

Volume 17, No. 11

November 1998

U.S. \$3.95

Can. \$6.25

Printed in the United States

# Monitoring Times

Your Personal  
Communications Source

Featuring favorites  
from  
**Satellite  
Times**

# JAMMING WALL

**MT Visits  
RAI Italy**



\*\*\*\*\*3-DIGIT 064  
03/01/1998  
THOMAS J SOKIRA  
69 MANOR DRIVE  
CHESHIRE CT 06410-2615  
S87/278

# Opto Hits The Spot



## SCOUT

- 10MHz - 1.4GHz
- Stores 400 frequencies in memory
- Reaction Tune the ICOM R7000, R7100, R8500, R9000, R10, AOR 8000, AOR 8200, and Opto R11
- 10 digit LCD with signal strength bar-graph
- Vibrator and beeper alert mode

**\$349** SAVE \$100

DB32 Antenna Sold Separately (\$29)



## R11

- 30MHz - 2GHz wide band receiver (Cellular Blocked)
- Built-in speaker for instant audio demodulation
- LED frequency range indication display
- Reaction Tune with Scout
- Capture 5 watt UHF signal from 500 feet
- 1000 frequency lockout

**\$299**

TA100S Antenna Included



## XPLORER

- 30MHz - 2GHz (Cellular Blocked)
- Two line LCD frequency display
- Decode CTCSS, DCS, and DTMF
- 500 memories
- 1000 frequency lockout
- Built-in PC interface
- Capture 5 watt UHF signal from 800 feet

**\$799** SAVE \$100

TA100S Antenna Included

In The Spotlight

Special Prices are for a Limited Time Only!!



INTRODUCTORY PRICE  
**\$459**  
ORDER NOW! Save \$90

NEW

Computer Not Included

## OPTOCOM

- High speed triple conversion GRE receiver
- Track Motorola 400, 500, 800, and 900MHz systems
- Decode CTCSS, DCS, LTR, DTMF, and Motorola talk group IDs
- Scan trunked and conventional frequencies simultaneously
- Reaction Tune with Scout Frequency Recorder
- Software Controlled volume & squelch for remote control operation

- Store & Scan, download up to 28 different frequencies or one talk group ID for scanning without computer control
- Supplied with the all new Trakkstar software
- Trunk Track LTR systems
- Scans conventional frequencies from 25-250, 760-823.995, 849.005-868.995, 894.005-1300MHz (Cellular frequencies blocked)



## CUB COUNTERS

Handheld frequency counters, all incorporating patented Digital Filter and Digital Auto Capture. All counters come with initial accuracy of +/- 1ppm. High impedance amplifiers standard on M1 and 3000APlus. Call for additional features on all three counters.

M1

3000A+

CUB **\$149**

M1 **\$199**

3000A+ **\$299**

SAVE \$50 on the M1 & 3000A+

Antennas Sold Separately

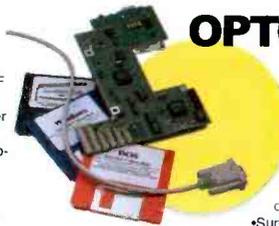


## OPTOTRAKKER

- Decodes CTCSS, DCS, LTR, Motorola Type I and II, and DTMF
- Scan multiple trunked systems at the same time under computer control
- All trunked frequency bands supported, including 400MHz, 500MHz, 800MHz and 900MHz
- Built-in Data Slicer Circuit
- Pass through technology requires only one com port

**\$299** Includes Software

Receivers supported under computer control:  
Icom R7300, R7100, R8500, R9000 and R10, AOR AR8000, AR3000A, AR5000, and Pro 2005/6 with OS456/OSLite, Pro 2035/42 with OS535



## OPTOSCAN

- Computer control scanning interface board for the popular RadioShack Pro 2005/6 (OSLite) and Pro 2035/42 (OS535).
- Decode CTCSS, DCS, and DTMF with OS535 only
- Supported by popular third party software

**\$175** SAVE \$24

OS456Lite: \$99

Micro Counter  
Micro DTMF



Micro RF Detector

Purchase all three for \$299 Save \$48

## TECHTOYZ

Micro Test equipment in pager style cases featuring a 2000 character DTMF decoder, a Frequency Counter with three memory hold, and an RF Detector with settable threshold alarm.

MicroCounter **\$99**

MicroDTMF **\$99**

MicroRF Detector **\$149**

TMC100 Antenna Sold Separately (\$9)

FACTORY DIRECT ORDER LINE 800-327-5912

Made in the

**U.S.A.**

**OPTOELECTRONICS®**

www.optoelectronics.com

5821 N.E. 14th Avenue • Ft. Lauderdale, FL • 33334

Telephone: (954)•771•2050 Fax: (954)•771•2052 EMail: sales@optoelectronics.com

Prices and Specifications are subject to change without notice or obligation

The OptoCom has not been approved by the Federal Communications Commission. This device may not be sold or offered for sale until the approval of FCC has been obtained. Contact Optoelectronics for information on availability. Optoelectronics, ScanStar, Motorola, EF Johnson LTR and Microsoft Windows are all registered trademarks. Scout, 3000A+, R11, Xplorer, MicroCounter, M1, Cub are covered by U.S. Patent No. 5,471,402.



*Cover Story*

## Inside Italy's RAI

By Jim Frimmel

On a recent trip to Italy, *MT's* programming manager had the opportunity to meet the friendly staff at Radio Roma, RAI International. Come along on a rare, quick tour behind the gates at RAI. The station broadcasts in 24 languages from its transmitter site at Prato Smeraldo. Story on page 8.

Our cover picture is of a vertical curtain antenna north-east of Moscow, similar to many of the antenna arrays used to jam broadcasts from the West. (Photo by Bernd Trutenau)

# CONTENTS

## Making the Best of Apartment Monitoring ..... 10

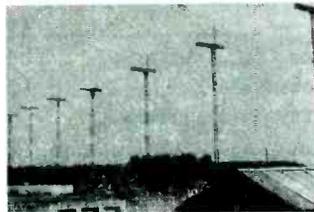
By Steve Douglass

I had spent the last five years getting the monitoring post just the way I wanted and now I had to tear it all apart. But all's well that ends well. No one would know that a miniature intercept station is operating in the nondescript apartment next to them, and reception is almost as good as before the move.



## Jamming Wall ..... 16

By Rimantas Pleikys

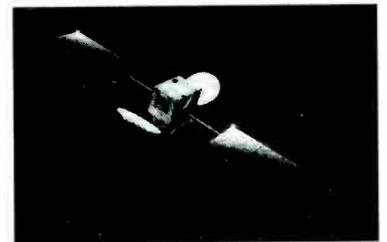


On November 29, 1988, the Soviet Union ceased jamming foreign radio stations for the first time in 40 years. This look back at the equipment and the stations involved in that effort is written in dedication of the 10th anniversary of its end.

## New! Inmarsats and How to Hear Them..... 22

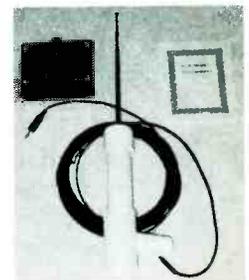
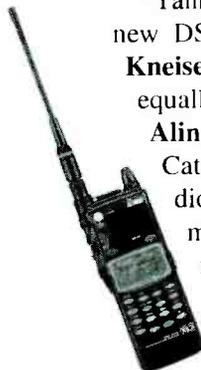
By Dave Cawley

A growing number of globe-trotting individuals are joining the ranks of ships, roving reporters, and international businessmen who conduct their business on Inmarsat. It is well worth the slightly extra effort required to pull these signals into your scanner to monitor these global communications!



## Reviews:

"Tank-tough" is how Magne categorizes a new DSP SW table-top from Germany, the **Kneiser + Doering KWZ 30** (p. 90). Parnass is equally impressed with the sturdiness of the new **Alinco DJ-X10T** scanner (p.92). Last month Catalano installed the **WR1500e** software radio; this month he waxes poetic over its performance (p.94) and also plays with an **IrDA mouse** from Selectech. Kiwa has produced its first "natural radio" detector, **Earth Sounds**, put to the test by LF columnist Kevin Carey (p.96).





**MONITORING TIMES**  
(ISSN: 0889-5341;  
CPC IPN Sales Agree-  
ment #1253492) is  
published monthly by  
Grove Enterprises, Inc.,  
Brasstown, North  
Carolina, USA.

Copyright © 1998. 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: web: [www.grove-ent.com](http://www.grove-ent.com)  
or e-mail: [mt@grove.net](mailto:mt@grove.net)  
Editorial e-mail: [mteditor@grove.net](mailto:mteditor@grove.net)  
Subscriptions: [order@grove.net](mailto:order@grove.net)

Subscription Rates: \$23.95 in US; \$36.50  
Canada; and \$55.45 foreign elsewhere. US  
funds. Label indicates last issue of subscrip-  
tion. **See page 103 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  
Enterprises. Unsolicited manuscripts are  
accepted. SASE if material is to be returned.

#### Owners

Bob and Judy Grove  
[judy@grove.net](mailto:judy@grove.net)

#### Publisher

Bob Grove, W8JHD  
[bgrove@grove.net](mailto:bgrove@grove.net)

#### Managing Editor

Rachel Baughn, KE4OPD  
[mteditor@grove.net](mailto:mteditor@grove.net)

#### Assistant Editor

Larry Van Horn, N5FPW

#### Art Director

Belinda McDonald

#### Advertising Svcs.

Beth Leinbach  
(828) 389-4007  
[beth@grove.net](mailto:beth@grove.net)

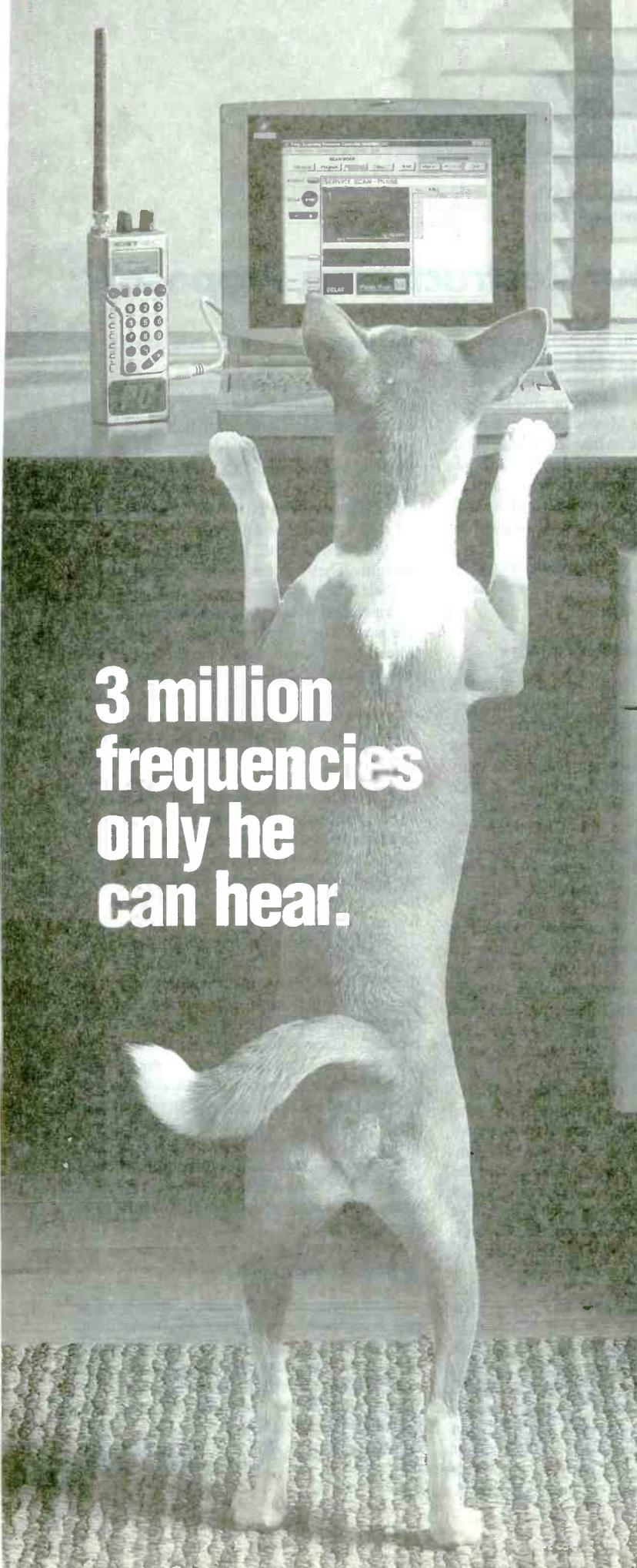
## DEPARTMENTS

<b>Washington Whispers</b> .....	4	<b>Outer Limits</b> .....	77
<i>What's Behind Ham Restructuring?</i>		<i>WBCQ: Pirate Station Goes Legit</i>	
<b>Communications</b> .....	6	<b>Below 500 kHz</b> .....	78
<b>Scanning Report</b> .....	26	<i>Tips from our Readers</i>	
<i>That New Band to Scan</i>		<b>KIS Radio</b> .....	80
<b>Utility World</b> .....	30	<i>Heathkit GR-64 Restoration</i>	
<i>NCS: Swords into SHARES</i>		<b>Experimenters Workshop</b> .....	82
<b>Digital Digest</b> .....	33	<i>Automatic NiCd Cell Discharger</i>	
<i>Digital Equipment Overview</i>		<b>Antenna Topics</b> .....	84
<b>Global Forum</b> .....	34	<i>Why all the Noise about Noise?</i>	
<i>WBCQ - An Alternative SW Station</i>		<b>On the Ham Bands</b> .....	86
<b>QSL Report</b> .....	38	<i>Wish List for a Ham's Christmas</i>	
<i>Adventist World Radio</i>		<b>And More!</b> .....	87
<b>English Lang SW Guide</b> .....	39	<i>Radio Shack's Easy FRS Radios</i>	
<b>Propagation Conditions</b> .....	60	<b>Ask Bob</b> .....	88
<i>Where to Listen on the Bands</i>		<i>The "Power Tip" Scam</i>	
<b>Programming Spotlight</b> .....	61	<b>Magne Tests</b> .....	90
<i>Tracking the Global Economy</i>		<i>Kneisner + Doering KWZ 30</i>	
<b>New! Satellite Radio Guide</b> .....	62	<b>Scanning Equipment</b> .....	92
<b>New! The Launching Pad</b> .....	66	<i>Alinco DJ-X10T</i>	
<i>Learning to Love Satellites</i>		<b>Computers &amp; Radio</b> .....	94
<b>Beginner's Corner</b> .....	68	<i>WinRadio WR1500e; AirData Mouse</i>	
<i>Understanding Radio Waves</i>		<b>Review</b> .....	96
<b>New! View from Above</b> .....	70	<i>Kiwa Earth Monitor</i>	
<i>Keeping an Eye on the Weather</i>		<b>What's New</b> .....	97
<b>Milcom</b> .....	72	<b>Letters</b> .....	101
<i>New USCG Air Station Opens</i>		<b>Stock Exchange</b> .....	102
<b>Plane Talk</b> .....	74	<b>Advertisers Index</b> .....	102
<i>Coming to Terms with Radar -2</i>		<b>Closing Comments</b> .....	104
<b>American Bandscan</b> .....	76	<i>The Frequency List and the Grain of Salt</i>	
<i>Beverage Questions</i>			

## 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 .....	<a href="mailto:gayle@grove.net">gayle@grove.net</a>
Frequency Monitors .....	David Datko, Mark J. Fine	
Program Manager .....	Jim Frimmel .....	<a href="mailto:frimmel@star-telegram.com">frimmel@star-telegram.com</a>
American Bandscan .....	Doug Smith, W9WI .....	<a href="mailto:w9wi@bellsouth.net">w9wi@bellsouth.net</a>
And More! .....	Jock Elliott KB2GOM .....	<a href="mailto:lightkeeper@sprintmail.com">lightkeeper@sprintmail.com</a>
Antenna Topics .....	W. Clem Small, KR6A .....	<a href="mailto:clemsmall@bitterroot.net">clemsmall@bitterroot.net</a>
Beginner's Corner .....	T.J. Arey, WB2GHA .....	<a href="mailto:tjarey@home.com">tjarey@home.com</a>
Below 500 kHz .....	Kevin Carey, WB2QMY .....	<a href="mailto:lowband@gateway.net">lowband@gateway.net</a>
Computers and Radio .....	John Catalano .....	<a href="mailto:j_catalano@conknet.com">j_catalano@conknet.com</a>
Digital Digest .....	Bob Evans .....	<a href="mailto:revans@total.net">revans@total.net</a>
Experimenter's Wkshp .....	Bill Cheek .....	<a href="mailto:bcheek@san.rr.com">bcheek@san.rr.com</a>
Federal File .....	John Fulford, WA4VPY .....	<a href="mailto:JOHNFO413@aol.com">JOHNFO413@aol.com</a>
K.I.S. Radio .....	Richard Arland, K7SZ .....	<a href="mailto:k7sz@juno.net">k7sz@juno.net</a>
Magne Tests .....	Lawrence Magne	
Milcom .....	Larry Van Horn N5FPW .....	<a href="mailto:larry@grove.net">larry@grove.net</a>
On the Ham Bands .....	Ike Kerschner, N3IK	
Outer Limits .....	George Zeller .....	<a href="mailto:George.Zeller@acclink.com">George.Zeller@acclink.com</a>
PCS Front Line .....	Dan Veeneman .....	<a href="mailto:dan@decode.com">dan@decode.com</a>
Plane Talk .....	Jean Baker, KIN9DD	
Programming Spotlight .....	John Figliozzi, KC2BPU .....	<a href="mailto:jfiglio1@nycap.rr.com">jfiglio1@nycap.rr.com</a>
Propagation .....	Jacques d'Avignon .....	<a href="mailto:monitor@rac.ca">monitor@rac.ca</a>
QSL Corner .....	Gayle Van Horn .....	<a href="mailto:gayle@grove.net">gayle@grove.net</a>
Satellite Radio Guide .....	Robert Smathers .....	<a href="mailto:roberts@nmia.com">roberts@nmia.com</a>
Scanning Equipment .....	Bob Parnass, AJ9S	
Scanning Report .....	Richard Barnett .....	<a href="mailto:ScanMaster@aol.com">ScanMaster@aol.com</a>
SW Broadcasting .....	Glenn Hauser .....	<a href="mailto:ghauser@hotmail.com">ghauser@hotmail.com</a>
SW Broadcast Logs .....	Gayle Van Horn .....	<a href="mailto:gayle@grove.net">gayle@grove.net</a>
The Launching Pad .....	Ken Reitz, KS4ZR .....	<a href="mailto:ks4zr@compuserve.com">ks4zr@compuserve.com</a>
Utility World .....	Hugh Stegman, NV6H .....	<a href="mailto:driver8@netcom.com">driver8@netcom.com</a>
View from Above .....	Lawrence Harris .....	<a href="mailto:lawrenceh@ndirect.co.uk">lawrenceh@ndirect.co.uk</a>
Washington Whispers .....	Fred Maia, W5YI .....	<a href="mailto:fmaia@cwixmail.com">fmaia@cwixmail.com</a>



**3 million  
frequencies  
only he  
can hear.**

**Only Sony can turn your PC into a watchdog of the airwaves with the Sony Radio Frequency Scanner and CD-ROM frequency database.**

Use the Sony Radio Frequency Scanner with PC Interface and be forewarned about approaching weather systems, traffic conditions and emergency situations. You can even get inside information at some of your favorite sporting events. The Sony CD-ROM gives you easy access to listings of 3 million U.S. frequencies. It makes scanning fast—and easy.

A unique bi-directional PC interface lets you use your PC to control all the Sony Radio Frequency Scanner's standard functions, as well as its special features, including:

- 20 programmable Scanning Ranges.
- Virtually unlimited Memory and Skip Preference Files.
- Data Import and Export between Scanner and PC.
- A searchable CD-ROM database of over 3 million U.S. frequencies.

**Performance you can rely on**

The Sony Radio Frequency Scanner with PC Interface is a powerful hand-held scanner with the latest scanning circuitry for top performance. It features the full range of functions and features scanner enthusiasts want:

- 25MHz to 1,300MHz Frequency Scanning
- 300-Channel Memory for personal customization.
- Public Service Scan of 9 pre-programmed bands, including police, air, fire/emergency, weather, marine, FM, and TV.
- Intelligent Active Memory that saves the 10 most recently received frequencies for convenient recall.
- AM and Narrow and Wide FM Reception
- Back-lit Display
- Compatible with Windows® 95

To place an order or to locate a dealer near you, call

**1-888-633-SONY**

**The Sony Radio Scanner with PC Interface. . . watchdog of the airwaves.**

[www.sony.com/radioscanner](http://www.sony.com/radioscanner)

\*Dealer prices may vary.  
©1998 Sony Electronics Inc. Reproduction in whole or in part without written permission is prohibited. All rights reserved. Sony is a trademark of Sony. Windows is a trademark of Microsoft Corp.



**SONY**

By Fred Maia, W5YI  
 fmaia@cwixmail.com

# What's Behind the Amateur Restructuring Proposal?

It has been nearly ten years since the Amateur Service has been remodeled. In 1989, the Federal Communications Commission (FCC) completely rewrote the Amateur Radio Service Rules. A lot has happened in communications technology since then. Most everyone agrees that it is time bring ham radio up to date.

The current campaign began on two fronts. First of all, satellite and automatic digital technology has developed to the point where analog communications and manual telegraphy are being replaced by more reliable modes. For seventy years, 500 kHz Morse code was the cornerstone of long distance distress communications. Now the Coast Guard does not even monitor the frequency any more. In February, the new Global Maritime Distress and Safety System (GMDSS) becomes mandatory and Morse code on the high seas goes the way of the horse and buggy.

Amateur radio operators still use Morse code, however, and many of their activities are centered around the mode. While no one objects to the use of CW on the ham bands, many question why Morse proficiency should be a licensing requirement. No other mode requires a practical demonstration of proficiency. The answer is that Morse proficiency is still required under international law.

The Amateur Service, like all radio services, is governed by a United Nations agency which determines the ground rules for access to the

radio spectrum. The nearly 200 countries that make up Geneva-based International Telecommunications Union (ITU) agreed twenty years ago that ham operators had to be able to manually send and receive Morse code messages if they wanted to operate on the world-wide bands below 30 MHz. The international law does not specify a particular code speed. Most countries, however, believe that 5 words-per-minute is all that is needed under the law. Changing the international rules takes time. A lot of time. It will be another three or four years before the matter can be considered at a World Radio Conference.

## ■ The ARRL makes the first move

The United States has an incentive system of amateur radio licensing. That means ham operators get additional frequency, transmitter power ...and even call sign privileges in exchange for more knowledge and operating skill. Currently the FCC requires three different Morse code speed examinations: Five words-per-minute is required for the Novice and Technician Plus license, 13 wpm for the General and Advanced Class ...and 20 wpm is the requirement for the top-of-the-line Amateur Extra Class ticket.

Since 1990, however, there has been a loophole in the FCC rules which permits applicants to by-pass the higher speed CW examinations if they present a doctor's certification confirming that they are unable to copy more than 5 words-per-minute due to a disability. And hundreds ...possibly thousands of applicants have done exactly that! It doesn't appear very hard to get the needed doctor's signature.

The Amateur Radio Relay League (ARRL) is an association of predominantly long term ham operators ...most of whom have passed a high speed Morse examination. ARRL members don't like the waiver procedure and the League petitioned the FCC to adopt rules which would make it more difficult to obtain them. For one thing, they wanted the examining community to be authorized to obtain and review medical records of those requesting a waiver.

## ■ Checkmate by the FCC

But there is reason to believe the FCC doesn't go along. We heard about a high level meeting held this past spring between FCC and ARRL officials where the League was told that the Commission was considering a single 5 wpm code speed which would eliminate the need for any waivers. The meeting also coincided with an agency-wide review of outdated regulations.

The Amateur Service rules were added to the list.

By summer, amateurs became very curious and concerned about what the FCC had in mind and rumors were rampant that 5 wpm would indeed be the top code speed tested for any amateur license. The FCC staff completed a straight Notice of Proposed Rulemaking (NPRM) and submitted it to the Commissioners for their approval and release.

About that time, the ARRL had second thoughts. They saw the handwriting on the wall. At their July Board meeting, the League voted to seek reduced telegraphy proficiency and fewer license classes. For one thing, the directors agreed that 5 wpm should be the code speed requirement for the General Class instead of 13. And Advanced and Extra Class applicants would only have to pass 12 wpm instead of 13 and 20. A letter was written by the ARRL's attorney to the FCC before the NPRM could be released. And the staff got their NPRM document back! The Commissioners wanted the NPRM changed into a combination proposal and inquiry. Instead of specifying lower code speeds, the FCC wanted to know "Should we continue to have three different levels, or should these be reduced to one or two ...and if so, what should be the required speed?"

The Commissioners agreed with the staff on one point, however. They didn't go along with the ARRL's request to make it more difficult for the handicapped to operate on the high frequency ham bands. They said the ARRL's proposals "...place an unfair burden on examinees with disabilities, and raise serious privacy and confidentiality concerns." The FCC's also proposed to reduce the number of license classes from six to four — very similar to that proposed in the ARRL's letter. The Novice and Technician Class licenses would be discontinued under both the FCC and ARRL proposals. There is a movement underway, however, to only have three classes.

## ■ Now it's your move.

And that is where we stand. The comment period for the Notice of Proposed Rulemaking ends on December 1, 1998. The FCC is trying a new Electronic Comment Filing System and you can now access the ECFS Home Page on the World Wide Web at <<http://www.fcc.gov/e-file/ecfs.html>> You will also be able to review comments filed by others. We suggest that you participate in the rulemaking. See you next month.

## FREE CATALOG

**Packed with great books  
for radio communications  
& electronics hobbyists.**

- ★ FREQUENCIES
- ★ MODIFICATIONS
- ★ REPAIRS
- ★ TROUBLESHOOTING

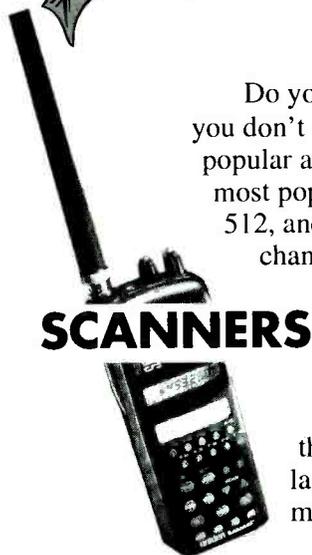
*Everything you're looking for!*

Largest selection of how-to & info books for scanner, CB & ham radio fans, beginners to experienced monitors.

### CRB RESEARCH BOOKS

PO Box 56-M, Commack NY US 11725  
 PHONE: 516-543-9169  
 FAX: 516-543-7486  
 ONLINE: <http://www.crbbooks.com>

# Let Grove simplify your holiday shopping!

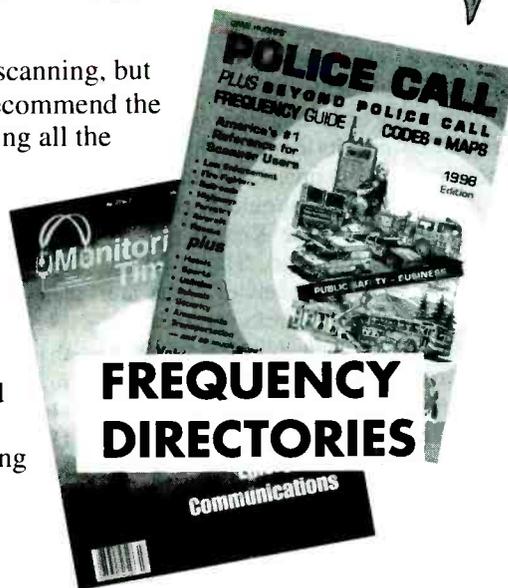


## SCANNERS

Do you know someone who might be interested in scanning, but you don't know what radio to select? Let us help. We recommend the popular and potent **Uniden SportCat** hand-held. Featuring all the most popular frequency ranges (29-54, 108-174, 406-512, and 806-956 MHz, less cellular), 100 memory channels, rugged and compact, this scanner is a favorite among sports fans and public safety monitors alike.

We will include a six-month trial subscription to *Monitoring Times*, the scanner enthusiast's favorite magazine, and the latest edition of *Police Call* to provide the law enforcement, fire, medical, and other exciting monitoring frequencies (specify state)!

All this for only **\$199.95** (plus shipping), a bargain price and a sure-fire hit during the gift-giving season! **Order SCN 23.**



## FREQUENCY DIRECTORIES



## MONITORING TIMES

For an inexpensive introduction to worldwide shortwave listening, we recommend the new **Sangean ATS404** portable, featuring digital selection of medium wave and shortwave broadcasting frequencies between 0.52-26.1 MHz, and brilliant FM too!

Simple to operate, highly sensitive to weak signals, and providing excellent audio, this powerhouse will pull those distant stations into the clear! And we will throw in a six-month trial subscription to *Monitoring Times*, the listener's choice magazine.

All for only **\$99.95** (plus shipping) during the gift-giving season!

**Order RCV 6.**



## SHORTWAVE RADIOS



When you order, remember to tell us the name and address of the recipient of your gift.

# 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

e-mail: [order@grove.net](mailto:order@grove.net)  
[www.grove-ent.com](http://www.grove-ent.com)



**North Korea's Phantom Satellite**

For years North Korea (DPRK) has sold Scud-class missiles to Iran and Pakistan, so western analysts were expecting the launch of a more sophisticated Nodong 3 two-stage medium range version. On August 31st at 3:07 UTC a missile was tracked. What was strange was the flight path — due east, taking it directly over Japan.

The first stage fell in the Sea of Japan between Korea and Japan, and the second stage landed in the Pacific Ocean to the east of Japan. Japan was understandably upset that the missile flew over its territory without any prior notification or permission. Humanitarian aid to North Korea was quickly cut off.

On September 2nd the Korean Central News Agency (KCNA) said, "High-ranking officials and other politicians of Japan are making provocative remarks against the DPRK over a missile launching test that they say was carried out by the DPRK. They describe the test as something 'regrettable' and 'dangerous' and claim that the test made it difficult to improve relations with the DPRK. ... Japan's behavior is ridiculous, indeed, in view of the fact that Japan is zealously developing long-distance vehicles and other up-to-date weapons and paving the way for overseas aggression, having worked out 'guidelines for Japan-U.S. defence cooperation.' ... We warn Japan to face up to reality, act with discretion and renounce its anachronistic hostile policy toward the DPRK at once."

... Not exactly polite things to say to a neighbor, especially the one which can help you the most.

On September 4th KCNA claimed that it wasn't a military missile, it was a launch vehicle for a satellite, saying, "It will contribute to promoting scientific research for peaceful use of outer space." They said Kwangmyongsong No. 1's orbit had a perigee of 218.82 km. and apogee of 6978.2 km. "The satellite is now transmitting the melody of the immortal revolutionary hymns *Song of General Kim Il Sung* and *Song of General Kim Jong Il* and the Morse signals 'Juche Korea' in 27 MHz."

Yes, 27 MHz — Citizens Band!

As a member of the International Telecommunications Union (ITU) the DPRK is required to file an application before a transmitter is put on the air which can interfere with other transmissions, especially spacecraft. The ITU has no filing from the DPRK for any satellite allocations, and 27 MHz is certainly not a band allocated for satellite communications.

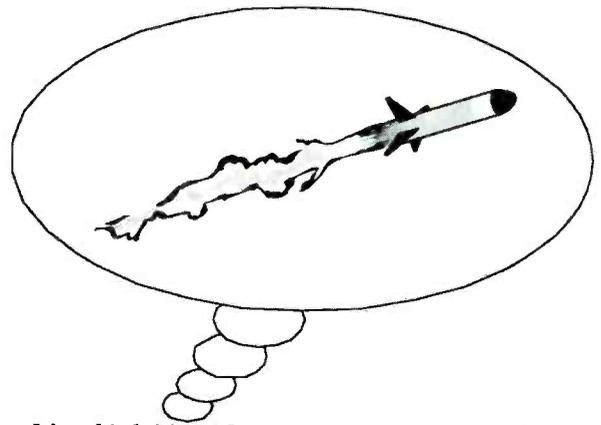
Although the Russian news agency ITAR-

TASS claimed that Russian military officials had tracked the satellite, it gave the identical figures as in the KCNA announcement, leaving out the same missing parameters. Identical parameters almost guarantee that the numbers trace back to the same source.

More importantly, nobody else has any indication that a satellite existed. It was invisible to all of the radar and visual tracking stations around the world, and no broadcasts were heard by any listeners. The USSPACECOM official press release (delayed due to the Labor Day holiday), stated, "US Space Command has not been able to confirm North Korean assertions that it launched a small satellite on August 31, 1998."

Some western officials said they were told that the satellite did reach orbit but it wasn't functioning. This seems highly doubtful considering the capabilities of the USSPACECOM tracking network. It's hard to believe that a satellite — and its much larger third stage — could be missed for several weeks. On the other hand, KCNA claimed on September 14th that the satellite had finished its 100th orbit around the Earth, and even claimed that the satellite was large enough to be visible to the naked eye!

So what was it? Portions of the North Korean statements may be correct; it conceivably could have been an attempted satellite launch. However, there's little doubt that there is no satellite in orbit. If it was a launch attempt then there was a failure during the third stage burn and North Korea's still trying to delude itself into believing that it has a satellite in orbit — functional or not.



...It's a bird, it's a plane, it's pure propaganda!

The test certainly proved that DPRK can loft a significant payload, whether it's an upper stage with a peaceful satellite or a weapon with a range of 1,646 km.

There's also little doubt that the test has increased tensions in a region already close to armed conflict. South Korea is now talking openly about accelerating its own domestic rocket technology development, and Japan is talking about funding its own spy satellites.

In a country where a significant portion of the population is starving, it has caused the world to wonder about North Korean priorities.

Even if you believe all of North Korea's claims, it did launch a rocket over Japanese territory without prior notification and did not properly apply for a license for its transmitting frequency — hardly indications of a peaceful scientific satellite.

For a "nostalgic" taste of Cold War rhetoric, see the Korean Central News Agency website at <http://www.kcna.co.jp/>

—by Philip Chien, *Earth News*

**BULLETIN BOARD**

**November 2: DX Test**

KLER-1300, Orofino, Idaho, will conduct DX tests between 0200 and 0215 EST, comprised of tones and Morse Code IDs, using 5 kW non-directional. Reception reports may be sent to: Mr. Jeff Jones, Owner, KLER-AM, P.O. Box 32, Orofino, ID 83544-0032. (Arranged by Bill Hale for the NRC CPC.)

**Nov 7: Odessa, TX**

West Texas ARC hamfest; Contact Robert Jordan N5RKN, 915-335-7980 or

[n5rkn@apex2000.net](mailto:n5rkn@apex2000.net). For hamfest details see WTARC webpage: <http://nonprofit.apex2000.net/hamfest/>

**Nov 16 -18: Boston, MA**

Surveillance Expo '98 will take place at the Hynes Convention Center in conjunction with Northeastern University's Criminal Justice Conference. Seminars, exhibits, panel discussions. Contact Security and Investigations Group, POB 20254, Washington, DC 20041 or Jim Ross at 800-US-DEBUG, [jross@rosseng.com](mailto:jross@rosseng.com)

## November Nightmares in the Clarke Belt

Satellite operators will breathe much easier when mid-November has come and gone — at least, until next year. Around November 17th of 1998 and 1999 the Earth makes its closest pass in a 33 year cycle through debris from the tail of comet Tempel-Tuttle. The meteor shower, known as the Leonids, was last experienced at its height in 1966 at an estimated rate of 150,000 meteors per hour! But in 1966, satellites were scarcely of concern.

However, “we might expect five to 10 functional satellites to be hit by Leonid meteoroids during a storm,” say the four co-authors of a report to be found on the Internet at [http://leroy.cc.uregina.ca/%7Eastro/Leonids/Leo\\_2.html](http://leroy.cc.uregina.ca/%7Eastro/Leonids/Leo_2.html).

Although some outages may be experienced while engineers take precautions by repositioning satellites in the end it's a crash-ship. GE American hopes to increase its odds of an impact to one in 100,000 by repositioning, but at 150,000 meteors per hour, that may not be too reassuring.

## A License to Jam

This month's feature story on jamming celebrates the cessation of soviet jamming on a major scale, but a new phenomenon has emerged in Japan that could be called “microjamming.” Only, the target of this jammer is not foreign broadcasting, but the omnipresent ring of the cellular phone.

Restaurants, concert halls, movie theaters, and hospitals are all venues with very good reasons for banning cellphones altogether. Plastering warning posters on every wall or subjecting the clientele to search and seizure does nothing for good customer relations, however. Thus the attraction of new jammers such as Medic's “Wave Wall.”

Wave Wall sends out strong signals on the same frequencies as the cellphones themselves and effectively jams both incoming and outgoing calls. \$480 wouldn't have paid the electric bill for a even month of Cold War jamming, but it doesn't seem unreasonable for creating a 20-foot radius of quiet.

Japan is just beginning to address concerns over potential misuse, blocking emergency calls to doctors and others, or interference to other devices such as pacemakers.

## Alien Pods at the Pentagon?

“Is this some sort of high powered visible light communications antenna?” wondered

Chuck McCullough about the contraption which suddenly appeared on the grounds of the Pentagon.

Stan Sulak pointed us to an article in the July email edition of *DOE This Month*. The bizarre looking structure is an array of mirrors which concentrates the sun's energy onto a receiver/engine to generate electric power. Sulak says, “The unit installed at the Pentagon is designed to provide 25 kilowatts of power — enough to supply electricity to an entire village in a remote area without generating any air pollution.”

After spending six months on display outside the Pentagon, the structure will be shipped to its “real job” producing electricity in Arizona.



## Bosnian Station Needs Support

Bosnia and Herzegovnia's largest independent radio network is FERN (Free inter-

Ethnic Radio Network), funded by the Organization for Security and Cooperation in Europe (OSCE) and the Swiss Government. In two years it has grown from a temporary, two month “elections radio” to a complete 24-hour national news, public information, and entertainment operation.

However, funding commitments cease after the September 1998 elections. It is seeking commercial investments, partnership agreements with other media, advertising, program sponsorship, and voluntary contributions. For more information, see [www.oscebih.org](http://www.oscebih.org)

“Communications” is compiled by Rachel Baughn from clippings submitted by our readers. Thanks to those who sent in clippings this month: Anonymous, NY; Brandon Artman, PA; David Barger, NY; Philip Chien, FL; Mike Elcsisin, CA; Brian Cathcart, FL; Thomas Folks, PA; Wm. Hearty, OH; Alan Henney, email; Jeffrey Heyman, email; David Howard, PA; Charles Johns, ME; Maryanne Kehoe, GA; Kevin Klein, WI; Ed Lentz, email; Mike Madsen, IL; Alan Masyga, MN; Ira Paul, MI; Glenn Richter, email; Doug Robertson, CA; Michael Saxton, CA; Ari Schwartz, email; Larry and Gayle Van Horn, NC; Brian Webb, email.

## HF-VHF-UHF Receiver Multicouplers & Preamplifiers

Are you using several HF radios or VHF/UHF scanners at your monitoring site??  
....consider including a multicoupler or a preamplifier to your system.

### SWL/Scanning - Radio Surveillance - News Rooms

Both our Passive and Active Multicouplers are commercial grade specially designed for demanding monitoring applications with multiple radios. Our 2 and 4 port couplers are 50 ohms units with better than 24 dB of port-to-port isolation. Active couplers features wide-band Low-Noise distribution amplifiers with High-Pass/Low-Pass filtered inputs, BNC connectors standard.

Price range: \$70 to \$150 depending on model

Give us a call for data sheet, application and ordering information.



STRIDSBERG ENGINEERING, INC.  
P.O. Box 5040  
Shreveport, LA 71135-5040, USA.

Phone: (318) 861-0660

Fax: (318) 861-7068

SEE US ON THE WEB!  
[www.vikingint.com](http://www.vikingint.com)

**Rave Review**  
*Pop Comm*  
April '96

# Professional 10 HOUR RECORDER

**"BUILT LIKE A BATTLESHIP"**

SPECIAL  
Monitoring  
Times Price..

\$159

- 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"

**FREE** AD PART (A COMMITMENT CATALOG)

COD's OK. Calif. residents add tax. Sorry, no credit cards. Free catalog USA only, other countries \$5. ..Includes UPS to 48 States

Viking International

Factory Direct Phone: (415) 468-2066 • Fax: (415) 468-2067 "Since 1971"

150 Executive Park Blvd. #4600 San Francisco, CA 94134

# Inside Italy's



By Jim Frimmel

**O**n a recent trip to Rome, I had the opportunity to visit the studios of Radio Roma, the name commonly used for RAI (Radio-Televisione Pubblica Italiana) International.

RAI's corporate offices occupy a vast complex of buildings on the outskirts of Rome in studios known as Saxa Rubra. Thank goodness I had arranged my visit well in advance of arrival, because the location is not open to the public and is well-guarded. Gaining admittance required a phone call from the main guard post (see photo) to my contact and escort, Andrea Borgnino.

While waiting for Andrea to arrive, I registered for a credit-card style identification badge with a magnetic strip. Andrea arrived in good time and, with my badge clipped to my coat pocket, the visit began.

We started with a visit to the office of Fausto Spegni, head of the central radio branch of RAI. I was very pleased to find that both



*Andrea Borgnino maintains many of the web pages for RAI and is a frequent contributor to Internet DX information.*



*A view of the main entrance to Saxa Rubra, RAI's central broadcasting studios.*

Mr. Spegni and Andrea had an excellent command of the English language, and I did not have to rely on the Italian I had learned while stationed in Italy many years earlier.

Mr. Spegni amusingly pointed out that his name was very appropriate for someone in his position. He explained that, in Italian, the name Spegni is taken from the verb "spegnere," meaning "to turn off," as in "turn off the radio."

After a nice discussion about the situation at RAI, the three of us undertook a tour of the radio and television studios.

## ■ RAI's Shortwave Output

RAI transmits on shortwave to the Americas, Europe, Africa, Asia/Oceania, and the Mediterranean. Most broadcasts are in Italian,

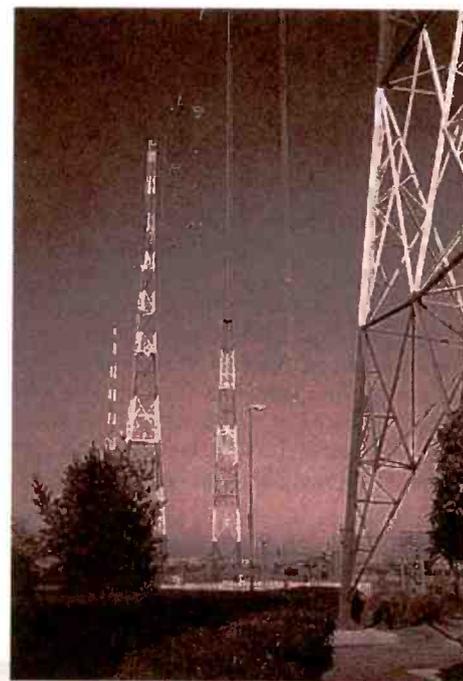


Photo credit: Andrea Borgnino

but there is also programming in English, French, Spanish, Portuguese, German, Swedish, Danish, Ukrainian, Romanian, Slovene, Croatian, Turkish, Bulgarian, Czech, Slovak, Polish, Serbian, Hungarian, Russian, Arabic, Amharic, Somali and Esperanto, for a total of 24 languages. No oriental languages are used.

In North America, most shortwave listeners are familiar with Radio Roma's daily 20 minute English broadcast from 0050-0110 UTC. The broadcast actually begins at 2230 hours in Italian, switches to English at 0050, continues on in French at 0110, reverts back to Italian at 0130, and then finishes with Spanish from 0305-0325. The English portion of the broadcast consists of ten minutes of news followed by ten minutes of light music. Summer frequencies in use until October 25th were 6010, 9675 and 11800 kHz.

One other English transmission that is often heard in North America is actually intended for the British Isles. The English portion of that broadcast is from 1935-1955 UTC on 5970, 7145 and 9760 kHz (until October 25th), and is best heard in North America on the East Coast.

### ■ RAI's Mediumwave Output

Radio Roma's main program in the AM broadcast band is an Italian program called *Notturmo Italiano*, which is also broadcast on shortwave and via satellite. It mainly consists of six hours of light music, opera and symphonic music, operettas, and jazz, with news every hour in Italian, English, French and German. It is heard in Europe from 2200-0400 UTC on both mediumwave and longwave.

### ■ RAI Satellite Programs

RAI International Satelradio offers 24 hours of the top programs of the three national radio channels as well as RAI International. Programming consists of music, entertainment, news and information. Transmissions are via Hot Bird 1 to Europe, Asiasat 2 to Asia, Orion 2 to North and Central America, Panamsat 3 to the Atlantic coast, Galaxy LA to Latin America, and to Australia via subcarrier of RAI's TV channel. There are also satellite



*Many RAI news reports and feature programs are readied for broadcast from these banks of tape recorders.*

rebroadcasts on AM and FM in Australia, Canada, and the USA.

### ■ The Transmitter Site

RAI's shortwave transmitting center is separately located at Prato Smeraldo in the outskirts of Rome. All major transmitters were destroyed during World War II and were later replaced in 1948.

Prato Smeraldo Center presently broadcasts RAI's signals with six transmitters using 30 antenna systems.

Transmitters are all 100 kW Brown Boveri with a Marconi 100 kW used as backup. The Boveri transmitters use Thomson water-cooled output tubes. The AM modulation is digitally controlled.

Twelve of the towers use dipoles and 18 use doppel dipoles with reflectors. There are also numerous vertical dipoles made with long wires stretching from tower masts to the ground.

### ■ Looking to the Future

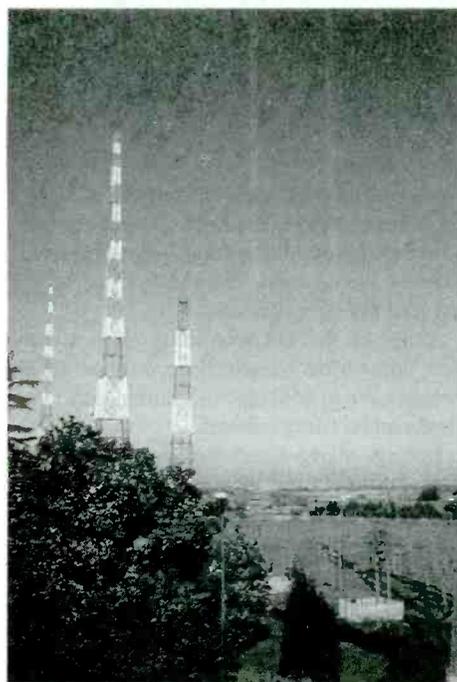
When originally constructed in 1931, the Prato Smeraldo site was considered far enough away from Rome to be interference-free to city commerce. Now, sixty-seven years later, Rome has spread out to the extent that the transmitter site is in need of relocation. Until such a move is made, RAI International is limited to the lower power outputs of the

present transmitters.

RAI has a twice-yearly publication called *QUIRAI*, available free of charge from RAI International; Largo Villy De Luca, 5; 00188 Roma, Italy. More information about RAI is also available off the internet at [www.raiinternational.rai.it](http://www.raiinternational.rai.it)

Jim Frimmel is editor of Selected Programming in MT and owner of DX Computing, radio software for the Macintosh.

*Since Alfa Romeo and Fiat have ceased exporting autos to the U.S., it was enjoyable to see all the Italian cars on the streets and autostradas. Sorry - no picture of the new Alfa 156, but here is a shot of the popular new Ford Ka, which parks easily on the streets of Rome.*



*A view of the Prato Smeraldo transmitter site on the outskirts of Rome. (Photo by Andrea Borgnino)*

# Making the Best of Apartment Monitoring

By Steve Douglass



I knew it could happen — my landlord had already warned me. Yet, when I opened up the envelope and the letter said that the house we were renting had been sold, it was a shock. I immediately began to contemplate the massive amount of work ahead. The least of which was dismantling my monitoring post.

We had been living in the comfortable ranch-style home for five years. The rent was incredibly cheap for the spacious three-bedroom house so my wife and I felt very lucky to find it. Since my family only numbers three, only two bedrooms were used. The other one became my office ... and, yes, my monitoring post.

In short order the roof of the house became an antenna farm and the "office" was stocked with wall-to-wall radios. To visitors it resembled a miniature version of NORAD, especially at night with all the LED readouts blinking, computers flashing and huge maps of the world adorning the walls. I must say, it was pretty cool.

I snagged a lot of signals from that room. Bombers on missions in the Gulf War, Hurricane Andrew slashing the coast, Jimmy Carter trying his best to negotiate a peaceful settlement with the dictator of Haiti, and even the fall of the Soviet Union, all from my monitoring post in southwest Amarillo.

Was it all about to end? What if I couldn't find another such an ideal place to monitor? Good houses were at a premium in Amarillo: could I luck into such a find again?

The answer was revealed to us in short order. Rental rates in Amarillo had skyrocketed and we couldn't begin to afford a comparable place. With the deadline for moving out fast approaching, we had to opt for a decision that I had sworn we would never make. We had to move into an apartment.

## Downsizing

A week before our moving date we finally located an apartment that

semi-suited our needs. It would be quite a chore to compress 2700 square feet of furniture and accumulated stuff to fit into 1200 square feet of apartment space. Half way through the move we realized that it just wouldn't work. Most of our stuff, including the bulk of my monitoring post, would have to be put in temporary storage.

As a free-lance press stringer for the local television press it was important that I still have some semblance of a monitoring post. After all, it was my job. I had even developed a reputation of sorts as the local "johnny on the spot" when it came to stories of news interest. If it was happening and was of interest to the public, chances are I knew about it. The local press depended on me to be their safety net and report the important news that their overworked reporters would miss. Would my job suffer because of the move? I assured my clients it wouldn't.

I staked out a small corner of the kitchen/dining room as my monitoring room and office. There wasn't much space, only a eight by ten foot square area that would have to hold eight scanning radios, my computer system, three desks and a filing cabinet.

Also crammed into the postage-stamp-sized spot would have to be no less than three television sets that I used to monitor the three local TV network affiliates. One of my daily services for the local media was to monitor all three six-o'clock newscasts at once, prepare a report on what stories were covered by each, and fax that report to the stations.

The hard part wouldn't be getting all the gear to fit in my *Reader's Digest* condensed version of an office. The problem would be to get it all



# A KEYNOTE SPEAKER *from Grove!*



Grove's improved **SP-200B Sound Enhancer** is really six products in one. Just look at its many features and capabilities:

- Top quality speaker; also includes headphone jack
- Hand-crafted hardwood cabinet
- Adjustable notch/peak filter (30 dB, 0.3-6 kHz)
- Recorder activator
- Audio amplifier (2.5 W @ 10% THD, 8 ohms)
- Audio activated squelch
- Noise limiter

## SP-200 SOUND ENHANCER

Housed in a stylish, solid oak cabinet hand crafted in the mountains of North Carolina, the Grove SP-200 is sure to enhance any listening post. The control panel, constructed of sturdy, black aluminum, has been designed for optimum ease and convenience when tuning and refining signals.

The SP-200 combines a powerful audio amplifier, top-of-the-line speaker, and an adjustable filter system to create the most versatile and precise listening environment available to listeners. The unique peak/notch filter system and noise limiter allow the listener to pull clear and distinct signals out of the haze of interference and background noise, while the adjustable bass and treble provide the flexibility to create just the sound you want. Voice, music, CW, and data are enhanced while interference and electrical noise are reduced or even eliminated by the analog audio processor.

The SP-200 also comes equipped with a stereo/mono headphone jack for private listening and an automatic tape activator so that you never have to miss anything.

Try the new Grove SP-200 Sound Enhancer with your receiver, scanner, or transceiver and enjoy the latest in speaker sophistication; you'll agree this is truly a keynote speaker!

**CALL NOW! 800-438-8155**  
828-837-9200

Order SPK13  
**\$199<sup>95</sup>**

### 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

e-mail: [order@grove.net](mailto:order@grove.net)

[www.grove-ent.com](http://www.grove-ent.com)

to work. Noisy, RF-spewing computers next to sensitive radio gear, and three televisions that produced more interference than a convention of radio pirates all had to be placed within inches of each other. Plus, I had to have some kind of antenna farm. Puny telescopic whips would not do. I had to have an antenna system that not only would be efficient enough to pull in most area-wide signals but would also not alarm the neighbors or my landlord.

With this impossible task in hand, I grabbed a pad of legal paper and began designing my new monitoring post.

After a few weeks of experimenting, hair pulling, dozens of cable ties and ten trips to the local electronics outlet, I finally got the new monitoring post situated. It took a bit of tweaking, but it works. In fact it works very well.

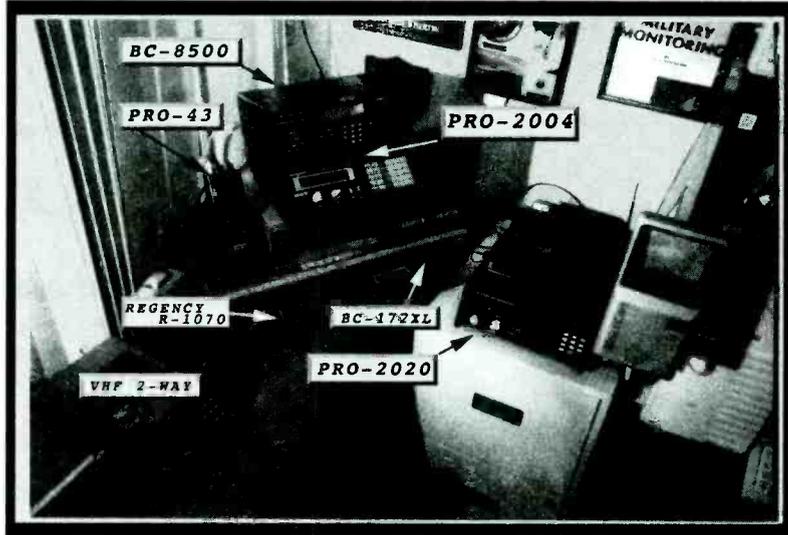
Although I don't quite have the reception capabilities that I had at the old place, on the whole, I can hear just as much. HF reception is a bit degraded but still much better than I anticipated. Area-wide police, fire and emergency communications come in loud and clear and I can hear about eighty percent of what I used to receive on the UHF military bands.

The cool thing is, none of my neighbors are the wiser. Only those who know me are aware that a miniature communications intercept station is operating in the nondescript apartment next door.

So, fellow apartment dwelling monitors, take heart. You, too, can monitor the airwaves almost as well as your home-owning brethren. Read on for some leads you can follow to find your own apartment solutions.

## Foiling Interference

The more distance you can put between your antennas and any interfering appliances the better, but if space is at a premium, try shielding both your equip-



ment and the source of the noise. When I encountered interference, I lessened it by carefully lining the inside of my receivers with aluminum foil. Using double-stick adhesive tape to mount the foil, I was able to reduce most computer interference by about eighty percent.

It also helps to line the inside of nonmetallic computer monitors and television cases with foil, but a word to the wise — be VERY careful about doing this. The foil could short out your computer or shock you if you are not very careful in your placement of the foil! Any contact with electronic components could fry it or you.\*

As I would discover, not all interference could be eliminated by shielding the equipment. A particularly annoying cyclic buzz could be heard coming over my DX-440. After a few days of turning off all electronic components one at a time in order to isolate the noise, I was able to deduce that it wasn't caused by anything in my apartment but possibly due to some type of heavy machinery used in the complex. Quite possibly it emanated from the laundry room and was bleeding into the radio through the power lines.

A digital signal processing (DSP) filter helped cut down the noise, but



didn't eliminate it entirely. The solution came about by accident. After buying a new radio, I ran out of outlets to plug it into. I switched the DX-440's power supply from the wall to my APC 650 Back Ups Pro, a backup battery used for my computer. I had forgotten that this automatic emergency battery supply also had built-in AC line noise filters. Miraculously the line noise all but disappeared!

Other noise reduction steps to improve reception included using high grade coax cable runs to the antennas and replacing the aging, leaky television cable that ran through the apartment with a new and better grade of coax.\*\*

## Secret Antennas

There are no less than five antennas connected to my monitoring system and yet all are totally discreet. One is for shortwave reception, three for general VHF/UHF monitoring, and one is cut specifically for the 225-400 MHz military UHF band.

Logistically, the only place to mount the antennas was on the apartment's back balcony. Some tenants grow mini-gardens on their terraces; I chose antennas masquerading as two large fake palm trees. From a distance they can't be seen.

For shortwave coverage I experimented with several antennas until I found one that would give me adequate reception and yet be discreet. I tried running an almost invisible thin strand of wire to a nearby tree, but often it broke and once a bird landed on it, giving its presence away. I'll never forget the lawn man's expression as he caught sight of the sparrow perched, preening his feathers seemingly in midair.

Since a longwire was out of the picture, I



\* Editor's Note: We recommend use of an adhesive which will not be affected by heat, and caution that, should the foil come in contact with internal components it could result in damage to your equipment and could be a fire hazard.

\*\* The ARRL Radio Frequency Interference Handbook (available from Grove) contains more theory, troubleshooting tips and solutions for RFI.

## THE WORLD'S MOST ADVANCED SHORTWAVE RECEIVER



**SANGEAN ATS-909**

### THE LAST SHORTWAVE RECEIVER YOU'LL EVER NEED TO BUY!!

#### LOADED WITH FEATURES:

- AM/FM Stereo/SW
- PLL Dual Conversion Receiver
- 306 Memories
- 28 SW Pages Programmed at Factory
- 42 World City Times Preprogrammed
- Full RDS Reception
- 5 Tuning Methods
- Auto Tuning Methods
- Auto SW Search
- ATS Automatically Presets Memories
- Manual Editing
- USB/LSB Single Side Band Select
- RF Gain Control
- 3 Individual Timers
- Adjustable Sleep Timer
- Dual Time System
- Selectable Tune Steps
- Priority Key
- Wide/Narrow Filter
- Battery Strength Indicator
- Signal Strength Meter
- Mono/Stereo Switch
- LCD Display Light
- Auto Daylight Savings Time Button
- Lock Switch
- Reset Switch
- Audio Record Output
- 9KHZ/10KHZ Switch
- Cassette Record Jack
- Tone Control
- Includes AC Adapter
- Includes ANT-60 Antenna
- Includes Carrying Case
- 8 1/4" x 5.0" x 1 1/2"

# ANNOUNCING

**T H E N E W A T S - 4 0 4**  
**THE WORLD'S FIRST FULL FEATURED DIGITAL SHORTWAVE RECEIVER**  
**UNDER \$100**



**SANGEAN ATS-404**

- **CONTINUOUS COVERAGE-** TUNES CONTINUOUSLY ALL SHORT WAVE BANDS AND ANY FREQUENCY IN-BETWEEN
- **AUTO MEMORY SCAN-** AUTOMATICALLY SCANS EVERY MEMORY PRESET & PLAYS EACH IN SEQUENCE FOR 7 SECONDS
- **AUTO PRESET SYSTEM-** AUTOMATICALLY DETERMINES ALL MEMORY PRESETS BASED UPON SIGNAL STRENGTH OF STATION
- **HUMANE WAKE SYSTEM-** REPEATING BEEP TCNE INCREASES IN VOLUME EVERY 15 SECONDS FOR 1 MINUTE
- ILLUMINATED DISPLAY
- SECONDS DISPLAY
- AUTO/MANUAL SEARCH
- LOCKSWITCH
- DUAL TIME DISPLAY
- ADJUSTABLE SLEEP TIMER
- 12/24 HOUR DISPLAY
- SNOOZE CONTROL
- KEYPAD ENTRY
- 45 MEMORY PRESETS
- 9/10 KHZ SWITCH
- LOCKSWITCH
- TONE CONTROL
- AM/FM STEREO/SW
- CARRYING CASE & STEREO EARBUDS INCLUDED

#### AVAILABLE IN THE FOLLOWING DEALERS:

##### C. CRANE

(800) 522-TUNE (8863)

[www.ccrane.com](http://www.ccrane.com)

##### AFFORDABLE PORTABLES

For location nearest you call:  
 (888) 277-2446 Mail orders welcome  
[www.affordable-portables.com](http://www.affordable-portables.com)

##### AMATEUR ELECTRONIC SUPPLY SHORTWAVE HEADQUARTERS

(800) 558-0411

##### AMERICAN FREEDOM

Box 1750, Johnstown, CO 80534  
 For credit card, call (800) 205-6245

[www.amerifree.com](http://www.amerifree.com)

##### CANADIAN DISTRIBUTOR

##### JANSONIC, INC.

(905) 738-0998 or (734) 996-8886  
[www.usascan.com](http://www.usascan.com)

##### GROVE ENTERPRISES

7540 Hwy 64-N, Brasstown, NC 28902  
 (800) 438-8155 Fax (828) 837-2216

[www.grove-ent.com](http://www.grove-ent.com)

##### HAM RADIO OUTLET

12 Stores, AZ, CA, CO, DE, GA, NH, OR, VA  
 (800) 854-6046/(800) 444-0047

[www.hamradio.com](http://www.hamradio.com)-24 hr. Secure on line order

##### LENTINI COMMUNICATIONS, INC.

21 Garfield Street, Newington, CT 06111  
 (800) 666-0908 Tech (860) 666-6227

Fax (860) 667-3561 [www.lentini-comm.com](http://www.lentini-comm.com)

##### J&R MUSIC WORLD

On Park Row, New York City  
 (800) 221-8180 (212) 238-9000

Fax (800) 232-4432

##### UNIVERSAL RADIO, INC.

6830 Americana Pkwy  
 Reynoldsburg, OH 43068  
 (800) 431-3939 Tech (614) 866-4267

Fax (614) 866-2339 [www.universal-radio.com](http://www.universal-radio.com)

# SANGEAN

AMERICA, INC.

2651 Troy Avenue, South El Monte, CA 91733

Tel: (626) 579-1600 • Fax: (626) 579-6806

Shortwave "Hot Line" Toll Free 1-888-SANGEAN

[www.sangean.com](http://www.sangean.com) • e-mail: [sangean@earthlink.net](mailto:sangean@earthlink.net)



1974 to 1997



WRTH Radio Industry Award  
 Best Shortwave Portable  
 1996/7

WRTH is a trademark of  
 Weston-Gupill  
 Publications and  
 is used with  
 express permission



### Tornado Transmissions

During severe weather season I can be usually be found chasing twisters in the Texas Panhandle. However, there are times when I just can't pull myself away from work but still want to help coordinate with local weather spotters and dispatch the press into the area where severe weather is occurring. For this purpose I obtained and licensed two programmable VHF FM transmitters. One is mounted in my chase vehicle and the other is used as a base station for communicating with fellow storm spotters in the field.

decided to go another route. Mounted horizontally along the wooden rail of my balcony is a Citizens Band 27 MHz steel whip antenna. To make up for the rather short antenna length I ran the coax to a Radio Shack shortwave antenna amplifier. I grounded the antenna to a metal plumbing pipe with a short run of copper wire.

Although the antenna can't compare to a good long wire dipole, reception isn't bad and only really falls off at lower frequencies. I have no problem receiving shortwave powerhouse broadcasters or even relatively weak military sideband communications, which is what I listen to most of the time anyway.

I mounted one of the VHF/UHF discone antennas on a photographer's light stand that I picked up at a garage sale for a few bucks. Another home-brew discone was mounted using nylon cable ties right on the trunk of one of the fake palm trees. The antenna elements blended in with the faux fronds making it nearly impossible to spot.

When I can't go out into the field what I usually do is monitor the severe weather on television, connect to local weather radars via the Internet, and monitor police fire and emergency channels for reports of severe weather. If the spotters are not in the local area I relay information via cellphone, but if they are close by I use the VHF two-way radio. The latter posed a real problem since I no longer had a roof on which to mount a transmitting antenna.

The solution? I attached a VHF mobile antenna to a metal utility cart that I set out on the balcony. The cart itself was grounded with hose clamps to a metal railing that ran the length of the apartment. I was surprised to see

the standing wave ratio (SWR) was very low, the cart and railing providing an excellent ground plane. On twenty five watts, transmission range varies from ten to twenty miles, but reception range is awesome: the radio is able to receive some communications at sixty miles or greater!

The only problems I have encountered with this setup is that I have to turn off all my scanning radios before I key up on the mike; the close proximity of the transmitter wreaked havoc with their sensitive circuits. So far there have been no complaints of television interference (TVI) from my neighbors, most likely due to the fact that I severely limit my transmissions to emergency communications only and resist the urge to chitchat.

### Running the Wires

All the coaxial cables for receivers run into the mini-monitoring post through a wall-through-tube that the previous tenants thoughtfully provided so I didn't have to drill any holes and ruin any chances of losing my rent deposit. I didn't want the coax for the VHF transmitter to be in close contact with the receiving gear, so I ran it into the post through a small gap between two glass sliding doors. I check it very often for signs of wear and tear due to the constant opening and closing of the doors.

Electrical cords are kept in check with nylon cable ties with heavy-duty circuit-breaker-protected power strips reducing the risk of short circuits or fire from an overload. All the while I kept in mind that from time to time the landlord would be inspecting the apartment and I didn't want a mass of tangled cables scaring her to death.

### Temporarily Permanent

Our "temporary" move into the apartment has now turned into almost four years as we take our time to look for the perfect home to spend the rest of our lives in. Apartment living does have its "perks." No lawns to mow, no weeds to pull, and a lovely pool to take a dip in are things I'll actually miss, so until we find our "home sweet home," my mini-command center in the corner of the kitchen will do quite nicely.

.....

*Steve Douglass lives in Amarillo, Texas, and has written about stealth aircraft and the scanning hobby in a number of books and magazines, including his own online newsletter, "Intercepts."*

# QUALITY COMMUNICATIONS EQUIPMENT SINCE 1942

## DRAKE

### SW-2

- Full Coverage
- LW/MW/SW
- Sync. Detect.
- AM/LSB/USB
- 100 Memories
- 100 Hz Readout



Made in America

The Drake SW-2 may be the best value in shortwave radio today. The SW-2 covers all longwave, medium wave (AM) and shortwave frequencies. Single sideband is easily tuned with separate LSB and USB positions. When a shortwave signal does start to fade you can engage sideband selectable synchronous tuning to stabilize and improve the signal. The nonvolatile memory system stores 100 channels. Other refinements include: RF Gain, Tuning Bar Graphs, Huge 100 Hz readout and Dimmer. Dual antenna inputs accept either a PL-259 coaxial or wire feedline. A mini earphone and 1/4" external speaker jack are provided. The optional remote (shown) lets you operate this radio from across the room (Order #1589 \$48.95). All Drake receivers are proudly made in Ohio, U.S.A. and feature a one year limited warranty.

List \$499.00 Order #2222 ~~\$489.95~~ Sale \$399.99 (+\$7 UPS)

## DRAKE

### SW-1

- Full Coverage
- LW/MW/SW
- Digital Readout
- Keypad Entry
- 32 Memories
- RF Gain



The Drake SW-1 sets the stage for worldwide shortwave listening with ease, simplicity and clarity. Coverage from 100 through 30000 kHz provides solid coverage of longwave, medium wave and shortwave in the AM mode (no SSB). This makes it an ideal broadcast receiver for the desk or bed-stand. Tuning is a snap via the keypad, manual tuning knob, Up/Down buttons or 32 memories. The huge LED display features 1 kHz readout. Antenna input is via a 50 ohm terminal or SO-239 jack. A 1/8" mini jack is provided for use with earplug or headphones (not supplied). Operates from 12 VDC or supplied AC adapter.

Order #1100 ~~\$249.95~~ Sale \$199.99 (+\$7 UPS)

## SANGEAN

### ATS-606AP



It's all here. You get continuous coverage of LW, MW and SW (153-30000 kHz) plus FM stereo. Enjoy 54 memories, scanning, dual clock timer, 1 kHz LCD, dual conversion circuit, dial light, dial lock, keypad entry and local DX switch. Includes multivoltage AC adapter and wind-up antenna! Limited time offer. One year limited warranty.

Order #3319 ~~\$179.95~~ Sale \$99.99 (+\$6 UPS)

## JRC

### NRD-545 DSP

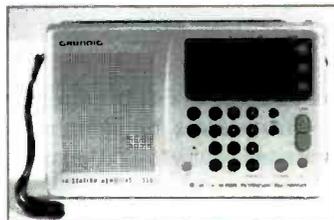


The new Japan Radio Co. NRD-545 DSP is the most sophisticated receiver ever developed for the hobby market. Please call to receive full technical details and pricing.

## GRUNDIG

### YB-400 PE

The new YB-400 PE has a striking titanium colored case and includes a wind-up antenna, case, SW Guide and AC adapter. This is our best selling worldband portable! List \$249.95 Order #0400 ~~\$199.95~~ (+\$8) The original YB-400 is similar but with a black colored case (AC adapter optional). List \$219.95 Order #0040 ~~\$169.95~~ (+\$7) Get a **FREE Lucite stand** with either model!



### WIND-UP



The BayGen FPR-1 Freeplay radio combines the ingenious Baylis generator with the latest in radio technology. Winding the handle for 20 seconds provides 30 minutes of listening. Here is assured radio performance, day or night without the worry (and expense!) of batteries. The analog dial covers AM, FM and SW from 3 to 12 MHz. Made in South Africa. #3123 ~~\$99.95~~ (+\$7)

The smaller Freeplay FPR-2 model covers just AM & FM. #3667 ~~\$69.95~~ (+\$6)  
The Freeplay FPR-2SM is gray, AM & FM with solar cell. #2413 ~~\$79.95~~ (+\$6)  
The Freeplay FPR-2SC is clear, AM & FM with solar cell. #1441 ~~\$79.95~~ (+\$6)

## Universal Radio Communications Catalog #98-06

This new Universal catalog was printed in June and is our biggest ever! With 116 pages, it features everything for the radio enthusiast. Please request your **FREE** copy today!

**Universal Radio, Inc.**  
6830 Americana Pkwy.  
Reynoldsburg, Ohio  
43068-4113 U.S.A.

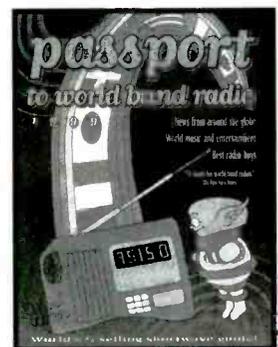
☎ 800 431-3939 Orders & Prices  
☎ 614 866-4267 Information  
☎ 614 866-2339 FAX Line  
✉ dx@universal-radio.com

**universal  
radio inc.**

NEW  
● Passport To World Band Radio  
New 1999 Edition!

Here is everything you need to know about when and where to hear the world; hour by hour, country by country and frequency by frequency. Equipment reviews, too. This 560 page book is the world's #1 shortwave guide. Brand new 1999 Edition!

#1000 ~~Sale \$15.90~~ (+\$2)



● Shortwave Receivers Past & Present **Third Edition**

This huge 473 page guide covers over 770 receivers from 98 manufacturers, made from 1942-1997. Entry information includes: receiver type, date sold, photograph, size & weight, features, reviews, specifications, new & used values, variants, value rating & availability. 840 Photos. Become an instant receiver expert! #0003 ~~\$24.95~~ (+\$2)

● Shortwave Listening Guidebook **2nd Ed.** By H. Helms

This noted author provides understandable information on all aspects of shortwave listening. #2984 ~~Sale \$16.90~~ (+\$2)

● Pirate Radio By A. Yoder **With audio CD!**

Here is the incredible saga of America's underground illegal broadcasters (with audio CD). #3038 ~~Sale \$26.90~~ (+\$2)

● Worldwide Aeronautical Frequency Dir. By R. Evans

The definitive guide to commercial and military, HF and VHF-UHF aeronautical communications including ACARS. Second Ed. 260 Pgs. #0042 ~~Sale \$17.90~~ (+\$2)

● Discover DX'ing! By J. Zondlo **New Second Edition!**

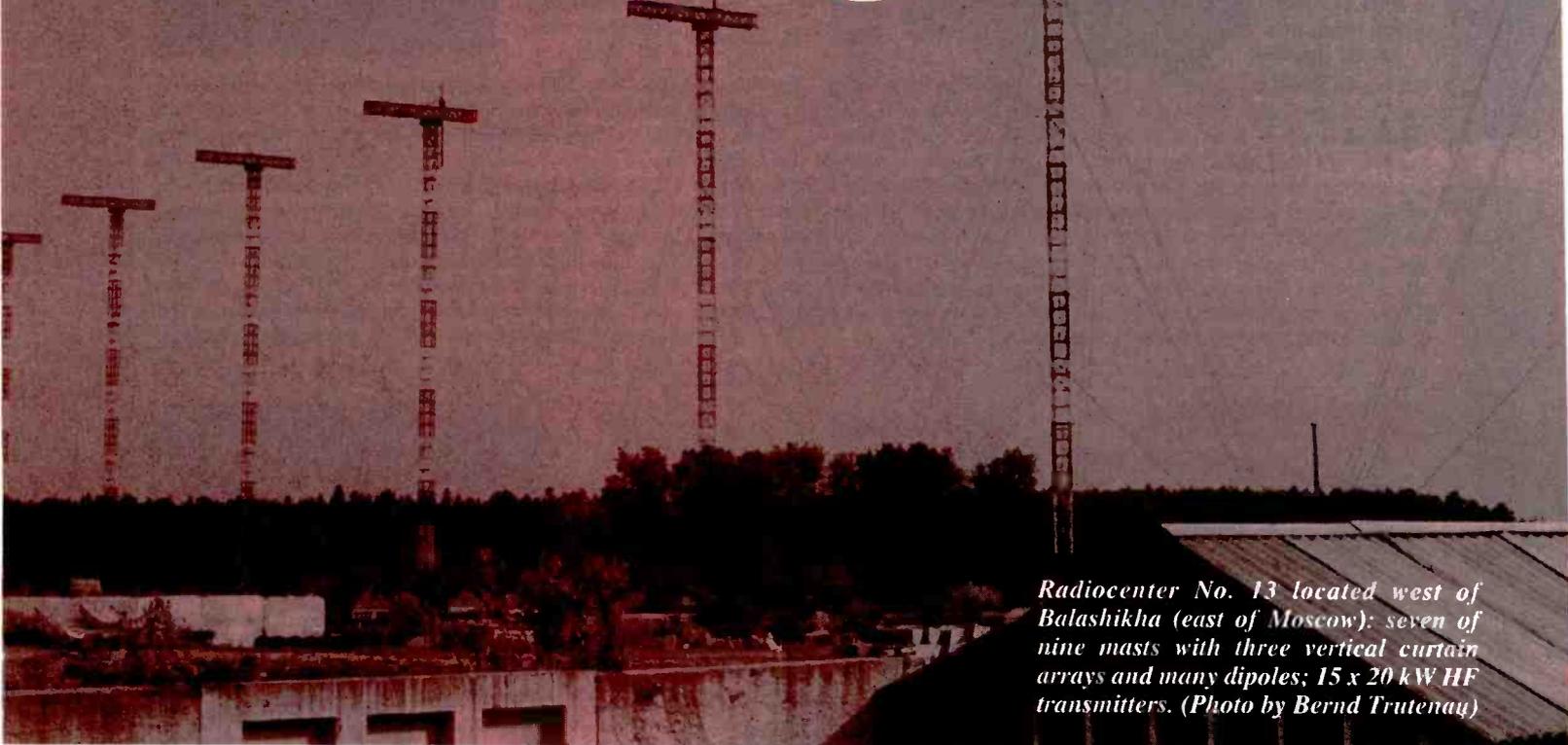
Hear distant AM, FM and TV stations. #0019 ~~\$5.95~~ (+\$2)

✉ Please add \$2 per title for surface shipping.

