Volume 18, No. 10 October 1999

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Monitoring Times

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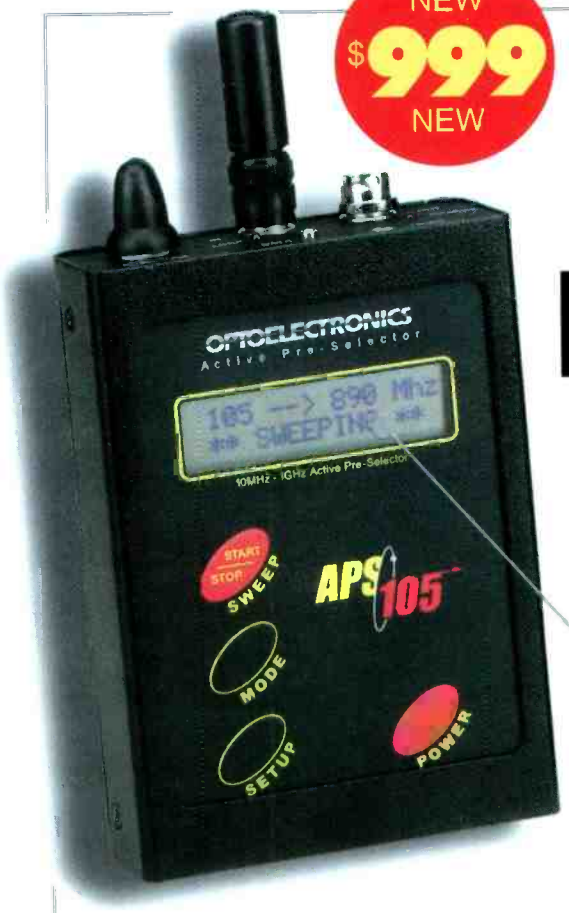

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Monitoring Times

Vol. 18, No. 10 October 1999

Cover Story

DXing the VHF Low Band

By Larry Van Horn, Assistant Editor

Don't discard that old scanner or give up scanning altogether because you think all the interesting communications have moved up to UHF trunked systems! Some of the most fascinating listening this winter should be found in the forgotten 30-50 MHz band. Winter conditions and the peak of the solar cycle could send a bumper crop of these long distant signals skipping into your scanning receiver.

Set your scanner on the frequencies in this feature article and you could hear the voice of a North Carolina trooper like Lawrence T. McPhail (pictured on our cover) or an officer from CHiPs (Calif. Highway Patrol) from opposite sides of the country. (Photo courtesy North Carolina State Highway Patrol)

CONTENTS

Reviews:

How do computer receivers stack up against their hardware competitors? We begin to address the question with a look at the **WiNRADiO WR-1500e** (p.90).

It was only a matter of time before computer-radio combinations would also be applied to communications; Bob Grove takes a look at a multi-mode amateur band transceiver—the **Kachina 505DSP** (p.96).

There is one piece of gear every household should have – a NOAA weather radio, says Elliott, and the **First Alert WX-67** fits the bill very well (p.87). Catalano is completely enthralled with the new **AirNav 3** aircraft tracking software (p.88).

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

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

Subscription Rates: $23.95 in US; $36.50 Canada; and $55.45 foreign elsewhere, US funds. Label indicates last issue of subscription. *See page 19 for subscription information.*

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

Owners
Bob and Judy Grove
judy@grove-ent.com

Publisher
Bob Grove, W8JHD
bgrove@grove-ent.com

Managing Editor
Rachel Baughn, KE4OPD
mteditor@grove-ent.com

Assistant Editor
Larry Van Horn, N5FPW

Art Director
Belinda McDonald

Advertising Svcs.
Beth Leinbach
(828) 389-4007
beth@grove-ent.com

Departments

Editorial Staff

Correspondence to columnists may be mailed c/o Monitoring Times; any request for a reply should include an SASE.

Frequency Manager	Gayle Van Horn	gayle@grove.net
Frequency Monitors	Mark J. Fine	fineware@erols.com
	Dan Roberts	
Program Manager	Jim Frimmel	frimmel@star-telegram.com
American Bandscan	Doug Smith, W9WI	w9wi@bellsouth.net
And More!	Jock Elliott KB2GOM	lightkeeper@sprintmail.com
Antenna Topics	W. Clem Small, KR6A	clemsmal@bitterroot.net
Beginner's Corner	T.J. Arey, WB2GHA	tjarey@home.com
Below 500 kHz	Kevin Carey, WB2QMY	lowband@gateway.net
Computers and Radio	John Catalano	j_catalano@conknet.com
Digital Digest	Stan Scalsky	sscalsk@mail.ameritel.net
	Mike Chace	Mike.Chace@parexel.com
Experimenter's Wkshp	Bill Cheek	bcheek@comtronics.net
Federal File	Larry Van Horn, N5FPW	larry@grove-ent.com
K.I.S. Radio	Richard Arland, K7SZ	k7sz@epix.net
Magne Tests	Lawrence Magne	
Milcom	Larry Van Horn N5FPW	larry@grove-ent.com
On the Ham Bands	Ike Kerschner, N3IK	N3IK@hotbot.com
Outer Limits	George Zeller	George.Zeller@acclink.com
PCS Front Line	Dan Veeneman	dan@decode.com
Plane Talk	Jean Baker, KIN9DD	jeanandbob@erols.com
Programming Spotlight	John Figliozzi, KC2BPU	jfiglio1@nycap.rr.com
Propagation	Jacques d'Avignon	monitor@rac.ca
QSL Corner	Gayle Van Horn	gayle@grove.net
Satellite Radio Guide	Robert Smathers	roberts@nmia.com
Scanning Equipment	Bob Parnass, AJ9S	parnass@megsinet.net
Scanning Report	Richard Barnett	ScanMaster@aol.com
SW Broadcasting	Glenn Hauser	wghauser@yahoo.com
SW Broadcast Logs	Gayle Van Horn	gayle@grove.net
The Launching Pad	Ken Reitz, KS4ZR	ks4zr@firstva.com
Utility World	Hugh Stegman, NV6H	driver8@netcom.com
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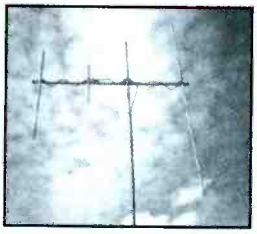

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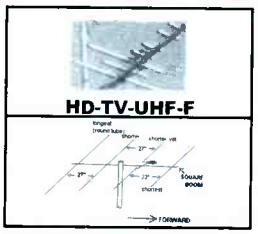
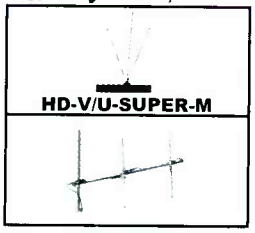
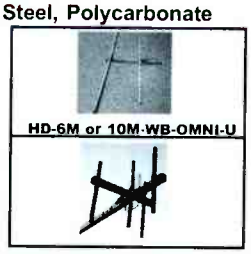


HD-FM-H4-F



HD-146-V3-U



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HD-TV-UHF-F	TV CHNL'S 14-69	**ULTIMATE UHF** TV Antenna *(& Small!)*	F	**21 DB**	30"	24"	3.5	0.5	N/A	6.5 LBS.	**$134.95**	**$143.35**
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HD-10M-WB-OMNI-U	**26.9-30 MHZ**	Top or side mount **3.1** (HAM) **DB: 10.6** ("CB LINGO") **DB**	PL-259	**3.1 DB**	72"	204"	5.5	1.6	1000 W	10.5 LBS.	**$149.95**	**$159.05**
HD-6M-WB-OMNI-U	**50.0-54 MHZ**	Top or side mount	PL-259	**3.1 DB**	42"	108"	3.5	0.9	1000 W	8.5 LBS.	**$134.95**	**$143.35**
HD-146-WB-*SUPER*-O-U	140-150 MHZ	**THE SUPER OMNI'S! RADICAL Design! Uses "1/5 the (expensive) Tower Space"!**	PL-259	**8 DB**	71"	37"	4.5	0.7	600 W	7.5 LBS.	**$169.95**	**$180.45**
HD-440-WB-*SUPER*-O-N	420-450 MHZ		N	**8 DB**	36"	12"	2.5	0.4	200 W	5.5 LBS.	**$154.95**	**$164.75**

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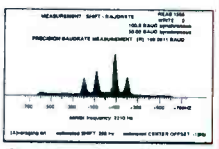

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Navy Report Critiques Y2k Readiness

The Navy has been maintaining an ongoing report on the state of Y2k readiness by public utilities upon which naval bases are dependent, and the report card is sobering. Although the category "Total failure is likely" includes only two electrical systems, water and sewer systems in 22 locations are currently predicted to fail – New York City among them. New London, Connecticut, received the worst rating in which electrical, water, gas, and sewer systems were all listed as likely to fail entirely.

