling Miami Radio of departure from Caracas, Venezuela, enroute to Quito, Ecuador, at 2339. (Perron-MD)
- 10204.0 Race Car-US Strategic Command, working Slow Ball, at 0213. Listerine, with an EAM simulcast on 8992 and 11244, at 1436, then working Slow Ball at 1511. (Haverlah-TX)
- 11039.0 DDH9-Hamburg Meteo, Germany, with RTTY weather in German, then markers giving their other frequencies as 143.7, 11039.0, and 14467.3 kHz, at 1303. (Watson-UK)
- 11122.0 9MR-Malaysia Navy, with RTTY at 1624. (Hall-RSA)
- 11130.0 Y301-Moroccan Army, calling Y3 in ALE, at 0442. (Boender-Netherlands)
- 11157.0 S16-Swedish Consulate, St. Petersburg, Russia, sounding in ALE at 1556. (Watson-UK)
- 11175.0 Skier 91-US Air National Guard, working Hickam Global, HI, regarding status of medical equipment, at 0701. (Davenport-CO)
- 11181.0 Reach 5106-US Air Force, enroute from Guam to Hickam AFB, HI, with the freed EP-3 crew, working Hickam at 1423. (Watts-TX)
- 11205.0 Architect-Royal Air Force Flight Watch Center, UK, with airfield "color" observations, at 2331. (Perron-MD)
- 11220.0 Unid-typical fishing boat types complaining about restrictions and unknown (to them) interference, which was only the US Air Force, that's all, at 2304. (Perron-MD)
- 11240.0 O2-Moroccan Army, with ALE calls to V3 at 2113, K2 at 2114, and T5 at 2125. (Boender-Netherlands)
- 11247.0 Ascot 3201-Royal Air Force, UK, working Haven (RAF Flight Watch, Ascension Island), at 0010. (Perron-MD)
- 11271.0 Trenton Military-Canadian Forces aircraft enroute to Sigonella Naval Air Station, Italy, getting arrival weather and asking Trenton to forward their arrival time, at 0142. (Perron-MD) *Sigonella has since joined GHFS on this frequency. -Hugh*
- 11466.0 ALG-Sonatrach Oil Company, Algiers, calling HMD in ALE at 1906. (Watson-UK)
- 12160.0 DP2-Moroccan Army, calling O1 in ALE, at 2033. (Boender-Netherlands)
- 12478.0 UCNJ-Russian vessel Igor Grabar, working Arkhangelsk in SITOR-A, with weather observations at 1835. (Watson-UK)
- 12710.5 PWZ33-Brazil Navy, repeating a no-traffic marker in RTTY (850/75), at 0637. (Hall-RSA)
- 12984.0 4XZ-Israeli Navy or Government, Haifa (M22), with traffic and then the usual markers, at 1457. (Watson-UK)
- 13510.0 CHF-Canadian Forces, Halifax, with FAX weather charts at 1822, then RTTY weather observations at 1844. (Boender-Netherlands)
- 13597.0 JMH4-Tokyo Meteo, with FAX weather charts at 1935. (Boender-Netherlands)
- 13855.0 OXT-Copenhagen Meteo, with a FAX ice chart for "Disko Bay," at 1311. (Watson-UK)
- 13886.0 Moscow Meteo, with FAX weather charts at 0752. (Boender-Netherlands)
- 13900.0 BMB-Taipei Meteo, Taiwan, with a FAX satellite picture at 1926. (Boender-Netherlands)
- 13907.0 Windmill-US Strategic Command, attempting secure communication with Good News at 1829 and 1835, then with a patch via Top Spot at 1836, finally moved to Zulu-250 (15962 kHz) by Good News at 1840. Unid-US Customs, with self-scanning tones, then calling Omaha 07B at 1854. (Haverlah-TX)
- 13927.0 AFA1AN-US Air Force MARS, Indiana, running a patch with Reach K185, at 2355. (Perron-MD)
- 13956.5 JMC-Tunisian Embassy, with encrypted SITOR-B traffic at 1000. PG3-Tunisian MFA, Tunis, encrypted traffic for IJ5, in SITOR-B at 1006, then working X4M at 1000, and JMC at 1020. (Watson-UK)
- 14550.0 123-Moroccan military, calling C6C in ALE, at 1619. (Boender-Netherlands)
- 15088.0 CAMSPAC-US Coast Guard, Pt. Reyes, CA, working C-130 Coast Guard 1790 who is tracking a possible drug-running vessel, with the shore operator apparently in touch with the anti-drug task force over landline or another channel, at 0018. (Perron-MD)
- 15633.5 HMF26-Korean Central News Agency, Pyongyang, with English-language news, in RTTY (250/50), at 1044. (Hall-RSA)
- 15962.0 Unknown, possibly Windmill from 13907, working unheard station that was possibly Good News, on Zulu-250 frequency, at 1841. (Haverlah-TX)
- 16014.2 RFVIC-French Navy, with ARQ traffic, in French, to RFVITT (Detmar Mayotte) and RFQPT (Djibouti), at 1245. (Hall-RSA)
- 16035.0 JJC-Tokyo Radio, with Japanese newspaper FAX, 60/576, parallel on 17069.6, at 1618. (Boender-Netherlands)
- 16800.0 Unid-Station with relay of English-language Philippines News Agency stories, in SITOR-B, at 1638. (Hall-RSA)
- 16816.0 ZSC-Capetown Radio, RSA, with SITOR-B weather bulletins, parallel on 4214, 8428, and 12601, at 0935. (Hall-RSA)
- 16971.0 JJC-Tokyo Radio, with Japanese newspaper FAX, 60/576, at 1703. (Boender-Netherlands)
- 17020.0 UDK-Murmansk Radio, Russia, calling 4LS in 3rd-shift Cyrillic RTTY, then giving a traffic list and sending a blind message to vessel UCT1, at 1300. (Watson-UK)
- 17430.0 9VF 209-Kyodo News, Singapore, with Japanese newspaper FAX at 1618. (Boender-Netherlands)
- 18012.0 Circus Vert-French Air Force headquarters, Villacoublay, working Cotam 2235 at 2033. (Perron-MD)
- 18220.0 JMH5-Tokyo Meteo, with a FAX weather chart, at 0913. (Hall-RSA)
- 18320.0 BRA-Slovakian MFA, calling unknown station in ALE, at 1844. (MADX-MD)
- 18650.0 Taipei Meteo, Taiwan, with a FAX weather chart at 1556. (Boender-Netherlands)
- 18666.0 SU1-Federal Bureau of Investigation, Salt Lake City, UT, sounding in ALE at 1834. (MADX-MD)
- 19131.0 Atlas-US DEA contract facility, Iowa, working aircraft Flint 951 at 1220. (Perron-MD)
- 19530.0 Probably US military weather bulletins, running a RTTY "quick brown fox" test loop, at 1620. (Hall-RSA)
- 20469.0 AMX-Melbourne Meteo, Australia, with a FAX weather chart at 0715. (Boender-Netherlands)
- 20815.0 HBC88-International Red Cross, probably Geneva, Switzerland, with a PACTOR (200/200) sign off of "IFRCGV," at 1250. (Hall-RSA)
- 20958.0 S12-Swedish Embassy, Bogota, Colombia, working S84, Washington DC Swedish Embassy, in 2400 baud phase-shift keying, then ALE signoff, at 2055. (MADX-MD)
- 22408.5 UFL-Vladivostok Radio, Russia, working vessel UDUK, in 3rd-shift Cyrillic SITOR-A, at 0822. (Watson-UK)
- 22447.0 FUV-French Navy Djibouti, sending RTTY markers with the routing indicator of RFQME, in RTTY at 1406. (Watson-UK)
- 22583.0 FUX-French Navy, Le Port, working an unknown ship, giving the usual one-line traffic rogers, then back to marker as RFVIE, in RTTY at 1458. (Watson-UK)
- 23546.0 Russian vessel Apollo-1, working UIW, Kaliningrad Radio, in 3rd-shift Cyrillic RTTY at 2353. (MADX-MD)
- 24332.0 GXQ-Royal Navy, London, idling in Piccolo at 1930. (Watson-UK)
- 24370.0 RFGW-French MFA, Paris, with encrypted FEC traffic to N2G, a French Embassy, at 0655. (Hall-RSA)
- 25040.0 P6Z-French MFA, Paris, with messages for the Brasilia embassy, in FEC, at 1805. (MADX-MD)
- 25120.0 C6-Moroccan military, calling C603 in ALE at 1608. 123, ALE call to C6C, at 1614. C6, ALE call to C603 at 1618. (Boender-Netherlands)
- 25186.0 HSP-UK military, sounding in ALE at 1837. (MADX-MD)
- 25350.0 5AB- Benghazi Radio, Libya, with CW marker at 1825. (MADX-MD)
- 26132.5 ZSC-Globe Wireless, Capetown, RSA, with CW, SITOR, and data marker at 1741. (MADX-MD)

Useful Modes – or Not?

This month's column is in direct response to a frequent readers' question which goes something like "Should I buy such and such a decoder which has X and Y modes?" or "Should I buy such and such a decoder if I want to listen to X"? If you've been asking yourself the same questions, you may find some answers here. We also check-in with another user-suggested topic, a profile of the commonly heard NATO system called Link-11.

◆ What's Obsolete?

As regular readers will know, the world of HF digital communications has changed markedly over the past five years. Many traditional services like press, aero and weather have moved to satellite, and, while military and diplomatic services still make use of HF, they have transitioned to more complex PSK (Phase Shift Keyed) systems like the MIL-188-110A 2400 baud modem standard.

What does this mean for the average decoder? Basically it means that you probably will never hear the following modes any more:

ASCII	(Press Agencies)
AUTOSPEC	(North Sea Oil Rigs)
ARQ-N	(a few diplomatic services)
ARQ6-70, 98 or 98	(French Diplomatic Service)
ARQ-S	(Austrian Diplomatic Service)
CIS-14	(Russian Military)
COQUELET-13	(Belgian Military)
GTOR	(Never really seriously adopted on HF)
HC-ARQ	(UNHCR)
FEC-S	(a few diplomatic services)
HNG-FEC	(Hungarian Diplomatic Service)
AX.25 Packet Radio	(Never really seriously adopted on HF)
SWED-ARQ	(Swedish Diplomatic Service)
TORG-10, 11	(Russian Weather Stations)

Nearly gone are the following modes:

DUP-ARQ	(Hungarian Diplomatic Service)
POL-ARQ	(Polish Diplomatic Service)
RS-ARQ/ALIS 228bd	(German & Italian Diplomatic Service)
RS-ARQ/ALIS2 240bd	(Italian & Turkish Diplomatic Service)

As most listeners can observe, a decoder chock-full of "exotic modes" such as these above really isn't worth much from the perspective of extending your listening horizons!

◆ Still Going...

So, just what *is* useful to have, and why? Now that we've whittled down the list of modes

most commonly found in decoder software, let's look at what is likely to be used these days:

ARQ-E & E3	(French Forces)
ARQ-M2 & M4	(French Forces)
BAUDOT RTTY	(Weather & Aero Services, a few Press, Russian Intel)
Coquelet-8	(Algerian Diplomatic Service)
CROWD-36	(Russian Intelligence & Diplomatic Service)
CW	(yes, some people still use Morse Code!)
FAX	(Weather Services, and the odd Press Agency)
FEC-A	(Turkish & French Diplomatic Service though getting rare)
Piccolo-6 & 12	(British Military)
PacTOR-I	(Aid Agencies)
ROU-FEC	(Romanian Diplomatic Service, though getting rare)
SITOR-A	(Mostly ship communications & a few diplomatic services)
SITOR-B	(Mostly ship communications & a few diplomatic services)
TWINPLEX	(Spanish, Danish, Norwegian & Pakistani Diplomatic Service)

However, expect ROU-FEC, FEC-A and perhaps Coquelet-8 to join the obsolete list soon.

◆ Worth It (if you can get it)

Some of the modes most representative of the shift mentioned in the introduction to this column are now very useful to have:

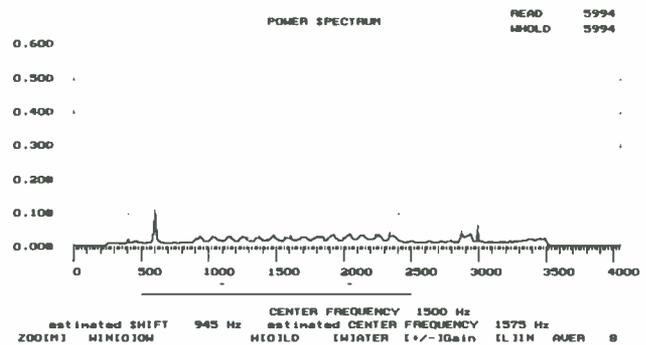
MIL-188-141A ALE	(Diplomatic, Military & Commercial Networks)
MIL-188-110A 2400bd	(Diplomatic, Military & Commercial Networks)
STANAG4285	(NATO Military)
PacTOR-II	(Email, Aid Agencies & Commercial Networks)
HF DataLink	(HF ACARS-like Aircraft Messaging & Data)

Next time you check the decoder's specifications and list of supported modes, check the lists above.

◆ System Profile: Link-11

Link-11 probably ranks pretty high on the all-time list of beginners' "What's this I'm listening to?" questions. The distinctive "rink-dink-dink" repetitive and raspy sound can be heard at just about any time and place throughout the HF spectrum.

Otherwise known as TADIL-A and often referred to as "Alligator" by operators, Link-11 is used by many NATO armies, airforces and navies to provide networked communications between ships, aircraft and ground stations, and particularly for communicating tracking and fire control information. Figure 1 shows the typical spectrum of a Conventional Link-11 Waveform



(CLEW). Perhaps the code name "alligator" comes from the alligator mouth-like spectrum?

As one can see, Link-11 uses 16 tones – 1 doppler correction tone, 14 data tones, and 1 synchronization tone. The 14 data tones are QPSK modulated and spaced every 110 Hz (from 935 Hz to 2585 Hz with the doppler tone at 605Hz). The synchronization tone is 2-PSK modulated. Typical data rates are 1364bps (HF) or 2250bps (VHF/UHF). Most Link-11's live on a round kHz USB point, and rarely on LSB. There are a number of fairly stable Link-11 frequencies, as follows:

4772 6706 8000 9120 10188 10253 11000 11190 11646 12277
13899 14364 14369 14760 15064 17444 kHz

◆ Tunisian MOI on the Move?

A number of monitors have reported ALE on at least one known Tunisian MOI frequency 13945 (the other being 14700 kHz USB). The stations "TU1", "TU2" and "TU3" have been heard calling "STAT2", "STAT15" and "STAT154" using ALE. Voice, CW and PacTOR-II have also been heard.

Resources

Link-11 CLEW Audio Clip
rover.wiesbaden.netsurf.de/~signals/WAV/LINK11-1364.WAV

Glenn Hauser

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

wghauser@yahoo.com

www.angelfire.com/ok/worldofradio

Lose a Lot, Gain a Little

This month we report the revival of R. Ecclésia and R. Yugoslavia on shortwave, R. Vilnius doubling its North American service, while BBC decides SW is no longer justified, Austria may be next, and CBC callously cripples RCI yet again.

Tropical SW broadcasting is also on the decline, to no one's surprise, but Anker Petersen, editor of the DSWCI *Domestic Broadcasting Survey*, has quantified this. In 1972-73 there were 1136 tropical broadcasting stations; in 2000-2001, only 389. During the 24-year period 1973-1997, 452 stations disappeared for an average of 19 per year. In the three years of 1997-2000 this drastically increased to 212 stations or 71 per year on average! During the past year no less than a further 83 stations have left the tropical bands!

Since 1972, Indonesians dwindled from 171 to only 22 still on the air; High Andeans from 188 to 99. However, the situation is more or less unchanged in countries like China, Papua New Guinea, Australia and the USA.

The main reason for all this is that FM-networks are growing in most parts of the developing world and replacing the need for shortwave transmitters. But, you can still hunt for 389 Domestic Broadcasting Stations on the Tropical Bands, before it is too late. Fortunately the interfering broadcast and utility stations are also disappearing. So do not give up your Tropical Band DXing!

Allover Shortwave Schedule

Covering the international bands is a personal project now made public by German student Eike Bierwirth, found via <http://www.eibi.de.vu> or more specifically, with no dot after www: http://wwwstud.uni-leipzig.de/~pge98crf/index_e.html or <http://wwwstud.uni-leipzig.de/~pge98crf/bc-a01.doc> (MS-Word)

This is quite a monumental opus, and updated to May 3 (maybe later by now). Says Joe Hanlon: "This site sure beats the *PWBR-2001* Blue Pages, hands down!"

ANGOLA [non] R. Ecclésia started relays in April via DTK Germany: 0500-0555 daily on 15545 at 160 degrees; 1800-1859(Saturday -2130) on 13810 at 155 degrees (Dr Hansjörg Biener, *DX Listening Digest*) Schedule last month never went into effect. R. Ecclésia contact info: Rua Comandante Bula No 118, São Paulo C.P. 3579, Luanda, Angola. Tel: +244 2 443041. Fax: +244 2 443093. E-mail: ecclésia@snet.co.ao Web Site: <http://ecclésia.snet.co.ao> (© BBC Monitoring)

ANTARCTICA LRA36, Radio Nacional Arcángel San Gabriel, 15476, in April was operating M-F only 1800-2100 with power reduced from 10 to 4 kW in order to preserve transmitter. E-mail: lra36@infovia.com.ar (Gabriel Iván Barrera, Argentina, *Conexión Digital*)

AUSTRALIA The Australian Broadcasting Authority has allocated the first two international broadcasting licenses for shortwave broadcasts from Australia issued under the new legislative regime for international broadcasting. They have been issued to Christian Voice (which will operate from Darwin), and HCJB, which will operate from a purpose-built facility at Kununurra in the Kimberley region of north-western Australia. CV is targeting audiences in SE Asia, China and India with Chinese, English and Hindi programs. HCJB will beam towards South Asia and the South Pacific.

Applicants for international broadcasting licenses commit to abide by International Broadcasting Guidelines issued by the ABA. The licenses have been issued after consultation with the Minister for Foreign Affairs on national interest considerations (Matt Francis, Canberra, *DX Listening Digest*)

Tentative schedule of Christian Voice to India: 1000-1200 17825, 1200-1700 13795, 1700-1900 11890 (Andrew Flynn, Head of Engineering, Christian Vision, via Alokesh Gupta, ODXA)

On a visit to the Cox Peninsula site we saw six 250 kW rigs, 3 Thomson and 3 Collins. One of the Thomsons was yet to be commissioned, moved in from Carnarvon with lots of yellow sticky labels on it (Chris Martin, Darwin, ARDXC)

RA via Darwin finally resumed May 14; Indo is to C&W Indonesia; English to SE Asia (Roger Broadbent, RA, via John Figliozzi):

2130-2330 9865 Indonesian
2200-0000 13625 English
0000-0030 21680 Indonesian
0000-0130 17775 English
0400-0430 21680 Indonesian
0500-0530 21680 Indonesian

AUSTRIA R. Austria International may be next: in a May mailbag program, staff member Robert Theiler remarked that ROI may no longer exist in a couple of months (Kai Ludwig, Germany, *DX Listening Digest*)

BRAZIL A bandscan on 25 m one afternoon in the 1840-1948 UT period found the following frequencies active, mostly with sports or religion: 11725 + spurs, 11735, 11765, 11785, 11805, 11815, 11830, 11855, 11895, 11915, 11925

(Célio Romais, Porto Alegre, DX Clube do Brasil <http://www.ondascurtas.com> via *radioescutas*)

Heard a preacher on R. Filadélfia, 6105, say that a new religious station would be appearing soon on 6215 with better coverage (Horacio Nigro, Uruguay, *DX Listening Digest*)

BULGARIA Radio Ezra was heard Sunday at 1100 UT on new 13850, strong but an awful buzz (Noel Green, UK, *DX Listening Digest*) via Wavre, Belgium according to presenter John D Hill (Dave Kenny, Caversham, BDXC-UK) R. Ezra 13850, Sunday 1040-1114* with hummy carrier, low modulation, distorted, transmitter breakdowns. No doubt the transmitter is in really bad shape, very same technical characteristics and procedure like on the 6900 Eurosonor transmission, identified by Olle Alm as typical for the Bulgarian Kostinbrod site. It is no surprise that Hill claims to use Wavre, because the TDP [broker] is a Belgium-based operation. I think neither Hill nor the Eurosonor guys know about the actual transmitter site and bought a pig in a poke (Kai Ludwig, Germany, *DX Listening Digest*)

CANADA Dancing the Same Dance Again: We've been to this dance, already, too many times in the past; the Canadian public having to stand up and voice support for RCI, now once again being threatened by illogical and ill-advised cuts, masterminded by the Canadian Broadcasting Corporation.

These amount to elimination of RCI weekend, in-house produced news in Canada's two official languages, English and French. Canadians abroad, and others tuning into RCI broadcasts on weekends, will receive repackaged, condensed CBC domestic newscasts in place of RCI, produced for an international audience.

It is unimaginable that the CBC, in the wake of a \$60 million cash-cow [budget increase], and public statements by Heritage Minister Copps, would attempt to implement cuts to RCI that would put CBC in breach of contract with respect to what has been mandated by the Broadcasting Act (Sheldon Harvey, President, Canadian International DX Club)

The RCI Action Committee said the cuts, which were described by management as fiscal responsibility, would cripple the station, its credibility and would result in the loss of audiences around the world. The employees are particularly surprised by the decision, since CBC and Canadian Heritage, which funds the shortwave service, signed an agreement at the end of March to maintain the service as is. CBC Corporate Policy No 14 which came into effect May 13, 1980, says RCI is to provide "daily shortwave broadcasts" "designed to attract an international audience..." For further information: Wojtek Gwiazda, (514) 597-7350, (514) 524-2229, E-mail: rciaction@yahoo.ca, Website: <http://www.geocities.com/rciaction> (Canada News Wire via Mike Cooper, DXLD)

All our morning shows in English and in French to Africa, Europe and the Middle East are cancelled as of beginning of June. All RCI newscasts in all seven languages will

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; A-01=summer season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

be cancelled on the weekends. There will be no staff in on weekends, no matter what news events may be going on in Canada. All RCI programming on the weekend in all seven languages will be pre-recorded during the week. On weekends no technicians will be in the building, except for one technician in master control. However, there will be no DALET technician to reboot our computer system of sound files if anything should go wrong. The master control technician would only be able to fill with music. We will fight on (RCI Action Committee via Ricky Leong)

COLOMBIA R. Nueva Juventud, pirate in San Juan de Pasto, heard at 0205-0230 on 5588.3, now here after trying various crystals, the owner told me. Operates Fri-Sat-Sun only, always with music (Rafael Rodriguez, Colombia, DX Listening Digest)

CONGO Am hearing Brazzaville via long-path on 9610, good strength at 0545 tune-in. Doesn't sound too African, except for occasional drum flourish, but plenty of IDs. Beware SRI via Jülich also in French 0430-0500, and BBC Ascension French from 0600, both also on 9610 (Craig Seager, Australia, ARDXC)

COSTA RICA Hate on shortwave has now become far more sophisticated and better financed than ever before. The production quality and ads now make hate radio indiscernible, in many cases, from the mainstream, except for the message. There are currently 28 transmitters in the U.S. broadcasting far right messages in both English and German. Their collective capacity is greater than that of VOA, thereby creating a curtain of hate around the U.S. which emanates outward to the world.

Due to the alarming increase in hate based radio, not only on shortwave, but on AM and FM as well, we at Radio For Peace International are inaugurating the first ever international campaign to bring awareness to and help stop this dangerous hateful rhetoric. The "Stop Hate on Radio" campaign is now underway worldwide. Radio stations, program hosts and producers, as well as concerned individuals around the world are asked to join this effort by signing a commitment form and proudly displaying the official campaign sticker. Take a stand today. Send financial contributions by check or money order, Visa or Mastercard (supply card number, expiration date and signature) to: Radio For Peace International, P. O. Box 1094, Eugene, OR 97440 (RFPI)

In mid-May, RFPI sked changed to: 15050 AM 24 hours; 21815-USB 1300-0200; 7445-USB 0200-1300. Reception reports appreciated to info@rfpi.org New on RFPI is Earthspan from the War & Peace Foundation, Fri 2100 and Mon 1700 plus repeats 6, 12, 18 hours later. See <http://www.warpeace.org>

R. Casino, Puerto Limón, 5954.2, best time to hear is *1030-1045, opening with prayer and also IDs as la Reina del Caribe (Rafael Rodriguez, Colombia, DX Listening Digest)

CROATIA [non] The Voice of Croatia, their new ID, has resumed English and Spanish news on their Jülich relays 2300-0500 on 9925; English was at 4-9 minutes past the hours (Joe Hanlon, Philadelphia, DX Listening Digest) Also heard with English 0242-0247, Spanish 0247-0256 (Rubén Guillermo Margenet, DX Listening Digest) Exact English times seem to vary (gh)

[non non] Relays of the First National Program of Hrvatski Radio, for Europe and Mediterranean Area, via the Croatian transmitter at Deanovic, are:

6165 0400-2300 100 kW
7365 0400-0900 10 kW
9830 0400-1800 100 kW
13830 0900-2300 10 kW

(Bob Padula, Melbourne, Victoria, EDXP) As distinct from the V. of Croatia external service via DTK Germany (gh)

CZECH REPUBLIC Of all the former Warsaw Pact countries, I enjoy Radio Prague the most. Production quality is quite high, and focuses on Czech matters, such as the ongoing adjustment to a market-based economy; generally doesn't seem as "heavy" as its peers. Announcers sound like they enjoy their work, and their English doesn't require intense concentration to understand (Richard D. Cuff, Easy Listening, NASWA Journal)

DIEGO GARCÍA This base for US military operations is to be handed back to the civilian population this year and it is hardly likely that the listed frequency (AFRTS 12579) will be heard again (Evan Murray, NZ DX Times)

ETHIOPIA Schedule of Voice of the Revolution of Tigray sent by director of VORT: M-F 0400-0500, 0930-1030, 1500-1900. Sat & Sun 0400-0900, 1100-1630 on 5500 and 7515, 10 kW (Rudolf Krumm, Germany, A-DX via BC-DX)

FINLAND Why R. Finland schedules are in local time: The main audience of Radio Finland are Finnish tourists and other nationals temporarily abroad who do not know the terms UT or GMT. We have received many thanks for the swap (Juhani Niinisto, YLE Radio Finland via Mike Terry, BDXC-UK)

GEORGIA Radio Khara: Main Studio: Tbilisi. Category: Domestic. Radio Khara ("We" in Abkhazian) was first heard in early 1999. It is reportedly sponsored by the Georgian-Abkhazian Relations Institute in Tbilisi with programming aimed at Georgian-Abkhaz reconciliation. Alternative frequency: 4540 kHz. Broadcasts are subject to Summer/Winter time changes. Address: Radio Khara, 52 Rustaveli Avenue, Tbilisi, Georgia. Tel: +95 32 987923. Schedule on 4875: 1600-1635 Mon & Thu in Abkhaz; repeated 0400-0435 Tue & Fri (© BBC Monitoring)

GERMANY The politician Erik Bettermann was chosen as new Deutsche Welle director. The ROI *Intermedia* show included a first statement from him: He doubts that foreign language broadcasts of 30 or 60 minutes

duration are of much use. Looks like further cancellations of language services at DW are to be expected (Kai Ludwig, Germany, DX Listening Digest)

GUYANA On 3291.42, GBC, at 0820. Back on 90 meters after an absence from this band for several months. Usual format of religious programs, subcontinental music, birthday announcements (Dave Hodgson, TN, DX Listening Digest) GBC, 3291.42, since mid-April, 0825-0940+ mixing traditional religious music in English with Hindi vocals; another night 0320-0800+ with continuous BBC programming instead (Brian Alexander, PA, DX Listening Digest)

HONDURAS On 4832.00, Radio Litoral with religion in English 0325-0358* (Karel Honzik, the Czech Republic, hard-core-dx) Regular here with English religion on 4832, but one night on 4830.05 instead, same content and R. Litoral ID (Aart Rouw, Bühl, Germany, Hard-Core-DX)

HRET is off SW due to lack of funds. They want to come back on MW (Larry Baysinger, Cumbre DX)

HUNGARY Vera Sarkany spent 30 of her 53 years at R. Budapest, her first and only workplace, and her voice was one which determined the profile of Radio Budapest. She joined the Radio in the summer of 1971, immediately on graduating. She was soon editing and reporting on a wide range of topics, especially science and health. Her series, *Insight*, continued until she fell ill in November 1999. She contributed to our daily current affairs magazine programme *Hungary Today* until just four days before she left us forever on March 3rd. We lost an excellent radio journalist and an ever-helpful colleague, faithful to the English Section right until the end. Less than a year before we also lost Charlie Courts. They are sorely missed (Budapest International, via Arthur Ward, World DX Club Contact)

INTERNATIONAL VACUUM Douglas Adams, creator of the *Hitchhiker's Guide to the Galaxy*, originally aired on BBC, died suddenly May 11 at his home in Santa Barbara, California, of a heart attack. He was 49 (BBC Radio 2 news) See tributes at <http://www.douglasadams.com> (Chet Copeland) An interview with Adams can be found at <http://www.americanatheist.org/win98-99/T2/silverman.html> (AA Newsletter)

IRAN [non] Radio Payam-e Doost (Radio Message from a Friend) is sponsored by Washington DC-based members of the Baha'i Faith. Web site refers to station in English as Baha'i Radio International; aims to "educate its listeners and dissipate misinformation about the Baha'i Faith." Commenced 21 March 1994 with a one-hour weekly program via WUST in Washington DC on 1120 kHz, now Sun 1330-1430 UT. The short-wave broadcast, via a hired transmitter in Eastern Europe or the CIS was first observed in May 2001: daily 1800-1830 on 7480. E-mail: feedback@bahairadio.org Web Site: <http://www.bahairadio.org> with archive audio (© BBC Monitoring) On exactly 7480 unlike R. Barabari an hour earlier, slightly off 7480, so may be different sites (Björn Fransson, Sweden, hard-core-dx)

Radio Barabari (Radio Equality) "a platform for breaking the walls of censorship and oppression" started in May, irr. 1700-1730 on 7480v. E-mail: info@barabari.org Web Site: <http://www.barabari.org/> with archive audio (© BBC Monitoring)

ISRAEL Instead of 21665 as planned, Israel Radio's summer frequency from May through September is 21670 for English at 1600-1630 (Moshe Oren, Bezeq, DX Listening Digest) Avoids BBC 21660 (gh)

KENYA KBC is often silent, but occasionally heard on 4885, 4915 or 4935; technical problems (Mahendra Vaghee, Mauritius, BC-DX)

LITHUANIA Complaints from NAM listeners about poor reception at new time of 2330 on 9875 led R. Vilnius to add a repeat at 0030 on 11690. Also announced likely to add internet audio at same times (Alan Roe, UK, DX Listening Digest) 11690 has splash from adjacent frequencies; 9875 better here (Bob Thomas, CT, DX Listening Digest)

MALTA [non] Voice of the Mediterranean English broadcasts are now 0600-0630 on 6110 Mon-Sat, 0800-0900 on 11770 Sun, via Italy and 1900-2000 on 12060 Sat to Thu via Russia (Mike Barraclough, England, World DX Club Contact)

MÉXICO Radio Mexico International via website <http://www.imer.gob.mx> has a pdf questionnaire it asks listeners to fill out and return postally (Cristina del Razo, Station Manager, Radio Mexico International, via Mike Terry, BDXC-UK)

PAKISTAN Radio Pakistan's special News and Current Affairs channel was inaugurated on 18 April 2001 from Broadcasting House, Constitution Avenue, Islamabad. Tel: +92 51 921 0689. Fax: +92 51 920 1861. 1225-1800 Daily in Urdu on 7265 and 7365 (© BBC Monitoring)

PARAGUAY R. Nacional has a special program for Paraguayans abroad, *Ventana al Mundo*, Sundays 2300-0300v on 9737.5, subject to sports or cultural preëmptions (Mauricio Remillier via Arnaldo Slaen, Conexión Digital) *0850 with beautiful Paraguayan folk music, morning prayer by Pope John Paul II; Sundays opens at *1000 (Takayuki Inoue Nozaki, Japan)

PERÚ On 5175.49, new Peruvian! L.P.C. La Radio premiered April 20 at 1100 (Björn Malm, Ecuador, SW Bulletin) 5175.8, 2321-0250* with pentecostal alabanza music. Nominal 5165 and sked 1000-0300 but heard at 0250* and *0950 (Rafael Rodriguez, Colombia, DX Listening Digest) Location is Gerillo, in Distrito Jelepacio, Provincia de Moyobamba, Departamento de San Martín (Henrik Klemetz, Sweden, DXLD) 5175.48, L.P.C. Radio Continente, Gerillo; stands for "La Petición Contestada".

On 6339.67, San Miguel Arcángel Radio, provincia de San Miguel, departamento de Cajamarca in May until 1205* (Björn Malm, Ecuador,

Shortwave Broadcasting

SW Bulletin)

On 6956.65, Radio La Voz del Campesino, Huarmaca, 1120-1150 Amanecer Campesino with first class OA folk music and personal messages (Takayuki Inoue Nozaki, Relampago DX Logging) 6956.56, 0250-0300 blasting in with excellent music (Robert Wilkner, FL, *hard-core-dx*) On late for Mother's Day (gh)

RWANDA Radio Rwanda, 6055 is easy catch evenings, seems to have extended till 2200 (Thorsten Hallmann, Autonomous Republic of Westphalia, *DX Listening Digest*)

SOMALIA R. Mogadishu, Voice of the People is quite regular with good signals on 6750 USB until 1900* after Koran and anthem (Mike Barraclough, England, World DX Club Contact)

SWEDEN [non] On at least two nights in May, R. Sweden relay at 0300 was heard on the CBC North Quebec frequency 9625 (Ricky Leong, Quebec, *DX Listening Digest*) 9625 synchronized with much stronger 11895, so Sackville (or Montréal) does it again, mixing up feeds internally, this time at the expense of the poor Northern Quebecers (gh) Reception is so good via Sackville 11895 for the 0330 English broadcast, that we are pulling the plug on the direct frequency 9495 May 21 (George Wood, *SCDX/MediaScan*)

TAIWAN Radio Taipei Int'l is looking for official monitors, starting July 1 for one year: 3 reports per month. Monitors will receive a CD of Taiwanese music. If interested, write or email RTI ASAP (Bill Bergadano, NJ, *DX Listening Digest*)

RTI program schedule shows that one set of features is on the UT 02, 07, 12, 16 and 22; another set on the 03, 11, 13, 17 and 18; except on Tuesdays and Wednesdays when all are the same (via Christopher J Williams, World DX Club Contact)

THAILAND Toward end of last millennium, Royal Thai Government ordered R. Thailand to add 15-minute daily broadcasts in remaining official languages of ASEAN and UN, Spanish, Russian, Tagalog, Hindi and Cantonese. These are still planned, and could start within the next year. Also being investigated, possibility of a relay station for the Americas (Amporn, R. Thailand director, interviewed by Jeff White months ago, on RN Radio Enlace in May)

TURKEY Live from Turkey, Tue 2219-2255 on 11845 and webcast, has been getting few calls; Reshide remarked they might move it earlier, more convenient for Europe. So that would be 1830 or 2030 UT (gh)

UKRAINE Alexander Yegorov, R. Ukraine International informed me 13590 changed to 12040 April 28, including English at 2100, 0000, 0300. And 12040 is much improved over 13590 (Kraig Krist, KG4LAC, *DX Listening Digest*)

UNITED ARAB EMIRATES UAE Radio Dubai monitored using four frequencies again for English: 1030-1050 on 13675 15370 15395 21605, 1330-1355 and 1600-1640 on 13630 13675 15395 21605 (Mike Barraclough, England, World DX Club Contact)

UNITED KINGDOM You may read elsewhere in this issue about BBC dropping SW to North America from July 1 (gh) Following are various reactions:

Response from management shows their basic misunderstanding of what a "real" BBC listener is.

They just count the people who listen to a bit of BBC newscast on public radio or who listen to the joint BBC/PRI "World" program as BBC listeners. A real BBC listener is someone like me, who wakes up in the morning and puts in an earphone while my wife is still asleep and listens to *Outlook* and then one of the Meridian programmes, followed by the science and ecosystem-related programs that come in the next hour. Someone who sets an alarm to wake up at 5:30 AM on a Saturday to hear *Science In Action*. Someone who tapes *Discovery* because it is on in the evening opposite a favorite TV show. Someone who will follow all the episodes of "Tale of Two Cities" on *Off The Shelf*. Someone who has to decide whether to watch TV or listen to a BBC programme in the evening, and ends up listening while videotaping the TV for later viewing, and has hundreds of unwatched tapes as a result!

I have no computer at home, so Internet listening is not an option. Even if it were, how could I do it the same as I now use a shortwave radio next to the bed? I just punch a button to turn it on, and a memory button to bring up the best current BBC shortwave frequency. How could I do this with a computer without waking my wife, and filling the bedside with equipment, and spending money every month for a service provider? Let's get rid of the managers who made this decision, and keep the BBC on shortwave to the entire world (William Martin, MO, replying to BBC Write On)

It seems to be quite clear that the BBC will cancel all transmissions via Sackville and WYFR, because they aim at North America exclusively (Kai Ludwig, Germany, *DX Listening Digest*)

Dropping shortwave to the United States, Canada, Australia, and New Zealand will save BBC \$700,000 per year, money which will be used to increase the FM and Internet of World Service. BBC World Service would not reveal how many listeners it has in the United States, but says that 88% of their audience in North America listens on FM, and only 12% listens exclusively via shortwave. Yes, there is occasional fading on shortwave. That's part of the experience. It's nature's way of reminding us that it is a privilege to listen to a radio station from another country, far away. Among shortwave broadcast listeners in the United States, BBC WS is the most popular station. Many of us think the

programming is better than from anything we can hear on U.S. radio stations, commercial or noncommercial. Shortwave will not be the same without BBC World Service. BBC World Service will not be the same without shortwave (Kim Elliott, *VOA Communications World*, std disclaimer)

WWFV offers to relay the BBC on one new AM transmitter, 24/7 for \$25 an hour, about \$219K per year; such as 15 MHz day, 6 MHz night. This could be paid for by listeners if not the BBC (WWFV, rec.radio.shortwave via John Norfolk) I think this is a major policy change, not just to save a few pounds, and doubt the BBC WS would even allow SW relays to be arranged via WWFV or any other site, paid for by someone else (gh)

As a UK taxpayer I actually pay for the BBC World Service. The real question is what does the BBC World Service do for us poor mugs that pay for it? Nothing at all as far as I can see. Does it increase Britain's influence? From Suez to Grenada we can see that when push comes to shove US administrations take precisely no notice of us. Does it improve the image of British people? Well I don't know, but many of us wonder why all the villains in Disney films are English? Seems the message isn't getting across. Perhaps no-one's listening? For all my life the British Government has shut down radio stations that I loved. Big L, Atlantis, Caroline, Radiofax - they closed the lot. Live with it. We've had to (Nicholas Mead, Cornwall, *DX Listening Digest*)

Something which no one seems to have realized yet: the frequencies vacated by BBC to North America will go begging for new clients. Merlin has shown us in many other situations that they will sell time to anybody, including gospel hucksters. As long as the transmitters are still functional, we well may start hearing g.h. and far-right hate shows on former BBC frequencies. Thus BBC's departure will add insult to injury (Glenn Hauser, *DX Listening Digest*)

U S A WBCQ-2 shifted to 9330-CUSB, and changed WORLD OF RADIO to UT Thu 0400, better for West Coast, just a few hours after first airing Wed 2330 on 7415. WWCR cancelled the Sun 1900 WOR broadcast. See our website (at head of column) for latest schedule (gh)

VOA's expanded Arabic service with five separate targeted streams will amount to 60 to 64 hours per day; add R. Free Iraq for a total of 69 to 73 hpd in Arabic from the US (Kim Elliott, *VOA Communications World* via John Norfolk)

The BBG has decided for now to make no changes in the existing VOA Thai broadcasting services. The Board will also maintain 30 minutes a day in Turkish and 15 in Uzbek (BBG Newsletter)

WNDN Meridian, MS, heard on 2579.86, 2 x 1290 harmonic, 0907-0918 with Soul/Gospel music, ads, ID (Mark Mohrmann, VT, *DX Listening Digest*)

Seldom Heard Radio, produced in the spirit of free radio, is heard every Sunday at 0500 UT on WRMI 7385. Includes folk, folk-rock, psychedelic and independent music from the 1960s to the present in a unique homespun format (Fred Moe, Producer, WORLD OF RADIO)

WMLK planned to have their 250 kW on air by May, but has been pushed back to June (Hans Johnson, Cumbre DX) Check 9465, 15265 afternoons (gh)

WWFV has been authorized by the FCC to start using 5975 July 1 if the BBC bails out (WWFV, rec.radio.shortwave via John Norfolk)

United Patriot Radio, clandestine from Kentucky, still wasn't busted in May, heard on new 6900 USB daytimes, 3260 at night. The Anti-Defamation League (ADL) says they have been monitoring Steve Anderson and his UPR. The ADL accuse Anderson of making anti-Semitic comments on the air and have identified him as a member of the Christian Identity 'church.' (Hans Johnson, Cumbre DX)

VENEZUELA R Rumbos programming heard on 8860 at 1025-1107, spur from Ecos del Torbes on 9640, not \ 4980 (David Hodgson, TN, *DX Listening Digest*) 8860 = 9640 minus 780, Torbes MW frequency (gh) Ecos del Torbes was active again in April on 4980, but could be gone tomorrow (Karel Honzik, Czech Republic, *hard-core-dx*)

DXers last winter reported Torbes on 4980 at least once in each of the months October, November, December, January, February, March and April. But the transmitter has been unstable for at least 12 months, in use sporadically, on the air some nights and off most others. Unfortunately this situation is typical not only for Ecos del Torbes, but for several tropical broadcasting stations nowadays (Anker Petersen, DSWCI)

VIETNAM [non] Clandestine programs as now scheduled on KWHR, Hawaii, 9930:

Mon-Sat 1230-1400 Que Huong Radio
Daily 1400-1500 Radio Free Asia Vietnamese
Mon-Sat 1500-1600 Radio Free Vietnam (WHR website)

YUGOSLAVIA Nine months after the authorities in Bosnia-Herzegovina forced the closure of Radio Yugoslavia's transmitter site at Bijeljina, shortwave broadcasts resumed 14 May, including English:

0000-0030 11870 C&ENAM (exc. Sun)
0430-0500 11870 WNA
1830-1900 6100 WEU
2100-2130 6100 EU
2200-2230 7230 AU (exc. Sat)

Full schedule in all languages: <http://www.radioyu.org> (Andy Sennitt, Media Network)

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

0008 UTC on 4915

BRAZIL: Radio Anhanguera. Portuguese. Up beat announcer's chat to station promos and station ID. heard as, "Nacional" and "Radio Anhanguera" at 0013. (Harold Frodge, Midland, MI) Brazil's **Radio Caiari** 4785, 0151-0204. Religious format to ID as "a Radio da familia...Radio Caiari...", very low signal, best in LSB. (Daniel Canonica, Muggio, Switzerland)

0035 UTC on 6950.45

PIRATE: Radio Free Speech SW. Earl Pitts & Paul Harvey commentary plus other inciteful bits. SIO=333. Minimal whiny interferences. **World Parody Network** heard on 6950; 0306-0318. Capt. Squirtlong and a female companion sing *I Love Myself* melody to Huntsville maildrop address. SIO=333. (Harold Frodge, Midland, MI)

0240 UTC on 6950LSB

PIRATE: Radio XANAX. DJ reading letters into intro for *Apocalypse Now* segments. Echo effect ID with Stoneham pirate maildrop address. Pirate-**Sycko Radio** 6950USB, *2334-2348*, heavy rock format "Abortive Attempt"-good name for a hard rock band. Audible *0323-0336* with Non Top 40 rock music program. (Frodge, MI)

0300 UTC on 3260 USB

CLANDESTINE-USA: United Patriot Radio. New name change for Kentucky State Militia (KSM). Commentary on Mark Koernke's case. 6880, 2338-0000+ with *Genesis Proactive News* and discussion on mind control. (Frodge, MI) Program should be on 12182 USB during the daytime. Station website <www.freekentucky.com/ksm/contents.htm>

0320 UTC on 11750

NETHERLANDS ANTILLES: Deutsche Welle relay. Informative program focus on computer viruses. (David W. Weronka, Benson, NC) A *Good Life* program 1900, 17605. (Bob Fraser, Cohasset, MA) **Antigua relay** 2220, 15410 German service. (Weronka, NC)

0320 UTC on 6015

ZANZIBAR: Radio Zanzibar. Swahili. Extended news bulletin and regional commercials. Strong signal and minimal interferences from Iran's VOIRI to 0328. (Victtorio De Tomasi-IK2CZL, Milano, Italy/HCDX)

0330 UTC on 11865

SEYCHELLES: BBC. Commentary to radio drama of fair signal quality. (Weronka, NC) BBC via UK 9410, 2110 *One Planet* program on cloning. (Fraser, MA) **BBC via Singapore** 6195, 2330 including ID, world news and *Greenfield Collection* focus. (William McGuire, Cheryl, MD; Frank Hillton, Charleston, SC)

0547 UTC on 7154.5

MADAGASCAR: RTV-Molagasy. Malagasy comments and announcements to instrumental music. Time signal tone and station identification. SINPO=33222. (Morales, ARG) **Radio Canada Int'l-Madagascar relay** 1810, 13640 with *Maple Leaf Mailbag*. (Fraser, MA; Sam Wright, Biloxi, MS) RTV-Malagasy 5009.6, 1726+. (Zacharias Linagas, Thessalonikis, Greece/Hard Core DX)

0700 UTC on 15110

KUWAIT: Radio Kuwait. Pop music program throughout hour to station ID, address and intros into Arabic service. News briefs and listener phone-in. (Liangas, GRC) 11990, 2035 with musical segments. (Weronka, NC)

1039 UTC on 5952.48

BOLIVIA: Radio Pio XII. Spanish news text from male/female duo to announcement, "el presidente del Consejo Municipal de Guari hizo la siguiente denuncia por Radio Pio XII." Bolivia's **Radio Fides** audible on 6155 at 1055. Musical program to Aymara spoken text. No sign of // 4B45. (Arnaldo L. Slaen, Buenos Aires, Argentina)

1100 UTC on 15375

CHILE: Radio Voz Cristiana. Spanish religious programming to half-hour station identification. (Roy Unger, Front Royal, VA) Station website: <www.vozcristiana.com>

1320 UTC on 6140

URUGUAY: Radio Montecarlo. Spanish programming in // with 930 // 770 AM kHz (Radio Oriental, Montevideo). Cycle competition

"Rutas de America". Commercials for Club Progreso, J&M Cigarettes, Banco de Seguros del Estado. SIO=44433. (Slaen, ARG) **Emisora Ciudad de Montevideo**, 2245-2315. Sports updates, ID and auto commercials. (Klaus Elsebusch, Marienthal, Germany) **SODRE**, Montevideo 1245-1305 program *Asi es Carlos Garden* to ID; "transmite CXA26 Radiodifusion Nacional Sodre, en 1050 kHz y su onda corta CXA4 en 6125 kHz..." (Slaen, ARG)

1802 UTC on 19160

GABON: Africa # 1. Spurious signal audible from normal 9580 kHz. African news features with remotes to "Africa bon soir" at 1814 followed by sports. "Radio Africaine" and "Africa # 1" at 1830. Nothing noted on // 15475. SIO=534 with interferences noted. (Frodge, MI)

1810 UTC on 9890

RUSSIA: Voice of Russia. *Moscow Mailbag* program with fair signal quality, // 9775, 11510. (Bob Fraser, Cohasset, MA) 2003-2015+, 15455 with ID and mailbag program. (Frodge, MI) 7180, 0355-0420+. (Weronka, NC) Russian's- **Radio Maryja** (via Samara) Polish on 7400, 2158-2213; **Radio Rossii** (via Irkutsk) Russian on 7440, 1008-1023; 4485, 1815. **VOA via Petropavlovsk-Kamchatsky relay**, 12065, 2130-2159. ID to Korean service reports, news and music to 2159*. (Morales, ARG; Liangas, GRC)

1947 UTC on 9565

USA: Radio Marti. Spanish programming with IDs and Spanish rendition of Diana Ross/Lionel Ritchie's *Endless Love* tune. Audible to 2001*. (Martin Brown, Brampton, Ontario, Canada) WYFR's Spanish broadcast 18980, 1844-1845+ with ID, interfering with more dominant WYFR English service on frequency for about a minute. (Frodge, MI)

2018 UTC on 15640

ISRAEL: Kol Israel. Commentary on Israel-Palestinian conflicts. National weather temps and news headlines. "Shalom From Israel" ID to interval signal and sign off. French service *2030. (Frodge, MI) 9435 at 2020, // 11505, 15650. (Fraser, MA) Audible 1915-1925*, 17545 with features to ID. Program line up and frequency quote. (Duane Hadley, Bristol, TN) Station-Galei Zahal 0330-0335, 6973. (Slaen, ARG)

2034 UTC on 15160

ALGERIA: Radio Algeria. Tentative logging to 2050*. News features and editorial to tentative ID at 2047, just prior to world news summary. Sign-off with "it's 10 minutes till 9 now", which would have been Algerian time. (Frodge, MI)

2108 UTC on 13750

CUBA: Radio Havana. Sports Beat program. (Fraser, MA) 13660 USB noted in // Station English noted; 0100-0300, 9B20, // 11705 USB. (Tom Banks, Dallas, TX)

2200 UTC on 6055

JAPAN: Radio Tampa. Time signal tone to station ID. Instrumental classical music to male/female announcers' Japanese text and conversation. (Morales, ARG) **Radio Japan** 6110, 0555 with 44 Minutes program. (Weronka, NC) Monitored English service 0600-0700, 11740, 13630, 15195; // 17870, 21755 un-audible. (Banks, TX) 1228, 9750 in Japanese. (Liangas, GRC) 2155-2200+, 17825 closing bits of programming to station ID, address and schedule. Japanese service at 2200, SIO=332. (Frodge, MI)

2326 UTC on 4965

ZAMBIA: Radio Christian Voice. English religious program of musical "gospel spirituals", to station identification. (Hillton, SC; Banks, TX) **Radio Zambia** 6265, 2130-2200. English interviews and regional music. SINPO=44333. (Claudio Morales, ARG/HCDX)

2328 UTC on 5008.85

DOMINICAN REP.: Radio Cristal Int'l. Station ID heard as, "La Loz de la Esperanza" followed by "Radio Cristal International." News-cast to pop music tunes. Signal SIO+323. (Canonica, SU1)

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

QSLing International Amateur Radio Operators

In last month's column we tipped *MT* readers off on a great opportunity to QSL U.S. and Canadian amateur radio operators during the annual June American Radio Relay League (ARRL) Field Day. If you enjoyed last month's activity and want an even more demanding challenge, then fire up that HF receiver the second weekend of this month for the Olympics of the amateur radio world – the International Amateur Radio Union (IARU) HF World Championships.

Unlike the Field Day event which was open to U.S. and Canadian hams only, this contest is global in nature and draws participants from all over the world on the air for a 24 hour event. This is a perfect opportunity for SWLs as well as ham radio operators to add to their country totals. In last year's contest 105 countries submitted entries in this grueling event. That is a hefty bunch of DX to work in a short period of time. Most new hams are able to work enough stations during this contest weekend to earn the coveted ARRL DXCC (DX Century Club – 100 countries verified).

And remember QSLing hams couldn't be easier. Note their call sign, frequency, time, date, and who they worked and give them a signal report. Put this on a card. But now you will have to get your card overseas. This represents new challenges that do not come into play when verifying the U.S. or Canadian hams.

After the contest is over and you have

decided to send your card/report to a specific station here are a few ideas to guarantee success. Our first task is to decide where to send your report. Your first stop should be at the pages of NG3K on the internet at <http://cpcug.org/user/wfeidt/>. Here you will find special listings on various participants in the contest and their QSL routes (who/where to send your card to get the station verified).

Some foreign stations have hams in the U.S. or other countries to handle their QSL request (they are known as "QSL managers"). If the station you worked has a U.S. QSL manager, you have saved yourself a lot of time and money getting that QSL card. If the NG3K website above doesn't mention the station you want to QSL then move on to the QRZ website and their QSL Corner at <http://www.qrz.com/sqsl.html>?

Finally, if your research fails to turn up a QSL manager for the foreign station you want to verify, you can send your request directly to the ham using his address found on the QRZ website. Go to <http://www.qrz.com>, plug in the call sign you heard, and you will get all the information you need to contact that ham directly via snail mail.

If you are a dedicated verification junkie and love to get QSL cards in your mailbox, you are going to love the weekend of July 14-15, 2001. Fire up that rig, give the dial a spin and see how many countries you can work that weekend.



ICELAND

Icelandic National Broadcasting Service, 11402 kHz. Full data *Blue Lagoon* card unsigned. Received in seven weeks for an English report. Station address: Efstaleiti 1, 150 Reykjavik, Iceland. (Don Dacus, Russellville, AR)

ITALY

Adventist World Radio, 17820 kHz. Full data *Zaokaskaya Seminariya Adventistov* card signed by Gysinn Ruff-Listener Mail Dept., plus letter from verie signer. Received in 18 days for an English report and one US dollar. Station address: AWR Europe, Casella Postale 383, 1-47100 Forli, Italy. (Comeau, MA)

IAR Rome Radio, 12602.5 kHz. Full data letter and frequency schedule. Received in 48 days for a utility report. Station address: Telecom Italia, MI.R.SR., Viale Parco De Medici, 61 00148 Rome, Italy. (George Clement, Powder Springs, GA)

MEDIUM WAVE

CHWO, 740 kHz AM. Full data QSL card, schedule, station info sheet and ODXA info. Received in two months for an AM report. Station address: P.O. Box 740, Station A, Toronto, Ontario, Canada M5W 4K6 (Dacus, AR)

CKWX, 1130 kHz AM. Canada. Full data QSL card signed by Jack W.-Chief Engineer. Card returned in envelope with my dollar enclosure. Received in 20 days for an AM report. Station address: 2440 Ash St., Vancouver BC Canada V5Z 4J6. (Patrick M. Griffith-NONNK/WPE9HWV, Westminster, CO)

KKOB, 25910 kHz AM. Full data verification on station letterhead, signed by Mike Langner-Chief Engineer. Received in ten days for an AM report and an SASE (not used for reply). This partly makes up for the QSL I didn't receive from them several years ago on 770 AM, which they denied being the station I head ID as, "the Great Voice of the Southwest." Station address: Citadel Southwest, Radio Center, 500 4th St., NW, Albuquerque, NM 87102-2102. (Harold Frodge, Midland, MI)

KMKI, 620 kHz AM. Plano, TX. No data folder *Radio Disney* card with handwritten "You heard us!", signed by Tish Thompson-Creative Coordinator, plus station "AM 620" promo goodies including; pencils, stickers, and promo card of *Radio Disney* DJs. Received in 15 days for an AM report and one US dollar. Station address: 2221 E. Lamar Blvd., Suite 400, Arlington, TX 76006. (Griffith, CO)

PHILIPPINES

DXAB, 1296 kHz AM. Philippines. Friendly letter from verie signer Micomim Prudencio Alojado-Station Manager, plus station stickers. Received in 97 days for a taped report. Station address: KM-4, Shine Hills, Martina, Davao City, Philippines. (Patrick Martin, Seaside, OR)

DXDX, 1161 kHz AM. Philippines. Handwritten letter signed by Gaudencia Y. Sabella-Engineering Dept. Letter mentioned the station was 1 kW. Received in 90 days for a taped report. Station address: Cor. P. Reyes and Palima Gil Streets, 8000 Davao City, Philippines. Nice surprise to receive two Philippine QSLs on the same day. (Martin, OR)

Radyo Pilipinas, 15190 kHz. Full data verification card signed by Tanny V. Rodriguez-Station Manager. Received in 356 days for an English report. Station address: Philippine Broadcasting Service, 4th Floor, PIA Bldg., Visayas Avenue, Quezon City 1100, Metro Manila, Philippines. (Enzio Gehrig, Denia, Spain/HCDX)

New Media, the BBC and Magazines

If, at this late date, the news that (as of July 1) the *BBC World Service* will stop using shortwave to serve North America, Australia and New Zealand is indeed news to you, you may want to review how you are receiving your information!