**VISIT UNIVERSAL RADIO ON THE INTERNET**  
[www.universal-radio.com](http://www.universal-radio.com)

- Visa
- MasterCard
- Discover
- Prices and specs. are subject to change.
- Returns subject to a 15% restocking fee.
- Used equipment list available on request.

# Jamming Wall



*Radiocenter No. 13 located west of Balashikha (east of Moscow): seven of nine masts with three vertical curtain arrays and many dipoles; 15 x 20 kW HF transmitters. (Photo by Bernd Trutenau)*

**By Rimantas Pleikys**

On the evening of November 29, 1988, at 2100 UTC, the Soviet Union ceased to jam all foreign radio stations. The jamming session that lasted for 40 years was over. This article is written in dedication of the 10th anniversary of its end.

**T**he Cold War between Russia and the United States was more than a conflict of powerful armies and nuclear missiles in silos. It was also a battle of words played out on a global scale via shortwave radio. International broadcasters such as the Voice of America and Radio Moscow, using powerful transmitters and multiple frequencies, broadcast their respective messages to millions across the planet. The former USSR didn't want the message of democracy to get through to its people and put up an electronic barrier using powerful transmitters that jammed signals from the West.

Fourteen of the 16 Radio Free Europe/Radio Liberty language services were jammed, and 12 of the 21 languages on Voice of America (VOA). Deutsche Welle was jammed in five of its 11 East European and USSR languages.

The BBC was jammed in two of its 12 Eastern languages. The effectiveness of jamming ranged from a minor annoyance to total blockage.

On December 16, 1988, Czechoslovakia stopped the jamming (which had been going on for 37 years) of Radio Free Europe's broadcasts to that country, and on December 23rd Bulgaria followed suit. By the end of year 1989, about 3,000 jamming transmitters were switched off, from Prague to Kamchatka, in



*Soviet made communications receiver "R-399," 1-32 MHz synthesizer steps 1/10 Hz, used in shortwave communications, surveillance, and jamming systems. (Photo by Rimantas Pleikys)*

some 200 to 220 jamming sites.

Shortwave jammers (high frequency or HF) were of two types: short range, also known as "groundwave," low power facilities intended for covering big cities, and long range jammers (ionospheric, or skywave jammers, with directional antennas). The Soviet jamming system was administrated by the RU-2 department of the All Union Ministry of Communications, headed by Mrs. Natalia Krestyaninova for more than 25 years. N. Krestyaninova is now a pensioner in Moscow.

It should come as no surprise that in Lithuania alone, a small Baltic country then occupied by the USSR, as many as five jamming radio stations were in operation in all major cities. Each of them had 10 to 15 transmitters, 1 or 5 kW each. Their effective range was 20 to 30 kilometers.

At many other widespread locations in the USSR powerful jammers were used for blocking out large territories by shooting into specific regions from great distances. The operational one-hop distances of skywave jammers were from 1,000 to 3,000 km; transmitter power ranged from 20 to 1,000 kW.

Dwarf jammers were numbered with "60" and "600" series — "Object No. 603," etc. — while giants were assigned "800" series. Lo-

Note to U.S. consumers only: It is unlawful to import, manufacture, or market cellular-capable or cellular-restorable scanners into the U.S.

## We have Scanners with 800MHz coverage!

AOR AR-5000, 5000/3+, 3000, 8000

Yupiteru MVT-9000, 7100, 8000

**OPTOELECTRONICS** Xplorer, R11  
nearfield receivers

New Welz/Standard WS-2000 (very tiny)

WinRadio WR-1000i, WR3000i

ICOM R9000, R8500, R100, R10, PCR1000

### Icom R-10

500KHz ~ 1300Mhz coverage  
AM/NFM/WFM/USB/LSB/CW Modes  
100 x 10 banks = 1000 memories  
Computer Control interface  
Selectable Step Size  
True SSB (Lower and Upper)



We do Modifications for your Scout!  
All Orders Shipped Expedited

### ATLANTIC HAM RADIO LTD.

(416) 636-3636 ahr@interlog.com 368 Wilson Ave  
(416) 631-0747 (fax) Downsview, ONT  
www.interlog.com/~ahr/scan.htm Canada M3H 1S9

## We don't make SCANNERS or the ICOM IC-R8500 RECEIVER - We make them better -

DELTA COMM I-8500 Communication Manager for the ICOM IC-R8500 communication receiver. With speed as a design goal DELTA COMM's QUICK LOG function will log signal level, frequency, mode, date, time and optional Global Positioning System (GPS) coordinates at speeds in excess of 2400 channels per minute. Here are a few examples of the many advanced features DELTA COMM J-8500 has to offer.

- Load 40 channels of information including ALPHA NUMERICs into one of the R8500's memory banks in 3 seconds.
- Separate volume level, resume scan delay and maximum monitor delay plus 40 character information field for each scan channel.
- Priority channel operation samples at 2.5 second intervals.
- Multi-receiver control will hand off active frequency to next receiver on line. Able to control up to 125 ICOM receivers (optional).
- Traditional scanning is a thing of the past with our CYBERSCAN feature, used to track systems employing frequency hopping.
- Activity log function automatically records and calculates total spectrum usage time.
- Unique search operation stores all frequencies found active and then automatically skips those frequencies during the remaining search cycles. This feature eliminates redundant logging.

Visit our Internet Web Page or Phone/FAX us for program features, new product releases and pricing schedule. DELTA COMM is available for ICOM R9000, R7100, R7000, R71, R72, IC-735 (features vary with type of radio). Also check out our DELTATONE 2.0 repeater programmer.

<http://www.execpc.com/~deltacom>



**Delta Research**



Box 13677 - Wauwatosa, WI 53213 - FAX/Phone (414) 353-4567

# CHEROKEE™

## WHO SAYS SIZE IS NOT IMPORTANT?

Introducing the new  
**CHEROKEE FR-465**  
Hand Held  
Family Radio  
Less than 4" tall

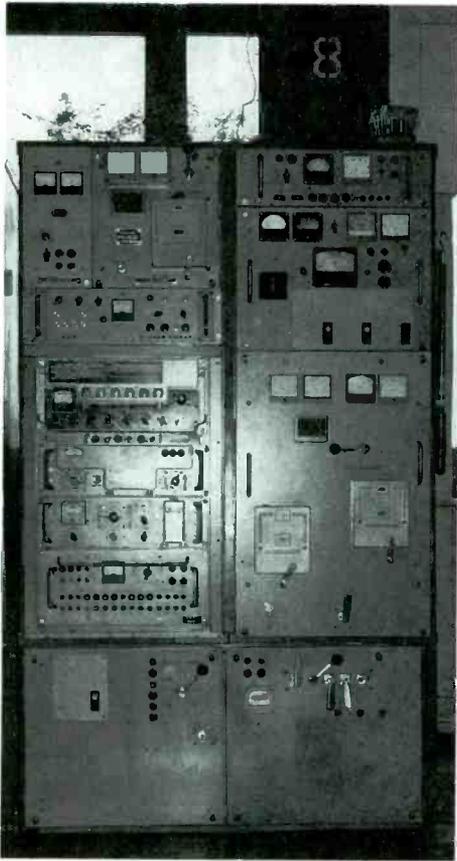


Once again, Cherokee leads the way with today's new technology. Unbelievable range and performance in a super small design. Only from Cherokee!

### "Now You're Talking"™

For more information on all the Cherokee radios and where you can purchase them, call us at 1-800-259-0959, or visit us on the web at <http://wirelessmarketing.com>.

Cherokee is a trademark of the Wireless Marketing Corporation, Schaumburg, Illinois



**Typical groundwave jamming equipment: communications transmitter "Viaz-M2-OP," 5 kW; 3-30 MHz at Panevezys (Lithuania) site. (Photo by Rimantas Pleikys)**

cal jamming transmitters ranged in power from 1 to 20 kW, typically 5 kW, with an average of 15 transmitters per station. If the need occurred, several jammers, most often positioned in different locations, were engaged to block a frequency of an enemy radio station. The antennas for long range jammers usually were vertical curtain arrays of 2/4 or 4/4 configurations. Local jamming facilities had wideband, multi-wire dipoles, suspended vertically or at 45 degree angles.

According to some International Telecommunications Union (ITU) direction finding triangulations, clusters of jamming sources were generally found in the more populous western regions of the USSR near Moscow, Leningrad (St. Petersburg) and Kiev; in the southern republic of Kazakhstan; and in the eastern part of the Russian Federation near Novosibirsk and Khabarovsk. Some experts estimate that the USSR alone might have been spending at least USD 800 million annually for jamming foreign radio stations.

The roar of jammers smothered Radio

Liberty, Radio Free Europe, Kol Yisrael, Deutsche Welle, Radio Free Afghanistan, Voice of America, Radio Beijing, Radio Tirana, BBC and some other stations before mid-seventies. Several times, when the political climate became warmer, the USSR would stop jamming government stations from London, Washington and Cologne. But the jamming returned with a powerful howl after the Czechoslovak and Polish crises of 1968 and 1980. In addition, the USSR jammed Polish, Czech/Slovak, Bulgarian, Hungarian and Romanian programs of the Radio Free Europe, as well as Radio Free Afghanistan.

### ■ A Look Behind the Jamming Wall

The Soviets were far more advanced than many other countries in the number of short-wave radio centers (44 in all ), HF broadcast transmitters (about 300), antennas (over 1,000), and in transmitter power (up to 1,000/2,000 kW), plus nearly 3,000 jamming units.

Jamming Control and Correction Posts (CCPs) used to be installed at some distance from the transmitting sites: from 3 to 10 km in the case of local jamming stations and up to several thousands of kilometers in the case of ionospheric wave systems. The CCP operators, mostly women, monitored the HF broadcast bands in order to identify the stations to be jammed. They also checked the "quality" of jamming and issued orders to the technicians at the transmitting facilities, among whom were a lot of elderly people and heavy drinkers.

The jamming manager/senior engineer received a salary of 165 rubles per month. Mr. Vytautas Liatukas, the supervisor of Kaunas city local jammer in Central Lithuania, complained in an institutional paper "Kauno radistas" back in 1975 about their station "be-

**A semi-professional tape deck "Tembr-2M," used in Vilnius (Lithuania) and other jamming CCPs for playback of speech-type jamming signals. (Photo by Rimantas Pleikys)**



ing in continuous shortage of filaments for radio tubes GU-50, transmitter measuring devices, cabling, as well as about the poor condition of the roof of the jammer building and antennas." Some of the KV-5 type transmitters were said to be in operation for as much as 20 years with no major overhaul and were in danger of falling apart at any time.

Since the transmitter feeders were unshielded, V. Liatukas, who had to work in an environment of 150 MV for more than 30 years, eventually developed cataracts and was later reassigned to the safer CCP.

In order to save tubes, sometimes transmitters were put at less power. Detailed jamming records — frequencies, times, station names, languages and audibility — were entered in shift journals. The jammed radio stations were called "communications correspondents."

Some skywave jamming transmitters were located at normal broadcasting or fixed communications radio centers. In some cases when HF broadcast transmitters were off duty, they were assigned jamming duty.

"The classic jamming pattern still found (1965) in the case of RFE Czech/Slovak and Bulgarian services, and used against all RFE languages prior to November 1956, is that of extensive coverage of a country with low or medium intensity interference from long range jammers located in the Soviet Union or in other satellites, plus reinforcement in highly populated areas by large number of local jammers" (from RFE/RL archive document dated October 17, 1965). For example, several HF radio stations near Leningrad, Kiev, Moscow, Sverdlovsk (Yekaterinburg), Kuibyshev (Samara), Tashkent and Almaty were involved to guarantee the effective short-wave jamming of RFE Polish language service.

Czechoslovakia and Bulgaria most likely paid the Soviets for its export jamming. It would be interesting to know how much they had to pay. Or whether there was a barter arrangement: Czech shoes and Bulgarian fruits for Soviet radio defense?

According to an old Soviet standard, masts of the jammers were painted in yellow and black until 1975, to prevent enemy aircraft from identifying them in the natural background. From about 1975 onward, all the radio and TV towers, including jammers, were painted in white and red. They have been illuminated at night with red non-blinking lights.

### ■ Jamming Techniques

Every short range jammer used the same

identification code, or call sign, for all its transmitters, usually made up of two letters. The more powerful skywave jamming transmitters may perhaps have had their own ID signals. The call letters of the jammer were sent from each transmitter currently in operation two times per minute, and twice each time. The Morse signal was produced by a simple device: a disk, driven by an electric motor which connected particular contacts into a short circuit every 30 seconds. The jammer personnel called it by the Russian word "mashinka." (See Table 1 and the Oct '86 MT article, "FCC Releases Russian Jammer Locations")

The IDs were assigned in order to enable the CCP monitors to identify each individual jamming station, even distant ones. The final decision concerning the jamming target was adopted by the relevant field CCP; it depended on the actual audibility of the station to be jammed. CCP operators issued orders by dedicated phone lines to the transmitter personnel to tune a particular transmitter to a particular frequency. The jammers engineers never had a chance to listen to what they jammed. After the unit was tuned in, its radio frequency stage was switched on and off re-



**"Sneg-M" HF transmitters (19 x 200kW), mostly used in pairs to provide 400 kW, very common for skywave jamming at radiocenters No. 11-1/2 near Popouka, southeast of St. Petersburg. (Photographer unknown)**

motely from the Control and Correction Post.

There were at least ten types of radio broadcast jamming methods:

1. To block out the "most anti-Soviet" stations, a wide spectrum, electronically-generated white noise signal was used. RFE/RL, Kol Yisrael, and Radio Tirana would experience this type of jamming.

2. On August 3, 1964, one more source of interference was invented: Radio Mayak (Radio Beacon) used its distorted program to jam some "grey propaganda" stations such as VOA, BBC, Deutsche Welle, and Radio Beijing.

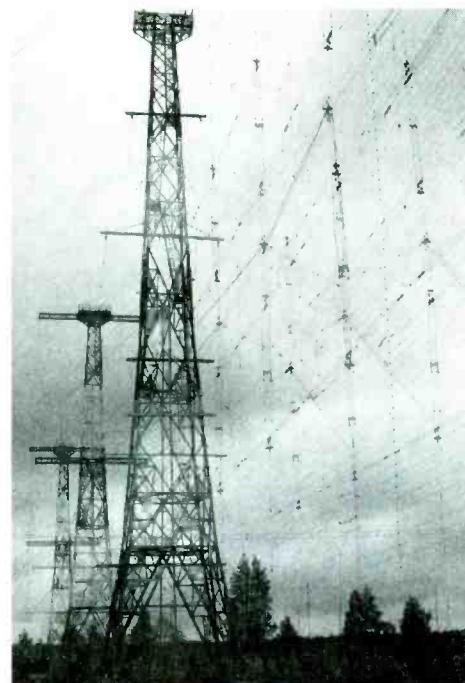
3. Around 1978, Soviets started to use the speech type, or speech resembling signal. Its advantage was that it conformed to the timbre of the human voice. This jamming sound, which used to be played back from open reel tapes, was composed of two voices of male and female Russian announcers of the All Union Radio.

4. There were several occasions reported when jamming made use of a non-modulated carrier wave. This technique was ineffective.

5. Another difficult to identify jamming method is when a jammer started broadcasting a regular domestic or foreign service program on the frequencies of the target station.

6. A unique case was the Polish service of the Radio Free Europe: from 1971 until 1980 only tapes with recordings of light instrumental music were employed to jam it, both nondistorted and overmodulated.

7. Just before the end of the jamming era one more insidious trick was invented. By means of a directional HF antenna, the program of the jammed station was received. The audio was fed by cable to the circuit which changed its phase by 180 degrees, and sent it back to the jamming transmitter, blocking the target station.



**4/4 configuration vertical curtain type reversible HF antennas at the radiocenter No. 11-1, near Lesnoy, northeast of Moscow: At least some of skywave jammers of the USSR used this same type of antenna. (Photo by Bernd Trutenau)**

8. During the 1960s the Soviet Union used an especially wild jamming type: medium wave transmitters, usually by night, were tuned on 465 kHz intermediate frequency. Such emissions paralyzed nearly all of the neighboring radio receivers, blocking out everything!

9. The "Democratic Republic" of Germany aired its domestic radio programs via MW transmitters tuned to approximately 800

### TABLE ONE: MORSE CODE JAMMERS AS IDENTIFIED BY THE FCC IN 1986

Originally published in the October 1986 issue of *Monitoring Times* by Bob Grove

ID	Location	Country
TG	58-47N 029-31E	USSR
4F	38-28N 066-09E	USSR
AW	64-42N 175-30E	USSR
B1	50-30N 015-30E	Czechoslovakia
BD	52-39N 032-48E	USSR
DR	54-21N 021-00E	USSR
DU	54-30N 034-29E	USSR
GI	56-18N 032-04E	USSR
GM	49-54N 131-56E	USSR
GR	48-45N 135-16E	USSR
IG	49-13N 135-29E	USSR
KB	48-32N 134-20E	USSR
MP	49-00N 023-00E	USSR
MU	41-50N 064-46E	USSR
NS	47-27N 030-30E	USSR
R6	43-17N 027-07E	Bulgaria
S5	49-05N 016-36E	Czechoslovakia
TK	40-56N 067-41E	USSR
TU	55-18N 037-17E	USSR
UA	48-39N 135-47E	USSR
U7	49-09N 018-41E	Czechoslovakia
UD	47-04N 134-30E	USSR
US	49-32N 027-54E	USSR
WI	55-43N 034-40E	USSR
Z1	44-03N 024-39e	Romania
	27-59N 117-24E	China
	55-43N 034-40E	USSR



**Pocket Loop**™

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. Ideal for travelers.

**NEW! Pocket Regeneration Module**  
The PRM is an accessory to the Pocket Loop providing regeneration from 530 kHz to >10 MHz. Increase gain 18 dB with improved selectivity!

**Kiwa Electronics**  
612 South 14th Ave., Yakima WA 98902  
☎ 509-453-5492 or 1-800-398-1146 (orders)  
✉ kiwa@wolfe.net.com (Internet/catalog)  
🌐 <http://www.wolfe.net/~kiwa>





# LENTINI

COMMUNICATIONS, INC.

Toll Free  
**1-800-666-0908**  
In CT 860-666-6227

## ICOM



### PCR1000



**CALL FOR MORE INFO & PRICING**

#### Communications Receiver For Computer

- Covers .01-1300MHz.
- All Mode WFM, FM, AM, SSB, CW.
- Employs Band-Tracking RF Filters.
- Connects to Your PC Externally.

### IC-R10



- Wideband, All Mode Receive Capability From 100kHz to 1300 MHz.
- 1000 Memory Channels With 8-Character Alphanumeric Names.

#### Many Other Features!

IC-R2A Scanner Available Nov/Dec call for info!

### IC-R8500



#### Communications Receiver

- Wideband, All Mode Receive From 0.1 to 2000 MHz.
- Many Features Similar to IC-R10

**CALL FOR PRICING!**

### IC-Q7A

**NEW!**



- The Q7A is a Wideband RX Scanner, 30-1309.995 MHz (Less Cellular), with CTCSS and a Dualband Ham Radio All In One!
- Triple Conversion.
- CTCSS Tone Scan.
- 200 Memories.
- Superior Audio.
- 300mW TX Power on 2M and 70cm Ham Bands.
- Size: 2.3"(W) x 3.75"(H) X 1.1"(D).
- AM/FM/WFM
- **MORE!**

**\$199.95**  
UPS Included

### GPSIII

**GPSIII**  
Combines a Global Position Systems (GPS) Receiver with an Electronic Map. It Not Only Shows You the Lay of Land But Also Just Where You Stand.



**GPSIII \$299.95**

UPS Included

GPS12...\$149.95 Street Pilot...\$549.95  
GPSII Plus...\$249.95  
Call For Accessories

## SONY

### ICF-SC1PC

**NEW!**

#### Sony ICF-SC1PC Radio Frequency Scanner

- Total Control of Scanning from PC or Scanner.
- Supplied CD-ROM Lists All Receivable Frequencies in the US.
- Scans All Frequencies Allowed by the FCC from 25MHz to 1,300 MHz.
- 300 Channel/AM/WFM/FM

Call For More Info.

**\$319.95**



**ICF-SC1**  
(Not Computer Programmable, No CD-Rom)  
**\$259.95**

## uniden

### BC895XLT

### BC235XLT

#### "TrunkTracker"



**\$229.95**  
UPS Included

BC9000XLT \$379.95  
BC3000XLT \$359.95 UPS included

#### Handheld "TrunkTracker"



**\$219.95**  
UPS Included

## AOR USA, Inc

### AR8200

**ALSO AVAILABLE**

**NEW!**



- 5-2040MHz
- AM, NFM, WFM, SSB, CW.
- Alpha-Num.
- Computer Prog.

AR8000B AR7030  
AR3000A AR7030 Plus  
AR5000 SDU5500  
AR5000 + 3 ARD-2

FULL LINE OF AOR ACCESSORIES

**CALL FOR MORE INFO & PRICING**

## Yaesu/Vertex VXF-10 ADVENTURER



Available in Black, Yellow (Special Order)

- 14 Channel Digital Coded FRS Two-Way Radio with National Weather Service Reception.
- 500MW RF Output Power/2 Mile Range.
- No License Required.

**each only \$99.95**

or 2 for **\$189.95**

## YAESU FT-50RD



Receive: 76-200MHz, 300-540MHz, 590-999MHz cellular blocked

Transmit: 144-148MHz, 430-450MHz

- AM Aircraft Receive
- Digital Coded Squelch
- High Speed Scanning
- 112 Memory Channels
- Much, Much More!

## VX-1R



World's Smallest Dual-Band Amateur Handheld

- Wide-Band Receive From 76-999MHz, CTCSS/DCS
- Alphanumeric, Display.
- 500mW Power Output
- 1 Watt w/External Power
- Call For More Info

## ALINGO DJ-X10



**NEW!**

Wide Range Receiver

- Multi-Mode Reception From .1 to 2000MHz.
- Channel Scope.
- AM/WFM/FM/SSB/CW.
- 1200 Memories.
- Superb Sensitivity, Clear Sound.

**\$399.95**

Drake Shortwave Radios	
R8A .....	\$999.95 + \$14 UPS
R8B (new) .....	\$1159.95 + \$14 UPS
SW8 .....	\$779.95 + \$10 UPS
SW2 .....	\$489.95 + \$7 UPS
SW1 .....	\$199.95 + \$7 UPS
SONY	
ICF-2010 .....	\$349.95 + \$7 UPS
ICFSW77 .....	\$469.95 + \$7 UPS
ICF-7600G .....	\$169.95 + \$6 UPS
ICF-7600GS .....	\$234.95 + \$7 UPS
ICF-SW1000TS .....	\$469.95 + \$7 UPS
ICF-SW100S .....	\$369.95 + \$7 UPS
ICF-SW55 .....	\$349.95 + \$7 UPS

TEKK PRO-SPORT TF-461-FRS 14 Channels... Each \$69.95 pair for \$129.95	
Cherokee CB	
CBS-1000 AM/SSB Base.....	CALL
CBS-500 AM Base.....	CALL
CM-10 AM Mobile.....	CALL
AH-27 Walkie.....	CALL
AH-100 AM/SSB Walkie.....	CALL
FR-465 Family Radio.....	CALL
CALL FOR ALL CB EQUIPMENT	
10-Meter	
2950 .....	CALL
2970 .....	CALL
2990 .....	CALL
Northstar .....	CALL

## SANGEAN

ATS-909



AM/ FM/ SSB Shortwave  
**\$249.95**  
+ \$8 UPS

## GRUNDIG

Shortwave

Yacht Boy 400PE



**\$199.00**  
UPS Included

## RELM MS200

**NEW!**



**\$239.95**  
UPS Included

## HS200



**\$199.95**  
UPS Included

HOURS: M-F 10am - 6pm SAT 10am-1pm UPS Ground (48 states)

Conn Sales Infor. & Tech Help 860-666-6227

Web Site: [www.lentini.com](http://www.lentini.com)

**21 Garfield St. Newington, CT 06111**

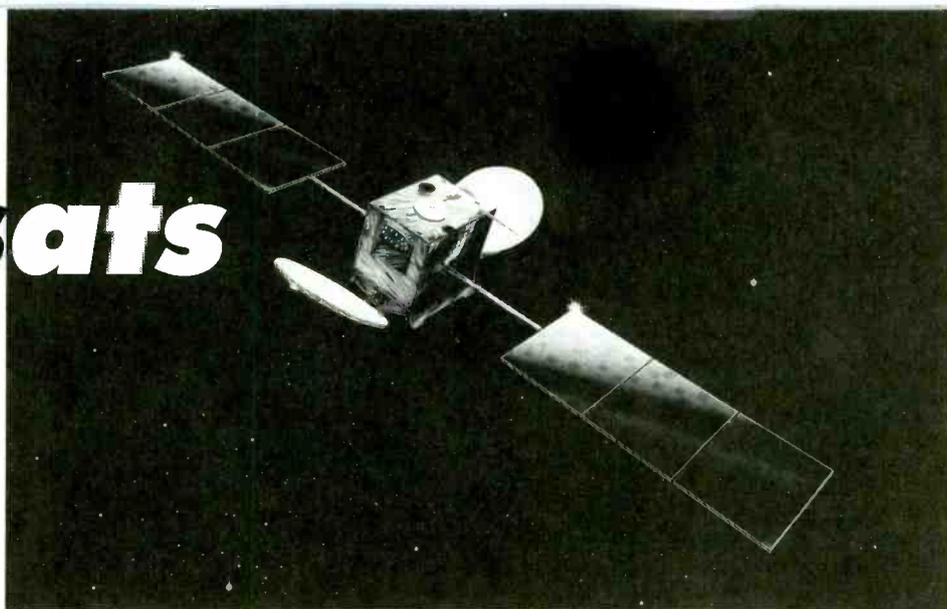
C.O.D.'s OK  
SAME DAY  
SHIPPING



# Inmarsats

## and how to hear them live

By Dave Cawley



Courtesy Inmarsat

**I**nmarsat is a system of communication satellites that allows people to talk and exchange data easily from almost every place in the world. Comprising four geostationary satellites, the system was started in 1979, nearly 20 years ago. Using simple equipment and a top end scanner, monitors can hear telephone traffic and witness important decisions being made all over the world, right now, in real time.

Inmarsat, short for International Maritime Satellite, was created so that ships at sea could communicate reliably. HF radio (high frequency or shortwave) is sometimes difficult to use and is often unreliable. The military had



Courtesy Inmarsat

*Once a maritime communications system, Inmarsat is increasingly used by news reporters, relief agencies, businessmen, and other world travelers.*

realized this and already had their own satellite systems in operation. But what about the long haul ships, the cruise liners, and other vessels out of normal communication range?

It was Arthur C. Clarke who, in October 1945, published his paper "Extra-Terrestrial Relays," suggesting that just three geostationary satellites could cover the world's surface. In fact, his title for the article was originally "The Future of World Communications" and, as we all know, he was right — as shown by these opening remarks:

"Although it is possible, by a suitable choice of frequencies and routes, to provide telephony circuits between any two points or regions of the earth for a large part of the time, long-distance communication is greatly hampered by the peculiarities of the ionosphere, and there are even occasions when it may be impossible. A true broadcast service, giving constant field strength at all times over the whole globe would be invaluable, not to say indispensable, in a world society."

These words must have rung true in the consortium of 47 countries who agreed in 1979 to build a truly worldwide communication system. Not limited by political or physical boundaries and free for all to use, providing safety and continuity where others had failed, Inmarsat became the only service to use.

Arthur C. Clarke had suggested three satellites would cover the world, but to have overlapping coverage four were eventually used. Inmarsat A has the "constant field strength" that Clarke suggested, which means that for as long as the satellite is visible its strength is

constant. There are few satellites that provide such big "footprints," other than perhaps weather satellites.

### Who uses Inmarsat ?

Who makes use of the Inmarsat service? Certainly most ocean-going ships, but in recent years more and more individuals are using the service. Take the traveling businessman, for example. There is no worldwide mobile phone service, so he has to rely on the hotel phone, often at \$12 to \$15 per minute, and frequently in Third World countries possessing little or no telephone service at all.

If he has a small briefcase-sized Inmarsat phone with him, it costs just \$3 a minute — an argument so compelling I'm left wondering why I don't have one. In fact, despite owning a world coverage GSM phone, I discovered while in Egypt recently, that, yes, GSM works in Egypt, but no, there is no reciprocal licensing agreement. Making important calls through the antiquated hotel telephone service manned by only Arabic speaking people cost me over \$600 in one week!

But there are more important nonmarine and noncommercial uses, such as disaster relief, help in inaccessible and hostile areas, scientific research, and, of course, front line news reporting.

### Types of Service

#### Inmarsat A

Inmarsat A was the first standard to be used on the satellites. It has a constant field strength and is analog; in fact, it behaves just like a good quality telephone line. Users can connect modems and call their office, send and receive FAXes and, of course, have a high quality telephone conversation. Some users continue using the A system for its analog

quality when other services would be cheaper.

There are also a lot of A terminals in use, because it was the first service and because it uses the constant field strength philosophy. Its users have chosen the A service for these specific qualities and are unlikely to swap to another service — good news to the hobbyist, since it is this service that is so easy to hear.

#### Inmarsat B

Inmarsat B is a digital service that provides low quality voice communication and medium speed data capability. Once popular, it is probably a dying mode now.

#### Inmarsat C

Inmarsat C is a very popular service capable of sending and receiving digital data from a simple omnidirectional antenna. The original use was for a Telex type system, but the standards are flexible enough to handle data for all sorts of uses.

#### Inmarsat D

Inmarsat D does not yet officially exist, but it will soon. It is conceived as a pager and low rate return system. For example, a road vehicle carrying a valuable cargo can be polled from the D service, and it can return its GPS position using a low speed digital signal. Not much actual information will be transmitted or received, but for those that need this information, it will be very valuable indeed.

#### Inmarsat M

Inmarsat M is a higher-powered system using spot beams. In fact, the spot beams cover most of the civilized world, and for most travelers it is quite sufficient. The system uses digital speech and low cost, small, light briefcase-type terminals. So popular is the M system that you will find advertisers in this magazine selling systems.

### **How to receive Inmarsat**

A lot of scanners and nearly all top end receivers now cover the Inmarsat frequencies of 1535.00-1543.50 MHz. There are only two problems. The first is that your receiver will only receive analog voice transmissions and that restricts you to the Inmarsat A service. This is no great problem because it always has several telephone calls at any time to monitor.

The second problem is that you will need a suitable antenna and a very low noise preamplifier. There are at least two manufacturers ready and willing to help you in this area.

A slight additional problem is that the bandwidth of the Inmarsat A transmissions is slightly wider than that provided on most

scanners. There are two ways around this: one is to put up with the slight distortion on some signals, and the other is to use an out-board demodulator. In fact, the transmissions use a compander that limits the dynamic range of the voice transmission and expands it at the receiver.

In reality, a standard out-of-the-box receiver is fine for casual monitoring of nearly all signals; only the Italians sound distorted!

What if you are willing to put up with a bit of distortion now and again, but your discone isn't picking up anything at all? This is such a common question, I put the following, rather technical answer on the Internet.

The average scanner has a sensitivity of about 1.0 uV at 1540 MHz (for 12 dB signal-to-noise). Using a 35 dB gain preamplifier with a 0.5 dB noise figure increases this sensitivity to just 0.08 uV, a difference of 22 dB. A 3 foot long, circularly polarized, helical antenna cut for 1540 MHz will give about 15 dB more gain than the best discone. Add antenna cable loss of about 6.0 dB. And you end up with 43 dB more signal, resulting in a receivable signal from Inmarsat of about 20+ dB signal-to-noise. So when you try to receive Inmarsat on your discone, it will be about 28 dB below the noise; hence, you will get absolutely nothing at all.

### **The Satellites**

There are four satellites in the series. In most places in the world you will probably receive two; here in England I am very lucky

that I can receive three, the maximum possible.

**AOR-W** is the West Atlantic Region satellite and covers most of North and South America and also most of Europe. It has much clear speech traffic all day and night. Its location is 54.0 degrees West.

**AOR-E** is the East Atlantic Region satellite and covers parts of North America, South America, Europe and the Middle East. It has a lot of clear speech traffic in several languages as it covers such a large area of non English speaking people. It is located at 15.5 degrees West.

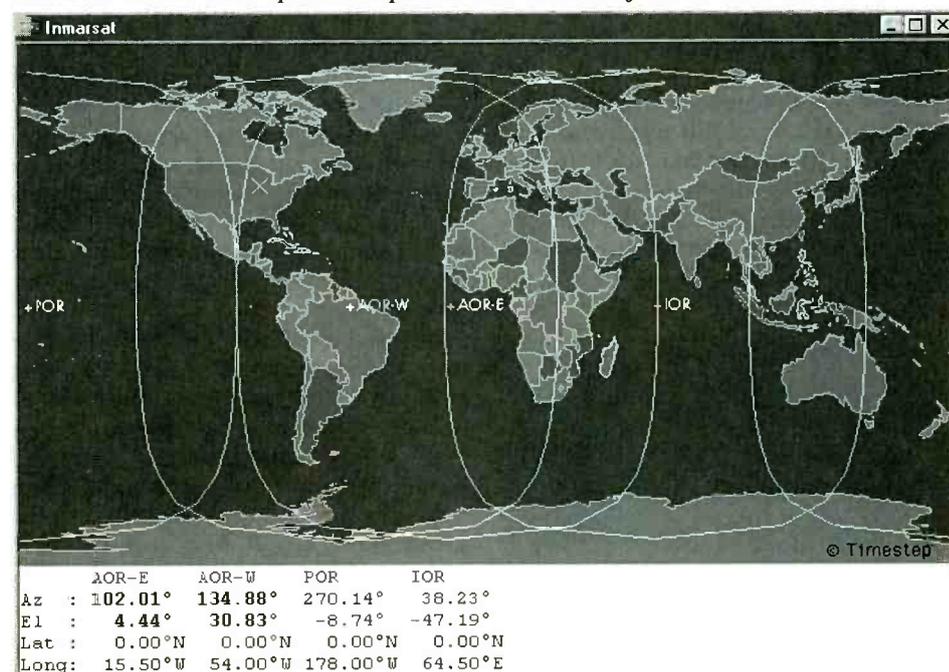
**IOR** is the India Region satellite and covers the whole of India, Europe and Western Australia. This satellite has a lot of very interesting traffic indeed, most of it in English, as it covers what used to be the main part of the British Empire. It is located at 64.5 degrees East.

**POR** is the Pacific satellite and covers Japan, Australia and the West Coast of North America. This satellite is out of my range, but I know that several Australian readers are successfully monitoring it. It is located at 178 degrees West.

### **Setting up a system**

You will find that on each satellite there is a 24 hour radio station, AFN (American Forces Network), which can be used to align the antenna. You simply connect the cables and use one of the supplied adapters to fit your scanner. With the scanner set to 1537.0 MHz

### **Inmarsat carries clear speech telephone conversations from around the world.**



and the antenna pointed roughly in the right direction, soon you will hear the broadcast; it is a simple matter to adjust the antenna for maximum clarity.

(Editor's note: It has been reported that AFN broadcasts on AOR-W and IOR have been discontinued and replaced with high powered HF broadcasts in the 416/12 MHz marine bands.)

Unlike satellite TV, you have a tolerance of at least 15 degrees within which you can still hear the satellite. From Chicago, for example, AOR-W is 134 degrees, nearly southwest, and 30 degrees elevation. Once you have found the satellite, usually after only a few minutes, then it's time to fix the antenna permanently, although for years I had mine at ground level resting on a plastic box. I have a cheap coax switch that gives me either the discone or the Inmarsat antenna.

I have tried nearly all the receivers that cover the Inmarsat frequencies and they all work well; you do not need a very expensive scanner. As all the signals are the same strength, the receiver's performance is not very critical, and a preamplifier helps make up for any deficiencies. However, in my experience, I would recommend Icom and AOR as reliable performers.

There is a choice of at least two commercial manufacturers from which to purchase the antenna and preamplifier. If you decide to build your own, there are just a couple of things you need to know. The transmissions are in narrowband FM and received with a right hand, circularly polarized antenna. Your receiving system must be able to resolve 0.1 uV or better and the antenna needs about 15 dB of gain.

There are other options, too: in Europe it is possible to modify a TVRO system, remove the 4 or 12 GHz section from the LNB, and feed a two- or three-turn helical feed directly into the IF amplifier of the LNB. Difficult, but not impossible: I have even seen what looked like nearly complete Inmarsat systems at the Dayton Hamfest!



*The author can receive three Inmarsat satellites with this array at his location in England.*

### What you will hear

This is the exciting part! The people using Inmarsat systems are not short of money. What they have to say is very interesting. I have heard ships being illegally boarded, ship owners instructing their captains about the time to dock to improve Customs relations, news reporters, deals inside large companies, military communications, and lots more that I simply cannot mention. Though you usually (but not always) get only one side of the conversation, it is generally obvious what is happening.

Those involved in international crime often use Inmarsat: it works anywhere, it is thought to be secure, it is thought to be bug and tap free, and you can pay your bill anywhere in the world. Monitors have allegedly heard drug and arms deals, trade embargoes being broken, several pirate ships working, and politicians colluding and generating cover-ups.

There are dozens of channels in use at any one time; you simply tune up and down and decide what to monitor. Nearly everything is the same signal strength. Computer software could be left to scan and, using the voice detection mode, could store hundreds of messages into your computer via its sound card. Inmarsat is perhaps the only way of using your scanner to listen to new and sometimes distant countries.

At home near Cambridge, England, I have three antennas on the end of my house so that I can listen to three out of the four satellites available. If I hear any interesting news on CNN, I immediately select the appropriate satellite and get the rest of the story hours before it breaks! As I write this article, dozens of calls are in progress on AOR-E. The Joker in the pack? Yes, there is an unknown, ordinary FAX transmission in the clear. Wonder what would happen if you connected your receiver to a FAX decoder?

Inmarsat monitoring is a huge and largely untapped area. You owe it to yourself to put your scanner to some good use above 1500 MHz. After all, didn't you buy it because of its wide frequency coverage? Now is the time to monitor satellites!

### Where you can buy

There are two sources of ready built equipment. Timestep, who provide a system comprising: helical antenna, preamplifier, 65 feet of cable, power inserter, adapters for your scanner and a manual. This Timestep system, costing \$399, requires only a 12 V power supply.

Swagur Enterprises provide a 3 foot dish, feed horn covering 1500-1800 MHz, preamplifier, power inserter, power supply and manual. This Swagur system, costing \$545, requires only cable.

**Timestep System (Europe sales)**  
 Timestep PO Box 2001  
 Newmarket  
 CB8 8QA  
 England  
 Tel. +44 1440 820040  
 Fax +44 1440 820281  
 e-mail Sales@time-step.com

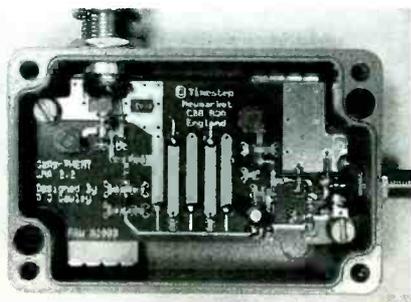
**Swagur Enterprises**  
 Box 620035  
 Middleton  
 WI 53562-0035  
 Tel/Fax 608 592 7409  
 e-mail swagur@execp.com  
 Web site www.swagur.com

### Acknowledgements

Arthur C. Clarke, who so graciously invited me to his home in Sri Lanka in July 1992 and who gave me his scientific autobiography and an annotated copy of the "Extra-Terrestrial Relay" article.

Martin Goodrum from British Telecommunications Research Laboratories who worked with me on a DGPS project using Inmarsat, hence giving me the enthusiasm to explore further.

.....  
 Dave Cawley, G4IUG, is owner of Timestep, which produces weather satellite receiving equipment. He was formerly a senior design engineer for Philips specializing in receiver design, and has been a ham for thirty years.



*Details of the Timestep preamplifier*

# Tune in the New Utility Band ... INMARSAT!

## Satellite reception never has been this easy!

A brave new world awaits the radio listener on the Inmarsat satellite frequencies, and you can hear all the action on the Icom R8500 and AOR AR5000 receivers. Just add a small portable dish and preamp system (like the one from Swagur Enterprises) and you are set to tune in aeronautical, marine, land mobile, government, and military clear voice communications from 22,300 miles above the earth.

**Icom  
R8500**



Here is one of the most popular, wide-frequency coverage (100 kHz 1999.99 MHz, less cellular) receivers. Tune longwave, shortwave, VHF/UHF, all services and modes (FM, AM, USB, LSB, CW) with high sensitivity, IF shift, selectable AGC timing, audio peak filter, built-in RS232C and CI-V for direct computer control, 1000 scannable memory channels, S-meter, noise blanker, and 12 VDC/120 VAC operation.

High stability crystal oscillators combine the automatic frequency control circuitry for outstanding stability. Multiple tuning speeds optimize signal hunting. Alphanumeric display aids in identifying memorized frequencies. Automatic memory stores search-discovered active frequencies. Three antenna connectors provide choices for frequency ranges, optional voice synthesizer and remote control—an incredible array of advanced features!

ORDER SCN-1 (ICOM R8500)

**\$1,499<sup>95</sup>** Please add \$16 2nd Day  
UPS or US Priority Mail.

**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

e-mail: [order@grove.net](mailto:order@grove.net)

web: [www.grove-ent.com](http://www.grove-ent.com)

**AR5000  
Plus III**



This super-wide-coverage receiver ranks among the best ever made!

The AR5000 PLUS III extended-frequency coverage receiver is tunable from 10 kHz through 2600 MHz (less cellular) and offers double and single sideband synchronous detection, 2000 memory channels, AM & FM automatic frequency control, 10 VFOs, 40 search banks, and more. For the first time, you can hear VLF time signals and naval communications, civilian and military aeronautical transmissions, VHF/UHF public safety radio, ham repeaters, microwave earth satellites, and much, much more!

This triple-conversion, luxury receiver offers outstanding sensitivity (0.15 microvolt SSB, 0.3 microvolt VHF/UHF FM, 0.6 microvolt AM), rapid 50-channel-per-second scan/search speed, 1 Hz to 1 MHz programmable tuning steps, all mode reception (AM/FM/LSB/USB/CW), selectable IF bandwidths (3/6/15/40/110/220 kHz), superb frequency stability (+/- 1 ppm, 0-50 deg. C.), mobile or fixed power (12 VDC/120VAC), and much, much more—all on one radio!

ORDER WBR-12P (AR5000 Plus III)

**\$2,095<sup>95</sup>**

Please add \$16 2nd Day  
UPS or US Priority Mail.

Richard Barnett  
ScanMaster@aol.com

### That New Band to Scan

In previous issues we've discussed the pending opening of the 746-806 MHz band for public safety communications. This is the top end of the UHF TV spectrum which is not fully populated by broadcasters nationally. The problem is that there are TV broadcasts within this band segment in most of the major metropolitan regions — the exact areas of the country where the spectrum is needed most.

The call for additional frequencies grew out of the World Trade Center bombing a number of years ago. Many public safety agencies responded to the blast, yet there was little or no interoperability on-scene. These federal, state, regional and local agencies lobbied Congress to open up a new range of channels as there was no existing available spectrum onto which they could migrate. Channels 63-69 occupy one of the least populated portions of the TV band and this is what ultimately was granted to the public safety community.

At the APCO (Association of Public Safety Communications Officers) convention which was held this past August in Albuquerque, Ross Ruthenberg of Motorola held a seminar in which he described the status of the allocation procedure at the FCC. It turns out that the Commission has not yet finalized the plans for the band, as law enforcement agencies, in particular, are still debating how best to make use of the spectrum. The FCC, in conjunction with public safety authorities, has been issuing what's known as Further Notices of Proposed Rulemaking (FNPRMs).

While we originally thought that licensing of the 746-806 range was imminent, the list of issues to be resolved is seemingly endless. A partial list of action items includes: how to deal with Canadian and Mexican broadcasters within the band, the desire to actually internationalize the band for global public safety use, the need to formulate national interoperability plans, the development of digital modulation and trunking standards (it is expected that digital trunking will be the norm within the frequency range), etc., etc.

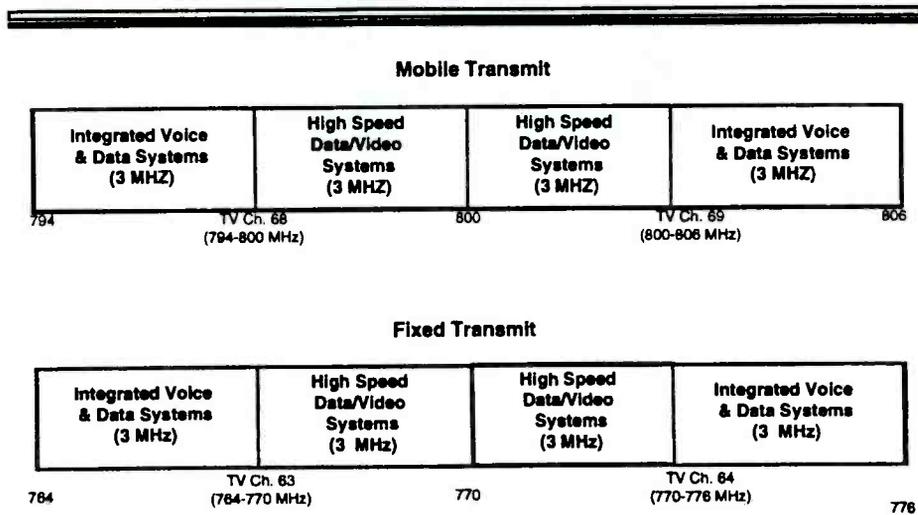
Many conventioners, including APCO

members and manufacturers, had as their objective a desire to adopt a more aggressive mobile/TV sharing criteria than that used at 470-512 MHz. To maximize spectrum availability for public safety without noticeable impact on TV broadcasters, it is important that the FCC takes into account the propagation differences between 470 MHz and 750 MHz; the lower power output of mobiles and portables; the fact that land mobile signals

are vertically polarized while television broadcast is horizontally polarized, and like issues. While broadcasters seek to insure that no land-mobile signals will interfere with their television transmissions, public safety does not want to be hamstrung with regulations that make it all but impossible to utilize the new band.

At the time of the convention in August, this much was known:

### BAND PLAN



### SPECTRUM USE DISTRIBUTION

USE	NARROWBAND (6.25KHZ BASIS CHANNELS)*	WIDEBAND (50KHZ BASIS CHANNELS)**	TOTAL SPECTRUM
GENERAL	7.8 MHz (1248 CH)	4.8 MHz (96 CH)	12.6 MHz (52.5%)
NATIONAL INTEROPERABILITY	0.8 MHz (128 CH)	1.8 MHz (36 CH)	2.6 MHz (10.8%)
SUBJECT TO 3RD FNPRM	3.4 MHz (544 CH)	5.4 MHz (108 CH)	8.8 MHz (36.7%)
<b>TOTAL</b>	<b>12 MHz (1920 CH)</b>	<b>12 MHz (240 CH)</b>	<b>24 MHz (100%)</b>

\*Aggregate up to 25kHz.

\*\*Aggregate up to 150kHz.

- 24 MHz of spectrum is due to be granted to public safety comprising TV channels 63 and 64 (764-776 MHz) and channels 68 and 69 (794-806 MHz).
- Certain areas of the country have no television broadcasters in this range currently, but the metro areas, most in need of spectrum, do have one or more such transmitting stations. These analog TV stations must be turned off at the end of the DTV (digital television) transition period which is in 2006. Stations in these upper UHF channels which have gone digital can stay where they are until they can subsequently be moved below channel 60 or, better yet, channel 51.
- The balance of the new spectrum in the range will be auctioned to commercial interests in 2001.
- Usage of the new spectrum will include integrated voice and data systems as well as high-speed data and video systems. (Here's hoping that out of all that we can access and decode the digital, non-encrypted, voice transmissions.)

The public safety community has also been pushing for a grant of spectrum in the 138 to 144 MHz band, hoping that federal and military authorities would free up some or all of the band.

This all constitutes quite an "air grab" of late for public safety. Agencies have been moving to digital for spectrum efficiency; the smaller channel spacing (such as 7.5 kHz in VHF) instituted by the FCC will allow for more channels; 764-806 will soon go to public safety ... and now they want even more.

It may be just a reflexive reaction to commercial interests vying to take spectrum away from services such as the amateur radio community. Whoever is first at the door, hat in hand, asking for frequencies — or paying for them as the case may be — may be the winner in the free-for-all. If public safety doesn't grab all it can now, it may not have a chance to go back later.

### ■ The Burning of Florida

Another well-attended APCO session dealt with the June and July Florida wildfires that consumed much of the central and northern areas of the state, as well as the interest of the nation. However, there was not a great deal of discussion about the performance of the 800 MHz trunking systems in the region, leaving one to wonder how they in fact responded.

A representative of Flagler County, which was ordered to evacuate (that's right : the entire county's 35,000 residents received an

evac order!), reported that all medical communications failed as their tower burned down. Officials tried to put MED 8 up (463.175/168.175) but couldn't get it done. Obviously, whether the cause is towers burning or phone lines melted, maintaining good communications under such conditions is extremely difficult.

Dade County eventually erected portable repeaters for Flagler, but what helped most were actually two-meter ham repeaters that continued in operation throughout most, if not all, of the conflagration. Other representatives reported that their old VHF and UHF equipment came in handy, particularly when they ran out of other portables or those other portables failed. Problems of keeping batteries charged were also described.

On the law enforcement side, county sheriffs on VHF couldn't talk with state agencies on 800 MHz digital systems. This sounds like a matter which needs to be raised at the next state budget hearing.

The most interesting solution involved the Civil Air Patrol (CAP), which orbited fire scenes with repeaters! That's right, airborne repeaters, just like something you might suspect to see under battlefield conditions — which is what this operation was most akin to.

Federal authorities that came to the state to assist with firefighting operations were shocked to find how difficult it was to battle these blazes that were occurring, not on mountainous terrain, but rather on flat, suburban and rural territory. The problem lay in the fact that subdivisions had been built right into the forests, leaving a blanket of limbs, leaves and pine needles covering the tops of homes.

Additionally, the federal radio officials were accustomed to mountaintop sites on which they could position tactical repeaters. In Florida you'll be lucky to even find hills. Federal firefighting crews, which were reported to have 403/408 MHz radios (input/output), could not communicate with the Floridians and had to be led in to many fire scenes by local and county apparatus.

Further comments on radio operations during the Florida wildfires may be forwarded to me at the main MT address or e-mail at [scanmaster@aol.com](mailto:scanmaster@aol.com).

### ■ Florida Trunking Systems

Florida is probably the most trunked state in the nation and the central portion of the state probably tops the list as far as system implementation. Trunking is so pervasive in Florida that a TrunkTracker Enthusiasts

Group may be formed to help foster monitoring of local trunked systems in the area (go to [www.trunktracker.com](http://www.trunktracker.com) and look under Information on how to subscribe to Trunkcom and find out more about this effort).

Most talkgroups are simulcast between the two main groups. If you use the group 1 list some Orange County Sheriff Office (OCSO) secondary channels will not be heard. If you use the group 2 list you will not hear Orlando Police Department (OPD) emergency channels. Also, any odd number ID is a talkgroup that is being simulcast or crosspatched.

The following information is courtesy of numerous contributors to our web site and of *Police Call '99*.

## ORANGE COUNTY/ORLANDO

### System 1 (Orlando primary) frequencies:

866.1125, 866.2375, 866.3625, 866.5750,  
866.6125, 866.7125, 866.7375, 866.9125,  
867.0750, 867.2125, 867.2375, 867.3250,  
867.3875, 867.6875, 867.7125, 867.7375,  
868.0375, 868.2125, 868.2375, 868.3125,  
868.6625, 868.7175, 868.9125

## POWERPORT™

LIGHT IT UP!



**Beefier than the PowerPort 149, the PowerPort 259 will run 250 Watts AC (500 W surge) and better than 15 amps DC. During power outage, or away from home, you can run your radios, lighting, small hand-tools, and more.**

**Three ways to recharge:**

- in your car ( DC ),
- in your home ( AC ),
- or in the sun (optional solar recharger).

**Hand-portable, powerful and compact AC / DC power.**

**SIZE: 5.8 x 4.5 x 4.25**  
Full line of products and accessories available.

\$184.95

CUTTING EDGE ENTERPRISES  
1803 MISSION #546 SANTA CRUZ CA 95060



ORDERS 800: 206-0115

 START AT PS \$66	 \$120	 \$77	 \$170
 \$160	 \$60	 \$185	 \$190

## System 2 (Orange County primary) frequencies:

857.4375, 858.4375, 859.4375, 860.4375, 866.0500, 866.1375, 866.3875, 866.4125, 866.6625, 866.6875, 866.8500, 866.8875, 866.9125, 867.1625, 867.5500, 867.8000, 868.1000, 868.1250, 868.2625, 868.2875, 868.5750, 868.6375, 868.8250, 868.8750

### Orange County Fire

2096	Fire 1	Dispatch
2128	Fire 2	Comm Center/Unit-Unit/Fire Loss Mgt
2160	Fire 3	District 6 East
2192	Fire 4	Fireground East
2224	Fire 5	District 5 South
2256	Fire 6	Fireground South
2288	Fire 7	District 4 North/West
2320	Fire 8	Fireground North/West
2352	Fire 9	Mutual Aid
2384	Fire 10	Mutual Aid (Osceola County FD Cross-patch)
2416	Fire 11	Admin
2448	Fire 12	Inspections
2480	Fire 13	Supply
2312	Fire 14	Admin/Supervisors Unit/Unit
2544	Fire 15	Unit/Unit
4272	EMS to Orlando Regional Medical Center	
4304	EMS to hospital	
4336	EMS to Sand Lake Hospital	
4368	EMS to Florida Hospital - Orlando	
4400	EMS to Florida Hospital - East	
4432	EMS to Florida Hospital - Apopka	
4464	EMS to Columbia Park Hospital	
4496	EMS to Health Central Hospital	
4528	EMS to Princeton Hospital	
4560	EMS to Winter Park Memorial Hospital	
4816	EMS to Florida Kissimee Hospital	

### Orlando Fire

8080	Tac 1	Dispatch, unit movement, alarm traffic
8112	Tac 2	Fireground
9104	Tac 3	Fireground
9136	Tac 4	Investigations
13328	Tac 7	

### Orlando International Airport

8016	Airport Patrol (OPD Airport)
8048	Airport Fire Dept.
8720	Airport Facilities Tac 2
8752	Adtranz Trains (between main terminal and airside)
8784	Airport Facilities Tac 1
8880	Airside Operations
8912	Orlando Executive Airport Operations
8944	Airline Operations
8976	Landside Operations
9008	Airport Parking
9264	Signal 43 Talkgroup
13616	Airport EMS (Backup Tac)
13648	Airport Teletype
13680	Airport Aux (Channel 14)
13840	Airport Emerg (FD Radio Emerg Button Tac)
13872	Airport Car-Car
14320	Airport Shuttle Buses

### Orange County Sheriff

2576	Sector 1	Northwest Patrol
2608	Sector 1	Tac 1
2643	Sector 1	Teletype
2672	Sector 1	Car/Car
2704	Sector 1	Special Ops
2736	Possible Sector 1	Service
2768	Sector 2	East Patrol
2800	Sector 2	Tac 2
2835	Sector 2	Teletype
2864	Sector 2	Car/Car
2896	Sector 2	Special Ops
2928	Possible Sector 2	Service
2960	Sector 3	West Patrol

2992	Sector 3	Tac 3
3027	Sector 3	Teletype
3056	Sector 3	Car/Car
3088	Sector 3	Special Ops
3120	Possible Sector 3	Service
3152	Sector 4	South Patrol
3184	Sector 4	Tac 4
3219	Sector 4	Teletype
3248	Sector 4	Car/Car
3280	Sector 4	Special Ops
3312	Possible Sector 4	Service
3344	Sector 5	I-Drive/Disney Patrol
3376	Sector 5	Tac
3411	Sector 5	Teletype
3440	Sector 5	Car/Car
3472	Sector 5	Special Ops
3536	Admin 1	(all emergency calls are simulcast on this talkgroup)

### Orlando Police

8208	Teletype	East
8240	Teletype	West
8272	Emergency	West
8304	Patrol	West
8336	Patrol	Central
8368	Patrol	East
8400	Car to car	
8496	Watch Commanders	
8528	11	
8560	Emergency	Central
8592	13	
8624	Teletype	Central
8656	Service	
8688	Emergency	East
9264	Signal	43

### Suburbs

10448	Winter Park PD	Tac 1
10480	Winter Park PD	Tac 2
10512	Winter Park PD	Tac 3
10544	Winter Park PD	Tac 4
10672	Winter Park Fire Dept.	
11824	Maitland PD	Tac 1
11856	Maitland PD	Tac 2
12592	Winter Garden PD	Tac 1
12624	Winter Garden PD	Tac 2
14448	Ocoee PD	Tac 1
14480	Ocoee PD	Tac 2

### Other Agencies

336	Disaster A
371	Disaster B
400	Disaster C
944	Animal Services

## OSCEOLA COUNTY

### Fire

1840	Tac 1	(Dispatch)
1872	Tac 2	East operations
1904	Tac 3	West operations
1939	Tac 4	
1968	Tac 5	Admin
1808	Fire	County Net

### Sheriff

272	Patrol	East/Central
784	Patrol	West
528	Teletype	
1040	Support	
1296	Tactical	
1552	Comm Channel	
1744	Civil Division	
1776	Courthouse Security	
2064	Tac 2	
2928	Law Enforcement Net	(countywide common)
2576	County Jail	

### Suburbs

3216	Kississimee Police	Patrol
3248	Kississimee Police	Teletype
3280	Kississimee Police	Tac 1
3312	Kississimee Police	Tac 2
3344	Kississimee Police	
3600	Kississimee Fire	Combat (dispatch)
3632	Kississimee Fire	Tac 1
3664	Kississimee Fire	Tac 2
3696	Kississimee Fire	Tac 3
3728	Kississimee Fire	Tac 4
4880	St. Cloud Police	Patrol
4912	St. Cloud Police	Admin
4944	St. Cloud Police	Tac 1
5072	St. Cloud	City Net
5104	St. Cloud Fire	Tac 1 Dispatch
5111	St. Cloud Fire	multiselected dispatch
5136	St. Cloud Fire	Tac 2 EMS response
5168	St. Cloud Fire	Tac 3 Fire response

## SEMINOLE COUNTY

**Frequencies:** 851.3875, 851.4375, 855.4875, 856.2375, 856.4625, 857.2375, 857.4625, 857.9875, 858.2375, 858.4625, 858.9875, 859.2375, 859.4625, 859.9875, 860.2375, 860.4625, 860.9875, 866.1125, 866.3625, 866.6125, 867.3875, 867.6375, 868.0375, 868.3125  
**Fleet Map (Ustr):** B0=S0 B1=S4 B2=S4 B3=S4 B4=S4 B5=S5 B6=S12

### County/Metro Fire

100-1	Fire	Dispatch
100-2	Unicom	(Talk Around)
100-3	Fire	Tac 1
100-4	Fire	Tac 2
100-5	Fire	Tac 3
100-6	ICS 1	(Incident Command)
100-7	ICS 2	(Incident Command - airport emergencies)
100-8	Winter Park Hospital	
100-9	Technical Services	
100-10	Emergency Services	
100-11	Columbia Park Medical Center - Sanford	
100-12	South Seminole Community Hospital	
100-13	Florida Hospital Altamonte	

### County Sheriff

600-1	A Patrol North Zones 1,2,3
600-2	B Teletype
600-3	C Patrol South Zone 4,5
600-4	D Patrol South Zone 6,7
600-5	E Car/Car
600-6	F
600-7	G
600-8	H
600-9	I Longwood Police
600-10	J
600-11	K
600-12	L
600-13	M
600-14	N
600-15	O

### Suburbs

000-2	Altamont Springs PD
000-3	Casselberry PD
000-7	Lake Mary PD
300-1	Sanford PD patrol
300-2	Sanford PD patrol
300-3	Sanford PD
300-4	Sanford PD
300-5	Sanford PD
300-6	Sanford PD
300-7	Sanford PD
300-8	Sanford PD
300-9	Sanford PD

# Big Savings on Radio Scanners



## Now...Monitor trunked radio broadcasts

### Save big on Bearcat235XLT or BC895XLT

trunk tracking radio scanners from CEI. To get your free fax-on-demand catalog, dial 734-663-8888 from the telephone handset on your fax machine and follow the recorded voice prompts. Visit CEI on the web at [www.usascan.com](http://www.usascan.com) for special savings. Get many free benefits such as extended warranty coverage on new scanners when you use your Communications Electronics Platinum Plus Master Card® issued by MBNA. No annual fee. Call 1-800-523-7666 anytime. Mention offer Q3K1 to request yours today.

DISTRIBUTOR'S COUPON | EXPIRES 01/31/99 | #9811X6

## SAVE \$125 on one BC895XLT

Save \$125 when you purchase your Bearcat 895XLT scanner directly from Communications Electronics Inc., PO Box 1045, Ann Arbor MI 48106 USA. Telephone orders accepted. Call 1-800-USA-SCAN. Mention offer CE18. TERMS: Good only in USA & Canada. Only one coupon is redeemable per purchase and only on specified product.

### Bearcat®895XLT-A Radio Scanner

Mfg. suggested list price \$729.95/Special \$319.95  
**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., 849,0125-956,000 MHz.

The Bearcat 895XLT is superb for intercepting trunked communications transmissions (see BC235XLT description) 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** - This feature lets you record channel activity from the scanner onto a tape recorder. **CTCSS Tone Board** (Continuous Tone Control Squelch System) which allows the squelch to be broken during scanning only when a correct CTCSS tone is received. 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.

### Bearcat®3000XLT-A Radio Scanner

Mfg. suggested list price \$699.95/Special \$329.95  
**400 Channels • 20 banks • Twin Turbo Search/Scan**  
**Frequency Transfer • VFO Control • Automatic Store**  
**10 Priority Channels • Selectable Mode • Data Skip**  
**Frequency step resolution 5, 12.5 & 25 KHz.**

**Size: 2-3/4" Wide x 1-1/2" Deep x 7-3/8" High**  
**Frequency Coverage:** 25,000-549,995 MHz., 760,000-823,995 MHz., 849,0125-868,995 MHz., 894,0125-1,300,000 MHz.

The Bearcat 3000XLT is the ideal handheld radio scanner for communications professionals. This handheld scanner scans at 100 channels per second and searches at a rate up to 300 steps per second. A selectable attenuator eliminates annoying intermodulation from adjacent frequencies in highly populated areas. Selectable AM, Wide FM and Narrow FM modes allow you to change the default receiving mode of the BC3000XLT. For maximum scanning pleasure, order the following optional accessories: **UA502** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter \$14.95; **LC3000** Deluxe swivel leather carrying case \$49.95; **BP2500** rechargeable nickel-cadmium battery pack for up to five hours of dependable use \$39.95; **ANTMMBNC** Magnetic mount scanner antenna with BNC jack and 12 feet of cable \$29.95; **ANTSGBN** Glass mount scanner antenna with BNC cable \$29.95. The BC3000XLT comes with AC adapter, belt clip, flexible rubber antenna, earphone, owner's manual and one year limited Uniden warranty. Order today.



## TrunkTracking Radio

DISTRIBUTOR'S COUPON | EXPIRES 01/31/99 | #9811X2

## SAVE \$100 on one BC235XLT

Save \$100 when you purchase your Bearcat 235XLT handheld scanner directly from Communications Electronics Inc., PO Box 1045, Ann Arbor MI 48106 USA. Telephone orders accepted. Call 1-800-USA-SCAN. Mention offer CE12. TERMS: Good only in USA & Canada. Only one coupon is redeemable per purchase and only on specified product.

### Bearcat®235XLT-A TrunkTracker

Mfg. suggested list price \$429.95/CEI price \$269.95  
**300 Channels • 10 banks • Trunk Scan and Scan Lists**  
**Trunk Lockout • Trunk Delay • Extra battery & charger**  
**10 Priority Channels • Programmed Service Search**  
**Size: 2-1/2" Wide x 1-3/4" Deep x 6" High**

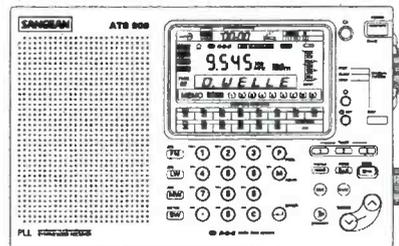
**Frequency Coverage:** 29,000-54,000 MHz., 108-174 MHz., 406-512 MHz., 806-823,995 MHz., 849,0125-868,995 MHz., 894,0125-956,000 MHz.

The Bearcat TrunkTracker BC235XLT, is the world's first scanner capable of tracking a selected radio transmission as it moves across a trunked radio system. Now it's easy to monitor fleets and subfleets in analog trunked radio systems. The BC235XLT can also work as a conventional scanner. This 300-channel, programmable handheld scanner provides scanner users with uninterrupted monitoring capabilities of Type I, II, III and hybrid trunking systems. Now it's easy to continuously monitor conversations even though the message is switching frequencies. The BC235XLT comes with AC adapter, CRX120 battery charger, two rechargeable long life ni-cad battery packs, belt clip, flexible rubber antenna, earphone, owner's manual and one year limited Uniden warranty. The BC235XLT when ordered from CEI now features built-in attenuator feature. Not compatible with AGEIS, ASTRO, EDACS, ESAS and LTR systems. Call CEI at 1-800-USA-SCAN to order your Bearcat TrunkTracker now.



## VHF/GMRS/CB Radios

Have fun and use our CB, GMRS, shortwave and commercial radios to keep in touch with the world, friends and family.  
**Cobra 148GTL-A2 SSB CB/SPECIAL** ..... \$124.95  
**Cobra 29WXST-A CB with sound tracker technology** ... \$149.95  
**Cobra HH45WX-A Handheld CB radio with weather** ..... \$89.95  
**Maxon GMRS210+3-A GMRS transceiver/SPECIAL** ..... \$144.95  
**RELM MPV32D-A 5 watt VHF handheld transceiver** ..... \$299.95  
**RELM RH256NB-A 25 watt VHF mobile transceiver** ..... \$284.95  
**RELM RMV60B-A 60 watt VHF mobile transceiver** ..... \$549.95  
**Uniden GRANTXL-A SSB CB Mobile** ..... \$124.95  
**Sangean ATS800-A2 shortwave receiver** ..... \$49.95



### Sangean ATS909-A2 Shortwave Receiver

Mfg. suggested list price \$399.95/Special \$219.95  
**Size: 8-1/4" Wide x 1-1/2" Deep x 5" High**  
**Frequency Coverage:** LW: 153-513 KHz.; MW: 520-1710 KHz.; SW: 1711-29999 KHz.; FM: 87.5-108.0 MHz.

Now...monitor the world on the most advanced shortwave receiver available from CEI. The Sangean ATS909 features 306 memories. Also features automatic tuning to automatically find all local stations with the push of a button, five tuning methods, eight character alphanumeric display, upper and lower single side band reception. Radio Data System (RDS) automatically shows station call letters on RDS equipped FM stations. RF Gain control, adjustable sleep timer, 42 world city times, dual time system, selectable manual tune steps, wide/narrow filter reduces adjacent station interference. Battery & Signal Strength indicator, 9KHz./10 KHz. switch. Lighted LCD Display, Lock Switch, separate audio recorder output & stand-by control jacks allows user to program tape recorder to turn on at three different times. Uses 4 AA batteries. When you order the ATS909 from us, you'll get a complete package deal including external AC adapter, portable antenna, carrying case and limited one year Sangean warranty. Call 1-800-USA-SCAN to order your shortwave radio.

## Radio Scanners

Monitor fire, police, weather, marine, medical, aircraft and other transmissions with your Bearcat scanner.

- Bearcat 9000XLT-A 500 channel base/mobile scanner ..... \$344.95
- Bearcat 3000XLT-A 300 channel handheld scanner ..... \$329.95
- Bearcat 895XLT-A 300 ch.TrunkTracker base scanner ..... \$319.95
- Bearcat 760XLT-A 100 channel base/mobile scanner ..... \$179.95
- Bearcat 560XLA-A base/mobile 16 channel scanner ..... \$69.95
- Bearcat 235XLT-A 300 channel TrunkTracker scanner ..... \$269.95
- Sportcat 150-A 100 channel handheld with 800 MHz. .... \$144.95
- Bearcat 148XLT-A 20 channel weather alert base scanner ..... \$79.95
- Bearcat 80XLT-A2 50 channel handheld scanner ..... \$109.95
- Bearcat 60XLT-A 30 channel handheld scanner ..... \$79.95
- Bearcat BCT12-A2 information mobile scanner ..... \$144.95
- Bearcat BCT7-A information mobile scanner ..... \$149.95
- ICOM PCR1000-A computer communications scanner ..... \$474.95
- ICOM R10 handheld wideband communications receiver ... \$399.95
- Relm MS200-A 200 ch. computer programmable scanner ... \$219.95
- Relm HS200-A2 handheld with CTCSS/800 MHz. scanner \$169.95

### NEW/RELM®MPV32D-A Transceiver

Mfg. suggested list price \$515.00/Special \$299.95

Looking for a great hand-held two-way transceiver? Law enforcement depends 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 handheld transceiver that has built-in CTCSS, which may be programmed for any 50 standard EIA tones or 210 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 oz., 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 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 1000 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 #BCMP is \$69.95; speaker/microphone, part #SMMP is \$54.95; extra high capacity 1000 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 \$34.95; PC programming kit, part #PCKIT030 is \$224.95. A UHF version with a frequency range of 450-480 MHz. part #MPU32D is \$349.95. 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 \$18.00. Call 1-800-USA-SCAN to order.



## Buy with confidence

It's easy to order from us. Mail orders to: Communications Electronics Inc., P.O. Box 1045, Ann Arbor, Michigan 48106 USA. Add \$18.00 per weather station or radio product for UPS ground shipping, handling and insurance to the continental USA unless otherwise stated. Add \$12.00 shipping for all accessories and publications. Add \$12.00 shipping per antenna. 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 state sales tax. No COD's. Satisfaction 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 from Communications Electronics Inc. today and save. Price schedule effective November 1, 1998 AD #110198MT ©1998 Communications Electronics Inc.

## For credit card orders call 1-800-USA-SCAN

**Communications Electronics Inc.**  
**Emergency Operations Center**  
**e-mail: [cei@usascan.com](mailto:cei@usascan.com)**  
**[www.usascan.com](http://www.usascan.com)**

PO Box 1045, Ann Arbor, Michigan 48106-1045 USA  
 For information call 734-996-8888 or FAX 734-663-8888

# NCS: Swords into SHARES

In the 1962 Cuban missile crisis, communications failures on both sides made a dangerous situation worse. For the United States, the ultimate result was the National Communications System (NCS), created by a Presidential memorandum in 1963. In 1984, the AT&T breakup inspired another executive order, which expanded NCS into today's alphabet soup of 23 agencies, all hatching plans and coining acronyms at a rate that is dizzying even by government standards.

Therefore, it's no surprise that NCS, with its National Coordinating Center for Telecommunications (NCC), most definitely plays a major role in Federal NS/EP (National Security/Emergency Preparedness) plans. Yes, NS/EP includes post-nuclear postmen and all that, but increasingly the focus has shifted to natural disasters. And this brings us to SHARES.

### ■ Shared Resources

We've talked about SHARES in this column before, so this time we'll mostly just hit on the changes. Remember that SHARES stands for Shared Resources. It's kind of like an HF (High Frequency, 3 to 30 MHz) channel pool, but also kind of like the voluntary nets that hams are used to. SHARES can be even more confusing than NCS — and that's saying something! — but it's the relative lack of structure that makes it work.

SHARES, after all, is a net of nets, created by NCS as a backup capability to move urgent traffic between different agencies which otherwise might have quite incompatible radios and procedures. SHARES is growing rapidly, and it's currently up to around 66 members, operating over a thousand stations, representing government, military, industry, and disaster preparedness groups.

While some 250 frequencies have been announced as available for SHARES, note that very few of these are "SHARES frequencies" per se. There's been some confusion about that. Further, only a handful of the participants are dedicated SHARES stations. All frequencies and resources remain allocated to the original entities that made them available. Further, an agency might move a SHARES message on its own system, further confusing listeners.

To be accepted for SHARES, messages

must be for a Federal agency, and have NS/EP content that cannot go through normal channels. The flag word "SHARES" is inserted into the message body to identify the traffic. Stations have a lot of flexibility in how they handle such traffic, but they must not compromise primary missions to do so. Most of what you hear is in upper-sideband (USB) voice, unencrypted, though digital modes like AMTOR (Amateur Teleprinting Over Radio) are being encouraged.

Well over half of the stations currently participating in SHARES are from the Military Affiliate Radio System (MARS). MARS operates several ongoing networks of licensed hams, who support the military on non-amateur frequencies. Another large group of participants comes from private industry.

A new player as of late 1997 is NTA, the National Telecommunications Alliance. Here's how it came about: After the AT&T breakup, the regional "Baby Bells" funded Bellcore, a consortium that continued certain centralized activities, including a telephone company point of contact into NCS and SHARES. Bellcore has recently been sold, however, and NTA was set up by the same companies to maintain this essential function.

### ■ SHARES Coordination Network

NCS has provided ten frequencies for a Shares Coordination Network (SCN) — not to be confused with a completely different SCN, the Systems Coordination Net operated by the U.S. Coast Guard. The SHARES net, whose frequencies appear in the sidebar, allows coordinators to take availability reports in emergencies and exercises. Stations wishing to be entered into NCC's database as available for SHARES traffic can check in via this net. Later, they can stand down, and be removed from NCC's list. You'll also hear general SHARES and MARS logistics, making the net a good one to monitor in emergencies.

We're starting to hear a lot of activity on SCN. Channels 1 and 2, both long-time NCC control frequencies, are for USB voice. Channels 9 and 10 are for narrowband direct printing, or computer networking via "packet radio." A packet bulletin-board system (BBS) is being created for this use.

Data bursts on 6800 kHz, the new SCN

channel 9, have recently confused some "spook" watchers. After all, this frequency used to be a favorite of the CIA for its "numbers" broadcasts. Now, however, it's just plain old SHARES, and you can decode it at home.

The remaining six channels, which are still kind of embryonic, are reserved for future use by Automatic Link Establishing (ALE) radios. ALE is new, and things change rapidly here.