According to an AP report, President Clinton's top Y2k adviser, John Koskinen, called the Navy's conclusions overly cautious, saying they operated on the assumption that major utilities would fail unless proven otherwise.

You can find the Navy report on a web site hosted by Jim Lord, a writer on Y2k issues: **<www.jimlord.to>**.

DW Suffers Budget Cuts

Catastrophic budget cuts, at an unprecedented level in public broadcasting according to Deutsche Welle's Director General Dieter Weirich, will force major reductions in DW's services if enacted in October. Details include:

- Elimination of six foreign language services.
- Reduced broadcast time for up to ten other language services.
- Elimination of DW's monthly international radio/TV program guide.
- No participation for DW in Hanover's Expo 2000, as had been planned.
- Elimination of DW's monitoring service.
- Elimination of DW radio's English language news department. (In future, news would be taken from DW TV.)
- Elimination of 160 full time jobs and 300 freelance journalists with 200 jobs coming open due to attrition not to be filled. (DW currently employs 1700.)

These cuts will force greater reliance on the Internet for services to developed countries. Efforts will still be made to expand these services while preserving and focusing services on shortwave for less developed areas not accessible via Internet.

Report said that journalists union voiced shock at the size of the cuts – especially inasmuch as they are being proposed by a Social Democrat government which made unemployment a major focus of the recent German elections. Demonstrations are planned for next month in Berlin to protest the cuts. Weirich is quoted as saying he has little hope that the cuts can be avoided when they come up for approval by the government in October. (John Figliozzi)

AT&T Pulls Plug on High Seas HF

The FCC has given the go-ahead to AT&T to discontinue its High Seas radiotelephone service in the first week of October. AT&T Corporation owns three Maritime Mobile Public Coast Stations: KMI at Dixon, CA, WOM at Pennsuco, FL, and WOO at Ocean Gate, NJ. AT&T had tried to close the stations in February of this year, but was prevented by the FCC.

CAP Offices Raided by FBI

Civil Air Patrol operations are being audited by the General Accounting Office and Dept of Defense at the direction of Congress. The Air Force Office of Special Investigations and Federal Bureau of Investigation undertook a joint investigation into misuse of federal funds and raided CAP headquarters at Maxwell Air Force Base in Alabama on July 21st. Eleven other wings were also raided by federal law enforcement agents. Reportedly, agents removed records and closed the Florida Wing's HQ building while warrants were executed at other CAP facilities across the country.

Three weeks later, Executive Director Paul J. Albano Sr. handed in his resignation, effective Oct. 3, although a CAP spokesperson says his resignation is not related to the FBI probe, nor had it been requested.

United States Air Force Auxiliary
Civil Air Patrol
National Headquarters

Tripp Indicted

A Maryland grand jury indicted Linda Tripp for secretly taping her phone conversations with Monica Lewinsky, charging she broke Maryland wiretapping laws. Mrs. Tripp thus becomes the only central figure in the scandal to face criminal charges.

Tripp was indicted on only one count of illegal interception of a phone conversation on Dec. 22, 1997, after she allegedly had been told by her lawyer that the taping was illegal.

Own a Share of Iridium?

Dan Veeneman reports this month in *PCS Front Line* on Iridium LLC, the satellite phone company which has filed for bankruptcy. A message posted in an Internet chat room suggested a novel use for the now nearly worthless shares – auction them off as collectibles! Several traders found the idea intriguing and have already started investigating the legalities.

Satellite Recycling

As NOAA launches newer and more powerful weather satellites, it often farms out the use of their older (but still working) "birds" to other organizations. NOAA has moved GOES-7 westward to a spot over the Pacific Ocean to let PEACESAT, the PanPacific Education and Communications Experiment by Satellite, incorporate it into education and government networks for several Pacific islands. GOES-7 is over 12 years old and its new role will replace GOES-2 and GOES-3, which are both over 20 years old. (*W5YI Report*)

Diego Medina, Voz De Alpha 66

One of the most colorful broadcasters in Cuban exile radio died July 23. Diego Medina, producer of *The Voice of Alpha 66* and Vice-Secretary General of the exile group Alpha 66, died of complications resulting from the flu.

He was a medical doctor each weekday morning, with two clinics in Miami. But, each afternoon, he went to a small radio studio at the offices of Alpha 66 in Miami's Little Havana area to spend hours producing a daily one-hour radio program for broadcast to Cuba. Over the years, the Voice of Alpha 66 was heard on AM radio stations in Miami, as well as on shortwave stations audible in Cuba, including WHRI, WRMI and, for a brief time, on WRNO.

Diego Medina is remembered by friends in Miami as a kind, gentle man who spoke eloquently on behalf of the Alpha organization and the Cuban exile community. Jeff White, general manager of Radio Miami International, which transmitted Medina's programs on several stations for nearly a decade, said "He was one of those charismatic people who was well-liked by everybody. And no matter whether you agreed with his politics or not, I've never seen anyone devote more time and effort to a radio program. He was absolutely convinced about the power of shortwave radio to influence opinions."

Dr. Medina began two decades ago pro-

ducing programs and broadcasting them on vacant shortwave frequencies using a small military surplus transmitter and a retractable antenna in his van. He would drive it around to locations in the Everglades on the outskirts of Miami where he would then broadcast the programs on shortwave frequencies like 6,666 kilohertz (because of the obvious relationship to Alpha 66).

"I'm not even sure whether he knew this was against the regulations in the beginning," said Jeff White. But eventually the Federal Communications Commission (FCC) discovered where the transmissions were coming from, and they sent U.S. marshalls out one night to bust the station.

"I remember Diego relating the story," said White. "He had finished transmitting a program, put the antenna down and was ready to leave. All of a sudden, dozens of federal marshalls with heavy weapons surrounded his van and told him to come out with his hands up. They quickly handcuffed him and asked where all of the other people were.

"'What other people?' asked Medina. 'There's nobody else here but me.'"

After a few of these scrapes with the FCC, Alpha decided it would be better to buy airtime on officially-licensed stations. Radio Miami International, in its role as an airtime broker, found them time on various stations over the years.

Medina's devotion to his radio programs was evident through the last day of his life. "Diego came into our office on Friday evening looking really ill," said Jeff White. "He said he had not slept the previous night due to a bad case of the flu. But he spent Friday afternoon and early evening recording radio programs with Andres Nazario, to the point where he could hardly speak. The next morning I got a call from our engineer Kiko Espinosa, who was also a good friend of Diego's, saying that Diego had died only about three or four hours after leaving our office. I realized that he had devoted the last bit of energy he had to the cause that he felt so strongly about."(Jeff White, WRMI, July 24, via Glenn Hauser)

"Communications" is compiled by Rachel Baughn, Editor, from news clippings and email submitted by our staff and readers. This month's reporters: Anonymous, NY; David Bender, Wilmington, DE; George Cahelo, email; Chet Copeland, DC; Chanel Cordell, GA; John Figliozzi, NY; Charles Howard, Jr, Tampa, FL; Glenn Hauser, Enid, OK; Ken Hydeman, Xenia, OH; Maryanne Kehoe, Atlanta, GA; Kevin Klein, Neenah, WI; Dann McKee, W4DLM, Windermere, FL; Haskell Moore, Cyprus, TX; Ed Muro, Cedarhurst, NY; Kirstin Ratter for Orbcomm; Doug Robertson, Oxnard, CA; Ed Schwartz, Chicago, IL; Larry Van Horn, Brasstown, NC; W5YI Report

BULLETIN BOARD

(See www.grove-ent.com/hmpgmt.html for more events and club info)

Oct 2: Leonardo, NJ
Middletown Township OEM and Garden State ARA sponsors the Garden State Hamfest 99 at Croyden Hall (Leonardville Road; follow signs to Park), talk-in 145.485 -6. 8a.m., admission $5. For more info, GSARA c/o Mario Selliti, PO Box 286, Keansburg, NJ 07734, *http://www.monmouth.com/~gsara*

N2MO Special Event Station
Operating Oct 3 UTC 1300 to Oct 9 UTC 2100 from old Marconi Hotel from the Marconi Test Facility in Wall Township, NJ. 3.875 - 7.235 - 14.240 - 21.325 MHz; QSL via OMARC, PO Box 267, Oakhurst, NJ 07755. For more information contact Gary Palamara KB2YTN, PO Box 791, Farmingdale, NJ 07727, 732-938-4217, *morningstar@monmouth.com*

Oct 3: Queens, NY
Hall of Science ARC Hamfest at the NY Hall of Science parking lot - Flushing Meadow Corona Park, 47-01 111th Street; talk-in 444.2000 rptr PL 135.5, 146.52 simplex. 9am, $5 donation. For further info call (night only) Stephen Greenbaum WB2KDG 718-898-5599 or email *WB2KDG@Bigfoot.com*