That simple statement may serve as an apt summary of the central issue raised by that *BBC* decision.

At one time, newspapers and magazines were what people relied upon for news of what was going on in the world. As hard as this may be for us in the 21st century to believe, these instruments once represented the most timely and immediate way of keeping up. Now, of course, we have several means of receiving virtually instantaneous transmission of information – so much so, that we have debates over which of these immediate technologies is best!

The worst bias in these debates is the simplistic argument that what is newest must be automatically the best. That is clearly not true as evidenced by the magazine you are holding in your hands. The advent of a new technology rarely renders older technologies obsolete. But, new technologies always force a reevaluation of all prior existing technologies.

So, to get back to our magazine, this means that someone relying on *MT* for their up-to-the-minute radio hobby news is going to hear about it much later than someone relying on one or more of the newer technologies (like even radio!). But, the magazine still fills a number of useful roles: as a chronicle, as a way to consider things in a more leisurely and considered matter, as a collection of relatively “recent” information gathered into a convenient form.

Of course, the second worst bias is that which says that what we already have is enough. As Andy Sennitt of *Radio Netherlands' Media Network e-zine* put it, if that were true “instead of CDs, we'd still be using scratchy old cylinders and wind-up motors.”

◆ A Question of Balance

International broadcasters, who once only had domestically-based shortwave transmitters as a means of delivery, now also have shortwave relays, direct satellite (in analog and digital forms), FM and AM/MW rebroadcast in the target area, and the Internet to choose from. The current wisdom says that the savvy international broadcaster will develop a scheme using this entire array of delivery systems in such a way as to ensure the optimum use of each.

This balancing act is challenging on its own, but is made even more daunting by the fact that the available budget is never enough to afford the broadcaster the luxury of using all of them to their fullest capacity. Compromise is a necessity and the added pressure does little to improve the chances of finding the right precise mix.

◆ The BBC as DX Catch?

Thus, we have arrived at the current dilemma. Certainly without shortwave frequencies specifically targeted to the US and Canada, the quality and consistency of reception of *BBC World Service* broadcasts here will be significantly affected. However, that doesn't mean the *BBC* will now be heard so poorly on shortwave that the experience will now be aurally unpleasant or even painful. We listeners are just going to have to be a little more creative in our approach.

Frequencies serving the Caribbean, Central and South America will remain on the air and these should provide adequate and even, at times, excellent reception of the Americas stream in at least the eastern half of North America.

Fortunately, shortwave signals at their fickle best refuse to be confined to a particular geographic target. Therefore, frequencies to other areas regularly offer us an added opportunity to hear the *World Service*, albeit via one or more of the other streams. For those in the western half of North America, their best opportunities will come from some of the frequencies used by the *BBC's* relay transmitters in the Middle East and Southeast Asia. For those in eastern North America, the *BBC's* transmitters in Europe, Africa and the Middle East offer similar possibilities. To help, beginning with this issue of *MT*, we will include, in the *Shortwave Program Guide* section, some program listings for the other *BBC World Service* transmission streams, in addition to the Americas stream.

Here are some preliminary suggestions:

◆ Best for eastern half of North America:

- These frequencies, targeting the Caribbean, Central and South America, will continue to carry the *Americas stream*: 5975 via Antigua (2100-0400), 6135 via Delano (0200-0400), 9915 via the UK direct (0000-0300) and 12095 via Ascension Island (2100-0300) should still be available to us during our evenings; and 6195

via Antigua (1000-1400), 15190 via Ascension Island (0900-1130), 15220 via Antigua (1100-1400), 17790 via Ascension Island (1100-1130) and 17840 via Antigua (1400-1700) during our mornings.

- These frequencies target Europe, North Africa and the Middle East and carry either the *Europe/North Africa* or *Middle East streams*: 6195 via the UK (0200-0700), 9410 via the UK (0400-0800) and via Cyprus (0200-0400 and 1500-2200), 12035 via Cyprus (0400-0500), 12095 via Cyprus and then the UK (0200-2100).

- These frequencies carry the *Africa streams*: 6005 via Ascension Island (0300-0700), 7120 via Meyerton (0300-0500), 7160 via Ascension Island (0300-0700), 11835 via the UK (2000-2300), 15400 via Ascension Island (1500-2300), 17830 via Ascension Island (1100-2100), 21470 via the Seychelles (1100-1300) and via Ascension Island (1300-1900) and 21660 via Cyprus (1400-1700).

◆ Best for western half of North America:

Since I live near the east coast, I asked Stewart MacKenzie of the *American Shortwave Listeners Club*, based in southern California, for help in identifying *BBC* frequencies originating from transmitters in Asia, the Middle East and Africa that are heard fairly reliably on the west coast. These frequencies broadcast the *East Asia* or *South Asia streams*.

Here's what Stewart suggests: 5965 via Oman (0000-0200), 6005 via the Seychelles (1700-1745, 1845-2200), 6195 via Singapore and other locations (0900-0630), 7105 via Singapore (2200-0030), 9410 via Cyprus and other locations (0200-2215), 9510 via Oman (1700-1830), 12095 via several locations (virtually around the clock).

Other frequencies to try include 9740 via Singapore (0500-1600), 11955 via Singapore (0900-1100 and 2200-0000) and via Oman (0000-0300), 15310 via Oman (0300-0600 and 0900-1700), and 15360 via Singapore (0000-0330 and 0500-1030).

Feel free to use this column as a means of exchanging information about usable *BBC* frequencies in your area. I'll pass on any and all information you send me. Making lemonade out of lemons, good listening!

HOW TO USE THE SHORTWAVE GUIDE

0000-0100 twfha USA, Voice of America 5995am 6130ca 7405am 9455af
 ① ② ⑤ ③ ④ ⑥ ⑦

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Daylight Savings) 4, 5, 6, or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each page.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (in other words, 8:30 pm Eastern, 7:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on ①, then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not daily, the days of broadcast A will appear in the column following the time of broadcast, using the following codes:

Day Codes	
s/S	Sunday
m/M	Monday
t/T	Tuesday
w/W	Wednesday
h/H	Thursday
f/F	Friday
a/A	Saturday
D	Daily
mon/MON	monthly

In the same column ⑤, irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

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

The frequencies ⑥ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations

and reports from her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before publication.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas

af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFPI)
me:	Middle East
na:	North America
om:	omnidirectional
pa:	Pacific
sa:	South America
va:	various

Choose a program or station you want to hear.

Selected programs appear on the lower half of the page for prime listening hours – space does not permit 24 hour listings nor can every station be listed. However, listings for the most popular stations and selected lesser-known stations illustrate the variety available on shortwave. The format of the listings alternates among three different styles – by station, by genre and by day – month by month. Times listed are approximate and programs are subject to change.

The program listings emphasize broadcasts targeted to North America. In most cases, the stations and programs listed should be readily receivable in North America using a portable radio. Most broadcasters produce one broadcast in English per day that is repeated over a 24 hour period to all areas. If you are able to listen to transmissions to other areas of the world during "non-prime time" hours, referring to the prime time listings for those stations will likely be helpful in determining what programs will be broadcast.

Occasionally, a program or station listing may be followed by a reference to another listing for the same program or station at a different time. This is done to conserve space and make it possible to provide more listings.

MT MONITORING TEAM

Gayle Van Horn Frequency Manager gayle@webworkz.com	John Figliozzi Program Manager jfiglio1@nycap.rr.com
---	--

Mark Fine, VA
fineware@erols.com

Program Highlights

VOA Adds Feature Repeats

Some VOA weekend programming is being repeated during the week. The following features now air at 0033, 0433, 0833, 1233 and 2033: M-Press Conference USA, T-Encounter, W-Our World, H-Kaleidoscope, F-Best of "Talk to America."

BBC Streams Added

With the elimination of shortwave to North America, the BBC's Americas stream should still be heard here via frequencies to the Caribbean, Central and South America – but at slightly different times than that to which we've become accustomed. Assuming the BBC's frequency charts hold for the remainder of the A01 season, the Americas stream will be on shortwave 0900-1000, 1015-1700 and 2100-0400 only. MT's shortwave program listings reflect this change. (*The frequency section has retained the North American and Australian streams for one more month until specifics are known* - ed.)

In addition, program listings for other streams have been added at times when reception should at least be possible somewhere in North America. Refer to the frequency lists and experiment. Some frequencies may work quite well for your sector of the continent. Identifying which frequency belongs to which stream will be an added challenge at times. Sometimes the same frequency is used simultaneously for different streams in different parts of the world; and some frequencies switch streams with time.

RCI Changes

An unexpected budget shortfall has resulted in major changes to RCI programming. All foreign language programs are being reduced to 30 minutes and will run Monday-Friday. Weekly English and French programs will run on weekends and will include Canada in the World, International Trade and Technology. Meet the Press, Arts and Culture, Mailbag and chat. News will not be aired on weekends.

Radio Yugoslavia Returns

In early May, Radio Yugoslavia returned to the air. At editorial deadline, it still wasn't clear what sort of program features and scheduling the station is pursuing; but we'll attempt to put something together for the August issue. Broadcast times and frequencies are listed in the frequency section of the Shortwave Guide.

Bush Telegraph

Radio Australia has added this program, in two forms, to its schedule. A daily rebroadcast of the version aired on the domestic Radio National network goes out at 1705 UT, Monday through Friday. In addition, RA's John Westland compiles a weekend edition of the program that draws from the best of the week's broadcasts. The latter replaces *In Conversation-Rural Edition* in the schedule, which has been discontinued. Both programs focus on providing an entertaining look at Australian rural and regional issues. Helen Brown hosts the weekday version.

0000 UTC - 8PM E / 7PM C / 5PM P

0000	0015	Cambodia, National Radio Of	11940as				
0000	0015	Japan, Radio	6145na	13650pa	17810pa		
0000	0027	Czech Rep, Radio Prague Intl	7345na	11615na			
0000	0030	Australia, Radio	9660pa	12080pa	15415as	15240as	
			15415as	17580pa	17775as	17795va	
			21740va				
0000	0030	Egypt, Radio Cairo	9900am				
0000	0030	Thailand, Radio	9655af	9690af	11905af		
0000	0030	UK, BBC World Service	3915as	5965as	5975am	6175na	
			6195as	7105as	9410me	9590am	
			9915sa	11945as	11955as	12095sa	
			15280as	15310as	15360as	17615as	
			17790as				
0000	0030	mtwhfa	11870am				
0000	0045	India, All India Radio	9705as	9950as	11620as	13605as	
0000	0056	North Korea, Voice of Korea	4405va	11460na	11710na	13760na	
			15180na				
0000	0057	Canada, R Canada International	11895as				
0000	0100	Anguilla, Caribbean Beacon	6090am				
0000	0100	vi	Australia, ABC/Alice Springs	4835do			
0000	0100	vi	Australia, ABC/Katherine	5025do			
0000	0100	vi	Australia, ABC/Tennant Creek	4910do			
0000	0100		Australia, Christian Voice	17775pa	21680pa		
0000	0100		Canada, CBC Northern Service	9625do			
0000	0100		Canada, CFRX Toronto ON	6070do			
0000	0100		Canada, CFVP Calgary AB	6030do			
0000	0100		Canada, CHNX Halifax, NS	6130do			
0000	0100		Canada, CKZN St John's NF	6160do			
0000	0100		Canada, CKZU Vancouver BC	6160do			
0000	0100		Costa Rica, R for Peace Intl	7455irr	15049va		
0000	0100		Costa Rica, University Network	5030am	6150am	7375am	9724sa
			11870am	13749na			
			9745na	15115na	21455usb		
0000	0100	a/monthly	Finland, Scandv Weekend Radio	11720va			
0000	0100		Guyana, Voice of	3289do	5949do		
0000	0100		Japan, Radio	6145na			
0000	0100		Malaysia, Radio	7295do			
0000	0100		Malaysia, RTM Kota Kinabalu	5980do			
0000	0100		Malaysia, RTM Sarawak	7160do			
0000	0100	vi	Namibia, Namibian BC Corp	3270af	3289af		
0000	0100		Netherlands, Radio	6165na	9845na		
0000	0100		New Zealand, R New Zealand Int	17675pa			
0000	0100		New Zealand, ZLXA	3935do	7290do		
0000	0100	vi	Papua New Guinea, NBC	9675do	11880irr		
0000	0100		Singapore, SBC Radio One	6150do			
0000	0100	vi/os	Solomon Islands, SIBC	5020do			
0000	0100	vi/a	Solomon Islands, SIBC	9545do			
0000	0100		Spain, R Exterior Espana	15385na			
0000	0100		Ukraine, R Ukraine International	5905eu	7320as	9640as	12040na
0000	0100		USA, Armed Forces Radio	4278va	4319va	4993va	5765va
			6350va	6458va	6847va	10320va	
			10940va	12579va	12689va	13254va	
			13362va	16847va			
0000	0100		USA, KAIJ Dallas TX	13815va			
0000	0100		USA, KTBN Salt Lake City UT	15590na			
0000	0100		USA, KWHR Naalehu HI	17510as			
0000	0100	twhfa	USA, Voice of America	5995am	6130am	7405am	9455am
				9775am	11695am	13740am	
0000	0100		USA, WBCQ Monticello ME	7415na	9335na		
0000	0100		USA, WEWN Birmingham AL	5825na	13615na		
0000	0100		USA, WHRA Greenbush ME	7580eu			
0000	0100		USA, WHRI Noblesville IN	5745va	7315am		
0000	0100		USA, WINB Red Lion PA	12160am			
0000	0100		USA, WJCR Upton KY	7490am	13595as		
0000	0100		USA, WRMI Miami FL	9955sa			
0000	0100		USA, WRNO New Orleans LA	7355va			
0000	0100		USA, WSHB Cypress Crk SC	7535am	9430am	15285sa	
0000	0100		USA, WTJC Newport NC	9370na			
0000	0100	sm	USA, WWBS Macon GA	11910na			
0000	0100		USA, WWCR Nashville TN	5070na	7435na	9475na	13845na
0000	0100		USA, WWFV McCaysville GA	5085va	6890am		
0000	0100		USA, WYFR Okeechobee FL	6085na	9505na		
0000	0100	vi	Vanuatu, Radio	3945do	4960do	7260do	
0000	0100		Zambia, Christian Voice	4965do			
0030	0100		Australia, Radio	9660pa	12080va	15240pa	15415as
				17580pa	17750as	17755as	17795va
				21740va			
0030	0100		Iran, VOIRI	9022am	9835am	11970am	
0030	0100		Lithuania, Radio Vilnius	11690eu			
0030	0100		Sri Lanka, Sri Lanka BC Corp	4940do			
0030	0100		Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	9770as
				15425as			
0030	0100		Thailand, Radio	9655as	11905as	15395na	
0030	0100		USA, VOA Special English	7215as	9770as	11760as	15185as
				15290as	17740as	17820as	
0030	0100		USA, Voice of America	7215as	9770as	11760as	15185as
				15290as	17740as	17820as	
0045	0100		Pakistan, Radio	11650as	15455as		
0050	0100		Italy, RAI International	9675na	11800na		
0050	0100		UK, International BC Tamil	11570as			

0100 UTC - 9PM E / 8PM C / 6PM P

0100	0110	Italy, RAI International	9675na	11800na			
0100	0115	Pakistan, Radio	11650as	15455as			
0100	0125	Netherlands, Radio	6165na	9845na			
0100	0127	Czech Rep, Radio Prague Intl	5915na	7345na			
0100	0127	Vietnam, Voice of	9525na				
0100	0130	s	Germany, Universal Life	9435as			
0100	0130		Hungary, Radio Budapest	9560na			
0100	0130		Iran, VOIRI	9022am	9835am	11970am	
0100	0130		Slovakia, R Slovakia International	5930na	7230ca	9485sa	
0100	0130	twhfa	USA, Voice of America	5995am	6130am	7405am	9455am
				9775am	13740am		
0100	0130		Uzbekistan, Radio Tashkent	7190as	9375as	9530as	9715as
0100	0145		Germany, Deutsche Welle	6040na	9640am	11810na	13720am
0100	0156		North Korea, Voice of Korea	3560va	11734va	15230va	17735va
0100	0159		Canada, R Canada International	5960am	13670am	13770am	15170am
				15305am			
0100	0200		Anguilla, Caribbean Beacon	6090am			
0100	0200	vi	Australia, ABC/Katherine	5025do			
0100	0200	vi	Australia, ABC/Tennant Creek	4910do			
0100	0200		Australia, Christian Voice	17775pa	21680pa		
0100	0200		Australia, Radio	9660pa	12080pa	15240as	15415as
				17580pa	17750as	17755as	17795va
				21725pa			
0100	0200		Canada, CBC Northern Service	9625do			
0100	0200		Canada, CFRX Toronto ON	6070do			
0100	0200		Canada, CFVP Calgary AB	6030do			
0100	0200		Canada, CHNX Halifax, NS	6130do			
0100	0200		Canada, CKZN St John's NF	6160do			
0100	0200		Canada, CKZU Vancouver BC	6160do			
0100	0200		China, China Radio International	9570na			
0100	0200		Costa Rica, R for Peace Intl	7455irr	15049va		
0100	0200		Costa Rica, University Network	5030am	6150am	7375am	9724sa
				11870am	13749na		
0100	0200		Cuba, Radio Havana	6000na	9820na	11705na	
0100	0200		Ecuador, HCJB	9745na	15115na	21455usb	
0100	0200	a/monthly	Finland, Scandv Weekend Radio	11720va			
0100	0200		Guyana, Voice of	3289do	5949do		
0100	0200		Indonesia, Voice of	9525as	11784as	15149as	
0100	0200		Japan, Radio	11860pa	11870me	11880me	15325as
				17685pa	17810as	17835sa	17845as
0100	0200		Malaysia, Radio	7295do			
0100	0200		Malaysia, RTM Kota Kinabalu	5980do			
0100	0200		Namibia, Namibian BC Corp	3270af	3289af		
0100	0200		New Zealand, R New Zealand Int	17675pa			
0100	0200		New Zealand, ZLXA	3935do	7290do		
0100	0200	vi	Papua New Guinea, NBC	9675do	11880irr		
0100	0200		Russia, Voice of Russia WS	9665na	9725na	11825na	12000na
				17595na			
0100	0200		Singapore, SBC Radio One	6150do			
0100	0200	vi/os	Solomon Islands, SIBC	5020do			
0100	0200	vi/a	Solomon Islands, SIBC	9545do			
0100	0200		Spain, R Exterior Espana	15385na			
0100	0200		Switzerland, Swiss R International	9885om			
0100	0200		UK, BBC World Service	5965as	5975am	6175na	6195as
				9410as	9590am	9915sa	11955as
				12095sa	15280as	15310as	15360as
				17790as			
0100	0200		USA, Armed Forces Radio	4278va	4319va	4993va	5765va
				6350va	6458va	6847va	10320va
				10940va	12579va	12689va	13254va
				13362va	16847va		
0100	0200		USA, KAIJ Dallas TX	13815va			
0100	0200		USA, KJES Vado NM	7555na			
0100	0200		USA, KTBN Salt Lake City UT	7510na			
0100	0200		USA, KWHR Naalehu HI	17510as			
0100	0200		USA, Voice of America	7115as	9635as	11705as	11725as
				11820as	13650as	15250as	17740as
				17820as			
0100	0200	s twhfa	USA, WBCQ Monticello ME	9335na			
0100	0200		USA, WBCQ Monticello ME	7415na			
0100	0200		USA, WEWN Birmingham AL	5825na	13615na		
0100	0200		USA, WHRA Greenbush ME	7580eu			
01							

Shortwave Guide



0200 UTC - 10PM E / 9PM C / 7PM P

0200	0210	mtwhf	Greece, Voice of	7475va	9420va	11645va	12105va
0200	0230	sm w fa	Belarus, R Belarus International	6070eu	7210eu		
0200	0230		Myanmar, Radio	7185do			
0200	0230	a	UK, Wales Radio Intl/Merlin	9795na			
0200	0230		USA, KJES Vado NM	7555na			
0200	0230		USA, WIN8 Red Lion PA	12160am			
0200	0245		Germany, Deutsche Welle	11965as	13710as	15370as	
0200	0245		Iraq, Radio Iraq International	7157irr	9684irr	11785irr	
0200	0256		North Korea, Voice of Korea	11845va	13650va		
0200	0256		Romania, R Romania International	11940na	15105as	15180as	15340na
				17735as	17790pa		
0200	0257		Canada, R Canada International	15260as	17860as		
0200	0300		Anguilla, Caribbean Beacon	6090am			
0200	0300	twthfa	Argentina, RAE	11710am			
0200	0300	vi	Australia, ABC/Alice Springs	4835do			
0200	0300	vi	Australia, ABC/Katherine	5025do			
0200	0300	vi	Australia, ABC/Tennant Creek	4910do			
0200	0300		Australia, Christian Voice	17775pa	21680pa		
0200	0300		Australia, Radio	9660pa	12080va	15240as	15415as
				15515va	17580va	17750as	21725va
0200	0300		Bulgaria, Radio	9400na	11700na		
0200	0300		Canada, CBC Northern Service	9625do			
0200	0300		Canada, CFRX Toronto ON	6070do			
0200	0300		Canada, CFVP Calgary AB	6030do			
0200	0300		Canada, CHNX Halifax, NS	6130do			
0200	0300		Canada, CKZN St John's NF	6160do			
0200	0300		Canada, CKZU Vancouver BC	6160do			
0200	0300		Costa Rica, R for Peace Intl	7455irr	15049va		
0200	0300		Costa Rica, University Network	5030am	6150am	7375am	9724sa
				11870am	13749na	13749na	
0200	0300		Cuba, Radio Havana	6000na	9820na	11705na	
0200	0300		Ecuador, HCJB	9745na	15115na	21455usb	
0200	0300		Egypt, Radio Cairo	9475am			
0200	0300	a/monthly	Finland, Scandv Weekend Radio	11720va			
0200	0300		Guyana, Voice of	3289do	5949do		
0200	0300		Kenya, Kenya BC Corp	4885irr	4915irr	4885irr	
0200	0300		Malaysia, Radio	7295do			
0200	0300		Malaysia, RTM Kota Kinabalu	5980do			
0200	0300		Namibia, Namibian BC Corp	3270af	3289af		
0200	0300		New Zealand, R New Zealand Int	17675pa			
0200	0300		New Zealand, ZLXA	3935do	7290do		
0200	0300	vi	Papua New Guinea, NBC	9675do	11880irr		
0200	0300		Russia, Voice of Russia WS	9665na	12000na	17595na	
0200	0300	vi/as	Singapore, SBC Radio One	6150do			
0200	0300	vi/a	Solomon Islands, SIBC	5020do			
0200	0300		Solomon Islands, SIBC	9545do			
0200	0300		South Korea, R Korea Intl	7275na	11725sa	11810sa	15575na
0200	0300		Sri Lanka, Sri Lanka BC Corp	6005as	6075as	6130do	9770as
				15425as			
0200	0300		Taiwan, Radio Taipei International	5950na	9680na	11740am	11825pa
				15345as			
0200	0300		UK, BBC World Service	5975am	6135am	6175na	6195eu
				9410eu	9770af	9915sa	11955as
				12095va	15280as	15310as	15360as
				17790as			
0200	0300		UK, Merlin Network One	9430na			
0200	0300		USA, Armed Forces Radio	4278va	4319va	4993va	5765va
				6350va	6458va	6847va	10320va
				10940va	12579va	12689va	13254va
				13362va	16847va		
0200	0300		USA, KAJI Dallas TX	5755va			
0200	0300		USA, KTBH Salt Lake City UT	7510na			
0200	0300		USA, KWHR Naalehu HI	17510as			
0200	0300		USA, Voice of America	7115as	9635as	11705as	11725as
				11820as	13650as	15250as	17740as
				17820as			
0200	0300	s twthfa	USA, WBCQ Monticello ME	7415na			
0200	0300		USA, WBCQ Monticello ME	9335na			
0200	0300		USA, WEWN Birmingham AL	5825na			
0200	0300		USA, WHRA Greenbush ME	7580eu			
0200	0300		USA, WHRI Noblesville IN	5745va	7315am		
0200	0300		USA, WJCR Upton KY	7490am	13595as		
0200	0300		USA, WRMI Miami FL	7385na			
0200	0300		USA, WRNO New Orleans LA	7355va			
0200	0300		USA, WSHB Cypress Crk SC	5850na	7535am	9430na	
0200	0300		USA, WTJC Newport NC	9370na			
0200	0300		USA, WWCN Nashville TN	3215na	5070na	5935na	7435na
0200	0300		USA, WWFV McCoysville GA	5085va	5085am		
0200	0300		USA, WYFR Okeechobee FL	6065na	9505na		
0200	0300	vi	Vanuatu, Radio	3945do	4960do	7260do	
0200	0300		Zambia, Christian Voice	4965do			
0200	1215		Cambodia, National Radio Of	11940as			
0215	0220		Nepal, Radio	5005as	7165as		
0230	0257		Vietnam, Voice of	9525na			
0230	0300		Albania, R Tirana International	6115na	7160na		
0230	0300		Hungary, Radio Budapest	9570na			
0230	0300		Philippines, Radyo Pilipinas	11885pa	15120pa	15270pa	
0230	0300		Slovakia, Adventist World Radio	7235as			
0230	0300		Sweden, Radio	9495am	9755na		
0230	0300		Switzerland, Swiss R International	9885am			
0240	0247		Croatia, The Voice of Croatia	6165eu	7365eu	9830eu	9925sa
				11870am			
0250	0300		Vatican City, Vatican Radio	7305am	9605am		
0250	0300	vi	Zambia, National BC Corp	6165do	6265do		

0300 UTC - 11PM E / 10PM C / 8PM P

0300	0310		Vatican City, Vatican Radio	7305am	9605am		
0300	0327		Czech Rep, Radio Prague Intl	7345na	7385na	9870na	
0300	0330		Egypt, Radio Cairo	9475am			
0300	0330		S Africa, Channel Africa	6035af			
0300	0330		Thailand, Radio	9655am	11905am	15395na	
0300	0330	s twthfa	USA, WBCQ Monticello ME	9335na			
0300	0345		Germany, Deutsche Welle	9535na	9640na	13780am	15105na
0300	0400		Anguilla, Caribbean Beacon	6090am			
0300	0400	vi	Australia, ABC/Alice Springs	4835do			
0300	0400	vi	Australia, ABC/Katherine	5025do			
0300	0400	vi	Australia, ABC/Tennant Creek	4910do			
0300	0400		Australia, Christian Voice	21680pa			
0300	0400		Australia, Radio	9660pa	12080pa	15240as	15415as
				15515va	17580va	17750as	21725va
0300	0400	mtwhf	Bhutan, Bhutan BC Service	6035do			
0300	0400	vi	Botswana, Radio	3356do	4820do	7255do	
0300	0400		Canada, CBC Northern Service	9625do			
0300	0400		Canada, CFRX Toronto ON	6070do			
0300	0400		Canada, CFVP Calgary AB	6030do			
0300	0400		Canada, CHNX Halifax, NS	6130do			
0300	0400		Canada, CKZN St John's NF	6160do			
0300	0400		Canada, CKZU Vancouver BC	6160do			
0300	0400		China China Radio International	9690na			
0300	0400		Costa Rica, Faro del Caribe	5054ca	6175ca	9644ca	
0300	0400		Costa Rica, R for Peace Intl	7455irr	15049va		
0300	0400		Costa Rica, University Network	5030am	6150am	7375am	9724sa
				11870am	13749na	13749na	
0300	0400		Cuba, Radio Havana	6000na	9820na	11705na	
0300	0400		Ecuador, HCJB	9745na	15115na	21455usb	
0300	0400	a/monthly	Finland, Scandv Weekend Radio	11720va			
0300	0400	vi	Guatemala, Radio Cultural	3300do	5955do		
0300	0400		Guyana, Voice of	3289do	5949do		
0300	0400	sm	Honduras, Radio Luz y Vida	3250ca			
0300	0400		Japan, Radio	17825ca	21610pa		
0300	0400		Kenya, Kenya BC Corp	4885irr	4915irr	4885irr	
0300	0400	vi	Lesotho, Radio	4800do			
0300	0400		Malaysia, Radio	7295do			
0300	0400		Malaysia, Voice of Islam	6175as	9750as	15295as	
0300	0400		Namibia, Namibian BC Corp	3270af	3289af		
0300	0400		New Zealand, R New Zealand Int	17675pa			
0300	0400		Oman, Radio Sultanate of	15355va			
0300	0400	vi	Papua New Guinea, NBC	9675do	11880irr		
0300	0400		Philippines, Radyo Pilipinas	11885pa	15120pa	15270pa	
0300	0400		Russia, Voice of Russia WS	9665na	11750na	12000na	17565na
				17650na	17660na	17690na	
0300	0400		Singapore, SBC Radio One	6150do			
0300	0400	vi/as	Solomon Islands, SIBC	5020do			
0300	0400	vi/a	Solomon Islands, SIBC	9545do			
0300	0400		Sri Lanka, Sri Lanka BC Corp	6005as	6075as	6130do	9770as
				15425as			
0300	0400		Taiwan, Radio Taipei International	5950na	9680na	11745as	11825as
0300	0400		Turkey, Voice of	7270af	11655va	21715as	
0300	0400		Uganda, Radio	4976do	5026do		
0300	0400		UK, BBC World Service	3255af	5975am	6005af	6135am
				6175na	6190af	6195eu	7120af
				7160af	9410eu	11730af	12035af
				12095me	15280as	15310as	15360as
				15420af	15575me	17760as	17790as
				21660as	21830as		
0300	0400		Ukraine, R Ukraine International	7320as	7410eu	9640as	12040as
0300	0400		USA, Armed Forces Radio	4278va	4319va	4993va	5765va
				6350va	6458va	6847va	10320va
				10940va	12579va	12689va	13254va
				13362va	16847va		
0300	0400		USA, KAJI Dallas TX	5755va			
0300	0400		USA, KTBH Salt Lake City UT	7510na			
0300	0400		USA, KWHR Naalehu HI	17510as</			

Shortwave Guide

0330	0400		UAE, Radio Dubai	11725na	12005na	13675na	15400na
0330	0400	tw/hfc	USA, WBCQ Monticello ME	9335na			
0345	0400	f	Seychelles, FEBA Radio	11885af			

0400 UTC - 12AM E / 11PM C / 9PM P

0400	0405		USA, WWCR Nashville TN	5070na	5935na	7435na	
0400	0405	sm	USA, WWCR Nashville TN	3210na			
0400	0405	tw/hfa	USA, WWCR Nashville TN	3215na			
0400	0415		Israel, Kol Israel	9435va	15640va	17545va	
0400	0430		Australia, Radio	9660pa	12080va	15240pa	15415as
				15515va	17580pa	21725pa	
0400	0430	as	Australia, Radio	17750as			
0400	0430		Belgium, RVI Flanders R Intl	15595na			
0400	0430		France R France International	9550af	15155af		
0400	0430	s tw/hfa	Mexico, R Mexico International	9705am	11770am		
0400	0430	vi	Nigeria, Radio/Kaduna	6090do	7275do		
0400	0430		S Africa, Channel Africa	5955af			
0400	0430		Sri Lanka, Sri Lanka 8C Corp	6005as	6075as	6130do	9770as
				15425as			
0400	0430		Switzerland, Swiss R International	9610eu	9885am		
0400	0430		USA, WRMI Miami FL	7385na			
0400	0445		Germany, Deutsche Welle	7225af	9565af	9765af	13690af
0400	0455		USA, WYFR Okeechobee FL	6065na	9355eu	9505na	
0400	0456		China China Radio International	9560na	9730na		
0400	0456		Romania, R Romania International	11940na	15365na	15365na	17735as
				21480as			
0400	0500		Anguilla, Caribbean Beacon	6090am			
0400	0500	vi	Australia, ABC/Alice Springs	4835do			
0400	0500	vi	Australia, ABC/Katherine	5025do			
0400	0500	vi	Australia, ABC/Tennant Creek	4910do			
0400	0500	vi	Australia, Christian Voice	21680pa			
0400	0500	vi	Botswana, Radio	3356do	4820do	7255do	
0400	0500		Canada, CBC Northern Service	9625do			
0400	0500		Canada, CFRX Toronto ON	6070do			
0400	0500		Canada, CFVP Calgary AB	6030do			
0400	0500		Canada, CHNX Halifax, NS	6130do			
0400	0500		Canada, CKZN St John's NF	6160do			
0400	0500		Canada, CKZU Vancouver BC	6160do			
0400	0500		Costa Rica, R for Peace Intl	7455irr	15049va		
0400	0500		Costa Rica, University Network	5030am	6150am	7375am	9724sa
				11870am	13749na	17645as	
0400	0500		Cuba, Radio Havana	6000na	9820na	11705na	
0400	0500		Ecuador, HCJB	9745na	15115na	21455usb	
0400	0500	a/monthly	Finland, Scandv Weekend Radio	11720va			
0400	0500	vi	Guatemala, Radio Cultural	3300do	5955do		
0400	0500		Guyana, Voice of	3289do	5949do		
0400	0500	vi	Kenya, Kenya 8C Corp	4885irr	4915irr	4885irr	
0400	0500	vi	Lesotho, Radio	4800do			
0400	0500		Malaysia, Radio	7295do			
0400	0500		Malaysia, Voice of Islam	6175as	9750as	15295as	
0400	0500		Myanmar, Radio	9730do			
0400	0500		Namibia, Namibian 8C Corp	3270af	3289af		
0400	0500		New Zealand, R New Zealand Int	17675pa			
0400	0500		New Zealand, ZLXA	3935do	7290do		
0400	0500	vi	Nigeria, Radio/Enugu	6025do			
0400	0500	vi	Papua New Guinea, N8C	9675do	11880irr		
0400	0500		Russia, Voice of Russia WS	9665na	11750na	12000na	17565na
				17650na	17690na		
0400	0500		Singapore, SBC Radio One	6150do			
0400	0500	vi/os	Solomon Islands, SIBC	5020do			
0400	0500	vi/a	Solomon Islands, SIBC	9545do			
0400	0500		Uganda, Radio	4976do	5026do		
0400	0500		UK, BBC World Service	3255af	5975am	6005af	6135me
				6175na	6195eu	7120af	
				7160af	9410eu	12035eu	12095me
				15280as	15310as	15420af	15575me
				17640af	17760as	17790as	21660as
				21830as			
0400	0500		USA, Armed Forces Radio	4278va	4319va	4993va	5765va
				6350va	6458va	6847va	10320va
				10940va	12579va	12689va	13254va
				13362va	16847va		
0400	0500		USA, KAIJ Dallas TX	5755va			
0400	0500		USA, KTBN Salt Lake City UT	7510na			
0400	0500		USA, KWHR Naalehu HI	17780as			
0400	0500		USA, Voice of America	4960af	5855af	6080af	7275af
				7290af	9530va	9575af	11965me
				15205va	17895af		
0400	0500		USA, WBCQ Monticello ME	7415na			
0400	0500		USA, WEWN Birmingham AL	5825na			
0400	0500		USA, WHRA Greenbush ME	7580eu			
0400	0500		USA, WHRI Noblesville IN	5745va	7315om		
0400	0500		USA, WJCR Upton KY	7490om	13595as		
0400	0500		USA, WMLK Bethel PA	9465eu			
0400	0500		USA, WSHB Cypress Crk SC	11930eu	15195af		
0400	0500		USA, WTJC Newport NC	9370na			
0400	0500		USA, WWFV McCaysville GA	5085va	5085am		
0400	0500		Zambia, Christian Voice	6065do			
0400	0500	vi	Zambia, National BC Corp	6165do	6265do		
0400	0500	vi	Zimbabwe, Zimbabwe BC Corp	4828do	6045do		
0405	0500		USA, WWCR Nashville TN	3210na	5070na	5935na	7435na
0425	0440		Italy, RAI International	5975af	7150af		
0427	0525	o	Liberia, Voice of Hope	12060af	15320af		
0430	0500		Australia, Radio	9660pa	12080pa	15240os	15415as
				15515va	17580pa	17580as	21725pa
0430	0500		Italy, Italian Radio Relay Service	3985va			
0430	0500		Netherlands, Radio	6165na	9590na		
0430	0500	vi	Nigeria, Radio/Ibadan	6050do			

0430	0500	vi	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
0430	0500	vi	Nigeria, Radio/Lagos	3326do	4990do		
0430	0500		S Africa, Adv World Radio Africa	11975af			
0430	0500		Sri Lanka, Sri Lanka 8C Corp	6130do			
0430	0500	mtw/hfa	Swaziland, Trans World Radio	3200af	4775af		
0430	0500		Switzerland, Swiss R International	9885am			
0430	0500	s tw/hfa	USA, WRMI Miami FL	7385na			
0430	0500		Yugoslavia, Radio	11870na			
0445	0500		USA, WYFR Okeechobee FL	9355eu			

0500 UTC - 1AM E / 12AM C / 10PM P

0500	0504		Pakistan, Radio	15185me	17825me	21460me	
0500	0515		Canada, CBC Northern Service	9625do			
0500	0515	s h/fa	USA, KVOH Los Angeles CA	9975na			
0500	0520		Vatican City, Vatican Radio	4005eu	5885eu	7250eu	9660af
				11625af	15570af		
0500	0530	as	Australia, Radio	17750as			
0500	0530		Canada, R Canada International	6145eu	7290eu	9595eu	11710eu
				13755af	15330af	17740af	
0500	0530		France R France International	11710af	17800af		
0500	0530	s tw/hfa	Mexico, R Mexico International	9705am	11770am		
0500	0530		Netherlands, Radio	6165na	9845na		
0500	0530		S Africa, Adv World Radio Africa	5960af	6015af		
0500	0530		S Africa, Channel Africa	11720af			
0500	0530		Switzerland, Swiss R International	9610eu			
0500	0530		Uganda, Radio	4976do	5026do		
0500	0530		UK, BBC World Service	5975am	6005af	6175am	6190af
				6195eu	7160af	9410eu	9740as
				11760me	11765af	11940af	11955pa
				12095eu	15280as	15310as	15360as
				15420af	15575as	17640af	17760as
				17790as	17885af	21660as	
0500	0530	s tw/hfa	USA, WRMI Miami FL	7385na			
0500	0530	vi	Zimbabwe, Zimbabwe 8C Corp	4828do	6045do		
0500	0545		Germany, Deutsche Welle	9690na	9785na	11985na	
0500	0600		Anguilla, Caribbean Beacon	6090am			
0500	0600	vi	Australia, ABC/Alice Springs	4835do			
0500	0600	vi	Australia, ABC/Katherine	5025do			
0500	0600	vi	Australia, ABC/Tennant Creek	4910do			
0500	0600	vi	Australia, Christian Voice	21680pa			
0500	0600	vi	Botswana, Radio	3356do	4820do	7255do	
0500	0600		Canada, CFRX Toronto ON	6070do			
0500	0600		Canada, CFVP Calgary AB	6030do			
0500	0600		Canada, CHNX Halifax, NS	6130do			
0500	0600		Canada, CKZN St John's NF	6160do			
0500	0600		Canada, CKZU Vancouver BC	6160do			
0500	0600		Costa Rica, R for Peace Intl	7455irr	15049va		
0500	0600		Costa Rica, University Network	5030am	6150am	7375am	9724sa
				11870am	13749na	17645as	
0500	0600		Cuba, Radio Havana	9550na	9830na		
0500	0600		Ecuador, HCJB	9745na	15115na	21455usb	
0500	0600	a/monthly	Finland, Scandv Weekend Radio	11720va			
0500	0600		Guyana, Voice of	3289do	5949do		
0500	0600		Italy, Italian Radio Relay Service	3985va			
0500	0600		Japan, Radio	5975eu	6110na	7230eu	11715as
				11760as	13630na	15195as	17810pa
				21755pa			
0500	0600		Kenya, Kenya 8C Corp	4885irr	4915irr	4885irr	
0500	0600		Kuwait, Radio	15110as			
0500	0600	vi	Lesotho, Radio	4800do			
0500	0600	vi	Liberia, R Liberia International	5100do			
0500	0600		Malaysia, Radio	7295do			
0500	0600		Malaysia, RTM Sarawak	7160do			
0500	0600		Malaysia, Voice of Islam	6175as	9750as	15295as	
0500	0600		Myanmar, Radio	9730do			
0500	0600		Namibia, Namibian 8C Corp	3270af	3289af		
0500	0600		New Zealand, R New Zealand Int	11725pa			
050							

Shortwave Guide



0500	0600	USA, WTJC Newport NC	9370na				
0500	0600	USA, WWCR Nashville TN	3210na	5070na	5935na	7435na	
0500	0600	USA, WYFR Okeechobee FL	5985na	9355eu	11580eu		
0500	0600	Vanuatu, Radio	3945do	4960do	7260do		
0500	0600	Zambia, Christian Voice	6065do				
0500	0600	Zambia, National BC Corp	6165do	6265do			
0515	0530	USA, KVOH Los Angeles CA	9975na				
0520	0530	Vatican City, Vatican Radio	9660af	11625af	15570af		
0525	0600	Ghana, Ghana BC Corp	3366do	4915do			
0530	0540	Cameroon, CRTV Radio Buea	6005do				
0530	0545	USA, KVOH Los Angeles CA	9975na				
0530	0559	Canada, R Canada International	13755af	15330af	17740af		
0530	0600	Australia, Radio	9660pa	12080va	15240pa	15515va	
			17580pa	17750as	21725pa		
0530	0600	Georgia, Georgian Radio	11805eu				
0530	0600	S Africa, Adv World Radio Africa	11970af				
0530	0600	Thailand, Radio	9655eu	11905eu	21795eu		
0530	0600	UAE, Radio Dubai	13675au	15435au	17830au	21700au	
0530	0600	UK, BBC World Service	17885af				
0530	0600	Zimbabwe, Zimbabwe BC Corp	5975do	6045do			
0532	0600	Austria, R Austria International	6155eu	13730eu			
0545	0600	USA, KVOH Los Angeles CA	9975na				

0600 UTC - 2AM E / 1AM C / 11PM P

0600	0615	S Africa, Trans World Radio	11640af				
0600	0615	USA, WBQC Monticello ME	7415na				
0600	0630	France R France International	11710af	17800af	21620as		
0600	0630	Malta, Voice of Mediterranean	6110eu				
0600	0630	S Africa, Channel Africa	15215af				
0600	0630	USA, Voice of America	5970af	6035af	6080af	7195af	
			9530va	9680af	11805af	11965me	
			11995af	12080af	13670af	15205va	
0600	0641	Romania, R Romania International	11940na	15180na			
0600	0645	Germany, Deutsche Welle	6140eu	11925af	13790af	17860af	
0600	0700	Anguilla, Caribbean Beacon	6090am				
0600	0700	Australia, ABC/Alice Springs	4835do				
0600	0700	Australia, ABC/Katherine	5025do				
0600	0700	Australia, ABC/Tennant Creek	4910do				
0600	0700	Australia, Christian Voice	21680pa				
0600	0700	Australia, Radio	9660pa	12080pa	15240pa	15415as	
			15515va	17580pa	17750as	21725pa	
0600	0700	Botswana, Radio	7255do	9600do	7255do		
0600	0700	Canada, CFRX Toronto ON	6070do				
0600	0700	Canada, CFPV Calgary AB	6030do				
0600	0700	Canada, CHNX Halifax, NS	6130do				
0600	0700	Canada, CKZN St John's NF	6160do				
0600	0700	Canada, CKZU Vancouver BC	6160do				
0600	0700	Costa Rica, R for Peace Intl	7455irr	15049va			
0600	0700	Costa Rica, University Network	5030am	6150am	7375am	9724sa	
			11870am	13749na	17645as		
0600	0700	Cuba, Radio Havana	9550na	9820na	9830na		
0600	0700	Ecuador, HCJB	9745na	11680eu	15115na	21455usb	
0600	0700	Finland, Scandv Weekend Radio	11690va				
0600	0700	Germany, Overcomer Ministries	9430pa	13810au			
0600	0700	Ghana, Ghana BC Corp	3366do	4915do			
0600	0700	Guyana, Voice of	3289do	5949do			
0600	0700	Italy, Italian Radio Relay Service	7120va				
0600	0700	Japan, Radio	7230eu	11740pa	13630pa	15195as	
			17870pa	21755pa			
0600	0700	Kenya, Kenya BC Corp	4885irr	4915irr	4885irr		
0600	0700	Kuwait, Radio	15110as				
0600	0700	Lesotho, Radio	4800do				
0600	0700	Liberia, ELWA	4760do				
0600	0700	Liberia, R Liberia International	5100do				
0600	0700	Malaysia, Radio	7295do				
0600	0700	Malaysia, RTM Sarawak	7160do				
0600	0700	Malaysia, Voice of	6175as	9750as	15295as		
0600	0700	Myanmar, Radio	9730do				
0600	0700	Namibia, Namibian BC Corp	3270af	3289af			
0600	0700	New Zealand, R New Zealand Intl	11725pa				
0600	0700	New Zealand, ZLXA	3935do	7290do			
0600	0700	Nigeria, Radio/Enugu	6025do				
0600	0700	Nigeria, Radio/Ibadan	6050do				
0600	0700	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
0600	0700	Nigeria, Radio/Lagos	3326do	4990do			
0600	0700	Nigeria, Voice of	7255af	15120af			
0600	0700	Papua New Guinea, NBC	9675do	11880irr			
0600	0700	Russia, Voice of Russia WS	15490au	17635au	17685au	21790au	
0600	0700	Sierra Leone, Sierra Leone BS	3316do				
0600	0700	Singapore, SBC Radio One	6150do				
0600	0700	Solomon Islands, SIBC	5020do	9545do			
0600	0700	Sri Lanka, Sri Lanka BC Corp	6130do				
0600	0700	Swaziland, Trans World Radio	4775af	6035af	9500af		
0600	0700	Uganda, Radio	5026do	7110do	7196do	6195eu	
0600	0700	UK, BBC World Service	6055af	6175am	6190af	6195eu	
			7160af	9410eu	9580pa	9740as	
			11760me	11765af	11940af	11955pa	
			12095eu	15310as	15360as	15485eu	
			15565eu	17640af	17760as	17790as	
			21660as				
0600	0700	UK, BBC World Service	17885af				
0600	0700	USA, Armed Forces Radio	4278va	4319va	4993va	5765va	
			6350va	6458va	6847va	10320va	
			10940va	12579va	12689va	13254va	
			13362va	16847va			
0600	0700	USA, KAIJ Dallas TX	5755va				
0600	0700	USA, KTBN Salt Lake City UT	7510na				
0600	0700	USA, KWHR Naalehu HI	11565pa	17780as			

0600	0700	USA, WEWN Birmingham AL	5825na				
0600	0700	USA, WHRA Greenbush ME	11730af				
0600	0700	USA, WHRI Noblesville IN	5745va	7315am			
0600	0700	USA, WJCR Upton KY	7490am	13595as			
0600	0700	USA, WMLK Bethel PA	9465eu				
0600	0700	USA, WRNO New Orleans LA	7395am				
0600	0700	USA, WSHB Cypress Crk SC	11615af	13650af			
0600	0700	USA, WTJC Newport NC	9370na				
0600	0700	USA, WWCR Nashville TN	3210na	5070na	5935na	7435na	
0600	0700	USA, WYFR Okeechobee FL	5985na	9355eu	11580eu		
0600	0700	Vanuatu, Radio	3945do	4960do	7260do		
0600	0700	Yemen, Rep of Yemen Radio	9780me				
0600	0700	Zambia, Christian Voice	9865do				
0600	0700	Zambia, National BC Corp	6165do	6265do			
0600	0700	Zimbabwe, Zimbabwe BC Corp	5975do	6045do			
0605	0610	Croatia, The Voice of Croatia	6165eu	7365eu	9830eu	9925sa	
			11870am	13749na	17645as		
0610	0615	Vatican City, Vatican Radio	4005eu	5885eu	7250eu	9645eu	
			11740eu	15595eu			
0610	0620	Greece, Voice of	9420eu	11900au	15630eu	17520pa	
			21530eu				
0630	0640	Cameroon, CRTV Radio Buea	6005do				
0630	0700	Finland, YLE/Radio Finland	15315va	21670va			
0630	0700	Georgia, Georgian Radio	6080me				
0630	0700	USA, Voice of America	9530va	9680af	11805af	11965me	
			15205va				
0630	0700	USA, Voice of America	5970af	6035af	6080af	7195af	
			11995af	12080af	13670af	15570af	
0630	0700	Vatican City, Vatican Radio	11625af	13765af	15570af		
0641	0656	Romania, R Romania International	11775eu	11940na	15180na	15365eu	
0645	0655	Monaco, Trans World Radio	6140eu				
0645	0700	Germany, Deutsche Welle	9870eu				
0655	0700	Monaco, Trans World Radio	9870eu				

0700 UTC - 3AM E / 2AM C / 12AM P

0700	0720	Swaziland, Trans World Radio	4775af	6035af	9500af		
0700	0727	Czech Rep, Radio Prague Intl	9880eu	11600eu			
0700	0730	Belgium, RWI Flanders R Intl	9865eu				
0700	0730	Papua New Guinea, NBC	9675do	11880irr			
0700	0730	Slovakia, R Slovakia International	9440ou	15460ou	17550au		
0700	0730	UK, BBC World Service	17885af				
0700	0730	USA, Voice of America	6873va				
0700	0756	Romania, R Romania International	17735pa				
0700	0800	Anguilla, Caribbean Beacon	6090am				
0700	0800	Australia, ABC/Alice Springs	4835do				
0700	0800	Australia, ABC/Katherine	5025do				
0700	0800	Australia, ABC/Tennant Creek	4910do				
0700	0800	Australia, Christian Voice	17870as	21680pa			
0700	0800	Australia, Radio	9660pa	12080va	15240va	15415as	
			17580pa	17750as	21725pa		
0700	0800	Botswana, Radio	7255do	9600do	7255do		
0700	0800	Canada, CFRX Toronto ON	6070do				
0700	0800	Canada, CFPV Calgary AB	6030do				
0700	0800	Canada, CHNX Halifax, NS	6130do				
0700	0800	Canada, CKZN St John's NF	6160do				
0700	0800	Canada, CKZU Vancouver BC	6160do				
0700	0800	Costa Rica, R for Peace Intl	7455irr	15049va			
0700	0800	Costa Rica, University Network	5030am	6150am	7375am	9724sa	
			11870am	13749na	17645as		
0700	0800	Ecuador, HCJB	11680eu	11755pa	21455usb		
0700	0800	Eq Guinea, Radio Africa	15185af				
0700	0800	Eq Guinea, Radio East Africa	15185af				
0700	0800	Finland, Scandv Weekend Radio	11690va				
0700	0800	France R France International	15605af				
0700	0800	Germany, Deutsche Welle	6140eu				
0700	0800	Germany, Overcomer Ministries	9430pa	13810au			
0700	0800	Germany, Trans World Radio	12070eu				
0700	0800	Germany, Voice of Hope	5975eu	21590me			
0700	0800	Ghana, Ghana BC Corp	3366do	4915do			
0700	0800	Ghana, Ghana BC Corp	3366do	4915do			
0700	0800	Guyana, Voice of	3289do	5949do			
0700	0800	Italy, Italian Radio Relay Service	7120va				
0700	0800	Kenya, Kenya BC Corp	4885irr	4915irr	4885irr		
0700	0800	Kuwait, Radio	15110as				
0700	0800	Lesotho, Radio	4800do				
0700	0800	Liberia, ELWA	4760do				
0700	0800	Liberia, R Liberia International	5100do				
0700	0800	Malaysia, Radio	7295do				
0700	0800	Malaysia, RTM Sarawak	7160do				
0700	0800	Malaysia, Voice of	6275as	9750as	15295as		
0700	0800	Monaco, Trans World Radio	9870eu				
0700	0800	Myanmar, Radio	9730do				
0700	0800	Namibia, Namibian BC Corp	3270af	3289af			
0700	0800	New Zealand, R New Zealand Intl	11725pa				
0700	0800	New Zealand, ZLXA	3935do	7290do			
0700	0800	Nigeria, Radio/Enugu	6025do				
0700	0800	Nigeria, Radio/Ibadan	6050do				
0700	0800	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
0700	0800	Nigeria, Radio/Lagos	3326do	4990do			
0700	0800	Nigeria, Voice of Russia WS	15490au	17495au	17525au	17635au	
0700	0800	Sierra Leone, Sierra Leone BS	3316do				