SCN normally operates at what NCC calls level three, in which case routine traffic is accepted. NCC can direct the net to go to level two, which is a potential emergency condition, or level one, an emergency. SCN went to level one in hurricanes Bonnie and Earl.

To ensure readiness, SHARES holds regular exercises, usually every April, August, and December. These can bring out a lot of stations, giving a great chance to update your callsign lists. In August of 1998, SHARES had to postpone a simulated hurricane to work a real one: Bonnie in North Carolina. That's emergency communications for you!

### Shares Coordination Network

Ch	kHz	Use	Comments
1	5236.0	Voice Primary 1	Confirmed
2	14396.5	Voice Primary 2	Confirmed
3	4490.0	Future ALE system	
4	5711.0	Future ALE system	was 7632
5	9106.0	Future ALE system	
6	11217.0	Future ALE system	was 17487
7	15094.0	Future ALE system	was 20107
8	17487.0	Future ALE system	was 26812
9	6800.0	Digital Channel 1	BBS/NBDP
10	13242.0	Digital Channel 2	BBS/NBDP

### SHARES Coordination Stations (SCS)

Region	Callsign	Agency	Location
SCS East	AAR1DD	Army MARS	West Hartford, CT
SCS Central	AFA3HY	AF Mars	Shawnee, KS
SCS Southeast	WPEH728	AT&T	Conyers, GA
SCS South	AAA6USA	Army MARS	Ft Sam Houston, TX
(Station quit fulltime operations Aug 98)			
SCS Midwest	WNIM867	NTA	Ballwin, MO
SCS Mountain	KCP63	FAA	Longmont, CO
SCS Southwest	NXN0VUV	USN-MC MARS	Costa Mesa, CA
SCS West	KHA908	NASA	Mountain Valley, CA
SCS Northwest	AAA0USA	Army MARS	Tacoma, WA

Hugh Stegman

### Abbreviations used in this column

AB	Air Base	NATO	North Atlantic Treaty Organization
AFB	Air Force Base	NDBP	Narrowband Direct Printing
AM	Amplitude Modulation	NORAD	North American Aerospace Defense Command
ARQ	Synchronous transmission and automatic repetition teleprinter system	Pactor	Packet Teleprinting Over Radio
AWACS	Airborne Warning and Control System	R3E	Single s deband, reduced carrier modulation scheme
BBS	Bulletin board system	RAF	Royal Air Force
CAMSLANT	Coast Guard Area Master Station, Atlantic; Chesapeake, VA	RCC	Rescue Coordination Center
CIA	U.S. Central Intelligence Agency	RTTY	Radio Teletype
CW	Morse code telegraphy ("Continuous Wave")	SAM	Special Air Mission, US Air Force VIP flight
DEA	US Drug Enforcement Agency	Selcal	Selective Calling tones
ETA	Estimated Time of Arrival	Swed-ARQ	Swedish diplomatic ARQ teleprinter system
FAA	Federal Aviation Administration	UK	United Kingdom
FAX	Facsimile	UN	United Nations
GHFS	US Air Force Global High Frequency System	Unid	Unidentified
HF	High Frequency (3-30 MHz)	US	United States; USN - US Navy
INA	Iraqi News Agency	VIP	Very Important Person
MC	Marine Corps	VOLMET	"Flying Weather," loosely from French
MFA	Ministry of Foreign Affairs	VVV	Morse telegraphy test group
Minrex	MFA, Cuba		

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time).

- 2749.0 Saint John's-Canadian Coast Guard, Newfoundland, with Notice to Mariners in English and French, warning of whales in the area, at 0149. (Ron Perron-MD)
- 2844.0 YHF-Israeli Mossad numbers, completely new frequency, at 1900. (Takashi Yamaguchi-Japan)
- 3047.0 Halifax-Canadian Forces, Halifax, NS, calling Rescue 108, aircraft searching for crashed Swissair 111, at 0438. (Roland McCormick-GA)
- 4372.0 "Alpha-Zulu-Echo" - US Navy, with relay from Giant Killer (Fleet Area Control and Surveillance Facility, VA) to "Zulu-Alpha-India," authorizing live-fire exercise. "J-9-J" and "5-0-I" also heard. Took nearly an hour to relay info to all units due to bad reception, starting at 2350. (Ray Stickney-USA)
- 4660.0 Unid-Chinese female numbers, at 1617. (Yamaguchi-Japan)
- 4724.0 "5-H-C" - Probably US Navy, warning vessel "2-W-P" of encroachment on his sector, and asking intentions, at 0333. "2-W-P" asking "K-9-F" for permission to leave assigned area, at 0351. (Perron-MD)
- 4739.0 Halifax Military-Canadian Forces, Nova Scotia, on primary frequency for large search with Halifax RCC, Rescue 115 (search coordinator), and many aircraft, giving alternate frequency as 5717, for two days starting at 0215. (Perron-MD)
- 4742.0 Architect-Royal Air Force, UK, with "colors" airfield weather at 0131, then working Ascot 3200 (RAF transport) at 0237. (Perron-MD)
- 4905.0 Unid-CW M1A numbers station, with unexpected end-of-month transmission at 2000 (Ary Boender-Netherlands) "M1A" is a radio club's designator for a special numbers transmission made at the end of most months - Hugh

- 5091.0 ULX-Israeli Mossad numbers, used to be JSR, at 1600. JSR apparently now on at 1530. (Yamaguchi-Japan)
- 5170.0 CIO-Israeli Mossad numbers, parallel on 10820, at 1645. Chinese female numbers, different day at 2020. (Yamaguchi-Japan)
- 5180.0 Cape Radio-US Air Force, Cape Canaveral, FL, with Charmer 1 and NASA Booster Recovery Vessel *Liberty Star*, searching for Titan IV debris off Kennedy Space Center, at 1402. (Allan Stern-FL)
- 5278.0 Unid-CW M1A numbers station, with unexpected end-of-month transmission at 1800 (Boender-Netherlands) *Like 4905 -Hugh*
- 5574.0 San Francisco-Central/East Pacific air route station, working airliners, at 0440. (David Cole-USA)
- 5598.0 New York, Gander, and Santa Maria, all in North Atlantic air route net, working Reach 7266 (US Air Force transport) and other aircraft, at 0142. (Perron-MD)
- 5696.0 U.S. Coast Guard-continuous heavy use for hurricane Bonnie information. (Bob Kozlarek-NJ) Coast Guard 6009-US Coast Guard helicopter, position report for CAMSLANT Chesapeake (VA), at 2330. Coast Guard Rescue 1715, also working CAMSLANT, at 2331. (Eddie Muro-NY) Various Coast Guard comms, possibly related to Swissair 111 crash. (Maryanne Kehoe-GA)
- 5715.0 Unid-North Korean numbers, followed by martial music, on large AM broadcast transmitter at 1400. Similar, but not parallel, broadcasts heard on 4770 and 5782. (Yamaguchi-Japan)
- 5717.0 Rescue 24-Canadian Forces aircraft in search for Swissair 111, telling Halifax Military of intention to refuel at Shearbrook, at 0109. Rescue 108-Canadian Forces, telling Halifax RCC that he was also on VHF marine Channel 16, and UHF air 282.8 and 383.2, at 0545. (Muro-NY) Rescue 108, with patch to Halifax RCC, taking control of situation at crash site, establishing safety of flight with three helicopters, and inserting raft with related gear into center of extensive debris field, at 0436. Mentioning search and rescue frequency of 2828 kHz. Reporting rescue 304, a Hercules, on scene and dropping flares, at 0553. (McCormick-GA)
- 6577.0 American 1165-Air route traffic with New York Radio, at 0216. (Cam Castillo-Panama)
- 6637.0 Collins Houston-Rockwell Long Distance Operational Control channel, TX, working various aircraft at 0249. (Perron-MD)
- 6693.0 SAM 683-US Air Force VIP flight, working Andrews after no joy on F311 (11220), at 2145. (Perron-MD)
- 6694.0 Halifax Military, working many aircraft in fisheries patrol at 1353, and another day at 1556 and 1815. Tip Tank-possible Canadian Forces in NATO exercise, with coded messages, simulcast on 10204. (Perron-MD)
- 6757.0 Dog Pound-US Air Force, in Nightwatch net, telling Browbeat that he

**NEW RECEIVER**



## UNIVERSAL SC-50

### SUBCARRIER - FM<sup>2</sup> AUDIO RECEIVER

**RECEIVE ALL FM<sup>2</sup> 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 FM<sup>2</sup> and audio subcarrier channels, hundreds of free programming channels.

**FOR INTRODUCTORY PRICE CALL: 1 - 614 - 866-4605**

**UNIVERSAL** ELECTRONICS, INC.  
*Communications Specialists*

4555 GROVES RD., SUITE 12, COLUMBUS, OH 43232  
(614) 866-4605 FAX (614) 866-1201



- could not decode his secure transmissions, then asked by Browbeat to change call signs and see if that worked. Dog Pound said he'd think about it, thought about it, and refused because he had traffic. All this began at 0100. (Jeff Haverlah-TX)
- 6761.0 Blue 93-US Air Force, using the static callword for tankers going to/from UK, working Blue 75, regarding status of Blue 94, at 0019. (Perron-MD)
- 6855.0 Unid-Cuban "Atención" numbers, simulcasting on 6826, at 0300. (Bill Fairbanks-FL)
- 6980.0 Unid-Cuban "Atención" female, AM numbers on Friday at 0205. Same station, Wednesday at 0210, and Thursday at 1125, all in progress, all ending with "Final" around 45 after the hour. (Castillo-Panama)
- 7668.0 8BY-French Intelligence, Saint Assise, with CW "VVV" and 3-number groups, separated by slant bars. Similar transmissions were heard on 10428, 12075, and 14931. (Yamaguchi-Japan)
- 8570.0 Unid-Machine generated "female" repeating number "106" over and over, in non-native English, at 0501. (Cole-USA) *Sounds like the Russian Man/Lady, a gender-bending "numbers" voice using several languages and transmitters. -Hugh*
- 8650.0 SPE-Poland, with CW channel marker at 0248. (Castillo-Panama)
- 8682.0 EAD-Madrid, Spain, with CW channel marker at 0240. (Castillo-Panama)
- 8700.0 9AR-Rijeka Radio, Croatia, CW marker at 0236. (Castillo-Panama)
- 8752.0 Endeavor-National Science Foundation research vessel out of Rhode Island, telling unheard station (possibly NOAA -Hugh) that ship was now on "the other side of the equator," in a nightly schedule at 0300. (Michael LeBlanc-IL)
- 8843.0 San Francisco Radio-Central/East Pacific air route control, asked by Delta 16 if the frequency was primary, at 0415. (Cole-USA)
- 8971.0 Blue Star-US Navy anti-submarine and drug interdiction, Puerto Rico, clear and secure with Top Rock, Argos, and Midnight, several times including 0005. Hunter 02 (British accent), with tracking data for Blue Star at 0343. Bear 3 and Claw 02, making clear ("red") and secure ("green") comm checks with Blue Star, also "7-Y-0" working Tiger 08, all at 2355. (Perron-MD)
- 8983.0 CAMSLANT Chesapeake-US Coast Guard, telling Rescue 6002 (H-60J from Elizabeth City, NJ) that people have been pulled from the water, so rescue is canceled and the helicopter can return to base, at 1440. (Perron-MD)
- 8983.0 U.S. Coast Guard-heavy use for hurricane Bonnie information. (Kozlarek-NJ)
- 8992.0 Contacte Radio-French Air Force "Circus" net, arranging diplomatic clearance for flight over Mexico by aircraft 301 and 303, at 0215. Portuguese Air Force, selcal checks with Alpha Zulu 033, at 0307. This drew interference complaints from the French. (Perron-MD)
- 8992.0 Match Stick-US Air Force, calling MacDill, no joy, at 1405. (Perron-MD) *Quite a few military operators are still heard calling the closed Global station at MacDill AFB. Oops. -Hugh*
- 9323.0 Possible US Marine stations Delta, Echo, Foxtrot, Lima, Mike, and Tango, in comm exercise, calling this the "Mullet" frequency, then switching to unknown new channel by "kicking to Flounder," starting at 0200. (Perron-MD)
- 9725.0 New Star Broadcasting-Taiwan intelligence, with music and numbers messages, in AM at 1500. Similar broadcasts were heard on 8300, 8375, 11430, 13750, and 15388. (Yamaguchi-Japan)
- 9970.0 JMH3-Tokyo Meteorological, Japan, good copy of fax weather chart, at 1656 (Bob Hall-RSA)
- 10162.4 INA-Iraqi News Agency, Baghdad, with Arabic traffic to unknown station, in RTTY at 1632. (Hall-RSA)
- 10204.0 Nightwatch 01-US Air Force E-4B airborne command post, authenticating traffic with Dragnet Uniform, at 1220. Valhalla, also in net, broadcasting coded message and then going to secure mode with Infinite, at 1339. Same day and net as logged on 11214. (Perron-MD)
- 10527 Unid-Possibly CIA "counting" station, but in USB, not R3E, at 2040. (Yamaguchi-Japan)
- 10820.0 CIO-Israeli Mossad numbers at 0247. (Dean Burgess-MA) CIO-Mossad numbers, new frequency this hour, at 2145. (Yamaguchi-Japan)
- 11093.0 Woodpecker-Control in US military exercise, with many tactical comms concerning targets for Bull Knight, Bouncer, Sierra Mike, Romeo, Golf, and Delta, at 0254. (Burgess-MA)
- 11175.0 AAFA-US Army vessel, passing position and status to Charlie 2 in patch via Ascension, at 0050. Army vessels ADMN (USAV *Corinth*, a landing craft) and ADMG also heard at various times. Turkish Air Force 001 in patch to Incirlik AB, Turkey, via Thule at 0224. (Perron-MD) Teal 33-US Air Force Reserve 53rd Weather Recon "Hurricane Hunter" WC-130, many patches and media interviews with Capt. Scott Spitzer, regarding Hurricane Bonnie, at 0155. (Tony Assenza-CA) Otis 81-US Air Force, enroute to Andrews AFB with "22 souls on board," told Andy that they would not stay the night, "just getting gas and going," at 2333. (Muro-NY) Reach 4018-US Air Force Air Mobility Command, patch via Andersen, informing Ramstein, Germany that aircraft had, "ETA 2300 Zulu with 11 HA" (human remains) and four wounded. Ramstein told aircraft where to offload bodies, at 2023. (Oscar Bosman-Netherlands) *A U.S. medical evacuation flight from the embassy bombings -Hugh*
- 11214.0 Dragnet Uniform-US Air Force AWACS, probably from Tinker AFB, OK, with patches through Trenton Military, Canada, to Big Deal, Huntress (NORAD regional intercept center at Griffis AFB, NY), and Nightwatch 01, confirming net frequencies as Z190 (10204) and Z175 (9016), starting at 1156. (Perron-MD)
- 11232.0 Darkstar X-ray-US Air Force, 552nd Air Control Wing, Tinker AFB, with patch through Trenton Military to Raymond 24 (Tinker command post), requesting relay of ops-normal status to Falcon 2 and Sentry 3 (also 552nd ACW), at 0237. (Perron-MD)
- 11244.0 SAM 27000-US Air Force VIP aircraft, enroute to Germany with US Secretary of State, many patches throughout day, also working Ramstein Command Post on UHF. (Bosman-Netherlands) *State Department mission to pick up embassy casualties -Hugh*
- 11247.0 Ascot 3201-Royal Air Force transport, UK, getting weather from Architect (RAF command) for Frankfurt, Germany and Brize Norton, England, at 0155. (Perron-MD)
- 11271.0 ADMN-US Army Vessel *Corinth*, with patch through Thule AB, then went to 13242. (Perron-MD)
- 11440.0 Teal 23-US Air Force Reserve Hurricane Hunter, with ground radio checks to Accountant (US Air Force rescue), at 1414. Also Spanish-speaking stations passing Zulu times, NATO phonetics, and messages regarding paramilitary personnel. Venezuelan Army, or ...? (Perron-MD)
- 12212.5 PWH33-Brazil Navrad, with Boletim de Ordones (Daily Orders), RTTY, in Portuguese at 1231. (Hall-RSA)
- 12380.3 XFM-Manzanillo, Mexico, CW English marker noting that this station will close its Morse services soon, at 0000. (A. Nonomous-NC)
- 13077.0 KMI-AT&T High Seas, Inverness, CA, with phone call to WY774, the *Aleutian Spring*, only one side heard, at 0232. (Burgess-MA) *This is maritime channel 1301, and the ships transmit on 12230 -Hugh*
- 13113.0 HLS-Seoul Radio, Korea, short music mirror and phone patches, also using 13161, at 0100. (Yamaguchi-Japan)
- 13200.0 Thule-US Air Force GHFS, Greenland, patch to Mudbug Control (Louisiana) to schedule air refueling for Doom 83 and Doom 96 (B-52s, Barksdale AFB), at 0219. (Perron-MD)
- 13267.0 Irkutsk Volmet-Russian flight weather, in Russian, at 0455. (Yamaguchi-Japan)
- 14000.0 Unid-male and female voices repeating "Nancy Adam Susan," "Frank Young Peter," and "Queen Thomas Susan," different days at 1400. (Yamaguchi-Japan)
- 14405.0 Unid-UN High Commission for Refugees, no call or address copied, with administrative messages in Pactor, at 1647. (Hall-RSA)
- 14686.0 Atlas-US Customs, probably Texas, working Panther (DEA, Bahamas) and aircraft 37 Charlie, who is enroute to base "Echo 3," at 1820. (Perron-MD)
- 16086.0 Unid-CIA "counting" station, parallel on 21811, numbers in R3E modulation at 1100. (Yamaguchi-Japan)
- 17147.0 URL-Sevastopol, Russia, with radiograms for ship crews, in RTTY at 1317. (Hall-RSA)
- 17204.0 LFI-Lyngby Radio, Denmark, with new call sign in CW, no longer OXZ82, at 1326. (Hall-RSA)
- 17428.9 CLP-Minrex, Havana, Cuba, on frequency usually used by MFA Stockholm, in RTTY at 0954. (Hall-RSA)
- 18000.0 Unid-voices repeating "Nancy Adam Susan," "Queen Thomas Susan," and "Baker Edward Charlie," different days at 1100. First hits this frequency. (Yamaguchi-Japan) *Yup; same people as 14000, good old Phonetic Alphabet Station -Hugh*
- 20699.0 SAM-MFA Stockholm, with urgent personal message for ambassador, in Swed-ARQ at 0833. (Hall-RSA)
- 20998.0 "Quebec-1-2"-calling "Oscar Dos" (O2) and "Eco Cero Cinco Seis" (E056), in Bahia Blanca, Argentina, then went to channel "AC061." (Castillo-Panama)



Bob Evans

reevans@interlog.com

<http://www.interlog.com/~reevans>

## Digital Equipment Overview

Continuing with the theme of last month's column, we now focus on the types of decoders currently available to the digital monitor. Once limited to the HF (shortwave) spectrum, decoders are now also available for the newer VHF modes as well.

Back in the late 60's, most digital signal monitors (your editor included) originally started by decoding Baudot RTTY in the shortwave bands. Only the strongest and cleanest signals could be decoded by these early AEA, HAL and Kantronics units — more sophisticated monitoring required more expensive equipment, often in the form of surplus commercial hardware. Many of these early decoders also handled Morse (CW) and ASCII signals as well.

Then in the 70's, Infotech introduced its high end/high priced line of decoders. I remember buying my first used Infotech M-600 from a local policeman at a price of one thousand dollars (twice the amount of the car I owned at the time). The Wavecom unit was introduced in Europe, but was never promoted successfully in North America and even today it remains one of the most expensive units available.

The late 70's and early 80's saw the addition of newer modes on the shortwave bands SITOR-A and SITOR-B, ARQ M-2/4, as well as the increasing popularity of HF FAX. Other standalone decoders were introduced and the Infotech line was taken over by Universal Radio.

The explosive growth of computers in the 90's contributed to the rise of newer communications protocols such as ARQ-E/3, SCI and FEC-ARQ, Packet and Coquelet, as well as a plethora of diplomatic digital modes. Universal and Wavecom continued to introduce outboard decoders that addressed these new modes.

Perhaps the most significant factor in the rise of popularity of digital communications for the hobbyist was the introduction of the personal computer. A relatively simple interface, coupled with intelligent software now provides not only a means of decoding but also of analyzing digital transmissions. As new digital communication protocols are introduced, progressive software engineers can implement new code routines to process them.

The Hoka series of decoders are very popu-



Early decoders like this HAL were costly.

lar among many monitors today. Among the most popular is the Hoka Code 3-Gold which retails for just under \$600. The small interface cable plugs into one of your COM ports with an audio lead going to the line-out/speaker out jack of your shortwave radio.

In addition to the standard modes found on most decoders today, the Hoka Code3-Gold also includes a plethora of specialty modes not generally available to the digital monitor.

### HF modes include:

ANNEX10 (aircraft SELCALs), ARQ-6-70, ARQ-6-90/98, ARQ-E, ARQ-N, ARQ-E3, ARQ-S (SI-ARQ), ARQ-SWE (SWE-ARQ), ASCII, Autospec, Baudot RTTY (IAT-2), Baudot F7BBn (2 channel), Coquelet Mk1 and Mk2, DCF 77 (Atomic Time), DUP-ARQ (ARTAC), Facsimile (FAX), FEC-A (100A/101 and Raw), FEC-S, GMDSS/DSC, Hellsreiber, HC-ARQ, HNG-FEC, Morse (CW), Packet Radio (AX25), PACTOR, Piccolo MK VI, POL-ARQ, ROU-FEC (RUM-FEC), SITOR AUTO ARQ/FEC CCIR 476-4 CCIR 626 Modes A & B, SITOR ARQ CCIR 476-4, CCIR 626 Mode B NAVTEX, SITOR RAW, Spread, SSTV (Martin-1), SYNOP decoder (AAXX/BBXX with 10,000 stations), TDM242 ARQ-M/4-242 CCIR 242, TDM342 ARQ-M2/4 CCIR 342-2, TORG-

### VHF modes include:

ACARS/SITA, DTMF, FAX (Meteosat), Packet, and POCSAG/Super POCSAG.

Hoka also makes a professional model, the Hoka Code-30, costing more than \$2000.

### Codes, Privacy, and the Law

In the past few years, decoders have also

been available for the newer VHF digital modes used by pagers (POCSAG and GOLAY) as well as the digital communications system used for air/ground aircraft transmissions (ACARS).

During the past three years, considerable controversy has existed at the federal level in the United States regarding the privacy of communications. These concerns have led to the blockage of cellular phone frequencies for scanners sold in the United States as well as Universal's self-imposed withdrawal of sale of its line of decoders to private American citizens.

Fortunately, as you read this column, the popular Universal M-450 and M-8000 decoders will be available for sale to the general public once more\*\*; however, the updated versions will no longer feature decoding of the VHF Pager modes (POCSAG and GOLAY).

Although it may be very tempting to purchase a decoder that handles every conceivable mode that currently exists, it should be remembered that in reality, you probably will never encounter many of the esoteric modes on the shortwave bands, and even if you do, many of them, such as the newer diplomatic modes, will be in the language of that country. Unless you are fluent in Serbian, Hungarian, Roumanian, etc., their message content will escape you.

By way of illustration, Joerg Klingenfuss in the 1998 *Guide to Utility Radio Stations* has compiled the following statistics from the 11,800 frequencies cited in his tome.

"Out of all non-IATA 50 Baud teleprinter signals of utility stations monitored here, there is:

- 50 % SITOR-A and SITOR-B;
- 13 % IAT2 75 Baud;
- 6 % VFT;
- 5 % ARQ-E;
- 3 % each ARQ-E3, ARQ-M, FEC-A, IATA2 100 Baud, and PACTOR;
- 2 % and less of all other teleprinter systems each."

Best wishes for a happy and safe holiday season.

\*\* Note: Universal Radio is an American company and its line of decoders is manufactured in Florida. Hoka Electronics is a Dutch company and is not bound by U.S. regulations. Similarly, scanners sold in other countries, such as Canada, do not have cellular phone frequencies blocked.



Glenn Hauser, P.O. Box 1684-MT, Enid, OK 73702  
E-mail: <ghauser@hotmail.com>; fax: (580) 233-2948, ATT: Hauser

## WBCQ - An Alternative Shortwave Station

WBCQ, Monticello, Maine, began testing August 20 and began programming September 8, only on 7415, on a 245° beam, which roughly crosses Buffalo, Columbus, Evansville, Little Rock, San Antonio, Laredo, Durango, Tuxpan, across the Pacific to south of New Zealand.

During the first week, nothing was more entertaining than Al Weiner's time-filling monologues, with the possible exception of the wacky revival of *Radio Newyork International* with Johnny Lightning on Sunday night.

Committed to freedom of speech, Weiner made time available to the neo-Nazi *American Dissident Voices* and to *Hour of the Time*, but also planned to carry impressionist Harry Shearer's political satire, *Le Show*, Sundays at 7-8 pm ET, as we suggested. Al also said he wanted to carry master storyteller Jean Shepherd. Gary Bourgois' satellite show, *Friday Night Live*, was at 9 pm-midnight ET. The latest program schedule should be posted at <http://theplanet.wbcq.net> which early on gave this info:

"WBCQ - The Planet is a 50,000 watt shortwave radio station that serves North America, the Caribbean and most of South America on 7415 kHz. We can broadcast your organization's programming to the world for the lowest cost of any such broadcaster serving our region of The Planet. Our airtime is available for as little as \$50/hour.

"We will accept programming via mailed audio cassette, VHS-



Hi-Fi, reel to reel tape, telephone, satellite or internet feeds. We encourage groups with a leftist, alternative, pacifist or populist perspective to take advantage of this unique opportunity to get their message out. Contact Allan H. Weiner, General Manager or Randi Steele, Operations Manager for further details at (207) 985-7547."

In response to a call-in question, Weiner said WBCQ has 14.2 dbi gain, equivalent to 18-20 over

50 kW transmitter power, considerably more than half a megawatt in the main beam of 245 degrees, but he couldn't remember the beam width. Antenna is a hybrid, both log periodic and beam, 60 feet or about a halfwave above ground. Transmitter is a 50 kW Harris MW converted to SW and now designated a SW-50, with pulse duration modulation (PDM), not plate or linear modulation; uses an Inovonics 222-02 audio processor modified for SW; it's simple, clean and broadband, and we must say the audio is quite good both on voice and music (but not on some of the phone lines).

Weiner closed his inaugural broadcast with "We are the light, and thunder, and the truth shall set us free."

Randi Steele was moving from NY to Monticello to be primary operator of the station. And she is in for a *real* winter.

First-night listener Jim Wishner in Duluth opined: WBCQ has potential to put some life into SWLing — some fun, some unpredictability, and some energy.

**AFGHANISTAN** R. Voice of Shari'ah, Kabul, is on the air 0030-1840 but SW 7200v is only used part of the day; includes news in English at 1645-1700. R. Voice of Shari'ah of Takhar Province, Taloqan, taken over by Taleban forces in mid-August from pro-Rabbani forces, 1230-1325 on 7085 (BBC Monitoring) Check out my sound files of this and many other Asian and African stations: <http://home.winsocet.com/~Vaghjee/> (Mahendra Vaghjee, Mauritius, *hard-core-dx*) Kabul's English later switched to 1700-1715 (Mikhail Timofeyev, Russia)

**ANDAMAN ISLANDS** AIR Port Blair, 4760, partial data card depicting statue of an elephant holding its mahout in its trunk received in one month for an English report sent registered mail to "General Correspondent." Verie signer A. K. Bhatnagar, Director (Frequency Assignments). Note: this was my second attempt to QSL via registered mail. The first attempt was returned because the correspondent listed in *PWBR* was no longer there. If you have an outstanding request of AIR Port Blair for a QSL, you might want to remail to this gentleman (Rich Hankison, KS, *Cumbre DX*)

**ANTARCTICA** LRA36, R. Nacional Arcángel San Gabriel, 15476, is still 1 kW; may not get new transmitter until next year; 1230-1430 M/W/F but the technical operator is sometimes away so a broadcast is missed (Gabriel Iván Barrera, Argentina, radio-escutas) Then it was going to be inactive for a month (Barrera, *Cumbre DX*)

**AZERBAIJAN** R. Baku on much better new 9165 ex-6110 including English 1700-1730 (Kai Ludwig, Germany) One hour later in winter? (gh) Was heard at 0215-0300, 1100-1500, 1600-1800 in various languages (Mikhail Timofeyev, Russia, *DSWCI DX Window*)

**BELGIUM** [non] RVI's English broadcast to NAM will be relayed via Bonaire from the end of October, at 2230 on frequency TBA; replaces direct broadcast at 1230 on 15545 (RVI *Radio World*)

**BHUTAN** BBS, Thimpu sked on 5030: Mon-Sat 1000-1245 in Dzonkha, 1245-1315 Nepali, 1315-1400 English; Sunday on 6035 at 0400-0830 in Dzonkha, 0830-0900 Nepali, 0900-

1000 English (*Radio-Incontro*) One of the *World of Radio* shows in November will feature a *Wavescan* special about this station, on its 25th anniversary (gh)

**CENTRAL AFRICAN REPUBLIC** I've been hearing Bangui back on SW on the (slightly) new frequency of 5036.36 kHz until the new signoff time at 2100. Reception isn't very good and I'm sure they are no way near the nominal power of 100 kW. Sounds more like 100 W to me. I believe the station returned in early August after having been silent on SW for some 6 or 7 months (Stig Hartvig Nielsen, Denmark, *hard-core-dx*)

Radio MINURCA is a 24 hr UN mission station on FM in Bangui which planned to add SW in Sept, 20 kW, on different day and night frequencies (David Smith, R. MINURCA, RN *Media Network*) Set up in connection with elections later this year and may be moved to another country, such as Philippines, afterwards. Frequency chosen by a Canadian advisor is 11300, but I suggested something clear in the 9180-9260 range; also may use 7.3-7.5 and 11.4-11.6 MHz (Stig Hartvig Nielsen, Denmark, *hard-core-dx*) It was quickly pointed out by Robert Joosten, Michiel Schaay that 11300 is a very active aeronautical frequency in East Africa, and hoped that R. MINURCA would not actually use it (gh)

**CHILE** Voz Cristiana heard on 5845 at 0400 (Don Putnick, CA, rec.radio.shortwave) It's the semi-harmonic of 11690 kHz (gh)

**CHINA** CRI has a new website: <http://english.cri.com.cn> (Jim, rec.radio.shortwave) And from Sept a new arrangement of their opening music with more horns (Joe Hanlon, *Review of International Broadcasting*)

**CONGO D.R.** R. Candip, Bunia, under rebel control since mid-August, 5066 kHz at 0400-0700, 1330-1800 in French and Swahili, includes News daily at 0500-

0530, 1500-1530 purportedly from "RTNC" Kinshasa, but is really pro-rebel. Alternative frequencies: 7150, 3390 kHz (BBC Monitoring)

**COSTA RICA** RFPi's Kitty which has taken over the station has been named Paz, which happens to sound like Paws. Pacifica Network News was finally added to the schedule in Sept, from internet feed, UT Tue-Sat at 0030-0100. James and Debra Latham have a new weekly hour, *Millennium*

**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; J-98=May-Sept; Z-98=Summer season; W-98=Winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there.**

*Dreams*, about their lives, RFPI, remotes from Costa Rican locations, storytelling, Mon 2000, Tue 0400, 1100, Fri 2330, Sat 0730, 2000, Sun 0400. It was planned to simplify RFPI's URL to: <http://www.rfpi.org> and change the E-mail address accordingly. Lifetime memberships in Friends of RFPI are \$1000, payable at \$500 this year and \$500 next, or \$100 for the next ten months. Info from Oregon office phone, 503-252-3639 (RFPI Mailbags)

*Continent of Media*, our program broadcast only on RFPI, is now also available thanks to Harry Helms at: <http://www.DXing.com/ContinentOfMedia.html> using RealPlayer 5.0 or G.2 player (gh)

**CROATIA** Zagreb being heard on new 5040 kHz is again explained as a mixing product between the MW transmitter on 1125 kHz and a new SW frequency of 6165 kHz from \*2200 UTC (Kai Ludwig, Germany)

**CUBA** [non] An Anti-Castro Historiography's URL including lots of clandestine radio info has changed to: <http://polisci.home.mindspring.com/ach.htm> (Armando F. Mastrapa, *Cumbre DX*)

A broadcaster for R. Martí, Luis Flores, pleaded guilty to lying to the US Government about personal moving costs from Washington to Miami. Flores could face up to five years in prison and a \$250K fine (Fort Lauderdale *Sun-Sentinel* via Mike Cooper)

**CZECH REPUBLIC** Czechs Worried Over Radio Free Iraq: Here are some excerpts from Radio Prague's news in English for Sunday, August 23:

"Radio Free Europe officials have rejected criticism regarding their failure to consult with Czech government officials on the chosen headquarters for Radios Free Iran and Iraq, which are to go on the air late September ... Czech deputy premier Egon Rounsky pointed out that the (billet?) chosen to house this service was located right next to a nursery school and the cabinet had no information as to what kind of security measures were being taken. He stressed that when the safety of Czech citizens was involved the cabinet should have been consulted" (Roger Tidy, UKOGBANI)

**DODECANESE ISLANDS** The final VOA Rhodes SW transmitter was to close down in mid-August (Dan Ferguson, IBB, *Cumbre DX*)

**DOMINICAN REPUBLIC** Ondas del Yuna, Bonaio, on 2700.09 = 2 x 1350 at 2345 with all-bachata format led by acoustic guitar but with electric bass and occasional accordion, steady all evening with fine audio past 0352, said 24 hours (Jay Novello, NC)

**ECUADOR** Harmonic, 4019.93, LV de Su Amigo, Esmeraldas, 3 x 1340, 0205 to 0500\* Aug 23, tropical uptempo selections and "Billie Jean," mentions of *Programa La Fiesta* and *Su Amigo* by male DJ, S7 signal, entertaining music, and great audio, despite noise. Signed off with full ID mentioning 1340 and 96.3 "FM Digital," and vocal version of Ecuadorian national anthem. There are RealAudio samples of this on my sprawling logs/samples page, <http://itrc.ncsu.edu/radio/samples/> (Jay Novello, NC)

R. Baha'i, Otavalo, 4950.34, caught with English ID at 0949, asking for reports and spelling out address (Dave Valko, PA, *Cumbre DX*)

We at HCJB are concerned about the report of distorted audio in your September column, but we are not using an Orban 9105a (Roger Stubbe, HCJB Worldradio, CO)

HCJB reports that due to the recent Cuban air crash in Quito, talks have begun again to implement building of a new airport. That is leading HCJB engineers to renewed efforts to look for new sites to relocate the transmitters from Pifo (Joe Karthaus, *World of Radio*) The present airport is one of the most difficult in the world to approach. You have to fly around some volcano tops just before touching down and the city has grown up with skyscrapers during the past two sesquidecades under the final approach, so aircraft are just a few metres above the top of tall buildings, and sometimes clip them; also the area is subject to fog (Anker Petersen, DSWCI *DX Window*)

**EQUATORIAL GUINEA** R. Africa, American religious programs in English, 2130-2300 on R. Nacional Malabo frequency 5003.5. What's going on here? (Michael Schnitzer, Germany, *hard-core-dx*) R. Africa was always part of R. Nacional, so it's not surprising it showed on the latter's frequency (gh)

**ETHIOPIA** V. of the Revolution of Tigray sent a QSL letter saying they have a 10 kW transmitter in Mekelle, the capital city of Tigray region, on 5500 and 7515 kHz: M-F 0400-0500, 0930-1030, 1500-1900; Sat and Sun 0400-0900, 1100-1630. Address is P O Box 450 (Daniel Canonica, Switzerland, DSWCI *DX Window*)

R. Fana, Amharic for "torch" or "light," began on Nov. 7, 1994, operated by the Ethiopian People's Revolutionary Democratic Front. In late 1995 R. Fana said it was no longer owned by EPRDF but is an "autonomous radio station deriving income from educational sponsorship by some NGOs." Addr is P O Box 30702, Addis Ababa. Alternate HF is 9335. Schedule in Amharic/Oromo all on 6940, 6210 and 1080 kHz: daily 0330-0530, 0900-1100, 1500-1800; Sat and Sun also 0530-0730, 1200-1500; M-F also 1800-2000 (BBC Monitoring) 6210 improved as fall approached, heard from \*0328 including rather nice flute music (Robert Montgomery, PA, *Cumbre DX*)

**GERMANY** Süddeutscher Rundfunk (SDR) and Südwestfunk (SWF) merged into the new Südwestrundfunk (SWR) at the end of August. SDR had SW on 6030, SWF on 7265. Both were to carry the SWR-3 pop music program 24h, Klaus Köhler was told by SDR (Kai Ludwig, Germany)

**GUAM** KSDA had AWR *Wavescan* Sunday 1330 on 13720, three weeks old (gh)

**INDONESIA** According to my monitoring on August 28 - 29, RRI stations (except those with asterisk) signed off using the "Love Ambon" tune as follows. (Juichi Yamada, Japan, *Jembatan DX*):

3215.0	RRI Manado -1515
3264.6	RRI Gorontalo -1310
3325.0	RRI Palangkaraya -1600
3344.9	RRI Ternate -1515
3355.3	RRI Jambi -1655*
3976.1	RRI Pontianak -1700
4000.0	RRI Padang -1655
4606.4	RRI Serui -1515
4753.3	RRI Ujung Pandang -1555
4766.0	RRI Medan -1600
4845.2	RRI Ambon -1130*
5040.0	RRI Pekanbaru -1600
7173.2	RRI Serui -0910*
9552.6	RRI Ujung Pandang -0850*
9741.6	RRI Sorong -1215*

**IRAN** [non] Democratic Voice of Iran, 6210 kHz is useless in Sweden, but 5835 kHz has a good signal. This anti-Iranian government station has nationalistic tendencies. 1745 UTC with news and music. They have a site on the Internet <http://www.dvi.org> with information in English and Persian. (Mehrhad Sahba, Sweden, *Cumbre DX*)

**IRAQ** R. Mother of Battles, the Radio of all Arabs (Arabic: *Idha'at umm al-ma'arik. Idha'atu kul al-arab*) heard on excellent new 9685 at 1600-1900v //11785 under QBS (*PanView*, Bulgaria)

[non] V. of the Iraqi Communisti Workers' Party, Sulaymaniyah, 1630-1830 daily in Arabic/Kurdish on 4000 (BBC Monitoring)

**IRELAND** RTE's media program *Soundbyte* is on the Sunday overnight service to USA NPR stations from WRN, and can be accessed in RealAudio, <http://www.rte.ie/radio/soundbyte> (Harry Sarkas and Finbarr O'Driscoll, *Review of International Broadcasting*)

**KOREA NORTH** R. for Soldiers at the Frontline reactivated in Aug after 10 months off, 2625 kHz with usual war dramas, music, political comments, daily 1400-2000 in Korean; MW 1613v has similar but not parallel programming (Sonny Ashimori, Japan)

**KOREA SOUTH** Yonhap News Agency, Seoul, press radioteletype in English to Asia: Mon-Sat 0030-0300, 0730-0900 UTC on callsign 6MK64 11602.5 kHz and 6MK50 7868 kHz (BBC Monitoring)

**KURDISTAN** Two stations, the Voice of Iraqi Kurdistan on 4060 and the Voice of the People of Kurdistan on 4085 stopped their transmissions at 1654 on 13 June. After two minutes they resumed. Both broadcast from one and the same radio centre (Mekhonoshin, Russia, World DX Club *Contact*) Or at least are on the same power grid (gh)

**MALDIVES** [non] FEBA Seychelles has a broadcast in the Maldivian language Fri 1630-1700 on 11670 ex-11600. It's jammed by the Maldives government, a 100% Islamic country (Victor Goonetilleke, Sri Lanka, RN *Media Network* via World DX Club *Contact*)

**MEXICO** Officials of Radio Educación told me that the SW transmitter on 6185 is now 10 kW and in the near future they are putting in service a new antenna with a gain 4.4 times the nominal power. And Radio Educación has a new SWL program, *Entre Medios*, one hour on all topics of radio and DXing. Wednesday at 2200 local time (Thursday, 0300 UT) & Friday at 0000 local time (Friday, 0500 UT) (Pedro Sedano, Spain, *Cumbre DX*) After DST the times should be 0400 and 0600 UT (gh)

XERTA, 4800.7, has a new program *En Línea* UT Tue, Thu, Sat at 0200-0300 [as shifted for winter], about Mexican culture, show people, gossip, folk, pop and rock music by a young group of journalists, produced by myself and Alfredo Villavicencio (Julia Serradilla, DSWCI *DX Window*) Also on XERTA is the new *Transcontinental DX* program, Thu 0000-0100 (Hector Garcia Bojorge, México DF, *Cumbre DX*)

Dr. Julián Santiago spoke with the director of Sistema Rasa in Mérida: they plan to broadcast on XEQM 6105 segments from their other stations besides

## DX Listening Digest

More broadcasting information by country compiled  
by Glenn Hauser

## Review of International Broadcasting

SW Programming, opinion, equipment, satellite monitoring.

Samples \$2.50 each (outside North America US \$3 or 6 IRCs)

10 issue subscriptions \$26 in USA, or both for \$49

Glenn Hauser, Box 1684-MT, Enid, OK 73702

Candela FM, want to answer all the letters, and may soon have a QSL card. Also want to price a new more powerful transmitter and apply for a power increase (Héctor García Bojorge, México DF)

**NEPAL** R. Nepal, 5005.03 kHz, heard at \*0011-0025 during a late-August geomagnetic disturbance, fair and clear as was //7165.24 but both had only a very weak het the next night (Brian Alexander, PA)

**NEW ZEALAND** The dollar amount of the cut which has caused RNZI's drastic reductions is less than \$100,000 US. If the NZ government isn't willing to pay it, seems to me that it could be raised by grants from elsewhere, even a single private benefactor. That's peanuts in the world of international broadcasting (gh)

**PAPUA NEW GUINEA** NBC's R. Morobe, 3220, is off the air due to transmitter faults, likely to stay off a while (*National* newspaper, Port Moresby, via Matt Francis, *hard-core-dx*)

**PERU** Radio Satélite, Santa Cruz, 6725.54, has seemingly started early morning operation on shortwave. It was first noticed until 1200 on 15 Aug, fair signal. Electricity was formerly supplied only in the local evening in the Province of Santa Cruz, so Radio Satélite had operated only at 2300-0300. Therefore, I assume that they have now electricity for 24 hours a day. According to announcement, the morning program *Saludos Musicales* is at 1100-1300 (Takyuki Inoue Nozaki, Japan)

R. Virgen del Carmen, Huancavelica, 4886.72 at 1100 with ID, replacing R. Villa Rica (Takyuki Inoue Nozaki, Japan)

R. Nueva Sensación on new 6618.16, strong at 0130 with wobbly Peruvian music, IDs (Jay Novello, NC) The one which used to be on 6895 until a few years ago. Will soon be on from 0930 all day long; sometimes just "Súper Sensación" (Henrik Klemetz, Colombia, DSWCI *DX Window*)

Ondas del Rio Mayo again using alternative frequency 6697 [sic] mornings and evenings (Hans Johnson, *Cumbre DX*) 6797.68 [sic] at 1019, beautiful signal with music filling the room (Jay Novello, NC, *ibid.*)

**SIERRA LEONE** Sixteen people have been sentenced to death for their part in last year's military coup, including Hilton Fyle, former BBC broadcaster and owner of an FM station here; and Felix George, former head of the SL Broadcasting Corp. (*The Times* via Joel Rubin) Found guilty of treason, because they broadcast material allegedly in support of the junta which seized power last year (and which was itself overthrown earlier this year with the help of mercenaries (Chris Greenway, British DX Club)

**SINGAPORE** R. Singapore International, external services to Asia daily: 1100-1400 Std. Chinese 6120, 6000 kHz; 1100-1400 English 6150, 6015 kHz; 1100-1200 Indonesian & 1200-1400 Malay 7245, 6070 kHz (BBC Monitoring)

**SOMALIA** I am the Coordinator for the UNESCO Civic Education for Peace and Good Governance in Somalia project which is based on community mobilization for peace through radio. We are partners with Radio Hargeisa and Radio Galkayo. Radio Hargeisa's signal can barely be heard even within Hargeisa itself. We are looking for technical assistance to assess their needs as well the possible donation/sale of used equipment to restore their radio which was destroyed in the civil war. Help is needed urgently as Somali refugees in Djibouti and Ethiopia do not have information regarding the situation in Somaliland (North West Somalia) and are uncertain as to whether to return.

A radio team from throughout Somalia is producing two weekly programmes for peace and reconciliation: a soap opera *Geedka Nabadda* (Tree of Peace) and a radio magazine, based on material recorded by community groups throughout Somalia, *Muuqaalka Noloshah* (Visions of Life). We are working on establishing networks of community groups trained in some basic radio techniques as a foundation for future community radio stations. We currently have Peace Resource Centres in Hargeisa, Bosaso, Garowe, Belet Weyne and Mogadishu. The programmes plus an *Omnibus* (the two programmes together) is broadcast weekly by Radio Hargeisa, Radio Galkayo and Radio KBC (in Kenya).

We are funded by UNDP but the funds are being reduced due to an overall lack of funding for UNDP and a decline in international support for peace building in Somalia. We are currently seeking support, including sister stations for Radio Galkayo and Radio Somalia. We are working on an English language feature on the project for radio stations. However, we do not have the ability to download it onto the Internet. We could send a copy of the cassette to anyone interested in broadcasting it (Pamela Collett, Project General Coordinator, UNESCO Civic Education for Peace and Good Governance in Somalia; email: mukinduri@form-net.com via Creative-Radio Mailing List via DevMedia List via Don Moore)

**SUDAN** R. Omdurman, 9200, after the American bombing, was on later than usual 2300\* with plenty of IDs, angry-sounding music (Jay Novello, NC) Later heard on 9220 but still announcing 9200, English with anti-American comments at 1800 (Ralph Famularo, Japan, *Cumbre DX*)

**SWEDEN** Digital Shortwave — In the future there should be a new way to listen to Radio Sweden in the old way — good old shortwave isn't dead yet. Around the world there are several projects working on what is sometimes wrongly called Digital AM, a digital version of the traditional AM mode on long, medium, and shortwave. Here in Sweden, Teracom, who run our transmitters, is one of two international centers carrying out research on how different ways of coding a

radio signal and fitting it into a normal 10 kHz wide shortwave channel sound. For two weeks last spring, volunteers spent 6 hours at a time, listening to and evaluating different coding systems (George Wood, *MediaScan*)

**SWITZERLAND** At the end of October, SRI is closing down the omnidirectional European service on 6165 kHz, leaving only the directional transmitter at Sottens in operation in Switzerland; SRI is counting on spillover from other sites, and satellites to fill the gap (Bob Zanotti, SRI, *Review of International Broadcasting*)

**UK OGBANI** There has been a small overall decline in the estimated audience of the World Service from 143 million in 1996/7 to 138 million in 1997/8. The fall is most marked in developing countries; for example in Egypt where the audience has reduced by 4 million. In Europe audiences are slightly down, largely owing to the closure of the Finnish service. Audiences are increasing in other countries: up by 1.2 million in Russia, up by half a million in Ghana and other parts of Africa. In the US and the Caribbean audiences have risen to record levels. The WS still commands a mass audience in countries where there is little else that people can depend upon. In countries such as Afghanistan, Somalia, and Rwanda the BBC acts almost as a national broadcaster. However the number of such countries is diminishing. The audiences which find the WS of most value tend to be the more highly educated, for whom it is their first choice for authoritative international news. In Turkey, for example, while only 1% of the Turkish population listens to the BBC WS, it reaches 25% of the country's opinion formers. In the coming year the WS will invest more in new services to make possible the introduction of television news programmes in selected languages, drawing upon existing BBC material. They aim to launch a second WS in English channel and to increase use of FM and digital systems to improve reception (BBC Annual Report via David Bowman, World DX Club *Contact*)

When the solar flux is up, look for BBC WS harmonics above 30 MHz, such as 30970, 31130, 35410 kHz (Wolfgang Büschel, Germany)

**USA** Mark from Michigan is no more. Mark Koernke, co-host of *The Intelligence Report* on WWCR, is probably no longer on the air. After failing to show up for a trial in late May, Koernke was on the run for a few months, according to stories in the *Ann Arbor News*. The same paper reports that he was caught in late July. Koernke reportedly had urged listeners to kill an assistant U.S. attorney on the show last year (Hans Johnson, *Cumbre DX*)

WWBS was ready to start testing in mid-Sept on 11910 kHz only, 2300-0400 UTC to be expanded to 1100; QSL reports with return postage by P-mail only to PO Box 18174, Macon, GA 31209; inquiries may go to [wwbsradio@aol.com](mailto:wwbsradio@aol.com) (Hans Johnson, (c) *Cumbre DX*) Would clash with Budapest at 0000, 0230 at least (gh)

New on WGTG is *Church and State*, sort of a shortwave version of *Crossfire*, discussions between a liberal and a conservative with a moderator, Sun 1600-1700 on 9400 kHz; see <http://mypage.goplay.com/churchandstate/> (Jim Corsiatto, *World Of Radio*) If still there unchanged, winter timing would be 1700-1800

*World Of Radio* on WWCR as expected to be timeshifted for winter, based on September scheduling: Thu 1700 and 2130 on 15685 kHz, Sun 0730 and 1030 on 5070 kHz, Tue 1330 on 15685 kHz. For the latest see <http://www.angelfire.com/ok/worldofradio>

The AFRTS SSB relays allowed us to hear some good programming on SW: *The Savvy Traveler* was Sunday at 1700 on 12689.5, but the next week this had the music service on instead. *Into Tomorrow* with Dave Graveline, technology talk show, appeared Sunday 1006 on 4278.5 (gh)

For the S-98 season, WSHB moved from 18930 to 18910 kHz at 1600-1900 (Bob German, GJA, *Electronic DX Press*) website says staff reduced from 17 to 9 (Jim Moats, OH, *Review of International Broadcasting*)

*Spectrum* was to return in mid-Oct, same time as before, i.e. UT Sun 0200-0300 on WWCR 5070; winter 0300-0400 (Mark Emanuele, *Mike Jarmus Show* via Alex Draper)

Due to congressional funding delays, the new Radio Democracy for Africa service is not likely to start before late this year, more likely next year (Kim Andrew Elliott, VOA *Communications World*)

**VENEZUELA** R. Barquisimeto, 690, plans to reactivate SW 9510 starting in October in order to broadcast the 98-99 season Lara Cardinals baseball games to Venezuela and abroad; will also have website and RealAudio (three local newspapers via Dr. Luis A. Guerra Brandt, *Mundo Radial*) Same station previously publicized 9510 reactivation plans which never happened; maybe this time? (gh)

**VIETNAM** An historic stack of tapes of V. of Vietnam programs recorded between 1964 and 1971 has been acquired from Jack Bock, who was a civilian communications technician in Japan and Thailand during the Vietnam War. Static and jamming have been digitally cleaned up. Includes combat action reports, lists of American KIAs and POWs, anti-war activities, etc. For a catalog of the 68 tapes, available on cassette or reel-to-reel, send \$1.50 to VVAW/Vietnam Veterans Radio Network, 7807 N. Avalon, Kansas City, MO 64152 (Doc Upton, *alt.war.vietnam* via Roger Tidy)

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

# Broadcast Loggings



Gayle Van Horn

## 0030 UTC on 9685

IRAN: VOIRI. English broadcast to 0127 sign off including // 9022; // 6050 not heard. (Lee Silvi, Mentor, OH) Audible at 1735 UTC on 7190. Poor signal quality, // 6025, 9695. International news in Arabic to ID. (Frank Hillton, Charleston, SC)

## 0050 UTC on 7335

VATICAN: Vatican Radio. Broadcast to southeast Asia, heard over top CHU Canada. English 0140-0200\*, ID to unknown language 0100-0120. (Silvi, OH) 0140 on 9605 in Spanish. (Ronald A. Perron, Glen Burnie, MD) Vatican website: <<http://www.vatican.va>>

## 0058 UTC on 11800

ITALY: RAI Intl. News item on the *Music Festival* in Rome // 6010. (Bob Fraser, Cohasset, MA)

## 0105 UTC on 7415

USA: WBCQ Monticello, ME. Obscure rock music to station ID/location between music segments, plus address quote as, "WBCQ-The Planet, 97 High St., Kennebunk, ME 04043. (Harold Frodge, Midland, MI)

## 0125 UTC on 15410

AUSTRIA: Radio Austria Intl. German service, // 13730 at 0150. (Perron, MD) News on national metro system at 2150 on 13730. (Fraser, MA) <<http://www.orf.at/roi/>>

## 0151 UTC on 13700

FRANCE: Radio France Intl. Portuguese programming, // 13640 (French Guiana relay) French noted on 17620 at 1646. (Perron, MD) <[www.rfi.fr/](http://www.rfi.fr/)>

## 0200 UTC on 7450

GREECE: Voice of. Greek programming noted on // 9375, 9420. (Perron, MD) World news to national headlines and Greek folk music to 2349\*. (Frodge, MI) Address: ERA-5, 432 Messogion Av., 153 42 Athens, Greece. (Perron, MD)

## 0254 UTC on 9705

MEXICO: XERMX/Radio Mexico Intl.. English programming including ranchera music, despite heterodyne interference from Radio Ethiopia on lower sideband. ID at 0300 with email address quote. (Paul Ormandy, Oamaru, New Zealand/*Hard Core DX*) Heard 1400 with ID to station address quote. (Larry Zamora, Garland, TX) Station website: <<http://www.telecommex.com/imer/rmi.html>>

## 0327 UTC on 4960

SAO TOME: Voice of America relay. VOA newscast to sign-off ID and address. (Frodge, MI)

## 0430 UTC on 4828

ZIMBABWE: ZBC. Poor signal though improving slightly for 30 minutes. Afro pops to English announcements. (Ormandy, NZ) Address: P.O. Box HG444, Highlands, Harare, Zimbabwe. \$1.00 helpful for reply. -ed.

## 0756 UTC on 11784.88

INDONESIA: (Java) Voice of. Tune-in to tone signal at 0757, into English programming at 0800. Fair signal level, but disturbed by Brazilian **Radio Gualba** on 11783.21 at 0900. (Al Quaglieri, Albany, NY) VO Indonesia heard on 15150, 1748-1755. (Mark Veldhuis, Borne, Netherlands/*HCDX*) Indo's **RRI-Tanjungkarang** (Sumatera) heard on 3395 in unknown dialect to kroncong interludes. (Liangas, GRC)

## 0813 UTC on 15294.7

MALAYSIA: Voice of. English news commentary to time check. Sports report to ID, freq schedule, into Bahasa Malaysian at 0830. (Veldhuis, NLD) Website: <<http://asiacconnect.com.my/rtm-net/>>

## 0945 UTC on 11804

BRAZIL: Radio Globo. Portuguese sports program. Lady announcer to jingles and commercials. Brazil's **Radio Record** on 9505.1, 2153-2158 with romantic ballads to ID. **Radio Universo** on 9565 at 2204. Interference from Indo's **RRI-Jakarta (Java)** on frequency. (Veldhuis, NLD)

## 1130 UTC on 5965

CANADA: BBC WS relay. *About Face* interview with Rev. Chad Varah-Founder of *Samaritans & Befrienders International*. (Fraser, MA) Sackville relay also noted on 6175 at 2317. (Eddie Muro, Cedarhurst, NY)

## 1307 UTC on 17545

ISRAEL: Kol Israel/Reshet Bet. Hebrew service of news and IDs as "Kol Israel." Fair signal. (Gianni Serra, Anzio, Italy/*The Four Winds*)

## 1337 UTC on 13710

INDIA: All India Radio-Bangalore. English world news to ID and editorial, poor signal. AIR-Hyderabad heard on 4800 at 1754. (Serra, Italy/*TFW*) URL:<<http://air.kode.net>>

## 1353 UTC on 15585

MADAGASCAR: Radio Netherlands relay. *Research File* program to *Dutch Press Review* segment. (Zamora, TX) **Netherlands Bonaire** relay audible on 15315 at 0126. (Perron, MD) RN website: <<http://www.rnw.nl>>

## 1432 UTC on 11785

QATAR: QBS. Arabic text and music, // 9570, fair signal quality. (Serra, Italy/*TFW*)

## 1500 UTC on 15560

RUSSIA: Voice of. *Focus on Asia & the Pacific* program to 1530. Russian text to 1600. (John Marko, Collingdale, PA) *Kaleidoscope* program on 11675 at 1935. (Fraser, MA) VOR website: <<http://www.vor.ru>> Heard 2020 on 11675 *Science & Engineering* program. (Fraser, MA)

## 1610 UTC on 11570

PAKISTAN: Radio Pakistan. English service editorial on Kashmir to 1613. Classical music bridge, frequency quote to slow speed English. **Azad Kashmir Radio** via Islamabad noted on 4790 at 1726. Talk to ID and announcements to 1752. (Serra, Italy/*TFW*)

## 1615 UTC on 11715

ALGERIA: Radio Algiers Intl. English world news to national briefs. Station ID to pop/rock music. Fair quality signal. (Hillton, SC)

## 1740 UTC on 4900

CHINA: Haixia Zhi Sheng # 2. Chinese talk to program pause for identification at 1746. Unidentified Chinese station on 5050 at 1757, mentions of Zhonguo, time tips 1800, talk and 1801\*. (Serra, Italy/*TFW*)

## 1748 UTC on 21500

CHILE: Voz Cristiana. Spanish ID at tune-in, Florida address to program jingles and promos, // 21549.4 considerably weaker. (Veldhuis, NLD/*HCDX*; Serra, Italy/*TFW*)

## 1823 UTC on 3345

SOUTH AFRICA: AWR. Religious choir music to multilingual station IDs and AWR interval signal, 1830\*. (Veldhuis, NLD/*HCDX*)

## 1912 UTC on 5935

LATVIA: Radio Latvia Intl. Poor signal for newscast format. Pop music to clear station ID, political commentary to 1920. Utility station interference. (Serra, Italy/*TFW*)

## 1959 UTC on 4965

ZAMBIA: Radio Christian Voice. Scripture readings to ID at 2000, "this is RCV broadcasting from Zambia." Good signal. (Zacharias Liangas, Thessaloniki, Greece)

## 1959 UTC on 13690

UK: Merlin Network One. Christopher England's show with pop music and commentary on the status of modern radio. (Frodge, MI)

## 2006 UTC on 9525

POLAND: Polish Radio Warsaw. Fair signal with audio buzz. Special on WWII *Battle of Britain*. Musical vocals to abrupt 2025\*. (Frodge, MI)

## 2040 UTC on 15120

NIGERIA: Voice of. *Sixty Minutes* show of interviews and commentaries. Drum signal interval signal at 2100, into French service, VOA interference on 15110. (Frodge, MI)

## 2105 UTC on 15345

ARGENTINA: RAE. *Lottery Internacional* info to station frequencies quote. (Liangas, GRC)

## 2125 UTC on 4820

BOTSWANA: Radio Botswana. English music program to Roberta Flack tune. Regional language at 2140. Fair signal. (Liangas, GRC)

## 2130 UTC on 5003.5

EQT. GUINEA: Radio Africa. Religious programming to 2258 identification. National anthem to 2300 sign-off. (Veldhuis, NLD/*HCDX*)

## 2211 UTC on 3976.06

INDONESIA: (Kalimantan/Borneo) RRI-Pontianak. Tentative ID on station for announcer in Indonesian. Brief segment of Islamic music and text. Interval signal to identification format segment. (Veldhuis, NLD/*HCDX*)

## 2220 UTC on 9620

URUGUAY: SODRE. Audible only in LSB. (lower sideband) Spanish commentary to ID at 2225. English blues tune from B.B. King to male/female duo after 2235. (Frodge, MI)

## 2226 UTC on 3325

INDONESIA: (Kalimantan/Borneo) RRI-Palangkaraya. Gamelean music to Indonesian text. Interval signal to station ID, interference on frequency from presumed Guatemalan **Radio Maya de Barillas**. (Veldhuis, NLD/*HCDX*)

## 2245 UTC on 9639.95

VENEZUELA: Ecos del Torbes. Spanish. Fine signal for local ads, jingles and ID, //4980 fair. (Ruud Vos, Netherlands/*HCDX*)

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

## Adventist World Radio...

...The Voice of Hope For All Peoples. So says the opening message at the Adventist World Radio website. AWR is the international radio broadcast service of the Seventh-day Adventist church, devoting over twenty-five years of spreading the gospel through radio, particularly in countries where other means of evangelism are not possible.

The AWR website can be found at <http://www.awr.org> with station facts, information and links to *Broadcast Program Schedules, News & Letters*, and more.

*Listener's Corner* includes reception report forms and sample QSLs to view. Real Audio and photos of AWR sites are available.

Online reception reports are available at the *Shortwave Radio QSL* link <http://www.awr.org/qsl.html> as well as a printable reception report form and an informative article *How to Write a Reception Report*.

AWR is an excellent verifier and is generous with stickers and cards, as well as their monthly newsletter *Current*. Reports can be confirmed for their station's transmitters in Africa, Asia, Europe, Pan America and Russia. Addresses for each site are found on the AWR homepage. IRCs or mint stamps are appreciated. For additional station information send your letter to Adventist World



Radio, International Relations, P.O. Box 29235, Indianapolis, IN 46229.

Need a new publication to complement your tropical DX sessions? The Danish Shortwave Club International has released their **1998 Tropical Band Survey**. Send ten International Reply Coupons (IRCs) to DSWCI, c/o Bent Nielsen, Egekrogen 14, DK 3500 Vaerloese, Denmark. Arranged-by-frequency, plus station names and schedules, the *Tropical Band Survey* continues to be highly recommended by many DXers!

### BELGIUM

Radio Vlaanderen Intl, unknown kHz. Full data card unsigned plus program schedule and sticker. Received in 20 days for an English report. Station address: P.O. Box 26, B-1000 Brussels, Belgium. (John Vercellino, Downers Grove, IL)

### CUBA

Radio Havana, 6000 kHz. Full data QSL card unsigned plus personal letter signed by Lourdes Lopez, station pennant and newspaper *Granma Internacional*. Received in 153 days for a cassette tape and one U.S. dollar. Station address: Infanta 105, La Habana, Cuba. (Walt Szczeplaniak, Philadelphia, PA)

### FRENCH GUIANA

Radio France International relay, 13625 kHz. Full data color/Montsinery antenna card unsigned, plus a program schedule. Received in 21 weeks for an English report and souvenir postcard. Station address: Boite Postal 9516, F-75016 Paris, France. (Doug Merkel, St Louis, MO)

### FM

WAUA-89.5 MHz FM. Full data prepared QSL card signed by Frank Hoffman, plus business card, and station stickers. Received in one month for an English FM report and mint stamps. Station address: West Virginia Public Radio, 600 Capitol St., Charleston, W VA 25301. (Robert S. Ross, Ontario, CAN/AmFmTvDx)

### INDIA

All India Radio-Thiruvananthapuram 5010 kHz. Full data letter signed by Station Engineer (signature illegible). Received in 111 days on third English followup report, tape, postcard and souvenir used stamps. Report sent directly to station site: Thiruvananthapuram 695014, Kerala, India. (Charlie Washburn, North Perry, ME)

### ITALY

AWR-the Voice of Hope, 7230 kHz. Full data color *Magic Eye* flower card unsigned. Religious brochures, stickers, schedule and letter enclosed. Station address: AWR-Europe, Box 383, 47100 Forli, Italy. (Sam Wright, Biloxi, MS)

### JAPAN

Radio Japan, 11705 kHz. Full data QSL card signed by Y. Fushimi, plus map of Japan, program schedule and reception report forms. Received in 22 days for an English tape report. Station address: Tokyo 150-01, Japan. (Szczeplaniak, PA)

### MEDIUM WAVE

British Virgin Islands-ZBV1 780 kHz AM. Verification letter and card signed by Sandra Potter Warrican-Operations Manager. Station sticker, coverage map and station profile sheet enclosed. Station slogan is *The AM Advantage*. Received in 15 weeks for an English AM report. Station address: Website: <http://www.zbvi.com> Email: [zbvi@caribsurf.com](mailto:zbvi@caribsurf.com) Ph: 284-494-2250. Fax: 284-494-1139 (Will Passmann, Muelheim, Germany/HCDX)

CBN 640 kHz AM. Full data map card signed by S. Williams. Received in 876 days for an English AM report and mint stamps (returned with reply). Station address: P.O. Box 12010-Station A, St John's NF Canada A1B 3TB. (Washburn, ME)

KDSX 1700 kHz AM. Full data verification on station letterhead signed by Hubert Beavers-Chief Operator KPLX-KLIF. Received in 90 days for an English AM report and a self-addressed stamped envelope (used for reply). Station address: 3500 Maple Ave. # 1600, Dallas, TX. (Harold Frodge, Midland, MI)

KGIL 1260 kHz AM. Full data card signed by Elaine Hawkes-Asst. Engineer. Received in 4 days after an English followup report. Station address: P.O. Box 250028, Los Angeles, CA 90025. (Patrick Martin, Seaside, OR)

Radio Sport, 792 kHz A m-Hamilton, New Zealand. Full data verification letter received in 13 days for a taped report. Station runs 1 kW. Station address: 54 Cook St., P.O. Box 3526, Auckland, New Zealand. (Martin, OR)

Radio Universal, 1270 kHz AM. Full data verification signed by Adela Arroba de Dupre-Ing. Com. Received in 70 days for a Spanish AM report and one U.S. dollar. Station address: Casilla 5177, Guayaquil, Ecuador. (Paul Ormandy, Oamaru, New Zealand)

### NEW ZEALAND

Radio New Zealand Intl 9795 kHz. Full data *New Zealand Birds* cards unsigned. Received in 23 days for an English report and three IRCs. Station address: P.O. Box 123, Wellington, New Zealand. (Washburn, ME)

### PERU

Radio La Hora 4855 kHz. Verification letter signed by Sr. Carlos Gamarra M.-Director. Received for a Spanish report. Station address: Av. Garcilaso 411, Distrito de Wanchac, Cusco, Peru. (Mauno Ritola, Finland/HCDX)

### SWEDEN

TeraCom/Radio Sweden, 15235/17870 kHz. Full data color control room photo signed by H. Widenstedt. Verification for test transmissions. Received in two months for report sent via email. (Gayle Van Horn, Brasstown, NC) TeraCom logo T-shirt, brochures, program schedules and signed business card from Magnus Nilsson-Frequency Management, R&D Department for test transmissions on 15240, 15235, 17870 kHz, via email. (Lex Jenkins, USA)

### TURKEY

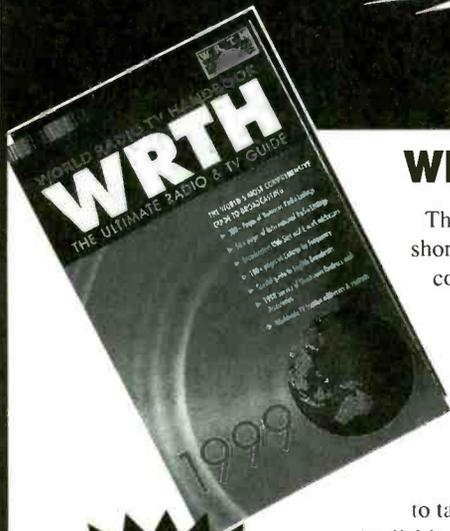
Voice of Turkey, 9655 kHz. Full data station card unsigned plus stickers, program schedule, station pennant, and brochure on Turkish cuisine. Received in 26 days for an English report. Station address: P.O. Box 333-06.443, Yenisehir, Ankara, Turkey. (Vercellino, IL)

### UNITED STATES

WHRA-Greenbush, ME, 15460 kHz. Full data *Test QSL* card signed by James Holycross-Engineering. Received in 207 days for an English report of test transmissions, one mint stamp included. Station address: P.O. Box 12, South Bend, IN 46624 (Randy Stewart, Springfield, MO)

# Last Chance

# Order Now and Save!!



## WRTH, 1999 edition ... The "DXer's Bible!"

This encyclopedic reference for professional monitoring stations and serious shortwave listeners for over 50 years bulges with station information, staff listings, contact information, worldwide mediumwave and shortwave frequencies, and program schedules in all languages.

A special English language program section makes station selection a breeze. Includes non-U.S. TV and FM broadcasters as well!

Chapters identify abbreviations, explain propagation forecasts, sort out time zones, and recommend equipment and accessories.

**Order before November 30, 1998,**

to take advantage of this special discount offer!

Available January 1999.

# GROVE

GROVE ENTERPRISES, INC.

1-800-438-8155 (US & Canada)

828-837-9200; FAX 828-837-2216

7540 Highway 64 West

Brasstown, NC 28902-0098

web: [www.grove-ent.com](http://www.grove-ent.com)

e-mail: [order@grove.net](mailto:order@grove.net)

ORDER BOK3-99

**\$20<sup>95</sup>**

with **FREE SHIPPING** in US. (After November 30, the price will be \$24.95 plus \$5.50 shipping. For foreign shipping, please add \$6.25 for foreign surface printed mail, \$6 for Air Mail in Canada, and \$13 for Air Mail elsewhere.)

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 over 54% 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"/> 25.95	<input type="checkbox"/> 35.95	<input type="checkbox"/> 45.95
2 Years	<input type="checkbox"/> 45.95	<input type="checkbox"/> 65.95	<input type="checkbox"/> 85.95
3 Years	<input type="checkbox"/> 65.95	<input type="checkbox"/> 95.95	<input type="checkbox"/> 125.95

Allow 6 to 8 weeks for delivery

**FOR FASTER SERVICE FAX 1-516-681-2926**

MT 98

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

## HOW TO USE THE SHORTWAVE GUIDE.

### 1: Convert your time to UTC.

Eastern and Pacific Times are already converted to Coordinated Universal Time (UTC) at the top of each page. The rule is: convert your local time to 24-hour format; add (during Standard Time) 5, 6, 7, or 8 hours for Eastern, Central, Mountain or Pacific Times, respectively.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (7:30 pm Eastern, 4:30 pm Pacific).

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

Some selected programs appear on the lower half of the page for prime listening hours—space does not permit 24-hour listings.

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

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

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

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

The frequency listing uses the same day codes as the program listings; if a broadcast is not daily, those day codes will appear before the

station name. Irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "VI" (various languages).