Oct 10: Wallingford, CT
7th Annual Nutmeg Hamfest and CT state convention at the Mountainside Special Event Facility on High Hill Road. Talk-in 147.36/96. Admission $6, 9a.m.-3p.m. For more info contact Gordon Barker K1BIY, 9 Edgewood Road, Portland, CT 06480 (860)342-3258 or visit *http://www.qsl.net/nutmeghamfest, nutmeghamfest@qsl.net*

W2GSA Special Event Station
Operating Oct 13 UTC 1300 to Oct 17 UTC 2100 from Twin Lights Lighthouse, Atlantic Highlands, NJ, to celebrate the first practical use of a wireless transmission on 3.875, 7.225, 14.240, 21.325 MHz. QSL via Garden State ARA, PO Box 34, Fair Haven, NJ 07704. Contact Gary Palamara KB2YTN, (see N2MO)

Oct 15-17: Nordic DX Championship
Annual competition among DXers in Finland, Denmark, Norway and Sweden, organized by the Danish Listeners Club. Radio listeners outside the Nordic countries may participate but not compete. Contact Stig Hartvig Nielsen at *nordx@wmr.dk* or *http://www.wmr.dk/nordx* for details

W2OD/MM Special Event Station
Operating from "somewhere in the New York Harbor," Oct 16 UTC 1400 to Oct 17 UTC 1400 to simulate a spark gap transmission from a ship at sea, operating on 3.875, 7.235, 14.240, 21.325 MHz. QSL via W2OD Bob Buus, 8 Donner Street, Holmdel, NJ 07733. Contact Gary Palamara KB2YTN (see N2MO)

Oct 16-17: Palm Beach Gardens, FL
Palm Beach County, FL, hamfest at the AMARA Shrine Temple, 3650 RCA Blvd, Palm Beach Gardens, FL. Contact Ken Summerell (KD4CTG) at 5136 El Claro Circle, West Palm Beach, FL 33415-2768; phone 561-640-9447 or by e-mail at *kd4ctg@freewwweb.com.*

Oct 17: Sellersville, PA
RH Hill ARC hamfest at the Sellersville Fire House on Rt 152, 5 mi south of Quakertown, 8 mi north of Montgomeryville; talk-in 145.31, admission $5. Hamfest hotline, Linda Erdamn (215) 679-5764, 2220 Hill Road, Perkiomenville, PA 18074, *http://www.rfhill.ampr.org*

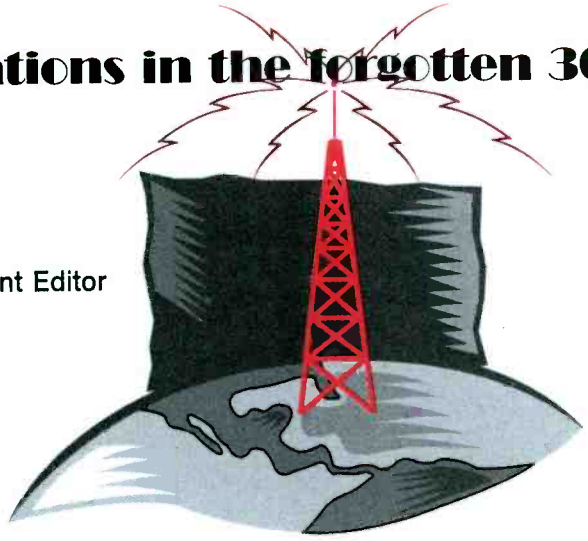
WA2GM Special Event Station
Operating Oct 20 UTC 1300 to Oct 24 UTC 2100 from the Twin Lights Lighthouse, Atlantic Highlands, NJ, in celebration of the 100th anniversary of NYT Yacht Race transmission from New York Harbor on 3.875, 7.235, 14.140, 21.325 MHz. QSL via N4FS Mike B. Feher, 89 Arnold Blvd, Howell, New Jersey 07731. Contact Gary Palamara KB2YTN (see N2MO)

Oct 23: Chattanooga, TN
Hamfest Chattanooga, Camp Jordan Arena, East Ridge, TN; Talk-in 146.79(-)/444.1(+), 8 a.m. to 4 p.m. Concessions, overnight camping on-site, convenient to major motels & restaurants. Contact David Hoffman, KE4FGW (423)877-7398 or *http://www.qsl.net/w4am/carc_index.html*

Oct 30: St Paul, MN
15th Annual Hamfest Minnesota at the St Paul River Centre. Guest speakers, FCC Enforcer Riley Hollingsworth K4ZDH, ARRL Exec Dir David Sumner K1ZZ. Contact Mark Roberts 651-460-6050 or *n0pfy@pclink.com* or Twin Cities FM Club, Box 16245, St Paul MN 55116

DXing the VHF Low Band

Hear distant stations in the forgotten 30-50 MHz band!



By Larry Van Horn, *MT* Assistant Editor

It is an early winter morning in the midwest United States and you're sitting in the radio shack tuning around the bands on your programmable scanner. While you've never heard much down in the 30-50 MHz range you decide to check out some of those obscure frequency ranges.

Suddenly the speaker comes alive with what sounds like state police traffic from somewhere out of state. You recognize that because the towns and locations being transmitted aren't familiar to you. After listening for a while, you determine the transmissions are coming from the state police dispatcher in Raleigh, North Carolina. Not bad, considering your location in the U.S. midwest. But how is reception that distant possible? That's easy. You are getting low band skip propagation.

What Causes Low Band Skip Propagation?

There are several methods of propagation that can cause distant (DX) public safety stations in the 30-50 MHz band to be received (via skip) at your radio location. Some are very exotic (meteor scatter) and seldom realized, while others are cyclic in nature (E-skip) – the primary method by which we receive these distant stations.

The VHF-low band is the lowest public safety band in our programmable scanners and it shares many of the propagation characteristics of the lower HF spectrum and higher VHF frequencies. While a detailed discussion of how this propagation occurs is outside the scope of this article, we will discuss some of the basics in the paragraphs that follow. If the reader wants a more detailed treatment on the subject, the *ARRL Handbook for Radio Amateurs* has an excellent section on propagation theory.

In the absence of any favorable propagation conditions, the average low band installation (omnidirectional antennas and consumer grade scanners) can expect to receive stations regularly within a 150-200 miles radius of the receiving antenna. This sort of reception will be via **tropospheric scatter**, and the exact mileage will vary, depending on terrain, power, receiver capabilities, and the antenna/coax installed.

If you have a top-of-the-line installation (beam type antennas, communications receivers, and preamplifiers), weak-signal tropospheric scatter can bring in distant stations out to 300 miles or more nearly any time (especially during hot, hazy, and humid summer mornings). Some special weather effects can also extend the normal groundwave range by a few hundred miles, especially during the spring/fall months, but such longhaul tropospheric ducting in the 30-50 MHz range is a relatively rare event.

Sporadic E-skip is probably the most common and certainly the most frequently monitored form of propagation on the VHF-low bands. There are several other forms of ionospheric E-layer propagation, but these modes are minor players compared to E-skip.

Single-hop E-skip openings may last many hours with stations from 350 to over 1500 miles being heard. The primary period of the year when E-skip occurs is spring (late April-early May) well into the

Courtesy of Solar-Terrestrial Physics Division of the National Geophysical Data Center

summer months. Patient monitors will also find another peak in E-skip activity around the Christmas holiday season.

Multiple-hop E-skip occasionally provides transcontinental reception during the summer months, and intercepts with stations in foreign countries from South America, Europe, and Japan have been logged.

Finally, during the peak of the 11-year sunspot cycle, worldwide VHF-low band DX is possible via the **F2 layer** of the ionosphere during daylight hours. As the amount of solar radiation increases (as it does during maximum solar activity), the density/ionization of the layers in the ionosphere increases. These periods of increased ionization drive the maximum usable frequency (MUF) that a given signal will propagate, even higher in frequency. It is not uncommon during periods of solar maximum to see MUF for F2-layer skip drive well past 50 MHz into the 6-meter ham bands, allowing for worldwide skip reception.

Also, F2 backscatter – in which the maximum usable frequency is just below the frequency you are trying to receive – provides an additional opportunity for reception as distant as 2,500 miles.

The VHF-low band DXer will also discover a seasonal connection to 30-50 MHz skip listening. Daytime ionization during the winter months of the F2 layer averages four times the level experienced during the summer months at the same period in the solar cycle, doubling the MUF. This has been dubbed by DXers as the winter anomaly, causing wintertime F2 conditions to be far superior to those in the summer months due to the higher MUFs.

Right now we are approaching solar cycle 23 maximum, and with the winter months upon us conditions are ripe for harvesting a large crop of 30-50 MHz DX stations. Now is the time to tune the VHF-low band for some truly exotic DX.

So What Can You Expect to Hear?