Shortwave Guide



			9740as	11760me	11765af	11940af			
			11955pa	12095eu	15310as	15360as			
			15400af	15485eu	15565eu	15575as			
			17640eu	17760as	17790as	17830af			
			21660as						
0700	0800	USA, Armed Forces Radio	4278va	4319va	4993va	5765va			
			6350va	6458va	6847va	10320va			
			10940va	12579va	12689va	13254va			
			13362va	16847va					
0700	0800	USA, KAIJ Dallas TX	5755va						
0700	0800	USA, KTNB Salt Lake City UT	7510na						
0700	0800	USA, KWHR Naalehu HI	11565pa	17780as					
0700	0800	USA, WEWN Birmingham AL	5825na						
0700	0800	USA, WHRA Greenbush ME	11730af						
0700	0800	USA, WHRI Noblesville IN	5745va	7315am					
0700	0800	USA, WJCR Upton KY	7490am	13595as					
0700	0800	USA, WMK Bethel PA	9465eu						
0700	0800	USA, WRNO New Orleans LA	7395am						
0700	0800	USA, WSHB Cypress Crk SC	11615af	13650af					
0700	0800	USA, WTJC Newport NC	9370na						
0700	0800	USA, WWCN Nashville TN	3210na	5070na	5935na	7435na			
0700	0800	USA, WYFR Okeechobee FL	7355eu	13695af	15170af				
0700	0800	Vanuatu, Radio	3945do	4960do	7260do				
0700	0800	Zambia, Christian Voice	9865do						
0700	0800	Zambia, National BC Corp	6165do	6265do					
0700	0800	Zimbabwe, Zimbabwe BC Corp	5975do	6045do					
0705	0710	s	6165eu	7365eu	9830eu	13830eu			
0715	0800	Guam, KTWR/ Trans World R	15200as						
0720	0735	mtwhf	4775af	6035af	9500af				
0730	0800	Georgia, Georgian Radio	11910eu						
0730	0800	Papua New Guinea, NBC	4890do	9675irr					
0730	0800	Switzerland, Swiss R International	15545af	17685af	21750af				
0730	0800	as	15575as	17885af					
0750	0755	as	9420eu	11900eu	15630eu	17520as			
			21530as						
0755	0800	mtwhf	12070eu						

0800 UTC - 4AM E / 3AM C / 1AM P

0800	0804	Pakistan, Radio	17520eu	21465eu					
0800	0815	Guam, KTWR/ Trans World R	15200as						
0800	0820	Monaco, Trans World Radio	9870eu						
0800	0825	Malaysia, Voice of	6275as	9750as	15295as				
0800	0830	vi	4835do						
0800	0830	vi	5025do						
0800	0830	vi	4910do						
0800	0830		5995pa	9710pa	12080pa	13605pa			
			15240pa	15415as	21725pa				
0800	0830	Myanmar, Radio	9730do						
0800	0900	Anguilla, Caribbean Beacon	6090am						
0800	0900	Australia, Christian Voice	17820as	21680pa					
0800	0900	mtwhf	6035do						
0800	0900	vi	7255do	9600do	7255do				
0800	0900	Canada, CFRX Toronto ON	6070do						
0800	0900	Canada, CFPV Calgary AB	6030do						
0800	0900	Canada, CHNX Halifax, NS	6130do						
0800	0900	Canada, CKZN St John's NF	6160do						
0800	0900	Canada, CKZU Vancouver BC	6160do						
0800	0900	Costa Rica, R for Peace Intl	7455irr	15049va					
0800	0900		5030am	6150am	7375am	9724sa			
			11870am	13749na	17645as				
			11755pa	21455usb					
0800	0900	mtwhf	15185af						
0800	0900	as/vl	15185af						
0800	0900	a/monthly	11690va						
0800	0900	Germany, Deutsche Welle	6140eu						
0800	0900	Germany, Overcomer Ministries	13800pa	13810ou					
0800	0900	Germany, Trans World Radio	12070eu						
0800	0900	Germany, Voice of Hope	5975eu	21590me					
0800	0900	vi	3366do	4915do					
0800	0900		3289do	5949do					
0800	0900		9525pa	11784pa	15149pa				
0800	0900	as/vl	7120va						
0800	0900	vi	4885irr	4915irr	4885irr				
0800	0900	vi	4800do						
0800	0900	vi	4760do						
0800	0900	vi	5100do						
0800	0900		7295do						
0800	0900	s	11770eu						
0800	0900		7165af	7215af					
0800	0900		9885pa						
0800	0900		3935do	7290do					
0800	0900	vi	6025do						
0800	0900	vi	6050do						
0800	0900	vi	4770do	6090do	7275do	9570do			
0800	0900	vi	3326do	4990do					
0800	0900	vi	4890do	9675irr					
0800	0900		15490au	17495au	17525au	17635au			
			17685au						
0800	0900	s	9750af	21560af					
0800	0900		3316do						
0800	0900		6150do						
0800	0900	vi	5020do						
0800	0900		9570am	13670eu					
0800	0900		6130do						
0800	0900		5026do	7110do	7196do				
0800	0900		6190af	9740as	11940af	11955pa			
0800	0900		12095eu	15310as	15360as	15400af			
0800	0900		15485eu	15565eu	17640eu	17760as			

0800	0900	as	UK, BBC World Service	15575as					
0800	0900		USA, Armed Forces Radio	4278va	4319va	4993va	5765va		
				6350va	6458va	6847va	10320va		
				10940va	12579va	12689va	13254va		
				13362va	16847vc				
0800	0900		USA, KAIJ Dallas TX	5755va					
0800	0900		USA, KNLS Anchor Point AK	11765as					
0800	0900		USA, KTNB Salt Lake City UT	7510na					
0800	0900		USA, KWHR Naalehu HI	11565pa	17780as				
0800	0900		USA, Voice of America	11930as	13610as	15150as			
0800	0900		USA, WEWN Birmingham AL	5825na					
0800	0900		USA, WHRA Greenbush ME	11730af					
0800	0900		USA, WHRI Noblesville IN	5745va	7315am				
0800	0900		USA, WJCR Upton KY	7490am	13595as				
0800	0900		USA, WRNO New Orleans LA	7395am					
0800	0900		USA, WSHB Cypress Crk SC	9845ou	9860eu	11615eu			
0800	0900		USA, WTJC Newport NC	9370na					
0800	0900		USA, WWCN Nashville TN	3210na	5070na	5935na	7435na		
0800	0900	vi	Vanuatu, Radio	3945do	4960do	7260do			
0800	0900		Zambia, Christian Voice	9865do					
0800	0900	vi	Zambia, National BC Corp	6165do	6265do				
0800	0900	vi	Zimbabwe, Zimbabwe BC Corp	5975do	6045do				
0810	0830	s	Armenia, Voice of	4810eu	15270eu				
0815	0900		Guam, KTWR/ Trans World R	15200as	15330as				
0815	0900	f	Seychelles, FEBA Radio	15460as					
0830	0900	vi	Australia, ABC/Alice Springs	2310do					
0830	0900	vi	Australia, ABC/Katherine	2485do					
0830	0900	vi	Australia, ABC/Tennant Creek	2325do					
0830	0900		Australia, Radio	5995pa	9710pa	12080pa	13605pa		
				15240pa	15415as	17750as	21725pa		
0830	0900		Austria, AWR Europe	17780af					
0830	0900		Georgia, Georgian Radio	11910me					
0830	0900		Italy/Adv World Radio Europe	9610eu					
0830	0900		Lithuania, Radio Vilnius	9710eu					
0830	0900		Switzerland, Swiss R International	21770af					
0855	0900	s	Taiwan, CBS	11725as					

0900 UTC - 5AM E / 4AM C / 2AM P

0900	0915	vi	Ghana, Ghana BC Corp	3366do	4915do				
0900	0929		Czech Rep, Radio Prague Intl	21745as					
0900	0930		Australia, Radio	11880as	13605pa	15240as	21820as		
0900	0930		Guam, KTWR/ Trans World R	15330as					
0900	0930		UK, BBC World Service	6190af	6195as	9605as	9740as		
				11760me	11940af	11945as	12095eu		
				15190sa	15310as	15360as	15400af		
				15485eu	15565eu	15575as	17640eu		
				17655as	17760as	17790as	17830af		
				17885af	21470af	21660as			
0900	0945		Germany, Deutsche Welle	6140eu	6160pa	12035af	15410af		
				15470as	17715pa	17770pa	17800af		

Shortwave Guide



0900	1000	USA, KAIJ Dallas TX	13362va	16847va			
0900	1000	USA, KTBN Salt Lake City UT	5755va				
0900	1000	USA, KWHR Naalehu HI	7510na				
0900	1000	USA, Voice of America	11565pa	17780as			
0900	1000	USA, WEWN Birmingham AL	11930as	13610as	15150as		
0900	1000	USA, WHRA Greenbush ME	5825na				
0900	1000	USA, WHRI Noblesville IN	11730af				
0900	1000	USA, WJCR Upton KY	5745va	7315am			
0900	1000	USA, WRMI Miami FL	7490am	13595as			
0900	1000	USA, WSHB Cypress Crk SC	9955am				
0900	1000	USA, WTJC Newport NC	9455eu	9860eu	11615eu		
0900	1000	USA, WWCR Nashville TN	9370na				
0900	1000	Vanuatu, Radio	2390na	5070na	5935na	7435na	
0900	1000	Vatican City, Vatican Radio	3945do	4960do	7260do		
0900	1000	Zambia, Christian Voice	5885eu				
0900	1000	Zambia, National BC Corp	9865do	6265do			
0900	1000	Zimbabwe, Zimbabwe BC Corp	6165do	6265do			
0910	0920	Greece, Voice of	5975do	6045do			
0915	1000	Ghana, Ghana BC Corp	12105eu	15630eu			
0915	1000	Ghana, Ghana BC Corp	6130do	4915do			
0930	1000	Ghana, Ghana BC Corp	4915do	4915do			
0930	1000	Australia, Radio	11880as	13605pa	15240as	17750as	
			21820as				
0930	1000	Netherlands, Radio	9790as	12065as	13710as		
0945	1000	Germany, Deutsche Welle	6140eu				

1000	1100	USA, WEWN Birmingham AL	15240as	15425as			
1000	1100	USA, WHRI Noblesville IN	7425na	15745eu			
1000	1100	USA, WJCR Upton KY	6040na	9495am			
1000	1100	USA, WRMI Miami FL	7490am	13595as			
1000	1100	USA, WRNO New Orleans LA	9955am				
1000	1100	USA, WSHB Cypress Crk SC	7395am				
1000	1100	USA, WTJC Newport NC	6095am	9455sa	11870as		
1000	1100	USA, WWCR Nashville TN	9370na				
1000	1100	USA, WYFR Okeechobee FL	5070na	5935na	7435na	9475na	
1000	1100	Vanuatu, Radio	5950na				
1000	1100	Zambia, Christian Voice	3945do	4960do	7260do		
1000	1100	Zambia, National BC Corp	9865do				
1000	1100	Zimbabwe, Zimbabwe BC Corp	6165do	6265do			
1000	1100	Zimbabwe, Zimbabwe BC Corp	5975do	6045do			
10000	1030	Switzerland, Swiss R International	15315eu				
1030	1035	Israel, Kol Israel	15640va	17545va			
1030	1045	Ethiopia, Radio	5990do	7110do	9705do		
1030	1100	Guam, KSDA/ Adventist World R	11560as				
1030	1100	Malaysia, RTM Sarawak	7160do				
1030	1100	Mongolia, Voice of	12085eu				
1030	1100	Netherlands, Radio	6045eu	9760as	9860eu	12065as	
			13710as				
1030	1100	Palau, KHBN/Voice of Hope	9965as	15725as			
1030	1100	Sri Lanka, Sri Lanka BC Corp	4940do	11835as	15120as	17850as	
1030	1100	UAE, Radio Dubai	13675eu	15370eu	15395eu		

1000 UTC - 6AM E / 5AM C / 3AM P

1000	1027	Vietnam, Voice of	12019as	15115as			
1000	1030	Guam, KSDA/ Adventist World R	11560as	11705as			
1000	1030	Netherlands, Radio	9790as	12065as	13710as		
1000	1030	Palau, KHBN/Voice of Hope	15725as				
1000	1030	Singapore, RTE Radio	11685au				
1000	1030	Sri Lanka, Sri Lanka BC Corp	4940do				
1000	1100	Anguilla, Caribbean Beacon	11775am				
1000	1100	Australia, ABC/Alice Springs	2310do				
1000	1100	Australia, ABC/Katherine	2485do				
1000	1100	Australia, ABC/Tennant Creek	2325do				
1000	1100	Australia, Christian Voice	13775as	17825as			
1000	1100	Australia, Radio	11880as	13605pa	15240as	17750as	
			21820as				
1000	1100	Bhutan, Bhutan BC Service	6035do				
1000	1100	Botswana, Radio	7255do	9600do	7255do		
1000	1100	Canada, CFRX Toronto ON	6070do				
1000	1100	Canada, CFVP Calgary AB	6030do				
1000	1100	Canada, CHNX Halifax, NS	6130do				
1000	1100	Canada, CKZN St John's NF	6160do				
1000	1100	Canada, CKZU Vancouver BC	6160do				
1000	1100	China China Radio International	11730pa	15210pa			
1000	1100	Costa Rica, R for Peace Intl	7455irr	15049va			
1000	1100	Costa Rica, University Network	5030am	6150am	7375am	9724sa	
			11870am	13749na	17645as		
			11755pa	21455usb			
1000	1100	Ecuador, HCJB	15185af				
1000	1100	Eq Guinea, Radio Africa	15185af				
1000	1100	Eq Guinea, Radio East Africa	15185af				
1000	1100	Finland, Scandv Weekend Radio	11690va				
1000	1100	Germany, Deutsche Welle	6140eu				
1000	1100	Germany, Sunshine Radio	6015eu				
1000	1100	Germany, Voice of Hope	21590me				
1000	1100	Ghana, Ghana BC Corp	6130do	4915do			
1000	1100	Ghana, Ghana BC Corp	4915do	4915do			
1000	1100	Guyana, Voice of	5949do				
1000	1100	India, All India Radio	11585as	13700au	15020as	17485au	
			17840au	17895au			
1000	1100	Italy, Italian Radio Relay Service	7120va				
1000	1100	Japan, Radio	9695pa	15590as	21755pa		
1000	1100	Jordan, Radio	11690eu				
1000	1100	Kenya, Kenya BC Corp	4885irr	4915irr	4885irr		
1000	1100	Lesotho, Radio	4800do				
1000	1100	Liberia, ELWA	4760do				
1000	1100	Liberia, R Liberia International	6100do				
1000	1100	Malaysia, Radio	7295do				
1000	1100	Namibia, Namibian BC Corp	7165af	7215af			
1000	1100	New Zealand, R New Zealand Int	9885pa				
1000	1100	New Zealand, ZLXA	3935do				
1000	1100	Nigeria, Radio/Enugu	6025do				
1000	1100	Nigeria, Radio/Ibadan	6050do				
1000	1100	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
1000	1100	Nigeria, Radio/Lagos	4990do	7285do			
1000	1100	Nigeria, Voice of	7255af	15120af			
1000	1100	Papua New Guinea, NBC	4890do	9675irr			
1000	1100	Sierra Leone, Sierra Leone BS	5980do				
1000	1100	Singapore, SBC Radio One	6150do				
1000	1100	Solomon Islands, SIBC	5020do				
1000	1100	Uganda, Radio	5026do	7110do	7196do		
1000	1100	UK, BBC World Service	6190af	6195va	9740as	11760me	
			11940af	12095eu	15310as	15360as	
			15485eu	15565eu	15575as	17640eu	
			17760as	17790as	17885af	21470af	
			21660as				
1000	1100	UK, BBC World Service	15190sa	15400af	17830af		
1000	1100	USA, Armed Forces Radio	4278va	4319va	4993va	5765va	
			6350va	6458va	6847va	10320va	
			10940va	12579va	12689va	13254va	
			13362va	16847va			
1000	1100	USA, KAIJ Dallas TX	5755va				
1000	1100	USA, KTBN Salt Lake City UT	7510na				
1000	1100	USA, KWHR Naalehu HI	9930as	11565pa			
1000	1100	USA, Voice of America	6165am	7370am	9590am	9770pa	

1100 UTC - 7AM E / 6AM C / 4AM P

1100	1105	New Zealand, R New Zealand Int	9885pa				
1100	1105	Pakistan, Radio	17520eu	21465eu			
1100	1120	Kazakhstan, Radio Almaty	9620eu	11840eu			
1100	1127	Vietnam, Voice of	7285as				
1100	1130	Australia, Radio	5995pa	6020pa	9475as	9580va	
			11650pa	11880as	12080va	13605va	
			15240as	21820as			
1100	1130	Netherlands, Radio	6045eu	9790as	9860eu	12065as	
			13710as				
1100	1130	Sri Lanka, Sri Lanka BC Corp	4940do	11835as	15210as	17850as	
1100	1130	UK, BBC Caribbean Report	6195ca	15220ca			
1100	1130	UK, BBC World Service	6195am	15190as	15220am		
1100	1130	Ukraine, R Ukraine International	12040eu	15135na			
1100	1145	Germany, Deutsche Welle	6140eu	11785af	15410af	17860af	
			21780af				
1100	1200	Anguilla, Caribbean Beacon	11775am				
1100	1200	Australia, ABC/Alice Springs	2310do				
1100	1200	Australia, ABC/Katherine	2485do				
1100	1200	Australia, ABC/Tennant Creek	2325do				
1100	1200	Australia, Christian Voice	13775as	17825as			
1100	1200	Botswana, Radio	7255do	9600do	7255do		
1100	1200	Bulgaria, Radio	15700eu	17500eu			
1100	1200	Canada, CBC Northern Service	9625do				
1100	1200	Canada, CFRX Toronto ON	6070do				
1100	1200	Canada, CFVP Calgary AB	6030do				
1100	1200	Canada, CHNX Halifax, NS	6130do				
1100	1200	Canada, CKZN St John's NF	6160do				
1100	1200	Canada, CKZU Vancouver BC	6160do				
1100	1200	Costa Rica, R for Peace Intl	7455irr	15049va			
1100	1200	Costa Rica, University Network	5030am	6150am	7375am	9724sa	
			11870am	13749na	17645as		
			11755pa	21455usb			
1100	1200	Ecuador, HCJB	12005am				
1100	1200	Eq Guinea, Radio Africa	15185af				
1100	1200	Eq Guinea, Radio East Africa	15185af				
1100	1200	Finland, Scandv Weekend Radio	11690va				
1100	1200	Germany, Sunshine Radio	6015eu				
1100	1200	Germany, Voice of Hope	21590me				
1100	1200	Ghana, Ghana BC Corp	6130do	4915do			
1100	1200	Ghana, Ghana BC Corp	4915do	4915do			
1100	1200	Guyana, Voice of	5949do				
1100	1200	Iran, VOIRI	15385as	15430as	15585as	21470as	
			21730as				
1100	1200	Italy, Italian Radio Relay Service	7120va				
1100	1200	Japan, Radio	6120na	9695pa	15590as		
1100	1200	Jordan, Radio	11690eu				
1100	1200	Kenya, Kenya BC Corp	4885irr	4915irr	4885irr		
1100	1200	Lesotho, Radio	4800do				
1100	1200	Liberia, ELWA	4760do				
1100	1200	Liberia, R Liberia International	6100do				
1100	1200	Malaysia, Radio	7295do				
1100	1200	Malaysia, TRM Sarawak	7160do				
1100	1200	Namibia, Namibian BC Corp	7165af	7215af			
1100	1200	New Zealand, ZLXA	3935do				
1100	1200	Nigeria, Radio/Enugu	6025do				
1100	1200	Nigeria, Radio/Ibadan	6050do				
1100	1200	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
1100	1200	Nigeria, Radio/Lagos	4990do	7285do			
1100	1200	Nigeria, Voice of	7255af	15120af			
1100	1200	Papua New Guinea, NBC	4890do	9675irr			
1100	1200	Sierra Leone, Sierra Leone BS	5980do				
1100	1200	Singapore, R Singapore Intl	6150as	9600as			
1100	1200	Switzerland, Swiss R International	13735as	21770as			
1100	1200	Taiwan, Voice of Asia	7445as				
1100	1200	Uganda, Radio	5026do	7110do	7196do		
1100	1200	UK, BBC World Service					

Shortwave Guide



1100	1200	USA, Armed Forces Radio	10940va 13362va 4278va 6350va 10940va 13362va	12579va 16847va 4319va 6458va 12579va 16847va	12689va 4993va 6847va 12689va	13254va 5765va 10320va 13254va
1100	1200	USA, KAIJ Dallas TX	5755va			
1100	1200	USA, KTBN Salt Lake City UT	7510na			
1100	1200	USA, KWHR Naalehu HI	9930as	11565pa		
1100	1200	USA, Voice of America	6160as 15160as	9645as 15425as	9760as 15425as	9770pa
1100	1200	USA, WEWN Birmingham AL	7425na	15745eu		
1100	1200	USA, WHRI Noblesville IN	6040na	9495am		
1100	1200	USA, WINB Red Lion PA	13750am			
1100	1200	USA, WJCR Upton KY	7490am	13595as		
1100	1200	USA, WRMI Miami FL	9955am			
1100	1200	USA, WRNO New Orleans LA	7395am			
1100	1200	USA, WSHB Cypress Crk SC	6095am	9455am	11590am	11660am
1100	1200	USA, WTJC Newport NC	9370na			
1100	1200	USA, WWCN Nashville TN	5070na	5935na	7435na	15685na
1100	1200	USA, WYFR Okeechobee FL	5850na	5950na		
1100	1200	Vanuatu, Radio	3945do	4960do	7260do	
1100	1200	Zambia, Christian Voice	9865do			
1100	1200	Zambia, National BC Corp	6165do	6265do		
1100	1200	Zimbabwe, Zimbabwe BC Corp	5975do	6045do		
1105	1200	New Zealand, R New Zealand Int	11675as			
1115	1145	Nepal, Radio	5005as	7165as		
1120	1140	Kazakhstan, Radio Almaty	9620eu	11840eu		
1130	1145	Libya, Voice of Africa	11815af	15435af	17725af	
1130	1200	Australia, Radio	5995pa 11650pa 21820as	6020pa 11880as	9475as 12080va	9580va 13605va
1130	1200	Austria, R Austria International	6155eu	13730eu		
1130	1200	Belgium, RVI Flanders R Intl	9865as	9925eu		
1130	1200	Belgium, RVI Flanders R Intl	9865as			
1130	1200	Netherlands, Radio	6045eu	9860eu		
1130	1200	South Korea, R Korea Intl	9650na			
1130	1200	Sri Lanka, Sri Lanka BC Corp	4940do			
1130	1200	Sweden, Radio	17505as	18960na		
1130	1200	Ukraine, R Ukraine International	15135na			
1130	1200	Vatican City, Vatican Radio	15595va	17515va		
1140	1200	Kazakhstan, Radio Almaty	9620eu	11840eu		
1145	1200	Germany, Deutsche Welle	6140eu			

1200 UTC - 8AM E / 7AM C / 5AM P

1200	1215	Somalia, Radio Galkayo	6985va			
1200	1220	UK, BBC Caribbean Report	6195ca	15220ca		
1200	1220	UK, BBC World Service	6195am	15220am		
1200	1225	Netherlands, Radio	6045eu	9860eu		
1200	1230	France, R France International	15540eu	25820af		
1200	1230	Iran, VOIRI	15385as	15430as	15585as	21470as
1200	1230	Philippines, FEBC	21730as			
1200	1230	Sri Lanka, Sri Lanka BC Corp	15110as			
1200	1230	Switzerland, Swiss R International	4940do			
1200	1230	Uzbekistan, Radio Toshkent	15315eu			
1200	1245	USA, WYFR Okeechobee FL	7285as	9715as	15295as	17775as
1200	1255	Poland, Radio Polonia	5850na	5950na	17750na	
1200	1256	North Korea, Voice of Korea	6095eu	7270eu	9525eu	11820eu
1200	1300	Anguilla, Caribbean Beacon	3560va	9640va	9850va	9975va
1200	1300	Australia, ABC/Alice Springs	11334va 11775am	13650va		
1200	1300	Australia, ABC/Katherine	2310do			
1200	1300	Australia, ABC/Tennant Creek	2485do			
1200	1300	Australia, Christian Voice	2325do			
1200	1300	Australia, Radio	13775as 13795as	13795as		
1200	1300	Bangladesh, Bangla Betor	5995pa 11650va	6020pa 11880as	9475as 21820	9580as oas
1200	1300	Botswana, Radio	7185as	9550as		
1200	1300	Brazil, Radio Nacional Bras	7255do	9600do	7255do	
1200	1300	Canada, CBC Northern Service	15445am			
1200	1300	Canada, CFRX Toronto ON	9625do			
1200	1300	Canada, CFVP Calgary AB	6070do			
1200	1300	Canada, CHNX Halifax, NS	6030do			
1200	1300	Canada, CKZN St John's NF	6130do			
1200	1300	Canada, CKZU Vancouver BC	6160do			
1200	1300	Canada, R Canada International	6160do			
1200	1300	Canada, R Canada International	9660as 9640am	15190as 15305am	17820am	
1200	1300	China, China Radio International	9730as 15415pa	9760pa 15115pa	11675pa	11980as
1200	1300	Costa Rica, R for Peace Intl	7455irr	21815usb		
1200	1300	Costa Rica, University Network	5030am 11870am	6150am 13749na	7375am 17645as	9724sa
1200	1300	Ecuador, HCJB	12005am	15115am	21455usb	
1200	1300	Eqt Guinea, Radio East Africa	15185af			
1200	1300	Finland, Scandv Weekend Radio	11720va			
1200	1300	Germany, Deutsche Welle	6140eu			
1200	1300	Germany, Sunshine Radio	6015eu			
1200	1300	Germany, Voice of Hope	15715me			
1200	1300	Ghana, Ghana BC Corp	4915do	6130do		
1200	1300	Guyana, Voice of	5949do			
1200	1300	Italy, Italian Radio Relay Service	7120va			
1200	1300	Jordan, Radio	11690eu			
1200	1300	Kenya, Kenya BC Corp	4885irr	4915irr	4885irr	
1200	1300	Lesotho, Radio	4800do			
1200	1300	Liberia, ELWA	4760do			
1200	1300	Liberia, R Liberia International	6100do			
1200	1300	Malaysia, Radio	7295do			

1200	1300	Namibia, Namibian BC Corp	7165af	7215af		
1200	1300	New Zealand, R New Zealand Int	11675as			
1200	1300	New Zealand, ZLXA	3935do			
1200	1300	Nigeria, Radio/Enugu	6025do			
1200	1300	Nigeria, Radio/Ibadan	6050do			
1200	1300	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
1200	1300	Nigeria, Radio/Lagos	4990do			
1200	1300	Palau, KHBN/Voice of Hope	9965as			
1200	1300	Papua New Guinea, NBC	4890do			
1200	1300	Sierra Leone, Sierra Leone BS	5980do			
1200	1300	Singapore, R Singapore Intl	6150as	9600as		
1200	1300	Taiwan, Radio Taipei International	7130as	9610au		
1200	1300	Uganda, Radio	7110do	7196do		
1200	1300	UK, BBC World Service	5026do 5965na 9815as 12095eu 15655eu 17830af	6190af 11760me 11940af 15310as 15485eu 21470af	9515as 9740as 11955as 15485eu 17700as	
1200	1300	USA, Armed Forces Radio	4278va 6350va 10940va	4319va 6458va 12579va	4993va 5765va 10320va	13254va
1200	1300	USA, KAIJ Dallas TX	13362va	16847va		
1200	1300	USA, KTBN Salt Lake City UT	13815va			
1200	1300	USA, KWHR Naalehu HI	7510na			
1200	1300	USA, Voice of America	9930as 6160as 15240as	9645as 15425as	9760as 15160as	
1200	1300	USA, WEWN Birmingham AL	7425na	15745eu		
1200	1300	USA, WHRI Noblesville IN	6040na	9495am		
1200	1300	USA, WINB Red Lion PA	13570am			
1200	1300	USA, WJCR Upton KY	7490am	13595as		
1200	1300	USA, WRMI Miami FL	9955am			
1200	1300	USA, WRNO New Orleans LA	7395am			
1200	1300	USA, WSHB Cypress Crk SC	6095am	9455am	9875as	11590am
1200	1300	USA, WTJC Newport NC	9370na	11660am		
1200	1300	USA, WWCN Nashville TN	9370na			
1200	1300	USA, WWFV McCaysville GA	7435na	12160na	13845na	15685na
1200	1300	Vanuatu, Radio	12172va			
1200	1300	Zambia, Christian Voice	3945do	4960do	7260do	
1200	1300	Zambia, National BC Corp	9865do			
1200	1300	Zimbabwe, Zimbabwe BC Corp	6165do	6265do		
1205	1210	Croatia, The Voice of Croatia	5975do	6045do		
1215	1300	Egypt, Radio Cairo	6165eu	9830eu	13830eu	
1230	1257	Vietnam, Voice of	17595as			
1230	1300	Finland, YLE/Radio F nland	12019as	15115as		
1230	1300	Germany, Overcomer Ministries	15400na	17670na		
1230	1300	Italy/Adv World Radio Europe	6110eu			
1230	1300	Sri Lanka, Sri Lanka BC Corp	9610eu	6005as	6075as	9770as
1230	1300	Sweden, Radio	4940do	15425as	18960na	21530as
1230	1300	Thailand, Radio	17505as	18960na	21530as	
1230	1300	Turkey, Voice of	9655as	9885as	11905as	
1230	1300	UK, Wales Radio Intl/Merlin	17810as	17830eu		
1245	1300	Seychelles, FEBA Rad o	17810au			
1245	1300	USA, WYFR Okeechobee FL	15535me			
1255	1300	Taiwan, CBS	17750na			
1255	1300	Taiwan, CBS	6180as	7250as	9630as	11725as

1300 UTC - 9AM E / 8AM C / 6AM P

1300	1305	New Zealand, R New Zealand Int	11675as			
1300	1320	Brazil, Radio Nacional Bras	15445am			
1300	1329	Czech Rep, Radio Prague Intl	13580do	21745as		
1300	1330	Australia, Radio	5995pa 11650va	6020pa 11880as	9475as 21820as	9580va
1300	1330	Egypt, Radio Cairo	11650va			
1300	1330	Germany, Universal L fe	17595as			
1300	1330	Guam, KSDA/ Adventist World R	9955na			
1300	1330	Turkey, Voice of	15385as			
1300	1400	Anguilla, Caribbean Beacon	17810as	17830eu		
1300	1400	Australia, ABC/Alice Springs	11775am			
1300	1400	Australia, ABC/Katherine	2310do			
1300	1400	Australia, ABC/Tennant Creek	2485do			
1300	1400	Australia, Christian Voice	2325do			
1300	1400	Botswana, Radio	13775as 13795as	13795as	13795as	9600do
1300	1400	Canada, CBC Northern Service	7255do			
1300	1400	Canada, CFRX Toronto ON	9625do			
1300	1400	Canada, CFVP Calgary AB	6070do			
1300	1400	Canada, CHNX Halifax, NS	6030do			
1300	1400	Canada, CKZN St John's NF	6130do			
1300	1400	Canada, CKZU Vancouver BC	6160do			
1300	1400	Canada, R Canada International	6160do			
1300	1400	Canada, R Canada International	9640am	15305am	17820am	
1300	1400	China, China Radio International	9730as 15415pa	9760pa 15115pa	11675pa	11980as
1300	1400	Costa Rica, R for Peace Intl	7455irr	21815usb		
1300	1400	Costa Rica, University Network	5030am 11870am	6150am 13749na	7375am 17645as	9724sa
1300	1400	Ecuador, HCJB	12005am	15115am	21455usb	
1300	1400	Eqt Guinea, Radio East Africa	15185af			
1300	1400	Finland, Scandv Weekend Radio	11720va			
1300	1400	Germany, Deutsche Welle	6140eu			
1300	1400	Germany, Sunshine Radio	6015eu			
1300	1400	Germany, Voice of Hope	15715me			
130						

Shortwave Guide



1300	1400	vl	Ghana, Ghana BC Corp	4915do	6130do			
1300	1400		Guyana, Voice of	5949do				
1300	1400	as/vl	Italy, Italian Radio Relay Service	7120va				
1300	1400		Jordan, Radio	11690eu				
1300	1400		Kenya, Kenya BC Corp	4885srr	4915srr	4885srr		
1300	1400	vl	Lesotho, Radio	4800do				
1300	1400	vl	Liberia, ELWA	4760do				
1300	1400	vl	Liberia, R Liberia International	6100do				
1300	1400		Malaysia, Radio	7295do				
1300	1400		Namibia, Namibian BC Corp	7165af	7215af			
1300	1400		New Zealand, ZLXA	3935do				
1300	1400	vl	Nigeria, Radio/Enugu	6025do				
1300	1400	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
1300	1400	vl	Nigeria, Radio/Lagos	4990do	7285do			
1300	1400		Palau, KHBN/Voice of Hope	9965as				
1300	1400	vl	Papua New Guinea, NBC	4890do	9675srr			
1300	1400	as	S Africa, Channel Africa	11720af	17780af	21725af		
1300	1400		Sierra Leone, Sierra Leone BS	5980do				
1300	1400		Singapore, R Singapore Intl	6150as	9600as			
1300	1400		South Korea, R Korea Intl	9570as	13670om			
1300	1400		Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	9770as	
				15425as				
1300	1400		Uganda, Radio	4976do	5026do			
1300	1400		UK, BBC World Service	5965na	6190af	9515na	9740as	
				9815as	11760me	11865na	11940af	
				12095eu	15310as	15420af	15485eu	
				15565eu	15575eu	17640eu	17700as	
				17830af	17885af	21470af		
1300	1400		USA, Armed Forces Radio	4278va	4319va	4993va	5765va	
				6350va	6458va	6847va	10320va	
				10940va	12579va	12689va	13254va	
				13362va				
1300	1400		USA, KAIJ Dallas TX	13815va				
1300	1400		USA, KJES Vado NM	11715na				
1300	1400		USA, KNLS Anchor Point AK	11870as				
1300	1400		USA, KTBN Salt Lake City UT	7510na				
1300	1400		USA, KWHR Naalehu HI	9930as	11565pa			
1300	1400		USA, Voice of America	6160as	9645as	9760as	15160as	
				15425as				
1300	1400	a	USA, WBCQ Monticello ME	17495no				
1300	1400		USA, WEWN Birmingham AL	11875na				
1300	1400		USA, WHRI Noblesville IN	6040na	15105am			
1300	1400		USA, WINB Red Lion PA	13570am				
1300	1400		USA, WJCR Upton KY	7490am	13595as			
1300	1400	mtwhfa	USA, WRMI Miami FL	15724no				
1300	1400	s	USA, WRMI Miami FL	9955am				
1300	1400		USA, WRNO New Orleans LA	7395am				
1300	1400		USA, WSHB Cypress Crk SC	9430no	9455om	9940as		
1300	1400		USA, WTJC Newport NC	9370na				
1300	1400		USA, WWCR Nashville TN	9475na	12160na	13845na	15685na	
1300	1400		USA, WWVF McCaysville GA	12172va				
1300	1400		USA, WYFR Okeechobee FL	11550as	11830na	11970na	17750na	
1300	1400		Zambia, Christian Voice	9865do				
1300	1400	vl	Zambia, National BC Corp	6165do	6265do			
1300	1400	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do			
1305	1400	occsnal	New Zealand, R New Zealand Intl	6095pa				
1325	1400		Germany, Voice of Hope	17550as				
1330	1357		Vietnam, Voice of	9730eu	11630eu	13740eu		
1330	1400		Australia, Radio	5995pa	6020pa	9475as	9580va	
				11650va	11660as	21820as		
1330	1400	s	Austria, R Austria International	6155eu	13730eu	21789as		
1330	1400		Guam, KSDA/ Adventist World R	11705as	11980as			
1330	1400		India, All India Radio	9690as	11620as	13710as		
1330	1400		Sweden, Radio	17505va	18960na			
1330	1400		UAE, Radio Dubai	13630eu	13675eu	15395eu	21605eu	
1330	1400		Uzbekistan, Radio Toshkent	7285as	9715as	15295as	17775as	

1400 UTC - 10AM E / 9AM C / 7AM P

1400	1430		Ecuador, HCJB	12005am	15115am	21455usb		
1400	1430		Guam, KSDA/ Adventist World R	17720as				
1400	1430		Thailand, Radio	9655as	9830as	11905as		
1400	1430	as	UK, BBC World Service	15425as				
1400	1430	s	USA, Voice of America	18275va				
1400	1456		Romania, R Romania International	15250eu	17735eu			
1400	1500		Anguilla, Caribbean Beacon	11775am				
1400	1500	vl	Australia, ABC/Alice Springs	2310do				
1400	1500	vl	Australia, ABC/Katherine	2485do				
1400	1500	vl	Australia, ABC/Tennant Creek	2325do				
1400	1500		Australia, Christian Voice	13730as	13795as			
1400	1500		Australia, Radio	5995va	9580va	11660as		
1400	1500	vl	Batswana, Radio	7255do	9600do	7255do		
1400	1500	vl	Cameroon, CRTV Radio Buea	6005do				
1400	1500		Canada, CBC Northern Service	9625do				
1400	1500		Canada, CFRX Toronto ON	6070do				
1400	1500		Canada, CFVP Calgary AB	6030do				
1400	1500		Canada, CHNX Halifax, NS	6130do				
1400	1500		Canada, CKZN St John's NF	6160do				
1400	1500		Canada, CKZU Vancouver BC	6160do				
1400	1500		Canada, R Canada International	9640am	15305na			
1400	1500	mtwhf	Canada, R Canada International	17820om				
1400	1500	as	Canada, R Canada International	17800am				
1400	1500		China China Radio International	7180as	7405na	9700as	11675as	
				11765as	13685af	15125af		
1400	1500		China, Voice of Hope	13820as				
1400	1500		Costa Rica, R for Peace Intl	15049srr	21815usb			
1400	1500		Costa Rica, University Network	5030am	6150am	7375am	9724so	
				11870am	13749na	17645as		
1400	1500	as/vl	Eq Guinea, Radio East Africa	15185af				

1400	1500	a/monthly	Finland, Scandv Weekend Radio	11720va				
1400	1500		France R France International	11610me	17620as			
1400	1500		Germany, Deutsche Welle	6140eu				
1400	1500	as	Germany, Overcomer Ministries	17490eu				
1400	1500		Germany, Overcomer Ministries	6110eu	13810af			
1400	1500		Germany, Voice of Hope	15715me	17550as			
1400	1500	vl	Ghana, Ghana BC Corp	4915do	6130do			
1400	1500		Guyana, Voice of	5949do				
1400	1500		India, All India Radio	6099as	11620as	13710as		
1400	1500	os/vl	Italy, Italian Radio Relay Service	7120va				
1400	1500		Japan, Radio	7200pa	9505na	11730as	17755me	
1400	1500		Jordan, Radio	11690na	17680al			
1400	1500		Kenya, Kenya BC Corp	4885srr	4915srr	4885srr		
1400	1500	vl	Lesotho, Radio	4800do				
1400	1500	vl	Liberia, ELWA	4760do				
1400	1500	vl	Liberia, R Liberia International	6100do				
1400	1500		Malaysia, Radio	7295do				
1400	1500		Malaysia, RTM Sarawak	7160do				
1400	1500		Namibia, Namibian BC Corp	7165af	7215af			
1400	1500	occsnal	New Zealand, R New Zealand Intl	6095pa				
1400	1500		New Zealand, ZLXA	3935do				
1400	1500	vl	Nigeria, Radio/Enugu	6025do				
1400	1500	vl	Nigeria, Radio/Ibadan	6050do				
1400	1500	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
1400	1500	vl	Nigeria, Radio/Lagos	4990do	7285do			
1400	1500		Oman, Radio Sultanate of	15140va				
1400	1500		Palau, KHBN/Voice of Hope	9965as				
1400	1500	as	Russia, Voice of Russia WS	9495as	12055as	15510as		
1400	1500		S Africa, Channel Africa	11720af	17780af	21725af		
1400	1500		Sierra Leone, Sierra Leone BS	5980do				
1400	1500		Singapore, SBC Radio One	6150do				
1400	1500		Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	9770as	
				15425as				
1400	1500		Switzerland, Swiss R International	9575as	17680as			
1400	1500		Taiwan, Radio Taipei International	15125as				
1400	1500		Uganda, Radio	4976do	5026do			
1400	1500		UK, BBC World Service	6190af	6195as	9515na	9740as	
				9815as	11865na	11940af	12095eu	
				15220na	15310as	15485eu	15565eu	
				15575me	17640eu	17700as	17830af	
				17840am	21470af	21660af		
1400	1500		USA, Armed Forces Radio	4278va	4319va	4993va	5765va	
				6350va	6458va	6847va	10320va	
				10940va	12579va	12689va	13254va	
				13362va				
1400	1500		USA, KAIJ Dallas TX	13815va				
1400	1500		USA, KJES Vado NM	11715na				
1400	1500		USA, KTBN Salt Lake City UT	7510na				
1400	1500		USA, KWHR Naalehu HI	9930as	11565pa			
1400	1500		USA, Voice of America	6160as	7125as	9645as	9760as	
				15160as	15255va	15425as		
1400	1500		USA, WBCQ Monticello ME	17495na				
1400	1500		USA, WEWN Birmingham AL	11875na				
1400	1500		USA, WHRI Noblesville IN	6040na	15105am			
1400	1500		USA, WINB Red Lion PA	13570am				

Shortwave Guide



1500	1600	China, Voice of Hope	15125af						
1500	1600	Costa Rica, R for Peace Intl	13820as						
1500	1600	Costa Rica, University Network	15049irr	21815usb					
			5030am	6150am	7375am	9724sa			
			11870am	13749na	17645as				
1500	1600	as/vl	Eqt. Guinea, Radio East Africa	15185af					
1500	1600	a/monthly	Finland, Scandy Weekend Radio	11720va					
1500	1600		Germany, Deutsche Welle	6140eu					
1500	1600	os	Germany, Overcomer Ministries	17490eu					
1500	1600		Germany, Overcomer Ministries	5110eu	13810af				
1500	1600		Germany, Voice of Hope	15715me					
1500	1600	vl	Ghana, Ghana BC Corp	4915do	6130do				
1500	1600		Guam, KTWR/ Trans World R	15330as					
1500	1600		Guyana, Voice of	5949do					
1500	1600		Japan, Radio	7200pa	9750os	11730as			
1500	1600		Jordan, Radio	11690na	17680al				
1500	1600		Kenya, Kenya BC Corp	4885irr	4915irr	4885irr			
1500	1600	vl	Lesotho, Radio	4800do					
1500	1600	vl	Liberia, ELWA	4760do					
1500	1600	vl	Liberia, R Liberia International	6100do					
1500	1600		Malaysia, Radio	7295do					
1500	1600		Malaysia, RTM Kota Kinabalu	5980do					
1500	1600		Malaysia, RTM Sarawak	7160do					
1500	1600		Myanmar, Radio	5985do					
1500	1600		Namibia, Namibian BC Corp	7165af	7215af				
1500	1600		Netherlands, Radio	9890as	11835as	12075as			
1500	1600	occnsa	New Zealand, R New Zealand Int	6095pa					
1500	1600		New Zealand, ZLX	3935do					
1500	1600	vl	Nigeria, Radio/Enugu	6025do					
1500	1600	vl	Nigeria, Radio/Ibadan	6050do					
1500	1600	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do		
1500	1600	vl	Nigeria, Radio/Lagos	4990do	7285do				
1500	1600	vl	Nigeria, Voice of	7255af	15120af				
1500	1600		Russia, Voice of Russia WS	4940me	4965me	4975me	7325me		
				9730eu	11500os	11985me			
1500	1600		Sierra Leone, Sierra Leone BS	5980do					
1500	1600		Singapore, SBC Radio One	6150do					
1500	1600		Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	9770as		
				15425as					
1500	1600		Uganda, Radio	4976do	5026do				
1500	1600		UK, BBC World Service	5975as	6190af	6195as	9515na		
				9740as	9815as	11860af	11865na		
				11940af	12095af	12095eu	15220na		
				15310as	15400af	15420af	15485eu		
				15565eu	17700as	17830af	17840am		
				21470af	21490af	21660af			
1500	1600	s	UK, Merlin Network One	6175eu					
1500	1600		USA, Armed Forces Radio	4278va	4319va	4993va	5765va		
				6350va	6458va	6847va	10320va		
				10940va	12579va	12689va	13254va		
				13362va	16847va				
1500	1600		USA, KAJI Dallas TX	13815va					
1500	1600		USA, KTBN Salt Lake City UT	15590na					
1500	1600		USA, KWHR Naalehu HI	9930as	11565pa				
1500	1600		USA, Voice of America	7125as	9645as	9700me	15205eu		
				15255vo					
1500	1600		USA, WBCQ Monticello ME	17495na					
1500	1600		USA, WEWN Birmingham AL	11875na					
1500	1600		USA, WHRA Greenbush ME	17650af					
1500	1600		USA, WHRI Noblesville IN	13760va	15105am				
1500	1600		USA, WINB Red Lion PA	13570am					
1500	1600		USA, WJCR Upton KY	7490am	13595as				
1500	1600	mtwhfa	USA, WRMI Miami FL	15724na					
1500	1600	s	USA, WRMI Miami FL	9955am					
1500	1600		USA, WRNO New Orleans LA	7395am	15420al				
1500	1600		USA, WTJC Newport NC	9370na					
1500	1600		USA, WWCR Nashville TN	9475na	12160na	13845na	15685na		
1500	1600		USA, WWFV McCaysville GA	12172va					
1500	1600		USA, WYFR Okeechobee FL	5280as	11830no	17750na			
1500	1600		Zambia, Christian Voice	4965do					
1500	1600	vl	Zambia, National BC Corp	6165do	6265do				
1500	1600	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do				
1530	1545		Alghanistan, Voice of Shari'ah	7002irr	7083as				
1530	1545		Seychelles, FEBA Radio	11600as					
1530	1600		Australia, Radio	5995va	9475as	9580va	11650va		
				11660as					
1530	1600		Austria, AWR Europe	7165eu	17660os				
1530	1600		Austria, R Austria International	6155eu	13730eu	17865na			
1530	1600	vl	Botswana, Radio	3356do	4820do	7255do			
1530	1600		Georgia, Georgian Radio	6180me					
1530	1600		Iran, VOIRI	7245as	9635as	11775na			
1530	1600	mtwhf	S Africa, World Beacon	6145af					
1545	1600	mtwh a	Seychelles, FEBA Radio	11600os					
1550	1600		Vatican City, Vatican Radio	12065au	13765au	15235au			

1600 UTC - 12PM E / 11AM C / 9AM P

1600	1610	Vatican City, Vatican Radio	12065ou	13765ou	15235ou				
1600	1615	Pakistan, Radio	11570me	15100of	15725af	17720of			
1600	1625	Netherlands, Radio	9890as	11835as	12075as				
1600	1627	Czech Rep, Radio Prague Intl	5930eu	21745af					
1600	1630	Iran, VOIRI	7245as	9635as	11775as				
1600	1630	Israel, Kol Israel	15615va	15640va	17545va	21670va			
1600	1630	Jordan, Radio	11690na	17680al					
1600	1630	Mexico, R Mexico International	9705am	11770om					
1600	1630	S Africa, Channel Africa	9525af						
1600	1630	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do				
1600	1640		UAE, Radio Dubai	13630eu	13675eu	15395eu	21605eu		
1600	1645		Germany, Deutsche Welle	6140eu	6170as	7225as	9735af		
1600	1650	occnsal	New Zealand, R New Zealand Int	6095pa					
1600	1656		North Korea, Voice of Korea	3560va	6520va	9660va	9975va		
1600	1700		Algeria, R Algiers International	11715va	15160va				
1600	1700		Anguilla, Caribbean Beacon	11775am					
1600	1700	vl	Australia, ABC/Alice Springs	2310do					
1600	1700	v	Australia, ABC/Katherine	2485do					
1600	1700	vi	Australia, ABC/Tennant Creek	2325do					
1600	1700		Australia, Christian Voice	13730os	13795as				
1600	1700		Australia, Radio	5995va	9475as	9580va	11650va		
				11660as					
1600	1700	vl	Botswana, Radio	3356do	4820do	7255do			
1600	1700		Canada, CBC Northern Service	9625do					
1600	1700		Canada, CFRX Toronto ON	6070do					
1600	1700		Canada, CFPV Calgary AB	6030do					
1600	1700		Canada, CHNX Halifax, NS	6130do					
1600	1700		Canada, CKZN St John's NF	6160do					
1600	1700		Canada, CKZV Vancouver BC	6160do					
1600	1700		China China Radio International	7190af	13650af				
1600	1700		Costa Rica, R for Peace Intl	15049irr	21815usb				
1600	1700		Costa Rica, University Network	5030am	6150am	7375am	9724sa		
				11870am	13749na				
1600	1700		Ethiopia, Radio	7165af	9560af				
1600	1700	a/monthly	Finland, Scandy Weekend Radio	11690va					
1600	1700		France R France International	11615af	11995af	12015af	15605af		
				17605af					
1600	1700	a	Germany, Good News World R	15105af					
1600	1700	as	Germany, Overcomer Ministries	17490eu					
1600	1700	vl	Ghana, Ghana BC Corp	4915do	6130do				
1600	1700	o	Greece, Voice of	9420eu	15630eu	17705na			
1600	1700		Guam, KSDA/ Adventist World R	11850as					
1600	1700		Guyana, Voice of	5949do					
1600	1700		Kenya, Kenya BC Corp	4885irr	4915irr	4885irr			
1600	1700	vl	Lesotho, Radio	4800do					
1600	1700	vl	Liberia, ELWA	4760do					
1600	1700	vl	Liberia, R Liberia International	6100do					
1600	1700		Malaysia, Radio	7295do					
1600	1700		Namibia, Namibian BC Corp	7165af	7215af				
1600	1700		New Zealand, ZLX	3935do					
1600	1700	vl	Nigeria, Radio/Enugu	6025do					
1600	1700	vl	Nigeria, Radio/Ibadan	6050do					
1600	1700	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do		
1600	1700	vl	Nigeria, Radio/Lagos	3326do	4990do				
1600	1700	vl	Nigeria, Voice of	7255af	15120af				
1600	1700		Russia, Voice of Russia WS	9875os	11985me	12065as	15540me		
1600	1700		S Africa, World Beacon	6145af					
1600	1700		Sierra Leone, Sierra Leone BS	5980do					
1600	1700		South Korea, R Korea Intl	5975om					

Shortwave Guide



1630	1700	vl	Zimbabwe, Zimbabwe BC Corp	4828do	6045do		
1645	1700		Germany, Deutsche Welle	6140eu			
1650	1700	mtwhf	New Zealand, R New Zealand Int	6095as			

1700 UTC - 1PM E / 12PM C / 10AM P

1700	1727		Czech Rep, Radio Prague Int	5930eu	21745af		
1700	1727		Vietnam, Voice of	12070eu			
1700	1730		Azerbaijan, Voice of	6110eu	9155eu		
1700	1730		France R France International	15605af	17605af		
1700	1730		Germany, Overcomer Ministries	6110eu			
1700	1730		S Africa, Channel Africa	17870af			
1700	1755		Poland, Radio Polonia	6000eu	7285eu		
1700	1756		Romania, R Romania International	11740eu	15365eu	15380eu	17805eu
1700	1800		Anguilla, Caribbean Beacon	11775am			
1700	1800	vl	Australia, ABC/Alice Springs	2310do			
1700	1800	vl	Australia, ABC/Katherine	2485do			
1700	1800	vl	Australia, ABC/Tennant Creek	2325do			
1700	1800		Australia, Christian Voice	9720as	11890as		
1700	1800		Australia, Radio	5995va	9475as	9580va	9655va
				9815as	11880va		
1700	1800	vl	Botswana, Radio	3356do	4820do	7255do	
1700	1800		Canada, CBC Northern Service	9625do			
1700	1800		Canada, CFRX Toronto ON	6070do			
1700	1800		Canada, CFVP Calgary AB	6030do			
1700	1800		Canada, CHNX Halifax, NS	6130do			
1700	1800		Canada, CKZN St John's NF	6160do			
1700	1800		Canada, CKZU Vancouver BC	6160do			
1700	1800		China China Radio International	7150af	9570af	9670af	9695af
				11910af			
1700	1800		Costa Rica, R for Peace Int	15049irr	21815usb		
1700	1800		Costa Rica, University Network	5030am	6150am	7375am	9724sa
				11870am	13749na	17645as	
1700	1800		Egypt, Radio Cairo	15255af			
1700	1800	mtwhf	Eqt Guinea, Radio Africa	15185af			
1700	1800	a/monthly	Finland, Scandv Weekend Radio	11690va			
1700	1800		Germany, Deutsche Welle	6140eu			
1700	1800	a	Germany, Good News World R	11795me			
1700	1800	a	Germany, Overcomer Ministries	17490eu			
1700	1800		Germany, Voice of Hope	9495eu			
1700	1800		Germany, Unt Methodist Church	13820af	15485af		
1700	1800	vl	Ghana, Ghana BC Corp	3366do	4915do		
1700	1800		Guyana, Voice of	5949do			
1700	1800	vl	Italy, Italian Radio Relay Service	3985va			
1700	1800		Japan, Radio	9505na	11970eu	15355of	
1700	1800		Kenya, Kenya BC Corp	4885irr	4915irr	4885irr	
1700	1800	vl	Lesotho, Radio	4800do			
1700	1800	vl	Liberia, ELWA	4760do			
1700	1800	vl	Liberia, R Liberia International	6100do			
1700	1800		Namibia, Namibian BC Corp	3270af	3289af		
1700	1800	mtwhf	New Zealand, R New Zealand Int	6095as			
1700	1800		New Zealand, ZLXA	3935do			
1700	1800	vl	Nigeria, Radio/Enugu	6025do			
1700	1800	vl	Nigeria, Radio/Ibadan	6050do			
1700	1800	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
1700	1800	vl	Nigeria, Radio/Lagos	3326do	4990do		
1700	1800	as	Russia, Voice of Russia WS	7420eu	9480eu	9820eu	
1700	1800		Russia, Voice of Russia WS	9495af	9685eu	9775eu	9890eu
				11510af	11985af		
1700	1800		S Africa, World Beacon	6145af			
1700	1800		Sierra Leone, Sierra Leone BS	5980do			
1700	1800		Sri Lanka, Sri Lanka BC Corp	4940irr			
1700	1800	vl	Sudan, Radio Omdurman	7199do	9200do	9505do	
1700	1800		Uganda, Radio	4976do	5026do		
1700	1800		UK, BBC World Service	3255af	3915as	5975as	6005af
				6190af	6195eu	7160as	9410eu
				9510as	9630af	9740as	12095eu
				15400af	15420af	15485eu	15575me
				17830af	17840no	21470af	
1700	1800	as	UK, Merlin Network One	11540as			
1700	1800		UK, World Beacon	15455eu			
1700	1800		USA, Armed Forces Radio	4278va	4319va	4993va	5765va
				6350va	6458va	6847va	10320va
				10940va	12579va	12689va	13254va
				13362va	16847va		
1700	1800		USA, KAIJ Dallas TX	13815va			
1700	1800		USA, KTBN Salt Lake City UT	15590na			
1700	1800		USA, KWHR Naalehu HI	9930as			
1700	1800		USA, Voice of America	6160as	7125as	7170as	9645as
				9700me	9760af	15255va	15410af
				15445af	17895af		
1700	1800	mtwhf	USA, Voice of America	5990as	6045as	7215as	9550as
				9770as	9785as		
1700	1800		USA, WBCQ Monticello ME	17495na			
1700	1800		USA, WEWN Birmingham AL	11875na	13615na	15745eu	
1700	1800		USA, WHRA Greenbush ME	17650af			
1700	1800		USA, WHRI Noblesville IN	9495am	13760va		
1700	1800		USA, WINB Red Lion PA	13570am			
1700	1800		USA, WJCR Upton KY	7490am	13595as		
1700	1800		USA, WMLK Bethel PA	15265eu			
1700	1800	mtwhf	USA, WRMI Miami FL	15724na			
1700	1800		USA, WRNO New Orleans LA	7395om	15420af		
1700	1800		USA, WSHB Cypress Crk SC	18910of			
1700	1800		USA, WTJC Newport NC	9370na			
1700	1800		USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
1700	1800		USA, WWFV McCaysville GA	12172va			
1700	1800		USA, WYFR Okeechobee FL	13855af	18980eu	21455eu	
1700	1800		Zambia, Christian Voice	4965do			
1700	1800	vl	Zambia, National BC Corp	6165do	6265do		