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

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

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

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

## SWL PROGRAMS.

COMPILED BY JIM FRIMMEL

### Sundays

0000 WHRI (Angel 2 Indiana): "DXing with Cumbre"  
0023 Radio Exterior de Espana: "Distance Unknown"  
0030 BBC (as): "Write On"  
0109 HCJB (am): "DX Partyline"  
0123 Radio Exterior de Espana: "Distance Unknown"  
0130 Radio For Peace Intl: "Continent of Media"  
0200 Radio For Peace Intl: "World of Radio"  
0234 Radio Havana Cuba: "DXers Unlimited"  
0258 Vatican Radio: "On-the-Air"  
0305 Australia, Radio: "Feedback"  
0347 Radio Bulgaria: "Radio Bulgaria Calling"  
0400 WHRI (Angel 2 Indiana): "DXing with Cumbre"  
0409 HCJB (am): "DX Partyline"  
0423 Voice of Turkey: "DX Corner" (biweekly)  
0508 Vatican Radio: "On-the-Air"  
0523 Radio Exterior de Espana: "Distance Unknown"  
0530 Australia, Radio: "Media Report"  
0530 WHRI (Angel 2 Indiana): "DXing with Cumbre"  
0634 Radio Havana Cuba: "DXers Unlimited"  
0700 KWHR (Angel 3 Hawaii): "DXing with Cumbre"  
0730 WWCR #3 (Tennessee): "World of Radio"  
0830 KWHR (Angel 4 Hawaii): "DXing with Cumbre"  
0830 Radio For Peace Intl: "Continent of Media"  
0835 Radio Vlaanderen Intl: "Radio World"  
0836 Radio Korea: "Multiwave Feedback"  
0900 Radio For Peace Intl: "World of Radio"  
0905 BBC: "Write On"  
1030 WWCR #3 (Tennessee): "World of Radio"  
1038 Radio Korea: "Multiwave Feedback"  
1130 KWHR (Angel 4 Hawaii): "DXing with Cumbre"  
1135 Radio Vlaanderen Intl: "Radio World"  
1136 Radio Korea: "Multiwave Feedback"  
1205 BBC: "Write On"  
1207 Radio Canada Intl: "The Mailbag"  
1236 Radio Korea: "Multiwave Feedback"  
1247 Radio Bulgaria: "Radio Bulgaria Calling"  
1335 Radio Vlaanderen Intl: "Radio World"  
1337 Radio Canada Intl: "The Mailbag"

1354 Vatican Radio: "On-the-Air"  
1400 KWHR (Angel 4 Hawaii): "DXing with Cumbre"  
1430 WHRI (Angel 1 Indiana): "DXing with Cumbre"  
1515 BBC (af): "Waveguide" (4)  
1636 Radio Korea: "Multiwave Feedback"  
1637 Radio Canada Intl: "The Mailbag"  
1705 BBC (as): "Write On"  
1730 KWHR (Angel 3 Hawaii): "DXing with Cumbre"  
1730 WHRI (Angel 2 Indiana): "DXing with Cumbre"  
1735 Radio Vlaanderen Intl: "Radio World"  
1835 Radio Vlaanderen Intl: "Radio World"  
1930 KWHR (Angel 3 Hawaii): "DXing with Cumbre"  
1936 Radio Korea: "Multiwave Feedback"  
2031 Radio Canada Intl: "The Mailbag"  
2105 BBC: "Write On"  
2108 Radio Korea: "Multiwave Feedback"  
2135 BBC (af): "Write On"  
2300 KSDA (Guam): "Wavescan"  
2300 Radio For Peace Intl: "World of Radio"  
2330 Australia, Radio: "Media Report"  
2330 WHRA (Angel 5 Maine): "DXing with Cumbre"

### Mondays

0000 AWR Latin America: "Wavescan"  
0106 Deutsche Welle: "World DX Meeting" (4/5)  
0130 WRMI (Florida): "Wavescan"  
0131 Radio Canada Intl: "The Mailbag"  
0230 Radio Korea: "Multiwave Feedback"  
0305 BBC: "Write On"  
0407 Radio Canada Intl: "The Mailbag"  
0700 Radio For Peace Intl: "World of Radio"  
1040 All India Radio: "DX-ers Corner" (2/4)  
1615 KTWR (Guam): "Pacific DX Report"  
1730 WWCR #1 (Tennessee): "Ask WWCR"  
1840 All India Radio: "DX-ers Corner" (2/4)  
2130 All India Radio: "DX-ers Corner" (2/4)  
2135 Radio New Zealand Intl: "Mailbox" (biweekly)  
2200 WWCR #1 (Tennessee): "Ask WWCR"

### Tuesdays

0030 BBC (as): "Waveguide" (4)

0900 KTWR (Guam): "Pacific DX Report"  
1330 WWCR #1 (Tennessee): "World of Radio"  
1346 Radio Sweden: "MediaScan" (1/3)  
1355 FEBC (Philippines): "DX Dial"  
1446 Radio Sweden: "MediaScan" (1/3)  
1846 Radio Sweden: "MediaScan" (1/3)  
1900 Radio For Peace Intl: "World of Radio"  
2100 Polish Radio: "Polish Radio DX Club"  
2111 Radio Havana Cuba: "DXers Unlimited"  
2311 Radio Havana Cuba: "DXers Unlimited"  
2340 All India Radio: "DX-ers Corner" (2/4)

### Wednesdays

0140 Radio Havana Cuba: "DXers Unlimited"  
0146 Radio Sweden: "MediaScan" (1/3)  
0246 Radio Sweden: "MediaScan" (1/3)  
0300 Radio For Peace Intl: "World of Radio"  
0335 Radio Havana Cuba: "DXers Unlimited"  
0346 Radio Sweden: "MediaScan" (1/3)  
0535 Radio Havana Cuba: "DXers Unlimited"  
0730 BBC (af): "Waveguide" (4)  
0730 HCJB (eu): "Ham Radio Today"  
0930 HCJB (pac): "Ham Radio Today"  
1000 Radio For Peace Intl: "World of Radio"  
1315 FEBC (Philippines): "DX Dial"  
1735 Radio New Zealand Intl: "Mailbox" (biweekly)  
1820 Argentina, RAE: "DX'ers Special"  
1820 Polish Radio: "Polish Radio DX Club"  
1900 Merlin Radio Network: "Media Zoo"  
1930 HCJB (eu): "Ham Radio Today"  
2000 Merlin Radio Network: "Media Zoo"  
2206 Radio Budapest Intl: "DX Blockbuster"

### Thursdays

0130 HCJB (am): "Ham Radio Today"  
0239 Argentina, RAE: "DX'ers Special"  
0345 Radio Budapest Intl: "DX Blockbuster"  
0430 HCJB (am): "Ham Radio Today"  
0545 BBC (am/eu): "Waveguide" (4)  
0730 BBC (as): "Waveguide" (4)  
0754 Radio Netherlands Intl: "Media Network"  
0800 KTWR (Guam): "Pacific DX Report"  
0953 Radio Netherlands Intl: "Media Network"  
1153 Radio Netherlands Intl: "Media Network"  
1320 Polish Radio: "Polish Radio DX Club"  
1352 Radio Netherlands Intl: "Media Network"  
1700 WWCR #1 (Tennessee): "World of Radio"

1753 Radio Netherlands Intl: "Media Network"  
1954 Radio Netherlands Intl: "Media Network"  
2115 BBC (as): "Waveguide" (4)  
2130 WWCR #1 (Tennessee): "World of Radio"

### Fridays

0053 Radio Netherlands Intl: "Media Network"  
0253 Radio Netherlands Intl: "Media Network"  
0345 BBC (as): "Waveguide" (4)  
0453 Radio Netherlands Intl: "Media Network"  
0915 BBC (am/eu): "Waveguide" (4)  
1030 KTWR (Guam): "Pacific DX Report"  
1930 Australia, Radio: "Media Report"  
1930 Radio For Peace Intl: "Continent of Media"  
1930 Radio New Zealand Intl: "Mailbox" (biweekly)  
2000 Radio For Peace Intl: "World of Radio"  
2047 Radio Bulgaria: "Radio Bulgaria Calling"  
2100 WWCR #1 (Tennessee): "Ask WWCR"  
2105 Australia, Radio: "Feedback"  
2338 Voice of Turkey: "DX Corner" (biweekly)

### Saturdays

0005 Australia, Radio: "Feedback"  
0044 Radio Bulgaria: "Radio Bulgaria Calling"  
0136 Voice of America (as pac/ca): "Communications World (A)"  
0330 KWHR (Angel 3 Hawaii): "DXing with Cumbre"  
0330 Radio For Peace Intl: "Continent of Media"  
0336 Voice of America (af): "Communications World (B)"  
0400 Radio For Peace Intl: "World of Radio"  
0400 WRMI (Florida): "Wavescan"  
0438 Voice of Turkey: "DX Corner" (biweekly)  
0530 KWHR (Angel 3 Hawaii): "DXing with Cumbre"  
0536 Voice of America: "Communications World (A)"  
0600 WHRI (Angel 1/2 Indiana): "DXing with Cumbre"  
0605 Australia, Radio: "Feedback"  
0630 WHRA (Angel 5 Maine): "DXing with Cumbre"  
0700 KWHR (Angel 3 Hawaii): "DXing with Cumbre"

(Continued on page 45)

## FREQUENCIES

0000-0100	Anguilla, Caribbean Beacon	6090am				0000-0100	UK, BBC Asian Service	3915as	6195as	7110as	9410as
0000-0100	Australia, Radio	9660pa	12080as	15240pa	17715pa			11945as	11955as	15280as	15310as
		17795pa	21740pa					15360as	17790as		
0000-0100 vl	Australia, VL8K Katherine	5025do				0000-0100	UK, BBC World Service	5970sa	5975am	6175na	9590am
0000-0100 vl	Australia, VL8T Tent Crk	4910do						9915sa	12095sa		
0000-0100	Bulgaria, Radio	9485na	11720na			0000-0100 t	UK, Merlin Network One	9645eu	11985na	13690na	
0000-0015	Cambodia, Natl Radio Of	11940as				0000-0100	USA, Armed Forces Network	4278am	6458am	12689am	
0000-0100	Canada, CBC N Quebec Svc	9625do				0000-0100	USA, KAIJ Dallas TX	13815am			
0000-0100	Canada, CFRX Toronto	6070do				0000-0100	USA, KTBN Salt Lk City UT	7510am			
0000-0100	Canada, CFVP Calgary	6030do				0000-0100	USA, Voice of America	7215as	9770as	11760as	15185as
0000-0100	Canada, CHNX Halifax	6130do						15290as	17735as	17820as	
0000-0100	Canada, CKZN St John's	6160do				0000-0030 twhfa	USA, Voice of America	5995am	6130ca	7405am	9455ca
0000-0100	Canada, CKZU Vancouver	6160do						9775am	11695ca	13740am	
0000-0100	Costa Rica, Adv World R	5030am	9725am	15460am		0000-0100	USA, WBCQ Monticello ME	7415na			
0000-0100	Costa Rica, RF Peace Intl	6975am	15050am	21460am		0000-0100	USA, WEWN Birmingham AL	5825na	9975eu	13615na	
0000-0027	Czech Rep, Radio Prague	5930na	7345na			0000-0100 stwhfa	USA, WGTG McCaysville GA	5085am			
0000-0100	Ecuador, HCJB	9745na	12015na	21455am		0000-0100	USA, WHRA Greenbush ME	15460af			
0000-0030	Egypt, Radio Cairo	9900am				0000-0100	USA, WHRI Noblesville IN	5745am			
0000-0100	Germany, Overcomer Minist	3975eu	9500as			0000-0100	USA, WINB Red Lion PA	13790am			
0000-0015 vl	Ghana, Ghana Broadc Corp	3366do	4915do			0000-0100	USA, WRMI/R Miami Intl	9955ca			
0000-0045	India, All India Radio	7410as	9705as	9950as	11620as	0000-0100 s	USA, WRNO New Orleans LA	7355am			
0000-0100	Ireland, Unt Christian BC	6200do				0000-0100 wfas	USA, WSHB Cypress Crk SC	7535am			
0000-0015	Japan, R Japan/NHK World	6155eu	6180eu	9665af	11705na	0000-0100 wf	USA, WSHB Cypress Crk SC	15285am			
		11815as	13650as			0000-0100	USA, WWBS Macon GA	11910na			
0000-0100	Liberia, LCN/R Liberia Int	5100do				0000-0100	USA, WWCR Nashville TN	5070am	7435am	9475am	13845am
0000-0100	Malaysia, Radio	7295do				0000-0100	USA, WYFR Okeechobee FL	5950na	6085na	9505na	
0000-0100 vl	Namibia, NBC	3270af	3289af			0010-0020	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
0000-0030	Netherlands, Radio	6020na	6165na	9845na		0015-0100	Japan, R Japan/NHK World	6155eu	6180eu	9665af	11705na
0000-0100	New Zealand, R NZ Intl	17675pa				0030-0100	Austria, R Austria Intl	9655na			
0000-0100	North Korea, R Pyongyang	11845am	13650am	15230am		0030-0100	Iran, VOIRI	6055eu	9022eu	9685eu	
0000-0100 vl	Papua New Guinea, NBC	9675do				0030-0100	Netherlands, Radio	6020na	6165na	9845na	9855as
0000-0100	Philippines, FEBC/R Intl	15450as						11655as	12090as		
0000-0100	Singapore, R Corp Singapore	6150do				0030-0100	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
0000-0100	Spain, R Exterior Espana	6055am				0030-0100	UK, BBC Asian Service	9410as	11955as		
0000-0100	Thailand, Radio	9655as	11905as	15395na		0045-0100	Albania, R Tirana Intl	6115na	7160na		
						0050-0100	Italy, RAI Intl	6010na	9675na	11800na	

## SELECTED PROGRAMS

### Sundays

- 0000 Australia, Radio: RA News. Five or ten minutes of world, Australian, and regional news.
- 0000 Japan, NHK/Radio: News. World news from NHK International.
- 0000 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0005 Australia, Radio: Money, Markets, and the Economy.
- 0010 Japan, NHK/Radio: Hello from Tokyo. The weekend magazine program.
- 0030 Australia, Radio: Correspondents' Report. The ABC's foreign correspondents report home with Hamish Robertson.

### Mondays

- 0000 Australia, Radio: RA News. See S 0000.
- 0000 Japan, NHK/Radio: News. See S 0000.
- 0000 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0010 Australia, Radio: Correspondents' Report. See S 0030.
- 0015 Japan, NHK/Radio: 44 Minutes. The weekday magazine program of feature reports and the popular vocal music of Japan.
- 0017 Japan, NHK/Radio: Guest Corner. The first segment of the magazine program "44 Minutes" features a conversation with a visitor.
- 0030 Australia, Radio: The Health Report. A program that examines health issues and makes complex scientific data understandable.
- 0034 Japan, NHK/Radio: Close Up. Featuring a Japanese person of note.
- 0047 Japan, NHK/Radio: News Commentary. An editorial opinion on the current news.
- 0052 Japan, NHK/Radio: Tumbling Dice. Focus on a topic of interest in Japan.

### Tuesdays

- 0000 Australia, Radio: RA News. See S 0000.
- 0000 Japan, NHK/Radio: News. See S 0000.
- 0000 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0010 Australia, Radio: Asia Pacific. See S 2310.
- 0015 Japan, NHK/Radio: 44 Minutes. See M 0015.
- 0017 Japan, NHK/Radio: Guest Corner. See M 0017.
- 0030 Australia, Radio: The Law Report. Susanna Lobez brings

- 0034 an insider's perspective to the complexities of the law.
- 0047 Japan, NHK/Radio: Close Up. See M 0034.
- 0047 Japan, NHK/Radio: News Commentary. See M 0047.
- 0052 Japan, NHK/Radio: Tumbling Dice. See M 0052.

### Wednesdays

- 0000 Australia, Radio: RA News. See S 0000.
- 0000 Japan, NHK/Radio: News. See S 0000.
- 0000 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0010 Australia, Radio: Asia Pacific. See S 2310.
- 0015 Japan, NHK/Radio: 44 Minutes. See M 0015.
- 0017 Japan, NHK/Radio: Guest Corner. See M 0017.
- 0030 Australia, Radio: The Religion Report. Hosted by John Cleary.
- 0034 Japan, NHK/Radio: Close Up. See M 0034.
- 0047 Japan, NHK/Radio: News Commentary. See M 0047.
- 0052 Japan, NHK/Radio: Tumbling Dice. See M 0052.

### Thursdays

- 0000 Australia, Radio: RA News. See S 0000.
- 0000 Japan, NHK/Radio: News. See S 0000.
- 0000 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0010 Australia, Radio: Asia Pacific. See S 2310.
- 0015 Japan, NHK/Radio: 44 Minutes. See M 0015.
- 0017 Japan, NHK/Radio: Guest Corner. See M 0017.
- 0030 Australia, Radio: Media Report. Agnes Warren presents the inside story on how the communications industry operates and puts the spotlight on media people and their activities.
- 0034 Japan, NHK/Radio: Close Up. See M 0034.
- 0047 Japan, NHK/Radio: News Commentary. See M 0047.
- 0052 Japan, NHK/Radio: Tumbling Dice. See M 0052.

### Fridays

- 0000 Australia, Radio: RA News. See S 0000.
- 0000 Japan, NHK/Radio: News. See S 0000.
- 0000 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0010 Australia, Radio: Asia Pacific. See S 2310.
- 0015 Japan, NHK/Radio: 44 Minutes. See M 0015.
- 0017 Japan, NHK/Radio: Guest Corner. See M 0017.
- 0030 Australia, Radio: Sports Report. Twenty minutes of news from the world of sports.
- 0034 Japan, NHK/Radio: Close Up. See M 0034.
- 0047 Japan, NHK/Radio: News Commentary. See M 0047.

- 0052 Japan, NHK/Radio: Tumbling Dice. See M 0052.

### Saturdays

- 0000 Australia, Radio: RA News. See S 0000.
- 0000 Japan, NHK/Radio: News. See S 0000.
- 0000 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0005 Australia, Radio: Feedback. See S 0305.
- 0010 Japan, NHK/Radio: Asia Weekly. See S 1410.
- 0030 Australia, Radio: Asia Pacific. See S 2310.

## HAUSER'S HIGHLIGHTS KUWAIT: R. KUWAIT

Main Programme in Arabic:

UTC	kHz
0000-0200	11675
0200-0359	15495, 11675, 6055
0359-0900	15505, 15495, 15110(0445-), 11675(-0530), 6055
0900-1305	17885, 15505, 15495, 15110(-0930), 13620, 6055
1305-1605	17885(-1505), 15505, 15110, 13620, 9880
1605-1800	15505(-1740), 15110(-1730), 11990(1615-), 9880
1800-2300	15505, 15495, 9880(-2130), 9855; 2300-2400 15495, 9855

in English:  
1800-2100 11990  
(BBC Monitoring)

FREQUENCIES

0100-0200	Anguilla, Caribbean Beacon	6090am				0100-0200	Singapore, RCorp Singapore	6150do		
0100-0200	Australia, Radio	9660pa	12080as	15240pa	15415as	0100-0130	Slovakia, R Slovakia Intl	5930na	7300af	9440sa
		17715pa	17750as	17795pa	21740pa	0100-0200	Spain, R Exterior Espana	6055am		
0100-0200 vl	Australia, VL8K Katherine	5025do				0100-0200	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as
0100-0200 vl	Australia, VL8T Tent Crk	4910do				0100-0130	Switzerland, Swiss R Intl	9885na	9905ca	
0100-0200	Canada, CBC N Quebec Svc	9625do				0100-0200	UK, BBC Asian Service	5965as	6195as	9410as 9605as
0100-0200	Canada, CFRX Toronto	6070do						11955as	15280as	15310as 15360as
0100-0200	Canada, CFVP Calgary	6030do				0100-0200	UK, BBC World Service	5970sa	5975am	6175na 9590am
0100-0200	Canada, CHNX Halifax	6130do						59915sa	12095sa	
0100-0200	Canada, CKZN St John's	6160do				0100-0200	Ukraine, R Ukraine Intl	5905eu	5915eu	6020eu 7180na
0100-0200	Canada, CKZU Vancouver	6160do						7240eu	9445na	12050na
0100-0129	Canada, R Canada Intl	5960am	9535am	9755am	11715am	0100-0200	USA, Armed Forces Network	4278am	6458am	12689am
		13670am				0100-0200	USA, KAIJ Dallas TX	5810am		
0100-0200	Costa Rica, RF Peace Intl	6975am	15050am	21460am		0100-0200	USA, KTBN Salt Lk City UT	7510am		
0100-0105	Croatia, Croatian Radio	9925am				0100-0200	USA, Voice of America	7110as	7200as	9635as 11705as
0100-0200	Cuba, Radio Havana	6000na	9820na	13605na				11725as	11820as	15250as 17740as
0100-0127	Czech Rep, Radio Prague	6200na	7345na					17820as		
0100-0200	Ecuador, HCJB	9745na	12015na	21455am		0100-0200 twtfa	USA, Voice of America	5995am	6130am	7405am 9455am
0100-0150	Germany, Deutsche Welle	6040na	6085na	6145na	9640na			9775am	13740am	
		11810am				0100-0200	USA, WBCQ Monticello ME	7415na		
0100-0200 s	Germany, Good News World R	9855eu				0100-0200	USA, WEWN Birmingham AL	5825eu	13615na	
0100-0200	Germany, Overcomer Ministr	3975eu	9500as			0100-0200 stwhfa	USA, WGTG McCaysville GA	5085am		
0100-0115	Ghana, Ghana Broadc Corp	3366do	4915do			0100-0200	USA, WHRI Noblesville IN	5745am	7315am	
0100-0200 vl	Guatemala, Radio Cultural	3300do				0100-0200	USA, WINB Red Lion PA	11950am		
0100-0200	Indonesia, Voice of	9525as	11765as	15510as		0100-0200	USA, WJCR Upton KY	7490na	13595na	
0100-0125	Iran, VOIRI	7260eu	9022eu	9685eu		0100-0200	USA, WRMI/R Miami Intl	9955ca		
0100-0200	Ireland, Unt Christian BC	6200do				0100-0200 twhtas	USA, WSHB Cypress Crk SC	7535am		
0100-0110	Italy, RAI Intl	6010na	9675na	11800na		0100-0200	USA, WWBS Macon GA	11905na		
0100-0200	Japan, R Japan/NHK World	6150af	11860as	11890me	15570as	0100-0200	USA, WWCR Nashville TN	5070am	7435am	9475am 13845am
		15590as	17810as	17835sa	21610pa	0100-0200	USA, WYFR Okeechobee FL	6065na	9505na	15165as
		21670pa				0100-0130	Uzbekistan, R Tashkent	7190as	9375as	9530as 9715as
0100-0200	Liberia, LCN/R Liberia Int	5100do				0100-0127	Vietnam, Voice of	5940am	7250am	
0100-0200	Malaysia, Radio	7295do				0125-0200	Netherlands, Radio	9855as	11655as	12090as
0100-0200 vl	Namibia, NBC	3270af	3289af			0129-0159	Canada, R Canada Intl	5960am	9755am	
0100-0125	Netherlands, Radio	6020na	6165na	9845na	9855as	0129-0159 sm	Canada, R Canada Intl	9535am	11715am	13670am
		11655as	12090as			0130-0200	Albania, R Tirana Intl	6246na	7160na	11645na
0100-0200	New Zealand, R NZ Intl	17675pa				0130-0150	Greece, Voice of	7450na	9375na	9420na
0100-0200 vl	Papua New Guinea, NBC	9675do				0130-0200	Lithuania, Radio Vilnius	9855am		
0100-0200	Philippines, FEBC/R Intl	15450as				0130-0200	Sweden, Radio	9435as	11985au	
0100-0130 mtwhfa	Serbia, Radio Yugoslavia	9580na	11870na			0140-0200	Vatican State, Vatican R	5980as	7335as	9650as

SELECTED PROGRAMS

Sundays

- 0100 Australia, Radio: RA News. See S 0000.
- 0100 Japan, NHK/Radio: News. See S 0000.
- 0100 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0100 USA, KJES (Mesquite NM): Religious Chanting.
- 0105 Australia, Radio: The Europeans. Maria Zijlstra presents reports and features on aspects of European politics, culture and society.
- 0110 Japan, NHK/Radio: Hello from Tokyo. See S 0010.

Mondays

- 0100 Australia, Radio: RA News. See S 0000.
- 0100 Japan, NHK/Radio: News. See S 0000.
- 0100 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0100 USA, KJES (Mesquite NM): Religious Chanting.
- 0110 Australia, Radio: Awaye. Lorena Allam hosts a program of indigenous arts and issues.
- 0115 Japan, NHK/Radio: 44 Minutes. See M 0015.
- 0117 Japan, NHK/Radio: Guest Corner. See M 0017.
- 0134 Japan, NHK/Radio: Close Up. See M 0034.
- 0147 Japan, NHK/Radio: News Commentary. See M 0047.
- 0152 Japan, NHK/Radio: Tumbling Dice. See M 0052.

Tuesdays

- 0100 Australia, Radio: RA News. See S 0000.
- 0100 Japan, NHK/Radio: News. See S 0000.
- 0100 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0100 USA, KJES (Mesquite NM): Religious Chanting.
- 0110 Australia, Radio: Science Show. Robyn Williams presents the world of science, both at home and abroad.
- 0115 Japan, NHK/Radio: 44 Minutes. See M 0015.
- 0117 Japan, NHK/Radio: Guest Corner. See M 0017.
- 0134 Japan, NHK/Radio: Close Up. See M 0034.
- 0147 Japan, NHK/Radio: News Commentary. See M 0047.
- 0152 Japan, NHK/Radio: Tumbling Dice. See M 0052.

Wednesdays

- 0100 Australia, Radio: RA News. See S 0000.

- 0100 Japan, NHK/Radio: News. See S 0000.
- 0100 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0100 USA, KJES (Mesquite NM): Religious Chanting.
- 0110 Australia, Radio: The National Interest. See S 1605.
- 0115 Japan, NHK/Radio: 44 Minutes. See M 0015.
- 0117 Japan, NHK/Radio: Guest Corner. See M 0017.
- 0134 Japan, NHK/Radio: Close Up. See M 0034.
- 0147 Japan, NHK/Radio: News Commentary. See M 0047.
- 0152 Japan, NHK/Radio: Tumbling Dice. See M 0052.

Thursdays

- 0100 Australia, Radio: RA News. See S 0000.
- 0100 Japan, NHK/Radio: News. See S 0000.
- 0100 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0100 USA, KJES (Mesquite NM): Religious Chanting.
- 0110 Australia, Radio: Background Briefing. Australia's top award-winning current affairs program.
- 0115 Japan, NHK/Radio: 44 Minutes. See M 0015.
- 0117 Japan, NHK/Radio: Guest Corner. See M 0017.
- 0134 Japan, NHK/Radio: Close Up. See M 0034.
- 0147 Japan, NHK/Radio: News Commentary. See M 0047.
- 0152 Japan, NHK/Radio: Tumbling Dice. See M 0052.

Fridays

- 0100 Australia, Radio: RA News. See S 0000.
- 0100 Japan, NHK/Radio: News. See S 0000.
- 0100 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0100 USA, KJES (Mesquite NM): Religious Chanting.
- 0110 Australia, Radio: Hindsight. See H 1605.
- 0115 Japan, NHK/Radio: 44 Minutes. See M 0015.
- 0117 Japan, NHK/Radio: Guest Corner. See M 0017.
- 0134 Japan, NHK/Radio: Close Up. See M 0034.
- 0147 Japan, NHK/Radio: News Commentary. See M 0047.
- 0152 Japan, NHK/Radio: Tumbling Dice. See M 0052.

Saturdays

- 0100 Australia, Radio: RA News. See S 0000.
- 0100 Japan, NHK/Radio: News. See S 0000.

- 0100 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0100 USA, KJES (Mesquite NM): Religious Chanting.
- 0105 Australia, Radio: Oz Sounds #1. See S 0505.
- 0110 Japan, NHK/Radio: Weekend Break. A magazine program featuring stories from around Japan.
- 0130 Australia, Radio: Arts Australia. See T 2330.

HAUSER'S HIGHLIGHTS  
GABON: AFRICA No. 1

Daily in French:

UTC	kHz
0500-0700	9580
0700-1600	17630, 9580
1600-2100	15475, 9580
2100-2400	9580

News summaries on the hour, and 15-min African newscasts at 0530, 0630, 0730, 1115, 1215, 1830, 2200 UTC;  
<http://www.africa1.com>  
(BBC Monitoring)

## FREQUENCIES

0200-0300	Anguilla, Caribbean Beacon	6090am				0200-0300	Taiwan, Radio Taipei Intl	5950na	9680na	11740am	11825pa
0200-0300 twhfa	Argentina, RAE	11710am				0200-0300 vl	Tanzania, Radio	5050do			
0200-0300	Australia, Radio	9660pa	11880as	12080as	15240pa	0200-0300	UK, BBC African Service	6135af			
		15415as	15510pa	17715pa	17750as	0200-0300	UK, BBC Asian Service	9605as	11955as	15280as	15310as
		21725pa						15360as			
0200-0300 vl	Australia, VL8K Katherine	5025do				0200-0300	UK, BBC World Service	5970sa	5975am	6175na	6195eu
0200-0300 vl	Australia, VL8T Tent Crk	4910do				0200-0300	USA, Armed Forces Network	9410eu	9590am	9915sa	
0200-0300	Canada, CBC N Quebec Svc	9625do				0200-0300	USA, KAIJ Dallas TX	4278am	6458am	12689am	
0200-0300	Canada, CFRX Toronto	6070do				0200-0300	USA, KJES Mesquite NM	5810am			
0200-0300	Canada, CFVP Calgary	6030do				0200-0300	USA, KTBV Salt Lk City UT	7555am			
0200-0300	Canada, CHNX Halifax	6130do				0200-0300	USA, Voice of America	7510am			
0200-0300	Canada, CKZN St John's	6160do				0200-0300	USA, WBCQ Monticello ME	7115as	7200as	11705as	11725as
0200-0300	Canada, CKZU Vancouver	6160do						11820as	15250as	17740as	17820as
0200-0229	Canada, R Canada Intl	9535am	9755am	11715am	13670am	0200-0300	USA, WEWN Birmingham AL	7415na			
0200-0300 twhfa	Colombia, Rdif Nacional	4955va				0200-0300	USA, WGTG McCaysville GA	5825eu	13615na		
0200-0300	Costa Rica, RF Peace Intl	6975am	15050am	21460am		0200-0300 stwhfa	USA, WHRI Noblesville IN	5085am			
0200-0205	Croatia, Croatian Radio	9925am				0200-0300	USA, WINB Red Lion PA	5745am	7315am		
0200-0300	Cuba, Radio Havana	6000na	9820na	13605na		0200-0300	USA, WJCR Upton KY	11950am			
0200-0300	Ecuador, HCJB	9745na	12015na	21455am		0200-0300 vl	USA, WRMI/R Miami Intl	7490na	13595na		
0200-0300	Egypt, Radio Cairo	9475na				0200-0300	USA, WRNO New Orleans LA	9955ca			
0200-0250	Germany, Deutsche Welle	7285as	9615as	9690as	11945as	0200-0300 s	USA, WSHB Cypress Crk SC	7355na			
		11965as	12045as			0200-0300 h	USA, WWSB Macon GA	5850na			
0200-0300	Germany, Overcomer Ministr	3975eu				0200-0300	USA, WWCR Nashville TN	7535am			
0200-0230	Hungary, Radio Budapest	9580na	11685na			0200-0300	USA, WYFR Okeechobee FL	11905na			
0200-0300	Ireland, Unt Christian BC	6200do				0215-0225	Nepal, Radio	3215am	5070am	5935am	7435am
0200-0300	Kenya, Kenya Broadc Corp	4885do	4935do			0225-0300	Netherlands, Radio	6065na	9505na		
0200-0230	Lithuania, Radio Vilnius	9855am				0229-0259 sm	Canada, R Canada Intl	5005do	7165do		
0200-0300	Malaysia, Radio	7295do				0230-0300	Austria, R Austria Intl	9855as	11655as		
0200-0250	Myanmar, Radio	7185do				0230-0257	Czech Rep, Radio Prague	9535am	9755am	11715am	13670am
0200-0300 vl	Namibia, NBC	3270af	3289af			0230-0245	Pakistan, Radio	9655na	9870sa	13730sa	
0200-0225	Netherlands, Radio	9855as	11655as	12090as		0230-0300 vl	Philippines, R Pilipinas	9480me	11600as		
0200-0300	New Zealand, R NZ Intl	17675pa				0230-0300	Sweden, Radio	7485as	11975as	15489as	
0200-0300 vl	Papua New Guinea, NBC	9675do				0230-0300	UK, BBC World Service	11885as	15120as	15270as	
0200-0300	Philippines, FEBC/R Intl	15450as				0230-0300	Vietnam, Voice of	7135am	9495am		
0200-0300	Romania, R Romania Intl	6155na	9570na	9690as	11740as	0250-0300 sf	Greece, Voice of	9895am			
		11940as	15380as			0250-0300	Vatican State, Vatican R	5940am			
0200-0300	Russia, Voice of Russia WS	7105na	12050na	15425na	15520na			7450na	9375na	9420na	11645na
0200-0300	Singapore, R Corp Singapore	6150do						7305ca	9605am		
0200-0300	South Korea, R Korea Intl	7275am	11725am	11810am	15575am						
0200-0300	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as							

## SELECTED PROGRAMS

### Sundays

- 0200 Australia, Radio: RA News. See S 0000.
- 0200 South Korea, R Korea Intl: News. Seven or ten minutes of world and regional news.
- 0200 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0200 USA, KJES (Mesquite NM): Religious Chanting.
- 0210 Australia, Radio: Fine Music Australia. The best Australian fine music performances and compositions are presented by Ivan Lloyd.
- 0215 South Korea, R Korea Intl: News Commentary. Opinion on developments in Korea and worldwide.
- 0220 South Korea, R Korea Intl: Music Trap. The most popular music of South Korea.
- 0230 Australia, Radio: Innovations. Desley Blanch reports on Australian inventions and innovative practices.
- 0240 South Korea, R Korea Intl: From Us to You. Listener letters, questions, comments, Q&A Corner and Music Request.

### Mondays

- 0200 Australia, Radio: RA News. See S 0000.
- 0200 South Korea, R Korea Intl: News. See S 0200.
- 0200 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0200 USA, KJES (Mesquite NM): Religious Chanting.
- 0210 Australia, Radio: The World Today (Part 1). Tony Eastley with current affairs updates.
- 0210 South Korea, R Korea Intl: Echoes of Korean Music. See S 1610.
- 0230 South Korea, R Korea Intl: Multiwave Feedback. See S 1636.

### Tuesdays

- 0200 Australia, Radio: RA News. See S 0000.
- 0200 South Korea, R Korea Intl: News. See S 0200.
- 0200 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0200 USA, KJES (Mesquite NM): Religious Chanting.
- 0210 Australia, Radio: The World Today (Part 1). See M 0210.
- 0215 South Korea, R Korea Intl: News Commentary. See S 0215.

- 0215 South Korea, R Korea Intl: Seoul Calling. See M 1615.
- 0237 South Korea, R Korea Intl: Economic News Briefs. See M 1640.
- 0242 South Korea, R Korea Intl: Notes of Nostalgia. See M 1645.

### Wednesdays

- 0200 Australia, Radio: RA News. See S 0000.
- 0200 South Korea, R Korea Intl: News. See S 0200.
- 0200 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0200 USA, KJES (Mesquite NM): Religious Chanting.
- 0210 Australia, Radio: The World Today (Part 1). See M 0210.
- 0215 South Korea, R Korea Intl: News Commentary. See S 0215.
- 0220 South Korea, R Korea Intl: Seoul Calling. See M 1615.
- 0240 South Korea, R Korea Intl: Economic News Briefs. See M 1640.
- 0245 South Korea, R Korea Intl: Cultural Promenade. See T 1645.

### Thursdays

- 0200 Australia, Radio: RA News. See S 0000.
- 0200 South Korea, R Korea Intl: News. See S 0200.
- 0200 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0200 USA, KJES (Mesquite NM): Religious Chanting.
- 0210 Australia, Radio: The World Today (Part 1). See M 0210.
- 0210 South Korea, R Korea Intl: News Commentary. See S 0215.
- 0216 South Korea, R Korea Intl: Seoul Calling. See M 1615.
- 0237 South Korea, R Korea Intl: Economic News Briefs. See M 1640.
- 0241 South Korea, R Korea Intl: Reaching Forward. See W 1645.

### Fridays

- 0200 Australia, Radio: RA News. See S 0000.
- 0200 South Korea, R Korea Intl: News. See S 0200.
- 0200 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0200 USA, KJES (Mesquite NM): Religious Chanting.
- 0210 Australia, Radio: The World Today (Part 1). See M 0210.
- 0210 South Korea, R Korea Intl: News Commentary. See S 0215.
- 0215 South Korea, R Korea Intl: Seoul Calling. See M 1615.
- 0240 South Korea, R Korea Intl: Economic News Briefs. See M 1640.

- 0245 South Korea, R Korea Intl: Tales from Korea's Past. See H 1645.

### Saturdays

- 0200 Australia, Radio: RA News. See S 0000.
- 0200 South Korea, R Korea Intl: News. See S 0200.
- 0200 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0200 USA, KJES (Mesquite NM): Religious Chanting.
- 0205 Australia, Radio: Ockham's Razor. See S 0605.
- 0215 South Korea, R Korea Intl: Let's Learn Korean!. See F 1630.
- 0217 South Korea, R Korea Intl: Sites and Sounds. See F 1620.
- 0230 Australia, Radio: Earthbeat. Peter Jacklyn examines environmental issues of the region from a scientific perspective.
- 0236 South Korea, R Korea Intl: Globalizing Korea. See F 1645.

## PROPAGATION FORECASTING

JACQUES D'AVIGNON, VE3VIA  
248 TOWERHILL ROAD  
PETERBOROUGH, ON K9H 7N1  
CANADA

DISTRIBUTOR ASAPS PROPAGATION SOFTWARE  
E-MAIL: MONITOR@RAC.CA

## FREQUENCIES

0300-0400	Anguilla, Caribbean Beacon	6090am				0300-0315 mtwhf	Uganda, Radio	4976do			
0300-0400	Australia, Radio	9660pa	12080as	15240pa	15415as	0300-0400	UK, BBC African Service	3255af	6005af	6190af	9600af
		15510pa	17715pa	17750as	21725pa			11730af			
0300-0400 vl	Australia, VL8K Katherine	5025do				0300-0400	UK, BBC Asian Service	9605as	15310as	15360as	17790as
0300-0400 vl	Australia, VL8T Tent Crk	4910do						21660as			
0300-0400	Australia, Defense Forces R	14790as				0300-0330	UK, BBC World Service	5970sa	6175na	6195eu	
0300-0330 smwfa	Belarus, R Belarus Intl	7210eu	11960eu					9410eu	9895am	9915sa	11760me
0300-0400	Bulgaria, Radio	9485na	11720na					12095me			
0300-0400 vl	Canada, CBC N Quebec Svc	9625do				0300-0400	USA, Armed Forces Network	4278am	6458am	12689am	
0300-0400	Canada, CFRX Toronto	6070do				0300-0400	USA, KAIJ Dallas TX	5810am			
0300-0400	Canada, CFPV Calgary	6030do				0300-0330	USA, KJES Mesquite NM	7555am			
0300-0400	Canada, CHNX Halifax	6130do				0300-0400	USA, KTBN Salt Lk City UT	7510am			
0300-0400	Canada, CKZN St John's	6160do				0300-0400	USA, Voice of America	6080af	6115af	7105af	7275af
0300-0400	Canada, CKZU Vancouver	6160do						7290af	7340af	9575af	9885af
0300-0400	China, China Radio Intl	9690am						11695af			
0300-0400	Costa Rica, RF Peace Intl	6975am	15050am	21460am		0300-0330 smtwh	USA, Voice of America	4960af			
0300-0305	Croatia, Croatian Radio	9925na				0300-0400	USA, WBCQ Monticello ME	7415na			
0300-0400	Cuba, Radio Havana	6000na	9820na	13605na		0300-0400	USA, WEWN Birmingham AL	5825eu			
0300-0327	Czech Rep, Radio Prague	7345na	9435na			0300-0400 stwhfa	USA, WGTG McCaysville GA	5085am			
0300-0400	Ecuador, HCJB	9745na	12015na	21455am		0300-0400	USA, WHRI Noblesville IN	5745am	7315am		
0300-0330	Egypt, Radio Cairo	9475am				0300-0400	USA, WINB Red Lion PA	11950am			
0300-0350	Germany, Deutsche Welle	6085na	6145na	6185na	9535na	0300-0400	USA, WJCR Upton KY	7490na	13595na		
		9640na				0300-0400	USA, WRMI/R Miami Intl	9955ca			
0300-0400	Germany, Overcomer Ministr	3975eu	9500as			0300-0400	USA, WRNO New Orleans LA	7355na			
0300-0400 vl	Guatemala, Radio Cultural	3300do				0300-0400 twhtfas	USA, WSHB Cypress Crk SC	5850na			
0300-0400 irreg	Iraq, Radio Iraq Intl	11785eu				0300-0400	USA, WWBS Macon GA	11905na			
0300-0400	Ireland, Unt Christian BC	6200do				0300-0400	USA, WWCR Nashville TN	3215am	5070am	5935am	7435am
0300-0400 as/vl	Italy, IRRS	7120va				0300-0400	USA, WYFR Okeechobee FL	6065na	9505na		
0300-0400	Japan, R Japan/NHK World	17685pa	17825ca	17855as		0300-0400	Vatican State, Vatican R	7305ca	9605am		
0300-0400	Kenya, Kenya Broadc Corp	4885do	4935do			0300-0400	Zambia, Natl BC Corp	6165do	6265do		
0300-0315 thfa/vl	Kyrgyzstan, Kyrgyz Radio	4010do	4050do			0300-0400 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
0300-0400 vl	Lesotho, Radio Lesotho	4800do				0310-0340	Vatican State, Vatican R	7360af	9660af		
0300-0400	Malaysia, Radio	7295do				0330-0357	Czech Rep, Radio Prague	9480va	11600as		
0300-0325	Moldova, R Moldova Intl	7520na				0330-0400	Finland, YLE/R Finland	9780eu	11900am		
0300-0400 vl	Namibia, NBC	3270af	3289af			0330-0400	Hungary, Radio Budapest	9840na	11910na		
0300-0325	Netherlands, Radio	9855as	11655as			0330-0400 vl	Philippines, R Pilipinas	13770as	15330as	17730as	
0300-0400	New Zealand, R NZ Intl	17675pa				0330-0400	Sweden, Radio	9475am	11665am		
0300-0400 vl	Papua New Guinea, NBC	9675do				0330-0355	UAE, Radio Dubai	12005na	13675na	15400na	
0300-0330 vl	Philippines, R Pilipinas	11885as	15120as	15270as		0330-0400	UK, BBC African Service	9610af			
0300-0400	Russia, Voice of Russia WS	7105na	12050na	15425na	15520na	0330-0400	UK, BBC Asian Service	11955as	15280as	15310as	
0300-0330	S Africa, Channel Africa	5955af				0330-0400	UK, BBC World Service	5975am	6175na	9895am	11760me
0300-0400	Singapore, R Corp Singapore	6150do						12095me			
0300-0400	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as		0330-0400 s	UK, BBC World Service	6180eu	6195eu	9410eu	
0300-0400	Taiwan, Radio Taipei Intl	5950na	9680na	11745as	11825as	0330-0400	Vietnam, Voice of	7260am	7505am		
		15345as				0340-0350	Greece, Voice of	7450na	9375na	9420na	11645na
0300-0400 vl	Tanzania, Radio	5050do				0345-0400	Tajikistan, Radio	7245as	9905as	11620as	
0300-0330	Thailand, Radio	9655am	11905am	15395na		0345-0400 as	Uganda, Radio	4976do			
						0356-0400	Zambia, Christian Voice	3330af	6065af		

## SELECTED PROGRAMS

### Sundays

- 0300 Australia, Radio: RA News. See S 0000.
- 0300 Radio Taiwan International: News. Twelve minutes of world news.
- 0300 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0305 Australia, Radio: Feedback. Roger Broadbent answers letters and discusses new programs, reception problems, and questions about Australia.
- 0315 Radio Taiwan International: Kaleidoscope. Spotlight on life in Taiwan.
- 0330 Australia, Radio: Correspondents' Report. See S 0030.
- 0330 Radio Taiwan International: Reflections. The best of Chinese literature.
- 0345 Radio Taiwan International: Let's Learn Chinese. Chinese lessons with commentary and translation in English.

### Mondays

- 0300 Australia, Radio: RA News. See S 0000.
- 0300 Radio Taiwan International: News. See S 0300.
- 0300 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0310 Australia, Radio: Australia Talks Back. Australians talking about issues of the day with Sandy McCutcheon.
- 0315 Radio Taiwan International: Food, Poetry and Others. The program in which host Paula Chao talks about her personal interests.
- 0330 Radio Taiwan International: Mailbag Time. Host Carlton Wong reads letters from listeners and plays music requests.
- 0345 Radio Taiwan International: Let's Learn Chinese. See S 0345.

### Tuesdays

- 0300 Australia, Radio: RA News. See S 0000.
- 0300 Radio Taiwan International: News. See S 0300.
- 0300 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0310 Australia, Radio: Australia Talks Back. See M 0310.
- 0315 Radio Taiwan International: Jade Bells and Bamboo Pipes. Carlton Wong plays Chinese folk and temple music.
- 0345 Radio Taiwan International: Let's Learn Chinese. See S 0345.

### Wednesdays

- 0300 Australia, Radio: RA News. See S 0000.
- 0300 Radio Taiwan International: News. See S 0300.
- 0300 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0310 Australia, Radio: Australia Talks Back. See M 0310.
- 0315 Radio Taiwan International: People. An introduction to people from all walks of life in Taiwan.
- 0330 Radio Taiwan International: Trends. Amanda with weekly sound bites about what's new and happening in Taipei.
- 0345 Radio Taiwan International: Let's Learn Chinese. See S 0345.

### Thursdays

- 0300 Australia, Radio: RA News. See S 0000.
- 0300 Radio Taiwan International: News. See S 0300.
- 0300 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0310 Australia, Radio: Australia Talks Back. See M 0310.
- 0315 Radio Taiwan International: Taiway Today. Focus on an aspect of Taiwanese life such as education or a point of interest.
- 0330 Radio Taiwan International: Miss Mook's Big Countdown. Miss Mook plays the latest releases of the popular music of Taiwan.

- 0345 Radio Taiwan International: Let's Learn Chinese. See S 0345.

### Fridays

- 0300 Australia, Radio: RA News. See S 0000.
- 0300 Radio Taiwan International: News. See S 0300.
- 0300 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0310 Australia, Radio: Australia Talks Back. See M 0310.
- 0315 Radio Taiwan International: Jade Bells and Bamboo Pipes. See T 0315.
- 0345 Radio Taiwan International: Let's Learn Chinese. See S 0345.

### Saturdays

- 0300 Australia, Radio: RA News. See S 0000.
- 0300 Radio Taiwan International: News. See S 0300.
- 0300 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0305 Australia, Radio: Book Reading. See F 2305.
- 0315 Radio Taiwan International: Taipei Magazine. A young couple's escapades in Taiwan.
- 0330 Australia, Radio: Rural Reporter. See W 2330.
- 0335 Radio Taiwan International: Life on the Outside. Discovering everyday life and customs in Taiwan.
- 0350 Radio Taiwan International: Let's Learn Chinese. See S 0345.

## FREQUENCIES

0400-0500	Anguilla, Caribbean Beacon	6090am				0400-0500	UK, BBC African Service	3255af	6005af	6190af	7160af
0400-0500	Australia, Radio	9660pa	12080as	15240pa	15415as	0400-0500	UK, BBC Asian Service	9600af	15420af		
		15510pa	17715pa	17750as	21725pa			9605as	21955as	15280as	15310as
0400-0500 vl	Australia, VL8K Katherine	5025do				0400-0430	UK, BBC World Service	17790as			
0400-0500 vl	Australia, VL8T Tent Crk	4910do						3955eu	5975am	6175na	6180eu
0400-0500	Australia, Defense Forces R	14790as						6195eu	9410eu	9895am	11760me
0400-0500	Canada, CBC N Quebec Svc	9625do				0400-0500	Ukraine, R Ukraine Intl	12095eu	15575as	17640eu	
0400-0500	Canada, CFRX Toronto	6070do						6020eu	6080eu	7410eu	9550na
0400-0500	Canada, CFVP Calgary	6030do						12040na	13590na		
0400-0500	Canada, CHNX Halifax	6130do				0400-0500	USA, Armed Forces Network	4278am		12689am	
0400-0500	Canada, CKZN St John's	6160do				0400-0500	USA, KAIJ Dallas TX	5810am			
0400-0500	Canada, CKZU Vancouver	6160do				0400-0500	USA, KTBN Salt Lk City UT	7510am			
0400-0429	Canada, R Canada Intl	9715me	11835me	11975me		0400-0500	USA, KVOH Los Angeles CA	9975am			
0400-0500	China, China Radio Intl	9560am	9730am			0400-0500	USA, Voice of America	6080af	7170af	7265af	7275af
0400-0500	Costa Rica, RF Peace Intl	6975am	15050am	21460am				7290af	9575af	9885af	11965me
0400-0405	Croatia, Croatian Radio	9925na						15205va			
0400-0500	Cuba, Radio Havana	6000na	9820na	13605na		0400-0500	USA, WBCQ Monticello ME	7415na			
0400-0500	Ecuador, HCJB	9745na	12015na	21455am		0400-0500	USA, WEWN Birmingham AL	5825eu			
0400-0450	Germany, Deutsche Welle	5990af	6015af	7225af	9565af	0400-0500 stwhfa	USA, WGTG McCaysville GA	5085am			
		11765af				0400-0500	USA, WHRA Greenbush ME	9400me			
0400-0500	Germany, Overcomer Ministr	3975eu	11910as			0400-0500	USA, WHRI Noblesville IN	5745am	7315am		
0400-0500 vl	Guatemala, Radio Cultural	3300do				0400-0500	USA, WINB Red Lion PA	11950am			
0400-0500	Ireland, Unt Christian BC	6200do				0400-0500	USA, WJCR Upton KY	7490na	13595na		
0400-0500 as/vl	Italy, IRRS	7120va				0400-0500	USA, WMLK Bethel PA	9465am			
0400-0500	Kenya, Kenya Broadc Corp	4885do	4935do			0400-0500 m	USA, WRMI/R Miami Intl	9955ca			
0400-0500 vl	Lesotho, Radio Lesotho	4800do				0400-0500 mw	USA, WSHB Cypress Crk SC	9840af			
0400-0410 vl/m-t	Malawi, MBC	5993do				0400-0500	USA, WWBS Macon GA	11905na			
0400-0500	Malaysia, Radio	7295do				0400-0500	USA, WWCR Nashville TN	3215am	5070am	5935am	7435am
0400-0500 vl	Malaysia, RTM Kuching	7160do				0400-0500	USA, WYFR Okeechobee FL	6065na	9505na	9985va	
0400-0430 mtwhfa	Mexico, Radio Mexico Intl	5985na	9705na			0400-0500	Zambia, Christian Voice	3330af	6065af		
0400-0425	Moldova, R Moldova Intl	7520na				0400-0500	Zambia, Natl BC Corp	6165do	6265do		
0400-0458	New Zealand, R NZ Intl	17675pa				0400-0500 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
0400-0500 vl	Papua New Guinea, NBC	9675do				0425-0440 vl	Italy, RAI Intl	5975af	7270af		
0400-0500	Romania, R Romania Intl	9570na	11940na	15325as	17720as	0425-0500	Nigeria, FRCN/Radio	3326do	4770do	4990do	
0400-0500	Russia, Voice of Russia WS	9825na	12000na	12050na	13640na	0430-0500	Austria, R Austria Intl	6155eu	13730eu		
		13790na	15425na	15455na	15595na	0430-0500	Netherlands, Radio	6165na	9590na		
0400-0430	S Africa, Channel Africa	5955af				0430-0500	Swaziland, Trans World R	3200af	4775af		
0400-0500	Singapore, R Corp Singapore	6150do				0430-0500	Switzerland, Swiss R Intl	9885na	9905na		
0400-0430	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as		0430-0500	UK, BBC World Service	5975am	6175am	11760me	15575as
0400-0430	Switzerland, Swiss R Intl	5840eu	9885am	9905am				17640me			
0400-0500 vl	Tanzania, Radio	5050do				0430-0500 as	UK, BBC World Service	3955eu	6180eu	6195eu	9410eu
0400-0500	Turkey, Voice of	7270as	9655va	17705as				12095eu			
0400-0415	Uganda, Radio	4976do				0455-0500	Nigeria, Voice of	7255af	15120af		
						0459-0500	New Zealand, R NZ Intl	11905pa			

## SELECTED PROGRAMS

### Sundays

- 0400 Australia, Radio: RA News. See S 0000.
- 0400 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0405 Australia, Radio: Pacific Focus. Coverage of issues of relevance to people of the Pacific region.
- 0430 Australia, Radio: The Week's End. No information available for this new program.
- 0455 Malaysia, Voice of: Voice of Islam.
- 0455 Nigeria, Voice of: Anthem/Program Information. National anthem, program times and descriptions.

### Mondays

- 0400 Australia, Radio: RA News. See S 0000.
- 0400 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0410 Australia, Radio: The World Today (repeat). See M 0210.
- 0455 Malaysia, Voice of: Voice of Islam.
- 0455 Nigeria, Voice of: Anthem/Program Information. See S 0455.

### Tuesdays

- 0400 Australia, Radio: RA News. See S 0000.
- 0400 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0410 Australia, Radio: The World Today (repeat). See M 0210.
- 0430 Radio Mexico Intl: Music of Mexico. See S 0430.
- 0455 Malaysia, Voice of: Voice of Islam.
- 0455 Nigeria, Voice of: Anthem/Program Information. See S 0455.

### Wednesdays

- 0400 Australia, Radio: RA News. See S 0000.
- 0400 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0410 Australia, Radio: The World Today (repeat). See M 0210.
- 0455 Malaysia, Voice of: Voice of Islam.

- 0455 Nigeria, Voice of: Anthem/Program Information. See S 0455.

### Thursdays

- 0400 Australia, Radio: RA News. See S 0000.
- 0400 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0410 Australia, Radio: The World Today (repeat). See M 0210.
- 0455 Malaysia, Voice of: Voice of Islam.
- 0455 Nigeria, Voice of: Anthem/Program Information. See S 0455.

### Fridays

- 0400 Australia, Radio: RA News. See S 0000.
- 0400 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).

### SWL Programs ..... continued from page 40

- 0709 HCJB (eu): "DX Partyline"
- 0830 WHRI (Angel 1/2 Indiana): "DXing with Cumbre"
- 0900 KWHR (Angel 4 Hawaii): "DXing with Cumbre"
- 0910 HCJB (pac): "DX Partyline"
- 0940 FEBC (Philippines): "DX Dial"
- 1015 WWCR #3 (Tennessee): "Ask WWCR"
- 1030 Radio For Peace Intl: "Continent of Media"
- 1100 Radio For Peace Intl: "World of Radio"
- 1136 Voice of America (as pac): "Communications World (A)"
- 1247 Radio Bulgaria: "Radio Bulgaria Calling"
- 1305 KWHR (Angel 4 Hawaii): "DXing with Cumbre"
- 1336 Voice of America (as pac): "Communications World (B)"
- 1342 Radio Tashkent: "Radio Tashkent DX Program"
- 1345 Voice of Turkey: "DX Corner" (biweekly)
- 1455 FEBC (Philippines): "DX Dial"
- 1530 WHRI (Angel 2 Indiana): "DXing with Cumbre"
- 1536 Voice of America (as pac/ea/af): "Communications World (C)"
- 1730 Radio For Peace Intl: "Continent of Media"

- 0410 Australia, Radio: The World Today (repeat). See M 0210.
- 0455 Malaysia, Voice of: Voice of Islam.
- 0455 Nigeria, Voice of: Anthem/Program Information. See S 0455.

### Saturdays

- 0400 Australia, Radio: RA News. See S 0000.
- 0400 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0405 Australia, Radio: Pacific Focus. See S 0405.
- 0430 Australia, Radio: Asia Pacific. See S 2310.
- 0455 Malaysia, Voice of: Voice of Islam.
- 0455 Nigeria, Voice of: Anthem/Program Information. See S 0455.

- 1736 Voice of America (af/as pac/ea/af): "Communications World (A)"
- 1800 Radio For Peace Intl: "World of Radio"
- 1830 WHRI (Angel 1 Indiana): "DXing with Cumbre"
- 1909 HCJB (eu): "DX Partyline"
- 1936 Voice of America (af/as pac/ea/af): "Communications World (C)"
- 1958 Vatican Radio: "On-the-Air"
- 2015 Voice of Turkey: "DX Corner" (biweekly)
- 2114 Radio Havana Cuba: "DXers Unlimited"
- 2130 WWCR #3 (Tennessee): "Ask WWCR"
- 2136 Voice of America (as pac/ea/af): "Communications World (B)"
- 2230 WHRA (Angel 5 Maine): "DXing with Cumbre"
- 2231 Radio Exterior de Espana: "Distance Unknown"
- 2243 Radio Bulgaria: "Radio Bulgaria Calling"
- 2300 KSDA (Guam): "Wavescan"
- 2300 Vatican Radio: "On-the-Air"
- 2323 Voice of Turkey: "DX Corner" (biweekly)
- 2330 WHRI (Angel 1 Indiana): "DXing with Cumbre"

FREQUENCIES

0500-0600	Anguilla, Caribbean Beacon	6090am				0500-0600	Singapore, R Corp Singapore	6150do			
0500-0600	Australia, Radio	9660pa	12080as	15240pa	15510pa	0500-0600	Spain, R Exterior Espana	6055am			
		17715pa	21820pa			0500-0600 vl	Tanzania, Radio	5050do			
0500-0600 vl	Australia, VL8K Katherine	5025do				0500-0515	Uganda, Radio	4976do			
0500-0600 vl	Australia, VL8T Tent Crk	4910do				0500-0600	UK, BBC African Service	3255af	6005af	6190af	7160af
0500-0600 vl	Cameroon, Radio Cameroon	4850do						9600af	15420af	17885af	
0500-0600	Canada, CBC N Quebec Svc	9625do				0500-0600	UK, BBC Asian Service	9740as	11955as	15280as	15310as
0500-0600	Canada, CFRX Toronto	6070do						15360as	17760as	17790as	21660as
0500-0600	Canada, CFVP Calgary	6030do				0500-0600	UK, BBC World Service	3955eu	5975am	6175am	6180eu
0500-0600	Canada, CHNX Halifax	6130do						6195eu	9410eu	11760me	12095eu
0500-0600	Canada, CKZU Vancouver	6160do						15575eu	17640me		
0500-0529 mtwhf	Canada, R Canada Intl	7295eu	9595eu	11835af	15430af	0500-0600	USA, Armed Forces Network	4278am	6458am	12689am	
0500-0600	Costa Rica, RF Peace Intl	6975am	15050am	21460am		0500-0600	USA, KAIJ Dallas TX	5810am			
0500-0505	Croatia, Croatian Radio	5945eu				0500-0600	USA, KTBN Salt Lk City UT	7510am			
0500-0600	Cuba, Radio Havana	9550na	9820na	9830na		0500-0600	USA, KVOH Los Angeles CA	9975am			
0500-0600	Ecuador, HCJB	9745na	12015na	21455am		0500-0600	USA, Voice of America	5970af	6035af	6080af	7110as
0500-0550	Germany, Deutsche Welle	6045na	6185na	9615am	11810na			7170eu	7195af	9630af	11965me
0500-0600	Germany, Overcomer Ministr	3975eu	11910as			0500-0600	USA, WBCQ Monticello ME	12080af	15205eu	15250as	
0500-0600	Ireland, Unt Christian BC	6200do				0500-0600	USA, WEWN Birmingham AL	7415na			
0500-0515	Israel, Kol Israel	9435eu	11605eu	17535va		0500-0600	USA, WHRA Greenbush ME	5825eu			
0500-0600 as/vl	Italy, IRRS	7120va				0500-0600	USA, WHRI Noblesville IN	9400me			
0500-0600	Japan, R Japan/NHK World	6110na	7230eu	9835na	11715as	0500-0600	USA, WINB Red Lion PA	5745am	7315am		
		11760as	11840as	11850pa	15230pa	0500-0600	USA, WJCR Upton KY	11950am			
		17820me				0500-0600	USA, WMLK Bethel PA	7490na	13595na		
0500-0600	Kenya, Kenya Broadc Corp	4885do	4935do			0500-0600	USA, WMLK Bethel PA	9465am			
0500-0600 vl	Lesotho, Radio Lesotho	4800do				0500-0600 mtwhfa	USA, WRMI/R Miami Intl	9955ca			
0500-0600	Liberia, Star Radio	3400do				0500-0600 w	USA, WSHB Cypress Crk SC	7535eu	9835af		
0500-0600	Liberia, LCN/R Liberia Intl	5100do				0500-0600	USA, WWCR Nashville TN	2390am	3210am	5070am	5935na
0500-0510 vl/m-f	Malawi, MBC	5993do				0500-0600	USA, WYFR Okeechobee FL	5985na	9985eu	11580af	
0500-0600	Malaysia, Radio	7295do				0500-0530	Vatican State, Vatican R	4005eu	5883eu	7250eu	9660af
0500-0600 vl	Malaysia, RTM Kuching	4895do	7160do					11625af	15570af		
0500-0530 mwhf	Mexico, Radio Mexico Intl	5985na	9705na			0500-0600	Zambia, Christian Voice	3330af	6065af		
0500-0600 vl	Namibia, NBC	3270af	3289af			0500-0600	Zambia, Natl BC Corp	6165do	6265do		
0500-0525	Netherlands, Radio	6165na	9590na			0500-0530 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
0500-0600	New Zealand, R NZ Intl	11905pa				0505-0600	Swaziland, Trans World R	3200af	4775af	9500af	
0500-0505	Nigeria, FRCN/Radio	326do	4770do	4990do		0525-0600	Ghana, Ghana Broadc Corp	3366do	4915do		
0500-0600	Nigeria, Voice of	7355af	15120af			0530-0600	Austria, R Austria Intl	6015na			
0500-0600	North Korea, R Pyongyang	3560as	11710eu	13790as		0530-0600	Finland, YLE/R Finland	11945as	17830au		
0500-0600 vl	Papua New Guinea, NBC	9675do				0530-0600 a	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
0500-0600	Russia, Voice of Russia WS	9825na	12000na	12050na	13645na	0530-0600	Serbia, Radio Yugoslavia	9580na	11870na		
		13790na	15425na	15495na	15595na	0530-0600	Thailand, Radio	9655eu	11905eu	15445eu	
0500-0530	S Africa, AWR Africa	6000af	6100af			0530-0600	UAE, Radio Dubai	17830eu	21605eu		
0500-0530	S Africa, Channel Africa	9525af				0530-0600 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
						0555-0600	Malaysia, Voice of	6175as	9750as	15295au	

SELECTED PROGRAMS

Sundays

- 0500 Australia, Radio: RA News. See S 0000.
- 0500 Israel, Kol Israel: News. World and regional news.
- 0500 Radio Mexico Intl: Universal Forum. Interview of a famous Mexican and discussion of his work.
- 0500 Nigeria, Voice of: Reflections. A thought-provoking talk on the real meaning of man and his existence.
- 0500 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0505 Australia, Radio: Oz Sounds #1. Twenty minutes of music selections by Radio Australia announcers.
- 0505 Nigeria, Voice of: VoN Link-up. See S 0220.
- 0511 Israel, Kol Israel: Review of the Paper Press. A summary of items in the Israeli newspapers.
- 0530 Australia, Radio: Pacific Review. New program - no information available.
- 0530 Radio Mexico Intl: Music of Mexico. The traditional music of Mexico.
- 0530 Nigeria, Voice of: News. Thirty minutes of news, press review, sports, and interviews on the most current issues in Nigeria and elsewhere.
- 0546 Nigeria, Voice of: News about Nigeria. See S 0220.

Mondays

- 0500 Australia, Radio: RA News. See S 0000.
- 0500 Israel, Kol Israel: News. See S 0500.
- 0500 Nigeria, Voice of: Wave Train. A live music magazine which lightens up and informs listeners.
- 0500 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0510 Australia, Radio: Pacific Beat. The magazine that provides a focus on the people and issues of the region.
- 0511 Israel, Kol Israel: Review of the Paper Press. See S 0511.
- 0530 Australia, Radio: Sport. Five or ten minutes of sports news.
- 0530 Nigeria, Voice of: VONSCOPE. See S 0530.
- 0540 Australia, Radio: Pacific Beat. See M 0510.

Tuesdays

- 0500 Australia, Radio: RA News. See S 0000.
- 0500 Israel, Kol Israel: News. See S 0500.
- 0500 Radio Mexico Intl: Antenna Radio Summary. A 15-minute magazine of news, finance, and culture.
- 0500 Nigeria, Voice of: Wave Train. See M 0500.
- 0500 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0510 Australia, Radio: Pacific Beat. See M 0510.
- 0511 Israel, Kol Israel: Review of the Paper Press. See S 0511.
- 0530 Australia, Radio: Sport. See M 0530.
- 0530 Radio Mexico Intl: Music of Mexico. See S 0430.
- 0530 Nigeria, Voice of: VONSCOPE. See S 0530.
- 0540 Australia, Radio: Pacific Beat. See M 0510.

Wednesdays

- 0500 Australia, Radio: RA News. See S 0000.
- 0500 Israel, Kol Israel: News. See S 0500.
- 0500 Radio Mexico Intl: Antenna Radio Summary. See T 0400.
- 0500 Nigeria, Voice of: Wave Train. See M 0500.
- 0500 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0510 Australia, Radio: Pacific Beat. See M 0510.
- 0511 Israel, Kol Israel: Review of the Paper Press. See S 0511.
- 0530 Australia, Radio: Sport. See M 0530.
- 0530 Radio Mexico Intl: Music of Mexico. See S 0430.
- 0530 Nigeria, Voice of: VONSCOPE. See S 0530.
- 0540 Australia, Radio: Pacific Beat. See M 0510.

Thursdays

- 0500 Australia, Radio: RA News. See S 0000.
- 0500 Israel, Kol Israel: News. See S 0500.
- 0500 Radio Mexico Intl: Antenna Radio Summary. See T 0400.
- 0500 Nigeria, Voice of: Wave Train. See M 0500.
- 0500 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0510 Australia, Radio: Pacific Beat. See M 0510.

- 0511 Israel, Kol Israel: Review of the Paper Press. See S 0511.
- 0530 Australia, Radio: Sport. See M 0530.
- 0530 Radio Mexico Intl: Music of Mexico. See S 0430.
- 0530 Nigeria, Voice of: VONSCOPE. See S 0530.
- 0540 Australia, Radio: Pacific Beat. See M 0510.

Fridays

- 0500 Australia, Radio: RA News. See S 0000.
- 0500 Israel, Kol Israel: News. See S 0500.
- 0500 Radio Mexico Intl: Antenna Radio Summary. See T 0400.
- 0500 Nigeria, Voice of: Wave Train. See M 0500.
- 0500 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0510 Australia, Radio: Pacific Beat. See M 0510.
- 0511 Israel, Kol Israel: Review of the Paper Press. See S 0511.
- 0530 Australia, Radio: Sport. See M 0530.
- 0530 Radio Mexico Intl: Music of Mexico. See S 0430.
- 0530 Nigeria, Voice of: VONSCOPE. See S 0530.
- 0540 Australia, Radio: Pacific Beat. See M 0510.

Saturdays

- 0500 Australia, Radio: RA News. See S 0000.
- 0500 Israel, Kol Israel: News. See S 0500.
- 0500 Radio Mexico Intl: Antenna Radio Summary. See T 0400.
- 0500 Nigeria, Voice of: African Safari. A musical journey around the countries of Africa with country profiles and current happenings.
- 0500 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0505 Australia, Radio: Money, Markets, and the Economy.
- 0530 Australia, Radio: Earthbeat. See A 0230.
- 0530 Radio Mexico Intl: Music of Mexico. See S 0430.
- 0530 Nigeria, Voice of: News. See S 0530.

## FREQUENCIES

0600-0700	Anguilla, Caribbean Beacon	6090am				0600-0700	Singapore, RCorp Singapore	6150do			
0600-0700	Australia, Radio	9660pa	12080as	15240pa	15415as	0600-0700 vl	Solomon Islands, SIBC	5020do			
		15510pa	17715pa	17750as	21725pa	0600-0605	Swaziland, Trans World R	4775af	9500af		
0600-0700 vl	Australia, VL8K Katherine	5025do				0600-0700 vl	Tanzania, Radio	5050do			
0600-0700 vl	Australia, VL8T Tent Crk	4910do				0600-0700	UK, BBC African Service	6005af	6190af	7160af	9600af
0600-0700 vl	Canada, CBC N Quebec Svc	9625do						11835af	11940af	15420af	17885af
0600-0700	Canada, CFRX Toronto	6070do				0600-0700	UK, BBC Asian Service	7145pa	9740as	11955pa	15310as
0600-0700	Canada, CFVP Calgary	6030do						15360as	17760as	17790as	21660as
0600-0700	Canada, CHNX Halifax	6130do				0600-0700	UK, BBC World Service	5975am	6175am	6180eu	6195eu
0600-0700	Canada, CKZU Vancouver	6160do						7325eu	9410eu	11760me	12095eu
0600-0700	Costa Rica, RF Peace Intl	6975am	15050am	21460am				15565eu	15575eu	17640me	
0600-0605	Croatia, Croatian Radio	5945eu	9830eu	13830au		0600-0700	USA, Armed Forces Network	4278am			
0600-0700	Cuba, Radio Havana	9550na	9820na	9830na		0600-0700	USA, KAIJ Dallas TX	5810am			
0600-0700	Ecuador, HCJB	9745na	12015na	21455am		0600-0700	USA, KTVN Salt Lk City UT	7510am			
0600-0650	Germany, Deutsche Welle	11915af	13790af	15185af	17820as	0600-0700	USA, KVOH Los Angeles CA	9975ca			
		17860af	21680as			0600-0630	USA, Voice of America	5970af	6035af	6080af	7170eu
		5850va						7195af	9630af	9680af	11805af
0600-0700 vl	Germany, Sunrise Radio	3975eu	13810au	15755as				11965me	11995af	12080af	15205va
0600-0700	Germany, Overcomer Ministr	3366do	4915do			0600-0700	USA, WEWN Birmingham AL	5825eu			
0600-0615	Ghana, Ghana Broadc Corp	6200do				0600-0700	USA, WHRA Greenbush ME	11565af			
0600-0700	Ireland, Unt Christian BC	3985va				0600-0700	USA, WHRI Noblesville IN	5745am	7315am		
0600-0700 vl	Italy, IRRS	5975eu	7230eu	9835na	11740as	0600-0700	USA, WINB Red Lion PA	11950am			
0600-0700	Japan, R Japan/NHK World	11840as	11850pa	17810as		0600-0700	USA, WJCR Upton KY	7490na	13595na		
		4885do	4935do			0600-0700	USA, WMLK Bethel PA	9465am			
0600-0700	Kenya, Kenya Broadc Corp	4800do				0600-0700 mtwhf	USA, WRMI/R Miami Intl	9955ca			
0600-0700 vl	Lesotho, Radio Lesotho	5470do				0600-0700 tf	USA, WSHB Cypress Crk SC	7355eu			
0600-0700	Liberia, Radio Veritas	3400do				0600-0700	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0600-0700	Liberia, Star Radio	5100do				0600-0700	USA, WYFR Okeechobee FL	5985am	7355va		
0600-0700	Liberia, LCN/R Liberia Int	7295do				0600-0700	Yemen, Radio Aden	9780do			
0600-0700	Malaysia, Radio	4895do	7160do			0600-0700	Zambia, Christian Voice	3330af	6065af		
0600-0700 vl	Malaysia, RTM Kuching	6175as	9750as	15295au		0600-0700	Zambia, Natl BC Corp	6165do	6265do		
0600-0625	Malaysia, Voice of	3270af	3289af			0600-0700 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
0600-0700 vl	Namibia, NBC	11905pa				0605-0700	Swaziland, Trans World R	4775af	6100af	9500af	
0600-0700	New Zealand, R NZ Intl	3326do	4770do	4990do		0630-0700	Switzerland, Swiss R Intl	5840eu			
0600-0630	Nigeria, FRCN/Radio	7255af	15120af			0630-0700	USA, Voice of America	7170eu	11805af	11965me	15205eu
0600-0700	Nigeria, Voice of	9675do				0630-0700	USA, Voice of America	5970af	6035af	6080af	7195af
0600-0700 vl	Papua New Guinea, NBC	9510na	11940na			0645-0700	Vatican State, Vatican R	9630af	11995af	12080af	
0600-0700	Romania, R Romania Intl	9450au	17495au	17665au	21760au	0630-0700 as	USA, Voice of America	4005eu	5883eu	7250eu	9645eu
0600-0700	Russia, Voice of Russia WS	21790au				0630-0645 mtwhfa	Vatican State, Vatican R	11740eu	15595eu		
		11900af				0641-0656	Romania, R Romania Intl	9550eu	9625eu	9665eu	11885eu
0600-0630	S Africa, Channel Africa	11735af				0645-0655 s	Albania, TWR Tirana	9685eu			
0600-0630	S Africa, Trans World R	3316do				0645-0700	Vatican State, Vatican R	11625af	13765af	15570af	
0600-0610	Sierra Leone, SLBS					0655-0700	Albania, TWR Tirana	9685eu			

## SELECTED PROGRAMS

### Sundays

- 0600 Australia, Radio: RA News. See S 0000.
- 0600 Nigeria, Voice of: This Week on VON. Highlights of programs for the coming week.
- 0600 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0605 Australia, Radio: Ockham's Razor. Robyn Williams with straight, sharp talk about science.
- 0615 Nigeria, Voice of: Listeners' Letters. Typical mailbag program with info for pen pals.
- 0630 Australia, Radio: Correspondents' Report. See S 0030.
- 0630 Nigeria, Voice of: Weekly Analysis. An examination of three issues of interest each week.

### Mondays

- 0600 Australia, Radio: RA News. See S 0000.
- 0600 Nigeria, Voice of: Across the Ages. An examination of the evolution of Nigeria's cultural practices.
- 0600 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0610 Australia, Radio: The Australian Music Show. Kim Taylor presents the music, people, and issues of the Australian contemporary music industry.
- 0615 Nigeria, Voice of: Nigeria and Politics. Happenings on the Nigerian political scene.
- 0630 Australia, Radio: Sports. A half-hour of sports.
- 0630 Nigeria, Voice of: World News. Ten minutes of international news.
- 0655 Nigeria, Voice of: Program Announcements. See S 0220.

### Tuesdays

- 0600 Australia, Radio: RA News. See S 0000.
- 0600 Nigeria, Voice of: Agenda for Peace. Focus on reconciliation among the races in the region.
- 0600 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0610 Australia, Radio: The Australian Music Show. See M 0610.
- 0615 Nigeria, Voice of: Nigeria Scene. See S 0220.
- 0630 Australia, Radio: Sports. See M 0630.

- 0630 Nigeria, Voice of: World News. See M 0630.
- 0640 Nigeria, Voice of: Commentary. Opinion on events in Nigeria.
- 0645 Nigeria, Voice of: News about Nigeria. See S 0220.
- 0655 Nigeria, Voice of: Program Announcements. See S 0220.

### Wednesdays

- 0600 Australia, Radio: RA News. See S 0000.
- 0600 Nigeria, Voice of: Nigerian Newsletter. A personal review of interesting Nigerian events with opinions on contemporary issues.
- 0600 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0610 Australia, Radio: At Your Request. Dick Paterson plays favorite music.
- 0615 Nigeria, Voice of: Wheel of Progress. Industrial and agricultural development in Nigeria.
- 0630 Australia, Radio: Sports. See M 0630.
- 0630 Nigeria, Voice of: World News. See M 0630.
- 0640 Nigeria, Voice of: Commentary. See T 0640.
- 0645 Nigeria, Voice of: News about Nigeria. See S 0220.
- 0655 Nigeria, Voice of: Program Announcements. See S 0220.

### Thursdays

- 0600 Australia, Radio: RA News. See S 0000.
- 0600 Nigeria, Voice of: West African Scene. A news magazine which reflects the events in the sub-region.
- 0600 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0610 Australia, Radio: Blacktracker. Mal Honess with an insight into the music and performance of Australia's aborigines.
- 0615 Nigeria, Voice of: World of the Arts. See S 0220.
- 0630 Australia, Radio: Sports. See M 0630.
- 0630 Nigeria, Voice of: World News. See M 0630.
- 0640 Nigeria, Voice of: Commentary. See T 0640.
- 0645 Nigeria, Voice of: News about Nigeria. See S 0220.
- 0655 Nigeria, Voice of: Program Announcements. See S 0220.

### Fridays

- 0600 Australia, Radio: RA News. See S 0000.

- 0600 Nigeria, Voice of: African Writers. See M 1630.
- 0600 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0610 Australia, Radio: Australian Country Style. Graham Bell goes up country.
- 0615 Nigeria, Voice of: Images of Nigeria. See S 1645.
- 0630 Australia, Radio: Sports. See M 0630.
- 0630 Nigeria, Voice of: World News. See M 0630.
- 0640 Nigeria, Voice of: Commentary. See T 0640.
- 0645 Nigeria, Voice of: News about Nigeria. See S 0220.
- 0655 Nigeria, Voice of: Program Announcements. See S 0220.

### Saturdays

- 0600 Australia, Radio: RA News. See S 0000.
- 0600 Nigeria, Voice of: From the Racks. See S 0220.
- 0600 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).
- 0605 Australia, Radio: Feedback. See S 0305.
- 0615 Nigeria, Voice of: Issues of the Moment. See F 1645.
- 0630 Australia, Radio: Arts Australia. See T 2330.
- 0630 Nigeria, Voice of: Weekly Analysis. See S 0630.