We have prepared a detailed guide to the U.S. allocations in the 30-50 MHz band in Table One on page 12. Of course, for reception of stations outside the U.S., the allocations set up by each foreign government vary widely. Uncovering foreign radio allocations and frequencies via low band skip is one of the most exciting aspects of radio monitoring. In many cases it's the only way to acquire such data, since many governments do not freely divulge this information.

Not only can the discovery of a new Caribbean or Central/South American frequency be entertaining, it may also prove to be newsworthy. You can occasionally hear military war games, political and civil unrest, government drug enforcement, and a variety of other communications flooding your scanner's speaker during periods of skip conditions.

While it is impossible to provide a detailed list of discrete frequencies in this article, we will cover some of the more interesting communications that have been recently monitored.

South of the Border Comms

One of the best indicators that long distance skip is propagating from south of the border is the Spanish dispatch operation on 30.22 MHz. This operation appears to originate from either Argentina or Venezuela, and the female dispatcher has been a regular visitor in my shack over the last few months.

There are several paging systems that are believed to be transmitting from Argentina that can be used as indicators of South American DX conditions. Keep an eye on the following frequencies: 32.31, 32.495, 32.68, 32.865, and 33.050 MHz.

Mexico has a string of half-duplex radio telephones in the 29.7-30 MHz band (15 kHz spacing, narrowband FM mode). They have been dubbed "whistlers" because of the continuous high-pitched guard tone heard during conversations. At the start of each call, the tone is interrupted to permit proper dialing of the number being called. These are the frequencies to watch: 29.715, 29.730, 29.745, 29.760, 29.775, and 29.790 MHz.

These radio-telephones seem to be point-to-point links used between hotels and casetas (long distance concessionaires located in their own buildings). The frequency 29.775 MHz is sometimes run parallel with 31.53 MHz.

Mexican federal and state police have been reported on a repeater frequency of 31.85 MHz. This is usually used as prime indicator that the band is open to that part of the world.

Not All Spanish comes from the South

More than one DXer has been tricked into thinking they have an opening down south when in reality they were hearing the infamous New York "Gypsy" taxi cab dispatchers. During a recent tropospheric opening into that part of the United States, I monitored a large number of these stations on the following frequencies: 30.84, 30.88, 30.92, 30.960, 31.02, 31.04, 31.16, 31.24, and 33.16 MHz, to mention a few.

Communications from the USAF A-10 aircraft are frequently heard in the VHF Low Band.

U.S. Military: A Dominant User

On examining Table One, the large amount of spectrum space devoted to government usage is immediately obvious. The U.S. military still maintains quite a few operations in the low band.

One of the first military stations logged by most low band monitors is the range control frequency (30.450) out of Fort Hood, Texas. A wide variety of interesting traffic can be heard on this frequency and they use a private line (PL) tone of 151.4 Hz. See Table Two for other interesting low band military comms recently intercepted.

The low band listener will also hear a large amount of air-to-air communications from most of the U.S. military services on a variety of low band frequencies. The US Air Force A-10 aircraft are frequently heard on low band. Keep an ear open for the following frequencies in the narrowband FM mode: 32.35 32.45 32.65 32.675 32.85 34.125 34.15 34.175 34.375 34.40 34.55 34.575 34.60 34.75 36.15 36.35 36.50 36.60 36.825 36.85 38.50 38.65 38.67 38.675 38.70 40.20 40.65 40.95 41.05 41.45 41.50 41.80 41.95 46.65 46.75 46.85 49.75 49.85 49.95

Police and Fire Services

Police and fire departments can still be widely heard in the VHF low band. Even casual listeners to this band have heard fire department dispatch/fireground operations in the 33 MHz range from the northeast portion of the United States.

Of course, state police departments are still the predominant law enforcement agencies that utilize this frequency range. Probably the most widely heard along the East Coast of the United States during transcontinental openings are the California Highway Patrol 42 MHz channels. It is a lot of fun and pretty exciting to hear long haul fire and law enforcement transmissions.

The California Highway Patrol is a favorite low band target of east coast DXers during skip conditions—but for a west coast listener, hearing North Carolina would be a real catch!

Useful Aids

This form of radio listening is very rewarding, especially if you have some basic tools to work with. One of the first steps any low band enthusiast should accomplish is to map the local 30-50 MHz *during dead band conditions*. You can do searches within the civilian portions of the band using 20 kHz spacing. Of course, when the skip is in, I highly recommend cutting that search step down to 5 kHz, since foreign band plans and government/military communications do not conform to traditional spacing steps we see in the U.S. allocation plan.

If you are internet active, there is online help for U.S. licensed operations on the Federal Communications Commission website at:

http://gullfoss.fcc.gov:8080/cgi-bin/ws.exe/beta/genmen/index.hts

Federal and state forest firefighters still use low band VHF for areawide communications. (Photo courtesy of Wildlandfire.com website.)

A good set of *Police Call* books or the Grove FCC database will help those monitors who do not have access to the internet.

There is an internet newsgroup recently organized by Ian Julian, ZL1TBM, in New Zealand devoted to VHF low band DXing. Go to **http://www.onelist.com** and sign up for the VHF Skip list. You will need an email address, as this is the format used to deliver the messages from various members of the group. I hope to see your post on that list real soon.

Current VHF listening conditions are instantly reported and posted on a very unique website hosted by Bob Colyard – the 50 MHz Propagation Logger. You will find Bob's site at URL: **http://raven.cybercomm.net/~slapshot/dxing/50prop.html**

The best source for up-to-date radio propagation information can be found on the NOAA Space Environment Center's radio user page. Here you will find timely information such as recent space environment reports (Joint USAF/NOAA primary and secondary HF propagation reports, reports of solar and geophysical activity, solar and geophysical activity summaries, and the latest geophysical alert message as broadcast on WWV); the current space environment alerts and warnings; auroral activity estimates from the NOAA/TIROS satellite; and various ionospheric data sets. This site is extremely valuable in determining current conditions regardless of which bands you are monitoring. Spin that browser toward: **http://www.sel.noaa.gov/radio/radio.html**

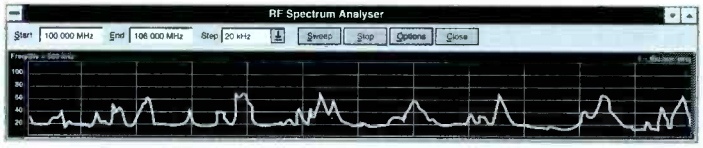
A reception report of these low band intercepts can be reported to the stations with the aim of obtaining a QSL or verification letter. For more on this subject be sure to read this month's *Beginners Corner* and the *QSL Report*.

So fire up that scanner and give low band DXing a try. Who knows? Maybe you will be lucky enough to hear the North Carolina Highway Patrol dispatch a call on 42.5/42.7 MHz to Grove Enterprises in Brasstown, North Carolina! Good luck and good hunting.

Continued on page 12

WiNRADiO

The Advanced Computer Receivers of Your Dreams!



This computer-controlled receiver and spectrum display appear on your computer screen!

• WR-1500

Turn your PC into a potent, wide-coverage monitoring station! User-friendly software allows all the usual receiver controls, plus much more. Rugged shielding resists interference from the host computer. Enjoy continuous 150 kHz through 1500 MHz (less cellular) frequency coverage; multimode reception of AM, wide and narrow FM, and USB, LSB, and CW; up to 16 memory banks with a virtually limitless number of channels; display records in memory by frequency, callsign, or comments field; scan by bank, grouping, or mode; and automatically search for activity by entering your choice of frequency limits.

Call up a full-fledged spectrum display and see signal presence on any 100 MHz span! Double-click the mouse on any signal spike and the receiver immediately tunes to that frequency! Storage feature allows recall of signal traces. BNC connector allows attachment of your antenna system, while a mini-jack permits connection of speaker or earphones. High sensitivity assures weak-signal pickup.

Easy installation, full instruction manual included. This unique receiving laboratory unleashes its power with Windows 95, requiring 486 or Pentium, 4 Megs RAM.

WBR05-i (internal unit) Only $499.95

WBR05-e (external unit) Only $549.95

plus $18 US Priority Mail or UPS 2nd Day Air Shipping

• WR-3100

Looking for a computer-hosted, wideband receiver with better specs for signal surveillance? For starters, how about continuous 150 kHz-1500 MHz reception, 65 dB image and spurious signal rejection, and 85 dB dynamic range? This is the WiNRADiO WR-3100i-DSP, designed specifically for government, military, and law enforcement applications.

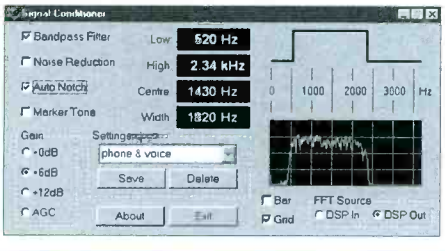
Featuring AM/SSB/NFM/WFM demodulation, 10 Hz tuning steps, and selectable bandwidths (2.4, 9, 17, 270 kHz), this plug-in receiver ISA card can memorize thousands of channels and scan them at speeds up to 50 per second! It will even log intercepts unattended, storing them into virtually unlimited memory for later recall? Up to eight independent receivers can be controlled at one time.