1700	1800	vl	Zimbabwe, Zimbabwe BC Corp	4828do	6045do		
1725	1740		Germany, Trans World Radio	5855eu			
1725	1745	mtwhf	UK, United Nations Radio	6125af	15265me	17580af	
1730	1745	vl	Libya, Voice of Africa	11815af	15435af	17725af	
1730	1745		Swaziland, Trans World Radio	9500af			
1730	1745	mtwhf	Swaziland, Trans World Radio	3200af			
1730	1800		Belgium, RVI Flanders R Intl	5910eu	9925eu	13770eu	
1730	1800		Georgia, Georgian Radio	6230eu			
1730	1800	as a	Georgia, Georgian Radio	6080as			
1730	1800		Guam, KSDA/ Adventist World R	11965as			
1730	1800		Netherlands, Radio	6020af	7120af	11655af	
1730	1800		Philippines, Radyo Pilipinas	11720pa	15190pa	17720pa	
1730	1800		S Africa, Adv World Radio Africa	12130af			
1730	1800	mtwhfa	Sweden, Radio	6065va			
1730	1800	s	Sweden, Radio	13580eu			
1730	1800		Switzerland, Swiss R International	15220af	17640af	21720af	
1730	1800		Vatican City, Vatican Radio	13765af	15570af	17515af	
1735	1745	vl/th	Paraguay, Radio Nacional	9739sa			
1745	1800		Bangladesh, Bangla Betar	7185eu	9550eu	15520eu	
1745	1800		India, All India Radio	7410eu	9950as	11620eu	11935as
				13750af	15200af	17670af	
1745	1800		Swaziland, Trans World Radio	3200af			
1745	1800	smtwhf	Swaziland, Trans World Radio	3200af			

1800 UTC - 2PM E / 1PM C / 11AM P

1800	1827		Vietnam, Voice of	7145eu	9730eu		
1800	1830		Egypt, Radio Cairo	15255af			
1800	1830	s	Germany, Universal Life	13855af			
1800	1830		Netherlands, Radio	6020af	7120af	11655af	
1800	1830		S Africa, Adv World Radio Africa	5960af	6100af		
1800	1830		S Africa, Channel Africa	17870af			
1800	1830	mtwh	UK, Merlin Network One	11590as			
1800	1830		UK, Merlin Network One	11540as			
1800	1830	f	UK, Merlin Network One	11535as			
1800	1830		UK, RTE Radio	15315me			
1800	1850	mtwhf	New Zealand, R New Zealand Int	6095as			
1800	1859		Canada, R Canada International	13690af	15200af	17820af	21570af
1800	1900		Anguilla, Caribbean Beacon	11775am			
1800	1900	mtwhf	Argentina, RAE	15345eu			
1800	1900	vl	Australia, ABC/Alice Springs	2310do			
1800	1900	vl	Australia, ABC/Katherine	2485do			
1800	1900	vl	Australia, ABC/Tennant Creek	2325do			
1800	1900		Australia, Christian Voice	9720as	11890as		
1800	1900		Australia, Radio	6080pa	7240vo	9475as	9580va
				9815pa	11880va		
1800	1900	vl	Bangladesh, Bangla Betar	7185eu	9550eu	15520eu	
1800	1900		Botswana, Radio	3356do	4820do		
1800	1900		Canada, CBC Northern Service	9625do			
1800	1900		Canada, CFRX Toronto ON	6070do			
1800	1900		Canada, CFVP Calgary AB	6030do			
1800	1900		Canada, CHNX Halifax, NS	6130do			
1800	1900		Canada, CKZN St John's NF	6160do			
1800	1900		Canada, CKZU Vancouver BC	6160do			
1800	1900		Costa Rica, R for Peace Int	15049irr	21815usb		
1800	1900		Costa Rica, University Network	5030am	6150om	7375am	9724sa
				11870om	13749na	17645as	
1800	1900	mtwhf	Eqt Guinea, Radio Africa	15185af			
1800	1900	a/monthly	Finland, Scandv Weekend Radio	11690va			
1800	1900		Germany, Deutsche Welle	6140eu			
1800	1900		Germany, Unt Methodist Church	13820af	15485af		
1800	1900		Germany, Voice of Hope	9495eu			
1800	1900	vl	Ghana, Ghana BC Corp	3366do	4915do		
1800	1900	s	Greece, Voice of	9420eu	15630eu	17705na	
1800	1900		Guyana, Voice of	5949do			
1800	1900		India, All India Radio	7410as	9950as	11620as	11935as
				13790af	15200af	17670af	
1800	1900	vl	Italy, Italian Radio Relay Service	3985va	</		

Shortwave Guide

1800	1900	USA, KAIJ Dallas TX	13815va				
1800	1900	USA, KJES Vado NM	15385ou				
1800	1900	USA, KTBN Salt Lake City UT	15590na				
1800	1900	USA, KWHR Naalehu HI	17510as				
1800	1900	USA, Voice of America	6035af	7415af	9760af	9770me	
			11975af	15410af	15580af	17895af	
1800	1900	mtwhfo	17495na				
1800	1900	USA, WBCQ Monticello ME	11875na	13615na	15745eu		
1800	1900	USA, WEWN Birmingham AL	17650af				
1800	1900	USA, WHRA Greenbush ME	9495am	13760va			
1800	1900	USA, WHRI Noblesville IN	13570am				
1800	1900	USA, WINB Red Lion PA	7490am	13595os			
1800	1900	USA, WJCR Upton KY	15265eu				
1800	1900	USA, WMLK Bethel PA	15724na				
1800	1900	mtwhf	7395am	15420af			
1800	1900	USA, WRNO New Orleans LA	15665va	18910af			
1800	1900	USA, WSHB Cypress Crk SC	9370na				
1800	1900	USA, WTJC Newport NC	9475na	12160na	13845na	15685na	
1800	1900	USA, WWCR Nashville TN	12172va				
1800	1900	USA, WWFV McCoysville GA	18980eu				
1800	1900	USA, WYFR Okeechobee FL	9780me				
1800	1900	Yemen, Rep of Yemen Radio	4965do				
1800	1900	Zambia, Christian Voice	6165do	6265do			
1800	1900	vi	4828do	6045do			
1800	1900	vi	4940irr				
1800	1900	\	6165eu	13830eu			
1805	1810	s	7155af				
1815	1845	s	11645eu				
1830	1855		21630af				
1830	1900	Ascension Island, RTE Radio	5945eu	6155eu			
1830	1900	Austria, R Austria International	6005do				
1830	1900	vi	13640na				
1830	1900	Cameroon, CRTV Radio Buea	11760eu				
1830	1900	Canada, RTE Radio	6020af	7120af	9895af	11655af	
1830	1900	Georgia, Georgian Radio	13700af	17405af	21590af		
1830	1900	Netherlands, Radio	5920eu	6055eu	7345eu		
1830	1900	Slovakia, R Slovakia International	9730as				
1830	1900	Turkey, Voice of	11690af	13730af	15525af		
1830	1900	as	6100eu				
1845	1900	USA, Voice of America	7210eu	9510eu			
1845	1900	Yugoslavia, Radio	5985do				
1845	1900	Albania, R Tirana International	11725pa				
1845	1900	Congo, RTV Congolaise					
1850	1900	New Zealand, R New Zealand Int					

1900 UTC - 3PM E / 2PM C / 12PM P

1900	1927	Vietnam, Voice of	9730eu	11630af	13740eu		
1900	1930	Hungary, Radio Budapest	7130eu				
1900	1930	Israel, Kol Israel	9435va	11605va	15615va	15640af	
			17545va				
1900	1930	Philippines, Radya Pilipinas	11720pa	15190po	17720pa		
1900	1930	Switzerland, Swiss R International	6110eu				
1900	1930	Turkey, Voice of	9730as	9785eu			
1900	1945	Germany, Deutsche Welle	11805af	11965af	13720af	15390af	
			17810af				
1900	1945	India, All India Radio	7410as	9950as	11620as	11935as	
			13790af	15200af	17670af		
1900	1950	New Zealand, R New Zealand Int	11725pa				
1900	1956	North Korea, Voice of Korea	4405va	6574na	6595no	6615na	
			9335na	11710na	13760na		
1900	2000	Anguilla, Caribbean Beacon	11775am				
1900	2000	vi	2485do				
1900	2000	vi	2325do				
1900	2000	Australia, ABC/Tennant Creek	9720as				
1900	2000	Australia, Christian Voice	6080po	7240va	9500as	9580va	
1900	2000	Australia, Radio	9815pa	11880va			
1900	2000	vi	3356do	4820do			
1900	2000	Botswana, Radio	9400eu	11900eu			
1900	2000	Bulgaria, Radio	6070do				
1900	2000	Canada, CFRX Toronto ON	6030do				
1900	2000	Canada, CFVP Calgary AB	6130do				
1900	2000	Canada, CHNX Halifax, NS	6160do				
1900	2000	Canada, CKZN St John's NF	6160do				
1900	2000	Canada, CKZU Vancouver BC	6160do				
1900	2000	Canada, CBC Northern Service	9625do				
1900	2000	China China Radio International	6165af	9440af	9585af		
1900	2000	Costa Rica, R for Peace Intl	15049irr	21815usb			
1900	2000	Costa Rica, University Network	5030am	6150am	7375am	9724sa	
			11870am	13749na	17645as		
1900	2000	Ecuador, HCJB	17660eu				
1900	2000	mtwhf	15185af				
1900	2000	a/monthly	11690va				
1900	2000	Finland, Scandy Weekend Radio	7290eu				
1900	2000	Germany, Voice of Hope	3366do	4915do			
1900	2000	Ghana, Ghana BC Corp	3985va				
1900	2000	vi	4885irr	4915irr	4885irr		
1900	2000	Italy, Italian Radio Relay Service	11990va				
1900	2000	Kenya, Kenya BC Corp	4800do				
1900	2000	Kuwait, Radio	4760do				
1900	2000	vi	5100do				
1900	2000	Lesotho, Radio	12060eu				
1900	2000	vi	3270af	3289af			
1900	2000	vi	6020af	7120af	9895af	11655af	
1900	2000	vi	13700af	17605af	21590af		
1900	2000	asmtwh	3935do				
1900	2000	New Zealand, ZLXA	6025do				
1900	2000	vi	6050do				
1900	2000	Nigeria, Radio/Enugu	4770do	6090do	7275do	9570do	
1900	2000	Nigeria, Radio/Ibadan	3326do	4990do			
1900	2000	Nigeria, Radio/Koduna	7255af	15120af			
1900	2000	Nigeria, Radio/Lagos	9480eu	9685eu	9775eu	9890eu	
1900	2000	Nigeria, Voice of					
1900	2000	Russia, Voice of Russia WS					

1900	2000	Russia, World Beacon	11675eu	12070eu			
1900	2000	S Africa, World Beacon	7360eu				
1900	2000	3230af	9675af	11640af			
1900	2000	Sierra Leone, Sierra Leone BS	3316do				
1900	2000	vi	5020do				
1900	2000	Salaman Islands, SIBC	5975am	7275eu			
1900	2000	South Korea, R Korea Intl	4940irr				
1900	2000	Sri Lanka, Sri Lanka BC Corp	6010eu				
1900	2000	a	3200af				
1900	2000	Sri Lanka, Sri Lanka BC Corp	7160eu	9655eu	11905eu		
1900	2000	Swaziland, Trans World Radio	4976do	5026do			
1900	2000	Thailand, Radio	3255af	6005af	6190af	6195eu	
1900	2000	Uganda, Radio	9410eu	9630af	9740pa	12095eu	
1900	2000	UK, BBC World Service	15400af	15575me	17830af		
1900	2000	a	17840na				
1900	2000	UK, World Beacon	9675eu	15585eu			
1900	2000	USA, Armed Forces Radio	4278va	4319va	4993va	5765va	
			6350va	6458va	6847va	10320va	
			10940va	12579va	12689va	13254va	
			13362va	16847va			
1900	2000	USA, KAIJ Dallas TX	13815va				
1900	2000	USA, KTBN Salt Lake City UT	15590na				
1900	2000	USA, KWHR Naalehu HI	17510as				
1900	2000	USA, VOA Special English	7260eu	9680me	13690me		
1900	2000	USA, Voice of America	4950af	6035af	6160me	7375af	
			7415af	9525pa	9760af	9770af	
			11805pa	11975af	15180pa	15410af	
			15445af	15580af			
1900	2000	mtwhf	9550eu	9840as	11780me	11780me	
			11970as	12015as	13725me	15235as	
1900	2000	mtwhfo	17495na				
1900	2000	USA, WEWN Birmingham AL	11875na	13615na	15745eu		
1900	2000	USA, WHRA Greenbush ME	17650af				
1900	2000	USA, WHRI Noblesville IN	9495am	13760va			
1900	2000	USA, WINB Red Lion PA	13570am				
1900	2000	USA, WJCR Upton KY	7490am	13595as			
1900	2000	USA, WMLK Bethel PA	15265eu				
1900	2000	mtwhf	15724na				
1900	2000	USA, WRNO New Orleans LA	7395am	15420af			
1900	2000	USA, WSHB Cypress Crk SC	15665va	18910af			
1900	2000	USA, WTJC Newport NC	9370na				
1900	2000	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na	
1900	2000	USA, WWFV McCoysville GA	12172va				
1900	2000	USA, WYFR Okeechobee FL	15775af	18980eu			
1900	2000	Zambia, Christian Voice	4965do				
1900	2000	vi	6165do	6265do			
1900	2000	vi	4828do	6045do			
1915	1945	Congo, RTV Congolaise	5985do				
1930	2000	t†	7105eu	7210eu			
1930	2000	Belarus, R Belarus International	9925eu				
1930	2000	Belgium, RVI Flanders R Intl	9022eu	11670eu	13730eu		
1930	2000	vi	4890do				
1930	2000	Papua New Guinea, NBC	6035eu	7185eu	7265eu	9525eu	
1930	2000	Poland, Radio Polonia	6065eu				
1930	2000	Sweden, Radio	13770af	15220af	17580af	17735af	
1930	2000	Switzerland, Swiss R International	5970eu	9750eu			
1935	1955	Italy, RAI International	4810eu	9960eu			
1940	2000	mtwhfo	4005eu	5885eu	7250eu	9645eu	
1950	1950	Vatican City, Vatican Radio	15160pa				
1950	2000	New Zealand, R New Zealand Int					

2000 UTC - 4PM E / 3PM C / 1PM P

2000	2010	Vatican City, Vatican Radio	4005eu	5885eu	7250eu	9645eu	
2000	2015	Swaziland, Trans World Radio	9660af	116			

Shortwave Guide



2200 UTC - 6PM E / 5PM C / 3PM P

2200	2210	vi	Zambia, National BC Corp	6165do	6265do			
2200	2215		New Zealand, R New Zealand Int	15160pa				
2200	2220	s	Greece, Voice of	9425au	15650au			
2200	2225		Italy, RAI International	9675as	11900as	15240as		
2200	2230		Canada, R Canada International	9755om	13670om	17695am		
2200	2230	mtwhf	Canada, R Canada International	15305om	17880am			
2200	2230		India, All India Radio	7150au	7410eu	9650eu	9910ou	
				9950au	11620au	11715au		
2200	2230		Iran, VOIRI	9570as	13745as			
2200	2230		Mexico, R Mexico International	9705om	11770am			
2200	2230	vi	Papua New Guinea, NBC	4890do				
2200	2230	mtwhf	USA, Voice of America	5855af	6035of	7375af	7415af	
				11975of				
2200	2230	mtwhfa	Yugoslavia, Radio	7230au				
2200	2245		Egypt, Radio Cairo	9990eu				
2200	2245		USA, WYFR Okeechobee FL	11740na	15120af	17845af		
2200	2300		Anguilla, Caribbean Beacon	6090om				
2200	2300	vi	Australia, ABC/Alice Springs	4835do				
2200	2300	vi	Australia, ABC/Katherine	5025do				
2200	2300	vi	Australia, ABC/Tennant Creek	4910do				
2200	2300		Australia, Christian Voice	9865pa				
2200	2300		Australia, Radio	11880as	15240as	17715vc	17795va	
				21740va				
2200	2300		Canada, CBC Northern Service	9625do				
2200	2300		Canada, CFRX Toronto ON	6070do				
2200	2300		Canada, CFVP Calgary AB	6030do				
2200	2300		Canada, CHNX Halifax, NS	6130do				
2200	2300		Canada, CKZN St John's NF	6160do				
2200	2300		Canada, CKZU Vancouver BC	6160do				
2200	2300		China China Radio International	7170eu				
2200	2300		Costa Rica, R for Peace Intl	15049irr	21815usb			
2200	2300		Costa Rica, University Network	5030am	6150om	7375am	9724sa	
				11870am	13749na	17645as		
2200	2300	mtwhf	Eqt Guinea, Radio Africa	15185af				
2200	2300	f/monthly	Finland, Scandv Weekend Radio	11690vo				
2200	2300	vi	Ghana, Ghana BC Corp	3366do	4915do			
2200	2300	fas/vl	Italy, Italian Radio Relay Service	3985va				
2200	2300	vi	Liberia, R Liberia International	5100do				
2200	2300		Malaysia, Radio	7295do				
2200	2300		Nambia, Namibian BC Corp	3270af	3289af			
2200	2300		New Zealand, ZLXA	3935do	7290do			
2200	2300	vi	Nigeria, Radio/Enugu	6025do				
2200	2300	vi	Nigeria, Radio/Ibadan	6050do				
2200	2300	vi	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
2200	2300	vi	Nigeria, Radio/Lagos	3326do	4990do			
2200	2300		Sierra Leone, Sierra Leone BS	3316do				
2200	2300	vi	Solomon Islands, SIBC	5020do	9545do			
2200	2300		Sri Lanka, Sri Lanka BC Corp	4940irr				
2200	2300		Taiwan, Radio Taipei International	11565eu	15600eu			
2200	2300		Turkey, Voice of	7190vo	11845va			
2200	2300		UK, BBC World Service	5965as	5975om	6175na	6195va	
				7105as	9590no	9660as	11835af	
				11955as	12080pa	12095sa	15400af	
2200	2300		USA, Armed Forces Radio	4278va	4319va	4993va	5765va	
				6350va	6458va	6847va	10320va	
				10940va	12579va	12689va	13254vo	
				13362va	16847va			
2200	2300		USA, KAIJ Dallas TX	13815va				
2200	2300		USA, KTBN Salt Lake City UT	15590na				
2200	2300		USA, KWHR Naalehu HI	17510as				
2200	2300		USA, Voice of America	7215as	9705as	9770as	11760as	
				15185as	15290as	15305as	17740as	
				17820as				
2200	2300	mtwhf	USA, WBCQ Monticello ME	9335na				
2200	2300		USA, WBCQ Monticello ME	7415na				
2200	2300		USA, WEWN Birmingham AL	9385na	9975eu	13615na		
2200	2300		USA, WHRA Greenbush ME	7580eu				
2200	2300		USA, WHRI Noblesville IN	5745va	9495am			
2200	2300		USA, WINB Red Lion PA	13570am				
2200	2300	as	USA, WJCR Upton KY	7490am	13595as			
2200	2300		USA, WRMI Miami FL	9955am				
2200	2300		USA, WRNO New Orleans LA	7395am	15420l			
2200	2300		USA, WSHB Cypress Crk SC	13770eu	15285sa			
2200	2300		USA, WTJC Newport NC	9370na				
2200	2300		USA, WWCR Nashville TN	7435na	9475na	12160na	13845na	
2200	2300		USA, WWVF McCaysville GA	5085vo	12172va			
2200	2300	vi	Vanuatu, Radio	3945do	4960do	7260do		
2200	2300		Zambia, Christian Voice	4965do				
2215	2300		New Zealand, R New Zealand Int	17675pa				
2230	2257		Czech Rep, Radio Prague Intl	11600no	15445na			
2230	2300		Belgium, RVI Flanders R Intl	15565na				
2230	2300		Canada, R Canada International	9755am	13670am	17695om		
2230	2300		Cuba, Radio Havana	9550am				
2230	2300	vi	Papua New Guinea, NBC	4890do	11880irr			
2230	2300	vi/os	Solomon Islands, SIBC	5020do				
2230	2300	vi/a	Solomon Islands, SIBC	9545do				
2245	2300		India, All India Radio	9705as	9950as	11620as	13605as	
2245	2300		USA, WYFR Okeechobee FL	11740no				

2300 UTC - 7PM E / 6PM C / 4PM P

2300	0300	sm f	USA, WINB Red Lion PA	12160am				
2300	0000		Anguilla, Caribbean Beacon	6090am				
2300	0000	vi	Australia, ABC/Alice Springs	4835do				
2300	0000	vi	Australia, ABC/Katherine	5025do				
2300	0000	vi	Australia, ABC/Tennant Creek	4910do				
2300	0000		Australia, Christian Voice	9865pa				
2300	0000		Bulgaria, Radio	9400na	11700na			
2300	0000	vi	Cameroon, CRTV Radio Buea	6005do				
2300	0000		Canada, CBC Northern Service	9625do				
2300	0000		Canada, CFRX Toronto ON	6070do				
2300	0000		Canada, CFVP Calgary AB	6030do				
2300	0000		Canada, CHNX Halifax, NS	6130do				
2300	0000		Canada, CKZN St John's NF	6160do				
2300	0000		Canada, CKZU Vancouver BC	6160do				
2300	0000		China China Radio International	5990na				
2300	0000		Costa Rica, R for Peace Intl	15049irr	21815usb			
2300	0000		Costa Rica, University Network	5030am	6150am	7375am	9925sa	
				11870am	13749na	17645as		
2300	0000		Ecuador, HCJB	17660as				
2300	0000		Egypt, Radio Cairo	9900am				
2300	0000	f/monthly	Finland, Scandv Weekend Radio	11690va				
2300	0000	vi	Ghana, Ghana BC Corp	3366do	4915do			
2300	0000		India, All India Radio	9705as	9950as	11620as	13605as	
2300	0000	vi	Liberia, R Liberia International	5100do				
2300	0000		Malaysia, Radio	7295do				
2300	0000		Malaysia, RTM Kota Kinabalu	5980af				
2300	0000		Namibia, Namibian BC Corp	3270af	3289af			
2300	0000		New Zealand, R New Zealand Int	17675pa				
2300	0000		New Zealand, ZLXA	3935do	7290do			
2300	0000	vi	Papua New Guinea, NBC	4890do	11880irr			
2300	0000		Sierra Leone, Sierra Leone BS	3316do				
2300	0000		Singapore, SBC Radio One	6150do				
2300	0000	vi/as	Solomon Islands, SIBC	5020do				
2300	0000	vi/a	Solomon Islands, SIBC	9545do				
2300	0000		Sri Lanka, Sri Lanka BC Corp	4940do				
2300	0000		UK, BBC World Service	3915as	5965as	5975om	6035as	
				6175na	6195as	7105as	9590na	
				11945as	11955as	12095sa	15280as	
				4278va	4319va	4993va	5765va	
				6350va	6458va	6847va	10320va	
				10940va	12579va	12689va	13254va	
				13362va	16847va			
2300	0000		USA, Armed Forces Radio	13815va				
				15590na				
				17510as				
				7190as	7200as	9545as	11805pa	
				11925as	13735as	13775as	15205pa	
				7215as	9705as	9770as	11760as	
				15185as	15290as	15305as	17740as	
				17820as				
2300	0000		USA, WBCQ Monticello ME	7415na				
2300	0000	smthwf	USA, WBCQ Monticello ME	9335na				
2300	0000		USA, WEWN Birmingham AL	9385na	9975eu	13615na		
2300	0000		USA, WHRA Greenbush ME	7580eu				
2300	0000		USA, WHRI Noblesville IN	5745va	9495am			
2300	0000		USA, WINB Red Lion PA	13570am				
2300	0000		USA, WJCR Upton KY	7490am	13595as			
2300	0000		USA, WRMI Miami FL	9955am				
2300	0000		USA, WRNO New Orleans LA	7355va				
2300	0000		USA, WSHB Cypress Crk SC	13770eu	15285sa			
2300	0000		USA, WTJC Newport NC	9370na				
2300	0000		USA, WWCR Nashville TN	7435na	9475na	12160na	13845na	
2300	0000	os	USA, WWBS Macon GA	11910na				
2300	0000		USA, WWCR Nashville TN	7435na	9475na	12160na	13845na	
2300	0000	vi	USA, WWVF McCaysville GA	5085va	6890va	7260do		
2300	0000		Vanuatu, Radio	3945do	4960do	7260do		
2300	2305	vi	Zambia, Christian Voice	4965do				
2300	2305	vi	Nigeria, Radio/Enugu	6025do				
2300	2305	vi	Nigeria, Radio/Ibadan	6050do				
2300	2305	vi	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do	
2300	2305	vi	Nigeria, Radio/Lagos	3326do	4990do			
2300	2330		Australia, Radio	9660pa	11880as	12080va	15240as	
				17715va	17795va	21740vo		
				11865am	11865am	15305am		
2300	2330	mtwhf	Canada, R Canada International	6040am				
2300	2330		Cuba, Radio Havana	9550am				
2300	2330	mtwhf	Mexico, R Mexico International	9705om	11770om			
2300	2345		Germany, Deutsche Welle	9815os	12055as	13610as	21790as	
2300	2345		USA, WYFR Okeechobee FL	11740na				
2300	2356		Romanic, R Romania International	9750eu	11775eu	11940na	15105na	
2300	2359		Canada, R Canada International	9755am	13670am	17695am		
2300	0000		Australia, Radio	9660pa	11695as	12080va	15240as	
				15415as	17715va	17795vo	21740va	
				15415as	9755am	13670am	17695am	
2300	0000		Canada, R Canada International	5960am				
2300	0000		Malaysia, RTM Sarawak	7160do				
2300	0000		Netherlands, Radio	6165na	9845na			
2300	0000		Switzerland, Swiss R International	9885sa	11905sa			
2300								



0000 UTC - Page 43 Freqs

BBC World Service (am)
0000 S/M World Briefing, T-A News; 0005 T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Omnibus (documentary); 0020 S/M Sports Roundup; 0030 S Arts in Action, M The World Today, T Music Mix, W UK Top 20, H/A Westway (drama serial), F World of Music; 0045 H UK Album Chart, A Music X-Press.

HCBJ, Ecuador
0000 S Did You Hear?, M Hour of Decision, T-A Insight for Living; 0028 T-A Money Minute; 0030 S Saludos Amigos, M Mountain Meditations, T-A A New Beginning; 0056 A Slice of Infinity.

Radio Australia
0000 D News; 0005 S The Europeans, A Feedback (letters/station news); 0010 M AWAYE! (Aboriginal culture), T The Science Show, W The National Interest (Australian politics), H Background Briefing (documentary), F Hindsight (Australian history); 0030 A Bush Telegraph (rural life).

Radio Netherlands
0000 S Aural Tapestry (cultural threads), M Dutch Horizons, T Research File (science), W Music 52-15 (international music), H Documentary, F Basement Sessions (classic jazz performances), A A Good Life (global development); 0030 S Roughly Speaking (youth culture), M Aural Tapestry, T EuroQuest (Europe in context), W A Good Life, H Dutch Horizons, F Research File, A Documentary.

Radio Japan
0000 D News; 0010 S Hello from Tokyo (listener contact), M Weekend Square; 0015 T-A 44 Minutes (feature magazine).

Radio New Zealand International
0000 S/A RNZ News; M-F Midday Report; 0012 S This Week in Parliament, A Focus on Politics; 0033 S Spectrum (life in NZ), A The Sampler (latest CDs).

Radio Prague
0000 D News; 0005 S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; 0010 S Saturday Music (classical/folk/jazz), M The Arts; 0015 M Mailbox, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Magazine; 0020 W Talking Point, F Economic Report.

Voice of America (News Now)
0000 T-A World News; 0010 T-A Regional News; 0014 T-A USA News; 0018 T-A Sports; 0022 T-A Features; 0030 T-A World News; 0033 T Encounter, W Our World, H Kaleidoscope, F Best of 'Talk to America' A Press Conference USA.

WBCQ, Maine
7415 kHz.: 0000 S A Different Kind of Oldies Show, M Radio New York International, H Idio-Audio, F Radio Detective (antique radio), A Allan Weiner Worldwide. 9335 kHz.: 0000 S Pagan Pouppouri.

WHRI, Indiana
7580 kHz.: 0000 A 20 The Countdown Magazine (from F 2300).

WWCR, Tennessee
5070 kHz.: 0030 F Ken's Country Classics.

0100 UTC - Page 43 Freqs

BBC World Service (am)
0100 S The World Today, M-A News; 0105 M Wright Around the World (musical variety), T Health Matters, W Science View, H Sports International, F One Planet (ecology), A Discovery (science); 0130 S Reporting Religion, T Everywoman, W Focus on Faith, H Pick of the World (BBC's best), F People & Places, A Essential Guide; 0145 S Letter from America (Alistair Cooke comments).

China Radio International
0100 D News; 0110 S Report on Developing Countries, M-F Current Affairs, A Global Review; 0120 S In the Spotlight (cultural magazine), A Listeners' Garden; 0130 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Deutsche Welle
0100 D News; 0105 S Talking Point (journalists), M Religion & Society, T-A Newslink (European current affairs); 0115 S Inside Europe, M Arts on the Air; 0130 T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCBJ, Ecuador
0100 D Latin American & World News; 0110 S DX Partyline, M Musical Mailbag, T-A Studio 9 (Latin American regional report); 0130 T Inside HCBJ, W Saludos Amigos, H Horn Radio Today, F Woman to Woman, A Musica del Ecuador.

Radio Australia
0100 D News; 0105 S Correspondents' Report, A Asia Pacific (regional current affairs); 0110 M-F Asia Pacific; 0130 S Oz Sounds (new releases), M Health Report, T Law Report, W Religion Report, H Medio Report, F The Sports Factor, A Arts Talk.

Radio Budapest
0100 D News; 0110 S DX Blockbuster; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine).

Radio Canada International
0100 D News; 0108 S Canada Newswave, M Maple Leaf Mailbag, T-S Canada Today (current events magazine); 0130 S Canada Review (business/tech edition), M Canada Review (arts edition).

Radio Habana Cuba
0100 D International News; 0110 M Weekly Review, T-S National News; 0115 T-S Viewpoint; 0130 M RHC 40 Years, T-S News Bulletin; 0135 T-A Time Out (sports); 0140 S/W DXers Unlimited, M Mailbag Show, T/H/F Caribbean Outlook, A Weekly Review; 0150 M Breakthrough (science report).

Radio Netherlands
0100 S/M News, T-A Newslink; 0105 S Europe Unzipped, M Wide Angle (week in review).

Radio New Zealand International
0100 D RNZ News; 0106 S Books at One, M-F Cadenza (light classics), A Home Grown (NZ music, including Musical Choirs-artist feature 0030); 0130 S Future Indicative (for disabled).

Radio Prague
0100 D News; 0105 S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; 0110 S Saturday Music (classical/folk/jazz), M The Arts; 0115 M Mailbox, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Magazine; 0120 W Talking Point, F Economic Report.

Swiss Radio International
0100 D Newswave (Swiss magazine); 0110 S Name Game (Swiss geography quiz-1st week) or Capital Letters (2nd/4th) or Sounds Good (Swiss music-3rd/5th), M Swiss Scene (includes Postcards from Switzerland-1st & Book Zone-3rd); 0115 H Book Zone (2nd H only), A Business Spotlight; 0130 D Newswave (Swiss magazine); 0140 S Name Game (Swiss geography quiz-1st week) or Capital Letters (2nd/4th) or Sounds Good (Swiss music-3rd/5th), M Swiss Scene (includes Postcards from Switzerland-1st & Book Zone-3rd); 0145 H

Book Zone (2nd only), A Business Spotlight.

Voice of America (News Now)
0100 T-A World News; 0110 T-A Regional News; 0114 T-A USA News; 0118 T-A Sports; 0122 T-A Features; 0130 T-A World News; 0133 A Communications World; 0136 T-F Dateline (news magazine); 0145 T-F Science; 0149 T-F Business; 0154 T-F Feature.

Voice of Russia
0100 D News; 0111 S News & Views, M Sunday Panorama, T-A Commonwealth Update; 0124 M Russia: People & Events; 0130 D News in Brief; 0132 S Moscow Yesterday & Today, M Timelines, T Folk Box, W Jazz Show, H Musical Portraits of the 20th Century, F Science & Engineering, A Christian Message from Moscow; 0146 F Music At Your Request; 0154 H Russia: People & Events.

Voice of Vietnam
0100 D News; 0105 D Current Affairs; 0110 Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; 0115 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0120 S Music, A Literature and Arts.

WBCQ, Maine
7415 kHz.: 0100 S Marion's Attic (vintage recordings).
9335 kHz.: 0100 S Bedtime Revelation Stories.

WHRI, Indiana
7315 kHz.: 0105 M Music (Christian contemporary and gospel)

WWCR, Tennessee
3215 kHz.: 0105 T-A Golden Age of Radio Theatre.
5070 kHz.: 0130 A New Horizons (science); 0145 S Ask WWCR (letters).

Radio Austria International
0130 D Report from Austria (magazine); 0135 S Week in Review, M Radio E; 0150 S Listener Letters.

RTE, Ireland
0130 S/M Sportsnews; T-A The News of Six.

Voice of America (Special English)
0130 T-A News; 0140 T Agriculture Today, W/H Science Report, F Environment Report, A In the News; 0145 T Science in the News, W Explorations, H Making of a Nation, F American Mosaic; A American Stories.

0200 UTC - Page 44 Freqs

BBC World Service (am)
0200 D The World Today; 0230 S From Our Own Correspondent, M Assignment, T-A World Business Report; 0245 T/W/F/A Analysis, H From Our Own Correspondent.

BBC World Service (am)
0200 D The World Today; 0230 S From Our Own Correspondent, A Global Business.

HCBJ, Ecuador
0200 S Horn Radio Today, M Sunday Nite, T Let My People Think, W The Book & the Spade (archaeology), H Adventures in Odyssey (Christian stories for children), F Viewpoint (issues), A Walkin' in the Sunshine (country music); 0215 W Words for Women; 0230 S Just Jazz, T-A Back to the Bible.

Radio Australia
0200 D News; 0205 S Margaret Throsby (interviews and music), A Ockham's Razor (a science issue); 0210 M-F The World Today (ABC Radio flagship news program); 0230 A Earthbeat (ecology).
[Special service: 0205 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba
0200 D International News; 0210 M From Habana, T-S National News; 0215 T-S Reports and music; 0230 M The Jazz Place, T-S News Bulletin; 0235 S World of Stamps, T-A Reports and music; 0245 S RHC 40 Years; 0250 S Cuban music.

Radio Korea International
0200 D News; 0210 S Seoul Report (week in review), M Korean Pop Interactive

Hauser's Highlights

BANGLADESH: Bangladesh Betar External Service

UT	Service	kHz	Zone
1200-1300	G.O.S. (Eng.)	7185 9550	S&SE Asia
1315-1345	Nepalese	7185 9550	Nepal
1400-1430	Urdu	7185 9550	Pakistan
1515-1545	Hindi	7185 9550	India
1600-1630	Arabic	7185 9550	Middle East
1630-1730	Bengali	7185 9550	Middle East
1745-1815	V. of Islam (Eng.)	7185 9550 15520	Europe
1815-1900	G.O.S. (Eng.)	7185 9550 15520	Europe
1915-2000	Bengali	7185 9550 15520	Europe

Reports To : Senior Engineer (Research Wing), National Broadcasting authority, Bangladesh Betar, 121 Kazi Nazrul Islam Avenue, Shahbag, Dhaka-1000, Bangladesh. E-mail: rrc@aitbd.net (Rifat J. Eusufzai, DX Forum, DX Listening Digest)

Shortwave Guide



(requests), T-A News Commentary; 0215 T-A Seoul Calling (magazine); 0230 S From Us to You (letters), M Multiwave Feedback (letters/DX news), T Exploring the New Millennium, W Cultural Promenade, H Economic Radar, F Korea & Its Splendors, A Notes of Nostalgia (traditional music).

Radio New Zealand International

0200 D RNZ News; 0205 S Eureka! (science)*, M-F In Touch with New Zealand (music/variety), A Home Grown (cont'd. from 0106)*; 0230 S Feature program or series*. [* may be preempted by live sport].

Radio Taipei International

0200 D News; 0215 S Great Wall Forum (discussing the mainland), M Jade Bells & Bamboo Pipes (traditional music), T Taiwan Culture, W Taiwan Today, H Journey into Chinese Culture, F Taipei Magazine, A Kaleidoscope (life in Taiwan); 0230 T Trends, W Confucius Confusion, H Life Unusual, F East Meets West (visitors), A Naluwan; 0245 S Mailbag Time, M-A Let's Learn Chinese.

Voice of Russia

0200 D News; 0211 S/W/H Moscow Mailbag, T/F Science & Engineering, W/A Newmarket (business); 0230 D News in Brief; 0232 S Songs from Russia, M This is Russia, T Kaleidoscope (Russian events), W Musical Portraits of the 20th Century, H Moscow Yesterday & Today, F Russian by Radio, A Audio Book Club (Russian lit.); 0246 S You Write to Moscow; 0254 W Russia: People & Events.

WBCQ, Maine

7415 kHz.: 0200 S Magic Radio.
9335 kHz.: 0200 S World of Radio.

WHRI, Indiana

7315 kHz.: 0205 M-A Music (Christian contemporary and gospel).

Radio Budapest

0230 D News; 0240 S DX Blockbuster; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine).

Radio Sweden

0230 S Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); 0245 T Sports Scan, W Media Scan (1st/3rd), H Money Matters, F Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

Swiss Radio International

0230 D Newsnet (Swiss magazine); 0240 S Name Game (Swiss geography quiz-1st week) or Capital Letters (2nd/4th) or Sounds Good (Swiss music-3rd/5th), M Swiss Scene (includes Postcards from Switzerland-1st & Book Zone-3rd); 0245 H Book Zone (2nd only), A Business Spotlight.

Voice of Vietnam

0230 D News; 0235 D Current Affairs; 0240 Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; 0245 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0250 S Music, A Literature and Arts.

Hauser's Highlights

FRANCE: RFI in English:

0400-0430 Af 15.155
0500-0530 Af 17.800
0600-0630 Af 17.800 21.620
0700-0800 Af 15.605
1200-1230 EuAf 15.540 25.820
1400-1500 MEAs 11.610 17.620
1600-1700 Af 11.615 11.995 12.015 15.605 17.605 17.850
1700-1730 Af 15.605 17.605

(© BBC Monitoring)

Radio France International via Moyabi, Gabon, until Sept 2 includes English: 0400-0430 9550, 0500-0530 11685, 0600-0630 11710 (Observer, Bulgaria) Omitted from schedule above!

WWCR, Tennessee

3215 kHz.: 0230 A Ward of Radio.
5070 kHz.: 0200 S Communications World; 0230 S World of Radio.

0300 UTC - Page 44 Freqs

BBC World Service (am)

0300 S/M World Briefing, T-A News; 0305 T Panel Game or Quiz, W The Alternative (music), H Greenfield Collection (classical music), F Itazmatz, A Composer of the Month; 0320 S/M Sports Roundup; 0330 S Science in Action, M Westway Omnibus (drama serial), T Body & Mind (health), W Patterns of Faith, H A Radio History of the World, F Heart & Soul (religion), A Write On (letters) or From Where I Stand (British views); 0345 T-A Off the Shelf (book readings).

BBC World Service (me)

0300 D World Briefing; 0320 D Sports Roundup; 0330 S Science in Action, M World Business Review, T-A World Business Report; 0345 M Write On or From Where I Stand (British views), T/W/F/A Analysis, F From Our Own Correspondent.

BBC World Service (esaf)(wcaf)

0300 D World Briefing; 0320 D Sports Roundup; 0330 S Postmark Africa, M-F Network Africa, A African Quiz or This Week And Africa.

BBC World Service (sas)

0300 S World Briefing, M-A News; 0305 M Talking Point, T-A Outlook; 0320 S Sports Roundup; 0330 S Science in Action; 0345 M-F Off the Shelf (book readings), A Write On or From Where I Stand (British views).

Channel Africa

0300 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

China Radio International

0300 D News; 0310 S Report on Developing Countries, M-F Current Affairs, A Global Review; 0320 S In the Spotlight (cultural magazine), A Listeners' Garden; 0330 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Deutsche Welle

0300 D News; 0305 S Saturday Review, M Sunday Review, T-A Newslink (European current affairs); 0315 S Spectrum (sci/tech), M Arts on the Air; 0330 T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCJB, Ecuador

0300 S Rock Solid, M The Sower, T-A Hope for the Heart; 0313 T-A Getting the Message; 0315 M The Word Today, T-A Rendezvous (inspirational music); 0330 M Renewing Your Mind, T Unshackled (radio's oldest drama series), W Science, Scripture and Salvation, H The Living Word, F Oorachimow, A Inspirational Classics (liturgical music); 0345 W Wonderful Words of Life (hymns), F Science, Scripture & Salvation.

Radio Australia

0300 D News; 0305 S Feedback (letters/station news), A Rural Reporter; 0310 M-F Regional Sports Report; 0320 M-F Pacific Focus (M business, T health, W environment, H sport, F culture); 0330 S Ockham's Razor (a science issue), A Educational series; 0340 M Oz Music Show (rock), T/F Music Deli (diverse world/folk), W Blacktracker (contemporary Aboriginal), M Australian Country Style.

[Special service: 0305 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0300 D International News; 0310 M Weekly Review, T-S National News; 0315 T-S Viewpoint; 0330 M RHC 40 Years, T-S News Bulletin; 0335 T-A Time Out (sports); 0340 S/W DXers Unlimited, M/H Mailbag Show, T/F Caribbean Outlook, A Weekly Review; 0350 M Breakthrough (science report).

Radio New Zealand International

0300 S/A RNZ News*, M-F Pacific Regional News; 0305 S Playhouse (radio theatre)*, A World of Music (BBC)*; 0308 M Tagata o te Moana (Pacific culture), T Top 5, W Pacific Report, H Mailbox or RNZI Talk (meet the RNZI staff), F Dateline Pacific; 0330 T New Releases, W Tradewinds, H The World in Sport, F Pacific Correspondent. [* may be preempted by live sport].

Radio Prague

0300 D News; 0305 S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; 0310 S Saturday Music (classical/folk/jazz), M The Arts; 0315 M Mailbox, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Magazine; 0320 W Talking Point, F Economic Report.

Radio Taipei International

0300 D News; 0315 S Great Wall Forum, M Taiwan Economic Journal, T Taiwan Culture, W Taiwan Today, H Soundbite, F New Music Lounge, A Kaleidoscope; 0330 M People, T Trends, W Confucius Confusion, H Life Unusual, F Business Chinese, A Maibag Time; 0345 S Asia Pacific, M-A Let's Learn Chinese.

Voice of Russia

0300 D News; 0311 M Sunday Panorama, T-S News & Views; 0324 M Russia: People & Events; 0330 D News in Brief; 0332 S Kaleidoscope (Russian events), M Audio Book Club (Russian lit.), T/H/A 20th Century: Footprints in History, W/F Russian history/culture.

WBCQ, Maine

7415 kHz.: 0300 S The Big Kaboom.

WHRI, Indiana

5745 kHz.: 0300 S DXing with Cumbre, M Joe 2K; 0330 S Joe 2K.
7315 kHz.: 0305 S/M 20, The Countdown Magazine (Christian rock music charts)
7580 kHz.: 0305 M-A Music (Christian contemporary and gospel); 0335 S Music (Christian contemporary and gospel)

WWCR Tennessee

3215 kHz.: 0305 M America's Greatest Heroes; 0310 M Profiles.
5070 kHz.: 0300 A Spectrum (communications discussion); 0330 M The Old Record Shop (vintage recordings).

Radio Sweden

0330 S Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); 0345 T Sports Scan, W Media Scan (1st/3rd), H Money Matters, F Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

Voice of Vietnam

0330 D News; 0335 D Current Affairs; 0340 Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; 0345 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0350 S Music, A Literature and Arts.

0400 UTC - Page 45 Freqs

BBC World Service (au)

0400 D The World Today; 0430 S Global Business, A Weekend; 0450 M-F Sports Roundup.

BBC World Service (me)

0400 D The World Today; 0430 S In Praise of God, A Assignment; 0450 M-F Sports Roundup.

Hauser's Highlights

NEW ZEALAND: RNZI Schedule

Time	Freq	Day	Content
1650-1850	6095	Mon-Fr	NE Pacific, Cooks, Niue, Tonga, Samoa
1851-1950	11725	Daily	All Pacific
1951-2215	15160	Daily	All Pacific
2216-0458	17675	Daily	All Pacific
0459-0705	11725	Daily	All Pacific
0706-1105	9885	Daily	All Pacific
1106-1305	11675	Daily	NW Pacific, Bougainville, East Timor/Asia
1305-1650	6095	Occasional use for sports or weather	(Adrian Sainsbury, Frequency Manager, Radio New Zealand International, http://www.rnzi.com)

Shortwave Guide



BBC World Service (esaf)

0400 D The World Today; 0430 S The Story of Africa, M-F Network Africa, A Talkabout Africa.

BBC World Service (wcaf)

0400 D The World Today; 0430 S The Story of Africa, M-F Network Africa, A Talkabout Africa.

BBC World Service (sas)

0400 S/A The World Today, M-F News; 0405 M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian Writing, F Omnibus (documentary); 0430 S In Praise of God, M Music Mix, T UK Top 20, W/F Westway (soap opera), H World of Music, A Assignment; 0445 W UK Album Chart, F Music X-Press.

Channel Africa

0400 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

China Radio International

0400 D News; 0410 S Report on Developing Countries, M-F Current Affairs, A Global Review; 0420 S In the Spotlight (cultural magazine), A Listeners' Garden; 0430 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

HCB, Ecuador

0400 D Latin American & World News; 0410 S DX Partyline, M Musical Mailbag, T-A Studio 9 (Latin American regional report); 0430 T Inside HCB, W Saludos Amigos, H Ham Radio Today, F Woman to Woman, A Musica del Ecuador.

Radio Australia

0400 D News; 0405 S/A Pacific Focus (S arts, A environment); 0410 M-F Margaret Throsby (interviews and music); 0430 S Arts Talk, A Jazz Notes. [Special service: 0405 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0400 D International News; 0410 M From Habana, T-S National News; 0415 T-S Reports and music; 0430 M The Jazz Place, T-S News Bulletin; 0435 S World of Stamps, T-A Reports and music; 0445 S RHC 40 Years; 0450 S Cuban music.

Radio Netherlands

0430 S/M News; T-A Newswire; 0435 S Europe Unzipped, M Sincerely Yours (letters); 0455 S Insight (commentary).

Radio New Zealand International

0400 D RNZ News; 0408 S A Question of Religion, M-F In Touch with New Zealand (from 0205), A Music feature or series.

Radio Vlaanderen Internationaal

0400 S Music from Flanders, M Radio World, T-A News; 0404 T-A Belgium Today; 0408 M Tourism in Flanders, T-A Press Review; 0413 T Focus on Europe, W Green Society (ecology), H/A Around the Arts, F Economics; 0414 M Brussels 1043 (letters); 0418 T Sports, H Around Town, F International Report, A Tourism in Flanders; 0424 M-A Soundbox (Flemish rock).

Swiss Radio International

0400 D Newsnet (Swiss magazine); 0410 S Name Game (Swiss geography quiz-1st week) or Capital Letters (2nd/4th) or Sounds Good (Swiss music-3rd/5th), M Swiss Scene (includes Postcards from Switzerland-1st & Book Zone-3rd); 0415 H Book Zone (2nd only), A Business Spotlight; 0430 D Newsnet (Swiss magazine); 0440 S Name Game (Swiss geography quiz-1st week) or Capital Letters (2nd/4th) or Sounds Good (Swiss music-3rd/5th), M Swiss Scene (includes Postcards from Switzerland-1st & Book Zone-3rd); 0445 H Book Zone (2nd only), A Business Spotlight.

Voice of Russia

0400 D News; 0411 S/M Musical Portraits of the 20th Century, T/F Moscow Mailbag, W/A Science and Engineering, H Newmarket (business); 0430 D News in Brief; 0432 S Moscow Yesterday and Today, M Jazz Show, T Yours for the Asking, W Musical Portraits of the 20th Century, H Folk Box, F Audio Book Club (Russian lit.), A Timelines; 0446 T Music At Your Request, W Russia: People & Events.

WBCQ, Maine

7315 kHz: 0400 S Tom & Darryl (electronic media), M-A Amos 'n Andy.

WHRI, Indiana

5745 kHz.: 0405 S Music (Christian contemporary and gospel), 0430 S DXing with Cumbre. 7315 kHz.: 0400 S 20, The Countdown Magazine (from 0305); 0405 M F Music (Christian contemporary and gospel).

WWCR, Tennessee

3210 kHz.: 0400 T-S Worldwide Country Radio (country music). 5070 kHz.: 0430 M New Horizons (science/technology); 0445 M Ask WWCR (letters).

0500 UTC - Page 45 Freqs

BBC World Service (eu)

0500 D The World Today; 0530 S Reporting Religion, A Arts in Action.

BBC World Service (me)

0500 D The World Today; 0530 S Global Business, A Arts in Action.

BBC World Service (esaf)

0500 D The World Today; 0530 S Artebeat, M-F Network Africa, A African Quiz or This Week And Africa.

BBC World Service (wcaf)

0500 D The World Today; 0530 S Artebeat, M-F Network Africa, A Talkabout Africa.

BBC World Service (sas)

0500 S The World Today, M-A News; 0505 M One Planet (ecology), T Discovery (science), W Health Matters, H Science View, F Sports International, A Wright Around the World (music requests); 0530 S Reporting Religion, M People and Places, T Essential Guide, W Everywoman, H Focus on Faith, F Pick of the World.

BBC World Service (eas)

0500 D The World Today; 0530 S Write On or From Where I Stand (British views), A Arts in Action.

Channel Africa

0500 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

China Radio International

0500 D News; 0510 S Report on Developing Countries, M-F Current Affairs, A Global Review; 0520 S In the Spotlight (cultural magazine), A Listeners' Garden; 0530 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Deutsche Welle

0500 D News; 0505 S Talking Point (journalists), M Religion & Society, T-A Newlink (European current affairs); 0515 S Marks & Markets, M COOL! (youth magazine); 0530 T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCB, Ecuador

0500 S Ham Radio Today, M Sunday Nite, T Let My People Think, W The Book & the Spade (archaeology), H Adventures in Odyssey (Christian stories for children), F Inspirational Classics (liturgical music), A Walkin' in the Sunshine (country music); 0515 W Words for Women; 0530 S Just Jazz, T-A A New Beginning; 0556 T-A A Slice of Infinity.

Radio Australia

0500 D News; 0505 S/A Pacific Focus (S business, A sport); 0510 M-F Pacific Beat (Pacific islands magazine with regional sports report @ 0530); 0530

S Fine Music Australia (classical), A Lingua Franca (about language); 0545 A Short Story.

[Special service: 0505 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0500 D International News; 0510 M Weekly Review, T-S National News; 0515 T-S Viewpoint; 0530 M RHC 40 Years, T-S News Bulletin; 0535 T-A Time Out (sports); 0540 S/W DXers Unlimited, M/H Mailbag Show, T/F Caribbean Outlook, A Weekly Review; 0550 M Breakthrough (science report).

Radio Japan

0500 D News; 0510 S Pop Goes Asia, A Hello from Tokyo (listener contact); 0515 M-F 44 Minutes (feature magazine).

Radio Netherlands

0500 S Aural Tapestry (cultural threads), M Dutch Horizons, T Research File (science), W Music 52-15 (international music), H Documentary, F Basement Sessions (classic jazz performances), A A Good Life (global development).

Radio New Zealand International

0500 D RNZ News; 0505 S Whenua! (Maori culture), M-F Checkpoint (comprehensive news), A Tagata o te Moana (Pacific culture).

Voice of Nigeria

0500 S Reflections, M-F Wave Train (music), A African Safari (music); 0505 S Link-Up (music requests); 0530 S/A News, M-F VON Scope (news magazine).

WBCQ, Maine

0500 S Radio Timron Worldwide.

WHRI, Indiana

5745 kHz.: 0500 A DXing with Cumbre; 0530 A World Harvest Country Style. 7315 kHz.: 0500 M-F Music (Christian contemporary and gospel), A DXing with Cumbre. 7435 kHz.: 0500 A Joe 2 K.

WWCR, Tennessee

3210 kHz.: 0500 M World of Radio; 0505 A Rock the Universe (Christian rock music); 0530 M Communications World. 5070 kHz.: 0500 T Ask WWCR (letters)

0600 UTC - Page 46 Freqs

BBC World Service (eu)

0600 D World Briefing; 0620 D Sports Roundup; 0630 S Agenda (trends), M-F World Business Report, A People and Politics; 0645 M Letter from America (Alistair Cooke comments), T/W/F Analysis, H From Our Own Correspondent.

BBC World Service (me)

0600 S World Briefing, M-A News; 0605 M Talking Point, T-A Outlook; 0620 S Sports Roundup; 0630 S Agenda (trends); 0645 M-F Off the Shelf (book readings), A Write On or From Where I Stand (British views).

BBC World Service (esaf)

0600 S World Briefing, M-A News; 0605 M Talking Point, T-A Outlook; 0620 S Sports Roundup; 0630 S Agenda (trends); 0645 M-F Off the Shelf (book readings), A Write On or From Where I Stand (British views).

BBC World Service (wcaf)

0600 D World Briefing; 0620 D Sports Roundup; 0630 S Agenda (trends), M-F Network Africa, A African Quiz or This Week And Africa.

BBC World Service (eas)

0600 S/A World Briefing, M-F News; 0605 M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing; 0620 S/A Sports Roundup; 0630 S Westway Omnibus, M Composer of the Month, T Music Mix, W UK Top 20, H Panel game or Quiz, F World of Music, A People and Politics.