## Macintosh Software

### SHORTWAVE NAVIGATOR FREQUENCY VALET • UTCLOCK

FREQUENCIES/PROGRAMS/COMPUTER CONTROL  
(DRAKE • KENWOOD • JRC)

SEND \$2 FOR DEMO DISK TO:  
DX COMPUTING • 232 SQUAW CREEK RD.  
WILLOW PARK, TX 76087



## FREQUENCIES

0900-1000	Anguilla, Caribbean Beacon	6090am			
0900-1000	Australia, Radio	6080as	9580pa	11880as	17750as
0900-1000 vl	Australia, VL8A Alice Spg	2310do			
0900-1000 vl	Australia, VL8K Katherine	2485do			
0900-1000 vl	Australia, VL8T Tent Crk	2325do			
0900-1000	Bhutan, Bhutan BC Service	5030do			
0900-1000	Canada, CFRX Toronto	6070do			
0900-1000	Canada, CFVP Calgary	6030do			
0900-1000	Canada, CHNX Halifax	6130do			
0900-1000	Canada, CKZU Vancouver	6160do			
0900-1000	China, China Radio Intl	9785pa	9890pa	11755pa	
0900-1000	Costa Rica, RF Peace Intl	15050am	21460am		
0900-0910 mtwhfa	Croatia, Croatian Radio	7185eu	9830eu	13820au	
0900-0927	Czech Rep, Radio Prague	17485af	21745as		
0900-1000	Ecuador, HCJB	9640pa	21455am		
0900-1000 as	Eqt Guinea, R East Africa	15186af			
0900-1000 mtwhf	Eqt Guinea, Radio Africa	15186af			
0900-0950	Germany, Deutsche Welle	6160pa	9565af	12055as	15205af
		15410af	17715as	17800af	21600af
		21680as			
0900-1000	Germany, Sunrise Radio	5850va			
0900-1000 a	Germany, Good News World R	5910eu			
0900-1000	Germany, Overcomer Ministr	13810au	15735as		
0900-0915 mtwtf	Ghana, Ghana Broadc Corp	3366do	4915do		
0900-0915	Guam, TWR/KTWR	15200as			
0900-0930	Guyana, GBC/Voice of	3290do	5950do		
0900-1000	Ireland, Unt Christian BC	6200do			
0900-1000	Kenya, Kenya Broadc Corp	4935do			
0900-1000	Liberia, Radio Veritas	5470do			
0900-0915	Liberia, LCN/R Liberia Int	5100do			
0900-1000	Malaysia, Radio	7295do			
0900-1000 vl	Malaysia, RTM Kuching	4895do	7160do		
0900-0930 s	Malta, VO Mediterranean	9600eu			
0900-1000 s	Malta, VO Mediterranean	9600eu			
0900-0935 a	Monaco, Trans World Radio	9755eu			
0900-0920 s	Monaco, Trans World Radio	9755eu			
0900-1000 twhfas	N Mariana Is, KHBI Saipan	15665as			
0900-1000 vl	Namibia, NBC	4930af	4965af		
0900-0925	Netherlands, Radio	9720pa	9820pa		
0900-1000	New Zealand, R NZ Intl	9700pa			
0900-1000 vl	Papua New Guinea, NBC	4890do			
0900-1000	Russia, Voice of Russia WS	9450au	17495au	17665au	21760au
		21790au			
0900-1000	Singapore, R Corp Singapore	6150do			
0900-1000 vl	Solomon Islands, SIBC	5020do			
0900-1000 vl	Tanzania, Radio	5050do			
0900-1000	UK, BBC African Service	6190af	11940af	15400af	17830af
		17885af			
0900-0915	UK, BBC Asian Service	6065as	6195as	9580as	9740as
		11765as	11955as	15310as	15360as
		17760as	17790as	21660as	
0900-1000	UK, BBC World Service	9410eu	11760me	12095eu	15190sa
		15485eu	15565eu	15575eu	17640eu
		17705eu			
0900-1000	USA, Armed Forces Network	4278am	6458am	12689am	
0900-1000	USA, KAIJ Dallas TX	5810am			
0900-1000	USA, KTBN Salt Lk City UT	7510am			
0900-1000	USA, KWHR Naalehu HI	11565pa			
0900-1000	USA, WEWN Birmingham AL	5825eu			
0900-1000	USA, WHRI Noblesville IN	5745am	7315am		
0900-1000	USA, WJCR Upton KY	7490na	13595na		
0900-1000 mtwhf	USA, WRMI/R Miami Intl	9955ca			
0900-1000 th	USA, WSHB Cypress Crk SC	9835eu			
0900-1000	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0900-1000	Zambia, Christian Voice	6065af			
0900-1000	Zambia, Natl BC Corp	6165do	6265do		
0900-1000 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
0915-1000	Ghana, Ghana Broadc Corp	6130do	7295do		
0915-0945	UK, BBC Asian Service	15310as	17790as		
0915-0945 as	UK, BBC Asian Service	6195as	9740as	11765as	15360as
		21660as			
0920-0930 t	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
0930-1000 mtwhfa	Austria, R Austria Intl	15455as	17870au		
0930-1000	Canada, CKZN St John's	6160do			
0930-1000	Georgia, Radio	11910eu			
0930-1000	Guam, TWR/KTWR	9865as			
0930-1000	Italy, AWR Europe	7230eu			
0930-1000	Netherlands, Radio	12065as	13710as		
0930-1000	Philippines, FEBC/R Intl	11635as			
0935-0950 s	Monaco, Trans World Radio	9755eu			
0945-1000	UK, BBC Asian Service	6195as	9740as	11765as	15360as
		17760as	17790as	21660as	
0945-1000 a	UK, BBC Asian Service	6065as	9580as	11945as	11955as
		15280as			
0945-1000 smtwhf	UK, BBC Slow Speed News	6065as	9580as	11945as	11955as
		15280as			
1000-1100	Anguilla, Caribbean Beacon	6090am			
1000-1100	Australia, Radio	6080as	9580pa	11880as	17750as
1000-1100 vl	Australia, VL8A Alice Spg	2310do			
1000-1100 vl	Australia, VL8K Katherine	2485do			
1000-1100 vl	Australia, VL8T Tent Crk	2325do			
1000-1100 vl	Canada, CBC N Quebec Svc	9625do			
1000-1100	Canada, CFRX Toronto	6070do			
1000-1100	Canada, CFVP Calgary	6030do			
1000-1100	Canada, CHNX Halifax	6130do			
1000-1100	Canada, CKZN St John's	6160do			
1000-1100	Canada, CKZU Vancouver	6160do			
1000-1100	China, China Radio Intl	9785pa	9890pa	11755pa	
1000-1100	China, China Radio Intl	15050am	21460am		
1000-1100	Costa Rica, RF Peace Intl	15050am	21460am		
1000-1100	Ecuador, HCJB	9640pa	21455am		
1000-1100 as	Eqt Guinea, R East Africa	15186af			
1000-1100 mtwhf	Eqt Guinea, Radio Africa	15186af			
1000-1100	Germany, Sunrise Radio	5850va			
1000-1100	Germany, Overcomer Ministr	15715au	15755as	17505pa	
1000-1100 as	Germany, Overcomer Ministr	5900eu			
1000-1030	Guam, AWR/KSDA	11790as			
1000-1100	Guam, TWR/KTWR	9865as			
1000-1100	India, All India Radio	11585as	13700va	15040va	17387pa
		17840as			
1000-1100	Ireland, Unt Christian BC	6200do			
1000-1100	Japan, R Japan/NHK World	9695as	11730as	11850pa	
1000-1100	Kenya, Kenya Broadc Corp	4935do			
1000-1100	Malaysia, Radio	7295do			
1000-1100 irreg	Malaysia, RTM KotaKinabalu	5980do			
1000-1030 s	Malta, VO Mediterranean	9600eu			
1000-1100 twhfas	N Mariana Is, KHBI Saipan	11660pa	15665as		
1000-1100 vl	Namibia, NBC	4930af	4965af		
1000-1030	Netherlands, Radio	12065as	13710as		
1000-1015	New Zealand, R NZ Intl	9700pa			
1000-1100	Nigeria, Voice of	7255af	15120af		
1000-1100 vl	Papua New Guinea, NBC	4890do			
1000-1100	Philippines, FEBC/R Intl	11635as			
1000-1030	Singapore, RTE Radio	11740as			
1000-1100	Singapore, R Corp Singapore	6150do			
1000-1100 vl	Solomon Islands, SIBC	5020do			
1000-1100 vl	Tanzania, Radio	5050do			
1000-1100	UK, BBC African Service	6190af	11940af	17885af	
1000-1100 as	UK, BBC African Service	15400af	17830af		
1000-1030	UK, BBC Asian Service	6195as	9740as	11765as	15310as
		15360as	17790as	21660as	
		15485eu	15565eu	15575eu	17640eu
		17705eu			
1000-1100	UK, BBC World Service	6195am	9410eu	11760me	12095eu
		15485eu	15565eu	15575eu	17640eu
		17705eu			
1000-1100 as	UK, BBC World Service	15190sa			
1000-1100	USA, Armed Forces Network	4278am	6458am	12689am	
1000-1100	USA, KAIJ Dallas TX	5810am			
1000-1100	USA, KTBN Salt Lk City UT	7510am			
1000-1100	USA, KWHR Naalehu HI	11565pa			
1000-1100	USA, Voice of America	5985pa	6165ca	7405ca	9590ca
		11720as	15425as		
1000-1100	USA, WEWN Birmingham AL	5825eu			
1000-1100	USA, WHRI Noblesville IN	6040am	9495am		
1000-1100	USA, WJCR Upton KY	7490na	13595na		
1000-1100 mtwhf	USA, WRMI/R Miami Intl	9955ca			
1000-1100 wh	USA, WSHB Cypress Crk SC	6095na			
1000-1100 a	USA, WSHB Cypress Crk SC	9455sa			
1000-1100	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
1000-1100 mtwhfa	USA, WYFR Okeechobee FL	5950na			
1000-1030	Vietnam, Voice of	9840as	12020as	15010as	
1000-1100	Zambia, Christian Voice	6065af			
1000-1100	Zambia, Natl BC Corp	6165do	6265do		
1000-1100 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1005-1010 s	Croatia, Croatian Radio	7185eu	9830eu		
1030-1100 s	Austria, R Austria Intl	15455as	17870au		
1030-1057	Czech Rep, Radio Prague	7345eu			
1030-1100	Georgia, Radio	11910eu			
1030-1100	Guam, AWR/KSDA	11790as	15170as		
1030-1100	Lithuania, Radio Vilnius	9710eu			
1030-1100	Netherlands, Radio	6045eu	9860eu	12065as	13710as
1030-1100	South Korea, R Korea Intl	11715am			
1030-1100	Sri Lanka, Sri Lanka BC	11835as	17850as		
1030-1100	UAE, Radio Dubai	13675eu	15370eu	15395eu	21605eu
1030-1100	UK, BBC Asian Service	6195as	9740as	11765pa	15310as
		17790as			



### Your Name in Lights!

... or at least in ink within the *Monitoring Times* Shortwave Guide. Please send us your "best catches" on the worldwide shortwave bands — QSLs, that is — and we will try to use them in future issues of *MT*. Your QSLs will be returned.



## FREQUENCIES

1200-1300	Anguilla, Caribbean Beacon	11775am				1200-1300	UK, BBC Asian Service	6195as	9580as	9740as	11955as
1200-1300	Australia, Radio	6020pa 9770as	6080as	9580pa	9660pa	1200-1300	UK, BBC World Service	5965na 11760me 15565eu	6195am 12095eu 15575as	9410eu 15220am 17640eu	9515na 15485eu 17705eu
1200-1300 vl	Australia, VL8A Alice Spg	2310do				1200-1300	USA, Armed Forces Network	4278am	6458am	12689am	
1200-1300 vl	Australia, VL8K Katherine	2485do				1200-1300	USA, KAJJ Dallas TX	5810am			
1200-1300 vl	Australia, VL8T Tent Crk	2325do				1200-1300	USA, KTNB Salt Lk City UT	7510am			
1200-1300	Brazil, R Nacional Bras	15445am				1200-1300	USA, KWHR Naalehu HI	11565pa			
1200-1300	Bulgaria, Radio	15175eu	17585eu			1200-1300	USA, Voice of America	6160as 15160as	9645as 15425as	9760as	11715as
1200-1215	Cambodia, Natl Radio Of	11940as				1200-1300	USA, WEWN Birmingham AL	7425na	9465na	15745eu	
1200-1300 vl	Canada, CBC N Quebec Svc	9625do				1200-1300 mtwhfa	USA, WGTG McCaysville GA	9400am			
1200-1300	Canada, CFRX Toronto	6070do				1200-1300	USA, WHRI Noblesville IN	6040am	9495am		
1200-1300	Canada, CFVP Calgary	6030do				1200-1300	USA, WJCR Upton KY	7490na	13595na		
1200-1300	Canada, CHNX Halifax	6130do				1200-1300	USA, WRMI/R Miami Intl	9955ca			
1200-1300	Canada, CKZN St John's	6160do				1200-1300 mwh	USA, WSHB Cypress Crk SC	6095na			
1200-1300	Canada, CKZU Vancouver	6160do				1200-1300 a	USA, WSHB Cypress Crk SC	11660am			
1200-1229	Canada, R Canada Intl	9640am 15195as	9660as	11855am	13650am	1200-1300	USA, WWCR Nashville TN	5070am	5935am	7435am	15685am
1200-1300	China, China Radio Intl	6950pa 9945as 11980as	7385pa 11660as	9565as 11675as	9715as 11795eu	1200-1300 mtwhfa	USA, WYFR Okeechobee FL	5950na			
1200-1230 vl	China, China Radio Intl	8660as	11700as	12110as		1200-1300	USA, WYFR Okeechobee FL	5850na	6015na	17750na	
1200-1300	Costa Rica, RF Peace Intl	15050am				1200-1228	Uzbekistan, R Tashkent	7285as	9715as	15295as	17775as
1200-1300	Ecuador, HCJB	12005am	15115am	21455am		1200-1300	Zambia, Christian Voice	6065af			
1200-1300 as	Eq Guinea, R East Africa	15186af				1200-1300	Zambia, Natl BC Corp	6165do	6265do		
1200-1300	Eq Guinea, Radio Africa	9530as				1200-1300 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1200-1300	France, Radio France Intl	11600as	15530am	15540af	17575am	1206-1300 occsnal	New Zealand, R NZ Intl	6100pa			
1200-1300	Germany, Sunrise Radio	5850va				1209-1215 mtwhf	UK, BBC Caribbean Report	6195ca	15220ca		
1200-1230 s	Germany, Universal Life	9710as				1209-1215 as	UK, BBC World Service	6195am	15220am		
1200-1300	Germany, Overcomer Ministr	15715au	15735as	17505pa		1210-1240	Mongolia, Voice of	12085au			
1200-1300	Ireland, Unt Christian BC	6200do				1215-1300	Egypt, Radio Cairo	17595as			
1200-1300	Jordan, Radio	11690eu				1220-1240 w	Kazakhstan, R Almaty Intl	9505eu	9620eu	11720as	
1200-1220 fa	Kazakhstan, R Almaty Intl	9505eu	9620eu	11720as		1229-1259	Canada, R Canada Intl	9640am	11855am	13650am	
1200-1300	Kenya, Kenya Broadc Corp	4935do				1230-1300	Austria, R Austria Intl	6155eu	13730na		
1200-1230 mtwhf	Kyrgyzstan, Kyrgyz Radio	4010do	4050do			1230-1300	Bangladesh, Bangla Betar	7185as	9550as		
1200-1300	Malaysia, Radio	7295do				1230-1300	Guam, AWR/KSDA	13720as			
1200-1300 irreg	Malaysia, RTM KotaKinabalu	5980do				1230-1300	Italy, AWR Europe	7230as			
1200-1300 twhf	N Mariana Is, KHBI Saipan	9355as				1230-1300	South Korea, R Korea Intl	6055as	9570as	9640am	13670as
1200-1300 vl	Namibia, NBC	4930af	4965af			1230-1300	Sri Lanka, Sri Lanka BC	9730as	15425as		
1200-1225	Netherlands, Radio	6045eu	9860eu			1230-1300	Sweden, Radio	13740as	15240au		
1200-1300	Palau, KHBN/Voice of Hope	9965as				1230-1300	Thailand, Radio	9655as	9885as	11905as	
1200-1300 vl	Papua New Guinea, NBC	4890do				1230-1300 a	USA, Voice of America	7768eu			
1200-1300	Singapore, R Singapore Intl	6015as	6150as			1230-1300	Vietnam, Voice of	9840as	12020as	15010as	
1200-1300	South Korea, R Korea Intl	7285as				1240-1250	Greece, Voice of	17525af			
1200-1300	Taiwan, Radio Taipei Intl	7130as	9610au			1240-1300 t	Kazakhstan, R Almaty Intl	9505eu	9620eu	11720as	
1200-1300 vl	Tanzania, Radio	5050do				1240-1255 smtwh	UK, BBC Slow Speed News	7140me	11820me	13660af	15180af
1200-1300	UK, BBC African Service	6190af 21660af	11940af	17830af	17885af			15555me	17585af		

## SELECTED PROGRAMS

### Sundays

- 1200 Australia, Radio: RA News. See S 0000.
- 1200 Singapore, R Singapore Intl: News/Weather. A five-minute summary.
- 1205 Australia, Radio: Country Club (Part 1). ABC's program of contemporary and traditional country music with Richard Porteous (1st Hour).
- 1205 Singapore, R Singapore Intl: Instrumentals. wghauser@usa.net
- 1215 Singapore, R Singapore Intl: Profile. A personality profile of prominent Singaporeans and foreigners who have made their mark in their chosen fields.
- 1230 Singapore, R Singapore Intl: News. See S 1100.
- 1235 Singapore, R Singapore Intl: Living. A lifestyle magazine that looks at leisure, food, culture, heritage, fashion, travel, and consumer trends.
- 1245 Singapore, R Singapore Intl: Snapshots. Visits to places of interest in Singapore and the region.
- 1250 Singapore, R Singapore Intl: Eco-Destinations. A 5-minute series of programs on eco-tourism in Sarawak.
- 1255 Singapore, R Singapore Intl: Comment. A personal viewpoint of a political, economic, social or cultural issue of interest to Singapore and the region.

### Mondays

- 1200 Australia, Radio: RA News. See S 0000.
- 1200 Singapore, R Singapore Intl: News. See S 1100.
- 1205 Australia, Radio: Late Night Live. Topical, political, cultural and philosophical issues with Phillip Adams of Radio National.
- 1205 Singapore, R Singapore Intl: Newslines. See M 1145.
- 1220 Singapore, R Singapore Intl: Reflections. See S 1105.
- 1230 Singapore, R Singapore Intl: Business and Market Report. See M 1109.
- 1235 Singapore, R Singapore Intl: Indonesia Today. An analysis of the issues currently appearing in the media.

- 1240 Singapore, R Singapore Intl: In Transit. An interesting aspect of a regional destination and a conversation with someone from the country being visited.
- 1245 Singapore, R Singapore Intl: Profile. See S 1215.

### Tuesdays

- 1200 Australia, Radio: RA News. See S 0000.
- 1200 Singapore, R Singapore Intl: News. See S 1100.
- 1205 Australia, Radio: Late Night Live. See M 1205.
- 1205 Singapore, R Singapore Intl: Newslines. See M 1145.
- 1220 Singapore, R Singapore Intl: Living. See S 1235.
- 1230 Singapore, R Singapore Intl: Business and Market Report. See M 1109.
- 1235 Singapore, R Singapore Intl: Asia Below the Headlines. A 10-minute montage of colorful snippets from different parts of Asia.
- 1245 Singapore, R Singapore Intl: Eco-Destinations. See S 1250.
- 1250 Singapore, R Singapore Intl: Wired Up. See S 1345.

### Wednesdays

- 1200 Australia, Radio: RA News. See S 0000.
- 1200 Singapore, R Singapore Intl: News. See S 1100.
- 1205 Australia, Radio: Late Night Live. See M 1205.
- 1205 Singapore, R Singapore Intl: Newslines. See M 1145.
- 1220 Singapore, R Singapore Intl: The Written Word. Focus on books, writers, journals and magazines.
- 1230 Singapore, R Singapore Intl: Business and Market Report. See M 1109.
- 1235 Singapore, R Singapore Intl: Reflections. See S 1105.
- 1245 Singapore, R Singapore Intl: Frontiers. See S 1135.

### Thursdays

- 1200 Australia, Radio: RA News. See S 0000.
- 1200 Singapore, R Singapore Intl: News. See S 1100.
- 1205 Australia, Radio: Late Night Live. See M 1205.
- 1205 Singapore, R Singapore Intl: Newslines. See M 1145.

- 1220 Singapore, R Singapore Intl: Arts Arena. See M 1115.
- 1230 Singapore, R Singapore Intl: Business and Market Report. See M 1109.
- 1235 Singapore, R Singapore Intl: Currency Crisis for Beginners. See S 1335.
- 1240 Singapore, R Singapore Intl: Limelight. See W 1115.

### Fridays

- 1200 Australia, Radio: RA News. See S 0000.
- 1200 Singapore, R Singapore Intl: Newsday. wghauser@usa.net
- 1205 Australia, Radio: Sound Quality. Tim Ritchie of National Radio presents innovations in contemporary music.
- 1205 Singapore, R Singapore Intl: Newslines. See M 1145.
- 1220 Singapore, R Singapore Intl: Snapshots. See S 1245.
- 1225 Singapore, R Singapore Intl: Currencies. Regional currency movements during the week.
- 1230 Singapore, R Singapore Intl: Business and Market Report. See M 1109.
- 1235 Singapore, R Singapore Intl: Regional Press Review. See S 1150.
- 1245 Singapore, R Singapore Intl: Business World. See S 1115.

### Saturdays

- 1200 Australia, Radio: RA News. See S 0000.
- 1200 Singapore, R Singapore Intl: News/Weather. See S 1200.
- 1205 Australia, Radio: The Week's End. See S 0430.
- 1205 Singapore, R Singapore Intl: Instrumentals. wghauser@usa.net
- 1220 Singapore, R Singapore Intl: The Written Word. See W 1220.
- 1230 Australia, Radio: Pacific Review. See S 0530.
- 1230 Singapore, R Singapore Intl: News. See S 1100.
- 1235 Singapore, R Singapore Intl: Wired Up. See S 1345.
- 1245 Singapore, R Singapore Intl: Comment. See S 1255.
- 1250 Singapore, R Singapore Intl: Currency Crisis for Beginners. See S 1335.

FREQUENCIES

1300-1400	Anguilla, Caribbean Beacon	11775am				1300-1400	Switzerland, Swiss R Intl	7230as	7480as			
1300-1330	Australia, Radio	9770as				1300-1330	Switzerland, Swiss R Intl	9535eu				
1300-1400	Australia, Radio	5995pa	6020pa	6080as	9580pa	1300-1400 vl	Tanzania, Radio	5050do				
		9660pa				1300-1400	UK, BBC African Service	6190af	11940af	15420af	17830af	
1300-1400 vl	Australia, VL8A Alice Spg	2310do						17885af	21660af			
1300-1400 vl	Australia, VL8K Katherine	2485do				1300-1400	UK, BBC Asian Service	5990as	6195as	9740as	11750as	
1300-1400 vl	Australia, VL8T Tent Crk	2325do						15310as				
1300-1320	Brazil, R Nacional Bras	15445am				1300-1400	UK, BBC World Service	5965na	6195am	9410eu	9515na	
1300-1400 vl	Canada, CBC N Quebec Svc	9625do						11760me	11865na	12095eu	15220am	
1300-1400	Canada, CFRX Toronto	6070do						15485eu	15565eu	15575eu	17640eu	
1300-1400	Canada, CFVP Calgary	6030do						17705eu				
1300-1400	Canada, CHNX Halifax	6130do				1300-1400	USA, Armed Forces Network	4278am	6458am	12689am		
1300-1400	Canada, CKZN St John's	6160do				1300-1400	USA, KAIJ Dallas TX	5810am				
1300-1400	Canada, CKZU Vancouver	6160do				1300-1400	USA, KTBN Salt Lk City UT	7510am				
1300-1400 smtwfhf	Canada, R Canada Intl	11855am	13650am			1300-1400	USA, KWHR Naalehu HI	11565pa				
1300-1400 mtwhf	Canada, R Canada Intl	9640am				1300-1400	USA, Voice of America	6160as	9645as	9760as	11715as	
1300-1400	China, China Radio Intl	7385pa	7405na	9945pa	11660as			15160as	15425as			
		11675pa	11980as	15180as		1300-1400	USA, WEWN Birmingham AL	7425na	9465na	15745eu		
		15050am				1300-1400 mtwhfa	USA, WGTG McCaysville GA	9400am				
1300-1330	Czech Rep, Radio Prague	13580as	21745af			1300-1400	USA, WHRI Noblesville IN	6040am	15105am			
1300-1400	Ecuador, HCJB	12005am	15115am	21455am		1300-1400	USA, WJCR Upton KY	7490na	13595na			
1300-1330	Egypt, Radio Cairo	17595as				1300-1400	USA, WRMI/R Miami Intl	9955ca				
1300-1400	Eq Guinea, R East Africa	15186af				1300-1400 mtwhas	USA, WSHB Cypress Crk SC	9410na				
1300-1400	Eq Guinea, Radio Africa	9530as				1300-1400 tl	USA, WSHB Cypress Crk SC	11660am				
1300-1400	France, Radio France Intl	9805eu	15155eu	15195eu		1300-1400	USA, WWCR Nashville TN	5070am	7435am	13845am	15685am	
1300-1400	Germany, Sunrise Radio	5850va				1300-1400	USA, WYFR Okeechobee FL	11830na	11970na	13695na	17750na	
1300-1330 s	Germany, Universal Life	12025as				1300-1400	Zambia, Christian Voice	6065af				
1300-1400 a	Germany, Good News World R	15385eu				1300-1400	Zambia, Natl BC Corp	6165do	6265do			
1300-1400	Germany, Overcomer Ministr	15625pa	15735as			1300-1400 vl	Zimbabwe, Zimbabwe BC	4828do	5012do			
1300-1400	Ireland, Unt Christian BC	6200do				1302-1400	USA, WYFR Okeechobee FL	11550as				
1300-1400	Jordan, Radio	11690eu				1305-1310	Croatia, Croatian Radio	7125eu	9830eu			
1300-1400	Kenya, Kenya Broadc Corp	4935do				1315-1400 mtwhfa	Bhutan, Bhutan BC Service	5030do				
1300-1310	Liberia, LCN/R Liberia Int	5100do				1330-1355	Belgium, R Vlaanderen Int	15545na				
1300-1400	Malaysia, Radio	7295do				1330-1359	Canada, R Canada Intl	9535as	11795as	11935eu	15325eu	
1300-1400 irreg	Malaysia, RTM KotaKinabalu	5980do				1330-1359 mtwhfa	Canada, R Canada Intl	17820va				
1300-1400 twhf	N Mariana Is, KHBI Saipan	9355as				1330-1400	Guam, AWR/KSDA	9650as				
1300-1400 vl	Namibia, NBC	4930af	4965af			1330-1400	India, All India Radio	9545as	11620as	13710as		
1300-1400 occsna	New Zealand, R NZ Intl	6100pa				1330-1400	Netherlands, Radio	9890as	15585as			
1300-1400	Palau, KHBN/Voice of Hope	9985as				1330-1400	Sweden, Radio	13740as	15240am	17515au		
1300-1400 vl	Papua New Guinea, NBC	4890do				1330-1400	Turkey, Voice of	15185as	17830as			
1300-1355	Poland, Polish R Warsaw	6095eu	7270eu	9525eu	11820eu	1330-1400	UAE, Radio Dubai	13630eu	13675eu	15395eu	21605eu	
1300-1400	Romania, R Romania Intl	15250na	15390eu	17770eu	17790na	1330-1400	Uzbekistan, R Tashkent	7285as	9715as	15295as	17775as	
1300-1400 as	S Africa, Channel Africa	9445af	17675af	17870af		1330-1400	Vietnam, Voice of	9840eu	12020as	15010as		
1300-1400	Singapore, R Singapore Int	6015as	6150as			1335-1345	Greece, Voice of	9395eu	11730na	15175eu	15630eu	
1300-1400	Sri Lanka, Sri Lanka BC	9730as	15425as			1345-1400	Vatican State, Vatican R	13765au	15540au			

SELECTED PROGRAMS

Sundays

- 1300 Australia, Radio: RA News. See S 0000.
- 1300 Singapore, R Singapore Intl: News. See S 1100.
- 1305 Australia, Radio: Country Club (Part 2). ABC's program of contemporary and traditional country music with Richard Porteous (2nd Hour).
- 1305 Singapore, R Singapore Intl: Friends of the Airwaves. Listener letters and colorful lifestyle snippets from the region.
- 1330 Singapore, R Singapore Intl: News. See S 1100.
- 1335 Singapore, R Singapore Intl: Currency Crisis for Beginners. A simplified discussion of the various aspects of the Indonesia financial crisis.
- 1345 Singapore, R Singapore Intl: Wired Up. Interesting thoughts surfacing on the Internet.
- 1355 Singapore, R Singapore Intl: News. See S 1100.

Mondays

- 1300 Australia, Radio: RA News. See S 0000.
- 1300 Singapore, R Singapore Intl: News. See S 1100.
- 1305 Singapore, R Singapore Intl: Singa-Pop. A showcase of homegrown Singaporean talents and local songs.
- 1315 Australia, Radio: The Planet (Part 1). Lucky Oceans plays richly varied music from around the world.
- 1330 Singapore, R Singapore Intl: News. See S 1100.
- 1335 Singapore, R Singapore Intl: Snapshots. See S 1245.
- 1340 Singapore, R Singapore Intl: Newsline. See M 1145.
- 1355 Singapore, R Singapore Intl: News. See S 1100.

Tuesdays

- 1300 Australia, Radio: RA News. See S 0000.
- 1300 Singapore, R Singapore Intl: News. See S 1100.
- 1305 Singapore, R Singapore Intl: Music and Memories. A musical journey down memory lane.
- 1315 Australia, Radio: The Planet (Part 1). See M 1315.
- 1330 Singapore, R Singapore Intl: News. See S 1100.

- 1335 Singapore, R Singapore Intl: Indonesia Today. See M 1235.
- 1340 Singapore, R Singapore Intl: Newsline. See M 1145.
- 1355 Singapore, R Singapore Intl: News. See S 1100.

Wednesdays

- 1300 Australia, Radio: RA News. See S 0000.
- 1300 Singapore, R Singapore Intl: News. See S 1100.
- 1305 Singapore, R Singapore Intl: Spin the Globe. A selection of world music.
- 1315 Australia, Radio: The Planet (Part 1). See M 1315.
- 1330 Singapore, R Singapore Intl: News. See S 1100.
- 1335 Singapore, R Singapore Intl: In Transit. See M 1240.
- 1340 Singapore, R Singapore Intl: Newsline. See M 1145.
- 1355 Singapore, R Singapore Intl: News. See S 1100.

Thursdays

- 1300 Australia, Radio: RA News. See S 0000.
- 1300 Singapore, R Singapore Intl: News. See S 1100.
- 1305 Singapore, R Singapore Intl: Singa-Pop. See M 1305.
- 1315 Australia, Radio: The Planet (Part 1). See M 1315.
- 1330 Singapore, R Singapore Intl: News. See S 1100.
- 1335 Singapore, R Singapore Intl: Eco-Watch. See M 1125.
- 1340 Singapore, R Singapore Intl: Newsline. See M 1145.
- 1355 Singapore, R Singapore Intl: News. See S 1100.

Fridays

- 1300 Australia, Radio: RA News. See S 0000.
- 1300 Singapore, R Singapore Intl: News. See S 1100.
- 1305 Singapore, R Singapore Intl: Hot Trax. Information about new music releases in Singapore.
- 1315 Australia, Radio: The Planet (Part 1). See M 1315.
- 1330 Singapore, R Singapore Intl: News. See S 1100.
- 1335 Singapore, R Singapore Intl: Comment. See S 1255.
- 1340 Singapore, R Singapore Intl: Friday Feature. wghauser@usa.net
- 1355 Singapore, R Singapore Intl: News. See S 1100.

Saturdays

- 1300 Australia, Radio: Radio National News. See F 1400.
- 1300 Singapore, R Singapore Intl: News. See S 1100.
- 1305 Australia, Radio: Science Show. See T 0110.
- 1305 Singapore, R Singapore Intl: Spin the Globe. See W 1305.
- 1330 Singapore, R Singapore Intl: News. See S 1100.
- 1335 Singapore, R Singapore Intl: Currencies. See F 1225.
- 1340 Singapore, R Singapore Intl: Lighthouse. See W 1115.
- 1355 Singapore, R Singapore Intl: News. See S 1100.



Tian Wei hosts "Voices from Other Lands" on CRI's English Service











## FREQUENCIES

2100-2200	Anguilla, Caribbean Beacon	11775am			
2100-2200	Australia, Radio	7240as 17715pa	9660pa 21740pa	11880pa	12080as
2100-2130	Australia, Radio	9500as			
2100-2130 vl	Australia, VL8A Alice Spg	2310do			
2100-2130 vl	Australia, VL8K Katherine	2485do			
2100-2200 vl	Australia, VL8K Katherine	5025do			
2100-2130 vl	Australia, VL8T Tent Crk	2325do			
2100-2200 vl	Australia, VL8T Tent Crk	4910do			
2100-2115 vl	Cameroon, Radio Cameroon	4850do			
2100-2200 vl	Canada, CBC N Quebec Svc	9625do			
2100-2200	Canada, CFRX Toronto	6070do			
2100-2200	Canada, CFVP Calgary	6030do			
2100-2200	Canada, CHNX Halifax	6130do			
2100-2200	Canada, CKZN St John's	6160do			
2100-2200	Canada, CKZU Vancouver	6160do			
2100-2129	Canada, R Canada Intl	7235va 13670va	11690va 15150va	11890va	13650va 17820va
2100-2130	China, China Radio Intl	11975af	15500va		
2100-2200	China, China Radio Intl	6950eu	7180af	9535as	9920eu
2100-2200	Costa Rica, RF Peace Intl	15050am	21460am		
2100-2130	Cuba, Radio Havana	13720eu	13750eu		
2100-2200	Ecuador, HCJB	17735eu	21455am		
2100-2200	Egypt, Radio Cairo	15375af			
2100-2200	Eqt Guinea, Radio Africa	15186af			
2100-2150	Germany, Deutsche Welle	7115as 9765as	9615eu 11785as	9670as 11865af	9735af 15135va
2100-2200	Germany, R Voice of Canada	15245am			
2100-2200	Germany, Voice of Hope	6015eu			
2100-2200	Germany, Overcomer Ministr	3975eu	9510as	11625sa	12050sa
2100-2200	India, All India Radio	7150pa 9950eu	7410eu 11620va	9650eu	9910pa
2100-2200 irreg	Iraq, Radio Iraq Intl	11785eu			
2100-2200	Ireland, Unt Christian BC	6200do			
2100-2200 fas/vl	Italy, IRRS	3955va			
2100-2200	Japan, R Japan/NHK World	6035pa	9725eu	11850pa	13630na
2100-2200 vl	Lesotho, Radio Lesotho	4800do			
2100-2200	Liberia, Radio Veritas	5470do			
2100-2115	Liberia, LCN/R Liberia Int	5100do			
2100-2200	Malaysia, Radio	7295do			
2100-2130 smthf	Mexico, Radio Mexico Intl	5985na	9705na		
2100-2200 vl	Namibia, NBC	3270af	3289af		
2100-2200	New Zealand, R NZ Intl	17675pa			
2100-2200	Nigeria, FRCN/Radio	3326do	4770do	4990do	
2100-2200	North Korea, R Pyongyang	4405as 13760am	6575eu	9335eu	11710am
2100-2200 vl	Papua New Guinea, NBC	4890do			
2100-2125	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	9525eu
2100-2200	Romania, R Romania Intl	7105eu	9550eu	9690eu	
2100-2200	Russia, Voice of Russia WS	7350eu 9775eu	9440af 9820eu	9710eu 11675eu	9765eu 11850af
2100-2130	South Korea, R Korea Intl	11930eu	6480eu		
2100-2200	South Korea, R Korea Intl	3970eu			
2100-2200 as	Spain, R Exterior Espana	15575eu			
2100-2130	Sri Lanka, Sri Lanka BC	9855eu	11830af		
2100-2130	Switzerland, Swiss R Intl	6005as			
2100-2200	Syria, Radio Damascus	3985eu			
2100-2200 vl	Tanzania, Radio	12085na	13610na		
2100-2110	Tanzania, Radio	5050do			
2100-2200	Uganda, Radio	4976do			
2100-2200	UK, BBC African Service	3255af	6005af	6190af	11835af
2100-2200	UK, BBC Asian Service	3915as	5965as	5975pa	6195as
2100-2200	UK, BBC World Service	9740pa 5975am 9410eu	11945as 6180eu 12095sa	6195eu	7325eu
2100-2200 w	UK, Merlin Network One	11915eu	11985eu	13690va	
2100-2200	USA, Armed Forces Network	4278am	6458am	12689am	
2100-2200	USA, KAJI Dallas TX	13815am			
2100-2200	USA, KJES Mesquite NM	15385am			
2100-2200	USA, KTVN Salt Lk City UT	15590am			
2100-2200	USA, Voice of America	6035af 9535af 15185as 17725af	6095me 9760eu 15410af 17735as	7375af 11870pa 15445af	7415af 11975af 15580af
2100-2200	USA, WEWN Birmingham AL	11875na	13615na	15745eu	
2100-2200 mtwhfa	USA, WGTG McCaysville GA	9400am			
2100-2200	USA, WHRA Greenbush ME	15460af			
2100-2200	USA, WHRI Noblesville IN	9495am	13760am		
2100-2200	USA, WINB Red Lion PA	13790am			
2100-2200	USA, WJCR Upton KY	7490na	13595na		
2100-2200	USA, WMLK Bethel PA	9465am			
2100-2200	USA, WRNO New Orleans LA	15420am			
2100-2200 mwa	USA, WSHB Cypress Crk SC	11550eu			
2100-2200	USA, WWCR Nashville TN	5070am	9475am	13845am	15685am
2100-2200	USA, WYFR Okeechobee FL	11855na	15215va	15695va	17845va
2100-2110	Vatican State, Vatican R	4005eu	5883eu	7250eu	9645eu
2100-2200	Zambia, Christian Voice	3330af	4965af		
2100-2200	Zambia, Natl BC Corp	6165do	6265do		
2100-2200 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
2115-2200	Egypt, Radio Cairo	9900eu			
2115-2130	Iran, VOIRI	6175au	9685ca		
2115-2130 mtwhf	UK, BBC Caribbean Report	5975ca	15390ca	17715ca	
2115-2130 as	UK, BBC World Service	5975am			
2130-2200	Austria, R Austria Intl	5945eu	6155eu	13730va	
2130-2200 th	Belarus, R Belarus Intl	7210eu	11960eu		
2130-2157	Czech Rep, Radio Prague	11600va			
2130-2200	Ghana, Ghana Broadc Corp	3366do			

2130-2200	Guam, AWR/KSDA	15310as			
2130-2135 mtwhf	Latvia, Radio Latvia Intl	5935eu			
2130-2155	Moldova, R Moldova Intl	7520eu			
2130-2200 as	Sweden, Radio	6065eu	9430af		
2130-2200	Turkey, Voice of	7210as			
2130-2145 t f	UK, BBC Calling Falklands	11680sa			
2130-2200	USA, Voice of America	6040me 11870pa 6035af	6095me 15185as 7375af	9535af 17735as 7415af	9760eu 11975af 11975af
2130-2200 smtwhf	USA, Voice of America	15410af	7375af	15580af	17725af
2130-2200	Uzbekistan, R Tashkent	9540eu	9545eu		

## 2200 UTC

2200-2300	Anguilla, Caribbean Beacon	11775am			
2200-2300	Australia, Radio	7240as 17715pa	9660pa 21740pa	11880pa	12080as
2200-2300 vl	Australia, VL8K Katherine	5025do			
2200-2300 vl	Australia, VL8T Tent Crk	4910do			
2200-2300	Bulgaria, Radio	9700eu			11720eu
2200-2300	Canada, CBC N Quebec Svc	9625do			
2200-2300	Canada, CFRX Toronto	6070do			
2200-2300	Canada, CFVP Calgary	6030do			
2200-2300	Canada, CHNX Halifax	6130do			
2200-2300	Canada, CKZN St John's	6160do			
2200-2300	Canada, CKZU Vancouver	6160do			
2200-2229	Canada, R Canada Intl	5960am 15305am	9755am	11705as	13670am
2200-2300	China, China Radio Intl	9880eu			
2200-2230	China, China Radio Intl	3985eu			
2200-2300	Costa Rica, RF Peace Intl	15050am	21460am		
2200-2245	Egypt, Radio Cairo	9900eu			
2200-2300	Eqt Guinea, Radio Africa	15186af			
2200-2300	Germany, Overcomer Ministr	3975eu	9510as	11625sa	11925sa
2200-2300	Ghana, Ghana Broadc Corp	4915do			
2200-2230	Hungary, Radio Budapest	3975eu	11700eu		
2200-2230	India, All India Radio	7150pa 9950eu	7410eu 11620va	9650eu 11715pa	9910pa
2200-2230	Iran, VOIRI	6025au			
2200-2300 irreg	Iraq, Radio Iraq Intl	11785eu			
2200-2300	Ireland, Unt Christian BC	6200do			
2200-2300 fas/vl	Italy, IRRS	3955va			
2200-2225	Italy, RAI Intl	6150pa	9675pa	11900as	
2200-2215	Liberia, LCN/R Liberia Int	5100do			
2200-2300	Malaysia, Radio	7295do			
2200-2300 vl	Namibia, NBC	3270af	3289af		
2200-2300 smtwh	New Zealand, R NZ Intl	17675pa			
2200-2215	Nigeria, FRCN/Radio	3326do	4770do	4990do	
2200-2300 vl	Papua New Guinea, NBC	9675do			
2200-2230	Serbia, Radio Yugoslavia	6100eu	6185eu		
2200-2215	Sierra Leone, SLBS	3316do			
2200-2205	Syria, Radio Damascus	12085na	13610na		
2200-2300	Taiwan, Radio Taipei Intl	15600eu	17750eu		
2200-2230	Turkey, Voice of	7210as			
2200-2300	UK, BBC African Service	11835af	15400af		
2200-2300	UK, BBC Asian Service	5965as	6195as	7110as	9660as
2200-2300	UK, BBC World Service	9890as	11955as	12080ps	
2200-2300 w	UK, Merlin Network One	5975am	6175na	6195na	7325eu
2200-2300	Ukraine, R Ukraine Intl	9410eu 9645eu	9590am 9780na	9915sa 11915eu	12095sa 11985na
2200-2300	USA, Armed Forces Network	13690na	6020eu	6080eu	7180eu
2200-2300	USA, KAJI Dallas TX	5905eu	7240eu	7380eu	7410eu
2200-2300	USA, KTVN Salt Lk City UT	9560eu	12040na	13590eu	9550na
2200-2300	USA, Voice of America	4278am 13815am 15590am	6458am	12689am	
2200-2230 mtwhf	USA, Voice of America	7215as 15185as 17820as	9705as 15290as	9770as 15305as	11760as 17735as
2200-2300	USA, WBCQ Monticello ME	6035af	7340af	7375af	7415af
2200-2300	USA, WEWN Birmingham AL	11975af			
2200-2300 mtwhfa	USA, WGTG McCaysville GA	7415na	13615na	15745eu	
2200-2300	USA, WHRA Greenbush ME	5825na			
2200-2300	USA, WHRI Noblesville IN	9400am			
2200-2300	USA, WINB Red Lion PA	15460af			
2200-2300	USA, WJCR Upton KY	5745am	9495am		
2200-2300 as	USA, WMLK Bethel PA	13790am			
2200-2300 h	USA, WRNO New Orleans LA	7490na	13595na		
2200-2300 w	USA, WSHB Cypress Crk SC	9955ca			
2200-2300	USA, WWCR Nashville TN	15240am			
2200-2300	USA, WYFR Okeechobee FL	11550eu			
2200-2210	Zambia, Natl BC Corp	15285sa	12160am	13845am	15685am
2230-2300	Albania, R Tirana Intl	9475am	11855na	15215va	17845va
2230-2300	Canada, R Canada Intl	6165do	6265do		
2230-2300	Cuba, Radio Havana	6025eu	7165eu		
2230-2257	Czech Rep, Radio Prague	5960am	9755am	13670am	
2230-2300	UK, BBC World Service	9550am 9435na	11600na	9590na	9915sa
2240-2250	Greece, Voice of	5975am	6175na		
2245-2300	Ghana, Ghana Broadc Corp	12095sa			
2245-2300	India, All India Radio	9420au	11645au		
2245-2300	Vatican State, Vatican R	3366do	4915do		
		7410as	9705as	9950as	11620as
		7305au	9600au	11830au	

## FREQUENCIES

2300-0000	Anguilla, Caribbean Beacon	6090am				2300-0000	Turkey, Voice of	7190eu	9655na		
2300-0000	Australia, Radio	9660pa	12080as	17715pa	17795pa	2300-0000	UK, BBC Asian Service	3915as	5965as	6035as	6195as
		21740pa						7110as	11945as	11955as	17790as
2300-0000 vl	Australia, VL8K Katherine	5025do				2300-0000	UK, BBC World Service	5975am	6175na	9590na	9915sa
2300-0000 vl	Australia, VL8T Tent Crk	4910do						12095sa			
2300-0000	Canada, CBC N Quebec Svc	9625do				2300-0000 w	UK, Merlin Network One	3955eu	7170na	9645eu	9780na
2300-0000	Canada, CFRX Toronto	6070do						11985na	13690na		
2300-0000	Canada, CFVP Calgary	6030do				2300-0000	USA, Armed Forces Network	4278am	6458am	12689am	
2300-0000	Canada, CHNX Halifax	6130do				2300-0000	USA, KAIJ Dallas TX	13815am			
2300-0000	Canada, CKZN St John's	6160do				2300-0000	USA, KTBN Salt Lk City UT	15590am			
2300-0000	Canada, CKZU Vancouver	6160do				2300-0000	USA, Voice of America	7215as	9705as	9770as	11760as
2300-2329	Canada, R Canada Intl	5960am	9755am	11895am	13670am			15185as	15290as	15305as	17735as
		15305am						17820as			
2300-0000	Costa Rica, RF Peace Intl	15050am	21460am			2300-0000	USA, WBCQ Monticello ME	7415na			
2300-2330	Cuba, Radio Havana	9550am				2300-0000	USA, WENW Birmingham AL	5825na	9975eu	13615na	
2300-0000	Egypt, Radio Cairo	9900am				2300-0000 mtwhfa	USA, WGTG McCaysville GA	9400am			
2300-2350	Germany, Deutsche Welle	5975as	6090as	7235as	9690as	2300-0000	USA, WHRA Greenbush ME	15460af			
2300-0000 s	Germany, Good News World R	9640eu				2300-0000	USA, WHRI Noblesville IN	13760am			
2300-0000	Germany, Overcomer Ministr	3975eu	9510as	11625sa	12050sa	2300-0000	USA, WINB Red Lion PA	13790am			
2300-0000	Ghana, Ghana Broadc Corp	4915af				2300-0000	USA, WJCR Upton KY	7490na	13595na		
2300-2330 as	Guam, AWR/KSDA	11775as				2300-0000 s	USA, WRMI/R Miami Intl	9955ca			
2300-0000 mtwhf	Guam, AWR/KSDA	11775as				2300-0000 w	USA, WSHB Cypress Crk SC	11550af			
2300-0000	India, Ali India Radio	7410as	9705as	9950as	11620as	2300-0000 m	USA, WSHB Cypress Crk SC	15285sa			
2300-0000	Ireland, Unt Christian BC	6200do				2300-0000	USA, WWCR Nashville TN	5070am	7435am	9475am	13845am
2300-2315	Liberia, LCN/R Liberia Int	5100do				2300-0000	USA, WYFR Okeechobee FL	11855na			
2300-0000	Malaysia, Radio	7295do				2300-2315	Vatican State, Vatican R	7305au	9600au	11830au	
2300-0000 vl	Namibia, NBC	3270af	3289af			2329-2359 as	Canada, R Canada Intl	11895am	15305am		
2300-0000 smtwh	New Zealand, R NZ Intl	17675pa				2329-2359	Canada, R Canada Intl	5960am	9755am	13670am	
2300-2315	Nigeria, FRCN/Radio	3326do	4770do	4990do		2330-0000	Netherlands, Radio	6020na	6165na	9845na	
2300-0000	North Korea, R Pyongyang	11335am	13760am	15130am		2330-0000	Vietnam, Voice of	9840eu	12020eu	15010eu	
2300-0000 vl	Papua New Guinea, NBC	9675do				2335-2345	Greece, Voice of	9395sa	9425sa	11595sa	11645sa
2300-0000	Romania, R Romania Intl	6130eu	7195eu	9570na	11830na	2335-2345	Sierra Leone, SLBS	3316do			
2300-0000	Singapore, R Corp Singapore	6150do				2345-0000 mtwhf	UK, BBC Asian Service	3915as			

## SELECTED PROGRAMS

### Sundays

- 2300 Australia, Radio: RA News. See S 0000.  
 2300 Guam, AWR/KSDA: Wavescan. A program for DXers and shortwave listeners produced at AWR's British studio.  
 2300 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).  
 2310 Australia, Radio: Asia Pacific. News and analysis from across the Pacific and Asia with Di Martin.  
 2320 Guam, AWR/KSDA: Pacific Island Journal. News and stories about the Pacific Islands.  
 2330 Australia, Radio: Correspondents' Report. See S 0030.

### Mondays

- 2300 Australia, Radio: RA News. See S 0000.  
 2300 Guam, AWR/KSDA: Sounds of Inspiration. An adult Christian music program.  
 2300 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).  
 2310 Australia, Radio: Asia Pacific. See S 2310.  
 2315 Guam, AWR/KSDA: Discovering the Bible. Recitation of scripture in story form.  
 2330 Australia, Radio: Innovations. See S 0230.  
 2330 Guam, AWR/KSDA: The Bible in Living Sound. A dramatic look at the bible.  
 2345 Guam, AWR/KSDA: Voice of Prophecy. Write for an adult bible study program.

### Tuesdays

- 2300 Australia, Radio: RA News. See S 0000.  
 2300 Guam, AWR/KSDA: Sounds of Inspiration. See M 2300.  
 2300 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).  
 2310 Australia, Radio: Asia Pacific. See S 2310.  
 2315 Guam, AWR/KSDA: Discovering the Bible. See M 2315.  
 2330 Australia, Radio: Arts Australia. Lisa Harris presents reviews and comment on current events within the Australian arts scene.  
 2330 Guam, AWR/KSDA: The Bible in Living Sound. See M 2330.  
 2345 Guam, AWR/KSDA: Voice of Prophecy. See M 2345.

### Wednesdays

- 2300 Australia, Radio: RA News. See S 0000.  
 2300 Guam, AWR/KSDA: Sounds of Inspiration. See M 2300.  
 2300 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).  
 2310 Australia, Radio: Asia Pacific. See S 2310.  
 2315 Guam, AWR/KSDA: Discovering the Bible. See M 2315.

- 2330 Australia, Radio: Rural Reporter. No information available.  
 2330 Guam, AWR/KSDA: The Bible in Living Sound. See M 2330.  
 2345 Guam, AWR/KSDA: Voice of Prophecy. See M 2345.

### Thursdays

- 2300 Australia, Radio: RA News. See S 0000.  
 2300 Guam, AWR/KSDA: Sounds of Inspiration. See M 2300.  
 2300 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).  
 2310 Australia, Radio: Asia Pacific. See S 2310.  
 2315 Guam, AWR/KSDA: Discovering the Bible. See M 2315.  
 2330 Australia, Radio: Media Report. See H 0030.  
 2330 Guam, AWR/KSDA: The Bible in Living Sound. See M 2330.  
 2345 Guam, AWR/KSDA: Voice of Prophecy. See M 2345.

### Fridays

- 2300 Australia, Radio: RA News. See S 0000.  
 2300 Guam, AWR/KSDA: Sounds of Inspiration. See M 2300.

- 2300 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).  
 2305 Australia, Radio: Book Reading. Serialized readings of the best Australian novels.  
 2315 Guam, AWR/KSDA: Discovering the Bible. See M 2315.  
 2330 Australia, Radio: Pacific Review. See S 0530.  
 2330 Guam, AWR/KSDA: The Bible in Living Sound. See M 2330.  
 2345 Guam, AWR/KSDA: Voice of Prophecy. See M 2345.

### Saturdays

- 2300 Australia, Radio: RA News. See S 0000.  
 2300 Guam, AWR/KSDA: Wavescan. See S 2300.  
 2300 USA, KAIJ (Dallas TX): World University Network (Dr. Gene Scott).  
 2310 Australia, Radio: Australia All Over. Join listeners across the island continent as Ian McNamara throws the spotlight on life in Australia.  
 2315 Guam, AWR/KSDA: Pacific Island Journal. See S 2320.

## MT MONITORING TEAM

Gayle Van Horn  
Frequency Manager  
gayle@grove.net

Jim Frimmel  
Program Manager  
frimmel@star-telegram.com

Jacques d'Avignon  
Propagation Forecasts  
Ontario, Canada  
monitor@rac.ca

Dave Datko, California  
Mark Fine, VA

## THANK YOU...

### ADDITIONAL CONTRIBUTORS TO THIS MONTH'S SHORTWAVE GUIDE:

Joe Brashier/WHRI; Glenn Hauser, Enid, OK/World of Radio & DX Report; Al Quaglieri, Albany, NY; Adrian Sainsbury, R NZ Intl; /George Wood/Media Scan/BBCMS/World Media; Cumbre DX; NASWA Journal/LN; Usenet newsgroups.

# PROPAGATION CONDITIONS, U.S.

OPTIMIZE YOUR MONITORING

Jacques d'Avignon

monitor@rac.ca

## Where To Listen On The Bands

As the DX conditions are greatly improving with a marked increase in the MUF (Maximum Usable Frequency) and in parallel the OWF (Optimum Working Frequency), the various SW broadcasters will now have a greater number of frequencies to use for their transmissions. One direct consequence of this situation is that the broadcasters will now migrate from the lower frequencies — the 49 and 41 meter bands where they were all piling up — to higher frequencies, especially at night.

We have to remember that there are many frequency bands that are available to the broadcasters. Depending on the time of day at the transmitter and at the target area, what time of the year and other factors, broadcasters may choose from a number of frequencies to carry their signals. You will find below a listing of these frequencies and what is the best time of the day to listen to if you live in North America. Even if the propagation forecasts do not seem to indicate that the upper frequencies will be open, give them a try; you never know what is really up there!

Experiment and good DX!

METER BAND	FREQUENCY MHz	WHAT CAN BE HEARD IN NORTH AMERICA
120	2.300-2.495	Tropical domestic. Some Australian stations can be heard at times in North America if you are located in a very RF quiet environment.
90	3.200-3.400	Tropical domestic. African stations can also be heard late afternoon when the noise level is low. WWCR can be heard on 3.215 MHz, this is an unusual frequency allocation for a station broadcasting from North America.
75	3.900-4.000	Used for "domestic" broadcast in Europe and the Pacific/Asia. BBC and other stations transmitting to and within Europe can be heard late at night or early morning in North America.
60	4.750-5.060	Tropical domestic. South and Central America can be heard at night and early morning. Very good signal in North America in early morning.
49	5.900-6.200	Good international evening band. Heavy use of this band when solar flux is low, major congestion.
41	7.100-7.350	Very good evening band. This band not normally used to transmit from North America. It is used extensively in Europe for transmission to North and South America specially late afternoon and at night.
31	9.400-9.900	Good all around-the-clock band. Depending of the

### OPTIMUM WORKING FREQUENCIES (MHz) For the Period 15 November to 14 December 1998 Flux=154 SSN=116 Predictions prepared using ASAPS for Windows®

UTC	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
<b>TO/FROM US WEST COAST</b>																									
SOUTH AMERICA	26	23	19	16	15	13	12	12	12	11	11	10	10	11	18	27	30	31	30	29	29	28	28	28	28
WESTERN EUROPE	10	10	10	10	9	9	9	9	10	10	9	9	9	12	18	23	25	22	19	15	13	12	11		
EASTERN EUROPE (P)	9	9	9	9	9	10	11	10	10	10	10	10	10	11	14	17	14	12	*	*	*	*	*	9	
MEDITERRANEAN	15	14	14	14	13	13	12	12	12	12	*	*	*	*	14	20	24	23	20	19	17	16	15	14	
MIDDLE EAST (P)	11	11	11	13	14	12	11	*	*	*	*	*	10	10	10	13	15	13	12	11	*	11	11	11	
CENTRAL AFRICA	22	21	19	16	13	13	12	12	*	*	*	*	*	*	18	26	25	25	23	21	22	23	25	23	
SOUTH AFRICA	20	18	17	14	13	12	12	*	*	*	*	*	*	*	20	25	25	25	24	24	23	22	22	21	
SOUTH EAST ASIA (P)	26	29	26	20	17	*	*	*	*	*	10	10	10	10	10	15	19	17	16	14	12		14		
FAR EAST	29	27	24	19	16	13	11	10	10	10	10	10	9	9	9	10	10	10	10	11	17	17	25	29	
AUSTRALIA	23	24	25	23	19	17	15	14	13	13	12	12	11	10	10	12	18	17	17	18	20	21	22	22	
<b>TO/FROM US MIDWEST</b>																									
SOUTH AMERICA	23	18	15	14	13	12	11	11	11	10	10	9	10	15	24	28	28	28	27	26	26	26	26	26	26
WESTERN EUROPE	12	12	12	11	11	11	11	11	11	12	12	11	12	15	22	27	30	29	26	23	19	16	14	13	
EASTERN EUROPE	8	8	8	8	9	9	11	11	11	11	11	11	11	12	16	22	18	15	12	*	*	*	8	8	
MEDITERRANEAN	15	14	14	14	13	12	13	12	12	12	*	*	*	15	22	27	29	25	22	20	18	16	16	15	
MIDDLE EAST (P)	11	11	11	12	13	12	12	12	*	*	*	11	11	12	15	19	17	14	12	12	12	12	12	11	
CENTRAL AFRICA	22	20	16	14	13	13	13	*	*	*	*	*	18	26	26	26	25	25	23	22	22	24	25	24	
SOUTH AFRICA	20	18	16	14	13	12	12	*	*	*	*	*	20	26	25	25	25	25	24	24	23	22	22	21	
SOUTH EAST ASIA (P)	24	25	20	16	13	*	*	*	*	*	10	10	10	10	11	15	18	17	16	14	13	12	11	13	
FAR EAST	29	26	21	17	14	12	11	10	10	10	10	10	10	10	11	11	11	11	11	*	*	11	17	26	30
AUSTRALIA	23	24	22	19	16	14	13	12	12	12	11	11	10	10	12	19	18	17	17	18	20	21	22	22	
<b>TO/FROM US EAST COAST</b>																									
SOUTH AMERICA	16	14	13	12	11	11	10	9	9	8	10	16	23	26	26	26	25	25	24	23	23	23	20		
WESTERN EUROPE	11	11	10	10	10	10	10	9	10	11	10	12	18	24	28	28	28	27	24	21	17	15	13	12	
EASTERN EUROPE	9	9	8	8	9	9	11	11	11	11	10	11	15	21	26	23	19	15	12	10	10	9	9	9	
MEDITERRANEAN	15	14	13	13	12	11	12	12	12	11	13	20	26	29	29	28	25	22	19	18	17	16	16		
MIDDLE EAST (P)	12	12	12	12	13	13	12	12	12	12	12	17	23	25	21	18	16	14	13	13	12	12	12		
CENTRAL AFRICA	19	17	15	15	14	14	13	13	*	*	*	19	25	26	26	27	27	26	24	22	22	24	25	22	
SOUTH AFRICA	19	17	15	14	13	14	13	13	*	*	*	17	26	26	26	25	25	25	24	24	23	22	22	21	
SOUTH EAST ASIA (P)	19	18	16	14	13	*	*	*	12	12	12	12	16	22	21	17	15	15	14	13	12	11	12		
FAR EAST	24	20	18	15	14	13	13	12	12	12	12	11	12	12	12	12	11	11	11	12	16	24	27		
AUSTRALIA	23	21	17	*	*	*	12	12	11	11	11	10	15	20	19	17	17	16	18	20	21	21	22		

Unfavorable conditions: Search around the last listed frequency for activity.

25	11.600-12.100	time of day, you can hear signals from Europe and/or Asia.	15	18.900-19.020	band, but not used as much as the 19 meter band.
22	13.570-13.870	Excellent band for mid-day listening.			Good morning and early daytime band. One of the new band for the broadcasters. Not much used at present.
9	15.100-15.800	This band has not yet been approved "officially" for broadcasting, but many countries are using it extensively. Good daytime band.	13	21.450-21.780	Good morning and early daytime band, also signal from Australia and area heard around 0500 UTC, when the solar flux is mid to high.
16	17.480-17.900	Good old daytime reliable band. Most SWLs have had their first experience in listening to foreign stations in this band. Signals of good quality can at times be heard at night. This also a good daytime	11	25.670-26.100	Early daytime band when the propagation conditions are very good, i.e., when the sunspot numbers are high. Has a very limited use at other times

## Tracking the Global Economy

**W**ith the recent turmoil in global financial markets, the world's attention is focused on business and economics like never before. Not all that long ago, such information was deemed too technical for the mainstream and consigned to the business pages of newspapers and specialized publications with names like *Barron's*. But, over time, both the public's appetite and acumen have grown with the realization that the markets are a major factor in determining how people live their lives.

Indeed, the emergence of new market economies in Asia, central Europe and the former states of the Soviet Union — combined with the growing interdependence of what historically had been primarily “national” economies — have made business an “around the clock” global phenomenon.

There are numerous well-produced programs on shortwave focusing on business, finance and economic development from a range of perspectives. This month's column offers a snapshot of these. Please note that every station almost without exception includes some degree of business and financial news within its regular newscasts. [Consult *MT's* “Shortwave Guide” section for frequencies and abbreviations.]

### ■ Daily Synopses

*World Business Report* (BBC) - Analyzes the day's main financial and economic news in a no-nonsense format. (Americas/Europe stream M-F 1205, 1630, 2105; T-A 0305, 0905; Africa stream M-F 0905, 1205, 2105; T-A 0305; Asia/Pacific stream 0905, 1205, 1705, 2105, 2230)

*Business and Economic News* (Voice of America) - An hourly three-minute check of global business. (49 minutes past most hours seven days a week on VOA News Now.)

*Pacific Money Update* (Radio New Zealand International - RNZI) - A report on currency trading in the Asia-Pacific region. (S-H 1959)

*Pacific Business Report* (RNZI) - Asia-Pacific region business news. (S-H 1935, 2055)

*Business News* (RNZI) - Daily report on New Zealand markets and business developments (M-F 0015)

*Business and Market Report* (Radio Singapore International - RSI) - Business and financial news focused on Singapore and Asia. (M-F 1109, 1230)

### ■ Weekly Magazines and Reviews

*Global Business* (BBC) - A top-notch half-hour with interviews, features and discussions about the international business community. (Americas/Europe stream S 0430, 1030; Africa

stream S 0915, 2105; Asia/Pacific stream S 0330, 1830)

*Marks and Markets* (Deutsche Welle - DW) - A magazine examining global business developments from a German and European perspective. (A 0915; S 0515; M 0215, 0415, 0615)

*World Business Review* (BBC) - The global business week in review. (Americas/Europe stream and Africa stream A 0905, 1205, 2105, S 0305; Asia/Pacific stream A 1205, 1705, 2105)

### ■ Around the World

*Money Focus* (BBC) - Magazine on African business matters. (T 1615)

*ECOWAS Today* (Voice of Nigeria - VON) - A weekly assessment of West African economic cooperation. (W 1645; A 1015)

*Trading Post* (RNZI) - NZ's overseas trade. (T 2115)

*Trade Winds* (RNZI) - Commerce between New Zealand and the Pacific nations. (H 1735)

*On the Export Front* (All India Radio - AIR) - Reports on Indian international trade. (A 1030, 1425, 1910, 2215; M 0005)

*Open Windows* (China Radio International - CRI) - Reports on foreign investment in China (approximately 30 past the hour in all transmissions beginning with M 1200 broadcast and the 0300, 0400, 0500, 0900 and 1000 broadcasts)

*Vietnam's Economy* (Voice of Vietnam) - Reports on Vietnamese business, investment and development. (H 15 minutes into all transmissions except on F in the 0100, 0130 and 0230 transmissions)

*Koreans at Work* (Radio Korea International) - (M 1145, 1245, 1645, 1945, 2145, 2215; T 0245, 0845)

*Currencies* (RSI) - A weekly report on regional currency movements. (A 1225, S 1255)

*Business World* (RSI) - Business and financial trends in Singapore and Asia. (A 1145, S 1115, M 1245)

*Studio 9 Report on Business in Latin America and the Caribbean* (HCJB) - (H 0710, 0910, 1910; F 0110, 0410)

*Venture Canada* (Radio Canada International) - Canadian business magazine. (A 1335, 1435, 1635, 2110; S 0205, 0405)

*Business Week* (Polish Radio Warsaw) - A report on Poland's economy. (F 1320, 1820, 2050)

*Economic Report* (Radio Prague) - Czech business and finance. (H ten minutes into all transmissions except on F in the 0000, 0100 and 0300 transmissions)

*Newmarket* (Voice of Russia) - A look at business and investment in Russia and the Com-

monwealth of Independent States. (M 1711; T 1511, 2011; W 0311, 0711, 2011; H 0511, 0911, 1711; F 1511, 2011; A 0311, 0711, 1611, 2111)

*Money Matters* (Radio Sweden) - Examines the Nordic economies. (W 15 minutes into all transmissions, except H in the 0130, 0230 and 0330 transmissions)

*Bottom Line* (Radio France International) - French business and its relationships with Europe. (W 1640; H 1234, 1434, 1720)

*Economics* (Radio Vlaanderen Internationaal) - A weekly brief on Belgian and European business, industry and markets. (H 1643, 1743, 2243; F 0743)

### ■ Economic Development Matters

This is a topic which clearly belongs within the realm of business and financial matters, but is not usually placed there. The problems of poverty and economic underdevelopment in our world are intertwined with the workings of the global economic system and should be seen in that context.

*A Good Life* (Radio Netherlands) - The best and most encompassing program about economic development bar none, *A Good Life* makes no assumptions about economic development efforts. It examines the motives, methods and consequences of development efforts, for better and for worse, on both societies and on individuals. This program really puts a human face on a topic that is usually drowned by statistics into meaninglessness. (T 0853, 1053, 1453, 1853, 2353; W 0153; F 0753, 0953, 1153, 1353, 1753, 1953; A 0053, 0253, 0453)

Other notable programs on this aspect of business and finance include:

*Development Forum* (DW) - (M 0930, 2130, 2330)

*Report from Developing Countries* (CRI) - (approximately 25 minutes into all transmissions beginning S 1200 continuing through M at 0300, 0400, 0500, 0900, 1000)

Until December, good listening!

**IT'S BACK AND BETTER THAN EVER**

**The Worldwide Shortwave Listening Guide** Edited by John Figliozzi

A “must” reference for every shortwave program listener!

**\$8.99 at all Radio Shack stores.**  
Catalog No. 62-1335



# SATELLITE RADIO GUIDE



## AUDIO SUBCARRIERS

By Robert Smathers

An audio sub-carrier requires the presence of a video carrier to exist. If you take away the video carrier, the audio sub-carrier disappears as well. Most TVRO satellite receivers can tune in audio subcarriers and they can be found in the range from 5.0 to 9.0 MHz in the video carrier.

Audio frequencies in MHz, all satellites/transponder coordinates are C-band unless otherwise noted. DS=Discrete Stereo, N=Narrowband, W=Wideband

### Classical Music

SuperAudio-Classical Collections	G5, 21	6.30/6.48 (DS)
WFMT-FM (98.7) Chicago, IL—Fine Arts	G5, 7	6.30/6.48 (DS)
WQXR-FM (96.3) New York, NY	S4, 14	6.20/6.80 (DS)

### Satellite Computer Services

Superguide	G5, 7	5.48
------------	-------	------

### Contemporary Music

KOCY-FM (105.3) Hoxie, Arkansas	G6, 6	8.50
Radio Desjardins 1	T5, 14	6.80
Radio Desjardins 2	T5, 14	6.20
SuperAudio—Light and Lively Rock	G5, 21	5.96, 6.12 (DS)
WBES-FM (94.5) Charleston, WV	GE1, 12	5.85
WPHZ-FM (96.9) Bremen, IN (South Bend market)	G6, 15	6.48, 7.30 (DS)

### Country Music

SuperAudio—American Country Favorites	G5, 21	5.04/7.74 (DS)
WSM-AM (650) Nashville, TN	C4, 24	7.38, 7.56

### Easy Listening Music

IAM Radio—easy listening music	G6, 6	7.69
SuperAudio—Soft Sounds	G5, 21	5.58/5.76 (DS)
FCC mandated safe-harbor program audio—easy listening music	G3R, 9	6.80
	G5, 2	6.80
United Video—easy listening music	C4, 8	5.895 (N)

### Foreign Language Programming

Antenna Radio (Greek)	S4, 14	7.80
Apna Sangeet Radio India	GE1, 16	7.38
Arab Network of America radio network	GE2, 22	5.80
La Cadena CNN Radio Noticias (CNN Radio News in Spanish)	G5, 17	7.56
KAZN-AM (1300) Pasadena, CA—Radio Chinese (Ch.)	GE1, 22 (Ku-band)	5.80
Radio Maryja—religious programming (Poland)	G7, 10	8.00
Radio Maria—religious programming (Italian)	G7, 10	5.80
Radio Tropical	GE1, 4	7.60
SRC AM Network	E2, 1	7.38
SRC FM Network	E2, 1	5.41/5.58 (DS)
Unidentified Los Angeles area ethnic radio station	GE-1, 22 (Ku-band)	7.78
WCRP-FM (88.1) Guyama, PR—religious (Sp.)	G6, 6	6.53
XEX-AM (101.7) "Vox FM" Mexico City, Mexico (Sp.)	SD2, 7	7.38

### Jazz Music

KLON-FM (88.1) Long Beach, CA., ID—Jazz-88	G5, 2	5.58/5.76 (DS)
Superaudio—New Age of Jazz	G5, 21	7.38/7.56 (DS)

### News and Information Programming

Broadcast News	E2, 1	5.78
Business News Network	C4, 10	8.06 (N)
Cable Radio Network	G5, 2	7.24 (N)
	C1, 21	7.30
CNN Headline News	G5, 22	7.58
CNN Radio News	GE3, 9	5.62
	G5, 5	7.58
	G5, 22	6.30
USA Radio Network—news, talk and information	GE3, 13	5.01, 5.20
WCBS-AM (880) New York, NY—news	G7, 19	7.38
WCCO-AM (830) Minneapolis, MN	GE3, 6	6.20

### Religious Programming

Ambassador Inspirational Radio	GE3, 15	5.96, 6.48
Brother Staire Radio	G5, 6	6.48

KHCB-FM (105.7) Houston, TX	C1, 10	7.28
LDS Radio Network	C1, 6	5.58
Salem Radio Network	GE3, 17	5.01, 5.20
Trinity Broadcasting radio service	G5, 3	5.58/5.78 (DS)
WHME-FM (103.1) South Bend, IN, ID—Harvest FM	G6, 15	5.58/5.78 (DS)
WROL-AM (950) Boston, MA (occasional Spanish)	GE3, 3	6.20

### Rock Music

SuperAudio—Classic Hits—oldies	G5, 21	8.10/8.30 (DS)
SuperAudio—Prime Demo—mellow rock	G5, 21	5.22/5.40 (DS)
WOKI-FM (100.3) Oak Ridge-Knoxville, TN.	E2, 5	6.20

### Shortwave Broadcasters via Satellite

C-SPAN Audio 1: Various shortwave broadcasters	C3, 7	5.20
C-SPAN Audio 2: British Broadcasting Corp. (BBC)	C3, 7	5.41
Deutsche Welle	GE1, 22	7.38, 7.56, 7.74, 7.92
		7.48
Radio Dubai United Arab Emirates (Arabic)	G7, 10	7.38
RAI Satelradio Italy (Italian)	G7, 14	5.40 (English), 5.58 (Spanish)
WEWN—Worldwide Catholic Radio, Vandiver, AL	G1R, 11	
WHRA Africa/Middle East—World Harvest Radio, South Bend, IN	G6, 15	7.82
WHRI Americas—World Harvest Radio, South Bend, IN	G6, 15	7.46
WHRI Europe—World Harvest Radio, South Bend, IN	G6, 15	7.55
KWHR Asia—World Harvest Radio, South Bend, IN	G6, 15	7.64
KWHR South Pacific—World Harvest Radio, South Bend, IN	G6, 15	7.73
World Radio Network: WRN1 North America	G5, 6	6.80
World Radio Network: WRN2 North America	G5, 6	6.20 (Multi-lingual)

### Sports

Madison Square Garden Network (MSG)		
Spanish Language S.A.P. (occ)	C4, 6	6.20

### Speciality Formats

Aries In Touch Reading Service	C4, 10	7.87
Colorado Talking Book Network	C1, 3	5.60
Ozarkana Satellite Network	G6, 6	7.96
SuperAudio—Big Bands (Sun 0200-0600 UTC)	G5, 21	5.58/5.76 (DS)
Weather Channel—background music	C3, 13	7.78
Wisdom Radio Network	GE1, 12	7.10
Yesterday USA—nostalgia radio	G5, 7	6.80
	G9, 1	7.38

### Talk Programming

American Freedom radio network	S4, 19	5.80
Amerinet Broadcasting	G1R, 17	5.58
For the People radio network	C1, 6	7.50
Friday Night Live (Friday 9-10 p.m. ET)	SBS6, 3 Upper (Ku-band)	6.20
		6.20
(Friday 3 p.m. - midnight ET)	S4, 16	5.80
Omega Radio Network	GE1, 6	7.56
Orbit 7 Radio Network	C1, 14	7.48
Radio America Network	C1, 2	5.58
Republic Radio International	G7, 14	7.70
Talk America Radio Network #1—talk programs	GE3, 9	6.80
Talk America Radio Network #2—talk programs	GE3, 9	5.41
Truth Radio	S4, 19	7.56
TVRO.NET (featuring Keith Lamonica)	S4, 16	5.80
United Broadcasting Network	C1, 2	7.50
WOKIE Network—tech talk	SBS6, 3 Upper (Ku-band)	6.20
		6.20
(network active when Megabingo is transmitting Monday-Friday 9-10 p.m. ET)		
WWTN-FM (99.7) Manchester, TN—news and talk	G5, 18	7.38, 7.56

### Variety Programming

American Urban Radio Network	GE3, 9	6.30, 6.48 (DS)
CBM-AM (940) Montreal, PQ Canada—variety/fine arts	E2, 1	6.12
KBVA-FM (106.5) Bella Vista, AR., ID—Variety 106.5	G6, 6	5.58/5.76 (DS)
WCBS-FM (101.1) New York, NY	S4, 16	5.80
(when TVRO.NET is not on the air with technical programming)		
West Virginia Public Radio	GE1, 12	7.74
WNMX-FM (106.1) Waxhaw, NC	G1R, 17	7.92
WUSF-FM (89.7) Tampa-St. Petersburg, FL (Public Radio)	C4, 10	8.26 (N)

## AUDIO SUBCARRIERS / SCPC SERVICES

### FM SQUARED (FM<sup>2</sup>) AUDIO GUIDE

Another type of satellite audio carrier is known as FM Squared. FM Squared signals do not require a video carrier to exist. These signals are similar to audio subcarriers as we know it except that they are normally located below the 5.00 MHz audio subcarrier frequency that a normal satellite receiver can tune to. The Universal SC-50 can tune these frequencies and was used to update this section.