The Visitune spectrum display spans up to 100 MHz at a time, with storage and recall of multiple scans. And you can access any signal immediately by pointing and clicking your mouse, or even rapidly tune through the spectrum by simply dragging the mouse. Double-clicking on a spike provides accurate center-frequency readout of AM and FM signals.

Built-in DSP permits audio recording, playback, and many other specific applications. A task manager permits programmable operation and response. *DSP not included with external unit.*

WBR26-i (internal unit) or WBR26-e (external unit) Only $1895.95

plus $22 US Priority Mail or UPS 2nd Day Air Shipping



The DSP Signal Conditioner is supplied as standard part of the 3100-I Series software, to provide a useful example of a DSP application.

GROVE

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TABLE ONE: *MT*'S VHF-LOW BAND 30-50 MHZ SPECTRUM GUIDE

Note: The band plan presented in this table is based on US FCC allocations only. Other countries' frequency allocations in this band will vary from what has been presented. VHF low or cordless phone band plans for other countries and other interesting low band intercepts are welcomed by the author at **larry@grove-ent.com** or c/o Monitoring Times.

25.02-25.32	Petroleum Service
25.33-25.55	Fixed/Mobile Stations
35.55-25.67	Radio Astronomy
25.67-26.10	International Shortwave Broadcasting
26.10-26.175	Maritime Mobile
26.175-26.48	Land Mobile
26.48-26.95	Fixed/Mobile Stations
26.620	Civil Air Patrol
26.955	International Fixed Public
26.965-27.405	Citizens Band Radio (US 40 channels)
27.120	Industrial, Science, Medical discrete +/- 160 kHz
27.43-.27.49	Industrial/Business Service (27.49 Itinerant)
27.51-27.53	Industrial/Business Service(Low Power 2 watts)
27.54-28.00	U.S. Government/Military
28.00-29.70	Amateur Radio 10-meter band
29.71-29.79	Industrial/Business Service
29.80-29.89	Fixed Stations
29.89-29.91	Fixed/Mobile Stations
29.91-30.56	U.S. Government/Military
30.58-30.68	Industrial/Business Service
30.70	Petroleum Service (Also 30.78)
30.72-30.76	Industrial/Business Service (Also 30.88 30.92 30.96 31.00 31.04 31.08 31.12 31.16 31.20 31.24 31.28 31.32 31.36 31.40 31.44 31.48 31.52 31.56 31.60 31.64 31.68 31.72 31.76 31.80 31.84 31.88 31.92 31.96)
30.80-30.82	Industrial/Business Service (Also 30.84 Low Power 2 watts)
30.86	Industrial/Business Service/Forestry Conservation Service (Also 30.90 30.94 30.98 31.02 31.06 31.10 31.14)
31.18	Forestry Conservation Service (Also 31.22 31.26 31.30 31.34 31.38 31.42 31.46 31.50 31.54 31.58 31.62 31.66 31.70 31.74 31.78 31.82 31.86 31.90 31.94 31.98)
32.00-33.00	U.S. Government/Military
33.02	Highway Maintenance Service/ Special Emergency Service (One-way paging on secondary basis) (Also 33.06 and 33.10)
33.04	Special Emergency Service (Also 33.08)
33.12	Industrial/Business Service (Also 33.14 Low Power 2 watts)
33.16	Industrial/Business Service
33.18-33.38	Petroleum Service
33.40	Industrial/Business Service (Low Power 1 watt)
33.42	Fire Communications Service (10 watts or less)
33.44-33.98	Fire Communications Service
34.00-35.00	U.S. Government/Military
35.02	Special Emergency Service/ Industrial/Business Service
35.04	Industrial/Business Service (Itinerant)
35.06-35.18	Industrial/Business Service (Also 35.28 35.32 35.36 35.40 35.44 35.48 35.52)
35.20-35.26	Radio Common Carrier Paging (Also 35.30 35.34 35.38 35.42 35.46 35.50 35.54-35.62)
35.64-35.68	Special Emergency Service (One-way paging to mobile receivers only)
35.70-35.98	Industrial/Business Service
36.00-37.00	U.S. Government/Military (except 36.25 as noted below)
36.25	Petroleum Service (Oil Spill Containment/Shared with Fed government)
37.02-37.08	Police Communications Service (Also 37.12-37.16 37.20-37.24 37.28-37.42)
37.10	Any Public Safety Service (Also 37.18 37.26)
37.44	Industrial/Business Service
37.46-37.86	Power Industrial/Business Service
37.88	Industrial/Business Service
37.90	Highway Maintenance Service/Special Emergency Service (Also 37.94 and 37.98)
37.92	Highway Maintenance Service (Also 37.96)
38.00-39.00	U.S. Government/Military
39.02-39.04	Police Communications Service (Also 39.08 39.12-39.16 39.20-39.44 39.48 39.52-39.56 39.60-39.80 39.84-39.88 39.92-39.96)
39.06	Any Public Safety Service (2 watts)
39.10	Any Public Safety Service (Also 39.18 39.50 39.58 39.82 39.90 39.98)
39.46	Police Communications Service (Intersystem)
40.00-42.00	U.S. Government/Military (except 41.71 as noted below)
40.50	U.S. Government/Military - Distress, Rescue, Guard and Interservice Use
41.71	Petroleum Service (Oil Spill Containment/Shared with Fed government)
42.02	Police Communications Service State: AK CA GA MS MO WV
42.04	Police Communications Service State: CT FL NE NY WI WV
42.06	Police Communications Service State: MO SC TX WV
42.08	Police Communications Service State: CA MS OH SC
42.10	Police Communications Service State: SC WV
42.12	Police Communications Service State: CA IN ME MO MS SC WV
42.14	Police Communications Service State: ME NY SC WI
42.16	Police Communications Service State: CA IN MS PA
42.18	Police Communications Service State: CA CT GA MI MS NE
42.20	Police Communications Service State: CA CT IN MS NE
42.22	Police Communications Service State: MO NC WI
42.24	Police Communications Service State: CA CT ID MI MS
42.26	Police Communications Service State: Industrial/Business Service ND SC TN WV
42.28	Police Communications Service State: CA MI NE TN
42.30	Police Communications Service State: CA CT MI MS NE NY
42.32	Police Communications Service State: GA MO OK
42.34	Police Communications Service State: CA IL MA NE SC
42.36	Police Communications Service State: CA CT IL NY TN
42.38	Police Communications Service State: MA MO NC ND WI
42.40	Police Communications Service State: CA IN MA
42.42	Police Communications Service State: CA IN MA TN
42.44	Police Communications Service State: CA IL MA NH OR
42.46	Police Communications Service State: CA IL MA NE
42.48	Police Communications Service State: CA CT MI NE NY
42.50	Police Communications Service State: CA IL MA NC NV
42.52	Police Communications Service State: CA CT IL NC NY PA
42.54	Police Communications Service State: CA ID IL MA
42.56	Police Communications Service State: CA IL MN NC ND NV OH OR PA TN
42.58	Police Communications Service State: CT MI MO NC NV
42.60	Police Communications Service State: CA IL NC OK PA
42.62	Police Communications Service State: CA IL NC PA RI
42.64	Police Communications Service State: CA CT MI NC
42.66	Police Communications Service State: CA IL NC OH WY
42.68	Police Communications Service State: CA CT IL MI NC
42.70	Police Communications Service State: CA IL NC NV
42.72	Police Communications Service State: CA IL NC OH
42.74	Police Communications Service State: CA MI NC NV OH TN
42.76	Police Communications Service State: CA IL NC
42.78	Police Communications Service State: CA MO MN NC NV OH OR PA
42.80	Police Communications Service State: IL MI MS NC NV TX (one way paging to mobiles only)
42.82	Police Communications Service State: CA MN NC OR WY
42.84	Police Communications Service State: CA IL MS NC
42.86	Police Communications Service State: FL MI MN NC OR VA VT
42.88	Police Communications Service State: CA IL ID NC NV OR UT WY
42.90	Police Communications Service State: FL IL NC NV OR TX
42.92	Police Communications Service State: CA FL NC OR VA
42.94	Police Communications Service State: MI NC NV OR UT
42.96	Industrial/Business Service (Also 43.00-43.02 43.06-43.52)
42.98	Industrial/Business Service (Low Power 2 watts)
43.04	Industrial/Business Service (Itinerant)
43.54-43.62	Radio Common Carrier Paging
43.64	Special Emergency Service (Low power under 10 watts digital transmissions)
43.66	Radio Common Carrier Paging
43.68	Special Emergency Service (One way paging to mobiles only)
43.70-44.60	Industrial/Business Service
44.62	Police Communications Service State: AL AR KY NY
44.64	Forestry Conservation Service (Also 44.68 44.72 44.76 44.80 44.84 44.88 44.92 44.96 45.00 45.04)
44.66	Police Communications Service State: AR AZ FL IL
44.70	Police Communications Service State: IL OK
44.74	Police Communications Service State: AR FL MA MD OH
44.78	Police Communications Service State: AL AR FL KY
44.82	Police Communications Service State: AZ KS NH OH
44.86	Police Communications Service State: CT DE NH OH
44.90	Police Communications Service State: MA MD OH OK
44.94	Police Communications Service State: FL KS NH OH
44.98	Police Communications Service State: KS NH OH
45.02	Police Communications Service State: CA CT DE NH OH OK