Channel Africa

0600 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

HCB, Ecuador

0600 S Saludos Amigos, M Mountain Meditations, T-A Family Life Today; 0630 S

Hauser's Highlights

SINGAPORE: R Singapore International:

Chinese 1100-1400 6000 9560

English 1100-1400 6150 9600

Indonesian 1200-1400 9665

Malay 0900-1200 7235 9665

From 1200, 7235 relays domestic Warna 94.2 FM in Malay

(Alan Davies, East Malaysia, BC-DX)

Shortwave Guide



Did You Hear?, M Renewing Your Mind, T-A Stories of Great Christians; 0645 S/H Specialized English, T Chords of Love (sacred music), W CCR Drama, F Science, Scripture & Salvation, A Wonderful Words of Life (hymns).

Radio Australia

0600 D News; 0605 S The Europeans, A Feedback (letters/station news); 0610 M-F Regional Sports Report; 0620 M-F Pacific Focus (M business, T health, W environment, H sport, E culture); 0630 A Oz Sounds (new releases); 0640 M Oz Music Show (rock), T/F Music Deli (diverse world/folk), W Blacktracker (contemporary Aboriginal), X Australian Country Style.

[Special service: 0605 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0600 D International News; 0610 M From Habana, T-S National News; 0615 T-S Reports and music; 0630 M The Jazz Place, T-S News Bulletin; 0635 S World of Stamps, T-A Reports and music; 0645 S RHC 40 Years; 0650 S Cuban music.

Radio Japan

0600 D News; 0610 S Weekend Square (Japanese life), A Pop Goes Asia; 0615 M-F Asian Top News (headlines from region's radio); 0625 M Unforgettable Musical Masterpieces, T Let's Learn Japanese, W Japan Music Log, H Brush Up Your Japanese, F Music Beat.

Radio New Zealand International

0600 D RNZ News; 0606 S Storytime (children), M-F Worldwatch (international news), A Focus on Politics; 0630 M Letter from America (BBC), T-H Today in Parliament, F The Pacific Report, A In a Mellow Tone (soft sounds); 0655 D Golden Kiwis (prominent NZers).

Voice of Nigeria

0600 S This Week on VON, M Across the Ages, T Agenda for Peace, W Nigerian Newsletter, H West African Scene, F African Writers, A From the Racks; 0615 S Listeners' Letters, M Nigeria & Politics, T Nigerian Scene, W Wheel of Progress, H World of the Arts, F Images of Nigeria, A Issues of the Moment; 0630 S/A Weekly Analysis, M-F World News; 0640 M-F Commentary & Press Review; 0645 M-F News about Nigeria.

WHRI, Indiana

5745 kHz.: 0630 S OXing with Cumbre.
7315 kHz.: 0604 A Turn Your Radio On; 0630 S World Harvest Country Style.

WWCR, Tennessee

3210 kHz.: 0600 S The Big Backyard (Australian country music), M Spectrum (communications discussion); 0605 T-F Golden Age of Radio Theatre; 0630 S The Old Record Shop (vintage recordings).
5070 kHz.: 0600 M Ken's Country Classics; 0630 S World of Radio.

1000 UTC - Page 48 Freqs

BBC World Service (am)

1000 D World Briefing; 1020 S/A Sports Roundup; 1030 S Agenda (trends), M-F World Business Report, A Science in Action; 1045 M-F Sports Roundup.

BBC World Service (eu)

1000 D World Briefing; 1020 S/A Sports Roundup; 1030 S Weekend, M-F World Business Report, A Science in Action; 1045 M-F Sports Roundup.

BBC World Service (me)

1000 D World Briefing; 1020 S/A Sports Roundup; 1030 S Agenda (trends), M-F World Learning (instructional series), A Science in Action.

BBC World Service (esaf)

1000 S News Summary, M-A World Briefing; 1005 S The Alternative (music); 1020 A Sports Roundup; 1030 S Composer of the Month, M Letter from America, T-F Analysis, A Science in Action; 1045 M-F Sports Roundup.

BBC World Service (wcaf)

1000 S News Briefing, A World Briefing; 1001 S Heart and Soul (religion); 1020 S The Alternative (music), A Sports Roundup; 1030 A Science in Action; 1045 A A Radio History of the World.

BBC World Service (oas)

1000 S News Summary, M-F World Briefing, A News; 1001 S Concert Hall; 1005 A Jazzmatuzz; 1030 M-F World Business Report, A Greenfield Collection (classical music); 1045 M-F Sports Roundup.

Radio Australia

1000 D News; 1005 S Lingua Franca, M-F Asia Pacific, A Pacific Review; 1030 S Rural Reporter, M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor, A In Conversation-Science.

R. New Zealand Int.

1000 D News; 1005 M-F Late Edition (the day's news), A Deep Purple (relaxing music/nostalgia); 1011 S Sunday Supplement (NZ opinions); 1025 S Feature program.

Voice of America (News Now)

1000 D World News; 1010 D Regional News; 1014 D USA News; 1018 D Sports; 1022 D Features; 1030 D World News; 1033 S On the Line (US foreign policy), A Best of 'Talk to America'; 1045 M-F Science, Medicine, Environment; 1049 M-F Business and Economic Report; 1053 M-F Music feature.

1100 UTC - Page 48 Freqs

BBC World Service (am) (eu)

1100 D World Briefing; 1120 D British News; 1130 S Arts in Action, M Letter from America, T/W/F/A Analysis, H From Our Own Correspondent; 1145 M-H Sports Roundup, F Football Extra.

[Special service to the Caribbean on 6195 & 15220 kHz.: 1105 M-F Caribbean Report; 1110 M-F Caribbean Sport; 1115 M-F Caribbean Magazine.]

BBC World Service (me)

1100 S World Briefing, M-A News; 1105 M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Wright Around the World (music requests); 1120 S British News; 1130 S Arts in Action, M Composer of the Month, T Music Mix, W UK Top 20, H Panel game or Quiz, F World of Music.

BBC World Service (esaf)

1100 S-F World Briefing, A News; 1105 A Westway Omnibus; 1120 S-F British News; 1130 S Arts in Action, M-F World Business Report, A Greenfield Collection (classical music requests); 1145 M-H Sports Roundup, F Football Extra.

BBC World Service (wcaf)

1100 D World Briefing; 1120 D British News; 1130 S Postmark Africa, M-F World Business Report, A Inside Track (African sport); 1145 M-H Sports Roundup, A Football Extra.

BBC World Service (oas)

1100 S/A World Briefing, M-F News; 1105 M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science); 1120 S/A British News; 1130 S Play of the Week, M Everywoman, T Focus on Faith, W Pick of the World (best of the BBC), H People and Places, F Essential Guide, A Science in Action.

HCB, Ecuador

1100 S Let My People Think, M-F Insight for Living, A We Kids, 1128 M-F Money Minute; 1130 S Encounter, M-F Morning in the Mountains (Christian breakfast show w/Bible Minute 1134, Scriptural Reading 1142, Beyond the Call 1148), A Down Gilead Lane.

Radio Australia

1100 D News; 1105 S Correspondents' Report, M-A Asia Pacific (regional current affairs); 1130 S Bush Telegraph (rural life), M-F Regional Sports Report, A Fine Music Australia (classical); 1135 M-F Life Matters (personal and social issues).

Radio Japan

1100 D News; 1110 S Hello from Tokyo (listener contact), A Pop Goes Asia; 1115 M-F Asian Top News (headlines from region's radio); 1125 M Unforgettable Music Masterpieces, T Let's Learn Japanese, W Japan Music Log, H Brush Up Your Japanese, F Music Beat.

Radio Sweden

1130 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report) A Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); 1145 M Sports Scan, T Media Scan (1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

Radio New Zealand International

1100 D RNZ News; 1105 S Sportsworld, M-H Kim Hill (interviews), F Sports Story, A The World in Sport; 1125 S A Question of Religion; 1130 F Top 5 (music), A NZ News; 1135 A Dateline Pacific.

WHRI, Indiana

6040 kHz.: 1100 M-F Music (Christian contemporary and gospel).
9495 kHz.: 1100 A Joe 2K; 1130 M-F Music (Christian contemporary and gospel), A OXing with Cumbre.

WWCR, Tennessee

5070 kHz.: 1100 S Profiles; 1105 A This Week in Americana (antiques/collectibles).

15685 kHz.: 1100 T World of Radio, W Communications World, F The Big Backyard (Australian country music), A Profiles; 1110 A A View from Europe; 1115 A Eco Watch (ecology); 1130 A World of Radio.

1200 UTC - Page 49 Freqs

BBC World Service (am)(me)(wcaf)

1200 D Newshour.
[Special service to the Caribbean on 6195 & 15220 kHz.: 1205 M-F Caribbean Business; 1210 M-F Caribbean Report.]

BBC World Service (eu)

1200 D News; 1205 S The Alternative (music), M-F Outlook (magazine), A Wright Around the World (music requests); 1230 S Global Business; 1245 M A Radio History of the World, T Heart and Soul, W Best of 'The Edge', H Body and Mind, F Patterns of Faith.

BBC World Service (esaf)

1200 S/A Newshour, M-F News; 1205 M-F Outlook (magazine); 1245 M A Radio History of the World, T Heart and Soul, W Best of 'The Edge', H Body and Mind, F Patterns of Faith.

BBC World Service (oas)

1200 S Play of the Week (cont'd. from 1130), M-A News; 1205 M-F Outlook (magazine), A Panel game or Quiz; 1230 S Agenda (trends), A Assignment; 1245 M Patterns of Faith, T A Radio History of the World, W Heart and Soul, H Best of 'The Edge', F Body and Mind.

HCB, Ecuador

1200 S Moody Presents, M-F Morning in the Mountains (cont'd. from 1130 w/ Latin American & International News 1200 & 1230, Sports News 1205, Insights 1206, Mission Network News 1224, Church Doctor 1233, Guidelines for Living 1245, The Gospel Truth 1255), A Adventures in Odyssey; 1230 S Words to Live By, A Toonz!.

Radio Australia

1200 D News; 1205 S Country Club (country music), M-H Late Night Live (discussion and interviews), F Sound Quality (innovative music), A The Spirit of Things (spiritual matters).

Radio Canada International

1200 M-F News; 1210 M-F This Morning (magazine).

Radio Sweden

1230 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report) A Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); 1245 M Sports Scan, T Media Scan (1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WHRI, Indiana

6040 kHz.: 1200 A OXing with Cumbre; 1205 M-F Music (Christian contemporary and gospel).

15105 kHz.: 1205 M-F Music (Christian contemporary and gospel); 1230 S Joe 2K, A OXing with Cumbre.

WWCR, Tennessee

5070 kHz.: 1205 A Rock the Universe (Christian rock music).
15685 kHz.: 1245 M Eco Watch (ecology).

YLE Radio Finland

1230 S Capital Cafe (conversations), M-F Finland This Morning (magazine), A Finland This Week (review); 1245 A Starting Finnish (language course).

Shortwave Guide



1300 UTC - Page 49 Freqs

BBC World Service (am)

1300 D News; 1305 S Jazzmatuzz, M-F Outlook (magazine), A Global Business; 1330 S In Praise of God, A People & Politics; 1345 M-F Off the Shelf (book readings).

BBC World Service (eu)

1300 S/A Newshour, M-F News; 1305 M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing; 1330 M Composer of the Month, T Music Mix, W UK Top 20, H Panel game or Quiz, F World of Music.

BBC World Service (me)

1300 D News; 1305 S The Alternative (music), M Discovery (science), T Health Matters, W Science View, H Sports International, F One Planet (ecology), A Jazzmatuzz; 1330 S Global Business, M Essential Guide, T Everywoman, W Focus on Faith, H Pick of the World (best of the BBC), F People and Places.

BBC World Service (wcaf)

1300 D News; 1305 S Concert Hall, M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Jazzmatuzz; 1330 M Composer of the Month, T Music Mix, W UK Top 20, H Panel game or Quiz, F World of Music, A Arts in Action.

BBC World Service (esaf)

1300 D News; 1305 S Concert Hall, M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Jazzmatuzz; 1330 M Composer of the Month, T Music Mix, W UK Top 20, H Panel game or Quiz, F World of Music, A People and Politics.

BBC World Service (eas)

1300 D Newshour; 1350 M-F World Business Report.

Channel Africa

1300 S/A Channel Africa Extra (weekend variety magazine).

China Radio International

1300 D News; 1310 S Report on Developing Countries, M-F Current Affairs, A Global Review; 1320 S In the Spotlight (cultural magazine), A Listeners' Garden; 1330 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

HCIJ, Ecuador

1300 S Message of Truth, M-F Precept, A Toonz! (from 1230); 1313 M-F Getting the Message; 1315 M-F Proclaim; 1330 S Mountain Meditations, M-F Family Life Today, A Rock Solid.

Radio Australia

1300 D News; 1305 S Country Club (cont'd. from 1205), A The Science Show; 1310 M-F Regional Sports Report; 1315 M-F The Planet (diverse music from around the world).

Radio Canada International

1300 D News; 1305 S The Sunday Edition, M-F This Morning (cont'd. from 1210), A The House (Canadian politics).

Radio Sweden

1330 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report)/A Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); 1345 M Sports Scan, T Media Scan (1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WHRI, Indiana

6040 kHz.: 1307 S Music (Christian contemporary and gospel), 15105 kHz.: 1300 M-F World Harvest Live; 1315 S Music (Christian contemporary and gospel); 1345 A Music (Christian contemporary and gospel).

WWCR, Tennessee

15685 kHz.: 1315 A Ask WWCR (letters).

1400 UTC - Page 50 Freqs

BBC World Service (am)

1400 D News; 1405 S Talking Point (global phone-in), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary), A Sportsworld (live action); 1430 M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; 1445 W UK Album Chart, F Music X-Press.

BBC World Service (eu)(wcaf)

1400 D News; 1405 S Talking Point (global phone-in), M Discovery (science), T Health Matters, W Science View, H Sports International, F One Planet (ecology), A Sportsworld (live action); 1430 M Essential Guide, T Everywoman, W Focus on Faith, H Pick of the World (best of the BBC), F People and Places.

BBC World Service (me)(esaf)

1400 S/A News, M-F World Briefing; 1405 S Talking Point (global phone-in), A Sportsworld (live action); 1420 M-F World Business Report; 1430 M-F British News; 1445 M-H Sports Roundup, F Football Extra.

BBC World Service (eas)

1400 S/A News, M-F East Asia Today; 1405 S Talking Point (global phone-in), A Sportsworld (live action); 1430 M-F British News; 1445 M-H Sports Roundup, F Football Extra.

Channel Africa

1300 S/A Channel Africa Extra (cont'd. from 1200).

China Radio International

1400 D News; 1410 S Report on Developing Countries, M-F Current Affairs, A Global Review; 1420 S In the Spotlight (cultural magazine), A Listeners' Garden; 1430 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

HCIJ, Ecuador

1400 S Renewing Your Mind, M-F Haven, A Rock Solid (from 1330).

Radio Australia

1400 D News; 1405 S Books and Writing, M-F The Planet (cont'd. from 1315), A New Dimensions ("progressive" ideas).

Radio Canada International

1400 D News; 1405 S The Sunday Edition (cont'd. from 1310), M-F This Morning (cont'd. from 1210), A Vinyl Cafe; 1430 F C'est La Vie (life in French Canada); 1445 M-H Out Front (experimental radio).

Radio Japan

1400 D News; 1410 S Pop Goes Asia, A Weekend Square (Japanese life); 1415 M-F 44 Minutes (feature magazine).

WHRI, Indiana

6040 kHz.: 1400 M-F World Harvest Live; 1430 S/A DXing with Cumbre. 15105 kHz.: 1405 M-F Music (Christian contemporary and gospel); 1430 S Music (Christian contemporary and gospel).

1500 UTC - Page 51 Freqs

BBC World Service (am)

1500 D News; 1505 S Concert Hall, M One Planet (ecology), T Discovery (science), W Health Matters, H Science View, F Sports International, A Sportsworld (live action); 1530 M People & Places, T Essential Guide, W Everywoman, H Focus on Faith, F Pick of the World (BBC's best).

BBC World Service (eu)

1500 S/A News, M-F World Briefing; 1505 S Concert Hall, A Sportsworld (live action); 1530 M-F British News; 1545 M/T/H Analysis, W From Our Own Correspondent, F Analysis at The New Europe.

BBC World Service (me)

1500 D News; 1505 S Concert Hall, M-F Outlook (magazine), A Sportsworld; 1545 M Patterns of Faith, T A Radio History of the World, W Heart and Soul (religion), H Best of 'The Edge' (youth culture), F Body and Mind (health).

BBC World Service (wcaf)(esaf)

1500 D News; 1501 S Play of the Week; 1505 M-F Focus on Africa, A Sportsworld; 1530 M-F World Learning (instructional series).

BBC World Service (eas)

1500 D News; 1505 S The Alternative (music), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary), A Sportsworld (live action); 1530 M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; 1545 W UK Album Chart, F Music X-Press.

China Radio International

1500 D News; 1510 S Report on Developing Countries, M-F Current Affairs, A Global Review; 1520 S In the Spotlight (cultural magazine), A Listeners' Garden; 1530 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Radio Australia

1500 D News; 1505 S Encounter (religion in Australia), M-F Asia Pacific (regional current affairs), A Melisma (innovative music); 1530 M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor.

Radio Austria International

1530 D Report from Austria (magazine); 1535 S Radio E, A Week in Review; 1550 A Listener Letters.

Radio Canada International

1500 S/A News; 1505 S The Sunday Edition (cont'd. from 1310), A Quirks and Quarks (science).

WHRI, Indiana

13760 kHz.: 1505 S World Harvest Country Style; M-F Music (Christian contemporary and gospel); 1530 S/A DXing with Cumbre.

15105 kHz.: 1500 S DXing with Cumbre; 1502 A 20 The Countdown Magazine (Christian rock music charts); 1505 M-F Music (Christian contemporary and gospel).

17650 kHz.: 1505 M-F Music (Christian contemporary and gospel); 1515 S Music (Christian contemporary and gospel).

1600 UTC - Page 51 Freqs

BBC World Service (am)(eu)(eas)

1600 S/A News, M-F Europe Today; 1605 S/A Sportsworld (live action); 1630 M-F World Business Report; 1645 M-F Sports Roundup.

BBC World Service (me)

1600 D News; 1605 S/A Sportsworld (live action), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary); 1630 M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; 1645 W UK Album Chart, F Music X-Press.

BBC World Service (wcaf)(esaf)

1600 D News; 1605 S/A Sportsworld (live action), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary); 1630 M/F Fast Track (African sport), T The Story of Africa, W Talkabout Africa, H Artbeat.

HCIJ, Ecuador

1600 S Message of Truth, M-F Renewing Your Mind, A Words of Hope.

Radio Australia

1600 D News; 1605 S The National Interest (Australian politics), M Margaret Throsby (interview and music), T The Comfort Zone (Australian homes/gardens/food), W Verbatim (oral histories), H Hindsight (Australian history), F AWAY! (Aboriginal culture), A Melisma (cont'd. from 1505); 1630 W Earshot (Australian voices).

WHRI, Indiana

13760 kHz.: 1615 S Music (Christian contemporary and gospel). 15105 kHz.: 1600 A 20 The Countdown Magazine (Christian rock music charts); 1605 S-F Music (Christian contemporary and gospel). 17650 kHz.: 1600 A Music (Christian contemporary and gospel).

WWCR, Tennessee

12060 kHz.: 1630 A Keen on Jazz. 15685 kHz.: 1600 M-F World Wide Country Radio (country music).

Shortwave Guide



1700 UTC - Page 52 Freqs

BBC World Service (eu)

1700 D News; 1701 S Play of the Week (radio theatre); 1705 M-F Outlook (magazine), A From Our Own Correspondent; 1730 A Agenda (trends); 1745 M Patterns of Faith, T A Radio History of the World, W Heart and Soul (religion), H Best of 'The Edge' (youth culture), F Body and Mind (health).

BBC World Service (me)

1700 S-F News, A World Briefing; 1701 S Play of the Week (radio theatre); 1705 M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science); 1720 A British News; 1730 M Everywoman, T Focus on Faith, W Pick of the World (best of the BBC), H People and Places, F Essential Guide, A Westway Omnibus (drama serial).

BBC World Service (wcaf)(esaf)

1700 D News; 1705 D Focus on Africa; 1745 D Sports Roundup.

BBC World Service (sas)

1700 S/A World Briefing, M-F News; 1705 M Panel game or Quiz, T The Alternative (music), W Greenfield Collection (classical music requests), H Jazzmatazz, F Composer of the Week; 1720 S/A British News; 1730 S Reporting Religion, M-F Off the Shelf (book readings), A World Business Review; 1745 D Sports Roundup.

1800 UTC - Page 52 Freqs

BBC World Service (eu)

1800 S/A World Briefing, M-F News; 1805 T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Omnibus (documentary); 1820 S/A British News;

1830 S Assignment, M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music, A World Business Review; 1845 W UK Album Chart, F Music X-Press, A Letter from America.

BBC World Service (me)(wcaf)

1800 D World Briefing; 1820 D British News; 1830 S Assignment, M-F World Business Report, A World Business Review; 1845 M/T/H/F Analysis, W From Our Own Correspondent, A Letter from America.

BBC World Service (esaf)

1800 S/A World Briefing, M-F News; 1805 M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science); 1820 S/A British News; 1830 S Assignment, M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide, A World Business Review; 1845 A Letter from America.

1900 UTC - Page 53 Freqs

BBC World Service (eu)

1900 S/A World Briefing, M-F News; 1905 M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science); 1920 S/A Sports Roundup; 1930 S Science in Action, M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide, A Westway Omnibus (drama serial).

BBC World Service (me)

1900 S/A News, M-F World Briefing; 1905 S Greenfield Collection (classical music requests), A Jazzmatazz; 1920 M-F Sports Roundup; 1930 S From Our Own Correspondent, M Body and Mind (health), T Patterns of Faith, W A Radio History of the World, H Heart and Soul (religion), F Best of 'The Edge' (youth culture), A Composer of the Month.

BBC World Service (wcaf)

1900 D News; 1905 S From Our Own Correspondent, M-F Focus on Africa, A Westway Omnibus (drama serial); 1930 S Body and Mind (health), M/F Fast Track (African sport), T Artebat, W Talkabout Africa, H Postmark Africa, A Greenfield Collection (classical music requests)

BBC World Service (esaf)

1900 S-F News, A World Briefing; 1905 S Wright Around the World (music requests), M-F Focus on Africa; 1920 A Sports Roundup; 1930 M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music, A Science in Action.

2000 UTC - Page 53 Freqs

BBC World Service (eu)(me)

2000 D Newshour.

BBC World Service (wcaf)(esaf)

2000 D Newshour; 2050 D Sports Roundup.

2100 UTC - Page 54 Freqs

BBC World Service (om)

2100 D News; 2105 S Global Business, M-F World Business Report, A World Business Review; 2120 M-A British News; 2130 D Sports Roundup; 2145 S Reporting Religion, M/T/H/ F Analysis, W From Our Own Correspondent, A Letter from America.

[Special service to the Caribbean on 5975/11675/15390 kHz.: 2105 M-F Caribbean Report. Special service to the Falklands on 5975/11680 kHz.: 2130 T/F Calling the Falklands.]

BBC World Service (eu)

2100 D News; 2105 M-F World Business Report, A Jazzmatazz; 2120 M-F British News; 2130 S Panel game or Quiz, M-F Sports Roundup, A Composer of the Month; 2145 M-F Off the Shelf (book readings).

BBC World Service (wcaf)

2100 D News; 2105 S Wright Around the World (music requests), M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science), A Science in Action; 2130 M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide, A People and Politics.

Radio Australia

2100 D News; 2105 F Feedback A Australia All Over; 2110 S-H AM (morning news magazine); 2130 S Educational series, M Health Report, T Innovations, W Religion Report, H Rural Reporter, F Jazz Notes.

2200 UTC - Page 55 Freqs

BBC World Service (om)

2200 D The World Today; 2230 S Agenda (trends), F People and Politics, A From Our Own Correspondent.

BBC World Service (wcaf)

2200 D News; 2205 S Panel game or Quiz, M-F Outlook (magazine), A Omnibus (documentary); 2230 S World of Music, A From Our Own Correspondent; 2245 M Patterns of Faith, T A Radio History of the World, W Heart and Soul (religion), H Best of 'The Edge' (youth culture), F Body and Mind (health).

Radio Australia

2200 D News; 2210 S-H AM (morning news magazine), F Asia Pacific Weekend Edition, A Correspondents' Report; 2240 S Australian Music Show (rock), M/H Music Deli (international), T Blocktracker (Aboriginal contemporary), W Country Style.

Radio Canada International

2200 S/A The World This Weekend, M-F The World at 6; 2230 S Inside Track (sports anthologies) M-F As It Happens (interviews with newsmakers), A Madly Off in All Directions (comedy).

Radio Vlaanderen Internationaal

2230 S Radio World, M-F News, A Music from Flanders; 2234 M-F Belgium Today; 2238 S Tourism in Flanders, M-F Press Review; 2243 M Focus on Europe, T Green Society (ecology), W/F Around the Arts, H Economics; 2244 S Brussels 1043 (letters); 2248 M Sports, W Around Town, H International Report, F Tourism in Flanders; 2254 S-F Soundbox (Flemish rock).

2300 UTC - Page 55 Freqs

BBC World Service (am)

2300 S World Briefing, M-F News, A News Summary; 2301 A Play of the Week (radio theatre); 2305 M-F Outlook (magazine); 2320 S Sports Roundup; 2330 S Greenfield Collection (classical music); 2345 M Patterns of Faith, T Plain English, W Heart & Soul (religion), H Best of 'The Edge' (youth culture), F Body & Mind (health).

BBC World Service (oas)

2300 D The World Today; 2330 F Global Business, A Arts in Action.

China Radio International

2300 D News; 2310 S Report on Developing Countries, M-F Current Affairs, A Global Review; 2320 S In the Spotlight (cultural magazine), A Listeners' Garden; 2330 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Radio Australia

2300 D N-ews; 2305 F Lingua Franca (about language, A Ockham's Razor (science issue); 2310 S-H Asia Pacific (regional current affairs); 2320 F Short Story; 2330 S Earthbeat (ecology), M Innovations (Australian products/ingenuity), T Arts Talk, W Rural Reporter, H Media Report, F In Conversation-Science.

Radio Canada International

2300 D CBC News; 2305 S Global Village (world music), M-F As It Happens (interviews with newsmakers)[began at 2230], A Quirks & Quarks (science); 2330 W Dispatches (world events through Canadian eyes).

Radio Netherlands

2330 S/A News; M-F Newslines; 2335 S Sincerely Yours (letters), A Europe Unzipped, 2355 A Insight (commentary).

Radio New Zealand International

2300 S-H World and Pacific News, F/A RNZ News; 2310 S-H Sports News, F Saturday Night with John Campbell, A Feature or series; 2315 S-H Pacific Weather; 2317 Kim Hill (interviews/current affairs).

WBCQ, Maine

7415 kHz. 2300 S Le Show (humor/entertainment), F Scream of the Butterfly, A The Real Amateur Radio Show; 2330 W World of Radio, A Fred Flintstone Music Show.

17495 kHz.: 2300 A Marion's Attic (vintage recordings).

WHRI, Indiana

5745 kHz. 2300 F OXing with Cumbre; 2330 A OXing with Cumbre. 7315 kHz.: 2300 F OXing with Cumbre; 2330 A OXing with Cumbre; 2335 F Music (Christian contemporary and gospel). 7580 kHz. 2300 F 20 The Countdown Magazine (Christian contemporary music charts).

WWCR, Tennessee

3215 kHz.: 2330 S Ken's Country Classics
5070 kHz. 2305 S Pat Boone Show.

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Bob Fraser, Cohasset, MA; Hans Johnson, WY/Ulis Fleming, MD /Cumbre DX/ BBCM; BBC Harold Sellers, DX Ontario; Hard Core DX; Radio Sweden/Media Scan; Robert E. Thomas, Bridgeport, CT; Usenet Newsgroups; Worldwide DX Club.

Satellite Service Guide



Robert Smathers
roberts@nmia.com

www.grove-ent.com/mtssg.html

All Frequencies MHz

GE Americom GE-1 - C-Band

103 degrees West longitude

1(H)	3720	Occasional video/HUD-TV (Housing and Urban Development)
2(V)	3740	Occasional video
3(H)	3760	PBS (digital)
4(V)	3780	Fox Sports Net (digital)
5(H)	3800	GEMS/Globecast (digital)
6(V)	3820	Valuevision (digital)
7(H)	3840	Pax TV/Worship TV/Praise TV (digital)
8(V)	3860	In Demand PPV (digital)
9(H)	3880	Fox Sports South (VC2 +) 7.28 KHCB-FM, Houston, TX - religious format
10(V)	3900	Data Transmissions
11(H)	3920	Univision feeds (digital)
12(V)	3940	Wisdom Television 7.10, 7.92 Wisdom Radio
13(H)	3960	In Demand PPV (digital)
14(V)	3980	In Demand PPV (digital)
15(H)	4000	Total Living Network (digital)
16(V)	4020	Occasional video
17(H)	4040	Telemundo (digital)
18(V)	4060	Fox Sports Net (digital)
19(H)	4080	Data Transmissions
20(V)	4100	M2: Music Television
21(H)	4120	Univision feeds (occasional)
22(V)	4140	Deutsche Welle TV 7.38, 7.56 Deutsche Welle radio (German) 7.74 Deutsche Welle radio (English) 7.92 Deutsche Welle radio (various languages)
23(H)	4160	TV Games Network (VC2 +)
24(V)	4180	Data Transmissions

GE Americom GE-1 - Ku-Band

103 degrees West longitude

1(H)	11720	Qualcomm Data Transmissions
2(V)	11740	Data Transmissions
3(H)	11760	NBC Television Network - Eastern Time Zone feed
4(V)	11780	Data Transmissions
5(H)	11800	Qualcomm Data Transmissions
6(V)	11820	Data Transmissions
7(H)	11840	NBC Television Network - feeds
8(V)	11860	Qualcomm Data Transmissions
9(H)	11880	NBC Television Network - Mountain Time Zone feed
10(V)	11900	Qualcomm Data Transmissions
11(H)	11920	(none)
12(V)	11940	Microspace (digital)
13(H)	11960	Data Transmissions
14(V)	11980	Qualcomm Data Transmissions
15(H)	12000	NBC Television Network - feeds
16(V)	12020	DirectPC (digital)
17(H)	12040	NBC Television Network - Pacific Time Zone feed
18(V)	12060	StarNet (digital)
19(H)	12080	NBC Newschannel/SNG (digital)
20(V)	12100	Data Transmissions
21(H)	12120	NBC SNG (digital)
22(V)	12140	Microspace (digital)

23(H)	12160	NBC SNG (digital)
24(V)	12180	Federal Express TV (digital)

GE Americom GSTAR-4 - Ku-Band

105 degrees West longitude

T01(H)	11730	Data Transmissions
T02(H)	11791	Data Transmissions
T03(H)	11852	Occasional video
T04(H)	11913	Occasional video
T05(H)	11974	Court TV feeds (occasional)/Occasional video
T06(H)	12035	Data Transmissions
T07(H)	12096	Data Transmissions
T08(H)	12157	Data Transmissions
T09(V)	11744	Data Transmissions
T10(V)	11805	Data Transmissions
T11(V)	11866	Data Transmissions
T12(V)	11927	Data Transmissions
T13(V)	11988	Occasional video
T14(V)	12049	Data Transmissions
T15(V)	12110	Occasional video
T16(V)	12171	Data Transmissions

Telesat Canada Anik F1 - C-band

107.3 degrees West longitude

Transponders with an "S" are beamed to South America.

1A(H)	3720	(none)
S1A(H)	3720	Data Transmissions
1B(V)	3740	Data Transmissions
2A(H)	3760	CBC (digital)
S2A(H)	3760	(none)
2B(V)	3780	Musimax/Musique Plus (digital)
3A(H)	3800	Data Transmissions
S3A(H)	3800	Data Transmissions
3B(V)	3820	Occasional video
4A(H)	3840	(none)
S4A(H)	3840	Data Transmissions
4B(V)	3860	Occasional video
5A(H)	3880	(none)
S5A(H)	3880	Data Transmissions
5B(V)	3900	Concom (digital)
6A(H)	3920	Radio Canada (digital)
S6A(H)	3920	(none)
6B(V)	3940	Concom (digital)
7A(H)	3960	CBC feeds (occ video)/SCPC Services 1205.50 (54.5) CBC Radio 1206.00 (54.0) CBC Radio - Occasional feeds/events
S7A(H)	3960	(none)
7B(V)	3980	Concom (digital)
8A(H)	4000	Occasional video
S8A(H)	4000	(none)
8B(V)	4020	Occasional video
9A(H)	4040	CBC feeds (occ video)/SCPC Services 1126.00 (54.0) CBC Radio 1125.50 (54.5) CBC Radio

S9A(H)	4040	(none)
9B(V)	4060	Meteo Media/TV 5 (digital)
10A(H)	4080	(none)
S10A(H)	4080	Data Transmissions
10B(V)	4100	CTV/The Weather Network (digital)
11A(H)	4120	Occasional video
S11A(H)	4120	(none)
11B(V)	4140	Occasional video

12A(H)	4160	CBC feeds (occ video)/SCPC Services 1005.50 (54.5) CBC Radio
S12A(H)	4160	(none)
12B(V)	4180	Occasional video

Telesat Canada Anik F1 - Ku-Band

107.3 degrees West longitude

Transponders with an "S" are South American beamed.

T1(V)	11714	Star Choice (digital)
T2(V)	11744	Star Choice (digital)
T3(V)	11775	Star Choice (digital)
T4(V)	11807	Star Choice (digital)
T5(V)	11836	Star Choice (digital)
T6(V)	11867	Star Choice (digital)
T7(V)	11897	Star Choice (digital)
T8(V)	11928	Star Choice (digital)
T9(V)	11960	Star Choice (digital)
T10(V)	11990	Star Choice (digital)
T11(V)	12020	Star Choice (digital)
T12(V)	12051	Star Choice (digital)
T13(V)	12081	Star Choice (digital)
T14(V)	12113	Star Choice (digital)
T15(V)	12140	Star Choice (digital)
T16(V)	12172	Star Choice (digital)
T17(H)	11725	Star Choice (digital)
T17S(H)	11725	(none)
T18(H)	11756	Star Choice (digital)
T18S(H)	11756	(none)
T19(H)	11786	Star Choice (digital)
T19S(H)	11786	(none)
T20(H)	11817	Star Choice (digital)
T20S(H)	11817	(none)
T21(H)	11850	Star Choice (digital)
T21S(H)	11850	Data Transmissions
T22(H)	11880	Star Choice (digital)
T22S(H)	11880	(none)
T23(H)	11910	SRC/CBC feeds
T23S(H)	11910	(none)
T24(H)	11940	CBC/SRC feeds
T24S(H)	11940	(none)
T25(H)	11971	Star Choice (digital)
T25S(H)	11971	(none)
T26(H)	12002	Star Choice (digital)
T26S(H)	12002	(none)
T27(H)	12033	Star Choice (digital)
T27S(H)	12033	(none)
T28(H)	12063	Star Choice (digital)
T28S(H)	12063	(none)
T29(H)	12094	Star Choice (digital)
T29S(H)	12094	(none)
T30(H)	12124	Star Choice (digital)
T30S(H)	12124	(none)
T31(H)	12155	Star Choice (digital)
T31S(H)	12155	Data Transmissions
T32(H)	12180	Star Choice (digital)
T32S(H)	12180	Data Transmissions

3B(V)	3820	Occasional video
4A(H)	3840	Data Transmissions
4B(V)	3860	Data Transmissions
5A(H)	3880	(none)
5B(V)	3900	(none)
6A(H)	3920	Occasional video
6B(V)	3940	Occasional video
7A(H)	3960	(none)
7B(V)	3980	Occasional video
8A(H)	4000	Occasional video
8B(V)	4020	Occasional video
9A(H)	4040	(none)
9B(V)	4060	(none)
10A(H)	4080	Data Transmissions
10B(V)	4100	Data Transmissions
11A(H)	4120	Data Transmissions/SCPC Services 1036.70 (63.3) In-store Music 1037.00 (63.0) In-store Music 1037.50 (62.5) In-store Music
11B(V)	4140	(none)
12A(H)	4160	Occasional video
12B(V)	4180	(none)

Telesat Canada Anik E2 - Ku-Band

111 degrees West longitude

T01(V)	11717	Data Transmissions
T02(V)	11743	Data Transmissions
T03(V)	11778	Data Transmissions
T04(V)	11804	Data Transmissions
T05(V)	11839	Data Transmissions
T06(V)	11865	Data Transmissions
T07(V)	11900	Occasional video
T08(V)	11926	Occasional video
T09(V)	11961	Saskatchewan Communications Network (SCN) (digital)
T10(V)	11987	Star Choice (digital)
T11(V)	12022	Star Choice (digital)
T12(V)	12048	Star Choice (digital)
T13(V)	12083	Star Choice (digital)
T14(V)	12109	Star Choice (digital)
T15(V)	12144	Telesat G.L.A.C.S. (digital)
T16(V)	12170	Occasional video
T17(H)	11730	Data Transmissions
T18(H)	11756	Data Transmissions
T19(H)	11791	Data Transmissions
T20(H)	11817	Data Transmissions
T21(H)	11852	Star Choice (digital)
T22(H)	11878	Star Choice (digital)
T23(H)	11913	Occasional video
T24(H)	11939	Occasional video
T25(H)	11974	Star Choice (digital)
T26(H)	12000	Star Choice (digital)
T27(H)	12035	Occasional video
T28(H)	12061	Occasional video
T29(H)	12096	Occasional video
T30(H)	12122	Telesat G.L.A.C.S. (digital)
T31(H)	12157	Star Choice (digital)
T32(H)	12183	Star Choice (digital)

TeleSat Canada Anik E2 - C-Band

111 degrees West longitude

1A(H)	3720	Occasional video
1B(V)	3740	Occasional video
2A(H)	3760	Data Transmissions
2B(V)	3780	Data Transmissions
3A(H)	3800	Data Transmissions

See Universal Electronic's ad on page 79 for satellite equipment.



Operational WXSATs

Just a few weeks after the new daily resynchronization routine was implemented for NOAA-15, problems appear to have taken over once more. The AVHRR (advanced very high resolution radiometer) is synchronized each day at 0730UTC. Despite this, many passes during May were once more providing unsynchronized data. Images are characterized by missing lines. Fortunately, some passes remain good, and due to the favorable ground illumination of the morning passes, these can be spectacular. If the image is already good during resynchronization, just a few seconds of data are lost.

NOAA is not the only organization experiencing problems with its fleet. Meteor 2-21 was reactivated in late April, transmitting APT (automatic picture telemetry) on 137.40 MHz, to act as a temporary replacement for Meteor 3-5. This has been an established routine each time that Meteor 3-5's orbit precesses into full sunlight (where, paradoxically, although continuously illuminated, the actual strength of the sunlight is minimal due to its aspect). I logged Meteor 2-21's transmission on 26 April, yet within a day or so it appeared to have been powered off. The same day, a transmission from Okean-O was received on 137.40 MHz, which might explain the apparent switch-off of Meteor 2-21.

With NOAA-16 not providing any APT either, we have another period of limited satellite transmissions. At least GOES is reliable!

Correspondence

A number of readers have sent images showing significant weather in their regions. This month I am including two such images from Joseph Gresham. Joseph's first image was received from GOES while using the CONUS (continental US) rapid scan mode. As of April 22, he commented "For the last three days, the nation's heartland has been getting pounded, with Kansas having tornadoes and severe storms. Figure 1 shows the CONUS Rapid Scan, and as you can see another cold front is going through Texas and Kansas with severe storms – notice the warm front just ahead."

I believe Joseph has recently acquired a new HRPT system from Timestep, or their US agents. He completed the set-up and plans to mount the tracking dish on a tower. He sent me figure 2 – an image from NOAA-16. "As you can see, there is a low pressure system giving Cuba some major thunderstorms. On the down side, central Florida did not get any rain from this, and we are in a severe drought." Internet site update.

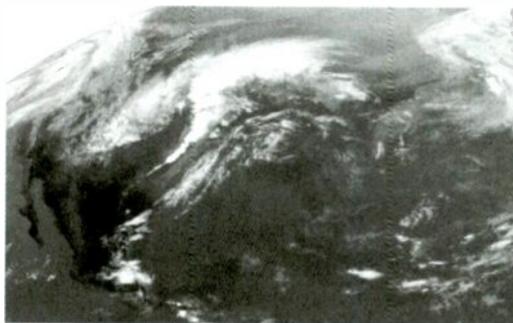


Fig 1: CONUS rapid scan image April 22, 22:41UTC channel-4 (infrared) from Joseph Gresham.



Fig 2: NOAA-16 HRPT image from April 29, from Joseph Gresham.

The Cooperative Institute for Meteorological Satellite Studies (CIMSS) is based at the Space Science and Engineering Center, at the university of Wisconsin-Madison. I discovered their home page while checking out information about the next GOES WXSAT – GOES-M. The Institute provides free access to a variety of satellite-originated imagery and data, together with real-time images and updates on GOES.

Their site notes that there are a couple of small differences between this latest GOES and the previous GOES birds (GOES-8 through GOES-11):

The 12.0 micrometer infrared channel (useful for such things as volcanic ash detection and low-level moisture detection) is being replaced with a 13.35micrometer "CO2 absorption channel" (to be used to improved cloud cover and cloud height measurements).

The water vapor channel is double the resolution of previous GOES – 4km (instead of 8km) – and is a little wider.

<http://cimss.ssec.wisc.edu/>

<http://cimss.ssec.wisc.edu/goes/realtime/grtmain.html#gscb05>

Some personal thoughts

I have to admit a degree of envy at the enlightened attitude to satellite image transmissions shown by the USA, in comparison to that shown by Eumetsat – the European organization responsible for the operation of Meteosat-7. I really need the high resolution (Primary Data) images transmitted almost continuously from Meteosat-7. Following a controversial decision by Eumetsat's council, virtually all Meteosat's images are encrypted, preventing the majority of users from seeing what the satellite is providing.

Moving house! When we first moved here, nearly 18 years ago, the house was selected for its accommodation. With our son and daughter having moved towards London, I now need a bigger garden for my dishes and antenna, and to get better coverage for my weather satellite tracking system! The tracking dish receives NOAA high resolution picture telemetry (HRPT) from a limited sky; there is virtually no east because our house is three stories tall. I am searching for a house and garden that will allow me to "rediscover" Europe.

Frequencies

NOAA-14 transmits APT on 137.62 MHz

NOAA-12 and NOAA-15 transmit APT on 137.50 MHz

Meteor 3-5 may transmit APT on 137.30 MHz when in sunlight

Meteor 2-21 may transmit APT on 137.40 MHz (when 3-5 is off)

Resurs 1-4 transmits APT on 137.85 MHz

GOES-8 and GOES-10 transmit WEFAX on 1691 MHz

The Coast Guard on VHF/UHF - I

In last month's *Fed Files* column we presented a sampling of HF spectrum radio frequencies for the U.S. Coast Guard. This month we continue our service profile with a look at some of the Coast Guard's VHF/UHF nationwide assignments and VHF Marine Information Broadcast frequency and transmission times.

General VHF/UHF Assignments

Here is a sample of the Coast Guard's nationwide authorizations. These frequencies should be loaded in your scanner if you are a maritime enthusiast.

40.500	Military joint common frequency (NFM-Narrowband FM)
46.900	Metear Burst communications net (FM)
49.830	Metear Burst communications net (FM)
121.500	Non-Scheduled Marine Broadcast (AM)
122.900	National VHF-AM Search and Rescue (SAR) training frequency (AM)
122.950	Coast Guard Auxiliary Aircraft (AM)
123.100	International VHF-AM SAR frequency (AM)
126.200	Coast Guard Aircraft-Ships Air/Surface (AM)
156.300	Non-Scheduled Marine Broadcast/On-scene SAR frequency/Intership Simplex/Shore Stations to non-government vessels (Channel 6) (NFM)
156.375	Intership Simplex (Channel 67) (NFM)
156.525	International Digital Selective Calling (DSC) for Distress, Safety and Calling (NFM)
156.600	Non-Scheduled Marine Broadcast (Channel 12) (NFM)
156.650	Intership Simplex (Channel 13) (NFM)
156.750	SAR Datum Marker Beacons (NFM)
156.800	International Distress, Safety and Calling (Channel 16) (NFM)
157.075	Marine Environmental Operations (Channel 81) (NFM)
157.100	Non-Scheduled/Scheduled Marine Information Broadcast (Channel 22) (NFM)
169.450/171.025	National Law Enforcement Liaison Net
229.325	SAR Datum Marker Beacons (AM)
229.335	SAR Datum Marker Beacons (AM)
237.900	Air-to-Air homing (AM)
240.600	SAR Datum Marker Beacons (AM)
242.650	SAR Datum Marker Beacons (AM)
242.6625	SAR Datum Marker Beacons (AM)
243.000	Non-Scheduled Marine Broadcast (AM)
275.100	SAR Datum Marker Beacons (AM)
277.800	Navy Fleet Warning/Tactical frequency (AM)
282.800	Joint/Combined on-scene SAR and UHF DF frequency (AM)
381.700	UHF Air/Surface (AM)
381.800	UHF Air/Surface (AM)
383.900	UHF Air/Surface (AM)
406.025	COSPAS-SARSAT satellite ERIPB frequency (NFM)
408.400	National Strike Force Fixed Link Net
418.050	National Strike Force Fixed Link Net

418.075	National Strike Force Fixed Link Net
418.575	National Strike Force Fixed Link Net
467.750	Coast Guard on-board communications

VHF Marine Information Broadcast Schedule

(Marine Channel 22A) All times are UTC, mode is narrowband FM.

1st Coast Guard District

Callsign	Location	Broadcast Times
NMF 2	Woods Hole	1005/2205
NMF 7	Boston	1035/2235
NMF 31	Portland	1105/2305
NMF 44	Southwest Harbor	1135/2335
NMY 3	New York	1050/2250
NMY15	Long Island Sound	1120/2320
NMY 42	Moriches	0010/1210
NMY 52	Sandy Hook	1020/2220

2nd Coast Guard District

Callsign	Location	Broadcast Times
NML 7	Memphis, TN	0100/0700/1400/1900
NML 20	Louisville, KY	0300/0900/1600/2100
NML 21	Keokuk, IA	0200/0800/1300/2000

5th Coast Guard District

Callsign	Location	Broadcast Times
NMK	Cape May	1103/2303
NMN 13	Cape Hatteras	0100/1055
NMN 37	Fort Macon	0130/1030
NMN 70	Chincoteague	0200/1145
NMN 80	Hampton Roads	0230/1120
NMX	Baltimore	0130/1205

7th Coast Guard District

Callsign	Location	Broadcast Times
NCF	Miami Beach	1230/2230
NMA 10	Mayport	1215/2215
NMA 21	St. Petersburg	1200/2300
NMB	Charleston	1200/2200
NMR 1	San Juan Section	1210/2210
NOK	Key West	1200/2200

8th Coast Guard District

Callsign	Location	Broadcast Times
NMG 2	New Orleans Group	1035/1235/1635/2235
NMG 15	Grand Isle	1035/1635/2235
NMG 37	Berwick	1000/1600/2200
NOQ	Mobile	1020/1220/1620/2220
NOQ 7	Panama City	1020/1220/1620/2220
NOY	Galveston	1050/1250/1650/2250
NOY 26	Corpus Christi	1040/1240/1640/2240

9th Coast Guard District

(During the shipping season only)

Callsign	Location	Broadcast Times
NMD 25	Detroit	0135/0435/0735/1035/1335/

NMD 32	Muskegon	1635/1935/2235 0235/0535/0835/1135/1435/ 1735/2035/2335
NMD 35	Alexandria Bay	0235/0535/0835/1135/1435/ 1735/2035/2335
NMD 47	Buffalo	0255/0555/0855/1155/1455/ 1755/2055/2355
NMP 9	Milwaukee	0255/0555/0855/1155/1455/ 1755/2055/2355
NOG	Sault Ste. Marie	0005/0305/0605/0905/1205/ 1505/1805/2105
NOG 14	Duluth	0135/0435/0735/1035/1335/ 1635/1935/2235

11th Coast Guard District

Callsign	Location	Broadcast Times
NMC 6	Monterey	1615/2345
NMC 11	Humboldt Bay	1615/2315
NMC 17	Group San Francisco	1630/1900/2330
NMQ 9	Group Los Angeles — Long Island	0200/1800
NOR	San Diego	0100/1700

13th Coast Guard District

Callsign	Location	Broadcast Times
NMW	Astoria	0533/1733
NMW 43	Seattle	0630/1830
NMW 44	Portland	1745
NOE	North Bend	0603/1803
NOW	Port Angeles	0615/1815

14th Coast Guard District

Callsign	Location	Broadcast Times
NMO 2	Honolulu	0500/1700
NRV	Guam	0900/2100

17th Coast Guard District

Callsign	Location	Broadcast Times
NMJ 1	Juneau	0203/0303/0403/1403/1433/ 1503
NMJ 2	Ketchikan	0215/0233/0315/1415/1433/ 1515
NMJ 3	Valdez	0115/0715/1315/2115
NOJ	Kodiak	0130/0230/0530/1430/1600/ 1800
NOV	Sitka	0103/0903/1350/2103

Next month we will complete our profile of the Coast Guard. We will include a variety of District VHF/UHF scanner frequencies.

And that is it for this month's edition of *The Fed Files*. Now it is time to look at this month's federal spectrum scan in Table One. In this issue we continue our detailed look at the reorganized 406-420 MHz UHF federal land mobile service. 73 and good hunting.

Table One: Federal UHF Land Mobile Service

Frequency	Ch/ Paired Freq	Agencies	Frequency	Ch/ Paired Freq	Agencies	Frequency	Ch/ Paired Freq	Agencies
415.0000	712/Simplex	Army, IRS (Nationwide)						Department, FAA, Forest Service, IRS, Navy, Post Office, Soil Conservation Service
415.0125	713/Simplex	(No reported activity)						(No reported activity)
415.0250	714/Simplex	Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service, Geological Survey, Interior Department (Nationwide), Post Office, TVA	415.3125	17/406.3125	Forest Service	415.5625	37/406.5625	(No reported activity)
			415.3250	18/406.3250	Agriculture Department (Nationwide), Agriculture Research Service, Animal and Plant Health Inspection Service, Federal Reserve System, Food Safety and Inspection Service, Forest Service, Soil Conservation Service	415.5750	38/406.5750	Agriculture Department (Nationwide), Forest Service, NOAA, Post Office
415.0375	715/Simplex	(No reported activity)				415.5875	39/406.5875	(No reported activity)
415.0500	716/Simplex	Post Office (Nationwide)				415.6000	40/406.6000	Drug Enforcement Agency (Nationwide)
415.0625	717/Simplex	(No reported activity)				415.6125	41/406.6125	(No reported activity)
415.0750	718/Simplex	Bureau of Land Management, Bureau of Reclamation, Energy Department, Federal Reserve System, Geological Survey, Interior Department (Nationwide), TVA	415.3375	19/406.3375	(No reported activity)	415.6250	42/406.6250	Air Force, Coast Guard (Nationwide), Energy Department, HHS, Transportation Department
			415.3500	20/406.3500	Federal Trunk Group 3 (paired with 406.5500): Agriculture Department (Nationwide), Air Force, Army, Bureau of Prisons, Energy Department, Federal Grain Inspection Service, Forest Service, NASA	415.6375	43/406.6375	(No reported activity)
415.0875	719/Simplex	(No reported activity)				415.6500	44/406.6500	Secret Service (Nationwide)
415.1000	720/Simplex	Customs Service, Federal Reserve System, IRS (Nationwide)				415.6625	45/406.6625	(No reported activity)
415.1125	1/406.1125	(No reported activity)	415.3625	21/406.3625	(No reported activity)	415.6750	46/406.6750	Secret Service (Nationwide), WHCA (Nationwide)
415.1250	2/406.1250	Hydrologic Channel (center frequency): US Government/Non-Government Agencies (paired with 406.1250)	415.3750	22/406.3750	Agriculture Department (Nationwide), Food Safety and Inspection Service, Forest Service, NASA	415.6875	47/406.6875	(No reported activity)
			415.3875	23/406.3875	(No reported activity)	415.7000	48/406.7000	WHCA (Nationwide)
415.1375	3/406.1375	(No reported activity)	415.4000	24/406.4000	Agriculture Department (Nationwide), Bureau of Land Management (Nationwide), Forest Service (Nationwide), National Institute of Health, Navy, Post Office, Veterans Administration	415.7125	49/406.7125	(No reported activity)
415.1500	4/406.1500	Federal Trunk Group 1 (paired with 406.3500): Air Force, Army, Bureau of Land Management, Bureau of Mines, Bureau of Prisons, Energy Department, Interior Department (Nationwide), NASA, Navy, Post Office	415.4125	25/406.4125	(No reported activity)	415.7250	50/406.7250	IRS (Nationwide)
			415.4250	26/406.4250	Agriculture Department (Nationwide), Animal and Plant Health Inspection Service, Army, Bureau of Land Management, Forest Service, IRS	415.7375	51/406.7375	(No reported activity)
415.1625	5/406.1625	(No reported activity)				415.7500	52/406.7500	Federal Trunk Group 4 (paired with 407.7500): Customs Service, Secret Service (Nationwide)
415.1750	6/406.1750	Hydrologic Channel (center frequency): US Government/Non-Government Agencies (paired with 406.1750): Army, Bureau of Reclamation, General Services Administration, National Park Service, Navy	415.4375	27/406.4375	(No reported activity)	415.7625	53/406.7625	(No reported activity)
			415.4500	28/406.4500	Agriculture Department (Nationwide), Animal and Plant Health Inspection Service, Army, Bureau of Land Management, FAA, Forest Service, Government Printing Office, HHS, NASA, Post Office, TVA	415.7750	54/406.7750	Coast Guard (Nationwide), Energy Department, HHS, Post Office, Transportation Department
415.1875	7/406.1875	(No reported activity)				415.7875	55/406.7875	(No reported activity)
415.2000	8/406.2000	General Services Administration (Nationwide repeater output/simplex)	415.4625	29/406.4625	(No reported activity)	415.8000	56/406.8000	IRS, Secret Service, Treasury Department (Nationwide)
			415.4750	30/406.4750	Agriculture Department (Nationwide), Forest Service, Post Office	415.8125	57/406.8125	(No reported activity)
415.2125	9/406.2125	(No reported activity)				415.8250	58/406.8250	Army, Coast Guard (Nationwide), Energy Department, National Institute of Health, Navy, Post Office
415.2250	10/406.2250	Agriculture Department (Nationwide), Animal and Plant Health Inspection Service, Forest Service, Post Office, Soil Conservation Service	415.4875	31/406.4875	Forest Service	415.8375	59/406.8375	(No reported activity)
			415.5000	32/406.5000	Agriculture Department (Nationwide), Bureau of Land Management (Nationwide), Drug Enforcement Agency, Federal Reserve System, Forest Service (Nationwide), Navy, Post Office, Soil Conservation Service (Nationwide), Veterans Administration	415.8500	60/406.8500	Environmental Research Lab (Nationwide), National Bureau of Standards, NOAA (Nationwide)
415.2375	11/406.2375	(No reported activity)				415.8625	61/406.8625	(No reported activity)
415.2500	12/406.2500	Agriculture Department (Nationwide), Animal and Plant Health Inspection Service, ATF (Nationwide), Federal Reserve System, Forest Service	415.5125	33/406.5125	(No reported activity)	415.8750	62/406.8750	Bureau of Engraving and Printing, Bureau of the Mint, IRS, Navy, Treasury Department
			415.5250	34/406.5250	Agriculture Department (Nationwide), Animal and Plant Health Inspection Service, Forest Service, NASA	415.8875	63/406.8875	(No reported activity)
415.2625	13/406.2625	(No reported activity)				415.9000	64/406.9000	National Weather Service-NOAA weather radio links (Nationwide), State Department
415.2750	14/406.2750	Agriculture Department (Nationwide), Animal and Plant Health Inspection Service, Food Safety and Inspection Service, Forest Service, Post Office, Soil Conservation Service, Veterans Administration	415.5375	35/406.5375	(No reported activity)	415.9125	65/406.9125	(No reported activity)
			415.5500	36/406.5500	Federal Trunk Group 2 (paired with 407.5500): Agriculture Department (Nationwide), Air Force, Army, Bureau of Prisons, Energy	415.9250	66/406.9250	Coast Guard (Nationwide), NASA, National Institute of Health, Transportation Department (Nationwide)
415.2875	15/406.2875	(No reported activity)				415.9375	67/406.9375	(No reported activity)
415.3000	16/406.3000	Agriculture Department (Nationwide), Animal and Plant Health Inspection Service, Forest Service, NOAA, Post Office				415.9500	68/406.9500	Federal Trunk Group 1 (paired with 407.1500): Air Force, Army, Bureau of Prisons, Energy Department, NASA, Navy, Post Office
						415.9625	69/406.9625	(No reported activity)
						415.9750	70/406.9750	Secret Service (Nationwide)
						415.9875	71/406.9875	(No reported activity)

TRACKING THE TRUNKS

TECHNOLOGY, EQUIPMENT, FREQUENCIES AND NEWS

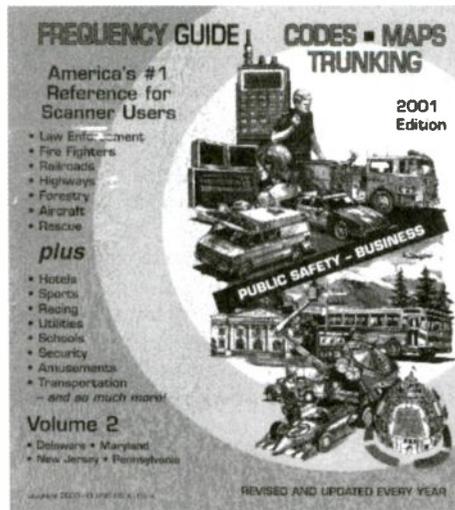
Dan Veeneman

dan@signalharbor.com

Travel Tips

Summertime usually means vacations, and that means taking your scanner on the road. Planes, trains, and automobiles can get you where you want to go, but being able to monitor can make for a more enjoyable and often safer trip.