#### GE-3 Transponder 13 (C-band)

Ambassador Inspirational Radio	1.41, 4.47 and 4.65 MHz
Blank audio carriers	1.05 and 3.57 MHz
Focus on the Family	1.23 MHz
Information Radio Network	3.39 MHz
Int'l Broadcasting Network (IBN)	4.83 MHz
USA Radio Network	5.01 and 5.20 MHz
Various Religious Programs (no common ministry)	.33 and 3.75 MHz
VCY/America (channel 1)	.51 MHz
VCY/America (channel 2)	.78 MHz

#### GE-3 Transponder 17 (C-band)

Blank audio carriers	1.28, 1.77 and 3.57 MHz
Data Transmission	80, 1.21, and 2.06 MHz
Focus on the Family	1.05 and 1.40 MHz
In-Touch Ministries	4.47 MHz
Salem Satellite Network	4.65, 4.84, 5.01, and 5.20 MHz
SRN News	.33 MHz

#### Galaxy 3R Transponder 3 (Ku-band)

Blank Audio Carriers	1.05, 2.06, 3.25, 3.62, and 4.20 MHz
Data transmissions	.06, 2.93, 3.07 and 3.17 MHz
AP Network News	3.53 MHz
In-Store audio network ads (various companies)	.71, .81, .91, 1.15, 1.26, 3.44, 3.70, 3.80, 3.88 and 3.97 MHz
Muzak Services	.15, .27, .39, .51, .98, 1.36, 1.48, 1.60, 1.72, 1.84, 1.96, 2.19, 2.31, 2.44, 2.56, 2.68, 2.80, 3.34, 4.08, 4.34, and 4.45 MHz

#### Galaxy 3R Transponder 16 (Ku-band)

Data transmissions	.64, 1.95, 2.18, 2.40, 2.52, 2.73, 2.82, 2.92, 3.20, 3.24, 3.26, 3.47, 3.73, 3.97, 4.03, and 4.14 MHz
In-Store audio networks	.15, .27, .39, .75, .87, .99, 1.11, 1.23, 1.35, 1.47, 1.59, 1.71, 1.83 and 2.07 MHz

#### SBS 6 Transponder 13 (Ku-band)

Data Transmissions	.06, .15, .25, .30, .35, .47, .51, .57, .65, .71, .74, .76, .84, .89, .93, .96, 1.05, 1.12, 1.22 and 2.08 MHz
--------------------	---

#### Telstar 5 Transponder 6 (Ku-band)

Data Transmissions	.06, .15, .23, .30, .35, .38, .47, .57, .65, .71, .74, .76, .84, .89, .93, .96, 1.05, 1.12, and 1.22 MHz
--------------------	--

#### Anik E1 Transponder 6 (Ku-band)

Nova Network FM Squared Services

## Single Channel Per Carrier (SCPC) Services

By Robert Smathers

An SCPC transmitted signal is transmitted with its own carrier, thus eliminating the need for a video carrier to be present. Dozens of SCPC signals can be transmitted on a single transponder. In addition to a standard TVRO satellite system, an additional receiver is required to receive SCPC signals.

The frequency in the first column is the 1st IF (typical LNB frequency) and the second column frequency (in parentheses) is the 2nd IF (commercial receiver readout) for the SCPC listing. Both frequencies are in MHz.

#### GE-2 Transponder-Horizontal 12 (C-band)

1204.90 (75.1)	Radio Marti—U.S. Information Agency Spanish language radio service to Cuba
----------------	--

#### GE-2 Transponder-Vertical 13 (C-band)

1178.70 (81.3)	NASA space shuttle audio
----------------	--------------------------

#### GE-3 Transponder-Horizontal 13 (C-band)

1207.90 (52.1)	Wisconsin Voice of Christian Youth (VCY) America Radio Network—religious programming
1204.45 (55.55)	KJAV-FM (104.9) Alamo, Tex—Spanish language religious programming/ <i>Nuevo Radio Christiana Network</i>

1204.25 (55.75)	Wisconsin Voice of Christian Youth (VCY) America Radio Network—religious programming
1204.00 (56.0)	SRN (Salem Radio Network) News
1201.50 (58.5)	Wisconsin Voice of Christian Youth (VCY) America Radio Network—religious programming
1201.30 (58.7)	Wisconsin Voice of Christian Youth (VCY) America Radio Network—religious programming

#### Galaxy 6 Transponder 1-Horizontal (C-band)

1443.80 (56.2)	Voice of Free China (International Shortwave Broadcaster) Taipei, Taiwan
1443.60 (56.4)	KBLA-AM (1580) Santa Monica, CA— <i>Radio Korea</i>
1443.40 (56.6)	Voice of Free China (International Shortwave Broadcaster) Taipei, Taiwan
1438.30 (61.7)	WWRV-AM (1330) New York, NY—Spanish religious programming and music, ID— <i>Radio Vision Christiana de Internacional</i>
1436.50 (63.5)	West Virginia Metro News—network news feeds

#### Galaxy 6 Transponder 3-Horizontal (C-band)

1404.80 (55.2)	KOA-AM (850)/KTLK-AM (760) Denver, Colo—news and talk radio/
----------------	--

INTRODUCING

### DIRECT FREQUENCY READOUT

## SCPC AUDIO RECEIVER

FULL COMMERCIAL FEATURES



UNIVERSAL SCPC-200 AUDIO RECEIVER

- EASY DIRECT FREQUENCY TUNING - 50 TO 90 MHz (LCD)
- DIRECT TRANSPONDER TUNING (LCD DISPLAY)
- LARGE MEMORY BANK- 50 CHANNELS
- C AND KU BAND AGILE - 950 - 1450 MHz
- AUTOMATIC LNB DRIFT COMPENSATION (ADC)
- COMPANDING, 1:1, 2:1, 3:1 (AUTOMATIC)
- BANDWIDTH, WIDE / NARROW
- AUTOMATIC TUNING INDICATORS
- DIGITAL FREQUENCY LOCK-ON (DFL)

- SPEAKER NAME ON LCD DISPLAY
- MICROPROCESSOR FREQUENCY DISPLAY
- SPEAKER AND LINE OUTPUTS, HIGH QUALITY AUDIO
- COMMERCIAL DIGITAL SYNTHESIZER
- 6 BUTTON KEY PAD FOR FAST TUNING
- BASEBAND 70 MHz OUTPUT
- BUILT IN U.S.A. BY THE LEADING SCPC MANUFACTURER
- FULL 16 CHARACTER LCD DISPLAY
- DOES NOT DISABLE VIDEO WHEN IN USE

**INTRODUCTORY PRICE \$399.00 plus S & H — CALL: 1 - 614 - 866-4605**

**UNIVERSAL** ELECTRONICS, INC.  
*Communications Specialists*

4555 GROVES RD., SUITE 12, COLUMBUS, OH 43232  
(614) 866-4605 FAX (614) 866-1201

# SATELLITE RADIO GUIDE



## SINGLE CHANNEL PER CARRIER (SCPC) SERVICES

1404.60 (55.4)	Denver Broncos NFL radio network/ Colorado college sports	1384.20 (75.8)	WSB-AM (750) Atlanta, GA – news/ talk/Georgia college sports	1005.50 (54.5)	AM Network Canadian Broadcasting Corporation (CBC) Radio-North (Yukon) service
1404.40 (55.6)	WGN-AM (720) Chicago, IL–news and talk radio/Northwestern college sports/ Chicago Bears NFL radio network	1383.70 (76.3)	Motor Racing Network (occasional audio) NASCAR racing	<b>Anik E1 Transponder 21-Horizontal (C-band)</b>	
1404.20 (55.8)	Illinois News Network–network news feeds/W MVP-AM (1000) Chicago, IL– talk/Chicago Blackhawks NHL radio network	1383.10 (76.9)	KIRO-AM (710) Seattle, WA–news and talk radio/Seattle Seahawks NFL radio network	1036.70 (63.3)	In-store music
1402.70 (57.3)	Tribune Radio Networks/Wisconsin Radio Network	1382.90 (77.1)	Michigan News Network–network news feeds	1037.00 (63.0)	In-store music
1402.20 (57.8)	WLAC-AM (1510) Nashville, TN–news and talk/ <i>Road Gang</i> trucker program (overnight)/Tennessee college sports	1382.60 (77.4)	Soldiers Radio Satellite (SRS) network–U.S. Army information and entertainment radio/Army college sports	1037.50 (62.5)	In-store music
1402.00 (58.0)	NorthWest Ag News Network – Ag info for the Pacific Northwest	1382.00 (78.0)	Westwood One College Sports feeds/ Occasional audio	<b>SBS5 Transponder 2-Horizontal (Ku-band)</b>	
1399.60 (60.4)	Occasional audio/Clemson college sports	1381.60 (78.4)	KEX-AM (1190) Portland, OR–news and talk radio	1013.60 (80.4)	Wal-Mart in-store network
1399.20 (60.8)	Occasional audio	1381.40 (78.6)	Occasional audio	1013.20 (80.8)	Wal-Mart in-store network
1399.00 (61.0)	Sports Byline USA/Sports Byline <i>Weekend/On Computers</i> radio show	1381.20 (78.8)	KJR-AM (950) Seattle, WA– sports talk radio/Washington State college sports	1012.80 (81.2)	Sam's Wholesale Club in-store network
1398.50 (61.5)	Occasional audio	1377.10 (82.9)	In-Touch–reading service	1004.50 (89.5)	Wal-Mart in-store network
1398.30 (61.7)	WSB-AM (750) Atlanta, GA– news/talk/ Georgia college sports	1376.00 (84.0)	Kansas Audio Reader Network–reading service	1004.00 (90.0)	Wal-Mart in-store network
1398.00 (62.0)	Occasional audio	1375.40 (84.6)	USA Radio Network/Agrinet Agriculture news service	1003.60 (90.4)	Sam's Wholesale Club in-store network
1397.80 (62.2)	Occasional audio/Colorado Avalanche NHL radio network	<b>Galaxy 6 Transponder 4-Vertical (C-band)</b>		1003.20 (90.8)	Wal-Mart in-store network
1397.50 (62.5)	Minnesota Talking Book Radio Network–reading service for the blind	1376.00 (84.0)	Data Transmissions	<b>SBS5 Transponder 12-Vertical (Ku-band)</b>	
1397.10 (62.9)	Wisconsin Radio Network/Green Bay Packers NFL radio network/Wisconsin college sports	<b>Galaxy 6 Transponder 6-Vertical (C-band)</b>		1095.00 (91.0)	Russian-American Radio Network
1396.90 (63.1)	Occasional audio	1347.00 (53.0)	WCRP-FM (88.1) Guayama, PR– Spanish language religious program- ming	<b>RCA C5 Transponder 3-Vertical (C-band)</b>	
1396.70 (63.3)	Radio America Network	<b>Anik E2 Transponder 1-Horizontal (C-band)</b>		1404.80 (55.2)	RFD Radio Service
1396.40 (63.4)	Georgia News Network (GNN)–network news feeds	1446.00 (54.0)	Canadian Broadcasting Corporation (CBC) Radio–North (Quebec) service	1404.60 (55.4)	Wyoming News Network–network news feeds/Northern Sports Network/ Wyoming college sports
1396.00 (64.0)	WHO-AM (1040) Des Moines, IA–talk radio/Iowa News Network–network news feeds/Iowa college sports	<b>Anik E2 Transponder 7-Horizontal (C-band)</b>		1400.60 (59.4)	Learfield Communications/Indiana college sports
1395.80 (64.2)	WTMJ-AM (620) Milwaukee, WI–talk radio/Green Bay Packers NFL radio network/Wisconsin college sports	1326.00 (54.0)	Canadian Broadcasting Corporation (CBC) Radio–North (Eastern Arctic) service	1400.40 (59.6)	Learfield Communications/ MissouriNet/St. Louis Rams NFL radio network
1395.60 (64.4)	WGST-AM/FM (640/105.7) Atlanta, GA ID <i>Planet Radio</i> –news and talk radio/ Atlanta Falcons NFL radio network	<b>Anik E2 Transponder 13-Horizontal (C-band)</b>		1400.20 (59.8)	Occasional audio/Data transmissions
1395.40 (64.6)	Michigan News Network–network news feeds/Michigan college sports	1206.00 (54.0)	Canadian Broadcasting Corporation (CBC) Radio–North (MacKenzie) service	1400.00 (60.0)	Learfield Communications/Purdue college sports
1395.00 (65.0)	Occasional audio	1205.00 (54.5)	Canadian Broadcasting Corporation (CBS) Radio–Occasional feeds/events	1396.60 (63.4)	Kansas Information Network/Kansas Agn–network news feeds/Kansas State college sports
1394.70 (65.3)	WJR-AM (760) Detroit, MI–news and talk radio/Michigan News Network	<b>Anik E2 Transponder 17-Horizontal (C-band)</b>		1396.20 (63.8)	MissouriNet
1394.50 (65.5)	XEPRS-AM (1090) Tijuana, Mexico– Spanish language programming	1126.00 (54.0)	Canadian Broadcasting Corporation (CBC) Radio–North (Western Arctic) service	1396.10 (63.9)	Occasional audio/Illinois college sports
1394.30 (65.7)	Michigan News Network/Michigan State college sports	1125.50 (54.5)	Canadian Broadcasting Corporation (CBC) Radio–North (Newfoundland and Labrador) service	1395.90 (64.1)	Western Montana Radio Network/Red River Farm Network/Montana college sports
1385.40 (74.6)	WDUQ-FM (90.5) Pittsburgh, PA – Jazz format	<b>Anik E2 Transponder 23-Horizontal (C-band)</b>		1395.70 (64.3)	MissouriNet
1385.00 (75.0)	Washington college sports	1006.00 (54.0)	Societe Radio-Canada (SRC) Radio–	1386.40 (73.6)	Learfield Communications/Kansas City Chiefs NFL radio network
1384.60 (75.4)	WDUQ-FM (90.5) Pittsburgh, PA – Jazz format			1386.20 (73.8)	Radio Iowa/Iowa college sports
1384.40 (75.6)	KOA-AM (850)/KTLK-AM (760) Denver, CO–news and talk radio/ Colorado college sports/Denver Broncos NFL radio network			1386.00 (74.0)	United broadcasting Network–talk radio
				1384.60 (75.4)	Capitol Radio Network/Tennessee Oilers NFL radio network/North Carolina State college sports
				1384.00 (76.0)	Occasional audio/ABC Direction Network–network news feeds
				1383.80 (76.2)	Occasional audio/Syracuse college sports
				1383.40 (76.6)	Capitol Radio Network/North Carolina college sports
				1382.90 (77.1)	MissouriNet/Missouri college sports
				1382.50 (77.5)	Virginia News Network–network news feeds
				1382.10 (77.9)	Learfield Communications/ MissouriNet/Illinois college sports



**Now you can hear GOES, METEOSAT, GMS, INMARSAT and many others with our Apartment Dwellers Special:**

1. 3 Foot Dish with Patio Mount
2. Feed Horn for 1.5Ghz to 1.8Ghz
3. LNA for 1 to 2 Ghz
4. Bias-T from 800 Mhz to 2 Ghz
5. Power Supply

Box 620035  
Middleton, WI 53562-0035  
Phone/Fax 608-592-7409

**Special System Price \$545.00** without SUPER-SWAGURSAT / **\$775.00** with SUPER-SWAGURSAT

For owners of ICOM R7000, R7100 & R8500 receivers we have the SUPER-SWAGURSAT at a new low price of \$250.00 so you can receive both voice as well as superb WEFAX images.

Place our 3 foot dish, feed horn and LNA in a South facing window and receive the GOES Satellites.

Our EMWIN System includes:

- |                |                        |
|----------------|------------------------|
| 1. 3 Foot Dish | 5. Power Supply        |
| 2. Feed Horn   | 6. Receiver (Optional) |
| 3. LNA         | 7. Software            |
| 4. Bias-T      | 8. Modem               |

Complete System Price: \$1350.00 with Receiver  
\$ 695.00 without Receiver

Purchase your WEFAX Modem & Software from us. We are authorized dealers for OFS WeatherFAX as well as MultiFAX.

Our SUPER-SWAGURSAT (\$250.00), 3 Foot Dish (\$75.00), Feed Horn (\$120.00), LNA less than 1 db noise & 37 db of gain (\$225), Bias-T with 25db of gain built in (\$125.00) and Power Supply (\$10.00), are now being used all over the world.



Image captured with Apt. Dwellers System

**Our Web Site is: <http://www.swagur.com> • Our E-Mail Address is: [swagur@execpc.com](mailto:swagur@execpc.com)**

# TrunkTrac<sup>®</sup>

**Now, the same breakthrough trunking technology that brought you the BC235™ is available for your desktop!**

With TrunkTrac, your computer, and a serial port equipped scanner you can see and follow Motorola™ trunked system activity, controlling and observing a wide variety of trunking parameters and features. TrunkTrac consists of non-infringing software, an FCC Class B approved signal processing board that plugs into an ISA slot in your PC, a serial interface and discriminator buffer for your scanner, plus all required cables.

- Both 800 MHz and 900 MHz system support.
- Track up to 4 systems at once (Pro version)
- Follow Private Call and phone Interconnects. (Pro version only with proper authorization)
- Individual ID display option w/Type I IDs (Pro version)
- Alphanumeric tags up to 30 chars for each talk group, fleet-subfleet, or ID.
- Hex or Decimal (Uniden™) display modes.
- Multiple Scan lists with priority.
- 300 lockouts per system.
- Temporary lockout for Scan list entries.
- Scan, Track, Search modes w/individual user selected delay values.
- Handles Type I, II, III, and all 3 Hybrid variants
- Advanced flexible fleet map management with presets, or easily tailored user defined maps.
- Uniden™ or Motorola™ style size-code entry.
- Only control channel freqs needed.
- Correct channel mapping for all 800/900 MHz U.S. freq plans.
- Frequency finder mode shows all the frequencies in use by a system.
- System finder mode helps you find new systems.
- Personality files for named scan list and lockout files you can recall between sessions.
- Supports OS456, Icom R7000, 7100, 8500, 9000.
- Only a single radio required to do it all.
- Real time repeater activity and frequency display.
- Easy, intuitive, menu driven operation with mouse support.



TrunkTrac v4.0 (Pro version).....\$599+s/h  
TrunkTrac v4.0 .....\$399+s/h

Distributed by: **Scanner Master**  
PO Box 610428  
Newton Highlands, MA 02161

Order line: **1-800-722-6701**  
More info: [www.scannermaster.com](http://www.scannermaster.com)

## Learning to Love Satellites

It's a funny sort of silicon world out there and, unless you've been hunkering down in a bunker somewhere in Montana, your world is buzzing with streams of electrons. Just try to get through the day without using your computer, cell phone, VCR, scanner, television, radio, or microwave. Heck, even your watch is crystal controlled!

What we used to consider a convenience has become a necessity. How many of us would even consider doing without any of the above mentioned items? Yet, all this convenience has led to a certain amount of frustration and intimidation on a daily basis. Anyone who's ever tried to program a new VCR, found themselves out of range with their cell phone, or gotten an error message from a recalcitrant computer knows all about it.

Mention the word "satellite" and folks tend to roll their eyes up into their sockets just thinking about how complicated it all is. No wonder 65 million homes are wired for cable in this country! Few electronic gadgets seem so hard to put together and operate. And, yet, once you get over this critical stumbling block a very big universe of monitoring opportunity opens up for you.

### ■ The Ubiquitous Satellite

Among the most sophisticated electronic creations of 20th Century people has been the communications satellite. But, what's not to love? They're quiet. You can't see them (usually). They're solar powered! Why, they're practically warm and fuzzy! And, they're the workhorse of the modern age. Billions of dollars in commerce are moved every day via satellite. News gathering, broadcasting, entertainment, and sports are all depending on those little metal moons to do their job.

The loss of Galaxy 4 this past summer was a sobering reminder of just how much we've come to depend on them. Ninety percent of North America's pager traffic was unceremoniously cut off. Tens of thousands of Muzak@ subscribers' speakers suddenly went silent. National radio networks disappeared from the dials of tens of millions of radios all across America in an instant. Thank God, ESPN and the Home Shopping Network were unaffected!

Yes, strip away the ubiquitous satellite from our everyday life and we're back in the dark ages where the latest news was in a day



*Your cheerful "Launching Pad" editor toiling in the dish farm, happy once again to be infesting the pages at MT. (Photo by Jensen Reitz Montambault)*

old newspaper, cars were the size and shape of fighter aircraft and vacuum tubes ruled the world of electronics. Well, it's unthinkable!

### ■ A Satellite-Delivered Future

The genie is out of the bottle; you can't turn the tide—add your own cliché if you like, but the fact is that satellites are the future of communications. Does this mean traditional over-the-air modes are doomed? Not a bit. If you dusted off your great grandad's crystal radio set it would still pick up the AM band tonight just as it did 77 years ago with the first radio broadcast of the World Series in 1921.

While you can tune in the BBC World Service via satellite and the Internet, it's also available 24 hours a day on shortwave. Good old dependable (?), analog, AM modulated shortwave. It's still the cheapest way to receive the world in your home and will remain so for many years to come. International broadcasters are savvy enough to hedge their bets and you may be assured that when the going gets tough financially, shortwave delivery will be the last to go. So, keep your shortwave receiver operational and on standby!

Meanwhile, there are exciting things happening in the world of satellites. From the

much anticipated, long delayed launch of AMSAT's Phase 3D bird, to the new and burgeoning world of digitally delivered broadcast satellites, to the seemingly endless stream of tiny telephone satellites, to the intriguing near future of 100 channel satellite radio for your car. Whew! So, strap yourself to an old Russian ICBM booster, get someone to light the fuse and lift off to a future world of satellites every month right here at MT's Launching Pad.

### ■ Mailbag

I know, you're thinking, "Hey, this is the first column, how can you have a mailbag?" That's easy: all the old *ST* subscribers are now *MT* readers and a number of them sent in questions which deserve to be answered. And, besides, it gives me a chance to touch on a couple of typical beginner questions to get the ball rolling.

- Mary Wilson from Illinois wants to know if it's possible to get shortwave broadcasts via satellite without having a big C-band dish, an outdoor installation, and running cables into the house.

The short answer is "no." Small dish DBS services such as DirecTV, Primestar and DISH

have all ignored the potential of simulcasting the popular shortwave services. Only C-band offers these broadcasters. Incidentally, if you wait until next year, CD Radio — the satellite-delivered car audio service — will offer at least BBC World Service among its channel selections.

- Steve Simon of Ohio wants addresses and phone numbers of companies making Digital Video Broadcast receivers, and John Stankovitz from New Jersey read my review of the Pansat 100A DVB receiver and wants to know if any other companies make DVB receivers. You can both use the list of DVB makers below.

- Tom Marongelli, returning to the States from active duty in Korea, wants to know if there will be Korean programming available via satellite on his return.

Yes. There is a channel of programming from Korea available in the DVB (Digital Video Broadcast) standard on Telstar 5 Ku-band, channel 7712, vertical polarity. It's called The Asian Network (TAN) and is broadcast from Los Angeles with a regular daily schedule, but not 24 hours a day.

- Nicholas Murza from Arizona would like to receive Russian and Ukrainian programming via satellite. There are plans for some of the small dish services to offer such programming, but, as of this writing, which services and what prices have not been disclosed.

### DIGITAL VIDEO BROADCASTING (DVB) RECEIVERS

Panarex Electronics  
11672 Tuxford Street  
Sun Valley, CA 93152  
818-768-5161

PME Smallear/Digiear  
6680 Lincoln Avenue  
Lockport, NJ 14094  
716-639-7778  
www.digier.com

Taylor Enterprises  
P.O. Box 100  
Independence, KY 41051  
606-356-9666

Samsonic Technology USA, Inc.  
2182 DuPont Drive  
Suite 203  
Irvine, CA 92612  
888-591-4416  
www.samsonic.com

Meanwhile, WMNB-TV from New Jersey still broadcasts their analog service of Russian programming on SBS-5 transponder 5. The video is transmitted inverted, so to view it simply press the video invert switch on your receiver. If you have no such switch, run the Ku-band feed line into the C-band LNB connector. This will cause all normal Ku-band transmissions to appear inverted, but inverted Ku-band transmissions to appear normal. Got it?

- An unnamed reader asks via e-mail: "Do I need so-called 'digital-ready' LNB to receive Ku-band MPEG-2 programs such as TAN and Thai-TV? Or will my current LNB, which I have been using to watch non-digital programs, work?"

It all depends on the condition of your current LNB. If you are experiencing problems with it, you'll likely need a new LNB. However, I've been using a 40 degree C-band LNB which is at least 12 years old and a .9 dB Ku-band LNB which is probably 5 or 6 years old (neither of which is "digital ready") and both do an excellent job. My motto is: Never spend more than you have to on your satellite hobby.

- Monny Gilano of California wants to know about receiving European and Russian satellites from his location. A glance at the foot print charts in the '98/00 *World Satellite Yearly* indicates that there are no European or Russian satellites receivable directly from your location. Even the old Molniya satellites, with their highly elliptical orbit which might have helped, are no longer sending video. Intelsat 511 at 180 degrees E has an eastern C-band spot beam which covers California, but carries mostly Japanese programming. Your best bet for Russian programming is the aforementioned WMNB-TV.

- John Grow, VE2EQL from Quebec, is new to C-band and has been given a 10 foot dish which he is rebuilding. He's looking for used feeds, receivers and VCII modules and wants to know if any of the 70 MHz receivers, often seen at hamfests, are worth buying.

First, today's market in new C-band equipment is so over stocked that it's tough to pass up new receivers with a warranty which often sell for under \$200. However, some used equipment in excellent shape can be had at half that price or even free. Check with local dealers, but don't pay over \$200 unless the price includes a VCII. I'd stay away from the 70 MHz systems because it is harder to find repair parts for them and replacement downconverters tend to be expensive.

You can send your questions to me in care of this magazine or via e-mail at the above address. If you're sending via snail mail,

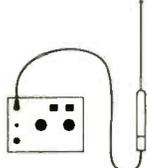
please include a self-addressed stamped envelope.

### It's Quiz Time!

Yes, satellite fans, here's a question which may require a little research. Name the year and the satellite on which the first radio waves were received on Earth. Send your answer to me in care of this magazine or to the e-mail address listed above. The winner or winners will earn my undying respect, the admiration of the entire *MT* circulation and enjoy the thrill of seeing their name in print. A truly lasting legacy.

## Earth Monitor

The Kiwa Earth Monitor is an ELF-Extremely Low Frequency receiver for listening to the natural radio signals from planet Earth. Hear whistlers, tweeks, the dawn chorus with this sensitive receiver. Tuning range is from 50 Hz to 15 kHz. Features include a remote field probe antenna, noise filter and variable bandpass filter.



### Kiwa Electronics

612 South 14th Ave., Yakima WA 98902  
 ☎ 509-453-5492 or 1-800-398-1146 (orders)  
 ✉ kiwa@wolffnet.com (Internet/catalog)  
 http://www.kiwa.com

## VIDEO SYNC GENERATOR

Restores Horizontal and Vertical Sync Lines from Distorted Video




For Free Information Package and Pricing

Call 219-233-3053  
www.south-bend.net/rcd

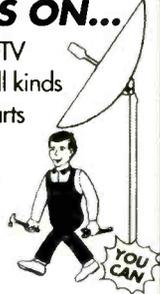
R.C. Distributing, P.O. Box 552, South Bend, IN 46624

## 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  
In/F: 218-739-5231

**800-543-3025**  
www.skyvision.com



## Understanding Radio Waves

Rachel Baughn reminded me recently that I have been writing for *Monitoring Times* for just a little over ten years now. Hard to believe I've gone from being the new kid on the radio writing block to being one of *MT*'s "Institutions." Frankly, the fact that I have, as Lord Buckley used to put it, "stomped on the Terra" for as long as I have without being actually placed in an institution is probably a bigger marvel than generating a monthly column.

Anyway, this humbling thought first led me up in the attic to the box that contains all those back issues of *MT*. This trip down memory lane further led me to realize that there are quite a few topics I have covered in that time that, for beginners and even some old timers, bear repeating. From time to time I intend to re-approach some of these subjects. This is not meant to be "Uncle Skip's Greatest Hits," but rather a fresh look at the kind of important material that all beginners need to get the most out of our hobby.

Most people who first enter the radio hobby start out with only the most basic exposure to radio's various "modes." Those who have never seriously tried to hear anything beyond their car radios are essentially only familiar with two of radio's modes, those being **amplitude modulation (AM)** and **frequency modulation (FM)**. Most folks get through life without knowing anything more than that about radio. But, as beginning radio monitors you not only want to know more about this subject, you *need* to know more about it. This is mainly because, as a radio monitor, you have likely purchased a receiver that has several more modes of operation beyond the more familiar AM and FM modes. What do they all mean?

AM, FM, and other modes like CW, SSB are all just a jumble of letters circling a receiver control knob to most beginners. The problem has always been one of trying to come up with a nontechnical way to tell folks about these very technical basics of radio. The solution I have used in articles, books and speaking engagements over more than ten years of experience comes out of my misspent youth at the Jersey Shore. I

spent many summers at the beach working on turning my skin into something that is putting my dermatologist's daughter through law school. Surfing has remained for me the best the way to explain all those positions on a receiver's mode switch.

Back in the citizen's band (CB) boom years of the early seventies, some people used to enjoy making horses' patoots of themselves by keying down their microphones without saying anything. Sadly, you can still hear

this moronic behavior on some segments of the 75 meter amateur radio bands. This crude form of jamming is known as "throwing a carrier." The **carrier** is just what its name implies. It is the signal that serves to carry the information to your receiver.

Just like those red hot days of the CB craze, a steady, unbroken carrier is little more than a waste of electricity. It communicates nothing at all by itself. The carrier signal becomes the radio signal that we all know and love *only* when it is modulated in some way. **Modulation** is the process of manipulating the carrier signal in some way to allow it to convey **information**. This modulated signal is then **demodulated** by the circuits in your receiver allowing you to hear the audio.

Clear as mud, huh? Now you see why I have leaned so heavily on the surfing analogy all these years.

Think of the ocean. If you are a life-long, landlocked resident of the Midwest, head to your video store and rent *The Endless Summer* or any other surfing movie that has more boards than bikinis in it. You'll get the idea.

If the surf is down and there are no waves to speak of, that would represent an unmodulated carrier.

Okay, now let's all visualize that the surf is up. The waves are breaking on the



beach at different heights or speeds. These waves of varying size and spacing could be thought of as representing modulation of the ocean/carrier. But of course, as any surfer will tell you, not all waves are created equal. These different waves/modulations are going to react differently and (dropping the analogy for a second) will require different receiving equipment (demodulation equipment) to be heard and understood.

### Continuous Waves

While continuous waves would represent every surfer's dream, to radio folks continuous wave signals are best known as "CW." CW is the simplest form of transmission — a plain unmodulated carrier simply switched on and off in a unique pattern. The dots and dashes of the International Morse code are formed by someone hitting a key to turn the carrier on and off. Think of these dots and dashes as waves of equal height and speed washing up on the beach. Imagine they start coming in sets of three and sets of five with a lull in between each set. The duration of the sets and the spaces in between are like dots and dashes.

Since an unmodulated carrier has no "sound" to it, your receiver has to jump through a few hoops to give you something you can hear. Most modern receivers have a CW position on their mode switch. Older receivers will often have a BFO switch. BFO stands for Beat Frequency Oscillator. In either case, the switch serves to turn the "soundless" CW signal into a recognizable series of audio tones. The "demodulation" happens in the listener's head when they translate the pattern of dots and dashes into letters and numbers.

Learning to copy CW signals can be a lot of fun. Many amateur radio operators still

enjoy using this mode. Pick up a code practice tape from one of the advertisers in *MT* and join in the fun.

### ■ Amplitude Modulation

Now imagine that the waves are coming toward the beach spaced exactly 20 feet apart and that they hit the beach every five seconds. The only "change" you can see occurring is that all these otherwise equal waves are different heights. Getting back to radio, this change in **amplitude** (a fancy word for height) can be interpreted as a change in voltage at the receiver that can then be translated into an audio signal. Eureka, voices that come out of the air!

### ■ Frequency Modulation

If you have spent any time tuning around with an AM radio or have done some listening on the shortwave broadcast bands, you have probably noticed that there is a lot of noise out there. Atmospheric and people-made noise can get in the way of your listening pleasure. Radio pioneer Edwin Armstrong got peeved enough at all this background noise that he set to work to develop a different form of modulation: one that would give a very clear signal that was essentially free of static.

Thus, FM was born. Armstrong figured that you could keep the amplitude constant and then **deviate** or change the frequency back and forth off of the center frequency. Back to the beach! Imagine the waves coming toward the beach are all the same height. The difference now is that the waves no longer hit the beach spaced uniformly apart. Now they are hitting the beach faster or slower, that space between each successive wave is changing instead of its height.

Doing this gave a clear, static-free signal. The trade-off was a reduction in the distance the signal could be practically used. However, most radio services aren't interested in sending a signal all the way around the world. For this reason, most local communication is done these days in the FM mode. Police, fire, business, amateur radio operators and others make wide and varied use of FM in the VHF and UHF frequency ranges. (Thus giving rise to the monitoring hobby of scanning.)

Since most modern scanners cover such a wide range of frequencies, the beginner can get really confused about the two primary types of FM signals out there in scanner land. Knowing the difference can be

important when setting the controls on your scanner.

### ■ Single Sideband

If you have been tuning across the short-wave frequencies for any length of time, you have no doubt run across some signals that sound like a duck quacking in a tunnel. These are **single sideband** (SSB) signals. From the earliest days of radio, folks were always trying to do two things: cram more signals into less space and get more signal from a given amount of power. SSB does both jobs remarkably.

To explain this we will need to stretch the limits of our surfing analogy. Imagine that you are seeing the wave pattern we dreamed up for AM—waves equally spaced but with varying heights. Now imagine that the waves are generating an equal, mirror image of themselves underneath the waves. The way you generate SSB is to start with a low-powered AM signal (one with waves on the top and underneath). Circuits in the transmitter serve to remove one of the side bands (the lower wave or the upper wave) *and* the carrier (i.e., remove the ocean. See, I told you this was going to get weird.)

Now the transmitter amplifies the remaining sideband (the oceanless waves become tidal waves). This produces a signal that is about four times as efficient as a regular AM signal with the same amount of power behind it. It also only occupies half the space of a standard AM signal. Almost like getting something for nothing, but not quite: On the receiving end, all you hear is that duck sound.

Unless, of course, your receiver is designed to accept this form of modulation. Remember when we talked about the Beat Frequency Oscillator (BFO) in relation to CW signals? The BFO signal serves as a substitute for the missing sideband, giving you a normal voice instead of duck noises. Most modern receivers have done away with the BFO in favor of a mode switch that will include CW (as previously discussed) as well as (USB) **upper sideband** (that's for the waves on top) and (LSB) **lower sideband** (for those mirror image waves beneath the sea). Both modes are used, so if you hear a duck voice and switching to one position does not do the trick, try the second. If you are using a receiver with a BFO you simply adjust the BFO Pitch control to get the same effect.

Hang ten!

## STOP! LOOK & Listen to This!

**Alinco DJ-X10T – We've reinvented the multichannel receiver!**

- 1200 memories plus two VFOs
- 100 KHz – 2 GHz coverage\*
- WFM, NFM, AM, USB, LSB and CW modes
- Alphanumeric channel designations – up to 3 lines
- Multi-function Channel Scope™ display
- Internal "help" function
- PC programmable
- Beginner and Expert operating modes
- Automatic Memory Write Feature
- Auto timer on/off, internal clock
- Backlit display and keys



**The Alinco DJ-S46 FRS radio will have YOU talking!**



- NO License Needed
- Up to 2 mile range\*\*
- 14 Channels
- FM Transmit/Receive
- NiCd, Alkaline or External Power
- Long Battery Life
- Self Storing Antenna
- Compact Size
- Simple Operation
- Lighted Display
- Accessory Ports
- Compatible with other FRS radios

Visit our web site!

**Simple • Clean • Dependable**

**ALINCO**  
RADIO'S VALUE LEADER™

Dealer Inquiries Welcome

U.S.A. Alinco Branch: 438 Amapola Ave.  
Suite 130 • Torrance, CA 90501

Phone: (310) 618-8616 • Fax: (310) 618-8758

Internet: <http://www.alinco.com>

\*Cellular blocked. \*\*Effective operating range varies due to terrain, channel use, batteries and other conditions

# Keeping an Eye on the Weather

I wrote my first article on weather satellites for the United Kingdom's Remote Imaging Group (RIG), back in the 1980s. At that time, I was new to weather satellites, though scientific satellite operations had previously been my profession. A couple of years later, the UK's *Short Wave Magazine* invited me to write a monthly column, which has now been running for ten years. I also write a column on astronomy for our local evening paper and have been a reader of *Monitoring Times* for well over a year. An invitation to write a column (replacing the one previously written for sister magazine *Satellite Times*) was therefore most welcome.

Here in Britain, I am one of those people that could be described as an "American-ophile," because having worked professionally with American space scientists on combined UK-British-Netherlands satellite projects during the 1970-80s, I am often seen or heard writing or talking positively about the American space program. I have yet to visit the United States, but perhaps one day ...?

### Weather satellites: the background

As a lad of 12 when Sputnik-1 first hit the headlines, I became fascinated with the idea of satellites and their applications. History records that the first television picture "from space" was from the American satellite TIROS-1, transmitted on April 1, 1960 - see figure 1. Just three years later, TIROS-8 transmitted the first "weather satellite" signal in December 1963, confirming the American lead in weather satellite technology. It carried a vidicon TV camera

for Automatic Picture Transmission (APT). This system involved the direct transmission of an analog signal in real-time that could be decoded to show land-sea-cloud pictures. These signals could be received by suitably equipped ground stations around the world. The APT service has remained available since 1963, with new satellites being launched every few years.

In December 1971, the Meteor satellites of the former USSR started a compatible APT service. Information from Grant Zehr (published in the book *Communication Satellites* by Larry Van Horn) indicates that prior to 1977, most Russian Meteor satellite transmissions were only made over Russia. The usual frequency was 137.300 MHz, though Meteor 1-30 (which I was monitoring until it was finally switched off several years ago) used a number of frequencies in the 137 MHz band. Later (class 2) Meteor satellites regularly transmitted images over the U.S. on either 137.300 or 137.400 MHz.

I collected several Meteor images in the 1980s, but in a non-PC compatible format that I could not display when I upgraded. I do have the original cassette tape recordings somewhere — which can still be decoded!

The use of geostationary satellites for weather monitoring followed a few years after the start of the polar satellites' APT service. In 1974, the American geostationary SMS-1 satellite started the weather facsimile (WEFAX) service, becoming the first geostationary meteorological satellite. Because it was practical and efficient, WEFAX used a compatible analog signal, so that similar equipment could be used for both APT and WEFAX.

### Picture production

Image generation by weather satellites involves using a telescope (radiometer) and producing an image line comparable to a television picture line — but much more slowly. This line comprises the brightness variations of the scene below: dark sea and bright clouds. These variations are impressed onto a 2.4 kHz sub-carrier by the process of amplitude modulation (AM). The resulting AM signal is then used to frequency modulate the main radio frequency carrier (in the 137-138 MHz band for the polar orbiters, or the 1675-1698 MHz band for geostationary satellites). The final signal can therefore be decoded by the same equipment (though an additional down-converter is required for WEFAX decoding).

The next development with weather satellite technology involved the move to a higher resolution, digital data transmission format in 1977 with the NOAA-2 satellite. Digital transmissions were consolidated as high resolution picture transmission (HRPT) telemetry from the advanced very high resolution radiometer (AVHRR) in 1978, when the TIROS-N series satellites were launched. This service has been provided continuously (with APT) ever since, and there are now more than 2,700 APT user stations worldwide. The image format has remained the same.

America's GOES (Geostationary Operational Environmental Satellite) constellation transmits WEFAX from at least two positions; GOES-East (currently GOES-8) is at about 74 degrees west longitude, and GOES-west (now GOES-10) is maneuvering further west.

### Equipment needed

You can, of course, receive weather satellite signals from the polar orbiters without decoding them, and you can do this at little cost. For monitoring, you need an external antenna and a receiver capable of tuning to the 137 MHz band: Check the frequencies given at the end of this column.

NOAA satellites transmit continuously, so you can hear them whenever they are above your horizon. General purpose receivers are normally unsuitable for providing a quality signal for decoding, because of the unusual characteristics of weather satellite (WXSAT) signals. However, you can still receive a strong signal for monitoring.

Most VHF antennas, even a 2 meter antenna,

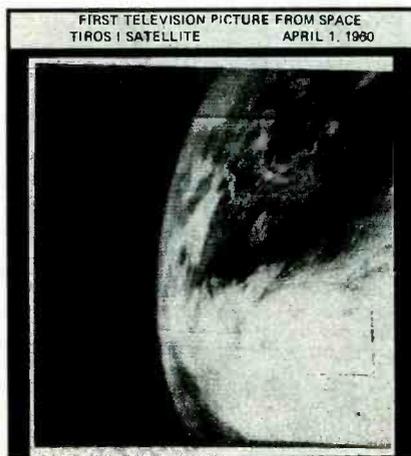


FIGURE 1 (left): Early TIROS picture

FIGURE 2 (below): Early NIMBUS picture.





**FIGURE 3:** NOAA image September 2 at 1750UTC.

should receive enough signal from a NOAA WXSAT to let you confirm that you have heard them. The optimum antenna has long been considered to be a right-circularly-polarized crossed-dipole, but some experimenters have researched alternative designs and come up with the quadrifilar helix (QFH). For purely test purposes, even a random length of wire connected to your receiver's input will "hear" a NOAA or a Meteor — as I have often confirmed! Just don't expect to decode the telemetry.

#### ■ Signal characteristics

The sound of an APT signal is easily recognized. The signal contains a data line length of half-a-second. The extracted audio signal therefore has a repetition rate of two "clicks" per second, each click containing image information. Meteor APT sounds like "croak-croak" every second. NOAA WXSATS encode two different images in each line, so this signal sounds like "tick-tock, tick-tock" every second.

In the NOAA picture, the infra-red image is continuous, but the other channel varies. In daylight transmissions, an image from the visible-light sensors forms the second channel. At night, a near-infra-red image forms the second channel. The satellites cross the terminator twice each orbit, so for much of the year we can see the channel switch happen — and hear it clearly from the receiver's speaker.

#### ■ Prediction software and "elements"

The first item in any satellite monitor's armory is surely a satellite predictions program. There are several freeware programs available from various sources on the Internet, including AMSAT's web page: <http://www.amsat.org>. This has links to several programs, including

Thomas C. Johnson's PC-Track version 3.1 written in May 1995 (the author being apparently no longer contactable), and STS-Orbit Plus, written by David H. Ransom. Other programs are also available from this site.

With a predictions program, you need to ensure that the software produces accurate data; this means updating the Kepler elements file every few weeks. Kepler elements are generated from measurements made by radar analysis of the velocity of satellites. Satellite orbits are modified by a number of factors, including residual atmospheric friction (most satellites are above the densest parts of the atmosphere).

Earth's gravitational anomalies (called mascons - mass concentrations) also change the orbits, and the Moon's variable relative distance has an effect. The combined result of these factors is that we usually need to update Kepler elements at least once each month. I update at least once each week using a large database of elements issued on the ftp site: <ftp://128.149.63.2/pub/space/elements/satelem/>

The directory shown is usually updated on Sunday evenings. Data is also issued by the Orbital Information Group (OIG): <http://oigsysop.atsc.allied.com>

Current orbital elements for the weather satellites are carried on the Celestrak site at: <http://celestrak.com/NORAD/elements/weather.txt> <ftp://ftp.celestrak.com/pub/elements/weather.txt> and are usually updated daily.

#### ■ Current WXSAT status

With the equipment listed, you can expect to hear NOAAs-12, 14 and 15, transmitting on the frequencies listed at the end of the column. Meteor WXSATS usually transmit in daylight only, so are not normally heard during the night. Meteor 3-5 is currently the operational CIS (Commonwealth of Independent States) WXSAT.

A new Resurs 1- (number 4) satellite is being tested, and may be heard sometimes. The latest information from the Resurs satellite operators is that the onboard systems have checked out satisfactorily. Transmissions have apparently been mostly on 8192 MHz. On rare occasions, signals may be heard on 137.40 MHz from the

**FIGURE 4:** Me and my optical telescope and WEFAX dish.



oceanographic satellites SICH-1 or OKEAN-4, but such transmissions are only for a few minutes at a time.

#### ■ E-mail

Readers can e-mail me at: [lawrenceh@peverell.demon.co.uk](mailto:lawrenceh@peverell.demon.co.uk) Future editions will include information on the move to digital signals, news about CIS WXSAT operations and readers' WXSAT web pages.

### FREQUENCIES:

#### Polar orbiting WXSATS:

NOAA-14 transmits APT on 137.620 MHz  
 NOAA-12 and -15 transmit APT on 137.500 MHz  
 NOAAs transmit beacon data on 136.770 or 137.770 MHz  
 METEOR 3-5 transmits APT on 137.850 MHz when in sunlight  
 Resurs 1-4 may transmit APT on 137.300 or 137.400 MHz  
 OKEAN-4 and SICH-1 sometimes transmit briefly on 137.400 MHz

#### Geostationary WXSATS:

GOES-8 and GOES-10 use 1691 MHz for WEFAX

**NEW!**

**Wireless Weather Stations**

Installation made easy! Davis' wireless Weather Monitor II® and Weather Wizard III® stations use our new SensorLink™ to transmit data to the display console up to 400' away! Each station comes completely pre-assembled and includes sensors, a radiation shield, a weather-tight shelter, and a display console with receiver. All without running wires!

Or try our new radio transmission solutions - Spread-Spectrum Radio Modem, UHF Radio Modem & Cellular Phone Modem. They work with all of our stations to provide data transmission from virtually anywhere.

**Davis Wireless Weather Stations Feature**

- Inside and Outside Temperature, Wind Speed and Direction, Barometric Pressure and Trend, Wind Chill, Dew Point, Daily and Yearly Rainfall, Inside and Outside Humidity, Time and Date, Highs and Lows, Alarms.

For a FREE catalog, call **MOT1198**

**1-800-678-3669**

One-year warranty • 30-day money-back guarantee

**Davis Instruments** 3465 Diablo Ave., Hayward, CA 94545-2778  
 (510) 732-9229 • FAX (510) 732-9188 • [sales@davisnet.com](mailto:sales@davisnet.com) • [www.davisnet.com](http://www.davisnet.com)

## New U.S. Coast Guard Air Station Opens

The U.S. Coast Guard opened a new air station at Atlantic City, New Jersey, on June 8, 1998. Coast Guard Group Atlantic City and Air Station Atlantic City are located at the Atlantic City International Airport. The US\$12.3 million project took 19 months to complete. Coast Guard aircraft 6501, 6511, 6513, 6522, 6529, 6539, and 6580 (HH-65A Dolphin helicopters) have been operating from the station since May 18.

Air Station Atlantic City will provide search and rescue service to the Atlantic coastal regions from Connecticut to Virginia. Air Station Cape May's and Air Station Brooklyn's operational responsibilities overlapped in that region, and the Coast Guard decided the same level of coverage could be maintained by consolidating the two air stations into one facility, according to Kathy Scott, aviation shore facilities manager, Office of Aviation Management at Coast Guard headquarters in Washington, D.C. Both air stations at Cape May and Brooklyn will be decommissioned.

One of Air Station Atlantic City's seven HH-65s will maintain a Coast Guard presence in the Brooklyn area, operating out of Air Facility Long Island, N.Y., at the Frances S. Gabreski Airport, from June 8 to October 15, according to Lt. Cdr. Brad Bean, Air Station Atlantic City aviation engineering officer.

Aircrews will rotate between Atlantic City and Long Island during search and rescue season and will use Air National Guard facilities, Bean said.

Those of you in the Atlantic City area should tune in on frequencies in Table one for Coast Guard activity. Thanks to J.D. Erskine, *World Maritime News*, and Coast Guard Atlantic Area Public Affairs for the news.

### ■ Navy Fleet Warning/Tactical

Those of you who live near a U.S. Navy ship homeport or Coast Guard cutter base should include 277.800 MHz in your scanner loadout. This frequency is guarded continuously by all U.S. Navy ships (except submarines) when underway. Coast Guard cutters may use this frequency to communicate with Navy ships when required. It is



*HH-65A Dolphin helicopter hovers during a rescue. Photo courtesy of the United States Coast Guard*



*This HH-65 Dolphin helicopter and six others now call Atlantic City home. Photo courtesy of the United States Coast Guard*

also used for navigational purposes during periods of reduced visibility when entering or leaving port. It is used by the Navy as well for local ship-shore harbor communications on a secondary basis to its intership use.

### ■ U.S. Navy on Inmarsat

Table two is a list of the known U.S. Navy ship tactical callsigns that have been monitored on Inmarsat satellite frequencies. We would like to thank John Wilson for supplying us with this excellent list.

If you have a milcom frequency or callsign list, we want to hear from you. Send it to our Brasstown mailing address or email me at the address in the masthead. See you in two months and good hunting.

**TABLE ONE: ATLANTIC CITY AREA CG ACTIVITY**

Freqs MHz	Use
108.6000	Automatic Terminal Information Service (ATIS)
120.3000	Atlantic City International Tower (paired with 239.0)
121.9000	Atlantic City International Ground Control (paired with 284.6)
122.9500	Unicom
124.6000	Approach/Departure Control (paired with 263.6)
127.8500	Atlantic City International Clearance Delivery (paired with 396.0)
134.2500	Approach/Departure Control (paired with 385.5)
156.6000	VHF marine channel 12 (Nationwide)
156.8000	VHF marine channel 16—Distress, safety and calling (Nationwide)
157.0500	VHF marine channel 21 (Nationwide)
157.1000	VHF marine channel 22 (Nationwide)
157.1500	VHF marine channel 23 (Nationwide)
157.1750	VHF marine channel 83 (Nationwide)
165.2625	Atlantic City Coast Guard Station Law Enforcement (Simplex)
229.3250	Search and Rescue Datum Marker Beacon (Nationwide)
229.3350	Search and Rescue Datum Marker Beacon (Nationwide)
237.9000	Rescue Coordination/Aircraft Homing (Nationwide)
239.0000	Atlantic City International Tower (paired with 120.3)
240.6000	Search and Rescue Datum Marker Beacon (Nationwide)
242.6500	Search and Rescue Datum Marker Beacon (Nationwide)
242.6625	Search and Rescue Datum Marker Beacon (Nationwide)
243.0000	Military UHF Calling/Emergency frequency
263.6000	Approach/Departure Control (paired with 124.6)
275.1000	Search and Rescue Datum Marker Beacon (Nationwide)
282.8000	Search and Rescue Net (Nationwide)
284.6000	Atlantic City International Ground Control (paired with 284.6)
381.7000	Search and Rescue/Law Enforcement Operations (Nationwide)
381.8000	Search and Rescue/Law Enforcement Operations (Nationwide)
383.9000	Search and Rescue/Law Enforcement Operations (Nationwide)
385.5000	Approach/Departure Control (paired with 134.250)
396.0000	Atlantic City International Clearance Delivery (paired with 127.85)

**TABLE TWO: U.S. NAVY INMARSAT CALLSIGNS**

Callsign	Hull Number	Ship Name	Homeport	Callsign	Hull Number	Ship Name	Homeport
Admiral's Elite	FFG-50	USS Taylor	Mayport, FL	Mary Lou	AE-28	USS Santa Barbara	Charleston, SC
Authentic	FFG-45	USS De Wert	Mayport, FL	McIntosh	FFG-59	USS Kauffman	Norfolk, VA
Aviation Specialist	DDG-57	USS Mitscher	Norfolk, VA	Mick	DDG-64	USS Carney	Mayport, FL
Bartman	FFG-56	USS Simpson	Norfolk, VA	Monty's Deal	FFG-32	USS John L. Hall	Pascagoula, MS
Beach	CG-60	USS Normandy	Norfolk, VA	Motorman	AOE-4	USS Detroit	Earle, NJ
Bellafonte	DD-989	USS Deyo	Norfolk, VA	Mountaineer	LHD-3	USS Kearsarge	Norfolk, VA
Big Ben	FFG-42	USS Klakring	Norfolk, VA	Musclemen	LSD-44	USS Gunston Hall	Little Creek, VA
Big Name	DD-981	USS John Hancock	Mayport, FL	Northwest	LSD-41	USS Whidbey Island	Little Creek, VA
Big Sky	TAE-27	USS Butte	No Homeport	Oregon Trail	FFG-11	USS Clark	Norfolk, VA
Big Tree	AOE-3	USS Seattle	Earle, NJ	Passion	MCM-12	USS Ardent	Ingleside, TX
Border Peak	TAE-34	USS Mount Baker	Charleston, SC	Peninsula	CG-71	USS Cape St. George	Norfolk, VA
Briar Patch	FFG-36	USS Underwood	Mayport, FL	Pierside	LCC-20	USS Mount Whitney	Norfolk, VA
Brilliance	CG-56	USS San Jacinto	Norfolk, VA	Pineapple	FFG-39	USS Doyle	Mayport, FL
Bristle	FFG-49	USS Robert G. Bradley	Mayport, FL	Pirates	LSD-46	USS Tortuga	Little Creek, VA
Bull Winkle	DD-980	USS Moosbrugger	Mayport, FL	Plateau	AO-186	USS Platte	Norfolk, VA
Carlos	FFG-52	USS Carr	Norfolk, VA	Polar Bear	AOE-8	USS Arctic	Earle, NJ
Chairman	DD-968	USS Arthur W. Radford	Norfolk, VA	Puzzle	DD-978	USS Stump	Norfolk, VA
Cheers	DD-969	USS Peterson	Norfolk, VA	Quiet Warrior	DD-963	USS Spruance	Mayport, FL
Cherry Tree	CVN-73	USS George Washington	Norfolk, VA	Resort	LHA-4	USS Nassau	Norfolk, VA
Cocktail Onion	DD-987	USS O'Bannon	Mayport, FL	River Siege	CG-69	USS Gettysburg	Mayport, FL
Colorful	CG-66	USS Hue City	Mayport, FL	Rose Festival	LSD-37	USS Portland	Little Creek, VA
Cue Ball	DD-970	USS Caron	Norfolk, VA	Satcom III	LCC-20	USS Mount Whitney Staff	Norfolk, VA
Eagle	AOE-6	USS Supply	Earle, NJ	Seaport	LPD-15	USS Ponce	Norfolk, VA
Ecilpse	CVN-72	USS Abraham Lincoln	Everett, WA	Semaphore	DD-997	USS Hayler	Norfolk, VA
Ecilpse II	CVN-72	USS Abraham Lincoln	Everett, WA	Seminole	CG-58	USS Philippine Sea	Mayport, FL
Ecilpse III	CVN-72	USS Abraham Lincoln	Everett, WA	Serein I	CV-67	USS John F. Kennedy	Mayport, FL
Ecilpse IV	CVN-72	USS Abraham Lincoln	Everett, WA	Serein II	CV-67	USS John F. Kennedy	Mayport, FL
Empire	CG-47	USS Ticonderoga	Pascagoula, MS	Soaring Hero	DDG-61	USS Ramage	Norfolk, VA
Father Navy	DDG-52	USS Barry	Norfolk, VA	Solomon Hero	DDG-55	USS Stout	Norfolk, VA
Fire Storm	LSD-48	USS Ashland	Little Creek, VA	Steel Halo	DDG-58	USS Laboon	Norfolk, VA
Firm Grip	ARS-53	USS Grapple	Little Creek, VA	Stinger	LHD-1	USS Wasp	Norfolk, VA
Five Flags	LSD-38	USS Pensacola	Little Creek, VA	Stinger II	LHD-1	USS Wasp	Norfolk, VA
Four Score	CG-64	USS Gettysburg	Mayport, FL	Strong Man	FFG-31	USS Stark	Mayport, FL
Friar	TAFS-6	USS San Diego	No Homeport	Sunrise	CVN-70	USS Carl Vinson	Bremerton, WA
Frontiersman	FFG-28	USS Boone	Mayport, FL	Sunrise II	CVN-70	USS Carl Vinson	Bremerton, WA
Garden Staff	LPD-14	USS Trenton	Norfolk, VA	Sunrise III	CVN-70	USS Carl Vinson	Bremerton, WA
Governor	DD-979	USS Conolly	Mayport, FL	Super Natant	CVN-71	USS Theodore Roosevelt	Norfolk, VA
Hammering Hank	FFG-55	USS Elrod	Norfolk, VA	Super Natant II	CVN-71	USS Theodore Roosevelt	Norfolk, VA
Handy	MCM-13	USS Dexterous	Ingleside, TX	Swimming Pool	CG-55	USS Leyte Gulf	Norfolk, VA
Hauler	LST-1194	USS La Moure County	Little Creek, VA	Swords Edge	FFG-15	USS Estocin	Norfolk, VA
Hebrew	FFG-58	USS Samuel B. Roberts	Norfolk, VA	Tar Heel	FFG-40	USS Haleyburton	Norfolk, VA
Hinge	CG-51	USS Thomas S. Gates	Pascagoula, MS	Terrier	DDG-995	USS Scott	Mayport, FL
Historian	FFG-13	USS Samuel E. Morison	Mayport, FL	Texan	LPD-4	USS Austin	Norfolk, VA
Hope Foundation	LSD-50	USS Carter Hall	Little Creek, VA	Thicket	DD-988	USS Thorn	Norfolk, VA
Hospital	TAH-20	USS Comfort	No Homeport	Three Rivers	AO-178	USS Monongahela	Norfolk, VA
Intrepid	CG-61	USS Monterey	Norfolk, VA	Timer Stand	FFG-29	USS Stephen W. Groves	Pascagoula, MS
Ireland's Own	FFG-8	USS McInerney	Mayport, FL	Tower	CG-68	USS Anzio	Norfolk, VA
Iron Clad	AO-179	USS Merrimack	Norfolk, VA	Twilight I	CVN-68	USS Nimitz	Norfolk, VA
Iron Grip	ARS-51	USS Grasp	Little Creek, VA	Twilight II	CVN-68	USS Nimitz	Norfolk, VA
Jelly	TAFS-5	USS Concord	No Homeport	Velarium	CG-72	USS Vella Gulf	Norfolk, VA
Joker	DD-982	USS Nicholson	Norfolk, VA	War Hero	DDG-51	USS Arleigh Burke	Norfolk, VA
Keelboat	LPD-13	USS Nashville	Norfolk, VA	Whetstone	DD-977	USS Briscoe	Norfolk, VA
Left	FFG-53	USS Hawes	Norfolk, VA	White Knuckle	CG-48	USS Yorktown	Pascagoula, MS
Leprechaun	AGF-3	USS LaSalle	Gaeta, Italy	White Sand	LHA-2	USS Saipan	Norfolk, VA
Magnolia	LSD-12	USS Shreveport	Norfolk, VA	White Wolf	CVN-69	USS Dwight D. Eisenhower	Norfolk, VA
				Yuletide	FFG-47	USS Nicholas	Norfolk, VA

**Barry Electronics Corp.**  
WORLD WIDE AMATEUR RADIO SINCE 1950  
Your one source for all Radio Equipment!

**OPEN 7 DAYS A WEEK**  
**1-800-990-2929**

**WE FEATURE ALL MAJOR BRANDS OF  
SHORTWAVE RECEIVERS AND SCANNERS AT THE BEST PRICES**

**YAESU • ICOM • KENWOOD • DRAKE • SANGEAN • JRC  
BEARCAT • RELM  
MOTOROLA RADIOS**

**"Hand Held"  
Satellite Telephones  
for Worldwide Calls**

540 BROADWAY, NY, NY 10012  
**For Orders Call 1-800-990-2929**  
PHONE 212-925-7000  
FAX 212-925-7001  
e-mail: barry\_electronics@compuserve.com

**New Trunk  
Tracker Scanners**

Note to U.S. consumers only: It is unlawful to import, manufacture, or market cellular-capable or cellular-restorable scanners into the U.S.

**Export  
all over the world!**

**boger electronics**  
The European most competent  
monitoring specialist *Testus!*

Scanners, Modifications and more ...  
Visit our WebSite at  
**http://www.boger.de**  
*Let's make winners*

Grundesch 15, D-88326 Aulendorf, Germany  
phone: (+49) 7525/451 fax: (+49) 7525/2382  
e-mail: bogerfunk@t-online.de

## Coming to Terms with Radar - 2

**W**elcome aboard, everyone! In this issue, we present part 2 of our look at air traffic control (ATC) radar, and continue our lengthy listing of airline call signs.

Unlike the Air Route Surveillance Radar (ARSR) mentioned last month, **Airport Surveillance Radar (ASR)** is designed to provide short-range (50 mile) coverage in the general vicinity of an airport, and it enables the expeditious handling of terminal area traffic by showing precise aircraft locations on a radarscope.

Most medium-to-large radar facilities at U.S. airports utilize some form of automated radar terminal system (ARTS). This is the generic term for the functional capability afforded by several automated systems. Each differs in functional purpose and equipment. ARTS, plus a suffix Roman numeral, denotes a specific system; a following letter indicates a major modification to that particular system.

In general, an ARTS display shows the terminal controller an aircraft's identification,

flight plan data, and other flight-associated information in conjunction with his other radar presentation. Normal radar co-exists with the alpha-numeric display. In addition to enhancing visualization of the air traffic situation, ARTS facilitates the transfer and coordination of flight information. Each ARTS level has the ability to communicate with other ARTS types, as well as with air traffic control centers (ARTCCs). The systems in ascending order of sophistication are ARTS II, ARTS IIA and E, ARTS III, and ARTS IIIA and E.

**Air Route Surveillance Radar (ARSR)** generically refers to ARTCC radar used primarily to detect and display an aircraft's position while en route between terminal areas. In some instances, ARSR may enable an ARTCC to provide terminal radar services similar to those provided by a radar approach control.

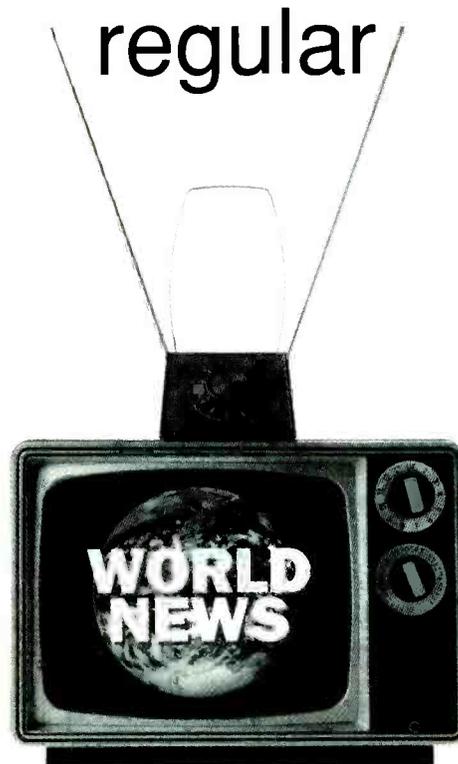
Enroute radar coverage can extend up to 400 miles; however, 200 miles is the normal working range in an ARTCC.

National Airspace System Stage A com-

prises the enroute air traffic control system's radar, computers and computer programs, controller plan view displays (PVDs/Radar-scopes), input/output devices, and the related communications equipment which are integrated to form the heart of the automated Instrument Flight Rules (IFR) air traffic control system. This equipment performs flight data processing (FDP) and Radar Data Processing (RDP). It interfaces with automated terminal systems and is used in the control of enroute aircraft.

Both airport surveillance radar and air route surveillance radar use radar data processed (digitized) displays at least 75% of the time—referred to as being in the narrowband mode. During the remaining time, the backup (broadband) system is put into use, so that the main systems can undergo preventive maintenance. Each radar system has several backups.

All ARTCC radars in the conterminous United States and most airport surveillance radars have the ability to interrogate Mode C



(see last month) and display altitude information to the controller from appropriately equipped aircraft. However, there are a small number of airport surveillance radars that are still two dimensional (range and azimuth only); consequently, altitude information must be obtained from the pilot.

At some locations within the ATC enroute environment, secondary radar only (no primary radar) gap filler radar systems are used to give lower altitude radar coverage between two larger radar systems, each of which provides both primary and secondary radar coverage. In the geographical areas serviced by secondary radar only, aircraft *without* transponders *cannot* be provided with radar service. Additionally, transponder-equipped aircraft cannot be provided with radar advisories concerning primary targets and weather.

There is one more type of radar that we will briefly examine: **Precision Approach Radar (PAR)**. In the United States, it is mostly utilized by the military, although there is some civilian usage.

Radar equipment in some ATC facilities operated by the Federal Aviation Administration (FAA) and/or the military services at joint-use civil/military locations and separate military installations are used to detect and display azimuth, elevation, and range of aircraft on the final approach course to a runway. This equip-

ment may be used to monitor certain non-radar approaches, but it is primarily used to conduct a precision instrument approach. In this case the controller issues guidance instructions to the pilot based on the aircraft's position in relation to the final approach course (azimuth), the glidepath (elevation), and the distance (range) from the touchdown point on the runway as displayed on the radarscope.

Each PAR scope is divided into two parts: the upper half presents altitude and distance information, and the lower half presents azimuth and distance. Range is limited to 10 miles, azimuth to 20 degrees, and elevation to 7 degrees. Consequently, only the final approach area is covered.

We've really come a long way from the days when all radarscopes were mounted horizontally and little plastic markers called "shrimp boats" (representing flights worked in a particular sector) were pushed around on the scope to help controllers identify an aircraft's position. Unfortunately, when these shrimp boats were in use, all it took was one explosive sneeze from a controller to wipe away a whole sector's portion of the sky!

#### ■ More Airline Callsigns

ODYSSEY - Odyssey international  
OLYMPIC - Olympic Airways S.A.  
OSCAR NOVEMBER - Air Nauru

PARAGUYA - Lineas Aereas Paraguayas  
PARCEL EXPRESS - Apex Air Cargo  
PERU - Aeronaves Del Peru S. A.  
PHILIPPINE - Philippine Air Lines, Inc.  
POLISH AIR FORCE 1 - Presidential Flight  
PROMPTAIR - Air Cargo Carriers, Inc.  
QANTAS - QANTAS Airways Limited  
RAINBIRD - Island Air Express  
RED CROSS - International Red Cross  
REEVE - Reeve Aleutian Airways, Inc.  
REGAL - Crownair  
RELIANT - Reliant Airlines, Inc.  
RICHAIR - Rich International Airways, Inc.  
ROMEO NOVEMBER - Royal Air Inter  
ROYAL JET 8200 - King's Flight VIP Aircraft (Jordan)  
ROYAL NEPAL - Royal Nepal Airlines Corp.  
RYAN AIR - Ryan Air Services, Inc.  
SABENA - Sabena World Airlines  
SAUDIA - Saudia Arabian Airlines  
SAUDIA GREEN FLIGHT - VIP Government Flight  
SCANDINAVIAN (SAS) - Scandinavian Airlines System  
SEYCHELLES - Air Seychelles  
SFACT - (France) Director of Civil Aviation  
SHADOW - Air Exel Belgique  
SHAMROCK - Aer Lingus - Teoranta  
SHARJAH - Sharjah Ruler's Flight  
SHEPHERD 1 - Papal Flight  
SIERRA HOTEL - Honduras Air Service  
SIERRA UNIFORM - Aeroflot  
SINBAD - Arab Air Cargo  
SINGA - Republic of Singapore Air Force  
SISAL - Seychelles International Safari Air, Ltd.  
SKYWALKER - General Aerospace, Inc.  
SPAR - U.S. Air Force VIP aircraft training flight  
SPECIAL - Metropolitan Police Air Support Unit (UK)  
SPEEDBIRD - British Airways  
SPRINGBOK - South African Airways  
STAR CHECK - U.S. Check Airlines  
SUDANAIR - Sudan Airways

# EXTRA STRENGTH

SONY

Listen to late-breaking world events at their source. Tune in to major sporting events, and cheer on your favorite team. Brush up on your French. . . or your Arabic. . . or your Chinese. Sony **World Band Receiver™** Radios bring the world in loud and clear—wherever you are—with the latest in receiver technology. Whether you're a novice or a radio buff, there's a Sony World Band Receiver Radio with user-friendly features designed for you. MSRP\* from \$59.95 to \$649.95.

Sony World Band Receiver Radios. Hear the world.

To locate a dealer near you, call 800-342-5721.

[www.sony.com](http://www.sony.com)



\* Actual dealer prices may vary.

© 1998 Sony Electronics Inc. Reproduction in whole or in part without written permission is prohibited. All rights reserved. Sony and World Band Receiver are trademarks of Sony.

## Beverage questions

**M**onte Carroll wrote by email with a few comments and questions about the "Cool Beverage" I described in the January issue of *MT*. "Mine is about 400 feet long and 8 feet high. Wire is individual 22 gauge telephone wire I pulled out and separated. It starts at the shack's second story window, runs out about 200 feet to a volleyball pole, then to a home-made mast another 200 feet further. The ground rod with 470 ohm resistor is next to a creek on the edge of the property. It works quite well, aimed almost northwest like yours."

"What is the purpose of the coax lead-in? I have the wire coming in directly to the radio and it seems to work alright. Admittedly, I suspect the coax would probably shield it from the RF of the computer here?"

Yes, that's the main reason for the coax; to shield against spurious signals. In Monte's case, the near end of the antenna comes directly into the radio room, so there isn't as much spurious pickup as there might be. But I would still recommend using coax for the last 30-50 feet unless you live in an unusually quiet house.

"For grounding on this end, would connecting it to the screw on the AC outlet work as well as an actual ground rod?"

Probably not. I will admit I haven't tried it — even if I had, the results in my house could be very different from those in Monte's, or yours. The center screw in an AC outlet *should* be connected through a ground wire to a ground conductor in your fusebox, and then from there to a ground rod. But, I have seen outlets where it isn't connected at all! Even if it is wired properly, the wire takes the "long way around" to get to ground. A wire going to a ground rod by the shortest route possible is still a better idea. Some hams even lay down ground "radials" (wires laid on, or even buried in the ground).

Monte has used the Beverage with a Radio Shack DX-394 and a GE Superadio. He just wraps the insulated wire around the whip antenna of the DX-394, or connects it directly to the terminal of the Superadio. The "balun" is probably not necessary with these sets, but you're likely to need it with a low-impedance receiver like a ham rig.

The "homemade mast" is an 8-10 foot

section of the smallest aluminum conduit available at Home Depot. Monte's mast is transportable — he stuck the conduit in a 5-gallon restaurant pickle bucket lined with vegetable oil, then filled the bucket with concrete. After allowing about 36 hours for the concrete to dry, he removed the bucket (lining it with oil made it easier to get it off) and had a transportable mast. Standoff insulators for the old "twin-lead" TV antenna cable were used to hold the wire at the top of the pole.

### Bits and Pieces from Canada

- In March, I reported the filing of applications for digital audio broadcasting (DAB) stations in Toronto. Now, digital radio is coming to another of Canada's largest cities. In early August, applications were filed for digital stations in Montreal. The Canadian Broadcasting Corporation's (CBC) four stations will share a transmitter on 1458.048 MHz, while private stations, CKGM-990, CKAC-730, CHOM-97.7, and CITE-107.3 will share one on 1452.816 MHz. Both transmitters will operate at 11.724 kW of power.
- Unfortunately for the DXer interested in listening to Canadian radio, CBC's AM stations in Montreal will probably be off the air by the time you read this. CBL-740 Toronto will probably be off soon, too, if it isn't already. Larry Van Horn reports no signals from this normally dominant station.

FMDXers should note that the CBC seems to have swapped the frequencies of their Montreal French-language FM stations. The "AM network" station that used to occupy 690 kHz will take over the existing transmitter used by the classical-music service on 100.7 MHz. The classical music will appear on the new transmitter on 95.1 MHz. The call letters CBFX-FM have been assigned to the 100.7 MHz transmitter, with the old calls CBF-FM moving to 95.1. A similar swap appears to have happened between the two French stations in Quebec City on 95.3 and 106.3.

By the way, don't expect 690, 740, or 940 kHz to stay silent for long. Applications have already been received for both Montreal stations, and the CBC has placed ads offering to lease the 740 transmitter. There are rumors

that the French-language station in Toronto on 860 may also be moving to FM (90.3); Canadians have told me the French-language classical music station currently using this FM frequency showed literally *zero* listeners in the ratings.

One might expect a "domino effect" here. Existing AM stations with lower-power facilities are expected to receive these channels; for example, CFRB-1010 is considered one of the strongest candidates for 740. If CFRB leaves 1010, expect another Toronto-area AM station to bid for the 1010 spot. Three or four AM frequencies *will* go silent in the Toronto and Montreal areas, but they probably won't be the big clear channels.

Returning to the States... Another expanded-band station has appeared. KBGG-1700 replaces KKSO-1390 Des Moines, Iowa; 1390 is now silent. KBGG carries programming from the Business News Network. Martin Gallas near Springfield, Illinois, and Pat Griffith in suburban Denver have both reported this station (as have a number of National Radio Club members — and yours truly).

I know other readers have been experimenting with Beverage antennas — have you had success with yours? Write me at Box 98, Brasstown NC 28902-0098, or by email at w9wi@bellsouth.net.

### CANADIAN TARGETS

These Canadian stations should have the strongest signals in the Chicago area, and should be good targets in the rest of the Midwest. Stations marked with an asterisk (\*) are moving to FM; you may hear something else from that city on their frequency!

Frequency:	Call sign:	City:
540	CBK (CBC Radio 1)	Regina, Saskatchewan
690*	CBF (Radio Canada)	Montreal, Quebec
740*	CBL (CBC Radio 1)	Toronto, Ontario
800	CKLW	Windsor, Ontario
860*	CJBC (Radio Canada)	Toronto, Ontario
900	CHML	Hamilton, Ontario
940*	CBM (CBC Radio 1)	Montreal, Quebec
990	CBW (CBC Radio 1)	Winnipeg, Manitoba
1010	CFRB	Toronto, Ontario
1050	CHUM	Toronto, Ontario
1550	CBE (CBC Radio 1)	Windsor, Ontario
1580*	CBJ (Radio Canada)	Chicoutimi, Quebec

## WBCQ: Pirate Station Goes Legit

**V**eteran pirate radio legend Allan H. Weiner has commenced broadcasting from **WBCQ**, a new licensed USA shortwave station. Using the formerly traditional pirate frequency of 7415 kHz, the station has been widely heard with its new 50 kW transmitter. This station is an outlet for the formerly pirate **Radio Free New York**, but other paid programming rounds out the schedule.

Testing started on August 20, with regular programming since September. WBCQ's slogan, "The Planet," is evident in its QSL card. Reports with return postage are being verified via 97 High Street, Kennebunk, Maine 04043.

### ■ FM Pirate Busts

The FCC continued its policy of active FM micropirate station busts late in the summer. Several Florida pirates and four Cleveland micropirates were shut down, but many dozens of stations remain active across the country. This crackdown has not been evident on the shortwave pirate bands, where activity remains at a brisk level. Meanwhile, dozens of new right wing Orthodox pirates remain active in Israel, despite a Supreme Court ruling that they should be licensed or closed.

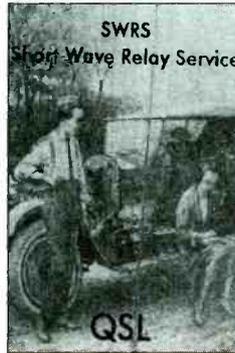
### ■ Europirate Season

With winter propagation returning, it's time to target Europirate transmitters that can be heard in North America. European DXperts Ranier Brandt and Stefan Prinz note that 3900-3950, 6210-6290, and 11470 kHz have recently been the most active frequency ranges in use. SRS Report Service at <http://www.lls.se/~jal/news.html> is a good web site for recent logging updates. For those with an interest in clandestine radio stations, *Clandestine Radio Intel* at <http://www.qsl.net/yb0rmil/clang.html> remains a tremendous resource.

### ■ Shortwave Pirate Activity

Pirates heard by our readers last month all used frequencies within 500 kHz of 6955 kHz, typically from two hours before sunset to at least 0500 UTC. Morning and afternoon broadcasts increase on the weekends. Programming formats and contact maildrops (when known) are listed here.