TABLE ONE, CONTINUED

45.06	Police Communications Service State: FL IL OH TX	45.86	Police Communications Service (Intersystem)	47.42	Special Emergency Service (Reserved for assignment only to national organizations eligible for disaster relief operations)
45.08	Any Public Safety Service (Also 45.12 45.16 45.20 45.24 45.28 45.32 45.36 45.40 45.44 45.48 45.52 45.56 45.60 45.64)	45.88	Fire Communications Service (Intersystem)	47.44	Industrial/Business Service (Also 47.48 47.52 47.56 47.60 47.64 47.68)
45.10	Police Communications Service (Also 45.14 45.18 45.22 45.26 45.30 45.34 45.38 45.42 45.46 45.50 45.54 45.58 45.62 45.66 45.70 45.74 45.78 45.82 45.90 45.94 45.98 46.02)	45.92	Special Emergency Service (Also 45.96 45.96 46.00 46.04)	47.46	Special Emergency Service (Also 47.50 47.54 47.58 47.62 47.66)
		46.06-46.28	Fire Communications Service (Also 46.32-46.50)	47.70-48.54	Power Industrial/Business Service
		46.30	Fire Communications Service (Maximum power 10 watts)	48.56-49.58	Industrial/Business Service
45.68	Highway Maintenance Service (Also 45.72 45.76 45.80 45.84)	46.52-46.58	Any Public Safety Service	49.60-50.00	U.S. Government/Military
		46.60-47.00	U.S. Government/Military	50.00-54.00	Amateur Radio 6-meter band
		47.02-47.40	Highway Maintenance Service (State/Local only secondary basis to work with state)		

TABLE TWO: SELECTED LOW BAND MILITARY INTERCEPTS

32.20	Sabre AHP/Fort Campbell, KY: Sabre tactical	38.40	National Guard Common (Nationwide)	41.45	Glenn Martin State Airport, MD: 175FG Tactical Ops/Colt callsign
32.35	Reno-Stead/NG Command Post, NV: Rocky operations	38.65	Fort Bragg, NC: Range control	41.50	Hunter AAF, Savannah, GA: Sunny Operations/Sunny RC-12 aircraft
32.50	Fort Bragg, NC: Range control	38.70	Hunter AAF, Savannah, GA: Sunny Operations/Sunny RC-12 aircraft	41.50	Shelbyville Muni, IN: NG Command Post
34.00	Fort Dix, NJ: Range control	38.70	Westover ARB, MA: NG Operations/Minuteman Ops	41.75	Fort Bragg, NC: Range control
34.20	USAF Claiborne Range, LA: Range control	38.90	Fort Bragg, NC: Range control/Camp McKall	41.80	Battle Creek, MI: 110FW Tactical
34.40	Warren Grove Range, NJ: Air-to-air communications	40.50	Military Search and Rescue (Worldwide)	41.90	Bradley Airport, CT: Operations/NG Aviation Support Facility
		40.60	Fort Bragg, NC: Helicopter operations	46.85	Kiowa Military Operating Area, PA: Range control
34.90	Fort Campbell, KY: Eagle Radio Flight Following	40.90	Fort Indiantown Gap, PA: Flight Following	46.95	Lowe AHP, AL: Tower
36.75	USAF Claiborne Range, LA: Air-to-ground communications	41.40	Fort Bragg, NC: Tactical operations	49.75	Warren Grove, PA: Range control
		41.40	Fort Indiantown Gap, PA: Range control		
		41.41	Fort Bragg, NC: Medical Net		

TABLE 3: CORDLESS TELEPHONE ASSIGNMENTS

United States

US Monitors Note: Federal law makes it illegal to monitor cordless phone conversations. These frequencies are presented for informational purposes only to help the low band DXers ferret out potential cordless phone frequencies from similar distant skip signals. Phone users should be aware that these low power phones have been heard great distances under the right ionospheric conditions.

43.720	New Cordless Phones Base <channel 1>	49.090	New Cordless Phones Handset <channel 6>
43.740	New Cordless Phones Base <channel 2>	49.100	New Cordless Phones Handset <channel 7>
43.820	New Cordless Phones Base <channel 3>	49.160	New Cordless Phones Handset <channel 8>
43.840	New Cordless Phones Base <channel 4>	49.200	New Cordless Phones Handset <channel 9>
43.920	New Cordless Phones Base <channel 5>	49.240	New Cordless Phones Handset <channel 10>
43.960	New Cordless Phones Base <channel 6>		
44.120	New Cordless Phones Base <channel 7>	49.280	New Cordless Phones Handset <channel 11>
44.160	New Cordless Phones Base <channel 8>		
44.180	New Cordless Phones Base <channel 9>	49.360	New Cordless Phones Handset <channel 12>
44.200	New Cordless Phones Base <channel 10>		
44.320	New Cordless Phones Base <channel 11>	49.400	New Cordless Phones Handset <channel 13>
44.360	New Cordless Phones Base <channel 12>		
44.400	New Cordless Phones Base <channel 13>	49.460	New Cordless Phones Handset <channel 14>
44.460	New Cordless Phones Base <channel 14>		
44.480	New Cordless Phones Base <channel 15>	49.500	New Cordless Phones Handset <channel 15>
46.610	Old Cordless Telephone Base <channel 1>		
46.630	Old Cordless Telephone Base <channel 2>	49.670	Cordless Handset <channel 1>
46.670	Old Cordless Telephone Base <channel 3>	49.830	Pre-1984 Cordless Handset
46.710	Old Cordless Telephone Base <channel 4>	49.845	Cordless Handset <channel 2> also Pre-1984 Cordless Handsets
46.730	Old Cordless Telephone Base <channel 5>		
46.770	Old Cordless Telephone Base <channel 6>	49.860	Cordless Handset <channel 3> also Pre-1984 Cordless Handsets
46.830	Old Cordless Telephone Base <channel 7>		
46.870	Old Cordless Telephone Base <channel 8>	49.770	Cordless Handset <channel 4>
46.930	Old Cordless Telephone Base <channel 9>	49.875	Cordless Handset <channel 5> also Pre-1984 Cordless Handsets
46.970	Old Cordless Telephone Base <channel 10>		
48.760	New Cordless Phones Handset <channel 1>	49.830	Cordless Handset <channel 6>
48.840	New Cordless Phones Handset <channel 2>	49.890	Cordless Handset <channel 7> also Pre-1984 Cordless Handsets
48.860	New Cordless Phones Handset <channel 3>		
48.920	New Cordless Phones Handset <channel 4>	49.930	Cordless Handset <channel 8>
49.020	New Cordless Phones Handset <channel 5>	49.970	Cordless Handset <channel 9>
		49.990	Cordless Handset <channel 10>

United Kingdom

Here is the new UK cordless phone band:

31.0375-31.2125 Base sets
39.9375-40.1125 Hand sets

The new cordless phone band is used by analog as well as digital phone sets. Information courtesy of Ian Julian, ZL1TBM, New Zealand.

Song of the Coconut Islands: DXing Indonesia

By Nick Grace

RRI Malang, East Java

The sound is unmistakable – a mournful little melody played on Hammond organ, piano and conch shell piercing through the static and gurgling under pressure from intense propagation. Although simple, Rayuan Pulau Kelapa ("Song of the Coconut Islands" in Indonesian) is easily the most recognized interval signal among hardcore shortwave (SW) listeners. It stands out like a precious jewel in a recently unearthed jungle temple; its sound can easily cause an adrenaline rush for any DXer.

What this obscure tune represents in the SW listening hobby is Radio Republik Indonesia (RRI), Indonesia's state radio network, which operates a number of sites across the Indonesian archipelago on the tropical SW bands.

Spanning three time zones across the equator and bridging the Indian and Pacific Oceans lies DXing's greatest challenge: Indonesia. Although the archipelago is home to dozens of SW stations it remains one of the most difficult countries to log and verify for American hobbyists. And for many, DXing Indonesia marks the transition between beginner and seasoned DXer.