Preparation is the key. First, map out the areas you'll be traveling to, and any interesting areas along the way. Then locate frequencies for those areas.



◆ Finding Frequencies

The traditional method for finding frequencies is to use a publication such as *Police Call*. My 2001 Edition is well used, and I'd recommend bringing a copy of the proper volume along on your trip. It doesn't need batteries and there's room to make notes or update listings. Also, if the fish aren't biting or you're stuck in your tent during a rain storm you can pass the time by reading the *Listener's Guide* in the front section of the publication, which provides an excellent introduction to radio monitoring in general and scanning in particular. There's also a separate section on trunked radio systems.

The computer age has brought us an alternative way to locate specific frequency and talkgroup information, and that is via the World Wide Web. A number of websites cater to the trunked radio listener, and I'll list a few of the more popular ones here:

<http://www.trunkedradio.net> operated by Lindsay Blanton, offers extensive frequency and talkgroup lists sorted by state. The site also provides news, equipment information, and computer software related to trunked

system monitoring. It's very good, very detailed, and very well maintained.

<http://www.bearcat1.com/fleet.htm> run by the Bearcat Radio Club, provides listings of frequencies and talkgroups for the United States and many foreign countries.

<http://www.trunktracker.com> by Trunking Technologies, LLC, also lists frequencies and talkgroups

<http://home.att.net/~wwhitby/> run by Warren Whitby, contains frequencies and talkgroups, although they don't appear to have been updated for quite some time.

I would also recommend using a search engine such as <http://www.google.com>, which may help to locate frequencies not easily found elsewhere. Using keywords like "trunked" and "talkgroup" along with the city or county of interest will often turn up a wealth of information.

◆ Conventional Frequencies

Besides state and county police, don't forget about federal agencies. For example, the U.S. Fish and Wildlife Service and the National Park Service are two organizations that may be involved in survey, protection, and even rescue operations during the summer. Warm dry weather often means forest fires out west, and frequencies used by the U.S. Forest Service are often busy with firefighting traffic.

Fish and Wildlife Service may be found at 34.8100 and 34.8300 MHz, as well as 408.6750, 408.7500, and 410.6250 MHz.

<http://www.geocities.com/CapeCanaveral/9952/nps.htm> has listings by state of National Park Service operations.

<http://web.csuchico.edu/~cw38/freq/agriculture.html> lists U.S. Department of Agriculture and U.S. Forest Service frequencies related to aerial firefighting in Northern California.

If your scanner doesn't already have it built in, you may want to add the National Oceanic and Atmospheric Administration (NOAA) weather frequencies. NOAA operates more than 500 radio stations across the country, broadcasting weather forecasts and alerts 24 hours a day. The seven nationwide frequencies are 162.400, 162.425, 162.450, 162.475, 162.500, 162.525, and 162.550 MHz.

I'd be interested in hearing about other frequencies, whether trunked or conventional, that you're using during your summer road trips.

◆ Project 25 Scanner in the works

At the end of April, Uniden America announced they are expecting to manufacture a scanner capable of decoding trunked Project 25 radio signals within a year or so. Their primary customer focus for this new scanner appears to be news gathering organizations, who are increasingly shut out from police and fire radio transmissions due to the digital nature of Project 25 and the current lack of consumer digital receivers.

Also, at the Dayton Hamvention in May, the ScannerMaster booth had a sign reading

APCO-25 Digital Monitoring Solution

Scanner/Receiver Drop-in Board
Available in 2001

Offers low-cost solution for receive-only
Also provides all-band analog trunked/
conventional reception

This Drop-in Board is apparently the long-rumored addition to the Uniden Bearcat 780XLT scanner and is being developed by Greg Knox and Rich Bamett.

Uniden expects that public safety agencies may move to encrypted communications once Project 25 scanners become widely available, in order to maintain the relative privacy from scanner listeners they now enjoy. Encrypted signals would be illegal to monitor under federal law, but Uniden speculates that news organizations may petition to Federal Communications Commission (FCC) to make an exception for public safety systems paid for by public tax dollars.

In addition, even though Motorola, the primary manufacturer for Project 25 equipment, would be happy to sell encryption devices to public safety agencies, it's not clear that counties and municipalities will be willing to spend additional dollars in the face of public opposition. Only time will tell.

◆ Fleet Map Programming

Dan,

When it comes to actual scanner programming, I am still unclear about how to use a Fleet Map. For instance, I am attempting to program Jefferson County in Arkansas. The web site shows Fleet Map: B0 = S13; B4 = S12; B6 = S12 Hence, B0 uses 4 blocks, B4 uses 2 blocks and B6 uses 2 blocks for a total of 8.

If I am required to program all eight blocks,

what do I put into the scanner? For instance, what would go into the first block? Would this be S13?

I am assuming that B1, B2, B3, B5, B7 are left without any entry.

The way I understand this, only three entries are required to finish the fleet map. That is, B0, B4 and B6.

I have both a BC245 and Pro-90.

Am I on the right track? Sorry, I am standard in my understanding of this left-brained process.

David

David, don't feel bad. Fleet Maps can be rather confusing at times, but you are indeed on the right track.

Jefferson County, Arkansas, and the city of Pine Bluff use a Motorola Type I analog system. I have conflicting frequency information: one source shows 856.2375, 856.9625, 857.2375, 857.9625, 858.2375, 858.9625, 859.2375, 859.9625, 860.2375, and 860.9625 MHz in use; the other reports only 856.4625, 857.4625, 858.4625, 859.4625, and 860.4625 MHz. Perhaps David or another Arkansas monitor can clarify the situation.

In any case, the Fleet Map information of B0 = S13, B4 = S12, and B6 = S12 breaks down like this. Recall that there are eight blocks in a Type I system. Each block has an associated size code, which can range anywhere from S-1 to S-14. Most size codes fit in a single block, except for S-12, S-13, and S-14. S-12 fits in two blocks, S-13 fits in four blocks, and S-14 fits in eight blocks.

For the Jefferson County system, then, all eight blocks are taken up by the three size codes. Blocks 0, 1, 2, and 3 contain size code S-13, blocks 4 and 5 hold S-12 and blocks 6 and 7 hold a second S-12. A size code of S-12 allows for up to 16 subfleets and 1024 individual unit identifiers. S-13 also supports 16 subfleets but can have as many as 2048 individual identifiers.

Block	0	1	2	3	4	5	6	7
Size Code	S-13				S-12		S-12	

More information about Fleet Maps can be found in my August 2000, *Tracking the Trunks* column. Instructions for programming fleet maps into the BC 245XLT begin on page 56 of the *Owner's Manual*. None of the sixteen predefined fleet maps match the Jefferson County system, so you'll need to create a "User Defined" fleet map. To do this on the BC 245XLT perform the following steps:

- Be sure the proper frequencies are already programmed into a selected bank.
- Turn on the radio.
- Press and hold the [TRNK] button until **BANK** and **TRUNK** begin flashing.
- Select the trunking bank you wish to use.
- Use the [Down/Limit] button until **E1** appears in the display.
- Press the [E] button.
- Press the [DATA] button. **E1P1** should appear in the display.

- Press the [Down/Limit] button until **USr** appears in the display.
- Press the [DATA] button. **b0** should appear on the left side of the display, indicating that the radio is waiting for the size code for block 0. In the center **S-0** should appear, indicating that block 0 is set to a size code of 0.
- Press the [Up/Hold] or [Down/Limit] button until **S-13** appears in the center of the display.
- Press the [E] button. This selects size code S-13 for block 0. The radio should now display **b4** on the left side of the display and **S-0** in the center. It has automatically skipped blocks 1, 2, and 3, since they're taken up by the S-13 in block 0.
- Press the [Up/Hold] or [Down/Limit] button until **S-12** appears in the center of the display.
- Press the [E] button. This selects size code S-12 for block 4. The radio should now display **b6** on the left side of the display and **S-0** in the center. It has automatically skipped block 5 since it is taken up by the S-12 in block 4.
- Press the [Up/Hold] or [Down/Limit] button until **S-12** appears in the center of the display.
- Press the [E] button. This selects size code S-12 for block 6. The radio should now display **b0** on the left side of the display and **S-13** in the center. It has automatically skipped block 7 since it is taken up by the S-12 in block 6.
- Finally, press the [SEARCH] button to exit the programming mode and begin searching for the control channel.

To finish out David's letter, here are some talkgroups in use on the Jefferson County system:

Arkansas State Police (Troop E)

Dispatch 000-0
 Dispatch 000-1
 Administration 000-3
 Investigations 000-4
 Tactical #1 000-5
 Tactical #2 000-6
 Car to car 000-15

Also, the Arkansas Department of Transportation uses talkgroup 400-12, and the State Police may use talkgroup 400-09 as a link to the local Sheriff.

◆ Illinois STARCOM 21 Update

From a source that would rather remain anonymous comes this information about the new STARCOM 21 system for the state of Illinois:

Dan, I know a good bit about the Illinois STARCOM 21 project. It will be a Motorola ASTRO Digital SMARTZONE system. Initially there will be about 6,000 units on the system, (Illinois State Police units) with more state agencies to follow if the funding is available.

The EDACS system in District Chicago will be taken over by Motorola and most of the downstate frequencies will be 821 MHz state frequencies.

Motorola is in the process of determining transmitter sites. As many of State of Illinois sites as possible will be used to save money. As of this

date Motorola is in contract negotiations with the State and no contract has been signed yet.

I believe the central part of the state will be the first phase with the north and south following. The coverage required will be 95% of the state.

Take care and I enjoy your column. By the way, the Illinois Department of Corrections currently has nine Smartnet systems, most are analog but a couple are mixed mode (digital and analog).

That's all for this month. I welcome your electronic mail at dan@signalharbor.com, and you can find more information and previous columns on my website at <http://www.signalharbor.com>. Until next time, happy monitoring & safe travels.

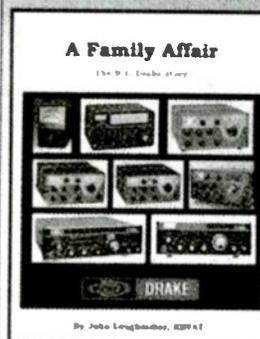
Software for the Shortwave Listener...

SWBC Schedules - Broadcast frequencies and programs, updated weekly+	\$35/year
Smart R8 Control - Smart control for the Drake RB/RBA/RBB	\$2500/\$4000/\$6000
Smart Icom Control 32 - for IC-R75	\$6000
Smart NRD Control 32 - for NRD-535/545	\$6000
Smart Kenwood Control 32 - for R-5000	\$6000
Smart Lowe Control 32 - for HF-150	\$6000
Smart Audio Control - Audio scope and spectrum analyzer for your PC	\$2500/\$3500
SWBC Interval Signals - Turn your PC into a virtual shortwave receiver	\$500/\$3000

FineWare

11252 Cardinal Drive * Remington, VA 22734-2032
fineware@fineware-sw.com * www.fineware-sw.com

A Family Affair The R.L. Drake Story



- Brand new!
- Printed October 2000
- 23 Chapters
- 300 Pages
- 150 Photos
- Glossy four color cover
- Over 150 pages of radio mods.
- \$29.95 (+\$4.95 ship)

John Loughmiller KB9AT reveals the behind-the-scenes history of the famous R.L. Drake Company, focusing on the glory days, when Drake was king in amateur radio. Every ham and SWL knew R.L. Drake from the outside, but now the inside story of this incredibly interesting company is told. This book also includes 150 pages of useful circuits and modifications for many Drake amateur radios. An entertaining read and a great technical reference for every Drake owner.



Universal Radio

6830 Americana Pkwy.
 Reynoldsburg, OH 43068
 ♦ Orders: 800 431-3939
 ♦ Info: 614 866-4267
www.universal-radio.com

Air Show Update

"Smoke on!"

"Up we go – a little more pull – a little power!"

"Standby boards – boards!"

"And we excite the audience with our world famous Blue Angel Fleur-de-les!"

That is just a sampling of some of the chatter on the scanner that Milcom listeners have enjoyed this year now that the military air show season is in full swing throughout the country. An estimated 15 million fans for the Blue Angels alone will flock to sites all over the United States to catch the fun and excitement of flight demonstration teams stepping through their high flying paces. But the Milcom radio enthusiasts get an added extra dimension to the show by monitoring the flight demonstration teams on their scanners.

A few of our MTMilcom readers have submitted air show reports. So at the mid-point of the air show season, here are those reports.

◆ West Coast Report

Mark Zurovski, in southern California, passes along the following observations from the first air show of the season back in March at Naval Air Station (NAS) El Centro and a little extra material discovered during the show from Marine Corps Air Station (MCAS) Yuma.

- 120.375 MHz(AM) Friday morning the tower handed this frequency out to the civilian performers who wanted to practice before Saturdays show. They established an aerobatic box in one of the restricted areas and were told to contact "Shodetree Control" for range entry.
- 123.150 MHz(AM) Air show discrete. Used by all performers, including the F-16 (the only military performer other than the Blues).
- 138.525 MHz(Narrowband FM—NFM) was referred to as the 'weapons frequency' and was used for the 'bombing and strafing' passes coordination. Standing next to an Explosive Ordnance Demolition (EOD) van using his Optoelectronics Scout frequency counter Mark heard this every time the operator keyed his mike.
- 139.600 MHz(NFM) Mark says he was a little confused by this one. His Scout frequency counter found it Saturday morning and it seems the Airshow boss on 140.900 Mhz was able to talk to a variety of support nets in this list on this frequency. Sounded like some kind of 'Airshow All Call.'
- 139.800 MHz(NFM) Medical and ambulance dispatch net. (I believe the input to that repeater is one 149.525 MHz-Larry)
- 140.025 MHz(NFM) Motor Transport Dispatch.

- 140.300 MHz (NFM) Fuel arrangements for aircraft. They called it "POL/Hazmat."
 - 140.900 MHz(NFM) Air boss-Ground boss-Show boss. This guy controlled everything moving on or flying over the airfield. But not being able to talk directly to aircraft made for some interesting conversations.
 - 141.150 MHz (NFM) Military Police used for crowd and parking control.
 - 142.800 MHz(NFM) Public Affairs Officer net coordinating VIP accommodations and arrangements. This one was referred to as the "PAO frequency."
 - 143.700 MHz(NFM) Used to arrange food and breaks for the various vendors. A lot of miscellaneous stuff on this one.
 - 250.250 MHz(AM) This frequency was handed out by 279 2 controller. The ground controller here IDed themselves as "BIGFOOT CONTROL" and worked several SHOOTER and DEVIL call signs aircraft. It was not show related. (I think you will find that this one is associated with the Yuma Tactical Range-Larry)
 - 279.200 MHz(AM) Mark said he found this new frequency in the Grove Military Frequency Directory, formerly the by-state *Monitoring the Military* series). Used as a tactical for most of the day on Friday. Heard conversations like "Tapes On, Fights On." Weapons load outs, laser targets and what sounded like a Forward Air Controller. Mark did not hear any call signs and these comms were not show related.
 - 299.500 MHz(AM) Noted in the March Milcom column as a F-14 team frequency, during Friday morning of the show SHOOTER 21 was troubleshooting what sounded like a minor problem with his jet on this frequency with his wingman. These comms were not show related. (This is a known 3rd Marine Air Wing, VMA-214 squadron tactical frequency-Larry)
 - 407.500 MHz(NFM) Navy Leap Frogs Parachute Team (cancelled both days due to high winds).
 - 410.150 MHz(NFM) Mark found this frequency with his Scout. No voice, just every 15 or so seconds some kind of data or something. (Interesting since this is a big trunk system frequency nationwide. Other reporters attending air shows this season please be on the lookout for this frequency-Larry)
- Mark also programmed the frequencies we published in the March issue of *Monitoring Times* for the Blue Angels team and heard the following in use during the show.
- 143.600 MHz (NFM) Communications cart. Used for show coordination.
 - 164.900 MHz (NFM) In use several hours before the show for chat and show coordination. Also used by the jets for the cockpit checklist and taxi out. Used by Boss and Maintenance Office (MO) at prestart (according to Pena, see report below).
 - 265.350 MHz(AM) Fat Albert (Marine C-130) JATO demonstration and fly-by communications
 - 275.350 MHz(AM) In use before the show for chat and for the four jet diamond formation off show center.
 - 307.700 MHz(AM) Used by both the solo and diamond formation at show center. Used by opposing solos aircraft off show center.
 - 345.900 MHz(AM) Short weather reports prior to the show and used by the solo aircraft at taxi out and off show center.

Fred Pena was also at the El Centro air show. He confirmed Mark's list above and adds 143.000 MHz (NFM). He states that this frequency was used by a tower observer. Mark also observed a Blazer, with government plates, parked next to the static AV-8B aircraft. There was a UHF blade antenna bolted to the top of the vehicle. He looked inside and found the following frequencies listed on the card taped to the radio.

Yuma Presets

1	ATIS	118.800
2	Range	274.000
3	Gnd	315.700
4	Twr	382.200
5	Dep	281.000
6	Apr	374.800
7	Tac 1	382.925
8	Tac 2	318.925
9	Tac 3	326.925
0	Base	242.200

Yuma Harrier Aircraft Discretes

	VMA-211	VMA-214	VMA-311	VMA-513
Base	328.100	269.700	262.900	242.200
Tac 1	273.800	314.850	293.100	382.925
Tac 2	318.700	299.500	352.300	318.925
Tac 3	382.100	281.900	322.150	326.925
Tac 4	316.950	302.900	320.575	Unknown

(Note: I think 287.800 might be VMA-513's Tac 4-Larry)

Mark remarks, "299.500 MHz looks like a pretty popular frequency. In years past here in SoCal the F-16 teams have used simply 123.400 MHz for pilot/maintainer talk. I have noted this at Vandenburg, Miramar, El Toro (while still open), Mugu and El Centro. I did not hear anything on that freq this time even though the F-16 Demo team had a jet for the show."

Mark also attended the Point Mugu air show in April. Here is some of that report.

"The frequency 276.675 MHz was used by the East Coast Air Force F-15 Flight Demonstration Team and their tailcode was 'FF.' Last year the West Coast F-15 unit, tailcode 'EG' used 384.550 MHz." ("FF" tailcode belongs the 1st Fighter Wing based at Langley AFB, Virginia and the "EG" tailcode belongs to the F-15 aircraft of the 3rd Fighter Wing out of Eglin AFB, Florida-Larry.)

"VR-55 had a couple of their C-130 aircraft open and 344.5 MHz was on a frequency card as VR-55 Base Operations. (VR-55 is based at Point Mugu-Larry.) Using my Scout frequency counter, I found 406.800 MHz carrying a simulcast of 124.850 and 382.800 MHz; both frequen-

cies are the Point Mugu tower. I have also found 410.025 MHz carrying both 121.600 and 360.200 MHz which are Point Mugu ground freqs. Point Mugu still uses frequencies in the 138-144 MHz range, but may they may be in transition to a trunk system."

◆ Miscellaneous Reports

Brian A. Topolski in Connecticut has been listening on the air show circuit and passes along some notes from recent events he has attended.

"In addition to the 413.025 and 413.100 MHz narrowband FM mode (NFM) ground frequencies listed in the *MT* March issue for the *Air Force Thunderbirds*, I can confirm 413.275 MHz (NFM) is also being used by the Thunderbird maintenance/ground personnel. I have also monitored the *Canadian Snowbirds* flight demonstration team on 245.750 MHz (AM)."

Also, Brian heard during the *Naval Air Station Oceana Airshow* in 1999, two F-117 aircraft from the 49th Fighter Wing/8th Fighter Squadron using 304.900 (AM) as a discrete squadron communications frequency.

James MacDonald from New England confirms Brian's 413.275 above and adds 413.250 and 413.375 MHz (NFM). James attributes the move to the regular T-bird ground channels being in use at the base they were visiting.

At the end of last season, Laura Quarantiello caught the *Blue Angels* at MCAS Miramar on media day. In addition to the frequencies mentioned above, Laura adds 238.150 (air-to-air), 123.150/315.600 show control.

MT reader Ronnie Stroup, KB8LNP in Ohio, passes along the following frequencies from a recent *US Balloon Team Nationals* and air show.

118.500	Tower
121.700	Ground Control
122.925	USAF STARS Parachute Team
123.100	Air Boss
123.150	Red Baron Squadron
136.975	Northern Lights, Mike Goulian (hot mic)
143.850	Thunderbirds - Diamond
173.440	Announcer
272.100	Canadian Snowbirds
322.950	Thunderbirds - Solos
413.025	Thunderbirds - Ground Control

Charles McAtee from Martinsburg, WV, monitored the following frequencies during a recent *Andrews AFB* show (all NFM):

170.900	USN Blue Angels - Ground Ops: This was the best frequency to listen to for information
409.350	Andrews AFB Security
413.200	Andrews AFB Security - Bike Patrols
413.275	USAF Thunderbirds - Ground Support
413.375	Andrews AFB Security

One of our overseas friends, Dudley in the UK, confirmed that the *UK Air Force Red Arrows* Flight Demonstration Team is using 243.450 MHz. for their show communications.

I want to also acknowledge air show reports from John Coker, Charles Ebert, Ric Garcia and Alan Sifford which confirmed material that

has been presented above. Thanks to all above for sharing your air show reports.

So, what about you? If you attend an air show this season we want to hear from you, even if you're confirming frequency material we have presented here in *Milcom*. Contact us at the email address in the masthead.

◆ Air Station Beaufort Profile

An old friend down in South Carolina, Ron McCormick, KF4LMT, provides this month's military base profile, MCAS Beaufort, South Carolina (KNBC).

Frequency Listing - Air Traffic Control

119.050	Tower
340.200	Tower
360.200	Tower
128.150	Ground Control
336.400	Ground Control
118.450	Approach/Departure (above 3000-ft)
301.200	Approach/Departure (above 3000-ft)
123.700	Approach/Departure (3000-ft and below)
251.700	Approach/Departure (3000-ft and below)
278.800	ATIS
281.800	Base Operations

Miscellaneous Frequencies

269.700	Tactical Control
349.800	Beaufort Warning Area Control
264.000	Marine Group Common, possibly Wing Common
344.200	Thought to be the VMFA(AW)-332 command post, but it is still used occasionally - unknown purpose

◆ Squadron Frequencies

Note: All frequencies with designators confirmed through monitoring are marked with an asterisk

VMFA-115 "Silver Eagles" F/A-18A	
Tailcode: BM (VE) ##	Callsign: BLADE
313.800	Command Post
320.200	TAC 2 probable but unconfirmed
321.900	TAC 3? (referenced 16 Feb 2001)
and 258.100	258.900 336.925 361.100

VMFA-122 "Crusaders" F/A-18A	
Tailcode: BM (DC)	Callsign: NICKEL
251.400	TAC 2?
251.900	TAC 1*
and 250.300	

VMFA(AW)-224 "Bengals" F/A-18D	
Tailcode: BM (WK) 5##	Callsign: BENGAL
305.800	Command Post*
250.300	TAC 1 probable but unconfirmed
258.900	TAC 2 probable but unconfirmed
270.800	TAC 3?
and 374.250	

VMFA-251 "Thunderbolts" F/A-18C	
Tailcode: BM (DW) AB 2##	Callsign: T-BOLT
345.800	Possible CP
315.300	TAC 1*
318.500	TAC 2 probable but unconfirmed
251.900	274.050 303.000 321.900 358.150 379.150

VMFA-312 "Checkerboards" F/A-18C	
Tailcode: BM (DR) AC 2##	Callsign: CHECK
253.100	Squadron Common*
301.950	TAC 1?

320.300	TAC 2?
and 251.900	321.900

VMFA(AW)-332 "Moonlighters" F/A-18D	
Tailcode: BM (EA) 4##	Callsign: SKULL
361.800	Command Post "SKULL BASE"
326.700	TAC 1*
333.300	TAC 3?
346.600	TAC 2*
and 245.500	361.000

VMFA(AW)-533 "HAWKS" F/A-18D	
Tailcode: BM (ED)	Callsign: HAWK
253.100	HAWK OPS questionable, unconfirmed
283.400	TAC 1*
354.700	TAC 2*
and 326.700	

VFA-82 "Marauders" F/A-18C	
Tailcode: AB 3##	Callsign: CARR
265.900	(tentative) and 333.300

VFA-86 "Sidewinders" F/A-18C	
Tailcode: AB 4##	Callsign: WINDER
250.700	Command Post reported, but not confirmed through monitoring
256.250	frequently used
263.600	281.200 292.900 299.500

Thanks, Mac, and to all our reporters this month. Until next time, 73 and good hunting.

* 5 ft solid 6-panel C/Ku dish, polar mount, add Hq18 and scan 120 azimuth, S150 + S80SH (Ku holder \$25 extra)
 * 4 ft solid 6-panel C/Ku dish, polar mount, fixed satellite S80 + S50SH (Ku LNB 23mm holder \$25 extra)
 * Digital C-LNB 20 deg NF + scalar ring, S49 + S10SH
 * Superjack 18" actuator for 5 ft, HQ18, S59 + S20SH
 * Integra IT910s hdvr s/b \$899 + S25SH
 Email: support@smaller.com or fax 888-7311834



GORDON WEST
HAM TEST PREP TAPES
BOOKS SOFTWARE VIDEOS

Prepare for your ham test with "Gordo"
WB6NOA as your personal instructor.

- **THE NEW THEORY** on audio cassettes
 No-Code Technician (4 tapes)..... \$19.95
 General Class (4 tapes)..... \$19.95
 Amateur Extra Class (4 tapes)..... \$19.95
- **THE CODE** on audio cassettes
 Learning CW (0-7wpm 6 tapes)..... \$29.95
 Speed Builder(5-16wpm 6 tapes)... \$29.95
 Speed Builder(10-28wpm 6 tapes)... \$29.95
- **NEW STUDY MANUALS** by "Gordo"
 No-Code Technician (Element 2)..... \$11.95
 General Class (Element 3)..... \$12.95
 Extra Class (Element 4)..... \$14.95
- **PC SOFTWARE** with study manuals
 No-Code Technician (Element 2) \$34.95
 Tech/Tech+/Gen. (+ Code, Windows) \$49.95
 General Class (+ Code, Windows)... \$34.95
 Extra Class (+ Code Windows)..... \$34.95
 Ham Operator (Tech-Extra +Code)..... \$59.95
 Morse Software Only..... \$12.95
- **VIDEO** VHS with study manual
 No-Code Tech Video Course..... \$31.95

Add \$4.00 for shipping 1st item, \$1.50 each additional
 Priority Mail 2-3 day service available
 VISA, MasterCard, Discover & AMEX Accepted

W5YI Group
 P. O. Box 565101 • Dallas, TX 75356
 Call Toll Free **1-800-669-9594**

Join the Club

Sitting alone in the radio room, with the headphones on and nobody else around, broadcast DXing appears to be a solitary hobby. For the most part, it is. Getting in touch with other DXers can make the hobby more enjoyable and productive. The domestic bands change quickly; club membership brings you the latest information on new and changed stations, tests, and the temporary or permanent absence of DX-killing pests.

There are three clubs that serve the domestic-band DXer in North America. All three have many things in common. All publish a regular newsletter, 30-40 pages in length. These newsletters detail new stations, technical changes to existing stations, and changes in programming format. Also present are reports of DX logged by club members. (The reports of nearby DXers can be quite helpful in identifying your DX, or knowing what frequencies to target.) Finally, there are technical articles on propagation, antennas, and equipment.

The National Radio Club (<http://www.nrcdxas.org>) serves AM DXers. 30 issues of *DX News* are included in a \$26 (in the U.S.) one-year membership. Send a 34-cent stamp to *DX News*, 2840 S.E. Illinois Ave., Topeka KS 66605-1427 for a sample newsletter.

Also serving AM DXers is the International Radio Club of America. (<http://www.geocities.com/Heartland/5792/>) Their *DX Monitor* publishes 34 issues a year for a \$25 membership. A sample can be had for a 34-cent stamp to *DX Monitor*, P.O. Box 1831, Perris CA 92572-1831. The IRCA also has a "soft DX Monitor," an Internet version of the regular newsletter. Subscriptions to this service are \$10/year.

FM and television DXers are served by the Worldwide TV-FM DX Association. (<http://www.anarc.org/wtfda>) *VHF-UHF Digest* comes out monthly; dues are \$24. Send \$1 to WTFDA, Box 501, Somersville CT 06072 for a sample issue.

These organizations are a great way to keep up with changes on the dials. Check them out!

◆ Bits and Pieces

* As you read in *Communications* in the May issue, the FCC has begun to issue low-power

FM (LPFM) permits. So far, 25 permits have appeared in the Engineering Database; the stations are located in California, Georgia, Indiana, Louisiana, Maryland, Maine, and Oklahoma. Additional permits have been issued in other areas but have not yet appeared in the database. Some FM DXers claim these little stations will ruin DXing in major cities, but they also provide additional DX targets.

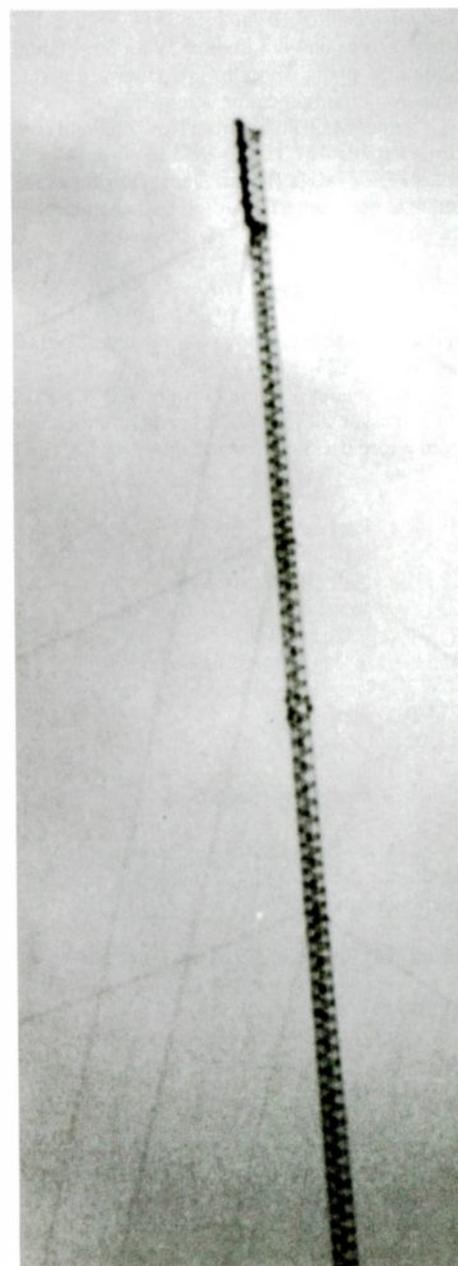
* Another "non-test" occurred in late April. WLS-890 posted notice on their website that they'd be going off the air for five hours on a Sunday morning. Internet reports indicate that most DXers heard Radio Progreso, Cuba, in WLS' absence. It pays to keep a close watch on the dial. You never know when that ultra-strong "pest" that makes a frequency "un-DXable" will disappear!

* A tragic – and unusual – event took place near Trois-Rivieres, Quebec, in April. In heavy fog, an airplane struck the tower holding the antennas of several TV and FM stations serving this city. The airplane got stuck inside the tower – but the tower did not collapse. Climbing the tower after such an accident was too dangerous, making it impossible to recover the plane or the pilot's body. Eventually, authorities were forced to dynamite the guy wires, bringing the tower down and allowing recovery.

* WTFDA member Bill Eckburg sent a picture of the WWTO-TV tower, located near La Salle in northern Illinois. If you look carefully, you can see the transmitting antenna – a black pole sticking out from the side of the tower. Bill asks, "Why is their antenna on the southeast corner instead of on top of the tower?"

That's a good question, you'd have to ask the engineer who designed the station! I would venture a guess it has something to do with wind loading – the ability (or inability) of the tower to tolerate a tall and heavy antenna being blown around by the wind. Many other UHF TV stations are built the same way. If someone out there knows for sure why these UHF antennas aren't placed atop the tower, please write and let us know.

It's the peak of the sporadic-E "short skip" season. Who will be the first to log a LPFM station by skip? Will anyone catch a digital TV station by skip this year? If you do, let us know. Write: Box 98, Brasstown NC 28902-0098, or by email to w9wi@w9wi.com. Good DX!



This 1,300-foot tower near La Salle, Illinois, houses WWTO-TV, channel 35.

Do We Need an Unlicensed Broadcasting Band?

The news from shortwave broadcasting circles could hardly be more discouraging this spring. In moves of questionable wisdom, both *Swiss Radio International* and the *BBC* announced that they are abandoning shortwave programming to the Western Hemisphere. Despite claims from both broadcasters that alternative media will pick up the slack, listening audiences will fall in both Switzerland and the UK.

At the same time, the shortwave pirate broadcasting scene remains quite vigorous. It could be that the time has come to recognize that as regular broadcasting and utility stations gradually phase out shortwave, a high frequency allocation could productively be made for amateur broadcasting. Existing pirate users have been taking pains to avoid interference to other stations while maintaining good technical standards. Given the changing technical environment, reserving a tiny amount of HF spectrum for amateur programming could make sense. The public policy consequences of this move could be a refreshing counterpoint to continually increased concentration of broadcasting control in the hands of few large corporations.

What do you think? Let us know at *Monitoring Times*.

New ACE Publisher

Association of Clandestine radio Enthusiasts announces that well-known and respected DXer and author Harry Helms has taken over the reins as *ACE* publisher. Harry, of LLH Publishing and eBook Tech, assumed control in June. Harry's renewed activity in the hobby has been welcomed by many. But, *ACE* subscriptions still go via the Belfast address listed below.

What We Are Hearing

MT readers heard all of these stations this month. Most were on or near 6955 kHz, but stations still move down to around 6950 kHz at night to avoid interference from Peru.

Blind Faith Radio- Dr. Napalm inevitably programs classic rock selections. (Uses blindfaithradio@yahoo.com e-mail)

Buckwheat Radio- Rock and dance music has been the fare on this one so far as they perform technical equipment adjustments. (Uses buckwheatradio@hotmail.com e-mail)

Crunch Radio- Their format changed to ancient 1930's pop tunes. They announced a final broadcast, but their demise is not yet certain. (None, QSLs FRN postings)

Eat It Radio- A "I Hate Tiger Woods" broadcast was counter to the feelings of most

sports fans. (None)

KHJ- A new one this year, their slick rock music shows with jingles are a close imitation of commercial radio. (None)

KIPM- Without any doubt, Allan Maxwell holds the all-time pirate record for most elaborate drama productions. (Elkorn)

Midi Radio- Here's a return of the computer-generated instrumental versions of rock music standards. (Uses midiradio@yahoo.com e-mail)

NASCAR Numbers Parody- The new fad of numbers station parodies has taken a new turn, with NASCAR auto race noises in the background. (None)

Radio Bingo- The radio version of bingo seems fixed, with John T. Arthur winning every game. *Caveat emptor!* (Uses radiobingo@chek.com e-mail)

Radio Cochiguaz- Despite summer propagation, the best heard South American pirate remains active. They transmit some weekends between 2000-0200 and/or 0800-1100 UTC on 11400 UTC. (Santiago)

Radio Neptune- A recent rock music show featured Joe Mack. Is he possibly the same announcer from Z-100? (Blue Ridge Summit)

Radio Titanic International- This Euro-pirate, with a 25 year history sometimes with North American relays, announced that it permanently left the air. They cited equipment failure, utility station interference, and a fake Radio Titanic from Holland. (Wuppertal)

Shadow Radio- Their IDs are from old "The Shadow" radio dramas, but they mix rock music and sketches with their old-time radio programs. (None)

Sycko Radio- By now their rock and comedy are a veteran pirate operation, but they still do not communicate with their listeners. (None)

Take It Easy Radio- Eagles soft rock music is often supplemented with documentary programming, including Vietnam war broadcasting histories. (Belfast)

United Patriot Radio- *Clandestine Radio Watch* has reclassified this one as a pirate, but its daily right wing rebellion programming still is heavily clandestine in nature. Frequencies vary among 3200, 6900, and 12182 kHz in upper sideband. (Not fully clear)

WBNY- The Rodent Freedom Fighters often bring this classic clandestine parody back to life around Easter. This year's Bunny Radio was no exception. (Announced maildrop defunct)

WHYP- James Brownyard, the legend of North East, PA, radio broadcasting, still peppers the pirate bands with creative shows. (Providence)

WMFQ- If you never received a pirate QSL before, these guys want to send one to you. (Providence)

Z100- This slick oldies pirate now has a web

site at www.z100fm.homestead.com/z100fm.html in addition to nearly a dozen shows over the air. (Uses bigz100fm@yahoo.com e-mail)

Reports and QSLs

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations. This finances postage for a souvenir QSL to your mailbox. Send your letters to these addresses: PO Box 1, Belfast, NY 14711; PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 69, Elkorn, NE; 68022; Postfach 220342 D-42373 Wuppertal, Germany; and Casilla 159, Santiago 14, Chile. A few pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. Reports to the *Free Radio Network* (FRN) go to <http://www.frn.net> on the web. *Free Radio Weekly* loggings go via niek@ican.net e-mail. Sample copies of *The ACE* are \$2 via the Belfast maildrop.

Thanks

Your input is always welcome via PO Box 98, Brasstown, NC 28902, or via the e-mail address atop the column. We thank every one of our contributors: John T. Arthur, Belfast, NY; Artie Bigley, El Paso, TX; Ranier Brandt, Hofer, Germany; Cachito, Santiago, Chile; Jerry Coatsworth, Merlin, Ontario; Ross Comeau, Andover, MA; Harold Frodge, Midland, MI; Tim Hall, Buffalo, NY; William T. Hassig, Mt. Prospect, IL; Harry Helms, San Diego, CA; Greg Majewski, Oakdale, CT; Bill McClintock, Minneapolis, MN; Big Mike, Belfast, NY; Craig Pradarelli, Necedah, WI; Fred Osterman, Reynoldsburg, OH; Mike Prindle, New Suffolk, NY; Lee Reynolds, Lempster, NH; Fred Roberts, Germany; Martin Schoech, Merseburg, Germany; Tom Severt, Frontenac, KS; Lee Silvi, Mentor, OH; Bud Stacey, Setsuma, AL; Mike Striatus, Connecticut; Niel Wolfish, Toronto, Ontario; and David Zantow, Janesville, WI.



Pirate DXers in Kulpsville

LF Receiving Antennas, Part II

It's startling to realize this month marks 10 years for me as the editor of *Below 500 kHz*. I want to thank all of you for your letters, photos and loggings over these past 10 years. Whether you've been with the column since day one (as many of you have), or are just discovering the fun of the low frequencies, please know that I appreciate hearing from you. In fact, it's the best part of this job.

Life has gotten a bit more complicated for me since I began the column, notably with the arrival of two children, increased job responsibilities, and volunteer work in my community. Rest assured, however, that I always look forward to hearing from *MT* readers. My responses may not be as prompt as they should be, but I do read all mail (e-mail or otherwise) that is sent to me. How about writing me soon to give your thoughts on the direction this column should take in the future?

◆ Loop Antennas

Last month we discussed the ubiquitous "random wire" antenna, a good workhorse that can provide decent reception (and transmission, in some cases) over a wide swath of the radio spectrum. I use one at my location for a variety of SWL and ham radio activities.

As one gets more serious about longwave, however, there are other antennas that should be considered. Loops, for example, provide solid benefits that will be of interest to lowband connoisseurs. The primary benefit of a loop is *directivity*. It can be rotated to null out interference or "pest" signals while focusing on a desired signal. This technique is used by many DXers to log two or more stations on a single frequency.

A second benefit is low noise pickup. Their small size (relatively speaking) and closed-circuit design make them less of a "noise collector" than a 150-foot wire strung across a backyard. Signals may be somewhat weaker on a loop – unless it is amplified – but the *signal-to-noise ratio* is frequently much higher, and this is preferable to just having strong signals.

There are at least three types of loops that are popular today: Ferrite Loops, Multi-turn Tuned Loops, and Broadband Loops. The *Ferrite Loop antenna* is most common since one is hidden inside nearly every AM radio. These are the small black rods you have probably seen wound with fine enameled wire. The rod itself is typically made of a nickel-zinc mix that increases the inductance of the windings and concentrates an electromagnetic field around the antenna. In operation, ferrite loops provide sharp

nulls off their ends, and give a maximum response to signals approaching from their "broad-side" planes.

Ferrite rods are among the smallest loops around, but they are generally not very efficient. An exception to this rule is an externally-tuned ferrite loop specifically designed for LF reception. These antennas typically couple to a set's internal ferrite rod via mutual inductance, or connect to the receiver with a short coax cable. Their larger size and tuning capability often provides greatly enhanced reception as compared with a stock internal antenna.

At present, commercial sources for high performance ferrite loops are limited. One firm that does carry them is RadioPlus+ Electronics of Pensacola, FL. You can check out their wares by sending e-mail to <http://radioplus@pcola.gulf.net>. You'll be e-mailed back a copy of their latest catalog as a file attachment. If you prefer conventional mail, send an SASE to them at 3635 Chastain Way, Pensacola, FL 32504.

Multi-turn Tuned Loops are another antenna worth discussing. This design usually consists of a cross or box-shaped frame wound with several turns of small diameter wire. The windings are tuned to resonance at LF with a variable capacitor connected in parallel. A separate, one-turn "link" is placed in the middle of the tuned windings and provides a low impedance (50-100 ohm) connection to the receiver via a short cable.

Multi-turn loops are easy to build, and you can get plans for one by ordering a back issue of the September '92 edition of *Below 500 kHz* from *Monitoring Times*. (An optional preamp for this loop was in the November '93 column. Send \$3 for each reprint plus SASE.) Such a loop can be set on a tabletop and rotated to favor (or null) the signal at hand. One *MT* reader mounted his loop on an old music stand and is achieving excellent results.

A disadvantage of tuned loops is that they must typically be used indoors. Most designs are too fragile to mount outside in the wind, and

even if you did, there is the problem of tuning. Whenever you move more than 20 kHz or so, the loop must be retuned for maximum performance. It is possible to employ remote tuning, but the arrangement can become very complicated. The good news is that these loops seem to perform very well indoors!

Finally, let's discuss *Broadband Shielded Loops*. These antennas have a number of advantages that make them popular with DXers – among them: Low noise pickup, good sensitivity, tune-free operation and mechanical stability.

Shielded loops contain only one turn of wire, and they are electrically shielded except for a very small portion (an inch or so) at the top of the loop circle. Shielding causes the loop to respond principally to the magnetic component of an incoming electro-magnetic (RF) signal, and reduces its susceptibility to electrical field noise.

Shielded loops typically contain a wideband (10-500 kHz) preamplifier, so there's no need for tuning the antenna as you move across the band. In a well-designed loop, the preamp begins "rolling off" above 400 kHz and becomes nearly "deaf" above 500 kHz to minimize AM broadcast overload.

Finally, shielded loops are made of a rigid or semi-rigid material such as copper pipe or "hardline" coax, so they can be easily mounted outdoors on a simple mast and turned with a TV rotor.

To build a shielded loop I highly recommend VE3OT's web site at <http://technology.fanshawec.on.ca/tele410/loop.htm>. Here, you'll find information for building two types of high performance loops. An excellent general reference on loop antennas is Joe Carr's *Loop Antenna Handbook*, available from Universal Radio Research, 6830 Americana Parkway, Reynoldsburg,

OH 43068. It contains over 130 pages of descriptions, plans and theory for many types of loop antennas.

Next time, we conclude the series with a discussion on active antennas.

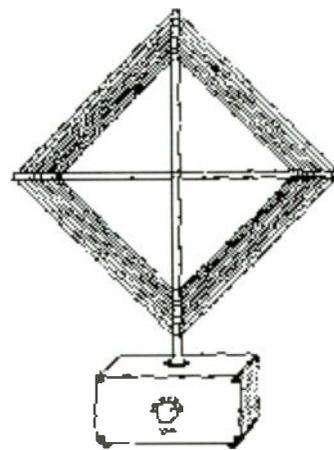


Figure 1. Multi-turn tuned loops have been around for a long time. They provide excellent performance on longwave, often surpassing the performance of wire antennas, particularly in noisy environments.

Big Savings on Radio Scanners

Uniden® SCANNERS



Bearcat® 780XLT Trunk Tracker III with free scanner headset!

Manufacturers suggested list price \$529.95
Less -\$205 Instant Rebate / Special \$324.95
 500 Channels • 10 banks • CTCSS/DCS • S Meter
Size: 7^{1/8}" Wide x 6^{15/16}" Deep x 2^{13/16}" High
Frequency Coverage: 25,000-512,000 MHz., 806,000-

823,987.5MHz., 849,012.5-868,987.5 MHz., 894,012.5-1300,000 MHz.
 When you buy your Bearcat 780XLTEV Trunktracker package deal from Communications Electronics, you get more. The EV means "Extra Value." With your BC780XLT scanner purchase, you also get a **free deluxe scanner headphone** designed for home or race track use. Headset features independent volume controls and 3.5 mm gold right angle plug. The Bearcat 780XLT has 500 channels and the widest frequency coverage of any Bearcat scanner ever. Packed with features such as Trunktracker III to cover EDACS, Motorola and EF Johnson systems, control channel only mode to allow you to automatically trunk many systems by simply programming the control channel, S.A.M.E. weather alert, full-frequency display and backlit controls, built-in CTCSS/DCS to assign analog and digital subaudible tone codes to a specific frequency in memory, PC Control with RS232 port, Beep Alert, Record function, VFO control, menu-driven design, total channel control and much more. Our CEI package deal includes telescopic antenna, AC adapter, cigarette lighter cord, DC cord, mobile mounting bracket with screws, owner's manual, trunking frequency guide and one-year limited Uniden factory warranty. For maximum scanning enjoyment, order magnetic mount antenna part number ANTMMBNC for \$29.95. Not compatible with AGEIS, ASTRO or ESAS systems. For fastest delivery, order on-line at www.usascan.com.

Bearcat® 895XLT Trunk Tracker

Manufacturer suggested list price \$499.95
Less -\$320 Instant Rebate / Special \$179.95
 300 Channels • 10 banks • Built-in CTCSS • S Meter
Size: 10^{1/2}" Wide x 7^{1/2}" Deep x 3^{3/8}" High
Frequency Coverage: 29,000-54,000 MHz., 108,000-174 MHz., 216,000-512,000 MHz., 806,000-823,995 MHz., 849,012.5-868,995 MHz., 894,012.5-956,000 MHz.

The Bearcat 895XLT is superb for intercepting trunked communications transmissions with features like TurboScan™ to search VHF channels at 100 steps per second. This base and mobile scanner is also ideal for intelligence professionals because it has a Signal Strength Meter, RS232C Port to allow computer-control of your scanner via optional hardware and 30 trunking channel indicator annunciators to show you real-time trunking activity for an entire trunking system. Other features include Auto Store - Automatically stores all active frequencies within the specified bank(s). Auto Recording - Lets you record channel activity from the scanner onto a tape recorder. CTCSS Tone Board (Continuous Tone Control Squelch System) allows the squelch to be broken during scanning only when a correct CTCSS tone is received. 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; EX711 External speaker with mounting bracket & 10 feet of cable with plug attached \$19.95. The BC895XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, EDACS, ESAS or LTR systems.



Bearcat® 245XLT Trunk Tracker II

Mfg. suggested list price \$429.95/CEI price \$189.95
 300 Channels • 10 banks • Trunk Scan and Scan Lists
 Trunk Lockout • Trunk Delay • Cloning Capability
 10 Priority Channels • Programmed Service Search
Size: 2^{1/2}" Wide x 1^{3/4}" Deep x 6" High
Frequency Coverage:
 29,000-54,000 MHz., 108-174 MHz., 406-512 MHz., 806-823.995 MHz., 849,012.5-868,995 MHz., 894,012.5-956,000 MHz.

Our Bearcat TrunkTracker BC245XLT, is the world's first scanner designed to track Motorola Type I, Type II, Hybrid, SMARTNET, PRIVACY PLUS and EDACS analog trunking systems on any band. Now, follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. Our scanner offers many new benefits such as Multi-Track - Track more than one trunking system at a time and scan conventional and trunked systems at the same time. 300 Channels - Program one frequency into each channel. 12 Banks, 10 Banks - Includes 12 bands, with Aircraft and 800 MHz, 10 banks with 30 channels each are useful for storing similar frequencies to maintain faster scanning cycles or for storing all the frequencies of a trunked system. Smart Scanner - Automatically program your BC245XLT with all the frequencies and trunking talk groups for your local area by accessing the Bearcat national database with your PC. If you do not have a PC simply use an external modem. Turbo Search - Increases the search speed to 300 steps per second when monitoring frequency bands with 5 KHz. steps. 10 Priority Channels - You can assign one priority channel in each bank. Assigning a priority channel allows you to keep track of activity on your most important channels while monitoring other channels for transmissions. Preprogrammed Service (SVC) Search - Allows you to toggle through preprogrammed police, fire/emergency, railroad, aircraft, marine, and weather frequencies. Unique Data Skip - Allows your scanner to skip unwanted data transmissions and reduces unwanted birdies. Memory Backup - If the battery completely discharges or if power is disconnected, the frequencies programmed in your scanner are retained in memory. Manual Channel Access - Go directly to any channel. LCD Back Light - An LCD light remains on for 15 seconds when the back light key is pressed. Autolight - Automatically turns the backlight on when your scanner stops on a transmission. Battery Save - In manual mode, the BC245XLT automatically reduces its power requirements to extend the battery's charge. Attenuator - Reduces the signal strength to help prevent signal overload. The BC245XLT also works as a conventional scanner. Now it's easy to continuously monitor many radio conversations even though the message is switching frequencies. The BC245XLT comes with AC adapter, one rechargeable long life ni-cad battery pack, belt clip, flexible rubber antenna, earphone, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, ESAS or LTR systems. Hear more action on your radio scanner today. Order on-line at www.usascan.com.