**Betty Boop Radio**- Old 1940's Betty Boop and Popeye music is an unusual format. (Providence)



Try 11470 near sunset for Euros like SWRS

**Blind Faith Radio**- A new one, with a rock oldies format. (Stoneham)

**Diana Is Dead Radio**- Taste is not a strong point on this Princess Diana memorial station. (none, verifies bulletin logs)

**He Man Radio**- He Man's parody of the battle of the sexes is a favorite of many. (Blue Ridge Summit)

**Jerry Rigged Radio**- Like most pirates, rock music is their staple. (Providence)

**KCFL**- Pat Griffith heard this 1970's WCFL-Chicago memorial station on 1630 kHz. (none)

**Lounge Lizard Radio**- No other shortwave station programs cocktail lounge vocal music. (Providence)

**Mystery Radio**- A distinctive instrumental music style continues here. (Stoneham)

**Radio Amazonia**- This Europirate rocker has regular North American relays. (Wuppertal)

**Radio Azteca**- Bram Stoker's long-running DX parody station is always hilarious. (Belfast)

**Radio Caliente**- Normally a South American music station, they now have a North American relay. (Merlin)

**Radio Eclipse**- A "Don't Worry, Be Happy" interval signal leads to rock and comedy from Steve Mann. (Providence)

**Radio Freedom**- Their powerful signal during tests promised Labor Day shows, but holiday activity was sparse. (Unknown)

**Radio Garbanzo**- Fearless Fred's original gut-splitting humor is highly entertaining. (Belfast)

**Radio Inca**- This new parody shows promise, with South American and Central American music. (Providence)

**Radio Metallica**- Dr. Tornado's 10 kW powerhouse frequently comments on President Clinton's sexual behavior. (Blue Ridge Summit)

**Radio Nonsense**- Joe Mama's rock is spiced with comedy sketches. (Belfast)

**Radio Tornado Worldwide**- This parody station plays actual voice clips from Radio Metallica. (none)

**Radio Xanax**- Science fiction drama and related music come from this unusual one. (Stoneham)

**RFM**- H. V. Short's veteran rock and comedy sketch station is active again. (Belfast)

**SWRS**- Their 11470 kHz signal is the best heard Europirate in North America. (Wuppertal)

**Tangerine Radio**- Raunchy Rick's anarchist station, originally from the 1980's, is making a comeback. (Belfast)

**Voice of Laryngitis**- Veteran 1980's pirates Genghis and Stanley Huxley (with Arty the barking seal) are back with new comedy! (Belfast)

**Voice of the Pig's Ear**- An active new one with rock and "radical" right wing advocacy. (none)

**Voice of the Raving Lunatic**- With only one show so far, we await further developments. (none, but verifies bulletin logs)

**Voice of the Rock**- They use a low power "Grenade" transmitter from an island off Boston. (Providence)

**WARR**- Captain Nobear's shows are similar to the WEED format. (none active)

**WBIG**- Big Mike specializes in hard rock tunes. (Belfast)

**WEED**- Johnny Smoke's marijuana advocacy is always a slick production. (Huntsville)

**WHYP**- A memorial to local upstate New York broadcaster James Brownyard. (e-mail via [whyp1530@yahoo.com](mailto:whyp1530@yahoo.com))

**WLIS**- Jack Boggan's interval signals regularly appear in the pirate band. (Blue Ridge Summit)

**WMFO**- This one promotes the QSL process in a profane way. (Providence)

**WRYT**- Rock and easy listening music plus TV theme songs are heard here. (Belfast)

**WSRR**- Dr. Love normally broadcasts a soul music playlist. (Belfast)

**WUNH**- Rockabilly and Do-Wop oldies have been recently featured. (Providence)

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign addresses. Send your letters to PO Box 1, Belfast, NY 14711, PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 146, Stoneham, MA 02180; PO Box 11522, Huntsville, AL 35814; PO Box 293, Merlin, Ontario N0P 1W0; and PO Box 220342, Wuppertal, Germany.

### ■ Thanks!

Your input is always welcome via PO Box 98, Brasstown, NC 28902, or via the e-mail address atop the column. We appreciate material sent in this month from: John T. Arthur, Belfast, NY; Shawn Axelrod, Winnipeg, Manitoba; Ranier Brandt, Hofer, Germany; Ross Comeau, Andover, MA; Joe Filipkowski, Providence, RI; Harold Frodge, Midland, MI; Paul Griffin, San Francisco, CA; Pat Griffith, Federal Heights, CO; Rich and Talea Jurrens, Katy, TX; Kevin Klein, WI; Michael Lehane, Lakeland, FL; Zacharias Liangas, Italy; Chris Lobdell, Stoneham, MA; Greg Majewski, Oakdale, CT; Dave Maxwell, Toronto, Ontario; Bill McClintock, Minneapolis, MN; Gary Neal, Sugar Land, TX; Pat Nobel, Toledo, OH; Dick Pearce, Brattleboro, VT; Stefan Prinz, Ytterby, Sweden; Al Quaglieri, Albany, NY; Jesse Rose, Hampton, VA; Randy Ruger, West Hollywood, CA; Martin Schoech, Merseburg, Germany; Ed Schwartz, Chicago, IL; Dick Seggelin, Whitman, MA; H. V. Short, MA; Lee Silvi, Mentor, OH; DJ Stevie, Basel, Switzerland; Allen H. Weiner, Kennebunk, ME; Jeff White, Miami, FL; Niel Wolfvick, Toronto, Ontario; and David Zantow, Janesville, WI.

### Tips from Our Readers

This month we'll share an assortment of tips and reader loggings, many of which weren't included recent columns because of space limitations. In the process, you'll hopefully be inspired to tune into the low bands during this season of rapidly improving conditions. November, in fact, often marks the beginning of the year's best DX reception.

Speaking of DX, this a good time to review the basics for hearing **European low frequency (LF) broadcasters** in North America. The first rule for success is to have a path of darkness between you and the transmitting station. This means tuning from dusk until about 1 a.m.

If you live near the East Coast, you have the best chance at hearing these stations, but they have also been copied from listeners much farther inland. Even if a station is not strong enough to hear clearly, you may be able to detect its presence by turning on your receiver's single sideband/beat frequency oscillator (SSB/BFO) switch, and listening for the telltale whistle of its carrier.

An excellent tip for DXing these stations was given by Paul Ormandy of the New Zealand Radio DX League via the Internet. He suggests programming the standard longwave (LW) broadcast frequencies into your receiver's memory channels to simplify tuning. With this method you can do a complete check of the band in a very short time. The standard frequency assignments are: 153, 162, 164, 171, 177, 180, 183, 189, 198, 207, 216, 225, 227, 234, 243, 252, 261 and 270 kHz. Keep an ear on 252 kHz for one of the more colorful stations on the band — Atlantic 252 of Ireland.

**Litz Wire** - Seasoned LF experimenters know the magic of Litz wire. This multi-conductor wire, composed of separately insulated strands, allows you to build coils of superior Q and efficiency. We mentioned Litz wire briefly during the Lowfer transmitter series (June 98 through August 98 MT),



but I also mentioned that locating this wire could be a real challenge.

We now have at least one supplier to announce. New England Electric Wire Corporation, located in Lisbon, New Hampshire, offers several types of Litz wire and offers a fine color catalog describing their wares. Especially interesting is a write-up describing how Litz wire gets its name and how it works to maximize efficiency in inductors. An in-depth technical brochure is also included that lists the physical parameters of Litz wire and shows the recommended frequency range for all types. To get a copy of the catalog, call the factory at (603) 838-6625 or e-mail them at [sales@neewc.com](mailto:sales@neewc.com).

Litz wire is a natural choice for **LF loading coils**. Above is a high Q coil built by Bill Bowers (OK) for use on the license-free Lowfer band (160-190 kHz). The coil form is made from the base of an old sprayer bottle measuring about 19 inches in diameter.

BSI
323

BEACON

This will verify your

Date: December 29, 1997

Freq: 323 KHZ

Time: 0456 UTC

Elevation: 60 Feet / 26 ASL

Power: 200 watts

Location: 32.22 N 64.39 W

Antenna Type: T 300 FT LONG

ST David's Island

+ FSK 100 BAND DIFFERENTIAL KHZ  
CONVERT SIGNAL FOR GPS  
RECEPTION OF OUR BEACON.

THE MANAGER GES  
BERMUDA AIRPORT

Date: MAR 5TH 1998

Remarks: USED ONLY FOR BERMUDA MARINE PURPOSES BY RCC BERMUDA

Allen Renner (PA) logged BSD (323 kHz) using a Realistic DX-440 and a Homespun Loop. Nice catch!

We have numerous **loggings** this month from two long time *MT* contributors-Dick Pearce (VT) and Allen Renner (PA). Several of the beacons listed are outside the U.S. and Canada, and would make excellent DXing targets as the cooler weather sets in. Let me know what you're hearing! Send your favorite loggings (and photocopies of QSLs) to: Below 500 kHz, P.O. Box 98 Brasstown, NC 28902. Be sure to take some time out from monitoring to enjoy the Thanksgiving season with family and friends.

#### SELECTED BEACON LOGGINGS

Freq.	ID	Location	By
216	CLB	Carolina Beach, NC	(D.P.-VT)
224	MO	Moosonee, ONT	(D.P.-VT)
224	VWD	West Dover, VT	(A.R.-PA)
230	QB	Ste. Foy, QUE	(D.P.-VT)
232	GP	Gaspe, QUE	(D.P.-VT)
238	MMK	Meriden, CT	(D.P.-VT)
250	YTJ	Terrace Bay, ONT	(D.P.-VT)
251	MVM	Machias, ME	(D.P.-VT)
257	TBY	Waterbury, CT	(D.P.-VT)
258	ZSJ	Sandy Lake, ONT	(D.P.-VT)
254	5B	Summerside, PEI	(D.P.-VT)
260	YAT	Attawapiskat, ONT	(A.R.-PA)
266	YZX	Greenwood, NS	(D.P.-VT)
268	VKN	Mt. Mansfield, VT	(D.P.-VT)
300	BHN	Barahona, DOM	(A.R.-PA)
323	BSD	St. David's Head, BER	(A.R.-PA)
330	BH	Bar Harbor, ME	(A.R.-PA)
338	MRK	Rayville, LA	(A.R.-PA)
353	JUK	McKinnon, GA	(D.P.-VT)
353	HOT	Higuerote, VEN	(D.P.-VT)
353	HOT	Higuerote, VEN	(A.R.-PA)
353	LI	Little Rock, AR	(A.R.-PA)
354	SP	St. Pierre Island, SP	(D.P.-VT)
360	KIN	Kingston, JAM	(A.R.-PA)
362	LYL	Lima, OH	(D.P.-VT)
365	CZM	Cozumel, MEX	(A.R.-PA)
369	ZDX	St. Johns, ANT	(D.P.-VT)
369	ZDX	St. Johns, ANT	(A.R.-PA)
374	SA	Sable Island, NS	(D.P.-VT)
379	BRA	Broad River, NC	(D.P.-VT)
380	UCY	Cayojabo, CUBA	(A.R.-PA)
382	BT	Unidentified	(D.P.-VT)
388	RNW	Washington, NC	(D.P.-VT)
391	DDP	San Juan, PR	(D.P.-VT)
392	VEP	Vero Beach, FL	(A.R.-PA)
401	YPO	Peawanuck, ONT	(A.R.-PA)
402	SJE	San Jose del Guaviare, COL	(A.R.-PA)
404	Y	North Bay, ONT	(D.P.-VT)
404	IUB	Baltimore, MD	(D.P.-VT)
412	CTZ	Clinton, NC	(D.P.-VT)
415	ASJ	Ahoskie, NC	(D.P.-VT)
415	HJM	Bonham, TX	(A.R.-PA)
417	HHG	Huntington, IN	(D.P.-VT)
423	CKP	Cherokee, Iowa	(A.R.-PA)
426	FTP	Fort Payne, AL	(D.P.-VT)
428	COG	Orange City, VA	(D.P.-VT)
450	PPA	Puerto Plata, DOM	(D.P.-VT)
450	PPA	Puerto Plata, DOM	(A.R.-PA)
515	RRQ	Rock Rapids, IA	(A.R.-PA)
530	F9	Chatham, NB	(A.R.-PA)

just released

Guide To

# SURVIVAL COMMUNICATIONS

## HOW TO BUILD AND POWER YOUR SYSTEM

**Guide to Emergency Survival Communications** is the first complete, up-to-date book dealing with the most important area of preparedness — SURVIVAL COMMUNICATIONS. The ability to receive accurate and timely information in time of crisis can be lifesaving!

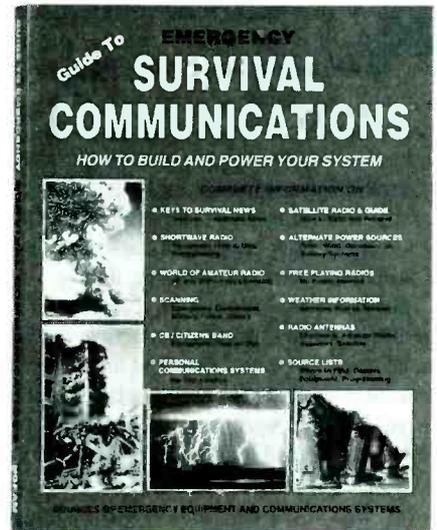
This new and informative book covers in depth the many types of communications systems that are available to anyone in time of need, detailing where these can be found—on shortwave, amateur radio, citizens band, federal services, weather services, overseas news services, plus many more important sources of vital information and programming.

"Survival Communications" shows you where to find the necessary equipment, how to choose the

proper equipment, and build your communications system. It also outlines ways to keep in touch with your friends using simple radio equipment without having to take a radio license test of any kind.

"Survival Communications" helps you build and setup your systems using emergency power sources, many types of inexpensive solar power systems, small generator systems, and back-up emergency battery systems that work when the power grid goes down. Many other unusual alternate power sources are thoroughly covered.

"Survival Communications" also covers building and using inexpensive satellite radio systems that can be powered by alternate power sources, solar, wind, generator, or battery systems.



**YOU ARE NOT PREPARED IF YOU DO NOT HAVE THE NECESSARY COMMUNICATIONS IN TIME OF NEED!**

### ★ ★ PARTIAL CONTENTS of "SURVIVAL COMMUNICATIONS"® ★ ★

#### CHAPTER ONE

The Need for Survival Communications  
Accurate Information Vital in Situations of Urgency

#### CHAPTER TWO

Traditional Sources of News and Information  
Rediscovering AM (Standard Broadcast) Radio  
Alternate News Sources  
Alternative Talk Shows

#### CHAPTER THREE

The International Shortwave Broadcast Bands  
The Marine Bands and The Aircraft Bands  
The Amateur Radio Bands  
How Shortwave Signals "Skip" Worldwide  
Shortwave Receivers  
Antennas for Shortwave Reception  
Power Sources for Shortwave Receivers

#### CHAPTER FOUR

The HF World of Amateur Radio  
The VHF/UHF World of Amateur Radio  
Equipment for Listening on the Amateur Radio Bands  
Becoming a Licensed Amateur Radio Operator  
Amateur Radio Antennas

#### CHAPTER FIVE

Scanning and Scanners  
Finding the Action  
How to Select Scanning Gear

Power Sources and Scanners  
External Antennas for Scanners  
ARRL Studies New Eavesdropping Bill

#### CHAPTER SIX

Citizens Band Radio  
Notes and Tips on Using CB  
Tuning in CB on Shortwave Receivers  
CB Antennas  
Power Sources for CB Gear

#### CHAPTER SEVEN

Personal Communications Systems  
Handheld Business Band FM Transceivers  
Marine Band FM Talkies  
GMRS and FRS Units  
Field Phones

#### CHAPTER EIGHT

GPS Receivers: Personal Pathfinders  
How GPS Works  
GPS Maps and Mapping  
Previewing GPS Receivers

#### CHAPTER NINE

Free-Playing Radios  
Shortwave Reception with a Crystal Set  
Aircraft Band Reception  
Field-Assembled Crystal Sets  
Wind-Up Radio

#### CHAPTER TEN

Weather Information Sources and Resources  
The NOAA Weather Radio System  
Aircraft and Marine Weather Stations  
Weather Fax: Weather Pictures and Maps  
Antennas for NOAA Weather Radio Receivers

#### CHAPTER ELEVEN

Emergency and Alternate Power Sources  
Rechargeable Cells and Batteries  
Heavy Duty Batteries  
Portable Energy Items  
Converters and Inverters  
Motor Driven Generators  
Fuel for Alternate Power Sources  
Gasoline vs. Diesel Fuel  
Wind and Water Powered Generators  
Solar Energy Panels

#### CHAPTER TWELVE

Satellite: Your Link to Alternative TV and Audio News and Programming  
How to Set up an Inexpensive Satellite System to Receive Alternative Programming  
Run Your Own Radio Station  
Fully Utilizing Your Satellite System for More Alternative News and Programming  
The Basic Satellite Formats  
"Satellite Radio Guide"™ Lists All Satellite Radio Channels  
Tune to Satellite Radio on Your Satellite System

UNIVERSAL ELECTRONICS, INC. NEW JUST PUBLISHED \$ **20**<sup>00</sup> plus \$4.00 Shipping and Handling By Priority Mail  
4555 Groves Road, Suite 12  
Columbus, OH 43232 Dealer Inquiries Invited

Please send \_\_\_\_\_ copies of the New "Survival Communications Book"

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

MasterCard  Visa  Discover Number \_\_\_\_\_ Exp. Date \_\_\_\_\_

Enclosed is \$20.00 plus \$4.00 Shipping and Handling, \$24.00 TOTAL \_\_\_\_\_

UNIVERSAL ELECTRONICS, INC. 4555 GROVES ROAD, SUITE 12 COLUMBUS, OH 43232 (614) 866-4605 FAX (614) 866-1201

## An affordable restoration: Heathkit's GR-64

**A**fter several years of restoring older, tube-type radio gear, called Boatanchors or "BAs" by those in the craft, one thing has become obvious: prices on tube gear have risen to astronomical heights. Collins, Drake and select Hallicrafters sets now bring top dollar, with prices occasionally becoming so outrageous that many of us wonder how anyone can afford to participate in this facet of the radio hobby.

Take heart! All is not lost. Every hamfest will turn up a few entry level shortwave (SW) sets of the '50s and '60s that make great restoration projects for the neophyte. About two years ago, I was prowling a flea market and found a Heathkit GR-64 SW receiver for \$20. Shades of the past! I built a GR-64 in my college days and used it in my dorm room for several years. I decided that this receiver would make a great restoration project.

The GR-64 is Heathkit's low-end entry into the general coverage SW field from the mid-'60s. The four tube design, featuring a 12BE6 mixer/local oscillator (LO), 12BA6 intermediate frequency (IF) amplifier/beat frequency oscillator (BFO), 12AV6 detector/audio amp, and a 12AQ5 audio output, is straightforward and is easy to troubleshoot.

A thorough visual inspection of the receiver, concentrating on burned, charred, or missing components, modifications, blown fuses or obvious signs of tampering is a must. Don't let your desire to apply power overshadow a good technical approach to making sure your receiver is free from obvious problems. Be very observant and look for "mods," extra switches, parts and wiring, as these sets were excellent candidates for experimentation by those of questionable electronics background.

### ■ Go by the book

A manual is a necessity at this point. Heathkit has recently started furnishing photocopies of their manuals for a nominal cost. Other sources of manuals are hamfest flea markets, Heath collectors on the Heathkit reflector ([heathkit@qth.net](mailto:heathkit@qth.net)) on the internet, A.G. Tannenbaum's in Ambler, Pennsylvania, or W7FG Manuals<sup>1,2</sup>.

My unit played from the start but the AC hum from a bad filter cap all but masked the receiver audio. A quick trip to the junk box yielded a replacement and the hum disap-



*My \$20 flea market find turned out very nice after a lot of electronic and cosmetic clean up. This mid-60s entry level SW receiver is a very good first project for those inexperienced in radio restoration. It looks good and plays well, too.*

peared.

Although my GR-64 worked, it did not work well. The receiver tended to squeal when tuned to a strong signal and the BFO was nonfunctional. First order of trouble shooting: take a close look at the circuit board and switch wiring and compare it to the pictorial diagrams and schematic in the GR-64 manual. *Boy*, did I find some differences!

R-5, the 12k ohm screen resistor for V1, the 12BE6 oscillator/mixer, had burned open. A previous owner of the radio did not bother to find out the proper value of R-5 and slapped a 1k ohm resistor from the screen of V1 to B+ line, placing almost 220 Vdc on the screen of V1 which was only supposed to have 90 Vdc! Not only did the poor receiver oscillate intermittently, the audio sounded horrible.

R-5 was replaced with a 12k ohm, 1/2 watt resistor and the oscillation problem disappeared. Voltage measurements on each tube socket were completed and compared to the schematic. If the proper voltages (+/- 10%) are not present on the various tube pins, then the set will not work properly.

In my instance, R-21, a 3.3 Meg resistor in the automatic gain control (AGC) line, was found to be grossly out of tolerance and was replaced. (Note: it is *not at all* uncommon to find carbon resistors in older sets as much as 300% out of tolerance! If your voltage measurements are off, start checking the carbon resistors.)

After replacing several caps and resistors, it was on to cleaning up the messy solder connections on the printed circuit (PC) board. This requires a lot of patience and solder wick.

The object is to remove excess solder from the PC board which will eliminate any cold solder joints caused by poor soldering technique: the leading problem with Heathkit and Knightkit radios.

### ■ Alignment techniques

Once the board is cleaned up and the set is checked for proper operation, you will need to align the radio frequency (RF), IF and LO stages to get the receiver up to speed. An IF alignment is simple; not so for the RF and LO sections of the receiver.

It is possible to do an IF alignment without a signal generator. This procedure involves tuning the set to a weak signal and then peaking the IF cans (normally these cans have a top and bottom slug adjustment) for peak AC voltmeter indication. (The AC voltmeter is connected across the speaker output.) This is not the best method, but it will suffice in a pinch. Once the IF is peaked, it is on to the RF and LO alignment.

A word of caution. If you do not have the necessary equipment or experience to properly align a shortwave receiver (good quality RF generator, frequency counter, AC voltmeter or oscilloscope), then please do not try. Find some ham radio operator or adroit SW listener in your area to help you with the alignment. You can really do more harm than good at this point, if you do not have the necessary experience and tools to do the job correctly.

If you are still game, then let's continue with the rest of the receiver alignment. Hook the RF generator to the antenna input on the

*This shiny interior looks very clean, but it sure didn't start out that way! Lots of elbow grease and liquid brass polish cleaned up the PC board better than new!*



receiver (or follow whatever hookup procedure your manual calls for). Use the frequency counter to accurately set the RF generator's frequency as called for in the alignment instructions.

In order to get the stations to appear at the proper frequencies on the receiver dial, you first start at the low end of the dial on each band and set the LO coil for zero beat with the RF generator, which is also tuned to the low end of the dial. Next move the dial and generator to the upper end of the band and adjust the LO capacitor for zero beat. Repeat the procedure several times to get the LO tracking in a linear manner across the entire band (this sets where the stations appear on the dial in relationship with the dial markings). LO alignment is required on each band of a multi-band receiver. *Note:* some simple SW receivers have only one LO adjustment for the top end of each band.

Once the LO is tracking properly, then adjust the receiver RF and antenna coils on each band for maximum signal on the scope (which is placed across the audio output transformer). In all instances, you *must* keep the output of the RF generator as low as possible in order to avoid overloading the receiver and causing misalignment problems. After com-

pleting the alignment you should find your newly refurbished receiver will play quite well.

#### Final touches

Cosmetic cleanup can be done in stages. Do be mindful not to use aggressive chemical cleaners on front panels with silkscreened lettering or on glass dials that have painted lettering. Murphy's Oil Soap or regular dish detergent, diluted 1:4 with water, will clean up the majority of stains, grime and grunge you encounter. If you must use something more aggressive, like Simple Green or 409, try it on a portion of the chassis or case that won't normally be visible to the casual eye, just to make sure that it does not attack the paint or crinkle finish. Don't forget to rinse thoroughly in clean water to remove any chemical residue from the cleaning solutions.

Clean knobs using a very weak solution of dish detergent and a toothbrush. Don't soak the knobs in the solution, as sometimes this will discolor the knob inserts. Use the toothbrush to get the grit and grime out of the splines on the knobs. Rinse in clear water.

If you take your time, you can take a flea market find and turn it into a vintage radio

treasure. By concentrating on the low end SW and ham receivers of the '50s and '60s, it is possible to enjoy the radio restoration hobby at a nominal cost. If you want more reading, try these titles, available from Antique Electronics Supply or Antique Radio Classified<sup>3</sup>: *Radios by Hallicrafters* by Chuck Dachis, *Old Time Radios! Restoration and Repair* by Joe Carr, *Fixing Up Nice Old Radios* by Ed Romney, *Heathkit - A Guide to the Amateur Radio Products* by Chuck Penson, *The Zenith Trans-Oceanic* by Bryant & Cones (also available from Grove). And remember: **Keep It Simple.**

#### FOOTNOTES:

- 1 A.G. Tannenbaum: PO Box 386, Ambler, PA 19002 TEL: (215) 540-8327. Web URL: [www.agtannenbaum.com](http://www.agtannenbaum.com) E-MAIL: [k2bn@agtannenbaum.com](mailto:k2bn@agtannenbaum.com)
- 2 W7FG Vintage Manuals: 3300 Wayside Dr., Bartlesville, OK 74006 TEL: (800) 807-6146 FAX: (918) 774-9180 Web: <http://www.w7fg.com> E-Mail: [w7fg@w7fg.com](mailto:w7fg@w7fg.com)
- 3 Antique Electronic Supply: 6221 S Maple AVE, Tempe, AZ 85238 TEL: (602) 820-5411 FAX: (620) 820-4643. Antique Radio Classified: P.O. Box 2, Carlisle, MA 01741 (free sample magazine)



## We Want Your Trade-ins!

### We'll give you credit against new scanners and receivers!

Buy that new scanner or shortwave receiver for Christmas and save \$\$\$ by trading in your unwanted equipment. Grove's excellent trade-in program replaces your older equipment economically, and with the delays and uncertainties of selling it yourself.

### Want to buy previously owned scanners or receivers?

The equipment we take in provides budget-minded buyers low-cost equipment!

All of our previously-owned equipment is tested and warranted against defects for 90 days. You can view the list by linking to Bob's Bargain Bin page on our World Wide Web [www.grove-ent.com/grove/hmpgbbb.html](http://www.grove-ent.com/grove/hmpgbbb.html). This list is updated frequently, visit often to catch outstanding bargains!

**At Grove, We're the Trade-in Specialists!**

**Want to discuss a trade?**

**GROVE** Enterprises, Inc.

7540 Highway 64 West • Brasstown, N.C. 28902  
800-438-8155 US & Can. • 828-837-9200 • Fax 828-837-2216  
e-mail: [order@grove.net](mailto:order@grove.net)  
web: [www.grove-ent.com](http://www.grove-ent.com)

## Automatic NiCd Cell Recharger

Learn something new, and you just never know what will come next. Last month, Judy May asked about a design for an automatic discharger circuit for NiCd and NiMH cells. A simple op-amp voltage comparator worked well for the job. The other day, when wondering what the heck to write about this month, I suddenly realized — that same circuit, slightly revised, could become an automatic RECHARGER. Comparators are versatile. They always intrigued me, even back in the olden days when the transistor version was the size of a cigar box. Now they come on tiny chips. Geez...

### ■ NiCd/NiMH Cell Basics

A NiCd/NiMH cell is considered fully discharged when its terminal voltage drops to 1.0 V. A new cell is fully charged when the terminal voltage reaches 1.40-1.44 volts. Halfway between at 1.2 V is considered the "nominal" voltage rating.

As a cell ages, its full recharge level declines. When a cell can't recharge above 1.2 V, it's considered to be "used up" for all practical purposes. So long as a cell can reach a terminal voltage of 1.35 V or greater, it's in great shape. When it can't recharge above 1.30 V, better jot it on your shopping list.

Rechargeable cells come in a variety of sizes and ratings, from Type N and AAA to D and larger. Portable radios usually take the AA size, for which several capacities are available. The cheapest AA cells come in at about 450-mA/h, with the median at 600-mA/h ("mA/h" stands for milliampere-hours: how many milliamps a cell can be expected to generate for a period of one hour). Heavy-duty AA cells start at 800-mA/h with 1000-1200-mA/h at the top. 600-mA/h cells offer about 33% more time between recharges.

The life of a cell is generally proportional to the number of times it is recharged, so it makes sense to buy higher capacity cells, so long as the percentage of extra "life" is greater than the percentage of extra cost. Usually it is.

A 600-mA/h cell should produce 600-mA for one hour before it fully discharges to 1.0 V. If a cell is either discharged or recharged at the actual mA/h rating, its life will be significantly shortened due to accumulated heat within the cell.

"mA/h" is also called "C." The maximum safe rate of discharge (and recharge) is considered to be one-third the mA/h rating, called the "C/3" rate. Thus, the C/3 of a 600-mA/h cell is 200-mA/h. A 600-mA/h cell can be expected to generate 200-mA for a period of three hours; 100-mA for six hours; and 50-mA for 12 hours,

etc., without unduly jeopardizing the life expectancy.

Clearly "less is more" with rechargeable cells. They last longer when slowly discharged and recharged. Trouble is, we want our rechargeable cells to last for days, and to recharge in a minute. No way, Bunky! Be leery of "fast recharges." Sure, you can recharge a cell in less time, the more current you pump through it; but if it gets even warm to the touch, the damage is done. And it will get warm with discharges or recharges higher than the C/3 rating, so beware!

NiCd and NiMH cells can be recharged indefinitely at a rate of one-tenth the mA/h rating (i.e., C/10), without appreciably jeopardizing the life expectancy. Thus, a 600-mA/h cell can be left on recharge at 60-mA or less without concern.

### ■ Recharging Basics

Real-world efficiency is never 100%, so it takes 10 hours to discharge a cell at its C/10 rate, it will take appreciably longer at that rate to fully recharge, typically about 14 hours. (Now you know why there is a market for "fast rechargers"! Fourteen hours is an awfully long time to twiddle your thumbs.

While it is best to recharge NiCd and NiMH cells at the C/10 rate, you can "fast charge" them at the C/3 rate in about five or six hours without too much concern. Caution is advised, because there is little difference between 190-mA and 210-mA. It's best to recharge at well under the

C/3 rate.

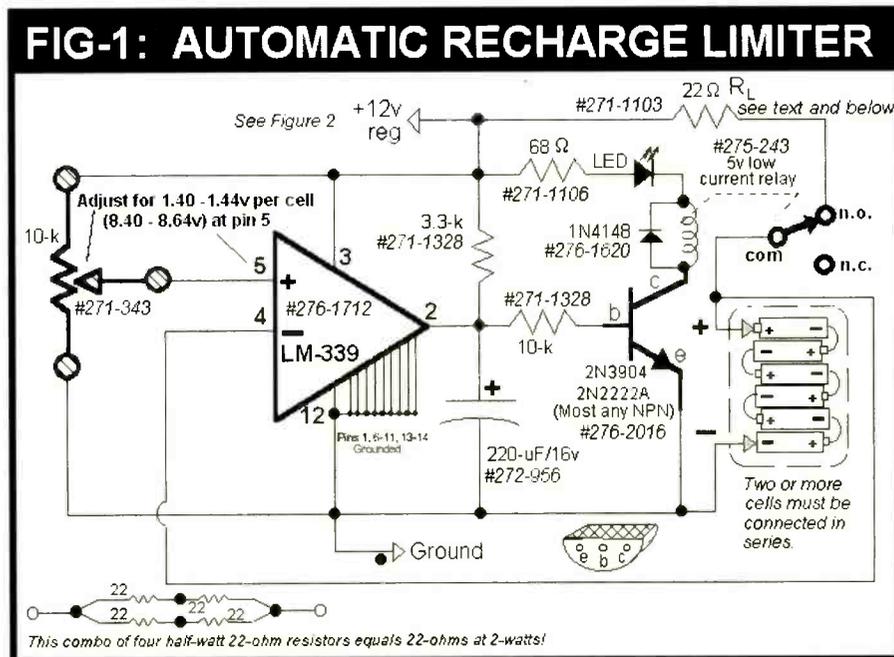
Even if the rate of recharge is under C/3, you will have a problem if the cell's terminal voltage is allowed to exceed the maximum of 1.44 V. At the C/10 rate, this isn't likely, but it could easily happen at C/3. Voltage limiting is required when the cell's terminal voltage reaches 1.44 V. That, or the charge current must be switched off altogether. Forewarned is forearmed.

### ■ The Automatic Recharger

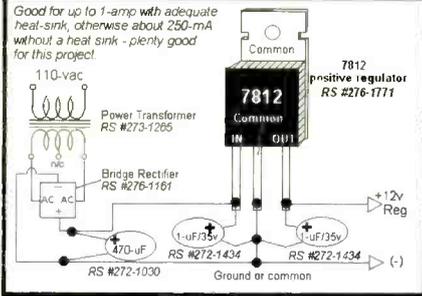
This experimenter's design is for rechargeable battery packs that contain one to six cells. We'll apply the bulk of last month's project to an automatic recharger that won't overcharge valuable NiCd or NiMH cells. Figure 1 shows the schematic diagram with Radio Shack part numbers. You can "breadboard" this circuit in a few minutes or build it on a piece of perfboard in about an hour.

Very little is critical about the circuit, but all leads should be short and the pin 2 output side of the circuit must be physically isolated from the pins 4 and 5 input side. The 220- $\mu$ F/16 V capacitor can be larger (up to 1000- $\mu$ F); but must not be a lesser value.

This circuit requires regulated 12 volts: a circuit for which is given in Figure 2. You can use any regulated 12 V or greater so long as the current rating is about 300-mA or more. If the regulated voltage exceeds 12.0 V, you'll have to increase the values of the 22-ohm and 68-ohm resistors. See "calculations" ahead.



**FIG-2: EASY +12V SUPPLY**



**■ Circuit Discussion**

The heart of the automatic recharger is the LM-339 comparator (see pinout in Figure 3 and last month for more information). The business-end of the recharger is the 10-kΩ potentiometer that sets the drop-out voltage. To set it correctly, first determine the number of cells in your rechargeable pack. Multiply 1.40 by the number of cells. For six cells, it's 1.40 x 6 = 8.40 V. Connect a voltmeter between ground and pin 5 of the LM-339, and set the potentiometer for a reading of 8.40 V. You can also use 1.44 V x 6 = 8.64 V, for a range of 8.4 - 8.64 V. Anywhere within that range will be fine.

The terminal voltage of the pack is fed back to pin 4 of the comparator. When this level rises to the reference setting at pin 5, the comparator's output goes low, and turns the transistor off. This de-energizes the relay and stops charging the pack.

**■ Calculations**

The 10-kΩ potentiometer sets the maximum voltage to which the pack can be recharged. The 22-ohm resistor is the current limiter, and is given solely as typical. You should calculate the precise value for that resistor, based on your power supply; the mA/h rating; and the number of cells in the pack. Let's assume 12 volts and a 6-cell, 600-mA/h pack.

First, we know that 1.44 V per cell is maximum, so 6 x 1.44 = 8.64 V. We also know that the maximum current is 200-mA/h (C3). So we want that resistor to drop the excess voltage above 8.64 V and limit the current to (C3) 200-mA, max. Ohm's Law says current equals volt-

age divided by resistance (I = E/R):

$$0.200 = (12.0 - 8.64)/R$$

$$R = (12.0 - 8.64)/0.200$$

$$R = 3.36/0.200 = 16.8 \text{ ohms}$$

You could use two half-watt 33-ohm resistors in parallel for 16.5-ohms. But that's pushing it. I chose 22-ohms because: I = E/R = 3.36/22 = 150-mA, a much safer value, you see, because it's less than the C3 rate.

Consider a discharged pack at 1.0 V per cell x 6 cells = 6 V. That resistor will drop the excess 6 volts. Again, Ohm's Law: I = E/R = 6/22 = 272-mA, the initial charging rate, which even though 22-ohms, exceeds the C3 rate. Not to worry: as the pack builds a charge, the excess voltage drops, which causes the current to drop. A safe level is quickly reached, well before heat builds up inside the cells. 22-ohms is about right for a 600-mA/h 6-cell pack.

See last month's column for how to calculate values of resistance in parallel (they're directly additive when in series). You have to account for the power that's consumed by the resistor. Assume 250-mA through 22-ohms, and use Ohm's Power Law: P = (I<sup>2</sup>)(R), to find P = (.250<sup>2</sup>) x 22 = 1.375 watts!

If you use a half-watt 22-ohm resistor, it might burn up before the current drops! A one-watt resistor might be okay, but let's make a 2-watt 22-ohm resistor with four half-watt 22-ohm resistors, wired as two in series, paralleled with an identical series pair. See the lower left corner of Figure 1. Three 82-ohm resistors and one 100-ohm resistor, all four wired in parallel, will yield

about 22-ohms, too.

Increase the value of the 68 ohm resistor to 100-ohms for a 13.8 V regulated supply, and a 100-ohm resistor in series with a 15-ohm resistor (115-ohms) for a 15 V regulated supply.

**■ Oddity and Caveat**

I didn't have the time to investigate, but my test circuit slowly pulses (turns on and off) as the battery pack reaches the drop-out point. I didn't sweat it because this pulsing is okay in the sense that it safely keeps the pack fully charged until you remove it. Kind of cool, actually, but if any of you op-amp wizards know about the phenomenon called "hysteresis" (which is what I think this is), clue me in so I can pass it on.

This is an experimenter's circuit. It is not intended, nor should it be trusted as an optimum recharger for NiCd and NiMH cells. Its primary purpose is as a learning aid for op-amps and comparators.

**■ Support**

Support for this and all my columns is freely available by e-mail (note the change!) If you're not computerized, please include an SASE with any postal requests.

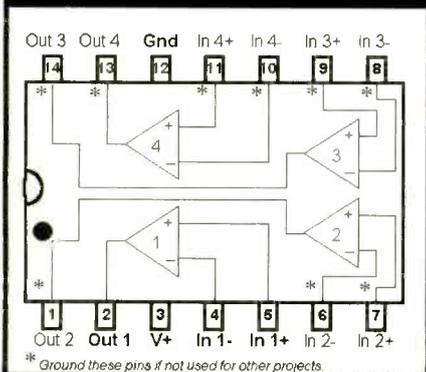
E-mail: bcheek@cts.com

WWW: <http://ourworld.compuserve.com/homepages/bcheek>

FAX: (619) 578-9247 anytime

Postal: PO Box 262478; San Diego, CA 92196-2478

**FIG-3: LM-339 PINOUT**



\* Ground these pins if not used for other projects.

**The return of a Classic**

- Completely updated
- New chapter on computers and shortwave listening
- Includes a directory of popular shortwave web sites
- Up-to-date international listings

**THE COMPLETE SHORTWAVE LISTENER'S HANDBOOK**

FIFTH EDITION

**ANDREW YODER**

This best-selling book on shortwave listening for the past 25 years is back, completely revised, rewritten, and packed with more info than ever!

Catch all of the excitement on the radio: broadcasters, pirates, utilities, ham radio, "spy" stations, and much more!

\$29.95 +3 (\$4 outside US)  
Cabinet Communications  
PO Box 642  
Mont Alto, PA 17237  
<http://www.frn.net/rfi>

Pennsylvania residents, please add 6% sales tax

## Why All the Noise about Noise?

If you do much reading about radio operations you often come upon the topic of noise. A great deal of time and effort is expended by radio operators and radio design engineers working to reduce noise in radio reception. Unfortunately there is no way at present to entirely prevent noise from entering our receiving systems; some is generated within the receiver itself, and some is received via the antenna.

This month we take a look at noise and some things we can do to minimize its effect on our communications.

### ■ The Masking Bandit

Perhaps you have been in a situation where the sound level was so high that you could not hear a person talking to you even though they were standing right beside you. One such experience that comes to mind is standing beside Niagara Falls with its thunderous bedlam of sound.

When a higher-intensity sound renders another sound inaudible we say that the higher-intensity sound has masked the less intense sound. Electrical noise of sufficient strength can mask received signals of lesser strength just as Niagara's roar can mask the sound of a person's voice.

### ■ Internal Noise

In a receiver, the circuit which is connected to the antenna is called the "first stage." This first stage almost always contains an amplifying device such as an integrated circuit (IC), transistor or vacuum tube. These devices (IC, transistor, tube) generate electrical noise as they operate. This internally-generated noise is capable of interfering with, or completely masking a weak signal.

Because the noise from the first stage is amplified by all following stages it becomes so strong that it essentially determines the overall level of internal noise (IN) generated by the receiver. Stages following the first stage — because they are followed by fewer stages to amplify their noise output than is the first stage — do not usually contribute significantly to the overall IN level.

### ■ External Noise

External noise (EN) is noise which enters the receiver from the antenna system. Sources which send electrical noise as radio waves to your antenna include electrical machinery, auto ignition systems, lightning bolts from near or afar, and extra-terrestrial sources such as the sun, other sources in our own galaxy, and beyond. The effect of EN on reception varies from no effect at all (for strong received-signals with little EN present) to rendering communications completely impossible (for weak radio signals competing with strong EN levels).

EN was even more of a problem in the early days of radio when receiver passbands were wider, and effective (sometimes) noise-reduction circuits were not yet developed. Lee DeForest, the self-styled "Father of American Radio," was so frustrated by EN at times that he termed it that "godawful" noise. Whatever we call it, EN can be totally disruptive to radio communications at times.

### ■ Internal Noise vs. External Noise

On the HF band and lower in frequency, EN is usually the limiting factor in communications (see fig.1). The strength of EN on these lower bands is high enough that radio designers are not usually concerned with designing the lowest-noise front end practical. As long as the IN is lower than the EN the noise with which the received signal competes is the EN. In this case, the lower strength IN has essentially no effect on the ratio of signal to noise in reception.

On the VHF band and higher (above 30 MHz) EN is generally so low (fig. 1) in strength that IN assumes great importance. At these

HF High Frequency (3-30 MHz)  
VHF Very High Frequency (30-300 MHz)  
UHF Ultra High Frequency (300 MHz-3 GHz)

higher frequencies IN is usually the limiting factor in receiver sensitivity, and so receivers are designed with the lowest IN practical.

Try the following test. Turn on both your HF receiver and VHF (or UHF, ultra high frequency) receiver with good antennas attached. Tune each receiver to a frequency with no signals present. Turn off any squelch controls and set any radio frequency (RF) gain controls to maximum. Adjust the volume controls such that you hear a moderate level of noise from each receiver. Now connect and disconnect the antenna to each set.

For the HF receiver, noise will generally significantly increase as you connect the antenna, but for the VHF receiver, connecting and disconnecting the antenna should make essentially no difference in the noise level you hear from the receiver. The noise you hear from the HF receiver obviously comes mainly from the antenna. Noise heard on the VHF set is obviously IN.

### ■ So What Do We Do?

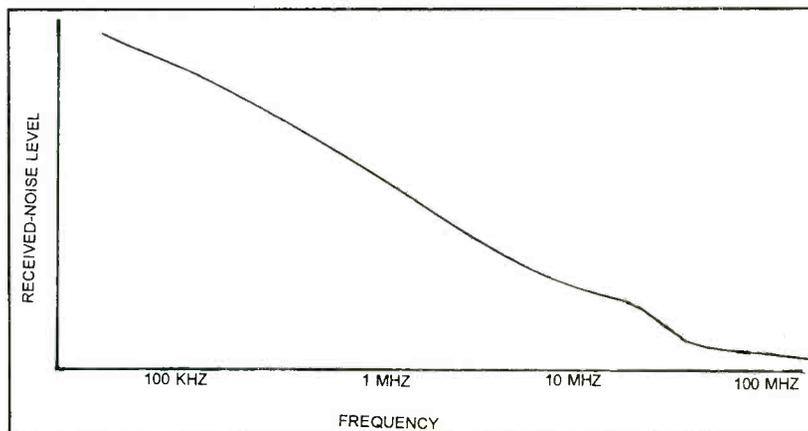
We combat noise in various ways. The most simplistic solution is to listen only to strong signals where noise is not such a problem. But we often want to hear what that weak DX station is saying, and so we do our best to reduce the effects of noise on our reception.

For VHF and above, our squelch control is one means of avoiding the nuisance of listening to IN. At these frequencies using a receiver with a very-low noise front end is also usually desirable.

For HF, some of the relatively common techniques are the use of noise limiters, noise blankers, and also noise reduction units which use a separate antenna. Limiters, blankers and reduction units are quite helpful with certain kinds of noise, particularly impulse noise such as auto ignition interference. Unfortunately none of these devices will really quiet all types of noise.

Another approach is to find the source of noise and get it

Figure 1. Received noise generally decreases with increasing frequency.



stopped. For locally-generated noise this is sometimes possible with a direction-finding receiver. If the source is a leaky insulator on a power pole, the utility company is often helpful in clearing it up. If it originates in some faulty appliance in the neighborhood that neighbor may be open to suggestions for reducing the noise by methods such as those suggested in the *ARRL Handbook*, or *ARRL Interference Handbook* (both available from Grove Enterprises).

Yet another approach is to utilize antennas which offer some amount of noise rejection. Most man-made noise seems to be vertically polarized, so using a horizontally oriented antenna is often helpful. Loop antennas, quad antennas, and underground antennas (yes, they work to a limited extent) are known for their quiet, somewhat noise-free operation. I've also read suggestions that a metal shield (Faraday cage) be put around small antennas to eliminate the electrical component of the signal. This leaves the signal's magnetic component, which is usually less noisy than the electrical component.

Beam antennas also are helpful in reducing noise due to their increased responsiveness in just one or two directions and reduced responsiveness in other directions. When the beam is directed toward the signal of interest that signal

is emphasized: Noise and interference from other directions are minimized. As long as the direction of the desired station doesn't include excessive noise, then the overall response is a reduction in received noise as well as an increase in the strength of the desired signal.

## RADIO RIDDLES

### Last Month:

I asked "Where did we get the name 'antenna?'"

In the early days of wireless our skywires were called "aerials." This was appropriate because they had to be high in the air which is, of course, the meaning of the term "aerial." But as technology developed, receivers became more sensitive, and it was possible to receive with tiny antennas which might be on your desk top rather than high in the air. Therefore, a term which was more descriptive was desirable.

"Antenna" (the organ through which insects receive information from the environment around them) was chosen as a more appropriate name for the device through which a radio receives information from the environment around it.

### This Month:

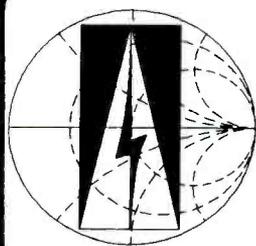
What is a sferic? It is related to what we discussed above.

You'll find an answer for this month's riddle, and much more, in next month's issue of *Monitoring Times*. 'Til then, Peace, DX, 73



Monitor what's happening in **REAL TIME**. Search, sort and scan by freqs, comments, hits etc. PC can even play back audio hits with the soundcard while scanning at full speed. Ascii and direct DBF file support. Tape controls, alarms, many new features. Functional demo [www.futurescanning.com](http://www.futurescanning.com) or call **RadioMax...just \$45 (includes s/h in USA)**

**FUTURE SCANNING SYSTEMS**  
6105 SE Nowata Road #6, Bartlesville OK 74006  
Ph. 918-335-3318 FAX 918-335-3328



# Austin Antenna

"The World Leader in Multiband Technology"

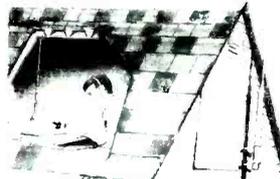
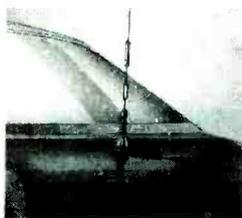
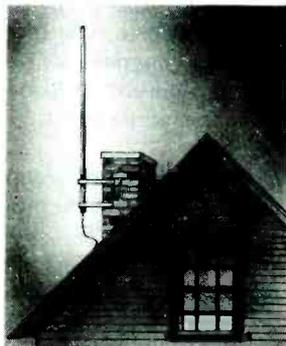
Manufacturers of multi-band Land Mobile, Microwave, and Scanner Antennas for Government Agency operations, Drug and Law Enforcement operations, Communications at the Kennedy Space Center and major networks such as NBC and ESPN.



The Ultimate Omnidirectional Multiband Station Antenna



New Innovation brings New Dimensions for Portables!



**Spectra**

Superb Performance!  
with Maximum Versatility for  
Mobile and Base Station



Send \$1.00 for an Austin Scanner Antenna User's Guide [a regular \$3.95 value]

Austin Antenna P.O. Box 920 Truro, MA 02666 (603) 335-6339

## Wish List for a Ham's Christmas

Every November I compile a list of neat gift ideas for hams. This year's list includes a few sleeper items that are really worthwhile!

Wish number one is a new book by Dave Ingram, K4TWJ called *33 Simple Weekend Projects*. All of the projects described are really simple and worthwhile for the average ham.

I particularly like the section on HF antennas; Dave shows how to build five simple and effective antennas. One, "the modified Bob-tail" is really a super DX antenna: I built one for 30 meters, and it consistently outperforms my loop on DX by a wide margin. Another (a Bruce Array) looks like a winner and should be on the air from this location on 17 meters by the time this is in print.

The chapter on theory is nicely laid out and allows the novice to grasp the general idea of how electronics works and just exactly what the various components are and how they are used.

Other chapters cover VHF, Mobile, and Home Station. Some of the projects described in these chapters are: using your VHF HT to work CW through the satellites, building and using two QRP transmitters, a classic radio transmitter, proper grounding of your station, restoring old receivers and transmitters, telegraph systems, building a soil tester and, best of all, an electric wiener roaster!

I am having a lot of fun with this book and am sure you will, too. Price is \$15.95 from *CQ Magazine*, phone 1-800-853-9797.

*How to Use The Amateur Radio Satellites* by Keith Baker, KB1SF, is the most comprehensive and easy to understand manual on using the various satellites I have ever seen. If you have any interest in satellite communications this is the first book you should obtain. Complete information on each usable amateur satellite is included. Details on working the shuttle and Mir are also in this nifty little 32 page manual.

*How to Use the Amateur Radio Satellites* is available from AMSAT, 850 Sligo Avenue, Suite 600, Silver Spring, MD 20910-4703 for a donation of \$5.00.

**The Bozak Antenna** - While at the Boxboro, Massachusetts, hamfest I came across a great buy on a two meter base station

antenna. This 5/8 wave over 5/8 wave antenna provides six dB of omnidirectional gain. And for the price, it is the best built base station antenna I have ever seen. The unit is fully fiberglass enclosed and uses all stainless steel hardware, looks great, and is really built to last. In fact most of us would call this antenna a work of art.

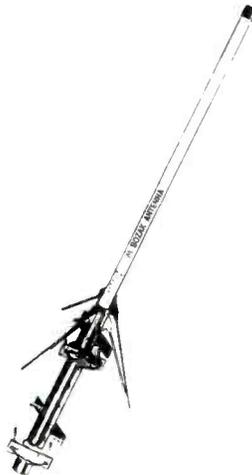
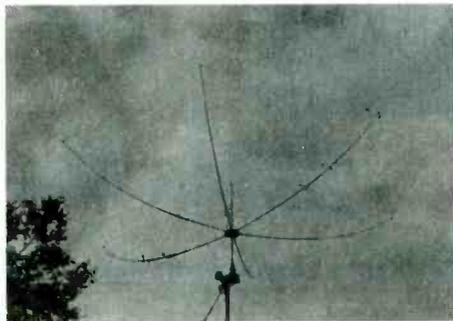
The Bozak antenna is available in two configurations. The 6 dB unit we just discussed, and a 5/8th wave 3 dB unit. The Bozak antenna can be had for 2 meters, 222, and 446. A six meter 5/8th wave unit is also available, (I do not have a price on the six meter antenna at this time).

Full information and pricing for all Bozak antennas can be had by calling Steve Bozak at 518-373-8069 or send a fax to him at 518-373-0701. His address is Steve Bozak, 100 Church Hill, Waterford, NY 12188.

At the same hamfest, I was introduced to the **Hex-Beam**. The Hex-Beam is a hexagonal antenna that performs like a two element yagi. The antenna is built of special PVC, fiberglass, and machined aluminum.

This is one compact lightweight antenna and appears to be very rugged. It is beautifully built and provides an extremely low profile.

The manufacturer claims excellent results with the antenna at low heights and a 6 to 8dB gain.



The Hex-Beam is available as a monobander on 6 to 40 meters, or a multi bander on several different combinations of bands. Prices vary from \$89.00 for a six meter model to \$849.00 for the 40-17-12 meter multiband unit.

This antenna is also available as a portable unit that fits into a very compact back pack and covers 6 to 20 meters; price of the portable unit is \$389.00.

For full info and spec sheets contact the manufacturer at Traffic Technology, 421 Jones Hill Rd, Ashby, Ma 01431-1801. (Note: A complete review of this antenna is planned for the near future).

### QRZ! Ham Radio

MARCH 1998  
Vol. 11

#### CALLSIGN DATA BASE

BY AA7BQ

- Callsign Data
- Programs
- Over 1,700 Digital Images
- Over 113,000 E-mail Addresses
- And More!

Over 1 Million Listings, Worldwide!

Walnut Creek CDROM

MSDOS UNIX HTML

Last but not least on our wish list is a piece of ham software that I really get a lot of use out of: It is **QRZ**, a callsign data base that includes over 1 million ham listings worldwide, plus 1400 programs for electronics, 113,000 E-mail addresses, and 1700 digital images. FCC exam training, Morse code programs and computer control programs are likewise included on this low-priced CD ROM. Call signs in many countries are included (23 countries currently).

As a call book, you can sort by call sign, name, or zip code. And any of the programs can be run directly from the CD.

Usual street price for QRZ is about \$14.00; the CD can be purchased at most ham radio stores or your local hamfest. If you cannot find a local dealer contact Walnut Creek CDROM at 1-800-786-0783.

Until next time, Happy Thanksgiving, one and all.

## Radio Shack's Easy FRS Radios

Industry insiders tell me that Radio Shack and Motorola enjoy the biggest shares of the mushrooming Family Radio Service (FRS) market. That isn't surprising: Motorola has certainly the most aggressive marketing campaign for its FRS offerings, and Radio Shack outlets are simply everywhere. It seems that almost every village in America has a Radio Shack store in which you can shop for electronic goodies.

As if to drive home the point, one morning not long ago I was sitting at the computer when a couple of voices broke through on FRS channel 1. It was a husband and wife traveling from Vermont to Colorado in two separate cars and using FRS to stay in touch between vehicles. They were using the Radio Shack 21-1802 single-channel FRS radios, which cost \$59.95 each. "It was the cheapest way to get the job done," the husband said.

The single-channel Radio Shack FRS transceiver is the soul of simplicity. It operates on FRS channel 1 (462.5625 MHz), uses four AAA batteries (alkalines provide about 24 hours of life), and has an automatic power save mode that activates when you do not transmit for over 8 seconds. The owner's manual for this radio states that the transmit power is only 100 milliwatts. That's only one-

fifth the maximum legal power for FRS radios.

This radio measures about 4-1/4" x 2" x 1-3/16" (less antenna). There is no belt clip, but there is a fastener for a wrist strap. A single knob on the top of the radio turns it on and adjusts the volume. On the left hand side of the case are a push-to-talk button and a button for turning off the auto-squelch. On the back of the case is a removable panel for inserting the batteries.

On the front of the 21-1802, there is a grill for the speaker/microphone and a red light that activates when transmitting or when the batteries need to be replaced. Also on the front, a Call button which, when pressed, causes a paging tone to sound on all FRS radios tuned to channel 1.

Also available from Radio Shack is the 21-1807 14-channel FRS transceiver which costs \$119.99. This radio measures 2-1/5"W x 3-7/8"H (excluding antenna) x 1-1/8"D (excluding belt clip). The 21-1807 offers 38 CTCSS (Continuous Tone Coded Squelch System) tones (Radio Shack calls them Quiet Codes), a call button, 30-hours nominal battery life from two AA alkaline batteries, 150 milliwatt output power, a backlit display, a connection for an optional speaker/microphone or earphone, and last channel memory.

On the front of this FRS radio are the display, two buttons for changing channels, and a Quiet button that allows CTCSS tones to be selected and activated. Any tone, once selected and activated, applies to all 14 channels. Radio Shack neatly gets around this by allowing the Quiet function to be turned off for all channels with a single push of the button.

Curiously, the owner's manual says: "We recommend that you select a quiet code from the range 7-30. If you select a code below or above that range, you must wait 1 to 2 seconds after holding down Push-To-Talk before you start talking." Radio Shack tells the reason is that the CTCSS tones are implemented in the microprocessor, and it takes longer for the processor to lock onto those upper and lower codes.

You can lock all but the transmit functions of this radio by pressing the CALL and MON buttons at the same time. A small key icon appears in the display. In addition, a shut-off timer automatically turns off the radio if it is



idle for two hours. This feature can be turned on or off by pressing the Channel down button while turning the radio on.

In the field, these two radios offer virtually identical performance. Both offer crisp, clear audio, provided you keep at least a hand's breadth between the speaker/microphone grill and your mouth (otherwise your voice may sound muffled or distorted). As might be expected, range of these radios was less than other FRS transceivers that offer a full half-watt of transmit power. Still, both offered approximately the same range as the Kenwood FRS radio, which had 330 milliwatts of transmit power.

The bottom line: if you want the ultimate in range from your FRS radios, you'll probably want to look elsewhere. But if you plan usage over shorter ranges (say, up to a mile), either of these Radio Shack offerings works well, and the Call button is a neat feature that makes them especially easy to use.



### VLF RADIO!

60 Min. Cassette featuring  
"The Sounds of Longwave"



Hear WWVB, Omega, Whistlers, Beacons, European Broadcasters and many other fascinating signals from radio's "down under." Includes many tips for improved reception. A superb introduction for the newcomer and a handy refference for the seasoned listener.

\$11.95 Postpaid (U.S. funds) from:

Kevin Carey  
P.O. Box 56, West Bloomfield, NY 14585

### More on those Patrolman Portables

In our August issue, we referred to the fine line of portable multiband radios offered by Radio Shack a number of years ago. Reader Doug Robertson reached back in time for a little more information.

The unit in question, the Patrolman SW-60, was first listed in the 1984 Radio Shack catalog and continued through 1990, priced regularly at \$99.95 and on sale for \$69.95. Previous models included the Patrolman CB-6 (my favorite) and its follow-on, the CB-60, which inaugurated the 1980s.

Thanks, Doug, for the nostalgic visit.

### More on Lightning

In our September column, we discussed the paths of lightning. Ray Hodgkiss, a faculty member of the Department of Computer Science, Indiana University, Bloomington, has much more to offer. Let's listen to some of his comments:

"You are correct in assuming that about 20% of all lightning flashes are cloud-to-ground. (Kessler, *Thunderstorm Morphology and Dynamics*, University of Oklahoma Press, copyright 1986, page 283.) However, one type of

cloud-to-ground lightning does occur more frequently than another. The first type of CG "usually deposits a negative charge." (Kessler, 291) The other type, +CG, "deposits a positive charge." (Kessler, 291).

"While I was working on my MS in Meteorology, we had a lightning detector that allowed us to observe the "strength" of CGs (in amps) and also whether they were "positive strokes" (+CGs). I noticed that less than 25% of all CGs were positive strokes. (It may be as low as 10%)

"Positive strokes tend to be MUCH more powerful and longer in duration (so that) one can observe a positive stroke in the field, because the strokes last MUCH longer than most other ones, which appear nearly instantaneous."

Fascinating. Ray, and thanks for sharing this information with our readers.

**Q. Would you benefit from better lightning protection by putting two or more surge protectors in series? Does switching off a power strip achieve the same protection as pulling the plug in a lightning storm?** (Vincent Murphy, Albany, NY)

**A.** No to both questions. If you put two or more surge protectors in series (actually parallel because the gas discharge tubes will all be across the line, not in series with it), the first one to conduct will do all the work. And while switching off the power strip and pulling the plug both prevent AC from reaching the equipment, a direct strike is more likely to jump across the open contacts of a switch than from the wall to a disconnected plug.

**Q. Will a better shortwave radio allow me to hear more shortwave signals, and should I listen in the daytime or evening?** (William Waros, N. Vandergrift, PA)

**A.** You may not hear more signals, but you will hear them better. A quality communications receiver helps separate closely-crowded signals so they cause less interference to each other.

A general rule of thumb is that you should listen below 10 MHz at night, and above it during the daytime. There is some crossover in that range, but lower frequency signals are best heard at night, with the higher best heard during daylight hours.

## Bob's Tip of the Month

Many readers have brought to our attention ads circulated by mail order companies for the "Power Tip," also called the "Super Signal Booster," an inverted-teardrop-shaped plastic contrivance advertised to "improve reception on your radio or cordless phone instantly." The ad usually continues, "Originally developed by military communications experts for Operation Desert Storm."

Super Signal Booster's imaginative ad writers tell us that it doesn't even have to be connected to the affected radio: "If the antenna is of the thick, rubberized sort, place the Super Signal Booster on a nearby antenna. For example ... (w)hen using your cellular phone in the car, place the Super Signal Booster on the car's outside radio antenna. (f)

The facts, however, are much different from the deceptive hype. The plastic glob is

actually an eye protector, designed to reduce the risk associated with walking around military vehicles equipped with whip antennas. The bubble is absolutely hollow except for a small, toothed washer which grips after the unit is slipped over the top of the whip.

MT readers James Peters of Scottsdale, AZ, and Michael Tammaro of Cranbury, NJ, discovered that theirs didn't seem to do anything at all. Undaunted, and with tongue in cheek, Michael suggested several possible uses for the quack device:

- (1) Place it on your car antenna so you can find it easier in a crowded parking lot;
- (2) Sew it into your pajama shirt to prevent you from snoring;
- (3) Tell young children it is a cyborg's eyeball—and it's watching them;
- (4) Set it on your coffee table to tempt friends

to ask, "What the heck is that?"

Now, after we dismiss the Power Tip, we may begin working on the "Crystaldyne" and its kin (electric barbecue ignitors being sold as acupuncture therapy) and the "Mineral Magnet" (small magnets to be attached to a water pipe to "modify the polarization of mineral salts" in your drinking water).

Perhaps, in an age where technology surges ahead of understanding, a zealous marketing agent may be excused for taking the word of the original vendors of these fraudulent devices, so write to the catalog companies and inform them of the facts. If they remove the ads from their catalog, fine; if not, turn them in to the Consumer Protection or Consumer Affairs office of your state Attorney General.



## The "Power Tip" Scam



# WINRADIO®

From the Pioneers of Computer Controlled Radio  
now comes a whole new range.



Internal Model (WR-1500i)



External Model (WR-1500e)  
(computer not included)



The WinRADIO Virtual  
Control Panel



Spectrum Scope

The popular WinRADIO WR1000i is the world's first commercially available PC-controlled scanning receiver. No wonder it has received the coveted Most Innovative Receiver Award for the Year 1998, by WRTH.

However, this fine receiver has now finally encountered serious competition:

### *Our own.*

WINRADIO Communications now proudly introduce a new series of radio-controlled PC-based receivers, in both internal and external versions:

- WR1000i ... 100% internal 1300MHz scanning receiver
- WR1000e ... 100% external 1300MHz scanning receiver with standard RS-232 control and optional PCMCIA (PC-card) interface
- WR1500i ... 100% internal 1500MHz scanning receiver
- WR1500e ... 100% external 1500MHz scanning receiver with standard RS-232 control and optional PCMCIA (PC-card) interface

The 1000/1500 series products offer cost-effective solutions for a wide variety of applications. The products come in two forms: internal ISA-bus cards, and compact external units with an RS-232 interface (PCMCIA interface optional).

The advantages of an internal card model are in its neatness – there are no external cables required, no external interface ports are occupied, no external power supplies or extra desk space are needed. And if you wish, nobody needs to know that you have a scanning receiver hidden inside your PC!

Multi-channel operation is simple to achieve, as up to eight WinRADIO internal receivers can be used simultaneously in one PC.

The advantage of an external model is in its portability – the optional plug-and-play PC card interface (PCMCIA) allows a very fast and simple installation for any portable PC. Serial RS-232 interface is also available as standard.

Both models are very well shielded from PC interference. We use specially developed shielding materials and innovative design methods to prevent any interference directly entering the receiver.

### Software options:

- WinRADIO Digital Suite software for decoding of WEFAX, HF fax, packet, ACARS, DTMF, CTCSS; for signal classification, audio spectrum analysis, squelch-controlled playback and recording.
- WinRADIO Database Manager

### Hardware options (for external models):

- WinRADIO Portable Power Source for a truly portable computer-controlled radio system, containing nickel-metal-hydrate batteries and an intelligent battery charging facility with battery charge indication.
- WinRADIO PC Card Adaptor allows the use of PCMCIA card interfaces commonly used with laptop computers.

WinRADIO receivers are available from selected radio dealers in North America.  
See our Web site [www.winradio.com](http://www.winradio.com) for more details or email enquiries to [info@winradio.com](mailto:info@winradio.com).

*Technical Specifications are subject to change without notice.  
WinRADIO, WinRADIO Digital Suite and VISITUNE are trademarks of WinRADIO Communications.  
Availability subject to FCC certification (application pending at time of printing). Contact us for details.*

# Germany's Kneisner + Doering KWZ 30

**Y**ears ago, when my wife's beloved Volkswagen Beetle was unceremoniously ripped off, it was difficult to find an affordable replacement with decent gas mileage. In the end, I sprung for an inexpensive, old, low-mileage Mercedes that needed its share of mechanical work.

I quickly learned how Mercedes gained its reputation. Even though this model was singularly unglamorous, it was built like a rolling fortress. These days, however, even Mercedes isn't made the way Mercedes was made just a couple of decades ago. Indeed, what is? The premium is on advanced engineering and lower prices, so what has been sacrificed—even in mighty Deutschland—is bulletproof construction.

### ■ \$1,800 receiver tough as a tank

Well, almost: because a new German manufacturer, Kneisner + Doering, has come up with the KWZ 30, a DM3,005 (roughly US\$1,800) DSP tabletop receiver built to panzer-tough professional standards. Its case is made of black-painted stainless steel, while the front panel is fully two-millimeters thick. The operating circuitry uses two DSP chips, rather than the solo chip used by the new Japan Radio NRD-545 we've been reporting on in recent months.

The KWZ 30 is clearly a labor of love, the result of years of effort by a team of German amateur radio operators who are also electrical engineers. Unsurprisingly, it was intended to be the *ne plus ultra* of ham receivers. But as hams now use transceivers almost exclusively, the manufacturer quickly found that the real interest was coming from a market they scarcely realized existed: shortwave listeners and DXers.

### ■ Few controls, but clever operating system

The receiver has few discrete controls. Instead, operation is by software command, as with the AOR AR7030. But, unlike the '7030, it is vastly more intuitive to operate, thanks to a larger display, four function keys and better software. While those who prefer a panel full of discrete controls are still not brimming with enthusiasm over the KWZ 30's operating scheme, it is nonetheless the first such receiver that gets their nod of approval. The English operating manual helps and is well written. But even without a manual, operation can be figured out over time—although more function

keys would certainly help.

The receiver tunes and displays in one Hertz increments from 6 kHz through 30 MHz, with reduced sensitivity below 50 kHz. Its large backlit LCD is highly visible at various angles and different ambient lighting conditions. The large, flywheel-effect tuning knob has superior "feel" and grip, with lots of tuning-speed choices. The all-important and hopefully robust keys are plastic tabs that click decisively when pushed, like an IBM keyboard.

Power is from an outboard "wall wart" AC adaptor instead of a multivoltage inboard power supply. The manufacturer doesn't as yet offer a 120 Vac adaptor, but Ohio's Universal Radio is considering importing the receiver for distribution and sale within North America. If it does, it would of course provide a suitable adaptor.

Those who choose to act as their own importers can use the \$40 Radio Shack #22-504 power supply, which works properly but runs hot. Its banana plugs won't fit into the receiver's input socket, so a short length of cable or wire and some basic soldering, as well as attention to polarity, are needed to make this work.

The KWZ 30 has no clock, but it does have an automatic notch filter which doesn't perform as well as it could. There is also passband shift, although it is of limited use because it doesn't function in the AM mode. The DSP—digital signal processing—system is also used for noise reduction; when carefully adjusted, it can be helpful in increasing intelligibility. The 250 presets store many useful parameters, although not alphanumeric station names.

### ■ Novel detector reduces fading distortion

There is no synchronous selectable sideband, but there is an ingenious type of AM detection in which the decoder samples both sidebands to calculate precisely the envelope curve of the audio. The theory is that the detector shouldn't need a carrier, and thus the receiver should be immune to selective fading distortion; *i.e.*, when a fade selectively attenuates the carrier more than the sidebands.

This novel detection system assumes both sidebands are at an equal level. Unfortunately, with shortwave and other skywave signals, most fades pass through the signal bit by bit,



first attenuating one sideband, then the carrier, and ultimately the second sideband. This means that in practice the two sidebands are often at unequal levels, so the detector performs less well than true synchronous detection. Nevertheless, it comes across better than conventional diode detection.

### ■ Astonishing AGC improves DX and audio

On most tabletop models, there are two or three automatic gain control (AGC) decay rates. On the new NRD-545 DSP receiver, one of our strongest criticisms is that there is only one AGC setting for the AM mode. However, on the KWZ 30 the AGC time constants can be controlled to an astonishing degree in all modes.

Here's how it works. As you would expect, the decay rate can be varied, just like on most other tabletop models, but with the KWZ 30, that's just the beginning. The attack and hang times, along with digital gain, can also be regulated individually—four operator-adjustable variables in all! Think about when you have heard about something like this before, and the answer is simple: you haven't. It is nothing short of incredible.

This is no gewgaw. Serious DXers will find these precision adjustments to be well worth taking the time to master to enhance the intelligibility of extreme DX signals. Too, because the KWZ 30 is a DSP receiver, precise AGC timing can make an audible difference in reducing the slightly artificial sound characteristic of any DSP gear.

If the AGC controls are set properly and you use a good outboard speaker, the resulting audio quality is powerful, pleasant and highly intelligible. This is despite a pedestrian level of overall distortion, which we measured at various audio frequencies as being from three to ten percent.

Professional receivers, at least those intended for the United States government, are invariably equipped with a 455 kHz IF output. For now, at any rate, the KWZ 30 has no IF output and one can't be retrofitted, so it can't use a Sherwood SE-3 outboard synchronous detector. Presumably this will be an option someday, if only because at least one official American agency has already indicated it wishes to place a quantity order if the receiver can be fitted with an IF output.

## ■ Laboratory test results run the gamut

As usual, we do our own laboratory testing, which we have tailored over the years to reflect the specific needs of shortwave listening and DXing. With the KWZ 30 this turned out to be especially illuminating, as some of the manufacturer's published measurements of performance turned out to be far grander than what we found.

For example, phase noise and the impact of blocking makes measurement of ultimate rejection dubious below 50 dB on the KWZ 30. Ditto the shape factors, which require a minimum of 60 dB ultimate rejection for measurement. Our adjusted measurement norm to allow shape factors to be measured (sort of) for the nine available voice bandwidths show a range from 1:1.3 to 1:1.8. These are superb numbers, but we know that in reality they are even better than this—we just can't measure more precisely because of the receiver's phase noise and blocking characteristics.

At 20 kHz signal separation points, dynamic range is superb, 100 dB, as is the third-order intercept point, +20 dBm. But because world band broadcast channels are 5 kHz, not 20 kHz, apart, we also measure using 5 kHz separation points. Here, dynamic range nosedives to a dismal 60 dB, and third order to -40 dBm—a

shortcoming we rarely find in modern receivers. This is especially surprising, inasmuch as the KWZ 30 was designed originally to be a ham receiver. Ham bands, especially under CW contest conditions, can be far more congested with meter-bending signals than the shortwave broadcasting bands (of course, on 40 meters in the Americas you get both).

Our other lab measurements range from good to superb, and you can hear it with your ears. For one thing, the KWZ 30 is audibly very quiet, and while we didn't get to test it on a winter DXpedition this could well be an exceptional rig for hearing super-weak signals in areas free from local electrical noise.

## ■ Impressive listening results

Program listening, world band DXing and utility DXing also fared well during our listening tests. Even the digital signal-strength indicator turns out to be not only highly readable, but also has unsurpassed accuracy—a plus for station monitors and field engineers. (However, since our tests were completed, I received a letter from reader John Wagner of Ohio about a local AM-band signal on 1460 kHz popping up around 18.1 MHz on the KWZ 30.)

The Kneisner + Doering KWZ 30 is an eyebrow-raiser. Its build quality is the stuff of

legend, and audio is surprisingly good by any yardstick, but especially for a DSP receiver. Yet, there are kinks, like poor close-in dynamic range and ultimate rejection that is sharply limited by phase noise and blocking. It is not yet the coin of the realm.

Apparently only two hundred KWZ 30s have been manufactured to date. During and after our tests, we were in considerable contact with the manufacturer, which has been unusually receptive to critical observations and suggestions from us and others. Clearly, there is no shortage of expertise or will at the German headquarters to improve upon the KWZ 30 in due course. Whether the requisite manpower and capital exists for a redesign anytime soon of a receiver which has only just barely gotten off the ground could well be another matter.

But even as is, the KWZ 30 is a tank tough, serious machine priced well under any other receiver with this level of build quality.

.....  
*This equipment review is performed independently by Lawrence Magne and his colleagues in accordance with the policies and procedures of International Broadcasting Services, Ltd. It is completely independent of the policies and procedures of Grove Enterprises, Inc., its advertisers and affiliated organizations.*

# JAVIATION

Carlton Works, Carlton Street, Bradford. BD7 1DA. U.K.  
Telephone: 011 44 1274 732146 Fax: 011 44 1274 722627  
E-Mail: [info@javiation.co.uk](mailto:info@javiation.co.uk) Web: [www.javiation.co.uk](http://www.javiation.co.uk)

## AOR Accessories RS-8000 & RS-8200 Computer Interfaces

High quality, low cost Interfaces for connecting the AR8000 or AR8200 to a PC. The RS-8000 is supplied with two (one spare) FFC's for use with the AR8000 whilst the RS-8200 plugs straight into the options socket on the side of the AR8200.

Export Price: RS-8000 - £29.99 (\$50 approx)  
RS-8200 - £39.99 (\$65 approx)

Both prices include delivery by Air Mail

## DX-8000 Narrow AM Board

Want to improve performance on your AR8000 on AM Broadcast bands both MW & SW? We now have available a small PCB that fits internally within the AR8000 and allows the narrower SSB filters to be selected when in AM/NFM mode. This can greatly assist with AM listening on crowded Shortwave bands. Once the PCB is fitted the narrower filters can be selected by pressing the LOCAL button and deselected in the same way. This board is exclusive to ourselves and not available from any other distributor.

For further details please give us a call or visit our web page.  
Export Price: £35.00 (\$60 approx) Including Air Mail

For further information on these or any of our products please feel free to contact us via telephone, fax or e-mail. Our Web Pages at <http://www.javiation.co.uk> are updated on a regular basis with news and information on all the latest product releases.