Background

SW broadcasting has enjoyed a long and interesting history in Indonesia thanks to the archipelago's difficult terrain and uneven development. The dawn of radio, in fact, can be traced to 1918 when radio telegraphic communication was employed by the Dutch to communicate directly to its colony from Europe. A few years later, they built an incredible 2.4 kW arc transmitter based in Bandung to ensure round-the-clock service.

As broadcasting began to entertain listeners in the West, the Dutch in Java built Bataviase Radio Vereniging (Batavia Radio Society) in June 1926, offering two-hour evening music programs from Jakarta. This station, according to many accounts, inspired others across the Dutch East Indies to hit the airwaves – including indigenous Indonesians.

Indonesian nationalist student leaders, including the then-future president Soekarno, met in Bandung in 1927 to draw a roadmap for the future of their movement. Although not directly declared, an agreement was apparently forged to employ the radio medium as a tool to reinforce Indonesian culture and identity. With the colony already awash with stations from Medan to Malang, programming was hard to control, and oftentimes the private and relatively small Dutch radio societies played into the hand of the Indonesians by allowing traditional music to be broadcast.

The autonomy of radio stations began to concern Amsterdam, which in 1934 licensed NIROM (Nederlands Indische Radio Omroep Maatschappij) to broadcast from five cities in Java. In addition, new laws were stipulated to decrease the number of stations that were on the air. Most private stations were pushed down into the medium wave, while NIROM remained on the lower SW bands. This not only ensured a wider monopoly on fees the government could extract from listeners, but also chopped coverage areas of the smaller organizations.

Perikatan Perkumpulan Radio Ketimuran (PPRK, Alliance of Eastern Radio Groups) formed in 1937 to organize local language broadcasts and to provide for a national Indonesian-language program through NIROM's network. Amsterdam agreed, playing into a scheme of Indonesian nationalists to unite the archipelago through a national tongue: Bahasa Indonesia. But events soon turned in another direction as the Japanese invaded and occupied NIROM to serve as its Southeast Asian service.

The Fortunes of War

Indonesian nationalists reluctantly sided with the Japanese during the occupation in order to receive training and take more powerful administration roles. Since radio propaganda was important for Japan and the personnel needed to operate the broadcasts were limited, Indonesians were also allowed to take part in this effort. On August 17, 1945, Indonesian nationalists declared independence upon Japan's surrender and began to wage a four-year bloody revolutionary war against the Dutch.

A conference was held in Jakarta on September 11, 1945, to create a framework for Indonesian radio. Representatives from all sides of Java arrived to represent stations in Bandung, Yogyakarta, Surakarta, Semarang, Purwokerto, Surabaya and Malang. They agreed to unite under the banner of Radio Republik Indonesia (RRI) and pledged the *Pri Prasetwa* (Three Principles), which stood for: 1) protect radio equipment from "anyone who wishes to use it to destroy our State"; 2) employ radio as a "fighting instrument"; and 3) support national unity.

Unbeknownst to the Dutch, radio would rapidly become the most effective weapon the Indonesians had since it could directly send the incredibly inspiring and passionate speeches from the movement's most powerful leaders into the homes of rural farmers and young students.

The RRI network, which began with only eight stations, soon expanded into 13 additional Javanese cities: Ciribon, Tasikmalaya, Cilacap, Kebumen, Magelang, Pekalongan, Tegal, Pati, Madiun, Bordowoso, Jember, Mojokerto and Kediri. The Dutch, however, maintained control over most of the outer islands, and in 1948, reclaimed Jakarta. RRI was quickly moved to Yogyakarta, in Central Java, and broadcast two clandestine programs: RRI Perjuangan Jawa Barat (RRI Struggle in West Java) and RRI Jawa Timur (RRI East Java).

This move was short-lived as the situation worsened for the Indonesians and the RRI stations in Yogyakarta and Surabaya retreated into the jungle to broadcast atop volcanoes. Although the Dutch had effectively silenced most of the revolutionary stations, these two programs continued to shake the colonial troops.

When the war finally ended in 1949 with the Dutch pullout, the Indonesian government quickly moved to reinstate RRI. But the cost of nation-building and weak domestic economy stood as a barrier for radio development. By 1953, only 23 radio stations remained on the air.

President Soekarno, however, had his eyes on the international community and was quickly

becoming one of the leaders of the Third World. Months before he hosted the Asia-Africa Conference in 1954, he proudly signed into existence the Voice of Indonesia. This service of RRI Jakarta was meant to broadcast externally to lend Indonesia prestige and influence through the SW bands.

Ten years later, the Voice of Indonesia had increased its foreign-language broadcasts to seven, but only 39 cities across Indonesia had a local RRI station. Soekarno's attention seemed to be fixated on the world outside his own archipelago.

In fact, most programming was in disarray as RRI outlets in Sumatra and Sulawesi broadcast programs in their local languages. What was available from Jakarta included mainly nationalist speeches by Soekarno and other government leaders in addition to shows sponsored by the Communist Party of Indonesia to counter those produced by the Indonesian Armed Forces and vice versa. In fact, this conflict between the Communists and the military led to Soekarno's confusing overthrow in 1965 – an event that witnessed the deaths of an estimated half-a-million suspected Communists.

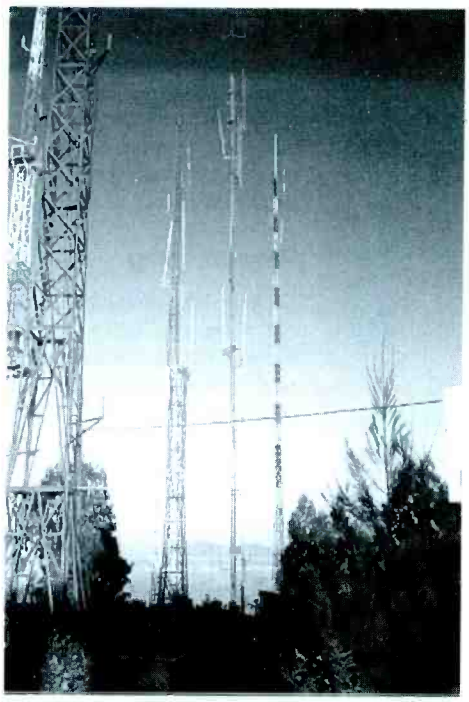
Indonesia found itself under the new leadership of General Soeharto, a little-known general from Central Java who had never had more than primary education. RRI began to develop at a greater rate as the nation's economy began to take off. By the end of the 60s, in fact, 46 cities had become home to a regional station. Since pirate radio had become a problem following Soekarno's downfall, President Soeharto issued a number of decrees, including Administrative Regulation 55/70, which to this day requires all stations to relay the news from RRI Jakarta.

RRI's Dwindling SW Base

A conference on rural communications and farm broadcasting in 1969 essentially laid the framework for RRI and SW broadcasting in Indonesia for years to come. Besides increasing news and economic programs, representatives also decided to use children and women's shows to push social and health-oriented campaigns. Another outgrowth of the meeting was the *Radio Khusus Pemerintah Daerah* (RKPD – Regional Administrative) stations.

Licenses for RKPD outlets were handed out in 1970 to provincial and municipal governments across the archipelago for local SW and AM stations. A total of 80 began broadcasting; however, by the late 70s and early 80s most had moved off SW and into the AM broadcast band.

Programming has changed little since the 70s. Although the government in Jakarta spent the early 80s investing in new broadcast equipment, many SW regional stations have been signing off SW for good. This trend accelerated during the early 90s as television became an attainable luxury for Indonesians living near urban centers, especially on Java. And now with the magic of the Internet expanding into



RRI Malang broadcasts from these mountaintop towers on AM, FM and SW.

even the most remote of areas, the future of SW service for most RRI regionals may very well be doomed.

Nevertheless, half of Indonesia's population continues to live in the *kampung* (countryside), where rural development and social programs are still important. But Indonesia's current economic and political state is currently in a shambles, further threatening the future of SW in the archipelago.

Already most of the urban RRI outlets in Java have let their SW transmitters burn out. And with Jakarta tightening its monetary belt, funding to repair the equipment is nowhere to be seen. Although RRI Malang in East Java, for example, is off SW, station chief Kartini recently told the author that it is a matter of time before they can find the budget to repair the transmitter. "The transmitter is still there," she said. "We just need to get it fixed so that we can reach our listeners in the valley below."

Time is truly running out to log and verify this exotic country. But with a little preparation and lots of luck you'll be able to pull in what's left burning through the static from the DX world's ring of fire.