More Radio Products

Save even more on radio scanners when purchased directly from CEI. Your CEI price after instant rebate savings is listed below:

Bearcat 895XLT 300 ch. Trunktracker I base/mobile scanner.....	\$179.95
Bearcat 780XLT 500 ch. Trunktracker III base/mobile.....	\$324.95
Bearcat 278CLT 100 ch. AM/FM/SAME WX alert scanner.....	\$159.95
Bearcat 245XLT 300 ch. Trunktracker II handheld scanner.....	\$189.95
Bearcat 248CLT 50 ch. base AM/FM/weather alert scanner.....	\$89.95
Bearcat Sportcat 200 alpha handheld sports scanner.....	\$159.95
Bearcat Sportcat 180B handheld sports scanner.....	\$149.95
Bearcat 80XLT 50 channel handheld scanner.....	\$99.95
Bearcat 60XLT 30 channel handheld scanner.....	\$74.95
Bearcat BCT7 information mobile scanner.....	\$139.95
AOR AR8200 Mark II Wide Band handheld scanner.....	\$539.95
AOR AR168Q Wide Band scanner with quick charger.....	\$209.95
ICOM ICR8500 wideband communications receiver.....	\$1,469.95
ICOM PCR1000 computer communications receiver.....	\$379.95
ICOM R10 handheld wideband communications receiver.....	\$279.95
Sangean ATS909 AM/FM/shortwave with 306 memories.....	\$209.95
Sangean AT818ACS AM/FM/shortwave w/cassette record.....	\$189.95
Sangean AT818 AM/FM/shortwave receiver - 45 memories.....	\$139.95
Sangean ATS505 AM/FM/shortwave receiver - 45 memories.....	\$99.95
Sangean AT5404 AM/FM/shortwave receiver - 45 memories.....	\$69.95
Uniden WX100 Weather Alert with S.A.M.E. feature.....	\$49.95

RELM® MPV32D Transceiver

Mfg. suggested list price \$515.00/Special \$284.95
 Looking for a great hand-held two-way transceiver? Fire departments depend on the RELM MPV32D transceiver for direct two-way communications with their fire or police department, civil defense agency or ham radio repeater. The MPV32D is our most popular programmable frequency agile five watt, 32 channel hand-held transceiver that has built-in Continuous Tone-Controlled Squelch System (CTCSS) and digital coded squelch (DCS). CTCSS may be programmed for your choice of 50 standard EIA tones or over 100 DCS codes. Frequency range 136,000 to 174,000 MHz. The full function, DTMF compatible keypad also allows for DTMF Encode/Decode and programmable ANI. Weighing only 15.5 ounces., it features programmable synthesized frequencies either simplex or half duplex in 2.5 KHz. increments. Other features include PC programming and cloning capabilities, scan list, priority channel, selectable scan delay, selectable 5 watt/1 watt power levels, liquid crystal display, time-out timer, receive only channels and much more. When you order the MPV32D from CEI, you'll get a complete package deal including antenna, 700 ma battery (add \$20.00 to substitute a 1,200 ma battery), battery charger, belt clip and user operating instructions. Other useful accessories are available. A heavy duty leather carrying case with swivel belt loop part #LCMP is \$49.95; rapid charge battery charger, part #BCMP1 is \$69.95; speaker/microphone, part #SMMP is \$54.95; extra high capacity 1200 ma. ni-cad battery pack, part #BPMP1 is \$79.95; extra 700 ma. ni-cad battery pack, part #BPMP7 is \$59.95; cloning cable part #CCMP is \$39.95; PC programming kit, part #PCKIT030 is \$225.95. A UHF version with a frequency range of 450-480 MHz, part #MPU32 is on special for \$299.95. Your RELM radio transceiver is ideal for many different applications since it can be programmed with just a screwdriver and programming instructions in less than 10 minutes. Programming is even faster with the optional PC kit. The programming instructions part #PIMPV is \$19.00. Call 1-800-USA-SCAN to order your RELM two-way radios from Communications Electronics today.

Buy with Confidence

Order on-line and get big savings

For over 32 years, millions of communications specialists and enthusiasts worldwide have trusted Communications Electronics for their mission critical communications needs. It's easy to order. For fastest delivery, order on-line at www.usascan.com. Mail orders to: Communications Electronics Inc., P.O. Box 1045, Ann Arbor, Michigan 48106 USA. Add \$20.00 per radio transceiver for UPS ground shipping, handling and insurance to the continental USA. Add \$13.00 shipping for all accessories and publications. For Canada, Puerto Rico, Hawaii, Alaska, Guam, P.O. Box or APO/FPO delivery, shipping charges are two times continental US rates. Michigan residents add sales tax. No COD's. Your satisfaction is guaranteed or return item in unused condition in original packaging within 61 days for refund, less shipping charges. 10% surcharge for net 10 billing to qualified accounts. All sales are subject to availability, acceptance and verification. Prices, terms and specifications are subject to change without notice. We welcome your Discover, Visa, American Express, MasterCard, IMPAC or Eurocard. Call anytime 1-800-USA-SCAN or 800-872-7226 to order toll-free. Call 734-996-8888 if outside Canada or the USA. FAX anytime, dial 734-663-8888. Dealer and international inquiries invited. Order your radio scanners from Communications Electronics Inc. today at www.usascan.com and save.

For credit card orders call
1-800-USA-SCAN

e-mail: cei@usascan.com

www.usascan.com

PO Box 1045, Ann Arbor, Michigan 48106-1045 USA
 For information call 734-996-8888 or FAX 734-663-8888
Price schedule effective June 3, 2001 AD #060101MT © 2001 Communications Electronics Inc.

COMMUNICATIONS ELECTRONICS INC.
 Emergency Operations Center

Visit WWW.USASCAN.COM • 1-800-USA-SCAN

Ragchewing and Other Fun

It should be no surprise to anyone reading this column to learn that I am, by nature, a "Rag Chewer." People get on the ham bands for all sorts of reasons. They may be interested in contesting. Maybe chasing DX. They could enjoy trying new and exotic modes. There are dozens of possibilities. But as a general rule, when I sit down in the evening to play radio, I'm looking for a bit of conversation. The topic and subject matter matters not. I just like to talk ham to ham about any subject under the sun (including the sun). And that rag chewing isn't limited to the voice modes. More often than not I'm working CW when I chew the rag. The other person in the QSO could be next door or on the other side of the world. I still have just as much fun. That is the primary symptom of Rag Chewer's Disease: an overabundance of fun.

ham's interests.

I get a kick out of running across folks who mention in the course of the QSO an interest I share. Motor sports, science fiction, "Old Time" radio programs, and Sherlock Holmes are all subjects that have kept me up way past my bedtime on both local repeaters and low bands. Or, maybe I'll get lucky enough to meet someone who has much to tell about a subject I know nothing about. Learning something new is always exciting. Most of my basic training in computers occurred on the ham bands long before I could muster up the money to buy my own PC. Now, in the world beyond writing this column, I am a senior staff member of an Internet/Intranet design team. I guess you could say I'm feeding my family thanks to things I learned rag chewing on the ham bands.

It's not hard to develop the basic skills to be a good rag chewer. A simple "so tell me a little about yourself" can go a long way to getting the ball rolling. A tried and true trick of the rag chewer trade is an atlas. Once you figure out where the other person is from, you can take a look in the book and go from there. "So Mark, I see you live in Ohio; I guess you've been to the Dayton Hamfest. What's that like?" Or maybe, "Ed, you live on Long Island, what's the ham activity like in New York City? Is it all repeaters or are there folks on the low bands?" You can even move off of ham-based subjects. "Jon, I see that Hopewell is near Princeton. I bet there are lots of fun things to do in a University town like that."

I find a lot of conversations these days can be started by mentioning that Number One Son is in college. Lots of hams have kids in college, out of college or looking to go to college. Talking about where your kids and your money are going can go on for hours.

I find you can always tell a really great rag chew by how it ends. It's always interrupted by something (phone, the need to get to bed) or someone (XYL, dog scratching at the door) else. The hams involved are having too much fun to call it quits. You may even set up a sked to pick up where you left off again next evening.

If you really enjoy talking over the radio as much as I do, you can go for a great award. The American Radio Relay League offers a certificate to folks who qualify to be members of The Rag Chewer's Club. Let me be-

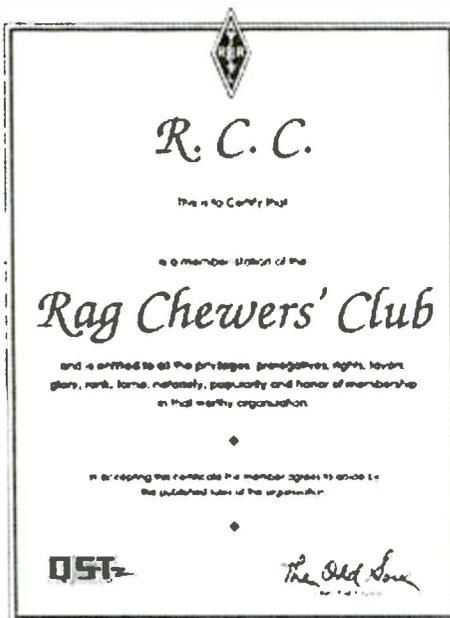
gin by saying that the RCC is probably the least exclusive club in the world. But, it is a club that even Groucho Marx would have been proud to be a member of.

The purpose of the award is to encourage friendly, meaningful contacts, rather than the impersonal "name, rank and serial number" QSO. All you need to do is get on the air and have a conversational QSO for at least 1/2 hour. On your honor you report that QSO to ARRL HQ (225 Main St, Newington, CT 06111-1494), and enclose a fee of \$3.00. Your Rag Chewers Club certificate will be sent to you by return mail. So, if you want to, you could even use your very first contact as a licensed amateur to earn your first award.

◆ Worked All State "Quarters"

It was a fairly typical evening around N2EI. I had finished my home chores and had settled in for an hour or so of cruising the 40 meter CW band looking for one of those rag chews I was talking about. My CQ was answered by N3GC, the callsign of the Greene County Amateur Radio Association of Waynesburg, PA. The "OP" was a gentleman named Roger. After the normal exchange of RST and basic info, we got on to talking about jobs and other things in our lives. As the QSO drew to an end Roger told me of his club's efforts to encourage hams to exchange the new "State" quarters with one another.

As you know, the U.S. Mint is issuing a series of quarters for all fifty states over the next several years. I had seen those posterbooks in various stores designed for folks to collect the state coins. It should have been obvious that it would also be a neat way to work through "Worked All States." Well, of course I agreed and sent off a New Jersey quarter along with my QSL card. In return I received a very official looking N3GC Penn-



Over the years I have talked to people from all walks of life. Military generals, priests, writers, musicians, professional sports figures, and people who were around when radio was young – these are only the tip of the iceberg of interesting rag chew QSOs I've enjoyed. Once you get beyond the basic signal report, equipment and local weather report, then the QSO can really begin as you get to know a lot more about your fellow

N3GC

Greene County A.R.A.
Waynesburg, Pa
The Club That Started
Worked All States
Via the State Quarter
and hoping that other
clubs will follow our lead



73's

sylvania quarter and QSL card. Since I've already earned my official QRO and QRP WAS awards, this is just the thing to get me chasing after states again. (Only now I think I'm going to try it with 1 watt, as we'll talk about in a few minutes). I encourage folks to talk this up on the bands and have some fun with it. Anybody can collect the 50 state coins, but hams can have their collection as a remembrance of 50 QSOs. Hats off to the Greene County ARA for promoting this wonderful idea.

◆ Making Up Your Own Contests

Many hams come up with some interesting ideas for making amateur radio more fun and exciting. One fairly common practice is to try to make contact with other folks with call signs sharing the same suffix. Interestingly, in all the years I was WB2GHA, I never worked another station with the "GHA" suffix. However, since I've become N2EI I have already talked with K2EI and N1EI. I've stopped short of writing to the other members of the "EI" call group but I have heard of folks doing this. I guess the personal award would be "Worked All 'EI's".

On a similar note, I have heard of a number of families where all members are also active licensed amateur radio operators. They cross-match their logs and, if you have QSOs with each member of the family you will be issued a certificate noting this fact.

There is a practice with DX contacts that sounds fairly intense but some people get a kick out of the game involved. Here's how it goes. You work a station such as VE3ATI (Canada). The last two letters of that call sign become the PREFIX of the next country you seek out. In this case "TI" means the next country you want is Costa Rica. So then you work TI2CX. "CX" would make your next contact Uruguay. What you end up with is a series of QSOs linked prefix to suffix for as long as you have the desire to keep this up. Now imagine doing this all the way through to DXCC! Believe it or not, it has been done by a number of hams.

If linking your international prefixes and suffixes sounds a bit daunting, let me tell you about another fun self-imposed challenge that is actually a bit harder than it looks. How about setting out to work all State Capitals? Sound too easy? I've lived in New Jersey for my entire ham career and I've never worked a native-addressed station in the city of Trenton. This could be yet another way to generate a bit of extra fun.

Some people need a little push to get them to operate regularly. I've set a more or less informal goal to get on the air for at least one QSO every day. I do this not just because it's fun but I also realize that I could easily spend all my time doing other things, even those related to the radio hobby such as building and experimenting. All at the expense of time on the air talking to fellow hams. Get-

ting on the air every day is a bit like a musician practicing their scales. It keeps the skill set honed.

I know a number of hams who pledged to make 2000 contacts in the year 2000. That works out to a little more than five QSOs a day. Not too hard if you're into quick exchanges. A dedicated rag chewer like myself would need to quit his or her regular job to meet that goal. But any ham can find a comfort level and get into the habit of getting on the air on a regular basis.

◆ On Purpose Underachievement

A practice fairly common among QRP operators can really be taken up by most any ham. If you have a good contact going, and have made all your information exchanges and other comments to one another, agree to begin to reduce power. Do this in a systematic way. If you're running 100 watts, drop first to 75, then 50, then 25...get the idea?

As a dedicated low power operator I always start at 5 watts and work my way down to 1 watt or lower. If you have never tried this before you will be amazed at how little power it needed to maintain a quality QSO. If you operate CW instead of phone you will be even more amazed that QSOs can be maintained on mere milliwatts.

A variation on this theme is to rework awards or self-imposed challenges with progressively lower power levels. For example, as I mentioned before, I have WAS with 100 watts and 5 watts. Now I'm cranking things down to 1 watt (yeah, and I'm going to be going after those quarters, too!). Once I've achieved WAS with 1 watt I'll crank it down to 500 milliwatts. I'm pushing the envelope a bit because I want to first try to achieve 1 watt WAS on phone. This is a lot harder than with CW but while the solar cycle is up I think I have a good chance to pull it off on 10 and 15 meters.

There's always some new fun on the ham bands. Jump on in. If you want to rag chew I'll see you on the lower end of 40 meters!

Kiwa Pocket Loop

TM

The Kiwa Pocket Loop is a 12.5 inch diameter Air Core Loop Antenna that collapses to fit in your pocket! This antenna is designed for portable receivers to enhance MW and SW reception. Tuning is from 530 kHz to 23 MHz using a battery powered low noise amplifier. No direct connection to the receiver is required. The special coupler is simply slipped over the whip antenna for improved reception.

The Kiwa Pocket Loop is the ideal travel companion for those who require a loop antenna for on the go!

Kiwa Electronics

612 South 14th Ave., Yakima WA 98902

509-453-5492 or 1-800-398-1146 (orders)

kiwa@wolfe.net (Internet/full catalog)

www.kiwa.com

NOTICE: It is unlawful to buy cellular-capable scanners in the United States made after 1993, or modified for cellular coverage, unless you are an authorized government agency, cellular service provider, or engineering/service company engaged in cellular technology.

Full 800 MHz Scanners

AOR AR-8200 (unblocked)

Wideband Portable receiver
 - 0.5 to 2040 MHz continuous.
 - NFM, WFM, NAM, WAM, USB, LSB & CW
 - Alphanumeric memory identification
\$699^{us} - Spectrum scan
 - Computer control
 - Flexible dynamic memory bank layout
 - Optional CTCSS & Extra memory boards

ALINGO DJ-X10 (unblocked)

Wideband Portable receiver
 - 0.1 to 2000 MHz continuous.
 - NFM, WFM, AM, USB, LSB & CW
 - Alphanumeric memory identification
\$499^{us} - Channel scope
 - 1200 memory channels
 - Superb sensitivity, Clear sound
 - Various scanning modes - Menu system

ICOM PCR-100-08

Wideband receiver for PC
 - PCR-100 can be used with your Desktop or Portable PC
 - 0.1 to 1300 MHz continuous.
 - Modes AM, FM & WFM
\$229^{us} - Built-in tone squelch
 - Multiple screens: multi-function control panel

+ OPTOELECTRONICS & YUPITERU

Guaranteed Delivery to USA.

Radioworld

Phone: (416) 667-1000

FAX: (416) 667-9995 Website Address:
 sales@radioworld.ca http://www.radioworld.ca
 4335 Steeles Ave. W, Toronto, ON Canada M3N 1V7

Longwave Resources

✓ **Sounds of Longwave** 60-minute Audio Cassette featuring WWVB, Omega, Whistlers, Beacons, European Broadcasters, and more!
 \$11.95 postpaid

✓ **The BeaconFinder** A 65-page guide listing Frequency, ID and Location for hundreds of LF beacons and utility stations. Covers 0-530 kHz.
 \$11.95 postpaid

Kevin Carey

P.O. Box 56, W. Bloomfield, NY 14585

Antenna Designer

New Version 2.1 for Microsoft Windows 95 and 98

Computer program helps you design and build 17 different antennas from common materials. Based on Antenna Handbook by W. Clem Small.

Only \$39.95

\$5 SH on all orders
 CA residents add 8.5%
 Shipped on CD ROM

Send check or money order to:
Small Planet Systems
 623 Mangels Avenue
 San Francisco, CA 94127

www.smallplanetsystems.com 415-337-9394

Continuing the SW-54 Restoration

Now that all of the books awaiting review have received their due attention (June 2001 column), we can get back to the National SW-54 restoration project. That project was announced in the May column. Back then, I gave you a little background information about the receiver and took stock of some of the restoration problems presented by the sadly neglected example in my workshop. I had to guess at the year of introduction of this cute little set, and I proposed that it might have been 1954 – the same as the model number.

◆ From the Mailbag

Since then, I've received some reader e-mails about the radio. Richard Gleitz tells me that he received an SW-54 as a gift from his parents when he graduated from high school in 1952. He still has the radio, and also the Howard Sams data folder for it, which is dated 1951. Perry Crabill, W3HQX, quoting from *Shortwave Receivers - Past & Present* by Fred Osterman, tells us that the SW-54 was manufactured from 1950-1957, and now sells for \$40-\$65 – close to its original price of \$50-\$60. Howard Ragan added some information about the National-equipped "Kon-Tiki" expedition mentioned in an ad for the SW-54 I ran in May. He tells us that the receiver on the raft was a National NC-173. He has a '173 himself and still uses it.

I should also mention that a restoration article on the SW-54 appears in the current issue of *The OTB*, newsletter of The Antique Wireless Association. I happen to be Editor of *The OTB*, but that article was written by Bill Fizette, AWA's President. See the AWA ad appearing with this column for more information about *The OTB*.

Before getting started I'd like to mention a couple of other reader e-mails relating to earlier "Radio Restorations" columns. Frank Adams, N6YP, is interested in restoring 1940-1960 communications receivers and had been looking around for an r.f. generator. He was pleased to find a Triplett 2432 like the one we worked on a few issues back and is now trying it out. Nick Terrence already had a signal generator (an Eico model), but wasn't sure how to

use it until he read about the Philco *Transitone* realignment discussed in the April 2001 column. This got him over his inhibitions and he went to work on the i.f. channel of a 1950s Sentinel 5-tuber with very good results.

◆ Cabinet Cosmetics

I decided to start the SW-54 restoration by working on the metal cabinet. To tell you the truth, I've been itching to go after it with some polishing compound ever since I took the set out of storage to begin this project. The painted finish (done in National's classic grey hammertone color) was generally dull, scuffed here and there, and bore the signs of an overzealous polishing attempt using

gleaming nicely – and most of the rust smears had disappeared.

Next, I turned my attention to the front-panel control markings. National's control labels in sets of this era are easy to rejuvenate because they are deeply engraved into the metal panel. I spent a little time in a paint store looking for some kind of touch-up stick I might be able to use to refill the "tired" letters. What I came home with was a wood filler "Blend Stick" made by DAP. It's normally used to repair scratches and small holes in furniture finishes and is available in several shades. White (shade 32) was the one I needed.

I rubbed the stick vigorously across each of the engraved labels until it stood out sharply from the panel once more and all of the "broken" parts were refilled. A few swipes with a cloth slightly dampened in mineral spirits removed the excess without taking any filler out of the engraved parts. The result: a quantum leap forward in cosmetic appearance!

I finished the job with an overall coating of hard floor wax, which I buffed to the best shine that elbow grease could provide. And while the result definitely does not look mint, it is quite pleasing to the eye – particularly when I remember how the cabinet looked originally! I'm not really through with the cabinet, though, because I still have to re-

place the missing metal rear panel with one salvaged from my very rusted parts set. More on the rehabilitation of that part in a later column. It's pretty rusty and grimy, but I am going to try the polishing compound and wax before I consider refinishing.

◆ Dealing with a "Nasty Chassis"

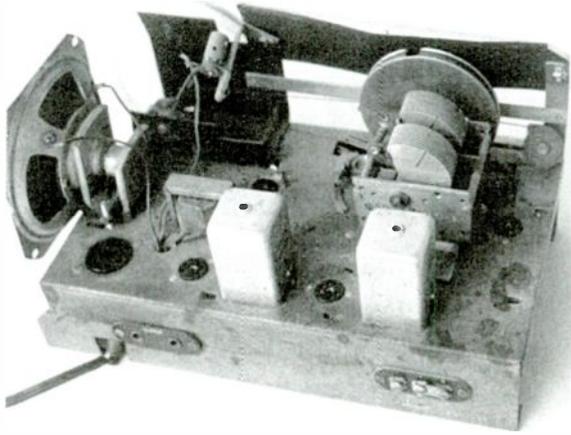
I think I mentioned the poor cosmetic condition of the top of the SW-54's chassis in my May article. Quite clearly, this equipment had been stored under less than ideal conditions. The copper finish of the metal (not sure if this was plating or some form of paint), was stippled and pock-marked everywhere with discolored areas, some particularly large and obvious.



The SW-54 cabinet after its "facelift." The old girl looks pretty good for age 50, doesn't she?

something a little too abrasive. Also, some of the scuffed, worn and dinged spots had begun to weep rust stains over the finish. The white control markings on the cabinet were yellowed and incomplete. Back in May, I promised that the cabinet would look decent once more – but remember that I asked you not to expect miracles!

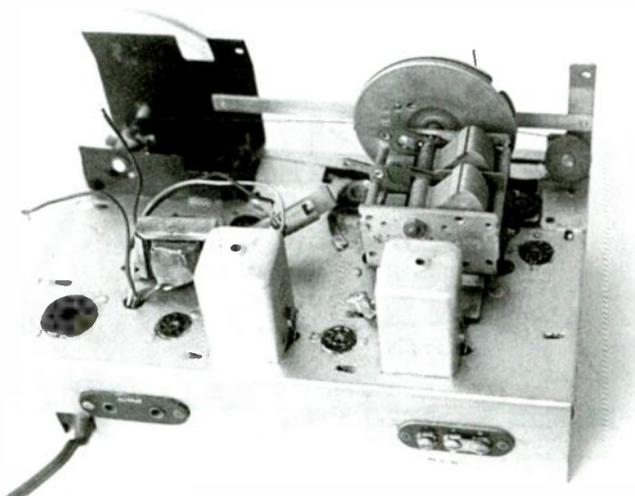
First I went to work on the finish with Turtle Wax Polishing Compound (available at any auto supply outlet for about \$2.00 a can). This was applied with a damp cloth, per instructions, then buffed with a soft dry cloth. After I did it once, I repeated the process. The results were really encouraging! Of course the scuffs and dings were still with me, but everywhere else the paint was evened out and



Here's a shot of the chassis just before I removed the dial and speaker for painting. Note the discouraging spots and speckles all over the surface of the chassis.

My first thought was to try the polishing compound because I think that a cleaned-up original finish, even if not perfect, is far preferable to a refinishing job. However, that treatment didn't even make a dent in the problem, and I decided to go shopping for some metallic copper brush-on paint. Spray paint would have been great, but masking of the many chassis items requiring it would have been a daunting job.

I finally found what I needed in a specialty paint store, but gulped when I saw the price (\$15.99 for a 6-ounce bottle!). I think if I'd had more time to shop, maybe at a hobby store, I might have found a smaller size at a better price. Apart from the cost, however, the paint was a great performer. The shade was almost exactly right and the material was so rich in pigment that it covered easily in one coat (though I put on two for good measure). I was amazed, also, to discover that the paint was water based, which made for easy brush cleanup.



*After a careful going-over with metallic copper paint, the set looks practically ready for a *concours d'elegance*. However, though the photo is flattering, this chassis would never pass for mint (see text).*

Before undertaking the painting, I removed all of the tubes from the chassis – checking as I did so to make sure that each had been installed in its proper socket. I had the tube layout chart in the factory instruction manual to help me with this, but each socket is also labeled with the tube type that belongs in it. The tubes were then set aside to be tested later.

I also removed the speaker from the chassis and loosened and raised up, but did not disconnect, the output transformer. These two grime magnets were the only easily removable components on the chassis. All others were riveted in place or otherwise difficult to unfasten. The dial scale was removed

for later cleaning and to provide easier access for my paint brush. Finally, I carefully cleaned the chassis using a rag dampened with mineral spirits.

In case you decide to do over a SW-54 with a similarly distressed chassis, I can recommend the paint product I used. It is "Copper Metallic Paint ME 149-06" Manufactured by CPC, Modern Masters, Inc. of N. Hollywood, CA. Other metallic colors are available, and it might be worth laying in color that looks like the usual anodized metal chassis for future rehab jobs. As to my bottle of copper – I have enough left for 20 or 30 more SW-54s if I should ever need to do them!

I was pleased that the paint dried with a minimum of brush marks, and the color was a close enough match to the original that it did not clash with certain chassis elements (such as the front apron and various brackets) that I chose not to repaint. However, I'd be lying to you if I told you that the chassis now looks mint!

Though the color is even and original looking, the irregularities due to corrosion are still visible. And, of course, careful as I was, I did get a bit of paint here and there on tube socket edges and other places where it doesn't belong. All these factors clearly give my "treatment" away as amateur re-paint job. But I'm well pleased with the appearance and, hey, if I'm going to put in this much effort on a

radio restoration I don't want to leave the chassis with a shabby appearance!

◆ More Housekeeping

I can't stress enough that proper housekeeping of your vintage set, something that requires practically no technical know-how, can often make the difference between a set that works the first time you turn it on and one that is silent or makes only static or a loud hum.

Before ending this work session, I checked all of the tubes, paying special attention to the heater of the 35Z5 rectifier tube. The heater is tapped to power a pilot light, and if the light is missing (as mine was) or burned out, the voltage across the filament section connected across the pilot light can rise too high and burn the section out. However, all was well and the tubes received a clean bill of health.

With the tubes checked out, I went to work with my can of Radio Shack control cleaner/lubricant and sprayed the contacts on both of the bandswitch wafers. I also hit the inside of the volume control (spraying through a couple of small openings that I found). Both controls were then operated several times throughout their ranges so that the cleaner could do its job.

Before next month's work session, I plan to order a replacement set of capacitors for this radio. Once they are installed, we can fire up the equipment and see if anything comes out. See you then!

JOIN THE AWA

Antique Wireless Association

The original and largest historical radio-collector group

• Publishes *The Old Timer's Bulletin*, Marc Ellis, Editor, with:

- Battery and AC receiver restoration
- Vacuum-tube history and collecting
- Old-time amateur-radio contests
- Communications receivers
- Free want-self-swap ads
- Early television
- Horn loudspeakers
- News of U.S. and foreign clubs

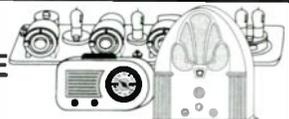


• Produces the famous annual Rochester meet

• Maintains unique radio-TV museum
Membership is only \$15 per year (\$27 for two years, \$18 per year for overseas). Mail check to:

Antique Wireless Association, Inc. • Box E, Dept. 2
Breesport, NY 14816 <http://www.antiquewireless.org>

**FREE
SAMPLE
COPY!**



ANTIQUE RADIO CLASSIFIED

*Antique Radio's Largest-Circulation
Monthly Magazine*

Articles - Classifieds - Ads for Parts & Services
Also: Early TV, Ham Equip., Books,
Telegraph, 40's & 50's Radios & more...

Free 20-word ad each month. Don't miss out!

 1-Year: \$39.49 (\$57.95 by 1st Class)
6-Month Trial - \$19.95. Foreign - Write.

A.R.C., P.O. Box 802-P14, Carlisle, MA 01741

Phone: (978) 371-0512; Fax: (978) 371-7129

Web: www.antiqueradio.com

An Antenna for Medium and High Frequencies

Two months ago we finished a series of articles on types of antennas as they vary across the radio spectrum. As a complement to that series last month we discussed an antenna for the VLF and LF bands. This month we feature an antenna employed on the MF and HF bands: the grounded quarterwave vertical, or Marconi antenna (fig.1). This antenna was invented by Guglielmo Marconi whose pioneering wireless inventions earned him the name: "The Father of Radio."

◆ The Marconi Antenna

The Marconi antenna is common on MF, particularly as a transmitting antenna. It is also a favorite of many DXing ham operators on the HF band. As with many antennas, the characteristic which makes this one so useful is the shape of its radiation-reception pattern. The low angles at which the Marconi concentrates its launching and receiving for a good portion of its signals makes it useful for groundwave communication on MF, and for skywave DX on HF.

◆ Credit to Hertz, too

A passing mention should also be made of the Hertz or halfwave dipole antenna, given its high popularity and usefulness on MF and HF. This antenna was invented by Heinrich Hertz himself: the man who first convincingly demonstrated radio waves. I discussed building and using dipole antennas in the July Antenna Topics column last year. That column is available as a reprint from *Monitoring Times*.

◆ Building a Marconi Antenna

As shown in fig. 1 the Marconi has a vertical element which is a quarter wavelength long with its lower end (base) at ground level, but insulated from the ground. At the base of the vertical element buried wires called "radials" radiate out as spokes radiate from the hub of a wheel. Generally speaking, the more of these radials we install (up to 120), the better the antenna will perform. These radials are buried one or two inches underground, or simply layed on the ground. Most ham or radio-enthusiast installations use far fewer

than 120 radials; a minimum of 15 is suggested by some antenna builders. A quarter wavelength is the suggested length for the radials, but length is not the important factor; it's more important to have as many as is practical rather than to have them a full quarter wavelength long.

On the other hand the length of the vertical element is quite important: It should be a quarter wavelength long. To determine its length use the formula given here:

$$\begin{aligned} \text{Length (feet)} &= 234/\text{frequency in MHz} \\ \text{OR} \\ \text{Length (meters)} &= 71.3/\text{frequency in MHz} \end{aligned}$$

If you want any antenna to be actually tuned to a specific resonant frequency, realize that formulas such as those above will only get you into the ballpark. The actual resonant length is affected by such factors as nearby metal buildings, trees, ground condition, and vertical-element diameter. Trimming the antenna's length to resonance while using a test instrument such as an automated SWR

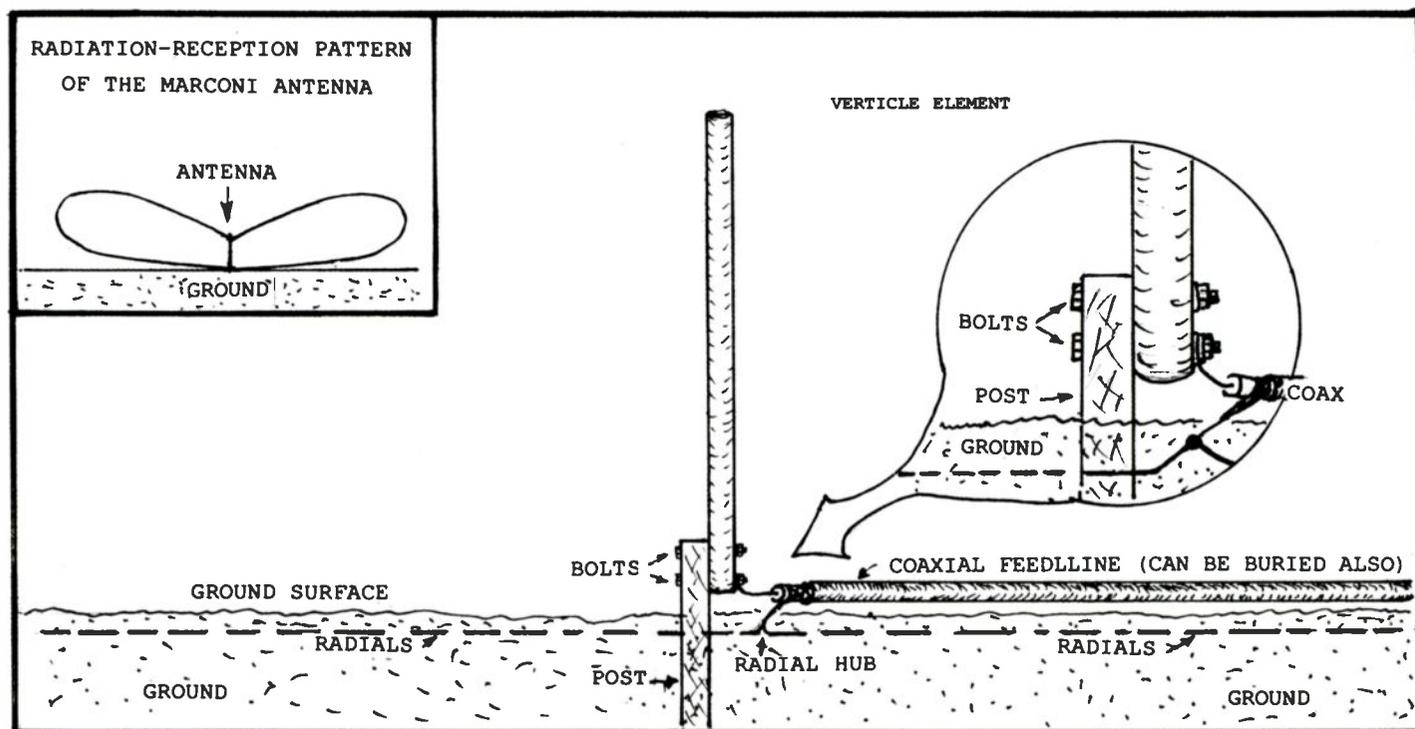


Fig. 1. A grounded quarterwave vertical antenna.

This Month's Interesting Antenna-Related

Web site:

This site has a variety of information and links concerned with antennas. Check it out at:

<http://www.beebware.com/directory/Arts/Radio/Formats/Short-wave/Equipment/Antennas/>

measurement device, noise bridge, or ordinary SWR meter is essential if you want your antenna tuned to resonance. Most hobbyist antenna builders don't bother with this precise tuning step. It is probably worthwhile on HF and MF only if you are using the antenna for transmitting, or when the antenna is used for receiving in a very electrically quiet location.

The vertical element can be made of such diverse things as metal pipe or tubing, a metal tower, or a wire supported by a tree limb or wooden pole. The greater the diameter of the vertical element the wider the bandwidth of the antenna, so a tower will have a greater bandwidth than a wire element.

Use as many radials as you have wire for. The radials are a means of reducing the resistance (and thus reducing signal-power loss) of the ground (which is part of the path for the electrical fields of the antenna). It's better to use a lot of radials that aren't a full quarter wavelength long than a few that are a quarter wavelength long. Laid on or buried under the ground, that quarter wavelength isn't resonant at the operating frequency anyhow, and isn't intended to be. Some builders just use a ground rod in place of the radials, but this should be a last resort. It is not recommended, and is a particularly poor practice if the antenna is to be used for transmitting.

Some designs utilize above-ground radials with excellent results. However, these antennas are not, strictly speaking, Marconi antennas. If the radials are quite high above ground, then the antenna becomes a groundplane antenna. For a groundplane antenna, the number of radials for good performance can be as low as two, and it does become important that they be a quarter wavelength long.

The feedpoint impedance of the Marconi varies with the installation: somewhere around 36 ohms or lower. There is no commonly-available feedline which matches that impedance, but for short runs (say 100 feet or less) using good-quality 50-ohm, or even 75-ohm feedline usually presents no significant problem for reception on HF or MF. For transmitting, an antenna matching unit (transmatch or antenna tuner) between the transmitter and feedline can allow the line to accept full power and also protect the transmitter from SWR problems. If you especially want a better match between antenna and feedline then various matching schemes such as those in *All About Vertical Antennas* by Orr and Cowan

(Radio Publications, 1986) are available.

The radials are all connected together at their hub. A good connection is important here, and soldering the wires together is a reliable way to get it. As shown in fig. 1 the center conductor of the coaxial feedline is connected to the base of the vertical element, and the outer shielding-conductor is connected to the hub of the radials.

The vertical element is mounted on a post as shown in fig. 1. The post is sufficient insulation from the ground provided the element doesn't touch the ground, and the post is dry and varnished or otherwise protected from absorbing moisture. Some installations that use guyed masts rather than a self-supporting one as shown in fig. 1, have a tubular vertical element resting over the neck end of a heavy glass bottle as an insulator.

Try to mount your antenna as much in the clear as possible so that its low-angle radiation can see its way toward the horizon without too much interference. Most of us have less than optimum antenna sites, but do the best you can. If you live in lightning country remember to use some kind of lightning protection. Disconnecting and grounding the antenna when it is not in use, and never using the antenna when lightning is likely is a minimum.

◆ Correction

In fig. 1 of the June Antenna Topics column there should be no connection between the 9-volt positive line and the antenna. Thanks to the readers who caught this.

◆ Antenna Contest:

If you have a last-minute entry for the unusual (even weird) antenna contest, get it to me right away. I hope to announce the win-

ner and discuss his or her unusual entry in *MT's* issue after next.

RADIO RIDDLES

Last Month:

I said: "There's an old saying about antennas that goes 'the higher the better.' Is that so?"

Well, as with so many things in life the answer depends on the situation. Due to an antenna's interaction with the ground the antenna's height above ground heavily influences the launch angle of its vertical radiation-reception pattern. And so, depending on where you want to aim your signals or from where you want to receive them, you can often pick an antenna height to optimize your effectiveness. If you want to communicate with stations a short distance away, particularly if there are intervening hills, lower antenna heights may be best. For DX higher may be best. And in lightning-prone areas underground (yes, underground!) antennas can be desirable to reduce chances of lightning damage, and also reduce received electrical noise.

This Month:

How can mounting your antenna lower improve communication over hills as mentioned above? And what is NVIS anyhow?

You'll find an answer for this month's riddle, another interesting, antenna-related web site, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

NEW RECEIVER

UNIVERSAL SC-50

SUBCARRIER—FM² AUDIO RECEIVER



**RECEIVE ALL FM² AND AUDIO
SUBCARRIERS—100 kHz to 9 MHz**

Full featured audio services, music, all sports, talk shows, news, religious programming, major radio stations, variety, public radio plus many other services, no fees. The SC-50 audio subcarrier receiver will work with all home satellite systems, 3-minute hookup, simple and quick to tune, 16-character display, 50-channel memory bank, direct frequency readout, covers all FM² and audio subcarrier channels, hundreds of free programming channels.

FOR INTRODUCTORY PRICE CALL: 1 - 828 - 293-2222

UNIVERSAL ELECTRONICS, INC. Communications Specialists
4515 LITTLE SAVANNAH RD., CULLOWHEE, NC 28723
(828) 293-2222 FAX (828) 293-2221

What is an Internet Receiver/Tuner?

A few months ago one of my colleagues and former VP of Marketing with a number of high tech companies, Lisa H, called me and said, "Hey, have you seen the new Internet receivers? Since you write for *MTI* thought that you and your readers would be interested." I replied that I had seen some early marketing hype from two companies about a year ago. But knew nothing more. In fact, I confessed that I was not quite sure what to expect from an Internet receiver. Was it hardware? Software? How would it operate? What would it tune?

"Well," said Lisa, "wonder no more. I'm faxing you a product release from SonicBox, recently renamed iM Networks. It's real and, according to the release, available now!"

So with the promise of giving her a marketing synopsis of an "Internet receiver" and my impression of its relative importance to the world, I contacted iM Networks and asked for their latest product called iRhythm, with all the bells and whistles; quite frankly still not sure what to expect.

◆ Done ... Before They Started

After speaking to iM Networks, I tried to connect to the website of the other company who had also pre-announced an Internet receiver product months ago. I was shocked to find that they had folded their tent and closed shop without ever getting a product out the door. Clearly, the cold hard venture capital community did not consider the Internet receiver product concept important enough to finance. I reflected to myself that this was not a good sign for the Internet receiver.

◆ The Arrival

UPS delivered a small, 11 by 14-inch flat box. Not only was the size surprising, but it seemed that it had no weight. Could this be an Internet receiver? I remembered back so many years ago to when I opened my first shortwave tube (valve) receiver, my first solid state communications receiver, my first programmable desk scanner, my first synthesized

shortwave receiver ... the last big "first" had been almost two decades ago. But now I was about to discover and explore another first, my first Internet receiver!

A three-compartment hard plastic package greeted me inside the mailing box. Three dark blue pieces occupied the plastic. So what was the deal?!

◆ What Is iRhythm?

It consists of three components: iM Band Base, iM Receiver and the Remote Tuner. Hold it right there. In my opinion these component names are very confusing to radio people. The iRhythm Internet receiver product is actually a system, not simply a "re-



Figure 1 – iRhythm's Remote Tuner Box

ceiver." Let's start with some definitions. An Internet radio "tunes" stations by connecting to websites of stations that are "broadcasting" over the Internet. The resulting streamed audio is then heard over the computer's sound card/speakers. No special "receiver" is needed. Any Pentium 100 MHz computer, with Internet access, sound card and speakers can "receive" Internet stations. Many traditional shortwave stations, such as BBC, have Internet outlets. See the *MT* feature article last month on Useful Internet Radio Sites for shortwave station websites.

"So why do we need Internet receivers/tuners?" This was the question that Lisa asked me and that I had also wondered about since reading SonicBox's first press release last year.

Well, as I said, iRhythm is a system. The

main piece of hardware is the remote tuner. This 9 x 4 inch (23 x 10 cm) retro styled component is where the "tuning" happens. See Figure 1. The tuning knob is visible on the left side of Figure 1. The "dial," which sits above the knob, is an LCD hash-mark "dial" which also indicates functions selected, such as audio muted. The Remote Tuner is powered by four AA batteries and allows the user to vary the audio volume and change "bands."

◆ WHOA! Internet Bands?

Yes, I was surprised and confused when I read the instructions. Here we need more definitions to be able to understand Internet radio-speak. First, the Remote Tuner is actually a 900 MHz transmitter. The corresponding 900 MHz receiver is component number two, called the Base Unit. The Base Unit connects to the USB port of your Pentium 133 (or faster) PC and the soundcard's line output. The Base Unit receives radio commands from the Remote Tuner. These commands select a website from a list of pre-programmed "stations" provided by the included iM Networks installation software.

So, in reality, the Remote Tuner is actually a fancy RF wireless remote control. All of its commands can be performed at the computer keyboard. But, I must say, that the 900 MHz works pretty good and allows you to "tune" your computer from up to 100 feet away.

The third component of the iRhythm system is a pocket-sized unit, which connects to the AUX input of your home stereo. This is yet another receiver!! As I said, iRhythm is not just a component, it's a system. This pocket-sized unit, powered by two AAA batteries, receives the audio output of the sound card. How? Good question. The Base Unit does double duty; first as a receiver of commands from the Remote Tuner, and also a transmitter of website station audio. The audio can therefore be enjoyed over your home stereo system, with all of its fidelity (almost) and convenience.

◆ Installation and Operation

The iRhythm software comes on a CD ROM ... well, not quite all the software you

may need. The software notified me at the end of its install that I did not have all the required software on my computer. I think this is a bit backward. It should have checked my system and given me the message BEFORE it installed itself. In my case, I had Windows 95 on my laptop. However, Windows 98 Second Edition is a must. Also, I had an older version of Real Audio. Version 7 or higher is required. Therefore, the installation became a two-hour long mad dash around the house for Microsoft CDs, Windows 98 Second Edition installation and Real Audio download and installation. Not exactly what I had planned for, or the basic instructions led me to believe.

Operation, I am happy to report, was much easier than installation. All required cables are included, and a wall wart power supply for the stereo receiver pocket unit comes as an alternative to the AAA batteries. All connections are clearly marked and the hardware can be in place in a few minutes.

With your computer turned on, pushing the power button on the Remote Tuner turns on its display, brings up the iRhythm software on the computer and makes a connection to the Internet. The software can be used with either a normal telephone 56K connection or a high speed broadband hook-up. I used a 56K dial-up ISP.

◆ Computer Screen Vs Tuner Display

Figure 2 is the resulting computer screen once everything is up and running. Now, since we have our Remote Tuner we should not need to see the computer screen. Right? Well, in practice that was not quite right.



Figure 2 – Main Screen of iRhythm's Software. Note Similarities to Hardware in Figure 1

The iRhythm software displays on the computer categories of web stations listed by program type. Each category is given a letter from A to Z. Within each category is a list of actual web station names and a corresponding number starting from the number One. For example, under the category of Alternative Music there may be sixteen stations; each numbered from one to sixteen. This detailed station list is only displayed on the computer screen. See Figure 3.

◆ What is an Internet Band?

You can change categories from the Remote Tuner. However, only the category letter is displayed on the Remote Tuner's LCD.



Figure 3 – Computer Screen Showing Police "Band" and Associated Internet Stations Available for "Tuning"

The "tuning" knob is used to select the station number within the chosen category. So if your local police agency was listed as station number 11, in Category P (Police Programs), all you would see on the LCD would be P11. Great for the game of Bingo, but not really how a "tuner" display should operate.

In the above example we are tuned to the P band. If anyone at iM Networks had any real tuner or monitoring experience they would have called the bands, banks. They function exactly like channel banks on a scanner. The use of "band" and "tuner" in this application is not only misleading, it is just plain wrong, relative to their accepted usage in the monitoring world.

Only one of the "Bands," Z, is user programmable. Here the user can store new audio web sites.

◆ Whaddya Think?

iRhythm was fun to use. It incorporated some nice ideas and hardware. I suggest that you have a Pentium 233 MMX, or higher, with a USB port, 64MB of RAM, running Windows 98 (Second Edition only!), 40MB of free hard disk space, a sound card and either Real Audio Player 7 or Media Player 6.4, or newer. The iRhythm software seems to put a real strain on my Pentium 133 PC. I tried all of the stations listed under Scanners. Many of the stations listed could be accessed and a

computer voice was heard exclaiming, "This station is no longer available." With all the changes that are occurring on the Internet daily, this should come as no surprise.

At just under \$100, iRhythm is a unique product with some unique concepts. According to their website at <http://www.sonicbox.com> Philips will incorporate iRhythm technology into their home audio product line. It is rumored that iM Networks is working on a similar product which connects directly to the phone line without the use of a computer.

In summation all I can say is two things, "Lisa, I'm still waiting to see an Internet receiver." And the venture capital companies' hunches concerning the importance of this type of Internet Radio were on the mark. Unfortunately, I really cannot add this product to my list of receiver "firsts."

Next time we'll get back to mainstream monitoring topics with a look at some very useful monitoring software. That is, real radio monitoring. Till next time.

KEEP YOUR C-BAND SYSTEM RUNNING STRONG!

Free Buyer's Guide

BEST VALUES ON...

- Receivers, including 4DTV
- Dish Movers & LNBs, all kinds
- Tune-up Kits, Tools & Parts
- Skypac® Programming
- Toll Free Technical Help

1010 Frontier Dr.
Fergus Falls, MN 56537

Fax: 218-739-4879
Int'l: 218-739-5231

800-543-3025
www.skyvision.com

Skyvision

YOU CAN!

Rave Review Pop Comm April '96

SEE US ON THE WEB!
www.vikingint.com

Professional 10 HOUR RECORDER

"BUILT LIKE A BATTLESHIP"

- Heavy duty commercial recorder - NOT improvised from consumer models
- 12, 14, and 16 hour models also available
- BUILT-IN voice activation (add \$30)
- Applications information included
- Dimensions: 11.5 x 7.0 x 2.75"

SPECIAL Monitoring Times Price..

FREE NO PREP SPECIAL EQUIPMENT CATALOG

\$159

COD's OK Calif residents add tax. Sorry, no credit cards. Free catalog USA only, other countries \$5. Free shipping to 48 contiguous states on prepaid orders.

Viking Systems International 100 North Hill Drive #42, Brisbane, CA 94005

Factory Direct **Phone: (415) 467-1220 Fax: (415) 467-1221** "Since 1971"

What are synthesizers and how do they work? Part 1

Today most receivers use frequency synthesizers. Many of them advertise this fact by displaying words like "PLL", "Synthesized", or "Quartz" on their front panels or in the advertising literature. Whatever one thinks of the sales language, synthesizers offer tremendous advantages to the operation of a receiver. Not only do they enable receivers to have the same stability as the quartz reference, but they also enable many other facilities to be introduced because they can easily be controlled by a microprocessor. This enables facilities such as multiple memories, keypad frequency entry, scanning and much more to be incorporated into the set.

Synthesizers are widely used, but their operation is not always well understood. One of the reasons for this is that their design can involve some complicated math. Despite this, the basic concepts are relatively easy to grasp.

Basics

A frequency synthesizer is based around a phase locked loop. This circuit uses the idea of phase comparison as the basis of its operation. From the block diagram of a basic loop shown in Fig. 1 it can be seen that there are three basic circuit blocks: a phase comparator, voltage controlled oscillator (VCO), and loop filter. A reference oscillator is sometimes included in the block diagram: Although this is not strictly part of the loop itself, a reference signal is required for its operation.

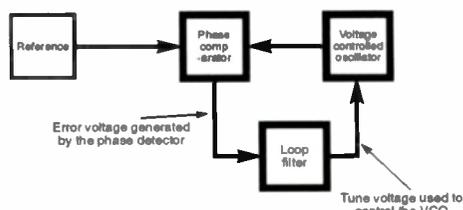


Fig. 1 Block diagram of a basic phase locked loop

The loop operates by comparing the phase of two signals. The signals from the voltage controlled oscillator and reference enter the phase comparator. Here a third signal equal to the phase difference between the two input signals is produced.

The phase difference signal is then passed through the loop filter. This performs a number of functions including the removal of any unwanted products that are present on this signal. Once this has been accomplished it is applied to

the control terminal of the voltage controlled oscillator.

This tune voltage or error voltage is such that it tries to reduce the error between the two signals entering the phase comparator. This means that the voltage controlled oscillator will be pulled towards the frequency of the reference, and when in lock there is a steady state error voltage. This is proportional to the phase error between the two signals, and it is constant. Only when the phase between two signals is changing is there a frequency difference. As the phase difference remains constant when the loop is in lock, this means that the frequency of the voltage controlled oscillator is *exactly* the same as the reference.

Synthesizers

A phase locked loop needs some additional circuitry if it is to be converted into a frequency synthesizer. This is done by adding a frequency divider between the voltage controlled oscillator and the phase comparator as shown in Fig. 2.

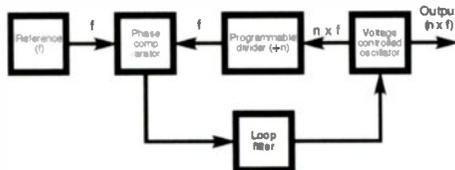


Fig. 2 A programmable divider added into a phase locked loop enables the frequency to be changed.

Programmable dividers or counters are used in many areas of electronics, including many radio frequency applications. They take in a pulse train like that shown in Fig. 3, and give out a slower train. In a divide-by-two circuit, only one pulse is given out for every two that are fed in, and so forth. Some are fixed, having only one division ratio. Others are programmable, and digital or logic information can be fed into them to set the division ratio.

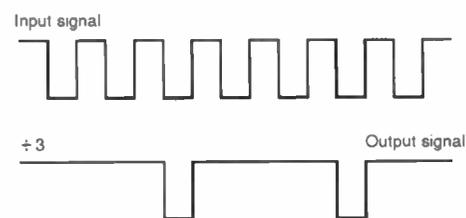


Fig. 3 Operation of a programmable divider

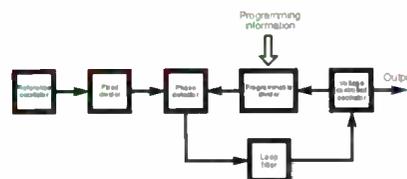


Fig. 4 Comparison frequency reduced by adding a fixed divider after the reference oscillator

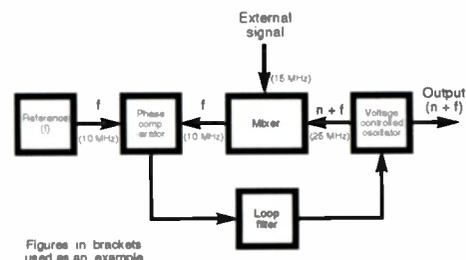
When the divider is added into the circuit, the loop still tries to reduce the phase difference between the two signals entering the *phase comparator*. Again, when the circuit is in lock both signals entering the comparator are exactly the same in frequency. For this to be true, the voltage controlled oscillator must be running at a frequency equal to the phase comparison frequency times the division ratio.

It can be seen that if the division ratio is altered by one, then the voltage controlled oscillator will have to change to the next multiple of the reference frequency. This means that the step frequency of the synthesizer is equal to the frequency entering the comparator.

Most synthesizers need to be able to step in much smaller increments if they are to be of any use. This means that the comparison frequency must be reduced. This is usually accomplished by running the reference oscillator at a frequency of a megahertz or so, and then dividing this signal down to the required frequency using a fixed divider. In this way a low comparison frequency can be achieved.

Analog Techniques

Placing a digital divider is not the only method of making a synthesizer using a phase locked loop. It is also possible to use a mixer in the loop as shown in Fig. 5. Using this technique places an offset into the frequency generated by the loop.



Figures in brackets used as an example

Fig. 5 A phase locked loop with mixer

SCANNER EQUIPMENT

EQUIPMENT AND ACCESSORIES FOR YOUR MONITORING POST

Bob Parnass, AJ9S

parnass@megsinet.com

<http://www.megsinet.com/parnass>

Yaesu VR-120 Portable Scanner

The Yaesu VR-120 is a palm-size wide coverage scanner. Its size, frequency coverage, and \$200 price place it in direct competition with the ICOM IC-R2 (April 1999 *MT*). Two simple AA batteries power each model. The IC-R2 is furnished with two NiCd cells and a charger, but none are supplied with the VR-120. Neither radio has a charging jack so batteries must be removed for recharging.

◆ General Features

The VR-120 is made in Japan. It tunes the spectrum from 100 kHz to almost 1300 MHz, but the US version has several undocumented frequency gaps which permit it to pass muster with the FCC's rules on rejection of cellular telephone signals (See table below). ICOM introduced its IC-R2 before the FCC crackdown and has gaps only at the cell input and output frequencies.

Users may choose AM, NFM, and WFM reception modes and 11 selectable tuning step sizes, ranging from 5 to 100 kHz. The IC-R2 provides CTCSS decoding and CTCSS search, but the VR-120 does not.

Battery life can be extended when not scanning or searching by enabling the power saver. A sleep timer function is configurable to turn the radio off after 30, 60, or 90 minutes.

Both the VR-120 and IC-R2 use a detent control knob for tuning and navigating through menus of options. The VR-120 is fitted with conventional volume and squelch knobs that are easier to adjust than the IC-R2. Pushbutton keys control the IC-R2's volume and its squelch is set using a knob and button in tandem.

A 1/8" side mounted jack is used for earphone or cloning connection. When not in use, the jack is protected from dust by a captive rubber plug.

◆ Memory and VFOs

Both the VR-120 and IC-R2 have one VFO, but different memory channel arrangements. The VR-120 sports 640 channels organized into 10 banks. The IC-R2 has 400 channels spread among eight banks.

Neither radio has a numeric keypad. The two models are programmed using a similar technique. Frequencies are entered into the VFO using a combination of the Band key and the top mounted tuning knob.

To program a memory channel, you first tune the VFO to the right frequency and use menus to select other parameters. Both radios can store the information in the next empty memory channel or you can choose a specific channel instead. Mode and tuning step size can be programmed for each memory channel. Several of the VR-120's memory channels are factory programmed to shortwave broadcast frequencies, but may be overwritten.

The VR-120 permits you to program an 8-character label for each channel, an advantage over the IC-R2.