## JAV-232 RS232 Interface

Whilst the AR8000 was the main reason for us producing the JAV-232 it is now compatible with the AR8200, IC-R10 & other Icom equipment, Alinco DJ-X10 and the Optoelectronics Scout together with any other receiver requiring a TTL interface. When used with the AR8000 the JAV-232 is unique in that it not only provides RS232 computer capabilities but also squelch activated tape recording and when used with the AR8200 a NFM discriminator output.

### Main Features

- Fully compatible with many receivers
- Original Sumitomo Flat Flexible Cable (FFC) supplied for use with AR8000
- Robust, Compact Metal Die Cast Case
- 1.0m high quality Multicore Cable
- Well produced Instruction Manual
- 6-pin Din output provides Audio and Squelch Activated Remote Tape Recording for AR8000/AR8200
- Demo versions of leading software included

Export Price: £59.99 (\$95 approx)  
Including Air Mail delivery. FedEx available as an option.



HF, VHF, UHF Receivers from all the leading manufacturers  
ALINCO - AOR - COMMTEL - ICOM - LOWE - STANDARD  
RADIO SHACK/REALISTIC - UNIDEN - WELZ - YUPITERU & OTHERS



## Alinco DJ-X10T Scanner

The Alinco DJ-X10T is a handheld, wide coverage receiver made in Japan for the US market by a company already known for its ham radio equipment.

Multimode frequency coverage extends from 0.1 to 2000 MHz (minus cellular bands) in 20 selectable step sizes from 0.05 to 500 kHz. A knob atop the radio clicks when rotated and serves as a variable frequency oscillator (VFO) knob, channel selector, and menu navigation control.

Our DJ-X10T came furnished with an EBP-37N 4.8 V, 700 mA/h NiCd pack and a sturdy, 11-hour drop-in charging stand. Interesting options include a soft carrying case, an EDC-36 automobile DC power cord, an EPB-34N 1200 mA/h battery pack, and an EDC-59 quick charger. The manual mentions a "dry cell case" but cites no model number.

The DJ-X10T can be cloned to another DJ-X10T or connected to a personal computer, but we do not have the cable or software to test. A "light" version of the software may be

downloaded from <http://www.alinco.com>.

Like the AOR AR8200, the DJ-X10T is loaded with firmware features and is complicated to use. The DJ-X10T instruction manual isn't as helpful as the AR8200 manual and seems choppy. For instance, the purpose of the Programmed Scan Range mode (PMS) is explained on page 26, but the PMS keystrokes are presented starting on page 42. The manual shows a computer/clone jack but provides no explanation of computer control and doesn't list a computer cable as an option.

### Memory

The DJ-X10T supports two variable frequency oscillators (VFOs) and 1200 channels in 30 banks of 40 channels each. Memory banks are cryptically designated A0-A9, B0-B9, and C0-C9. The DJ-X10T would be easier to use if it simply had 26 banks, labeled A-Z.

Each memory channel can be programmed with the frequency, an eight-character label, attenuator, a skip (lockout) flag, and mode (WFM, NFM, AM, USB, LSB, CW, AUTO).

### Scanning and Searching

Comparison with the ICOM IC-R10 is inevitable. Unlike the IC-R10, the DJ-X10T can scan more than one bank at a time. Both models scan slowly through an assortment of VHF/UHF frequencies at only 6 channels per second (see comparison chart). The DJ-X10T rescan delay is about 1 second and we cannot disable or lengthen it.

The Auto Memory Write facility permits you to search between upper and lower frequency limits and store active frequencies only in bank C9. Only 40 frequencies may be stored, and the DJ-X10T stores the same active frequencies over and over rather than checking for duplication.

There are 20 search banks, designated P0-P9 and p0-p9, which you can program with frequency limits and labels. Search banks can be linked together, permitting you to search disjointed parts of the spectrum, e.g., 146 - 148 MHz and 440 - 445 MHz. You can also

search between the frequencies in both VFOs. Up to 50 frequencies per search bank can be locked out using the Pass facility.

A priority feature lets you designate one channel to be checked for activity every 5 seconds while scanning memory channels or searching. The periodic sampling interrupts activity on an active frequency, accompanied by a noticeable noise burst.

### Other Features

The DJ-X10T contains other features which set it apart from simpler scanners:

1. a digital clock with on/off timer
2. a battery saver circuit which can be disabled
3. the ability to scan or search for signals above a selectable threshold
4. the ability to search only channels with a specific mode
5. the ability to clear the contents of all memory channels in a bank
6. a band scope which graphically portrays activity within a band of frequencies 7 or 40 steps wide

### Rugged Construction

This is one of the most ruggedly built scanners since the old Regency HX-1500. With its metal back and snap-on battery pack,



### MEASUREMENTS

#### DJ-X10T PORTABLE SCANNER S/N T000618

#### Frequency coverage (MHz):

0.1 - 1999.9999 MHz,  
except 824 - 850 and 869 - 895 MHz

#### Step sizes (kHz):

0.05, 0.1, 1, 2, 5, 6.25, 9, 10, 12.5, 15,  
20, 25, 30, 50, 100, 125, 150, 200,  
250, 500

**Modes:** AM, WFM, NFM, USB, LSB, CW

**Sensitivity:** see graphs

#### MDS (minimum discernible signal):

0.18  $\mu$ V @ 15 MHz, AM mode

**FM modulation acceptance:** 8.9 kHz

#### Audio output (measured at earphone jack):

125 mW @ 7% distortion

151 mW @ 15% distortion

#### Practical memory scan speed:

6 channels/sec.

#### Search speed: 22 steps/sec.

#### Current consumption at 4.8 VDC:

off - 0.45 mA

manual - 132 mA

scan - 139 mA

full volume - 195 mA

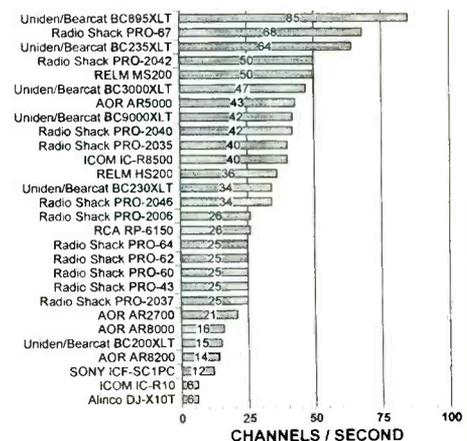
lamp - 66 mA additional

#### Battery saver: after 2 sec. Manual mode

Low battery warning at 4.38 VDC or less

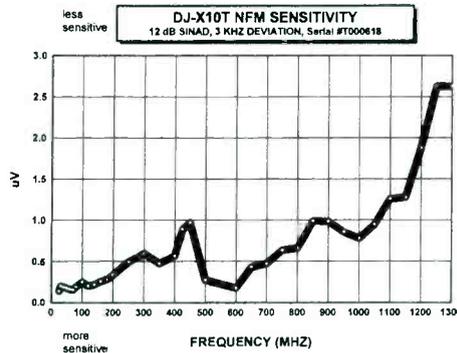
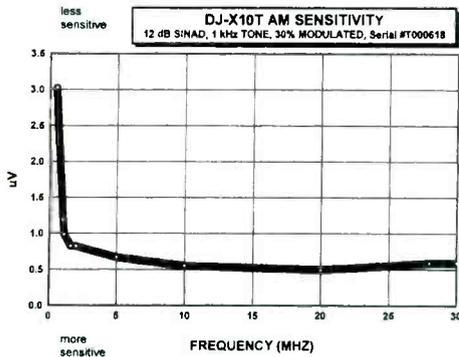
Shutdown at 4.04 VDC or less

### PRACTICAL MEMORY SCAN SPEED



#### Notes:

1. Measurements made on one sample of each model.
2. Measured with memories programmed with unsorted frequencies in various bands and AM and NFM detection modes.
3. Measurements are approximate.



the DJ-X10T looks and feels like a 2 meter walkie talkie. The supplied metal belt clip that holds this hefty radio on your belt is fastened to the back with two machine screws.

The single, multifunction knob is conical and difficult to grasp without your fingers slipping off. The control uses a 1/4-inch fluted shaft so you can easily replace the knob. Squelch and volume are set by a pair of momentary contact rocker switches instead of simpler knobs, and we find this unhandy as well as time consuming.

The Function, Search, Monitor, and Lamp keys are mounted under a black rubber boot on the side of the radio. The labels are not painted, making them difficult to read. The remaining keys are well labeled and widely spaced.

Keypresses are confirmed by a beep tone which can be disabled. The dot matrix LCD screen features adjustable contrast via a keypad sequence, though it's not quite as clear as the AR8200 display. The display contains a 7 bar S-meter and a separate green LED lights when a the squelch is open — a nice touch. Both the display and numeric keypad are backlit in green when the Lamp key is pressed. The lamps can be latched on by pressing a two key combination.

#### ■ VHF/UHF Performance

The stock antenna supplied with our DJ-X10T looks like a 146/440 MHz base loaded rubber whip. Our ICOM FA-1443B dual band rubber antenna provides better VHF-high and UHF reception.

In short, 30 - 1000 MHz sensitivity is good, and we heard few birdies and little intermod. WFM broadcast reception is head and shoulders above the table radio inside our steel and concrete office.

The DJ-X10T squelch can be set to one of 10 levels, labeled SQ0 - SQ9. SQ0 disables the squelch so white noise is heard in between transmissions. We keep the squelch set to SQ3 or higher, otherwise it opens at inappropriate times, especially when the battery saver is active.

The DJ-X10T instruction manual does not specify the IF (intermediate frequency) scheme, and this information is omitted from the AR8200 manual as well. Filters inside the DJ-X10T imply 0.455, 10.7, and 45 MHz IFs. Our tests indicate a first IF of 736.25 or 275.45 MHz, depending on the frequency to which the DJ-X10T is tuned. Our DJ-X10T hears images of cellular phone signals clearly in the 1419.9 - 1444.9 MHz range, 550.9 MHz above their actual frequency. We measured a sensitivity of 0.41 - 0.56 µV (12 dB SINAD) to these cell images.

#### ■ Shortwave Reception

None of the handheld wide spectrum scan-

ners we've tested provides good shortwave reception with the supplied antenna, and their tiny knobs make band surfing difficult. The older, larger shortwave portables, like the Sony 2010 and Magnavox D2935, run circles around them.

Our DJ-X10T hears better on shortwave than the AOR AR8200 we tested. Passable shortwave reception requires the DJ-X10T be used with a longer antenna, but not too long. A 132 foot dipole overloads our DJ-X10T, necessitating use of the built-in attenuator.

#### ■ Overall

With a street price under \$400, the Alinco DJ-X10T is ruggedly built and sized just right. It can be powered by a variety of battery packs, in probably the best arrangement of any scanner. We like the solid VHF/UHF performance, wide frequency coverage, and memory bank flexibility.

Like the IC-R10 we tested, our DJ-X10T's main drawback is that it scans too slowly. The bank naming convention is obscure and complicates programming. The Auto Memory Write operation should not store duplicate frequencies, and the user should be able to assign a 2 to 3 second rescan delay on a per-channel basis.



## Alinco DJ-X10T

Covering 100 kHz-2000 MHz (less cellular), the triple-conversion Alinco DJ-X10T monitors AM, NFM, WFM, USB, LSB, and CW. A Channel Scope provision visually displays 40 channels simultaneously so you can quickly tune to a nearby signal as soon as it appears on the screen.

Help messages assist you choose your level of operation from beginner through expert! The alphanumeric display allows you to name-tag each channel's contents for instant ID. Auto-memory write automatically stores frequencies discovered during unattended searching--up to 1200 channels in 30 banks.

Highly versatile scanning modes include 10-group program, programmed memory, selected mode, dual-VFO, linked-range, and priority. Up to 1000 undesired frequencies may be locked out from the scan/search sequence.

Additional features include auto-timer, clock, cloning, demo mode, key lock, priority, display contrast, low battery alarm, VFO>memory entry, selectable attenuator, and backlight.

**Call Grove Today  
to Place Your Order!**

**ORDER  
WBR 2  
Only \$389<sup>95</sup>** plus \$10 US Priority Mail or  
UPS 2nd Day Air Shipping

**GROVE ENTERPRISES, INC. (Visit us at [www.grove-ent.com](http://www.grove-ent.com))**  
(800) 438-8155 (US & Canada); 828-837-9200; 828-837-2216 (Fax)  
7540 Hwy 64 W, Brasstown, NC 28902; e-mail: [order@grove.net](mailto:order@grove.net)

## DC-to-Light Communications

**W**hen you hear the word “wireless,” what do you think of? Most of us would probably answer, “radio waves.” However, in today’s developing personal computer market, another wireless technology is being developed for short distance data communications: IrDA is the acronym and light is the media.

But first, let me give you some of my impressions after using WinRadio’s new, dc-to-light, external computer receiver — the WR1500e — for a few weeks.

Last time, we loaded the WR1500e software and hooked up the “box” to a laptop. Since then, we have tried both the serial connection and the PCMCIA card radio/computer connection. The latter appeared to be faster. But in either case the procedure could not have been simpler or easier. As we saw last time, the software for the WR1000 and the WR15000 appear to be exactly the same. The only difference is the allowable frequencies which the user can enter. The WR1000 stops at 1.3 GHz, while the 1500e goes up to 1.5 GHz. On the low end, the WR1000 stops at 0.5 MHz and the WR1500e goes down to 0.15 MHz, covering the aero/marine beacons and longwave broadcast stations.

The installation program had us up and running in a matter of minutes. We started our monitoring in the shortwave band around 6 MHz. The WR1500e comes with a wire antenna that has shielded cable on the first few feet, close to the receiver/computer. This is an attempt to minimize computer noise. However, as we have previously suggested, and is reiterated by WinRadio in their “Read Me Please” enclosure, a tuned antenna or preselector is advised for more than casual monitoring when using any wide-band receiver.

Not heeding our own advice, I just gave a quick tune to the 6 MHz shortwave broadcast band using the wire antenna. On this September evening you can see from Figure 1, the Spectrum Scope, that the band was quite crowded. Yet we were able to clearly listen to seven stations. Five other stations were about 80% in the clear. An additional five stations varied from listenable to impossible. Not bad for crowded, high powered, broadcast listening. But what about my first monitoring love, utilities? Using an *MT* column, we (my wife reading and me typing) entered a batch of USAF HF frequencies.

Since the WR1500e has separate USB and LSB modes, tuning utility and ham stations is easy. As we used the channel scan feature, 6.739 MHz came alive. Then 15.016 MHz went active. Again, not bad. But now, I wanted to use the WR1500e where I believed it would outshine all competitors: VHF, UHF and SHF.

### ■ Up, Up and Away

Even on the wire antenna, I was able to monitor lots of unicomms at small uncontrolled airports up to 60 miles away. Using WinRADiO’s excellent Digital Suite Software, ACARS messages were non-stop the next morning. The WR1500e made scanning the civil aircraft band a thrill once again. Digital Suite is a WinRADiO program, sold separately, which really provides excellent scanning and decoding features (See May ’98 Computers & Radio column for a more detailed discussion of Digital Suite.)

The WR1500e specs say that the receiver has better than a 25% increase in sensitivity over the WR1000 in the 30 to 1000 MHz range using the FM narrow mode; and you can really hear it!

With a whip antenna replacing the wire, I tuned to the 150 MHz service band. The WR1500e did not disappoint me as it pulled in paging stations from over 70 miles away and police, fire and medical services from up to 60 miles away. The Digital Suite’s Packet Decoder worked well on a pair of two meter (144 MHz) packet stations about 50+ miles, as the crow flies, from my shack. Ham repeater stations were heard all over the band.

### ■ It Gets Even Better

I usually look with envy on reports of military UHF airband (200 to 400 MHz) intercepts. A few years ago, while living near Cape Kennedy, I had no shortage of milair traffic. But from my current location, I usually cannot hear any military aircraft. That is, until I tuned the WR1500e to a list of UHF: mid air refueling, flight service stations and tower/approach mil frequencies at civil airports. I don’t know whether it was luck, propagation, timing or just a very hot radio. But the WR1500e crackled with milair activity all day. In a side-by-



**FIGURE 1.** WR1500e Spectrum Scope - 6 MHz band in Sept

side comparison, the WR1500e proved to be more sensitive than my PRO-2006 on the UHF mil frequencies.

Up at 451 MHz lives our department of public works (DPW) and small local business communications. When the weather is bad, this is the place to be, as the DPW moves into action. The WR1500e pulled in DPW stations from 40 miles away, about twice the performance of my scanner. Lots of taxis, plumbers, building contractors and heating companies were heard from up to 60 miles away. Using the Digital Suite’s Signal Classifier Module made scanning much more reliable, minimizing the annoying false stops that occur on most scanners.

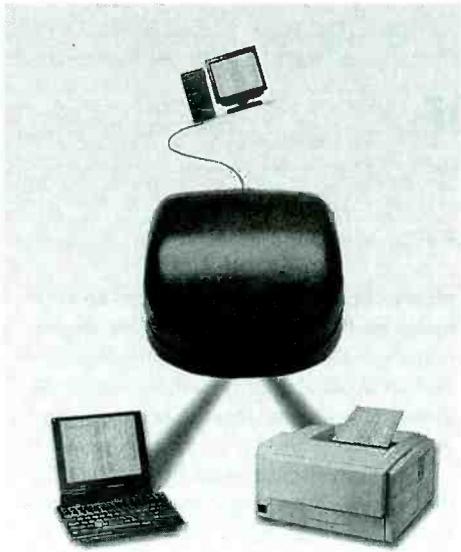
### ■ Enough already

By now you must know that I think the WR1500e, together with the Digital Suite, make a useful shortwave receiver and a very powerful VHF/UHF receiver; perhaps one of the best I have ever used. However, no Catalano column would be complete without a “changes I’d like to see” section.

One change I’d like to see is that the audio output power be increased. It’s fine for most listening. But at 200 milliwatts it’s not much more powerful than a transistor radio, and can be a problem in a high ambient noise environment. One simple solution is to use a powered speaker. Grove sells a number of powered speaker products that would be good candidates.

The WR1500e’s scanning speed is maxed out at 50 channels per second. It’s not bad. It’s not the fastest thing on the scanner block. But overall, the WR1500e, as a VHF/UHF/SHF receiver, rated an excellent in my book.

The computer and monitor you use affect the amount of digital noise. But using the WR1500e with a Fujitsu 735 DX Lifebook resulted in a pretty “quiet” monitoring setup. At \$549.95 the WR1500e is a real value. The WR1500e is available from selected dealers. In the USA, you can check Grove for latest



**FIGURE 2.** AirData Mouse - The only desk mouse with a light communications transceiver inside

pricing and availability. Check out the WinRadio website at [www.winradio.com](http://www.winradio.com) for dealers, software upgrades and more.

### ■ The Other Wireless

If you own a laptop, palmtop, hand PC (perish the thought) or a personal data assistant (PDA) such as the PalmPilot, take a look around the case. Did you find a dark (red/black) window? If so, you already have 50% of a wireless data communications network. No, not wireless like in radio. Wireless, like in light beam communications. This dark red lens may be your entry to the future of personal wireless data communications.

Welcome to the IrDA port. IrDA, Infrared Data Association, is a group of 120+ major computer companies who have formed a consortium and produced a wireless data transmission standard using infrared beams. The first standard, IrDA version 1.0, has a range of 3 meters and a data rate of up to 117 kbs. The whole concept is very user friendly and has been around for a number of years. Even my vintage 1995 IBM 701C ThinkPad has an IrDA port. IrDA makes sharing files between your portable computer and your desktop computer/scanner/printer system simple, easy and convenient.

### ■ What! No Desktop IrDA Port?

You say your desktop does not have an IrDA port? Neither do over 90% of all the desktops made to date. Well, now that's no problem. A company in Vermont, Selectech Ltd., makes a fully functional desk mouse, AirData Mouse, for use with any computer with a serial port and running Windows 95 or

98. See Figure 2.

Inside the AirData Mouse is a complete IrDA transceiver. Selectech patented the "IrDA in a mouse concept" in 1997. So now any Win 95/98 PC (laptop or desktop) can transmit and receive infrared data from any IrDA device; even another AirData Mouse. For example, the AirData Mouse provides wireless connections to IrDA capable laptops from IBM, Compaq, Fujitsu and lots of other laptop manufacturers. Existing IrDA products include: Canon's BJC-80 color printer, HP's IrDA printers, IBM laptops, IrDA compatible electronic cameras and lots of soon-to-be released IrDA peripherals. Even Hand PCs like the Cassiopeia have a built-in IrDA Port.

To use AirData Mouse I went to the IrDA icon on the Control Panel. Clicking the "new driver" menu, I loaded the included AirData Mouse driver disk. Next, you'll be prompted to re-boot your machine. Choose the "Shut Down" option, if you are given a choice. After you shut your computer off, disconnect your existing desk mouse. Then install your AirData Mouse in your serial port and connect it into your keyboard port for power. No external "wall wart" is needed. When you turn your computer on, Windows will identify the AirData mouse as a "new device."

### ■ Broadcasting Data

Now double click the IrDA shortcut which appears on your desktop. Click "Enable" and the transceiver will be activated. If another IrDA device is in range, the two will automatically make a wireless connection and tell you who is "talking" to you. If the "link" is broken, your computer will continue searching for another IrDA transmission.

AirData Mouse, including all cables and adapters, is \$49.95 and is available from Selectech at (802) 878-9600. See their web site at [www.selectechltd.com](http://www.selectechltd.com). Mentioning John from MT's Computer and Radio column will get you free ground shipping. This offer is good for up to 30 days after this issue hits the newsstands.

### ■ Windows CE Feedback

Wow! I think I stirred up a hornet's nest with this one. I felt I was duped by the name and the marketing hype, since WinCE is not compatible with Win 3.1, 95, NT or 98. However, half of the Emails and letters I received held a very positive opinion of Windows CE. The rest of the readers think I hit the nail on the head.

The computer retailers I've spoken with at a recent trade show expect Windows CE Hand PC to be the "real big" sellers of the 1998 Christmas Season.

Windows was not the first, nor is it the only

graphical user interface (GUI). The old Atari ST system and the MAC used GUIs. So why did Microsoft see fit to name all their GUIs "Windows"? If they were all downward compatible, as 3.1, 95 and 98 are, then there may have been a logical reason. But if CE is not at all compatible, why use a misleading name? Time will be the judge. I did see a shareware website with a Windows CE section. If it's of any use we'll take a quick look at it. Till next time.

**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](http://www.antiqueradio.com)

## LONGWIRE BALUN

- Use coaxial cable from antenna to receiver for less noise.
- Matches antenna to coax for more signal strength.
- Static charges go to ground, not through the radio.
- For 500 KHz to 30 MHz.

Model MLB-1 ..... \$49.95  
+ \$6 S&H. Tax in Calif.

## AMPLIFILTER

- Improves shortwave reception.
- Cuts overload & crossmod from local AM and TV/FM stations.
- 20 dB gain or attenuator. Low/Highpass filters.

Model PA-360 (for 12v DC) ..... \$89.95  
+ \$6 S&H. Tax in Calif.

Model PS-90 AC Adapter ..... \$9.95

Send for FREE catalog

**PALOMAR**

BOX 462222, ESCONDIDO, CA 92046  
TEL: 760-747-3343 FAX: 760-747-3346  
e-mail: [Palomar@compuserve.com](mailto:Palomar@compuserve.com)

# Kiwa Earth Monitor

By Kevin Carey

**A**lthough Kiwa Electronics is best known for their line of receiving accessories, the addition of the Earth Monitor™ now puts a receiving device in their product lineup. The Earth Monitor is capable of tuning into the fascinating realm of “natural radio”—the study of signals from planet Earth. These signals include “sferics,” “tweeks,” “whistlers,” “dawn chorus,” and other phenomena occurring in the Extremely Low Frequency (ELF) and Very Low Frequency (VLF) radio spectrum. The unit detects a broad band of signals from 10 Hz to 15 kHz.

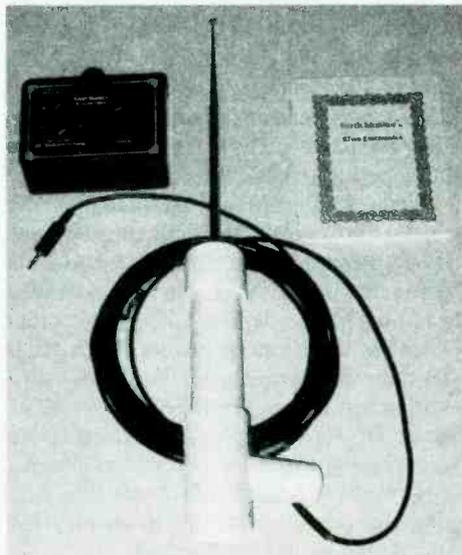
Not too many years ago, the only practical way to hear natural radio was to build your own detector, or adapt some other piece of equipment such as an audio amplifier or selective voltmeter. Even today, there are few commercial units available, so it’s refreshing to see a new entry to the field from a respected firm. It confirms my belief that we are entering the “golden age” of natural radio.

## ■ Product Overview

The Earth Monitor is a compact, portable unit measuring 3" (76 mm) x 4.5" (114 mm) x 2.25" (57 mm). It is designed to run from six internal AAA batteries or from an external source of 6 to 15 Vdc. The unit draws only 22 milliamperes, so battery life should not be a major concern. For long trips, however, the external power feature allows operation of the set from a car battery or other high capacity source.

The Earth Monitor shipment includes the detector itself, antenna (more on this later), and an instruction manual. All you need to supply are batteries (or external power) and a pair of headphones. Kiwa recommends using 30 to 600 ohm headphones such as those included with personal stereos.

The rear panel of the device includes connections for signal input, headphones, external power, and record output. I especially like the provision for recording; it provides an easy way to capture those moments when natural radio signals are at their best. The record output is at a constant



*The Kiwa Earth Monitor includes everything you need to get started in the world of natural radio. (Antenna pictured was first design as tested by this author.)*

level and does not vary with the setting of the unit’s volume control.

## ■ Reception

It is well known that you should be far away from power lines and electrical equipment when you listen for natural radio signals; if you’re not, 60 Hz hum can wipe out all but the strongest signals. Despite this, I decided to begin by testing the receiver in a “worst case” environment—my radio room. To my surprise, some “swooshy” whistlers and pings were heard right away, and the 60 Hz hum was not nearly as bad as I had expected. The credit for this goes to the filters built into the Earth Monitor.

Another surprise came when I was able to hear the weak but distinguishable beeps from the Russian Alpha system on 14 kHz. Although my interest was in hearing natural radio signals, it was reassuring to hear these VLF radio beeps.

Encouraged by these initial tests, I drove a few miles into the country to get away from high voltage power lines. When I reached a point about a half-mile from the nearest line, I turned the set back on and was greeted by

plenty of clearly audible whistlers and virtually no hum. A bee flying near the antenna was also clearly heard! Insects generate electrostatic energy as their wings beat through the air, and this can often be heard on ELF receivers.

I had excellent results by just holding the antenna base in my hand, though the manual recommended it be mounted 10 feet above the ground. However, to reduce interference problems Kiwa is now redesigning the entire antenna to incorporate a grounding stake and a 20-foot spool of antenna wire instead of the 33-inch telescoping antenna.

The antenna is just one type of input sensor planned for the signal detector. According to the manual, Kiwa intends to make other types of sensors available, such as a parabolic microphone for listening to birds, and a hydrophone for listening to dolphins and whales. These will certainly add versatility to the unit!

The manual for the Earth Monitor is brief but complete; its shirt pocket size makes it ideal for use in the field. Besides covering the operation of the unit, the manual describes the types of signals you can hear and sets reasonable expectations for listening success. My only complaint is that the type size proved a challenge even for my nearly 20/20 vision.

## ■ The Bottom Line

The Kiwa Earth Monitor has a sturdy, substantial feel, and its on-air performance exceeded my expectations. If you’ve been hearing about natural radio for years, but have never actually tuned in, this unit will bring the signals to life with minimal fuss. At \$145 it’s priced a bit higher than some other VLF receiving devices, but, in my opinion, this is justified by the quality of the unit and its ease of operation.

For more information contact Kiwa Electronics, 612 South 14th Avenue, Yakima, WA 98902, or visit their web site at <http://kiwa.com>. The Kiwa web site also contains a link to Stephen P. McGreevy’s excellent tutorial on natural radio (highly recommended).

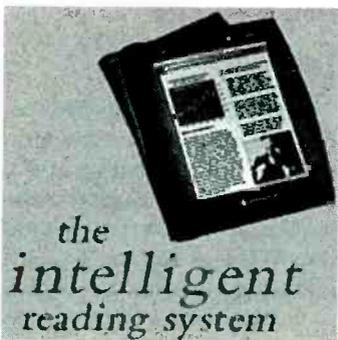
# WHAT'S NEW?

TELL THEM YOU SAW IT IN MONITORING TIMES

## Gearing up for Christmas

Every year new technology offers up more gadget goodies. Here are a few our readers have sent in.

As computer chips become increasingly sophisticated, they are changing the nature of children's



toys. Here are some examples: Lego Mindstorms allows children to build robots that interact with their environment. Interactive dolls are being introduced by a number of companies: computer chips allow the dolls react differently to various ways of squeezing or touching, interact with associated television programs, change what they say or do according to external stimuli, and/or be programmed with specific information about the child. These include Microsoft ActiMates, Amazing Amy by Playmates Toys, My Interactive Pooh by Disney, and Toyriffic's Takin' Care of Baby.



Softbook Press, [www.softbook.com](http://www.softbook.com).



How about electronic books? Three approaches are making their debut this fall or early next year. You can read more about them at the following web sites: NuvoMedia's Rocket eBook [www.nuvomedia.com](http://www.nuvomedia.com); Softbook by



com; Everybook's EB Dedicated Reader, [www.everybk.com](http://www.everybk.com).

You'd better use tact if you put the Body Logic (available at K-Mart) by Omron Healthcare under the tree. Hold onto the handles for seven seconds and an undetectable electric current will read out the user's body-fat, accurate to tenths of a percent.

In addition to the dangers of plastic melt-down, the likelihood of credit card loss or theft increases during holiday shopping.

## Hear Natural Radio Signals From Our Own Earth!

Join the ranks of the new radio explorers—scientists and hobbyists alike who are listening to very low frequency sounds emanating from the earth!

Now you can hear "sferics"—whistlers, tweeks, even the dawn chorus. Adjustable filters allow you to peak the signal of interest.

Detecting signals in the 10 Hz-15 kHz range, the Earth Monitor is equipped with output jacks for headphones (included), tape recorder, and an input jack for the remote field probe (probe and 15' cable included). Requires 6 AAA cells. A free cassette of natural radio sounds is included.

**CALL GROVE TODAY!**

**New!**

**The Kiwa VLF "Earth Monitor!"**

ORDER RCV27  
Only **\$144<sup>95</sup>**

Please add \$10 2nd Day UPS or US Priority Mail.

**GROVE**

Grove Enterprises, Inc.

7540 Highway 64 West

Brasstown, N.C. 28902

(800) 438-8155 US & Can.

(828) 837-9200

Fax (828) 837-2216

e-mail: [order@grove.net](mailto:order@grove.net)

World Wide Web: [www.grove-ent.com](http://www.grove-ent.com)

Now you can be alerted any time your credit card is out of its usual slot with the "Beeping Wallet," [www.beepingwallet.com/](http://www.beepingwallet.com/) Once the card is removed, the wallet will beep every 20 seconds until it is restored—or until five minutes have passed.

## The Wireless Weather Station



Davis Instruments, famous for its quality weather instruments, just made installation much simpler. Now you can mount your instruments in their weather-tight shelter atop a roof or mast with no wires or cables necessary. Their data is transmitted in the 900 MHz band to be received by the display module as much as 400 feet away. Each station comes preassembled and includes

premounted sensors, radiation shield, transmitter, and AC adapter for the remote station; plus a display module with its AC adapter. A lithium battery is provided for the sensor if there is no AC outlet, or a solar package is also available.

If you already own a Davis weather station, three new wireless options will allow remote access to its data — Spread-Spectrum Radio Modem, UHF Radio Modem, and Cellular Telephone Modem. These radio modems support a number of transmission ranges and can be operated point-to-point or point-to-multipoint. Solar power options are also available for locations without an external power source. Your choice of radio option will also need to be paired with an antenna installation kit.

Pricing varies widely depending upon the system you design for yourself, so for more information and a free catalog, call 1-800-

678-3669 or visit [www.davisnet.com](http://www.davisnet.com)

## Big Features in a Compact Package

The new Icom IC-746 general coverage transceiver is guaranteed to please almost any ham. The tidy, nearly 1-foot square package, provides all-mode communications on amateur HF (1.8-28 MHz), 6 meter (50 MHz), and 2 meter (144 MHz) bands—all at 100 watts output — plus reception of 30 kHz to 60 MHz and 108-174 MHz.

Digital signal processing (DSP) provides noise reduction, automatic notch filter, and three



selectable passband widths (80 Hz, 160 Hz, and 320 Hz) to fight interference and augment the audio signal.

The digital display provides a band scope to monitor radio activity, along with signal strength indicator and other easy-to-read informational displays. Three antenna inputs are provided.

The IC-746 suggested retail price is \$2,228. For more information, see your Icom dealer or visit [www.icomamerica.com](http://www.icomamerica.com).

## Are you into Leather?

The little mini-handheld receivers and transceivers are amazingly convenient, but there is a built-in liability—as anyone who has leaned over to tie his shoe has discovered as his sophisticated radio slips out of his shirt pocket.

Cutting Edge Enterprises has an equally classy solution—the

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

## SCANCAT GOLD for Windows "SE"

Since 1989, The Recognized Leader in Computer Control

**NOW SUPPORTS**  
 • FULL TRUNKING UNIDEN BC-845  
 • ICOM IC-PCR1000  
 (incl. band scope)  
 • YAESU FT-847

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 OS456/535), Lowe HF-150, and Watkins-Johnson.

### SCANCAT GOLD FOR WINDOWS "SE" FEATURES

- Selective Sound Recording using PC-compatible sound card.
- "Point & Shoot" playback by individual hits.
- Demographic search for frequency co-ordination and 2-way Usage Analysis.
- Detailed logging to ASCII type files with DATE, TIME, Sig Str, Air Time.
- UNLIMITED file sizes with our exclusive SCANCAT filing method.
- Exclusive "MACRO" control by frequency of Dwell, Hang, Resume.
- Sig. Threshold and even 6 separate programmable, audible alarms.
- Command line options for TIMED ON/OFF (Unattended) logging/searches.
- Run as many as 6 different C/I-V addressable radios as "Master/Slave."

### SEVERAL GRAPHICAL ANALYSIS MODES AVAILABLE

- With Scancat Gold for Windows "SE," your spectrum never looked so good! Load virtually "any" database and Scancat "SE" will examine your database, plot each and every frequency, no matter what the range... and "paint" the entire analysis on your screen.
- By Signal Strength per frequency in a "histograph".
- By Signal Strength plotted in individual dots.
- By Number of hits per frequency in a "histograph".
- IF THAT ISN'T ENOUGH, try this... Multicolored, 3-D "Spatial/Landscape" (Depicted at left).

SCANCAT GOLD "SE".....\$159.95 + S & H\*      UPGRADE SCANCAT GOLD FOR WINDOWS "SE".....\$59.95 + S & H\*      \*\$5 U.S. \$7.50 FOREIGN

### SCANCAT'S WINDOWS FEATURES

- Unattended Logging of frequencies
- Scan Create Disk Files
- Spectrum Analysis to Screen OR Printer
- Supports PerCon, Mr. Scanner, and Betty Bearcat CD Roms.
- LINK up to 100 Disk files or ranges.
- Scan VHF & HF Icom's Simultaneously.
- MULTIPLE search filters for Dwell/Scanning.
- Search by CTCSS & DCS tones with OS456/535 or DC440 (ICOM only).
- INCLUDES several large shortwave and VHF/UHF databases
- UNIQUE database management system with moveable columns. Even SPLIT columns into doubles or triples for easy viewing of ALL important data on one screen.
- Exclusive SLIDE RULE tuner. Click or "skate" your mouse over our Slide-Tuner to change frequencies effortlessly! OR use our graphical tuning knob.
- VERSATILE "Functional" spectrum analysis. NOT just a "pretty face". Spectrum is held in memory for long term accumulation. Simply "mouse over" to read frequency of spectrum location. "CLICK" to immediately tune your receiver. You can even accumulate a spectrum from scanning DISKFILES of random frequencies! DIRECT scanning of most DBASE, FOXPRO, ACCESS, BTRIEVE files WITHOUT "importing".

SCANCAT GOLD FOR WINDOWS (NON-"SE").....\$99.95 + S & H\*      UPGRADE.....\$29.95 + S & H\*      \*\$5 U.S. \$7.50 FOREIGN

### 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, ASCII text, comma delimited, HTML, DBase, ScanStar, RadioManager and ScannerWear.
- NEW WINRADIO. "WRM" files and PCR1000 "MCH" files.

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

LIMITED TIME OFFER!  
 Limited Time Thru 10/31/98

MAGIC FOR WINDOWS PACKAGE  
 Purchase MAGIC FOR WINDOWS (Retail \$34.95)

with any of our software programs and receive a \$10 discount from your total purchase price. Plus, you will also receive our Disk Full of Frequencies (Retail \$15) FREE! Please Ask For Special "MCG-PKG"

### "UNI-VERSATILE" INTERFACE

- Supports ICOM/IC-R10, AR8000, YAESU and SCOUT.
- Comes with 6 FOOT cable, 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 Tune" scout with NO modifications to radio.



NOW IN STOCK

DEALER INQUIRIES INVITED

INTERNET WEB ADDRESS - <http://www.scancat.com> WEB E-MAIL - [scancat@scancat.com](mailto:scancat@scancat.com)

Order direct or contact your favorite dealer

**COMPUTER AIDED TECHNOLOGIES**

P.O. Box 18285 Shreveport, LA 71138

Phone/Orders: (318) 687-4444 FAX: (318) 686-0449

Info/Tech Support: (318) 687-2555 (9 am - 1 pm Central M-F)

FREE DEMOS ON THE WEB



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



Radio Glove. Made of glove-quality leather with punched speaker holes, these pouches are custom designed for the Yaesu VX-1R, Icom IC-Q7, Standard

C508A, C108A, and Alinco DJ-CIT, DJ-C4T, and DJ-C5T. The belt clip is also covered in leather and the pouch closes with heavy-duty Velcro. A lanyard is also provided.

The Radio Glove provides protection for the radio in case it is dropped, but why not prevent the drop in the first place? The Radio Pocket PROtector, also made of fine leather, fits into the breast shirt pocket, holds the radio upright and keeps it from falling out, and even has room for a pen and a spare antenna.

Both pouches retail for less

than \$20. Call 800-206-0115 or 408-429-5384 for a distributor near you, or write Cutting Edge Enterprises, 1803 Mission St., Suite 546, Santa Cruz, 95060. (Although we verified a reported problem with the 800 number last July, it was apparently temporary.)



## Stray Signal Detector

Speaking of miniature, here's one for the Christmas stocking! Grove has a tiny new signal detector which measures a scant 1-1/2 inch by 2 inches. The MicroAlert, manufactured by TriField, beeps in the presence of radio signals from 100 kHz to at least 3000 MHz,

revealing the presence of concealed transmitting devices, stray radio fields from equipment such as computer terminals, nearby radio transmissions, and much more.

The beeps become more frequent according to signal strength, becoming continuous if the strength is twenty times the selected threshold level. A switch selects between a standard or high sensitivity level, though further adjustment is possible with a set screw. Using the standard threshold, the unit beeps at about 100 feet of a cellular tower, or at 300 feet when set on high.

The MicroAlert uses a lithium battery with a 10-year shelf life. It's available from Grove Enterprises (800-438-8155 or [www.grove-ent.com](http://www.grove-ent.com)) for \$69.95. While you're asking, check out the upgraded TriField broadband signal detector if you need something more sophisticated.

## A Techie Christmas



Here's a toy I might keep for myself! American Technology has come out with the Model 310 Desktop Calculator Clock Radio. Yup, all in one. Time is shown in hours, minutes, and seconds, plus year, month, and date, and a 200-year calendar up to 2099. A world time function shows the time in 24 major cities. The alarm functions as buzzer or radio.

The AM/FM radio (no expanded band) sports a rotating telescopic antenna, plug for an AC adapter and earphone jack.

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

## CAT-5000

### SPECTRUM ANALYSIS ON YOUR PC

Only \$99.95 + S & H

- With the addition of AOR's SDU-5000 Spectrum Analyzer and this NEW Windows Software any radio that has a 10.7MHz IF output will give you full computer controllable spectrum analysis.
- Plus, with the listed radios below, you can have a complete computerized control of receive frequency, direct frequency readout, and a spectrum bandwidth (variable from 500KHz to 10 MHz)
- Just use your mouse to "arm chair" the controls. Never touch the radio once the software is running.

#### Supports

- AR3000A 5000
- R7000, R7100 ICOM
- Most ICOMs with 10.7MHz IF

#### Features

- Variable bandwidth, up to 10.7 MHz.
- Instant Readout of Frequency any place on the PC's Display.
- Instant change of center frequency with a simple mouse click.
- "Indicates for above listed radios only."
- Save Spectrum data to disk. Playback of Recorded Spectrum data from disk.
- Signal Averaging, PLUS our exclusive "VARI-COLOR" Analysis.
- Variable Peak Readout.
- THREE different graphical analysis modes.
- Download our demo for test drive.

Minimum Requirements • IBM PC 8 meg ram. • Windows 3.1 or later. • 8 meg Hard Drive

## COPYCAT-PRO

The ONLY Commercially Available Computer Control Program for the Universal M-7000 & M-8000. Also, AEA's PK-232 and the MFJ-1278

### COPY-CAT PRO FEATURES

- 32K incoming text buffer.
- Runs on any 640K PC-Compatible.
- Control BOTH you TNC and radio simultaneously!
- Multiple pop-up windows for HELP, frequency files, and text editor.
- Supports ALL SCANCAT files.

Discover our revolutionary COMPUTER CONTROL PROGRAM for the M-7000, M-8000, PK-232, and MFJ-1278. Let COPYCAT-PRO free you FOREVER from remembering all those buttons and keys. COPYCAT-PRO does it all! Simple "PULL-DOWN" menus control all functions! Fully editable text buffer, 20 PROGRAMMABLE "menus" and much more

COPYCAT-PRO \$79.95, UPGRADES \$24.95 S+H \$5.00 (\$7.50 Foreign)  
Specially wired cable for the M-7000/8000 \$24.95

## CAT-WHISKER

### TIRED OF YOUR HANDHELD SCANNER FALLING OVER?

- Try our unique, swivel base, telescopic scanner antenna. CAT-WHISKER lets you lay your handheld scanner on its back and still keep the antenna vertical!
- Swives to ANY angle, adjusts to any length.
- Fits ANY scanner with a BNC antenna connector.

CAT-WHISKER #1 (5 to 23 inches)...\$19.95  
CAT-WHISKER #2 (6 to 36 inches)...\$24.95  
plus \$3.00 S & H

## HOKA CODE-3 USA Version

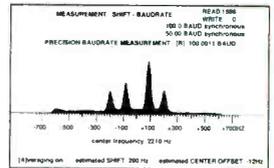
"The Standard Against Which All Future Decoders Will Be Compared"

Many radio amateurs and SWLs are puzzled! Just what are all those strange signals you can hear but not identify on the Short Wave Bands? A few of them such as CW, RTTY, Packet and Amtor you'll know - but what about the many other signals?

There are some well known CW/RTTY Decoders but then there is CODE-3. It's up to you to make the choice, but it will be easy once you see CODE-3. CODE-3 has an exclusive auto-classification module that tells YOU what you're listening to AND automatically sets you up to start decoding. No other decoder can do this on ALL the modes listed below - and most more expensive decoders have no means of identifying ANY received signals! Why spend more money for other decoders with FEWER features? CODE-3 works on any IBM-compatible computer with MS-DOS with at least 640kb of RAM, and a CGA monitor. CODE-3 includes software, a complete audio to digital FSK converter with built-in 115V ac power supply, and a RS-232 cable, ready to use. CODE-3 is the most sophisticated decoder available for ANY amount of money.

26 Modes included in PROFESSIONAL package Include:

- Morse \*
- RTTY/Baudot/Murray \*
- Sitor CCIR 625/476-4
- ARQ - Navtex \*
- AX25 Packet \*
- Facsimile all RPM (up to 16 gray shades at 1024 x 768 pixels)
- Autospec - Mk's I and II
- DUP-ARQ Artrac
- Twintplex
- ASCII \*
- ARQ6-90/98
- SI-ARQ/ARQ-S
- SWED-ARQ-ARQ-SWE
- ARQ-E-ARQ1000 Duplex Variant
- ARQ-E3-CCIR519 Variant
- POL-ARQ 100 Baud Duplex ARQ
- TDM242/ARQ-M2/4-242
- TDM342/ARQ-M2/4
- FEC-A FEC100A/FEC101
- FEC-S - FEC1000 Simplex
- Sports info 300 baud ASCII
- Hellsreiber-Synch/Asynch \*
- Sitor - RAW (Normal Sitor but without Synch).
- ARQ6-70
- Baudot F789N
- Pactor \*
- WEFAX \*



Simulated Speed Measurement Module

#### EXTRA OPTIONS

	REG. PRICE
Piccolo	\$85.00
Coquelet	\$85.00
4 special ARQ & FEC systems:	
TORG-10/11	
ROU-FEC/ RUM-FEC,	
HC-ARQ (ICRC) and	
HNG-FEC	\$115.00
SYNOP decoder	\$85.00

### PROFESSIONAL CODE-3 DECODER

\$595.00 + S & H

Includes: ALL Modes, Plus Oscilloscope\*, ASCII Storage, Auto Classify\*, and PACTOR\* Options

with ALL EXTRA OPTIONS \$795.00 + S & H

### CODE 3 - GOLD VHF/SW DECODER

\$425.00 + S & H

includes POCSAG & ACARS Plus \* Modes/Options

with ALL EXTRA MODES/OPTIONS \$595.00 + S & H

ALSO AVAILABLE - HOKA CODE-30 DSP-based Professional Decoder - CALL FOR PRICE

INTERNET WEB ADDRESS - <http://www.scancat.com> WEB E-MAIL - [scancat@scancat.com](mailto:scancat@scancat.com) (S & H \$10 US, \$15 Foreign)

Order direct or contact your favorite dealer

COMPUTER AIDED TECHNOLOGIES

P.O. Box 18285 Shreveport, LA 71138

Phone/Orders: (318) 687-4444 FAX: (318) 686-0449

Info/Tech Support: (318) 687-2555 (9 am - 1 pm Central M-F)

FREE DEMOS ON THE WEB



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

For battery power, it requires three AA alkaline batteries (not included). Other functions use two button cell batteries which are provided.

Last, but not least is a large-display calculator which folds out on a slant for easy operation. This nifty gift idea, which retails for about \$51.99, is marketed by the American Technology Corporation (800-417-2346 or visit [www.atcsd.com](http://www.atcsd.com))

## Remember the "Wow!"

You can take your place in the history of the search for extra-terrestrial intelligence (SETI) and get to keep a piece of it, too, when you make a minimum \$100 tax-deductible contribution to The SETI League, Inc. One hundred pieces of the now-dismantled Big Ear Radio Telescope at Ohio State University have been mounted on a wooden plaque along with a depiction of the August 15, 1977, signal which made the OSU SETI famous. According to the promo, "These sections of antenna reflector were actually illuminated by the 'Wow!' signal, the most tantalizing (yet unconfirmed) evidence to date of extra-terrestrial intelligence."

Send your contribution to The SETI League, Inc., PO Box 555, Little Ferry, NJ 07643. (Visa or



MasterCard accepted.) Proceeds are to be shared equally between The SETI League and OSU Radio Observatory. Allow four weeks for delivery. For more information call 800-TAU-SETI or visit [www.setileague.org/](http://www.setileague.org/)

## A Gift that Keeps Giving

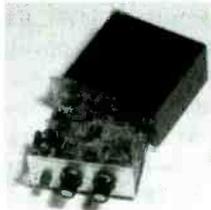
When you give a hobbyist a kit to build, you give not only a nice piece of equipment at a bargain price, but hours of enjoyment and satisfaction as well. You can choose from thirty high-quality kits in Vectronics' new kit line, including shortwave converters, aircraft receivers, ham radio kits, and old fashioned crystal radio kits. And not one of these kits is priced over \$100!

Each kit includes a PC board with screen printed components legend, quality components, and "owner's manual," which provides detailed assembly instructions and schematic diagram. The manual also gets you started once the unit is assembled. An optional custom cabinet is available for most kits.

To order or for your nearest dealer call 800-363-2922 or visit [www.vectronics.com](http://www.vectronics.com).

## Voices in the Air

Nostalgia is in, and old timers as well as newcomers will enjoy *Voices In The Air...The Fascination of Radio*, Robert Bonebrake's personal look back as he relives the role ham radio has played in his life. Those of us who were there during the earlier days of vacuum tubes and home-brew rigs will identify with the author's fond reminiscences — late night listening to distant stations, struggling to learn the code and theory, getting the ham ticket, building a two-stage CW rig, dreaming about that first Hallicrafters receiver,

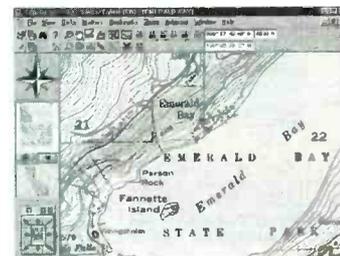


and more. A warm and gentle look back.

*Voices In The Air* is \$12.95 plus shipping from RAD Publishing, PO Box 87785, Carol Stream, IL 60188-7785.

## Your Best GPS Accessory

Hikers, hunters, real estate agents, surveyors ... all kinds of folks order the US Geological Service topographical maps, but these can cost \$5 or more per map. North Carolina alone comprises 999 USGS maps! Now there's a great way to get all these topo maps and print out your own, customized copy.



Maptech has developed Terrain Navigator (formerly TopoScout); much more than just a map, this program can record trails, mark and measure distance and area, and view maps in four zoom levels, with path elevation and line of sight profiling. Add your personal markers for favorite camping or fishing spots; because the maps are geo-referenced, you can enter GPS coordinates. When you're ready, print it

out to take with you!

A working demo is available on the web at [www.maptech.com/topo](http://www.maptech.com/topo). For information call Maptech at 800-627-7236. Terrain Navigator provides up to 300 maps per CD for up to \$99.

## Business News

- AOR, manufacturer of the AR-series wide-range receivers, has established AOR U.S.A., Inc, a sales and support center serving North America. Vice President in charge of AOR USA is Takashi "Taka" Nakayama, KW6I. The headquarters are located at 20655 S. Western Ave., Suite 112, Torrance, CA 90501; 310-787-8615. Watch their website at [www.aorusa.com](http://www.aorusa.com) for news on several new products in the planning stages.

- Dr. Paul Shuch of The SETI League passed along the news that the quarterly magazine *SETIQuest*, edited by Carl Helmers, ceased publication one month following a similar announcement by *Satellite Times*. "These are indeed hard times for publishers!" he said, adding that the *SearchLites* bulletin for SETI League members will "do its best to fill the void" for up-to-date SETI information. (See address under "Wow" item)

**Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Hwy 64 West, Brasstown, NC 28902 Press releases may be faxed to 828-837-2216 or e-mailed to [mtditor@grove.net](mailto:mtditor@grove.net).**

# LETTERS TO THE EDITOR

NEWS AND VIEWS FROM OUR READERS

Rachel Baughn, Editor

## Air Navigation in the UK

In the August "Letters," Albert Lozano mentioned the first hyperbolic navigation system — which inspired responses from two hobbyists:

Mike Powell wrote, "This system, invented during the war by Dr Dippy, was known as "Gee" (for Grid). It was still in use in 1956 when I did my National Service in the RAF (Signals) but it went out of use shortly afterwards."

Jacques d'Avignon, *MT's* propagation columnist, adds: "The Gee System is a hyperbolic system operating on direct waves in the frequency bands between 25 and 85 mcs (MHz). It was developed as an aircraft navigation system and is said to provide coverage for any number of craft with an accuracy of from one fourth to one third of a mile up to distances of 250 to 300 miles depending on the altitude of the craft. Gee is a British development and at present quite complete coverage of the British Isles is in existence. The equipment has proven to be reliable and simple to operate and maintain."

Hm-m-m, is it being maintained as a back-up, then?

## The Great NiCd Debate

Dan Hamilton of Cape Cod, Massachusetts, wrote regarding Werner Heim's article on NiCd cells in the March '98 *MT*, but he says he was "very disappointed to see it perpetuate the false myth about 'memory' in rechargeables and the attendant 'need' to discharge before recharging."

"I would invite *MT* readers to check out a superb web site, put together by a competent and articulate engineer, on this topic: <http://gnv.fdt.net/~redscho/>

"On that site you will find facts about precise behavior of NiCds under various conditions of charge and discharge. The bottom line is that there is almost no rational reason for discharging multi-cell packs ... and in fact some discharging schemes ... can permanently damage individual cells and therefore the whole pack."

For more discussion on rechargeable cells, be sure to check out Bill Cheek's October and November Experimenters Workshop columns. Also, as an aside, Dan also recommended Ben Saladino's Radio Manager for Windows program, "which is a very nicely done computer control interface for the BC895XLT."



*Antennae at 10,450 feet: Greg Feis of Potomac, Maryland, took this picture of "quite a nice assortment of radio antennae" from the top of Rendezvous Mountain in the Wyoming Teton.*

For those for hard-to-find NiCd cell replacements, Bob Earl KD6UIH had this advice: "In the August issue of *MT's* 'Ask Bob' column Vern Batt asked about replacement nicads for a 1977 JVC portable TV. I get my batteries for anything from the NiCad Lady, Grace N6WPA; she is great.

"If Grace doesn't have the battery pack you need she can put new cells in the battery pack you have. She is reasonable in her prices and gives excellent service.

The NiCad Lady  
17052 Alameda Drive Perris, CA 92570  
Phone: (909) 789-0830  
Fax: (909) 789-4895  
E-Mail: [niclady@deltanet.com](mailto:niclady@deltanet.com)

## Think About It

In line with our guest editorial this month regarding frequency lists that get passed from hand to hand as gospel without being questioned or tested, Van R. H. Sternbergh of Cos Cob, Connecticut, has a similar beef with other "modern myths" that have no basis in fact. For example, the statement that the Great Wall of China can be seen from the Moon (Sept. issue, p. 16). Here are some issues he'd like us to consider:

"1. The wall is in disrepair — only short sections have been 'restored' for the benefit of tourists.

"2. Even if the wall were continuous for its original 2,600 mile length, it follows the ridges of the foothills, and is almost never straight. There are few, if any, straight lines in nature, which is why airport runways and other large straight things (like interstate highways, bridges, etc.) can be so easily seen from airplanes.

"3. The wall is only a few yards wide — less than 30 feet wide at the top, and only

about 60 feet wide at the base. This isn't much. The New Jersey Turnpike, or Interstate 95 is much wider.

"4. Think of the photos you have seen in *National Geographic* and elsewhere of the earth taken from space. Those taken from the moon merely show a big blue ball with lots of white stuff obscuring most of the features. Those taken from the space shuttle may show some vague outlines of continents, but even when you can make out Australia, you still can't see New Zealand. And believe me, New Zealand is MUCH bigger than the wall.

"I don't know how this canard got started, but it is widespread. When I was in China in March, my guide and the tourist literature continue to espouse this nonsense. It is simply not true — Ask your local high school physics teacher to work out the math, and you'll see what I mean. This could be an interesting class project. (If the 'great pyramids' of Egypt can't be seen from space, the wall hasn't a chance.)

"There are man-made constructions which can be seen from space (but not from the moon): irrigation circles in the Saudi Arabian desert. The pipe system slowly rotates around a central point, producing green circles thousands of yards across. Perfect circles like these do not appear in nature, which is one tip-off; the color contrast between the desert and the crops is the other."

Van also put it another way: can you see a human hair on the floor from the top of a flight of stairs?

We're appreciative of the reminder to stop and think. And you readers, here's a reminder to keep your brains and fingers involved in your hobby: Take nothing for granted — check it out for yourselves.

Maybe we should adopt a new slogan: "*MT — it's a real Mind Trip!*"

— Rachel Baughn, editor

**RadioMap™**

Transmitter sites in your area are researched and marked on a beautiful 8-1/2 x 11 full color plot. See FCC licensed sites from VLF through microwave including police, fire, cellular phone sites, business, industrial, broadcasters and selected FAA transmitter sites. Call signs, frequency assignments, and names provided. Ham radio stations not included.

You choose the map center location—your neighborhood, near your office, around sports stadiums—anywhere within the United States. We adjust map coverage for best readability, depending on transmitter site density.

Invaluable to radio professionals and hobbyists for identifying towers, sources of radio interference etc. Send nearest street intersection and check for \$29.95 payable to Robert Parnass.

Robert Parnass, M.S.  
Radio Electronics Consulting  
2350 Douglas Road, Oswego, IL 60543

# ESTOCK EXCHANGE

Monitoring Times assumes no responsibility for misrepresented merchandise.

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.

**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.

**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.

**LIGHTNING RODS.** Install yourself. [www.lightningrod.com](http://www.lightningrod.com) or 1-800-532-0990.

**CONSUMERTRONICS 200+** high-tech survival publications, Special Projects, Electronics, microwave, computers, Internet, phones, security, energy, financial, radionics, exotic weaponry, countermeasures. Catalog \$3US, \$7 foreign, PO Box 23097, Albuquerque, NM 87192, [www.tsc-global.com/consumer.html](http://www.tsc-global.com/consumer.html)

**FREE 80-PAGE RADIO CATALOG.** Call 1-800-522-8863, or visit our website: [ccrane.com](http://ccrane.com)

**HOBBY SHOP:** customized filters, professional coax, RF connectors, Econn Electronics, 624 West Main Street, Suite 60, Norwich, CT 06360. 860-823-1230.

**WANTED:** NYE Viking Station Monitor Model RFM 003 RFM 005. Paying \$600. Randy Ballard, N5WV 903-687-3002, e-mail: [tmt@prysm.net](mailto:tmt@prysm.net)

**WANTED:** Sangean ATS803A/DX440. Working condition. Will pay top \$\$ or trade an ICF-2010 for 'like new, in box' condition. Bill, 610-494-1559.

**FOR SALE:** Watkins-Johnson HF-1000 receiver. Latest software version, manual, original box. Call Dean, 518-834-7640.

**WANTED:** Panasonic RF-B45 in good condition. 912-744-4461.

**TO SETTLE ESTATE.** Purchased new Jan. 1997: R-9000 receiver, Universal M8000 decoder, JPS NIR12 interference reducer, MFJ antenna matcher. \$5,600. Write Mrs. Mallinger, 129 Elatan Dr., Pittsburgh, PA 15243.

**WHO CAN REPAIR BC2500XLT?** Parts needed: logic board and RF boards. Call 303-936-2835 or write Richard Neuber, 2028 S. Hooker Cir., Denver, CO 80219.

**FOR SALE:** ICOM R7000 with "full" 800 MHz coverage and RC-12 remote. Excellent, \$750 includes UPS shipping. 309-454-2249 or [blomgren@ilstu.edu](mailto:blomgren@ilstu.edu)

## INDEX OF ADVERTISERS

Alinco .....	69
Antique Radio Classified .....	95
AOR .....	Cover III
Atlantic Ham Radio .....	17
Austin Antenna .....	85
Barry Electronics .....	73
Boger Electronics .....	73
Cabinet Communications .....	83
Communications Electronics .....	29
Computer Aided Technologies ...	98, 99
CRB Research .....	4
Cutting Edge Enterprises .....	27
Davis Instruments .....	71
Delta Research .....	17
DX Computing .....	47
Future Scanning Systems .....	85
Glenn Hauser .....	35
Grove Enterprises ....	5, 11, 25, 39, 81, 93, 97
Jacques d'Avignon .....	43
Javation .....	91
John Figliozzi .....	61
Kevin Carey .....	87
KIWA Electronics .....	19, 67
Lentini Communications .....	21
Monitoring Times .....	103
OptoElectronics .....	Cover II, IV
Palomar Engineering .....	95
Popular Communications .....	39
Radiomap .....	101
R.C. Distributing .....	67
R.D.I. White Papers .....	53
Sangean .....	13
Scanner Master .....	65
Skyvision .....	67
Sony .....	3, 74, 75
Stridsberg Engineering .....	7
Swagur Enterprises .....	65
Universal Electronics .....	31, 63, 79
Universal Radio .....	15
Viking International .....	7
W5YI .....	103
WINRADIO .....	89
Wireless Marketing .....	17

### DX Block" on WWCR sponsored by Grove Enterprises

WWCR and Grove Enterprises are proud to announce two well-established programs are being carried on WWCR as an informational service to the DX community.

The Voice of America's *Communications World* program, hosted on Dr. Kim Andrew Elliott, will be aired as a full one-half-hour radio program. Following Dr. Elliott's program will be the half-hour *World of Radio* with Glenn Hauser.

Exclusive sponsorship of this DX block is being provided by Grove Enterprises, publishers of *Monitoring Times*. See web sites at: [www.grove-ent.com](http://www.grove-ent.com) and [www.wwcr.com](http://www.wwcr.com)

The DX block can be heard on WWCR-Shortwave Radio, on 5070 kHz - Saturday at 2200 UTC. The block is repeated on 3210 kHz - Monday at 0500 UTC, on a space available basis.

## 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

79 Kipps St., Greenfield Park,  
Quebec, CANADA J4V 3B1  
e-mail: ve2shw@rac.ca  
Web: www.anarc.org/cidx/

## Windows Logging Software

**New!** DXtreme SWRIgold™ V3.0 lets you

- Log the stations you've heard
- Create reception reports *automatically*
- Scan, then view QSLs on your screen
- Track the performance of your station
- Output reports to HTML...and more!

Only \$39.95 in NA (\$41.95 DX). Requires Windows® 95 or 98. For more information about all our products, visit us *On the Web* at <http://www.dxtreme.com/dxtreme>

### DXtreme Software

26 Langholm Dr. Nashua, NH 03062  
E-Mail: [dxtreme@ix.netcom.com](mailto:dxtreme@ix.netcom.com)

## Find All of Your Scanner and Shortwave Needs On-Line!

### See Grove's On-Line Catalog at

<http://www.grove-ent.com/grove/hmpgcat.html>

## WANTED OLD COMPUTERS

Altair 8800	\$ 1000
Altair 8800b	\$ 600
IMSAT	\$ 400
Heath EC-1	\$ 500
Sol-20	\$ 400
Scelbi-8H	\$ 2,500
Mark-8	\$ 2,500

[old\\_computers@yahoo.com](mailto:old_computers@yahoo.com)  
(607) 625-5221

## Radio Fest 98

Join the Ontario DX Association at our annual convention for one of the year's top radio events. **October 2-4, 1998**  
Mohawk College, Hamilton, Ontario

### Ontario DX Association

Box 161, Station A, Willowdale  
Ontario M2N 5S8 Canada  
Phone:(416)293-8919 Fax (416)293-8603  
Internet 70400.2660@compuserve.com

Visit our web site for the latest info  
[www.durhamradio.ca/odxa](http://www.durhamradio.ca/odxa)

## R F P I THERMO MUGS 16-oz \$10 each, ppd



P.O. Box 20728 - M  
PORTLAND, OR 97220

Best satellite TV news source includes coverage of piracy.  
**Free catalog.**

Scrambling News  
Voice/FAX 941-646-2564  
[www.scramblingnews.com](http://www.scramblingnews.com)

## SATELLITE RADIO BOOK & GUIDE

**NEW BOOK** covers all Audio Services, SCPC, Subcarriers, FM<sup>2</sup>, Facsimile, Press Services, Weather Services. Simple how-to-receive instructions. **Satellite Radio Guide Included.**  
\$16.95 plus \$3 Priority Mail (\$19.95 total).

**UNIVERSAL ELECTRONICS, INC.**  
4555 Groves Road, Suite 12  
Columbus, OH 43232 (614) 866-4605

## Guide To SURVIVAL COMMUNICATIONS

How to build complete communications systems. Covers shortwave radio, amateur radio, citizens band, scanners, federal, weather, alternate news, satellite radio, equipment sources. How to build alternate emergency power sources, solar, generators, backup batteries. 200 pages. \$24.00 Priority Mail. MC or Visa. Call Universal Electronics 800-241-8171.

## HUGE 100 PAGE CATALOG

- Shortwave Receivers
- Amateur Radio Gear
- Scanners
- RTTY & Fax Equipment
- Books & Accessories

Send \$1 to  
Universal Radio  
6830 Americana Pkwy. MT  
Reynoldsburg, OH 43068  
Tel. 800 431-3939

## Think of what you could do with this space...

It's painless, we promise. Contact our advertising manager, **Beth Leinbach, at 704-389-4007**

## Subscribe to MT for as little as \$12.95 (U.S. Second Class Mail)



Clip and mail this ad along with your payment or call us to subscribe or renew to Monitoring Times!

If you are currently a subscriber to *Monitoring Times*, please check your label to determine the expiration date of your subscription. Rates are the same for each publication. MasterCard, Visa, and Discover Card accepted!

	6 months	One Year	Two Years	Three Years
US Rates	<input type="checkbox"/> \$12.95	<input type="checkbox"/> \$23.95	<input type="checkbox"/> \$45.95	<input type="checkbox"/> \$67.95
US 1st Class	<input type="checkbox"/> \$28.45	<input type="checkbox"/> \$54.95	<input type="checkbox"/> \$107.95	<input type="checkbox"/> \$160.95
Canada Surface*	<input type="checkbox"/> \$19.95*	<input type="checkbox"/> \$36.50*	<input type="checkbox"/> \$69.95*	<input type="checkbox"/> \$103.95*
Foreign International*	<input type="checkbox"/> \$28.95*	<input type="checkbox"/> \$55.45*	<input type="checkbox"/> \$108.95*	<input type="checkbox"/> \$162.45*

\*All payments must be in U.S. Funds drawn on a U.S. Bank!

Grove Enterprises, 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.net](mailto:order@grove.net)

Name \_\_\_\_\_ Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ Country \_\_\_\_\_  
CC# \_\_\_\_\_ Exp. Date \_\_\_\_\_  
Signature \_\_\_\_\_

## GORDON WEST HAM TEST PREP TAPES BOOKS • SOFTWARE • VIDEOS

Prepare for your ham test with "Gordo" WB6NOA as your personal instructor.

- **THE THEORY** on audio cassettes  
No-Code Technician (4 tapes)... **\$19.95**  
General Class (2 tapes) ..... **\$ 9.95**  
Advanced Class (4 tapes) ..... **\$19.95**  
Amateur Extra Class (4 tapes) ..... **\$19.95**
- **THE CODE** on audio cassettes  
Learning CW (6 tapes) ..... **\$29.95**  
General Class CW (6 tapes) ..... **\$29.95**  
Extra Class CW (6 tapes) ..... **\$29.95**
- **STUDY MANUALS** by "Gordo"  
No-Code Technician (283A)..... **\$12.95**  
General Class (3B) ..... **\$ 9.95**  
Advanced Class (4A)..... **\$11.95**  
Extra Class (4B)..... **\$11.95**

Add \$3.00 shipping charge - 3 Day Service  
VISA, MasterCard, Discover & AMEX Accepted

**The W5YI Group, Inc.**  
P.O. Box 565101 • Dallas, TX 75356

Call Toll Free **1-800-669-9594**



By Bob Grove,  
Publisher

## The Frequency List and the Grain of Salt

A Guest Editorial by MT Assistant Editor Larry Van Horn

If I hear one more commercial or email message telling me that the Internet is the answer to all of the world's problems, or the greatest storehouse of knowledge in the world, I'm going to yank my modem plug out of the wall.

Now don't get me wrong. I like the Internet as a whole, I really do. I greatly enjoy several email news groups such as milcom, fedcom, and amfmtvdx. But when it comes to accurate frequency information, I take it all with a huge grain of salt. Consider the following recent example. During the latter part of August, Hurricane Bonnie threatened the U.S. coastline. On just about every radio-related news group the call went out for hurricane-associated frequencies that could be heard on shortwave radio.

Within minutes someone would post his comprehensive list of frequencies into the waiting hands of the anxious hobbyist who made the original request (and, of course, everyone else in that news group). Over a 24 hour period I saw dozens of hurricane frequency lists come out of every nook and cranny of the net. Dozens more gave addresses to Internet websites where even more of these wonderful lists could be found.

So I did a little walkabout on the worldwide web in search of this great storehouse of hurricane frequency information. What I found was a huge disappointment. Not one single list — whether posted to the news groups or found on the web — had accurate and up-to-date information. Most of the lists were just plain wrong all the way through.

When I asked some of these list owners if any of them had actually turned on a radio to verify their patented frequency list, the answer was always the same — no! No one seems to take the time to update information before posting it — well-meaning respondents just pass it along indiscriminately as fact.

This doesn't just apply to the aforementioned hurricane related frequencies; some of the recent lists of air show frequencies border on the ridiculous. And let's not even discuss the folks in Montana passing along scanner frequency lists for monitors in New York City!

Some lists have circulated on the net for so long now they have become gospel, and Heaven help the person that attacks their accuracy! You will hear folks say, "I got this list from inside sources," or (the one I love to hear), "it came from the pages of *Monitoring Times* or *PopComm*" — with no attribution to either source on the posted list, of course.

Someone recently sent me a supposedly up-to-date utility military frequency list. I thought it looked familiar, so I went back into my *Utility World* archives and sure enough, it was one I ran in 1990 in *MT*, typing mistakes and all. It was forwarded to me by this person who said he had personally developed the list over many years of monitoring. Having let his *MT* subscription expire in 1991, this person was unaware of all the major changes that had occurred to this particular radio network since his subscription ran out — or of the fact that he was feeding a frequency list back to its original author!

The integrity that originally built these frequency lists through actual radio monitoring has been thrown out the window by those who want to be the first to post something. Also the lack of proper attribution to the source is not only plagiarism, but ignores the basic rules of proper research techniques. Of course, in the end, someone may actually hear something on frequency from one of these lists, but does that validate the entire list? Clearly not.

### ■ Something for Nothing?

There is a whole generation of new radio listeners out there with the mindset that they don't need to buy a book or magazine for their radio information. They are going to save money and get it from the 'net. The best example of this was the gent who was taking a trip from the West Coast to the East Coast. He posted his complete route cross country in an email message and wanted scanner buffs to provide him with every frequency he would hear on his trip! This fellow didn't need help from the list, he needed to quit being so darn cheap and buy the *Monitor America* book by Scanner Master!

To hobbyists with this mindset, I say you are getting exactly what you deserve: you pay nothing and, chances are, that's about what the information is worth. As you get your free Internet frequency list, ask yourself, "Who is minding this store and making sure that what you got was right?" If we in the magazine business perform badly, the consumer votes with his pocketbook. If a website does badly, the worst that can happen is they get fewer hits and the recipients get bad information.

### ■ The Moral to This Story

So what is the solution? First, never post to the net a list that you haven't personally verified or that does not acknowledge the original source of information. At least with some sort of attribution, consumers can judge the accuracy of the new postings based upon the past performance of that compiler.

Second, rather than sending out a list of old discrete frequencies that are no longer valid, it would be more useful if experienced monitors would recommend to newcomers the frequency ranges in which to tune around for a particular listening target. Listeners can then report back what they actually heard. This approach builds a viable list, helps newcomers gain monitoring experience, and can be downright exciting! On the other hand, if folks can't find signals on the list they were given, they may get discouraged and give up on the hobby altogether.

So the next time you hear that helpless cry of, "I need frequencies for ..." please pass along those frequencies with a grain of salt ... and with appropriate credit. And you on the receiving end, verify the list you receive before you pass it on. It might be a pig you got in that poke, or it might be a deliberate ringer to thwart plagiarism — like the FleetSatCom Delta bandplan frequency list!

# Your concept of the word "scanner" is obsolete.

AOR introduces Advanced Technology Receivers™

Calling an AOR Advanced Technology Receiver a "scanner" is like referring to a modern fighter aircraft as an "airplane."

AOR has long been at the forefront of receiver technology. The new AR 8200B, and the forthcoming AR 16 Wide Ranger and the limited edition AR 70003 DSP Wide Range Receiver are new concepts that redefine what is possible in wide-band multimode receivers. Discover AOR, the serious choice in Advanced Technology Receivers.™

**AOR**  
www.aorusa.com

AOR U.S.A., Inc.  
20655 S. Western Ave., Suite 112 • Torrance, CA 90501  
310-737-8615 Phone • 310-787-8619 Fax

## AR 8200B Wide Range Receiver

The AR 8200B is an all-new receiver, not an update of a previous model.

- 500 KHz-2040 MHz \*coverage
- 1,000 memory channels (20 banks)
- Computer control and programming. (requires optional connection cable)
- Download free control software from AOR web site!
- "All Mode" reception includes "super narrow" FM plus wide and narrow AM in addition to 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 the AR 8200B 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
- 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

These are but a *few* of the features of the new AR 8200B. Visit your dealer or the AOR web site for more information!

\*Cellular frequencies blocked in compliance with USA regulations. Continuous coverage model available for authorized users/agencies, documentation required. AOR engages in ongoing efforts to improve its products. As such, design and performance parameters may change without notice or obligation on the part of the manufacturer and/or distributor(s).



# The LITTLE Black Box with BIG Performance!

## OPTOCOM SETS THE STANDARD.....

Combining a high speed, high performance receiver, Motorola®/LTR Trunking, and full featured decoding.



Computer  
Not Included

INTRODUCTORY  
PRICE

**\$459**

FREE Trakkstar Software  
& Shipping  
**Order Now! Save \$90**

## CHECK OUT THESE FEATURES

- High speed triple conversion GRE receiver board (50 channels per second)
- Track Motorola 400MHz, 500MHz, 800MHz, and 900MHz systems, as well as conventional frequencies, simultaneously
- Decode CTCSS, DCS, LTR, DTMF, and Motorola talk group ID
- Reaction Tune with the Scout Frequency Recorder
- Built-in Data Slicer Circuit for decoding of FSK programs
- Software and hardware controlled volume and squelch
- Download up to 28 different frequencies or one Talk Group ID for scanning without the computer
- Supplied with the all NEW TRAKKSTAR software from ScanStar
- Trunk Track LTR systems
- Scans conventional frequencies from 25-520, 760-823.395, 849.005-868.935, 394.005-1300MHz (Cellular frequencies are blocked except for FCC approved users)

## Flexibility



Built-in data slicer circuit for decoding of popular FSK programs.

## Portability



For use without the computer, download up to 28 different frequencies or one talk group ID for mobile applications.

CC50 Carry Case  
Holds OptoCom & Laptop  
Computer.....\$25

**FACTORY DIRECT ORDER LINE 800-327-5912**

# OPTOELECTRONICS®

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

Telephone: 954-771-2050 Fax: 954-771-2052 Email: sales@optoelectronics.com

Prices including Promotions and Specifications are subject to change without notice or obligation

[www.optoelectronics.com](http://www.optoelectronics.com)

\*\*Shipping UPS Ground continental U.S. only  
OPTOCOM supplied with Software, Antenna & Cables. Operates under Windows 3.1, 3.11, 95, and 98