◆ Scanning and Searching

The VR-120 can scan combinations of memory banks, in contrast to the IC-R2's single bank arrangement. You can scan all channels in the designated banks or only those channels you mark as "preferential." The upscale VR-500 uses the same arrangement. Yaesu's Preferential Scan is merely an alternative to the more familiar approach of locking out channels in other brand scanners and both schemes accomplish the same mission.

There are three choices for when to continue scanning (or searching) in the presence of a signal: Busy, Pause, and Hold. A global rescan delay waits for the signal to drop and is set to 2 seconds.

Instead of a rescan delay, you can choose to pause the scan for 1 to 12 seconds and restart the scan after that interval

even if the station is still transmitting. The Hold setting halts the scan the first time the VR-120 detects a signal.

The VR-120 provides eight limit search ranges and the IC-R2 provides 25 pairs of search limits. The VR-120 can skip up to 64 frequencies during limit and VFO searches. Special memory channels are used to store the locked out frequencies, and you can inspect or restore them.

The VR-120 includes a Smart Search (a.k.a. auto memory write), another advantage over the IC-R2. You can program upper and lower frequency limits and a starting frequency. After commencing Smart Search, the

VR-120 will look for signals in that range and store active frequencies in a special 21-channel memory bank.

Too bad that the Smart Search capabilities are so limited. The VR-120, like the VR-500, will make only one sweep through the search range before stopping. You get one chance to inspect the search results because you cannot look at them after exiting the Smart Search mode.

There are 10 pairs of Dual Watch frequencies. These behave like 10 miniature, non-linkable memory banks of 2 channels each.



◆ Other Features

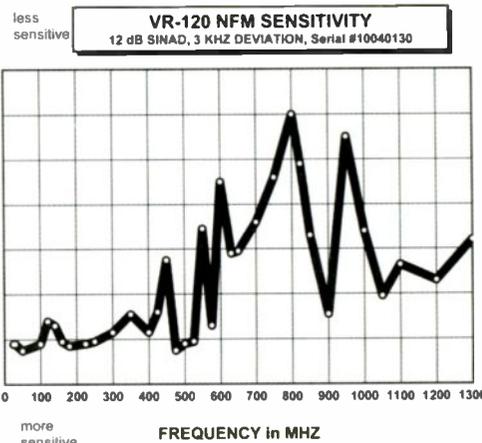
The VR-120 contains an internal bar antenna for AM broadcast band listening. A menu item lets you select this bar or an external antenna. Another menu item permits an optional earphone to serve as an antenna for stealthy VHF/UHF monitoring, an innovation also found in the Alinco DJ-X2T (December 2000 *MT*).

The VR-120's Channel Counter feature permits the radio to act as a simple frequency counter. The antenna is disabled while using the counter mode, so you must be located near the transmitter. By default, the counter is limited to a 50 MHz wide frequency range centered on the display frequency, though you can narrow it 5 MHz or widen it to 100 MHz. The results are delayed, sometimes for several seconds; we find our DJ-X2000T Flash Tune's search results are faster and more repeatable.

The memory and operating parameters of a VR-120 may be cloned from another VR-120

VR-120 Frequency Gaps

339 - 340	542 - 549
351 - 352	558 - 572
372 - 373	605 - 615
384 - 385	620 - 630
396 - 397	784 - 798
482 - 483	807 - 820
496 - 497	824 - 849
504 - 505	807 - 820
511 - 512	869 - 894



by using the optional CT-35 cable. The user manual does not document the interface protocol nor mention cloning by personal computer. Yaesu should make the interface public and let the marketplace provide a variety of computer cloning programs. The IC-R2 is more attractive in this regard because you can obtain both free and low-cost computer software for it.

◆ Performance

After using the VR-120 at home and on a dozen trips, we concluded that the VR-120 and IC-R2 are about evenly matched. Both radios perform comparably, though the IC-R2's sensitivity is more consistent. The VR-120's display is much easier to read and its classic squelch and volume knobs are better suited than the IC-R2's pushbutton arrangement.

This VR-120's audio and intermod immunity are superior to our VR-500. The IC-R2's audio is a bit crisper and the CTCSS squelch keeps more unwanted signals out.

We prefer the VR-120's BNC antenna connector to the IC-R2's SMA style. The VR-120's

rubberized antenna is a fair performer on VHF/UHF, though not as good as a wire-thin Pryme RD-9. Our VR-500's antenna has a performance notch near 159 MHz but the VR-120's antenna does not. The stock antenna excels, believe it or not, in shortwave reception. We can receive dozens of foreign shortwave broadcast stations using the stock antenna while sitting in the basement at night.

◆ Wrap-up

If you require a tiny scanner with good performance, the VR-120 and IC-R2 should be tops on your list. They are loud enough to hear comfortably and can be powered by ordinary AA

batteries. Both scan memory at about the same speed.

The IC-R2 provides CTCSS squelch and there are several free and low cost computer programs available for loading frequencies. Its duplex facility lets you monitor repeater inputs with a simple key press.

The VR-120's larger display and conventional knobs make it easier to use. It draws less battery current, which implies longer battery life. The alpha labels and multibank scanning are advantages. The internal bar antenna affords better AM BCB reception than our IC-R2.

Check the table of frequency gaps to make sure the VR-120 covers the frequencies you want to monitor.

Measurements

Yaesu VR-120 Scanner

S/N 1C040130

List price \$249

Yaesu USA, 17210 Edwards Rd., Cerritos, CA 90703

Frequency coverage (MHz):

0.1 - 1299.995 except gaps (see table)

Frequency steps (kHz):

5, 6.25, 9, 10, 12.5, 15, 20, 25, 30, 50, 100

Sensitivity: see graphs

RF attenuator:

29 dB @ 10 MHz
28 dB @ 40 MHz
15 dB @ 155 MHz
10 dB @ 460 MHz
14 dB @ 860 MHz

FM modulation acceptance:

10 kHz

Intermediate Frequencies: (MHz)

248.45, 15.0, 0.450

Image rejection due to 1st IF:

54 dB @ 40 MHz
51 dB @ 155 MHz
33 dB @ 460 MHz
58 dB @ 860 MHz

Audio output power at earphone jack:

40 mW @ 10% distortion into 8 ohms

Practical memory scan speed:

11 ch/sec.

Current consumption at 3.0 VDC:

off - 0.17 mA
manual - 27 mA avg (w/battery saver)
scan - 60 mA
full volume - 132 mA
lamps - 30 mA additional

Battery saver: after 5 sec. in Manual

Low battery warning: 2.24 VDC

Shutdown: 2.08 VDC

BEYOND Family Radio!

Stay in touch with your family and friends! The new PRYME Radio Products PR-460: SportConnect™ and PR-460: ClearConnect™ transceivers use frequencies in the **General Mobile Radio Service (GMRS)** to provide long range personal communications. Unlike half-watt FRS radios these new two-way radios provide a **full FOUR WATTS** output power.

The 8-channel PR-460: SportConnect™ model has a range of **up to 5 miles**, while the PR-460: ClearConnect™ has 23 channels including all GMRS **repeater frequencies**, for a range of **up to twenty-five miles** or more!

Family Radio PLUS! Family Radio users upgrading to GMRS can still communicate with their existing FRS radios! Channels 1-7 in both our ClearConnect™ and SportConnect™ are the **same as Family Radio channels 1-7**, so you can still talk with any FRS radios in your group!

FCC License Required: Operation on the General Mobile Radio Service requires an FCC issued GMRS license. Information on obtaining a license is included with your transceiver. The FCC license fee is \$80 for five years, which breaks down to a little more than \$1.00 per month. One license covers you and everyone in your immediate family, including your children and parents.

PR-460: SportConnect

8 Channels up to 5 miles range!

\$199.95*

PR-460: Clear Connect

23 Channels including repeater operation for range up to 23 miles!

\$219.95*

- * 4 Watts Output Power
- * Just 4.25 inches tall! (excluding antenna)
- * Includes CTCSS (38 tones)
- * Communicate with the FRS Radios that you already have!
- * One touch access to the 462.675 MHz emergency channel
- * Up to 5 miles range. Use the repeater mode on the ClearConnect model to increase your range up to 25 miles!



NEW!

Range may vary due to obstructions, weather, low battery, or other factors. Access to repeaters may require a fee.

* NOTE: The prices shown above are estimated street prices. Actual dealer prices may vary.

PRYME
Radio Products

by **PREMIER Communications Corp.**

480 Apollo St. #E • Brea, CA 92821

Phone: 714-257-0300 • Fax: 714-257-0600

Web: <http://www.adi-radio.com>

Index of Reviews Monitoring Times 1994 - 2001

* = Reviews by Lawrence Magne may not be reprinted
** = Reviewed by Bob Grove or other freelance reviewer

Scanners

Alinco DJ-X10T — NOV 98
Alinco DJ-X2000T — JUN 01
Alinco DJ-X2T — DEC 2000
AOR AR1500 ** — APR 94
AOR AR16 — AUG 19
AOR AR2700 — OCT 95
AOR AR3000A** — JUN 94
AOR AR3000A — NOV 20
AOR AR5000 — DEC 96
AOR AR7000 — JAN 1999
AOR AR8000** — SEP 94
AOR AR8000 Comparisons — NOV 95
AOR AR8200 — OCT 98
AOR AR8600 — APR 01
Electra Tiger Scan TSA — JUL 00
Harris RF-590 — AUG 99
Icom IC-R10 — MAR 97
Icom IC-R2 — APR 99
Icom IC-R3 — OCT 00
Icom R8500 — JAN 97
Icom R8500 vs. AOR AR5000** — NOV 96
Icom W32A TXer as a scanner** — FEB 00
OptoCom receiver ** — MAY 99
Racing Electronics RE2000 — JUL 99
Radio Shack PRO-23** — JUL 94
Radio Shack PRO-26 — AUG 95
Radio Shack PRO-51** — MAY 94
Radio Shack PRO-60 — SEP 95
Radio Shack PRO-62; RadioMap — FEB 95
Radio Shack PRO-64 — AUG 97
Radio Shack PRO-67 — OCT 97
Radio Shack PRO-91 — DEC 98
Radio Shack PRO-92 — JAN 00
Radio Shack PRO-94 — MAY 00
Radio Shack PRO-2004 — MAR 87
Radio Shack PRO-2006 — OCT 90
Radio Shack PRO-2027 — MAR 94
Radio Shack PRO-2030, PRO-2032 — JAN 94
Radio Shack PRO-2035 — OCT 94
Radio Shack PRO-2035 vs. PRO-2006 — JAN 95
Radio Shack PRO-2036/BC890XLT — JUN 95
Radio Shack PRO-2037 — JUL 95
Radio Shack PRO-2040 — DEC 95
Radio Shack PRO-2042 — FEB 96
Radio Shack PRO-2045 — FEB 97
Radio Shack PRO-2046 — OCT 96
Radio Shack PRO-2050 — MAY 98

Radio Shack PRO-2052 — JUN 00
Radio Shack PRO-2066 — FEB 99
Radio Shack PRO-2067 — SEP 00
RCA RP-6150 — APR 98
RELM HS200 — APR 97
RELM MS-200 — MAR 1998
Sony ICF-SC1PC — AUG 1998
Sporty's JD-100 — NOV 1997
BC220XLT/BC230XLT — APR 96
BC235XLT — JUL 97
Uniden BC245XLT — SEP 99
Uniden BC248CLT — DEC 99
Uniden BC278CLT — NOV 99
Uniden BC780XLT — MAR 01
Uniden BC860 XLT — MAY 95
Uniden BC895XLT** — NOV 97
Uniden BC895XLT — DEC 97
Uniden BC3000XLT — APR 95
Uniden BC9000XLT — MAR 95
Uniden BCT-10 — JUL 96
Uniden SC-200 — MAR 00
Yaesu VF-500 — FEB 00
Yaesu VR-5000 — MAY 01

Shortwave Receivers

AOR AR7030* — APR 96
AOR AR5000+3 Receiver* — SEP 98
AOR AR8600 on HF** — FEB 01
AR3030* — JAN 95
Aroma SED-EDL88C* — OCT 95
BayGen Free-Play* — OCT 96
Becker Mexico 2340* — FEB 97
Bolong HS-490* — NOV 94
ComFocus SoftWave receiver* — OCT 94
DJ-X2000T** — JUN 01
Drake R8A* — MAY 96
Drake R8B - Part I* — MAY 98
Drake R8B - Part II* — JUN 98
Drake SW-1* — AUG 96
Drake SW2* — AUG 97
Drake SW8 Improvements* — JUN 95
Drake SW8 Portatop Receiver* — AUG 94
Drake's Little Secret: the "SW8A" * — NOV 96
Electro Brand SW-3000 Digital* — MAR 97
Emergency Radio: Info-Mate 837; Sony introduces ICF-SW07* — APR 99
Grundig G2000A compact portable* — SEP 97
Grundig Platinum Traveller Portable* — JAN 99
Grundig Satellit 800 sneak preview** — MAY 00
Grundig Traveller II* — MAR 96
Grundig Traveller III* — DEC 97
Grundig Yacht Boy 300PE* — AUG 99
Grundig Yacht Boy 400PE* — JUL 98
Grundig Yacht Boy 500* — MAR 94
Icom IC-R75* — SEP 99
Icom IC-R8500* — JUL 97
Icom IC-PCR1000 virtual radio* — NOV 99
ICOM R71 * — MAY 95
International MT718 Portable* — MAY 97

International MT798 Portable* — JUN 97
International R-110 * — MAR 98
InterNational WR-689* — APR 98
Japan Radio NRD345* — NOV 97
JPS Digital Signal Processors* — DEC 94
JRC NRD-93* — JUL 95
JRC NRD-545 first look* — AUG 98
JRC NRD-545 * — JUL 99
JRC NRD545 with VHF/UHF converter** — MAY 99
Kachina 505DSP** — OCT 99
Kachina's Proposed KC-105CRX Receiver (Kachina KC-505 tx)* — DEC 99
Kaito KA-007 Free-power Radio** — JAN 00
Kneisner + Doering KWZ30* — NOV 98
Lowe HF-250* — SEP 95
Lowe HF-250E* — FEB 98
Lowe SRX100/Target HF-3* — OCT 97
Luke DP-976 Emergency Radio* — JUN 99
MFJ 8100 World Band SW Radio — MAY 01
MFJ-784B Tunable DSP Filter — MAR 00
MFJ-8100 Shortwave Radio * — JUL 94
Palstar R30 — JUN 00
Radio Shack DX-375* — FEB 94
Radio Shack DX-394* — JUN 96
RS DX-397 Compact Portable* — MAR 99
Sangean ATS 202* — JAN 94
Sangean ATS 303 Portable* — DEC 96
Sangean ATS 505 — MAY 00
Sangean ATS 909* — SEP 96
Sangean ATS404 Economy Portable* — OCT 98
Sangean SG 789A* — MAR
Sharper Image VA100* — JAN 97
Sony ICF SW-600* — APR 97
Sony ICF-2010* — APR 95
Sony ICF-SW100 Pocket Radio* — JUN 94
Sony ICF-SW1000T* — FEB 96
Sony ICF-SW40* — JUL 96
Sony SW-12/ Sony AN-LP1* — JAN 98
Sony SW7600G; W-J Update* — SEP 94
Sony ICF-SW07 ROM-tuned portable* — MAY 99
Ten-Tec Receiver Kit 1254** — SEP 98
Ten-Tec RX-340 — JUL 00
Watkins-Johnson HF1000* — NOV 95
Wellbrook ALA 1530 Loop — APR 00
WinRADiO 1500e PC Receiver** — OCT 99
Yacht Boy 305* — AUG 95
Yaesu FRG100 Improvements and keypad* — FEB 94
Yaesu FRG-100 Keypad * — MAY 94
Yaesu FRG-100 - Another Keypad — JUL 94
Yaesu VR5000 on HF — APR 01

FRS, GMRS, CB, AM/FM, and other Radios

Alinco DJ-S41** — MAR 97
Alinco DJ-V5 Dualbander — MAY 00

- BayGen Freeplay 1 & 2 radios** — JUL 98
- Bose vs. Zenith Challenge** — MAR
- CB - New Cobra and Cherokee models — JUN 00
- CCRadio vs. GE Superadio** — MAR 00
- Crane/Sangean CCRadio** — FEB 99
- Cherokee CB SSB AH-10 — JUL 980
- Cherokee FR-460 — FEB 99
- Cherokee FR-465 — MAY 98
- Cherokee FR-465plusVW FRS — MAY 99
- Cobra Line of MicroTalk FRS Radios — JUN 99
- Cobra MicroTALK 2000WX — APR 01
- Cobra MicroTalk Weather FRS radio — DEC 99
- Coleman CR-411 FRS — MAY 01
- Drake FRS Sport 110 — JUL 99
- Drake Minitalk 99 FRS radio — JUL 00
- First Alert WX-17 and WX-30 — JUN 01
- First Alert WX-67 — OCT 99
- GE Sedona FRS — AUG 00
- Hamtronics Aviation Rx Module** — AUG 00
- Icom IC-4008A FRS — AUG 98
- Icom IC-718 — MAR 01
- Icom IC-T8A Tri-band Transceiver** — AUG 98
- Icom VHF Marine Transceiver — JUN 98
- Kenwood FreeTalk (FRS freqs) — OCT 98
- Kloss Model One AM/FM receiver** — MAR 01
- Kloss Model 88 AM/FM radio** — JUL 99
- Maxon FRS-214 — JAN 99
- Maxon GMRS 21X — SEP 99
- Maxon Sp-100G GMRS HT — APR 98
- Motorola TalkAbout Distance GMRS — APR 99
- Motorola TalkAbout FRS — SEP 98
- Motorola TalkAbout TA280 — MAR 99
- Oregon Scientific & Midland weather receivers — DEC 98
- Oregon Scientific WR-102 Wx radio — NOV 99
- Pryme PR-460 GMRS HTs — APR 00
- Radio Shack FRS Radios — NOV 98
- Radio Shack FRS-105** — JUN 97
- Radio Shack FRS-108** — APR 97
- Ramsey FM-10** — JUN 95
- Ramsey FM-100 Stereo tx** — APR 00
- Ramsey Kits** — JUN 94
- Sangean DT-300VW Wx,MW,TV radio — SEP 00
- SGC SG2020 HF Transceiver** — JAN 01
- Sony FRS U-ceiver — JAN 00
- Sony ICF-B200** — MAR 99
- Sony SRF-42 AM Walkman** — JAN 96
- V-Link 2-way radio** — APR 97
- ANLI RD8H, RD78H, AT-2 antennas — MAY 96
- AOR Antenna Line — NOV 00
- AOR SDU5000 Spectrum Display — MAY 95
- Austin Ferret VHF/UHF Antenna** — DEC 94
- Avcom PSA65C Spectrum Analyzer — DEC 97
- AVCOM SDM42A SDU — APR 99
- Black Box Antenna — OCT 94
- Black Box Antenna, model S (SW) — DEC 94
- C.Crane AM/FM Mobile Ant — APR 94
- Caig DeoxIT D5 — MAR 96
- Creative Express Corp Ergo 3 soft — MAR 98
- CTP DS-49 Descrambler — SEP 95
- Darcy SW Booster — MAR 97
- Diamond vs Condor scanner ant — SEP 00
- Digitech Loop Recorder — NOV 94
- DXAID 4.5 — FEB 96
- Emerson Universal Multi-Sys Video Converter — FEB 01
- E-Trax software utility — SEP 99
- Everhardt SW Listening ant — AUG 94
- EXP-1750 LF transceiver kit — JUN 99
- Free Radio Berkeley transmitter kit — JUN 95
- Future Scanning Sys Radio Max — OCT 98
- GAP "Titan DX" antenna — AUG 96
- GAP Multiband Antenna — OCT 94
- Grove FTR-100 Notch Filter — OCT 00
- Grove No-Tenna — JUN 94
- Grove SP-200 Sound Enhancer — MAY 94
- Grove TUN-4A — JUN 96
- Grove TUN-5 — OCT 95
- Hamtronics LNK-WB preamplifier — JUN 01
- JPS ANC-4 Antenna Noise Canceller — AUG 95
- K&L Message Tracker — JUL 95
- Kiwa Earth Monitor — NOV 98
- Kiwa MW Air-Core Ant — DEC 95
- Klockit clock kits — NOV 99
- LF Eng SkyMatch Active Antenna — OCT 96
- Logic Limited Franklin Converter — OCT 95
- Magnavox WebTV — FEB 97
- MFJ Deluxe Noise Canceling Signal Enhancer MFJ-1026 — AUG 99
- MFJ Giant Display Calendar Clock — SEP 98
- MFJ-418 Morse Tutor — MAY 98
- MFJ-616 Speech Enhancer — MAR 01
- MFJ-784 DSP Filters — SEP 95
- Naval Electronics HTS-2 vs. -3 — JUL 95
- Optimus Speaker — APR 94
- Opto 3300 Freq Ctr — FEB 94
- Opto DC442 Decoder — JUN 98
- Opto Micro DTMF Decoder — OCT 97
- Opto MicroCounter — JAN 98
- Opto RF Detector — MAY 98
- OptoScan 456 — OCT 94
- Opto Trakker — JUN 98
- Optoelectronics DC 440 decoder — MAR 95
- Optoelectronics OS535 Interface — JUL 96
- Optoelectronics Scout 40 NOV 95
- Optoelectronics Scout 400 — FEB 95
- Palm IIIe — MAR 00
- Palomar Loop Antenna System — APR 98
- PAR AM Broadcast Filter — MAY 01
- Par Electronics intermod filters — SEP 95
- PAR MON-3 VHF/UHF Antenna — MAY 01
- Protek 3201 RF Field Analyzer — DEC 00
- Radio Plus+ Quantum Stick — JAN 97
- Radio Shack Tuner Control Cleaner & Lubricant — AUG 99
- Ramsey Mobile RDF System — JUL 00
- Ramsey SM100 Signal Magnet kit — MAY 97
- Scanner Antenna Comparisons — SEP 97
- Select-a-Tenna — APR 94
- Select-A-Tenna vs the Black Box — APR 95
- Sharp Wizard OZ-750 — FEB 00
- Sky Scan Desk 1300 antenna — APR 96
- Sony MiniDisc recorder** - SEP 00
- Stridsberg FLT201A Notch Filter — JAN 00
- Stridsberg MCA204 Multicoupler — JAN 00
- Super Select-A-Tenna — JUL 00
- SysCalc for Windws — JAN 94
- Tigertronics BP-2M digital modem — DEC 99
- Timestep feed and converter for GOES reception — MAY 00
- Trifield Environ Monitor — JUL 94
- Wellbrook Antenna Splitter AS1030 — SEP 00
- WiNRADiO AX-31B Antenna — APR 01
(chart correction to above) — MAY 01
- ZS Electroniques ZSRX Antenna — JUL 95

Related Articles

- Best Receivers to Buy* — FEB 95
- Lab measurements and features* — JAN 96
- Looking Ahead: Should you buy now?* — DEC 95
- Tips for Your New Scanner — FEB 94
- What do those specs really mean? — AUG 00
- What is dynamic range? — NOV 00
- What is receiver selectivity? — DEC 00
- What is receiver sensitivity? — OCT 00
- Synchronous Detection - What is it? — SEP 00

Reviews of Accessories, etc.

- Active Duck for HH — DEC 99
- Alpha Delta speaker / Icom Q7A Tx — JAN 99
- Alpha-Delta DX-Ultra — JUN 95

Icom's Super Neat IC-706MkIIIG – Part I

To steal a page from Kenneth Graham's *The Wind in the Willows*, "Believe me, my young friend, there is *nothing* – absolutely nothing – half so much worth doing as simply messing about *with radios*."

Graham's original quote referred to boats, but never mind that – if you enjoy, as I do, "messing about with radios," one of the Most Cool things you can do is to get your amateur radio license. Your "ham ticket," as amateurs call it, will allow you to engage in two-way communication on the amateur radio frequencies. In addition, federal legislation specifically exempts ham radio operators from local laws that forbid ordinary citizens from carrying certain types of radio equipment, such as scanners, in their vehicles.

Furthermore, from my point of view, it is simply impossible to be over-prepared for emergency communications when the potential mulch hits the ventilation equipment. In my area (upstate New York), amateur radio operators were called out to provide emergency communications when an ice storm swept the area, and the cell phone towers were simply overloaded. When cell phones were hearing nothing but wall-to-wall busy signals, two meter ham radio was able to get through.

You can get your Technician Class license by passing a 35-question multiple-choice examination. That will give you privileges to operate on all amateur VHF and UHF frequencies (all frequencies above 50 MHz). If you pass a 5 word per minute Morse code test, you will be entitled to operate on 80, 40, and 15 meter bands using CW (Morse) and on the 10-meter band using CW, voice and digital modes.

If you pass an additional 35-question multiple-choice test, you will have earned your General Class license, with authorization to operate on any frequency in the 160, 30, 17, 12, and 10 meter bands, as well as significant segments of the 80, 40, 20, and 15

meter bands. Let me put it another way: Answer a few questions, learn a little bit of Morse code, and you can talk and operate on both local and worldwide frequencies. If that isn't a Good Deal, I don't know what is.

For those who protest that Morse code is too hard, I sympathize – I struggled for 6 years to learn Morse. But I have a suggestion: I found that the Gordon West tapes, available from Radio Shack or from W5Y1 (see ad in *MT*), really do the trick. Study them diligently 15 minutes every other day, and in about three weeks, you should be ready to pass the code test. At least that's the way that it worked for me.



The IC-706MkIIIG squeezes a lot of goodies into a compact attractive package.

After you've passed your tests, there comes the delicious and agonizing part of the amateur radio experience: buying the equipment. Most new Technician Class licensees start with a two-meter handtalkie; then comes a 2 meter mobile rig, a 440 rig, an HF transceiver, perhaps a six-meter rig, and so forth. It's a great deal of fun in a lot of ways, but it often results in a stack of equipment and an empty wallet.

I'd like to suggest an alternative course: buy an Icom IC-706 MkIIIG. Period. This diminutive piece of gear truly is a wonder rig. Just 6.6 inches wide by 2.3 inches high by 7.9 inches deep, it weighs just 5.5 pounds. Receiver coverage is 0.000-1999.999 MHz and 400-470 MHz. Transmit coverage includes all ham bands from 1.8 MHz to 450 MHz. Available modes include USB, LSB, CW, /RTTY (FSK), AM, FM and WFM (receive only).

Power output on HF and six meters is 5-100 watts (SSB/CW/FM/RTTY) and 2-40 watts AM; on two meters 2.5-50 watts (SSB/CW/FM/RTTY), 2-20 watts (AM) and 2-20 watts (AM); and on 440 MHz 2-20 watts (SSB/CW/FM/RTTY) and 2-8 watts (AM).

The 706 has more tricks than a bridge tournament, including a detachable front panel/display. With the optional remote separation cable, a friend mounted the main "box" of his 706 in the trunk of his compact car and fastened the front panel and microphone to his dash. Other goodies include tone encode, tone squelch, 102 alphanumeric memories (99 regular, 2 scan edges, 1 call), second VFO, crossband split capability, CW keyer, speech processor, and voice-operated transmit, just to name a few.

The IC-706MkIIIG comes standard with a digital signal processing (DSP) module that has an automatic notch filter (ANF) that hunts down and "kills" beat tones, tuning signals, and the like. The noise reduction capability in the DSP helps to attenuate noise components and to boost signals that are buried in noise.

There are just 12 buttons, two pairs of concentric knobs, and the tuning knob on the face of the 706, plus a large and legible backlit liquid crystal display that serves as information central for this transceiver. Many of the buttons are backlit for easier nighttime operation.

The bottom line is that this is an attractive, compact radio that covers a considerable chunk of the frequencies that hams can operate on, as well as a number of frequencies that would be of interest to any radio hobbyist. Even better, the IC-706MkIIIG delivers all this at a street price under \$1,000. For more info, check out <http://www.icomamerica.com>.

Next time, we'll take the IC-706MkIIIG for a test drive.

What's NEW

Tell them you saw it in *Monitoring Times*

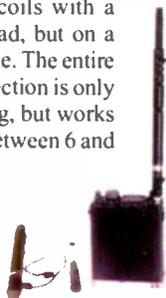
Uniden Developing "Project 25" Scanner

In an online exclusive with *Mobile Radio Technology*, Jim Cassidy, Uniden America's project planning manager for scanners and other products, verified that a scanner capable of receiving digital trunked Project 25 communications is under development. Project 25, a set of digital standards designed for flexibility and interoperability, is being incorporated into many new public safety communications systems as older systems are replaced. Cassidy expects the new Project 25 scanner to be on the market in a little more than a year.

Currently, there are no scanners on the market which can convert digital communications into audio signals, and some agencies have been enjoying their "privacy." However, following the release of the new scanner, Project 25 systems will again be audible to the public and the press. Project 25 does include an encrypted mode. "Once a system is encrypted, it is absolutely illegal to monitor it," Cassidy confirmed. He said that if enough systems choose to encrypt, the media's next appeal would probably be to the FCC.

Mobile Multiband Antenna

Cutting Edge Enterprises is now carrying a line of English-made antennas designed especially for the Yaesu FT-817 handheld transceiver. The Waters and Stanton antennas are ultra-light and compact. Tops in the line is the ATX-All Band antenna, which uses tapped coils with a wandering lead, but on a miniature scale. The entire coil and tap section is only 12 inches long, but works in all bands between 6 and 80 meters. The telescoping whip section is re-



movable for the ultimate in portability.

The antennas fit into a nylon pouch, also available from Cutting Edge Enterprises and which fits onto the Worldpouch fanny pack (see April 2001 *What's New*). Antenna prices range from \$25 to \$166. Visit the website at <http://www.powerportstore.com> or Cutting Edge Enterprises, 1803 Mission Street, Suite PMB-546, Santa Cruz, CA 95060; 800-206-0115.



Wireless Weather Station

When you want to monitor the weather with a minimum of fuss, you can't beat a wireless weather station. Scientifics has just released a new model with everything you need for complete weather monitoring and forecasting. All sensors operate using 433 MHz up to 300 feet, even through walls. Additional temperature/humidity sensors and repeaters can be added to monitor up to nine locations, indoors and out.

The Professional Weather Station monitors indoor temperature, humidity and pressure; outdoor temperature and humidity; displays minimum and maximum data for all readings, with time and date. Air pressure is displayed with a 24 hour history bar chart; the weather forecast and pressure trend is shown as an icon. The rain gauge displays rainfall amount for the last hour, last 24 hours, and total amount. The wind gauge displays speed and direction.

All outdoor sensors are solar powered. The indoor receiver requires four AA batteries, and the indoor temperature/humidity sensor uses two AA batteries.

The basic Professional Wireless Weather Station sells for \$499. In addition to extra sensors or repeaters, a PC Interface is also available for \$169.95. Contact Scientifics, a

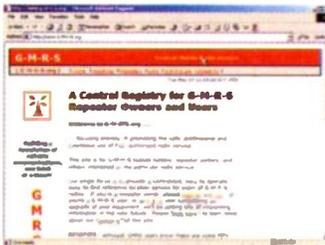
division of Edmund Scientific, Dept A011-C999, 60 Pierce Avenue, Tonawanda, NY 14150-6711; 800-728-6999, or visit <http://www.scientificsonline.com>, cons_order@edsci.com.

Callsign 2001

A British publisher has just released their 2001 edition of this directory of 8000 civilian and military aviation callsigns heard worldwide. The spiral-bound guide offers an alphabetical listing of callsigns, along with aircraft type, country of origin, wing/squadron identification, home base, and other comments to aid the listener.

Cross-listing charts allow search by country and service. A great look-up guide for avid aviation enthusiasts. US\$19 with airmail postage included, payable by International Money Order or similar transfer in UK Sterling funds.

Order from Photavia Press, Sunrise Break, Chiseldon Farm, Southdown Hill, Brixham, Devon TQ5 0AE, UK. Visit their web site at <http://www.photav.demon.co.uk>



GMR S Directory

Wayne Barringer and Bob Leef of California have established a website for the development of an online directory of General Mobile Radio Service repeaters throughout the U.S. <http://www.G-M-R-S.org> was established as a service to new GMR S owners looking for a repeater in their area and owner/operators looking for potential club members and/or paying subscribers. Repeater owners and

operators are urged to visit the site to list their repeaters for the benefit of all. The form is a simple one, and optional fields such as tone, etc. may be omitted if the owner is concerned about unauthorized use.

Scanner Sales and Service

G&G Communications, one of the few locations that still performs scanner repairs, is now available on the web at <http://www.iinc.com/ggcomm/> Check out their sales, parts, pagers, and list of all known scanners while you're there!

Kachina Discontinues HF Radio Products

At the end of May, Kachina Communications, Inc. discontinued production of all HF radio products, including the 505DSP (reviewed Oct '99) and its related accessories, citing the reduced worldwide demand for amateur radio in general and HF radio in particular. Check <http://kachina-az.com> to see if any bargain-priced inventory remains. The company promised to service all Kachina HF radio products for the foreseeable future, and to honor all factory warranties through the duration of the warranty period.

Kachina Communications, Inc. will remain in Arizona, as a provider of broadband wireless Internet products and services.

Books and equipment for announcement or review should be sent to "What's New?" c/o *Monitoring Times*, P.O. Box 98, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to mtditor@grove-ent.com.

HERE'S WHAT OUR READERS ARE SAYING ABOUT MT EXPRESS:

"No doubt about it, the future is here! Sure nice to get the magazine so early, this has got to be the way! Thanks for a great job!"

- Charles (Chuck) Boehnke
Keaau, Hawaii

"You and the MT staff that put this project together have done a FANTASTIC job. You would seem to be the leaders in the field presenting material in this manner so it can be archived so easily. This is the way to receive a magazine."

- Don Nauer

Clip and mail this ad along with your payment or call us to subscribe or renew to Monitoring Times!

Subscribe to MT for as little as \$14.00 (U.S. Second Class Mail)



7540 Hwy. 64 W.; Brasstown, NC 28902
1-800-438-8155 US and Can.; 828-837-9200; Fax 828-837-2216
e-mail order@grove-ent.com

	6 months	One Year	Two Years	Three Years
US Rates	<input type="checkbox"/> \$14.00	<input type="checkbox"/> \$25.95	<input type="checkbox"/> \$49.95	<input type="checkbox"/> \$73.95
US 1st Class	<input type="checkbox"/> \$29.50	<input type="checkbox"/> \$56.95	<input type="checkbox"/> \$111.95	<input type="checkbox"/> \$166.95
Canada Surface*	<input type="checkbox"/> \$21.00*	<input type="checkbox"/> \$38.50*	<input type="checkbox"/> \$73.95*	<input type="checkbox"/> \$109.95*
Foreign International*	<input type="checkbox"/> \$30.00*	<input type="checkbox"/> \$57.50*	<input type="checkbox"/> \$112.95*	<input type="checkbox"/> \$168.50*
Electronic Subscription	<input type="checkbox"/> \$19.95	<input type="checkbox"/> \$38.90	<input type="checkbox"/> \$73.80	<input type="checkbox"/> \$107.70

*All payments must be in U.S. Funds drawn on a U.S. Bank!

Name _____ Address _____
 City _____ State _____ Zip _____ Country _____
 CC# _____ Exp. Date _____
 Signature _____

If you are currently a subscriber to Monitoring Times, please check your label to determine the expiration date of your subscription. MasterCard, Visa, and Discover Card accepted!

INDEX OF ADVERTISERS

Antique Radio Classified 77
 AWA 77
 AOR Cover III
 Cellular Security Corp. 17
 Communications Electronics 73
 Computer Aided Technologies 9
 Computer International 83
 Fineware 67
 Grove Enterprises 5,15,23,31
 ICOM Cover IV
 John Figliozzi 25
 Kevin Carey 85
 KIWA Electronics 75
 Monitoring Times 87,90,91
 OptoElectronics Cover II
 Patcomm 83
 Popular Communications 25
 Premier Communications 85
 Radiomap 27
 Radioworld Inc. 75
 RC Distributing 27
 Skyvision 81
 Small Ear 69
 Small Planet Systems 75
 Universal Electronics 79
 Universal Radio 67
 Viking 81
 W5YI 69
 WINRADiO 1

EDITORIAL STAFF

Correspondence to columnists may be mailed c/o Monitoring Times; any request for a reply should include an SASE.

Frequency Manager	Gayle Van Horn	gayle@webworkz.com
Frequency Monitors	Mark J. Fine	mark.fine@fineware-swl.com
Program Manager	John Figliozzi, KC2BPU	jfiglio1@nycap.rr.com
American Bandscan	Doug Smith, W9WI	w9wi@bellsouth.net
Antenna Topics	W. Clem Small, KR6A	clemsmall@hotmail.com
Ask Bob	Bob Grove	bgrove@grove-ent.com
Beginner's Corner	Ken Reitz, KS4ZR	ks4zr@firstva.com
Below 500 kHz	Kevin Carey, WB2QMY	lowband@gateway.net
Bright Ideas	Gary Webbenhurst	ab7ni@arrl.net
Closing Comments	Bob Grove	bgrove@grove-ent.com
Communications	Rachel Baughn	mteditor@grove-ent.com
Computers and Radio	John Catalano	j_catalano@conknet.com
Digital Digest	Stan Scalsky	sscalsk@mail.ameritel.net
	Mike Chace	mike.chace@mindspring.com
Easy Access Radio	Jock Elliott KB2GOM	lightkeeper@sprintmail.com
Federal File	Larry Van Horn, N5FPW	larry@grove-ent.com
Letters to the Editor	Rachel Baughn	mteditor@grove-ent.com
Milcom	Larry Van Horn, N5FPW	larry@grove-ent.com
On the Ham Bands	T.J. Arey, N2EI	tjarey@home.com
Outer Limits	George Zeller	georgez@nacs.net
Plane Talk	Jean Baker, KIN9DD	jeanieandbob@earthlink.net
Programming Spotlight	John Figliozzi, KC2BPU	jfiglio1@nycap.rr.com
Propagation	Jacques d'Avignon	monitor@rac.ca
QSL Corner	Gayle Van Horn	gayle@webworkz.com
Radio Restorations	Marc Ellis	mfellis@enteract.com
Satellite Radio Guide	Robert Smathers	roberts@nmia.com
Scanning Equipment	Bob Parnass, AJ9S	parnass@megsinet.net
Scanning Logs	Larry Van Horn, N5FPW	larry@grove-ent.com
Scanning Report	Richard Barnett	ScanMaster@aol.com
SW Broadcasting	Glenn Hauser	wghauser@yahoo.com
SW Broadcast Logs	Gayle Van Horn	gayle@webworkz.com
The Fed Files	Larry Van Horn, N5FPW	larry@grove-ent.com
The Launching Pad	Ken Reitz, KS4ZR	ks4zr@firstva.com
Tracking the Trunks	Dan Veeneman	dan@signalharbor.com
Utility World	Hugh Stegman, NV6H	utilityworld@ominous-valve.com
View from Above	Lawrence Harris	Lawrence@itchycoo-park.freeserve.co.uk
Washington Whispers	Fred Maia, W5YI	fmaia@texas.net
What's New	Rachel Baughn	mteditor@grove-ent.com

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.

1-3/4" SQUARE DISPLAY AD: \$50 per issue if camera-ready copy or, \$85 if copy to be typeset. Photo-reduction \$5 additional charge. For more information on commercial ads, contact Beth Leinbach, 828-389-4007.

STOCK EXCHANGE

Monitoring Times assumes no responsibility for misrepresented merchandise.

LINE ADS

NON-COMMERCIAL SUBSCRIBER RATES: \$.25 per word — *Subscribers only!* All merchandise must be personal and radio-related.

COMMERCIAL, NON-SUBSCRIBER, AND MULTIPLE SALES RATES: \$1.00 per word. Commercial line ads printed in bold type.

NOTICE: It is unlawful to buy cellular-capable scanners in the United States made after 1993, or modified for cellular coverage, unless you are an authorized government agency, cellular service provider, or engineering/service company engaged in cellular technology.

Satellite TV - Large selection of items at reasonable prices. We specialize in Big Dish TVRO C & Ku Band equipment. Check us out at www.daveswebshop.com

MT Back Issues: 4-87, 6-87 to present. Best offer. F.O.B. Xenia, OH. Phone 937-372-5891. Ken. Write Ken H. 144 N. Mechanic St., Xenia, OH. 45385

Make sure to check often at <http://www.grove-ent.com/hmpgbbb.html> for the greatest deals on used and refurbished equipment! Prices and items are updated constantly!

ELECTRONIC COMPONENTS. Parts bonanza for manufacturers, engineers, hobbyists. Thousands of chip capacitors, resistors, transistors, ICs, diodes, plus valuable items such as signal strength meters, LCDs, hardware, much more! All at a fraction of the original cost. Grove Enterprises, Inc., 828-837-9200, order@grove-ent.com.

Join the Club!

Open to hobbyists worldwide, the **CANADIAN INTERNATIONAL DX CLUB** is Canada's national, general coverage radio club serving members since 1962. The *Messenger* features columns on AM/FM, shortwave, utilities, scanning, QSLing, pirates, ham radio and more. Send \$2 for a sample copy to:

CIDX

P.O. Box 67063-Lemoyne
St. Lambert, Quebec, Canada J4R 2T8
email: cidxclub@yahoo.com
web: www.anarc.org/cidx/

CUMBRE DX

is the world's best DX publication. Every issue features news and loggings that you just won't find elsewhere. But the best part about Cumbre DX is that it is absolutely **FREE!**

FOR YOUR FREE SAMPLE COPY, SEND AN EMAIL TO:
cumbredx@yahoo.com

Visit us online at: www.cumbredx.org

Listening In

That's what we do and who we are!

For over 25 years we have published one of the world's leading radio magazines, *Listening In*. Now available in PDF files. In print or on tape for the sight-impaired. Mention MT and get a free sample.

Ontario DX Association
Box 161, Willowdale Station A,
Toronto, Ontario M2N 5S8 Canada
odxa@compuserve.com
www.odxa.on.ca

Windows Logging Software With Audio Processing and QSL Imaging

DXtreme Reception Log 2000™ lets you:

- Log the stations you have heard.
- Record and playback audio clips of the stations you have logged.
- Create paper and electronic reception reports *automatically*.
- Scan and view images of your QSLs.
- Track the performance of your station.

Visit our Web site today! Be sure to enter our Quarterly Prize Giveaway!



Web: www.dxtreme.com
E-Mail: sales@dxtreme.com

SCANNER ANTENNAS

HF/VHF/UHF Super Discone ... \$45.95
VHF/UHF Discone ... \$29.95
Mag-Mount Mobile Scan. Ant. ... \$24.95
Super Scan Duck HandHeld Ant. ... \$21.95

plus S&H

See These Plus Many, Many More At:
www.antennawarehouse.com

811 9th Ave.

Camanche, IA 52730

Tollfree MC/Visa Order Line

877-680-7818

HUGE 100 PAGE CATALOG

- Shortwave & Ham Gear
- Scanners & RTTY/FAX
- Antennas & Accessories
- Radio Books & CDs.

Send \$1 to **Universal Radio**
6830 Americana Pkwy.
Reynoldsburg, OH 43068
Tel. 800 431-3939
www.universal-radio.com

Think of what you could do with this space...

It's painless, we promise. Contact our advertising manager, Belinda McDonald at 800-438-8155.

MT ANTHOLOGY 2000 EDITION

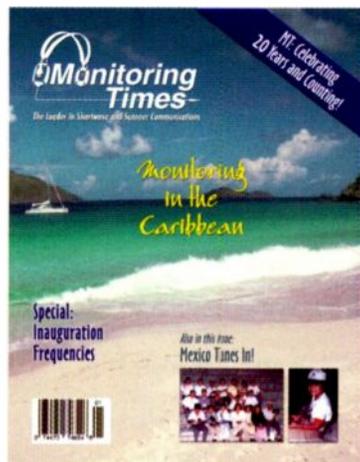
A Whole Year of MT on ONE CD!

That's right, an entire year of *Monitoring Times*, complete with full articles, reviews, and even advertisers, all on one CD. Completely searchable and user-friendly, this CD is the perfect companion when you're wondering "what issue was that review in" or "I remember I saw how to build that antenna in ONE of these!" Imagine being able to search for just what you need in a matter of seconds! It's the radio-room reference you've been looking for! *Order yours today!*

Order SFT27-00 today for only \$19.95 (\$14.95 for current MT subscribers)

Grove Enterprises, Inc. 800-438-8155
www.grove-ent.com

7540 Highway 64 West Brasstown, NC 28902



The BBC Should Reconsider

Guest Editorial by John Figliozzi

The BBC's announcement in early May that it intends to end the use of shortwave to North America, Australia and New Zealand as of July 1 came as a shock to the system for many of us. As this is being written, there has been substantial criticism of this decision and there are serious efforts underway to convince the World Service that these plans should be reversed or at least delayed. Nonetheless, whatever the BBC ultimately decides to do, just the announced intention alone warns us that we need to more closely consider the implications that the interplay of shortwave listening, international broadcasting and the new media have for us as we proceed into the 21st century.

At the outset, let's be honest. This is not as outlandish an idea as some among us would like to believe. The emergence of other delivery systems for international broadcasting over the past decade and the need to be both efficient and effective have compelled broadcasters to weigh one against the other and all against traditional shortwave. With too few resources chasing too many tasks, the pressure to find the right mix is tremendous. However, the measurement tools available to help make these determinations are imperfect at best and can lead broadcasters to make faulty judgments in the hot pursuit of valid objectives. All of these factors are at work in the instant case.

The research that the BBC has released to support its decision is less than persuasive, especially when viewed in the light of other relevant facts. For example, Lextronics (which markets Grundig radios in North America) says that sales of shortwave radios approach one million units annually. The overwhelming majority of those receivers are portables, which are suitable for program listening but ill-equipped for DXing. Add that figure to the number of shortwave sets already in use and you get quite a substantial figure. Yet, extrapolations drawn from BBC figures show that the World Service shortwave audience in North America is less than 700,000. If the objective for the BBC is to make the right call on delivery mix, then this is one discrepancy that has to be addressed. There are others.

The BBC does not differentiate the extent to which its broadcasts are available to listeners via each delivery system. Occasional BBC newscasts or even overnight carriage on FM public radio stations does not equate to the full service that is available via shortwave. Neither does the World Service acknowledge that the characteristics and level of

commitment of its audience likely changes depending on the delivery system. The Internet can provide the service around the clock, but it cannot yet provide it with the affordability and portability that shortwave does. Does dropping shortwave mean that the BBC has decided that North Americans are interested only in its news and not in the "rich mix" of programming which is the hallmark of the World Service? Does it mean that the BBC is willing to forego – even temporarily – an ability to reach whole segments of its listener base?

The BBC also appears to have misjudged the quality and commitment of its shortwave audience in North America. For this, though, it is the listeners who must accept some responsibility. In the face of inadequate research tools, the direct response of listeners carries considerable importance. The legendary passivity of shortwave listeners, except for the pure hobbyists in singular pursuit of QSL cards, have left broadcasters with a distorted picture. They see shortwave listeners largely as hobbyists interested only in trinkets, rather than listeners interested in or committed to their programs. If you've concluded that shortwave listeners have no interest in your product, it makes little sense to spend literally millions on transmitter time when it seems that the money could be put to better use elsewhere.

This distortion is real and the BBC's announcement clarifies it all too well. It should serve as a wake-up alarm to shortwave listeners, the clubs, ANARC and others that presumably wish to see shortwave retain viability as a communications medium on this continent. But, that's a subject for another editorial.

Having said that, though, if the BBC really wants to get it right, it needs to look beneath the surface and beyond raw numbers. The added value of having the World Service available via FM, the Internet and eventually direct satellite are positive developments. However, at the present time, none of these yet provide the extent, the ease and affordability of access, or the portability that shortwave radio provides for many listeners.

The equation that the BBC apparently feels it has achieved in North America is a myth. There may indeed come a day when some technology or mix of technologies will provide what shortwave currently provides and provide it better. But that day did not come on July 1. For its good and the good of its loyal listeners, the BBC should reconsider.

AOR AR8200 Mark II B & AR8600 Receivers

Welcome to the Top Shelf



AOR wide-range communications receivers are designed and built for the serious user. Among our customers are governments and government agencies, news gathering operations, military units, laboratories, public safety operations and more. If you are a demanding user who expects the best, you're ready for AOR, The Serious Choice in Advanced Technology Receivers.™ Don't look for AOR on the bottom shelf at your local discount store, you won't find us there. For dealer locations, check our web site, www.aorusa.com



Technology so advanced,
it's patented (US Patent 6,002,924).

AR8200 Mark II B

Base performance in a hand-held receiver!

- 530 KHz ~ 2040 MHz * coverage
- 1,000 memory channels (20 banks) with alphanumeric labeling
- Computer control and programming (requires optional cable)
- Download free control software from AOR web site
- "All Mode" reception includes "super narrow" FM plus wide and narrow AM and USB, LSB, CW and standard AM and FM modes
- True carrier reinsertion in USB and LSB modes
Includes 3 KHz SSB filter!
- Detachable MW antenna with negative feedback
- Optional internal slot cards expand capabilities. Choose from Memory Expansion (up to 4,000 memories), CTCSS Squelch & Search, Tone Eliminator, Voice Inverter** and Record Audio (saves up to 20 seconds of audio)
- Tuning steps programmable in multiples of 50 Hz in all modes
- 8.33 KHz airband step is correctly supported
- Noise limiter and attenuator
- Lighted keys
- Band activity "scope" display with "save trace" capability
- Four-way side panel rocker switch allows one-hand operation
- Large display includes: A and B VFO frequencies and signal strength meter
- Battery Save function with Low Battery indicator
- Operates on 12 VDC external power
- 4 AA Ni-Cd batteries supplied, also uses standard AA dry cells
- BNC antenna connector
- Wide choice of accessories

AR8600 Base/Mobile

Think of it as a magnet for signals.

- Temperature Compensated Crystal Oscillator (TCXO) ultra-stable frequency reference
- Coverage from 530 KHz ~ 2040 MHz*
- Receive Modes: WFM, NFM, SFM, WAM, NAM, USB, LSB, CW
- New front end and RF stages for superior sensitivity
- 2 VFOs (A/B)
- 1000 memory channels (20 banks x 50 memories/bank)
- Alphanumeric channel labels
- Scan rate up to 37 channels/second
- Add up to 3 optional slot cards: Tone eliminator, CTCSS, Voice Inversion**, Recording, External memory
- Accommodation for Collins® Mechanical Filters
- RS-232C port
- 10.7 MHz IF output (WFM mode only) can be used with SDU 5500 Spectrum Display Unit.
- 12 VDC operation
- BNC antenna connector
- Download free control software from AOR web site

AORTM
Authority On Radio

AOR U.S.A., Inc.
20655 S. Western Ave., Suite 112, Torrance, CA 90501, USA
Tel: 310-787-8615 Fax: 310-787-8619
info@aorusa.com • www.aorusa.com

*Cellular blocked. Unblocked version available to authorized users, documentation required. **Available to authorized users only. Specifications subject to change without notice or obligation. All trademarks remain the property of their respective owners.



IC-R75 SAVE \$200*

Pull out the weak signals

30 kHz - 60.0 MHz†

Commercial grade • synchronous AM detection (S-AM) • optional DSP with auto notch filter • all mode • triple conversion • twin passband tuning (PBT) • large front mounted speaker • large display • well spaced keys and dials • 1000 memory channels • up to two optional filters • PC remote control with ICOM software for Windows®.

"A versatile HF/6-meter receiver that offers a good measure of performance in a compact package. All mode capability for the ham and utility listeners and synchronous AM for the SWLs should make the IC-R75 a popular choice for a wide variety of radio enthusiasts."—QST, 1/00

Want the latest specials? See your authorized ICOM dealer or go to www.icomamerica.com for the most up to date savings!



IC-R10 SAVE \$50 & FREE SOFTWARE & CABLE

Advanced performance and features

500 kHz - 1.3 GHz†

All mode • alphanumeric backlit display • attenuator • 7 different scan modes • beginner mode • 1000 memory channels; band scope • includes AA Ni-Cds and charger.

IC-R2 SAVE \$20 & FREE SOFTWARE & CABLE

Excellent audio, tiny package

500 kHz - 1.3 GHz†

AM, FM, WFM • easy band switching • CTCSS decode • 400 memory channels • priority watch • MIL SPEC 810C/D/E • weather resistant • includes 2 AA Ni-Cds and charger.



IC-R3 AUDIO/VIDEO SCANNER SAVE \$50*

See and Hear all the action.

500 kHz - 2.45 GHz†

450 Memory Channels with Alphanumeric Names • CTCSS with Tone Scan • 4 Level Attenuator • Telescoping Antenna with BNC Connector • Four Way Action Joystick • Lithium Ion Power • 2" Color TFT Display with Video/Audio Output.

"Wide tuning range allows you to see and hear the excitement behind the scenes. Large easy to read color display for frequency settings and video reception. All in a compact easy to carry package. Perfect for sporting events and commercial uses."



log on > download > listen in

www.icomreceivers.com
Download frequencies right from the web

ICOM makes it easy to get the frequencies you want. Our database searches your area. You download the frequencies to your computer and easily load them into your ICOM radio. Optional software and PC connection cable required.

DOWNLOAD FREQUENCIES RIGHT FROM THE WEB



IC-PCR1000 SAVE \$50*

The original "black box" is still best

100 kHz - 1.3 GHz†

AM, FM, WFM, USB, LSB, CW • unlimited memory channels • real time band scope • IF shift • noise blanker • digital AFC • "VSC" voice scan control (when activated, stops only on modulated signals) • attenuator • tunable bandpass filters • AGC function • S meter squelch • CTCSS tone squelch • large selection of tuning steps and scans • external speaker level control • DSP optional • download and demo the latest software for free at <www.icomamerica.com>

"The PCR1000 has something to intrigue and satisfy everyone. This is a fun product."—QST, 7/98

IC-PCR100 SAVE \$50*

Much like its big brother, but for less

100 kHz - 1.3 GHz†

AM, FM, WFM • many of the same features and performance as the IC-PCR1000 • designed for Windows® 95 or 98 • download and demo the latest free, full version software today: <www.icomamerica.com>



IC-R8500

The experts choice

100 kHz - 2.0 GHz†

Commercial grade • all mode • IF shift • noise blanker • audio peak filter (APF) • selectable AGC time constant • digital direct synthesis (DDS) • 1000 memory channels • RS-232C port for PC remote control with ICOM software for Windows®.

"If you want a receiver that is both a superior world band radio and a solid scanner, the new ICOM IC-R8500 is the best choice."

—Passport to World Band Radio, 1998

Get the latest specials

www.icomamerica.com



* Limited time offer. See dealer for details.

† Cellular: frequencies blocked; unblocked versions available to FCC approved users. ©2000 ICOM America, Inc. 2380 116th Ave NE, Bellevue, WA 425-454-8155. The ICOM logo is a registered trademark of ICOM, Inc. All specifications are subject to change without notice or obligation. RCVRFAMMT401