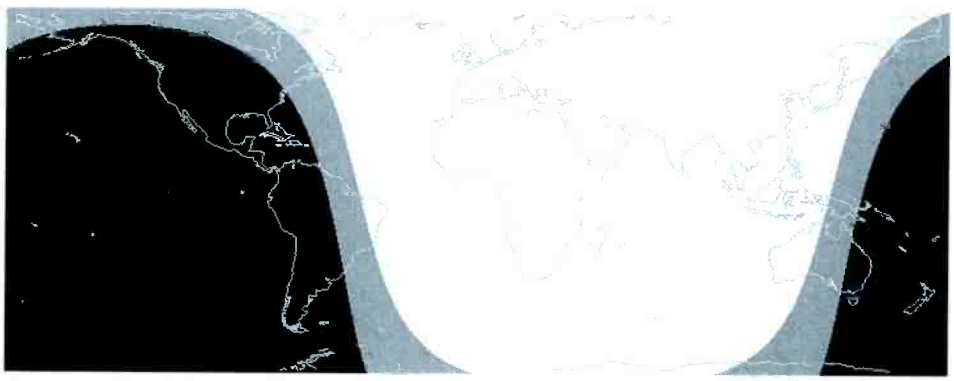
Logistics

DXing Indonesia is unlike logging European, Latin American and African stations. Because of the tremendous distance between Southeast Asia and North America, signals tend to be weak and riddled with fading – if a station is even audible at all. Therefore, it is important to know what's active and when other SW hobby colleagues have heard an active signal. There are scores of weekly Internet-based bulletins, which you can refer to, including Cumbre DX (**www.cumbredx.org**).

Keep a list handy of what's being reported to maintain your focus. Equipment maintenance is oftentimes difficult for remote stations in Indonesia and as a result many regionals come and go. As long as you are familiar with what's active you have a better chance at catching one of these rare birds.

A general knowledge of propagation is also vital if you decide to take the challenge. Signals usually prefer to greet your receiver by traveling the shortest path possible. However, in order to catch the rare long-haul stuff we must utilize two phenomena: grayline and long-path DX.

Grayline DX occurs when you pull in a signal during your sunrise or sunset and the transmitter's location is going through its sunset or sunrise – that is, the two points are going through opposite transitions. Depending on the time of year and the sunset and sunrise times of the locations, there may be a window of opportunity which may last anywhere from 5 to 30 minutes. Most seasoned listeners keep a list of these times by their radio in order to target stations more effectively. In addition, there is a free programmable map that you can download off the web, which shows the grayline: (**www.clark.net/pub/bblake/geoclock/**).



An example of the grayline as it passes across the globe, recorded on August 21, 1999 at approximately 1000 UTC.

RRI Semarang production studio for pre-recorded shows.

Long-path DX, on the other hand, happens when the signal lands into your receiver by taking the longest route possible. As a result, reception tends to sound "watery," as if bubbling through a layer of water. Although long-path DX is associated with SW frequencies above 10 MHz, it does occur on the lower bands. It's much more difficult to prepare for than the grayline mode, however, since the phenomena is less predictable.

Beyond current data and propagation, I cannot emphasize enough the importance of your receiver and antenna. Quality receivers, including the Drake R8 and tabletop Yamaha, Yaesu and Icom radios, are vital, since their sensitivity and selectibility are powerful enough to help you pull in the weakest of signals. You also cannot overlook your antenna. In general, the longer the antenna, the better it will be. If you don't have the space or live in an apartment, don't worry. I was able to toss a 50-ft. clandestine longwire antenna above the sidewalk from my basement apartment in downtown Washington, DC, and still had luck with catching regional stations across Indonesia.

Programming

With the groundwork now out of the way, you've got to know what to listen for. If you're lucky enough to catch an RRI station at the top of the hour you'll find yourself enchanted by the network's interval signal. RRI regionals don't actually hold a recording of this song in their libraries. It's actually relayed directly from Jakarta since it precedes the hourly news, which by law, must still be broadcast by every government and private station in the archipelago.

But, this is Indonesia that we're talking about, so sometimes station personnel decide to forego the books and forget about the news. In case you do hear the news, you'll notice that it will be parallel to the news you would hear if you tuned into one of the many Indonesian FM stations on the web. The Indonesian Radio Web **(http://www.qsl.net/yb0rmi www.qsl.net/yb0rmi)** contains many links to on-line radio stations.

Other identifying pieces of programming you should be on the lookout for include *Wayang Kulit* (Shadow Puppet) shows. These all-night concerts are accompanied by a 30-piece gamelan orchestra and are led by a single puppeteer who vocalizes all of the characters. Wayang performances are almost always broadcast by Javanese stations, but regionals in Sumatra, Sulawesi, Kalimantan and the outer islands tend to use gamelan music for fill material. You can sample this type of music on the web through the Indonesian Radio Web as well.

Don't overlook programming, as it is central to the work of any station regardless of its location. If you can familiarize yourself with how the news sounds—which will also introduce you to the unique sound of the Indonesian language and gamelan music—all that's left will be to catch that elusive identification: *Inilah Radio Republik Indonesia ...*

Conclusion

DXing Indonesian regional outlets is both highly rewarding and challenging. Few can forget the first time they caught RRI's beautiful interval signal riding over the airwaves as it is such a satisfying achievement. In just a few short bars, the tune represents both independence and development for the Indonesian listeners and the ultimate catch for American DXers. And now that we are blazing through the fall and winter DX season, chances are good that you, too, will pull in the "Song of the Coconut Islands."

The author is a Washington-based freelance correspondent for the Indonesian press. His own interest in DXing Indonesia led him to pursue a degree in Indonesian Politics and he now travels regularly to the archipelago.

TUNING IN TO INDONESIA

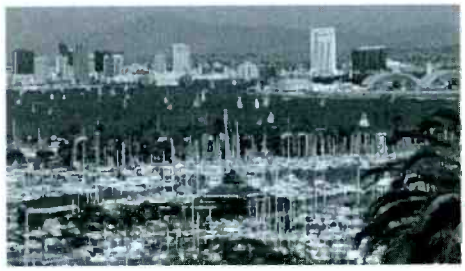
Bold frequencies indicate stations which have recently been heard in the U.S. Note that all frequencies are in kHz and all times are in UTC. Data courtesy Numero Uno and Cumbre DX.

Freq kHz	Station	Notes
2490.3	RRI Ujung Pandang	
2695	RPDT2 Ende	
2899	RPDT2 Ngada	
2960	RPDT2 Manggarai, Ruteng	
3050 – 3600	Unlicensed pirate statians	
3165.2	RDK Serang	
3215	RRI Manada	Audible around 1200
3223	RRI Mataram (inactive)	
3224.8	RRI Tanjung Pinang	Audible 1130 & 2200
3231.8	RRI Bukittinggi	
3249.8	RRI Banjarmasin	
3264.7	RRI Gorontala	Audible 1100 / 1200
3264.8	RRI Bengkulu	Audible 2200 / 2230
3325	RRI Palangkaraya	Audible 1100 & 2200
3344.8	RRI Ternate	Audible 1100 / 1200
3355.3	RRI Jambi	
3385	RRI Kupang	Audible 1100 / 1200
3395.1	RRI Bandar Lampung	Audible 1100 & 2300
3541.8	RPDT2 Sumba Timur, Waingapu	
3646	RRI Fak Fak	
3905	RRI Banda Aceh (inactive)	
3905	RRI Merauke	Audible 1200
3934	RRI Semarang (inactive)	
3960	RRI Padang (inactive)	
3960.2	RRI Palu	Audible 1200
3976.1	RRI Pontianak	Audible 1200 & 2200

Freq kHz	Station	Notes
3985.8	RRI Surabaya	Audible 1100 / 1200
4000.1	RRI Padang	Audible 1200 / 2200
4000.1	RRI Kendari	Audible 2130
4003.2	RRI Padang (alt. freq.)	Audible 1200 & 2300
4021.1	RRI Manokwari	
4606.4	RRI Serui, Irian Jaya	Audible 1200
4696.6	RKIP Surabaya	Audible 1200
4753.3	RRI Ujung Pandang	Audible 1200 & 2200
4766	RRI Medan	Audible 1200 & 2300
4777.1	RRI Jakarta	Audible 1200 & 2200
4789.1	RRI Fak Fak	Audible 1200 / 1300
4845.2	RRI Ambon	
4855.5	RRI Palembang	
4875.5	RRI Sorong	Audible 1200 & 2130
4925	RRI Jambi	Audible 1200 & 2300
5040	RRI Pekanbaru	Audible 1200 & 2230
6071	RRI Jayapura	Audible 0930
6153.3	RRI Biak	Audible until 1100 sign off
7098.2	RRI Yogyakarta	Audible 1100 & 2200
9525	Voice of Indonesia	Audible1200
9565	RRI Jakarta	Audible 1200 & 2300
9630	RRI Jakarta	Audible 1200 & 2200
11760	RRI Jakarta	Audible 1300
11785	Voice of Indonesia	Audible 2100
15125	RRI Jakarta	Audible 2200
15149.8	Voice of Indonesia	Audible 2000 / 2100

Trunked System Profile:

San Diego County Regional Communications System



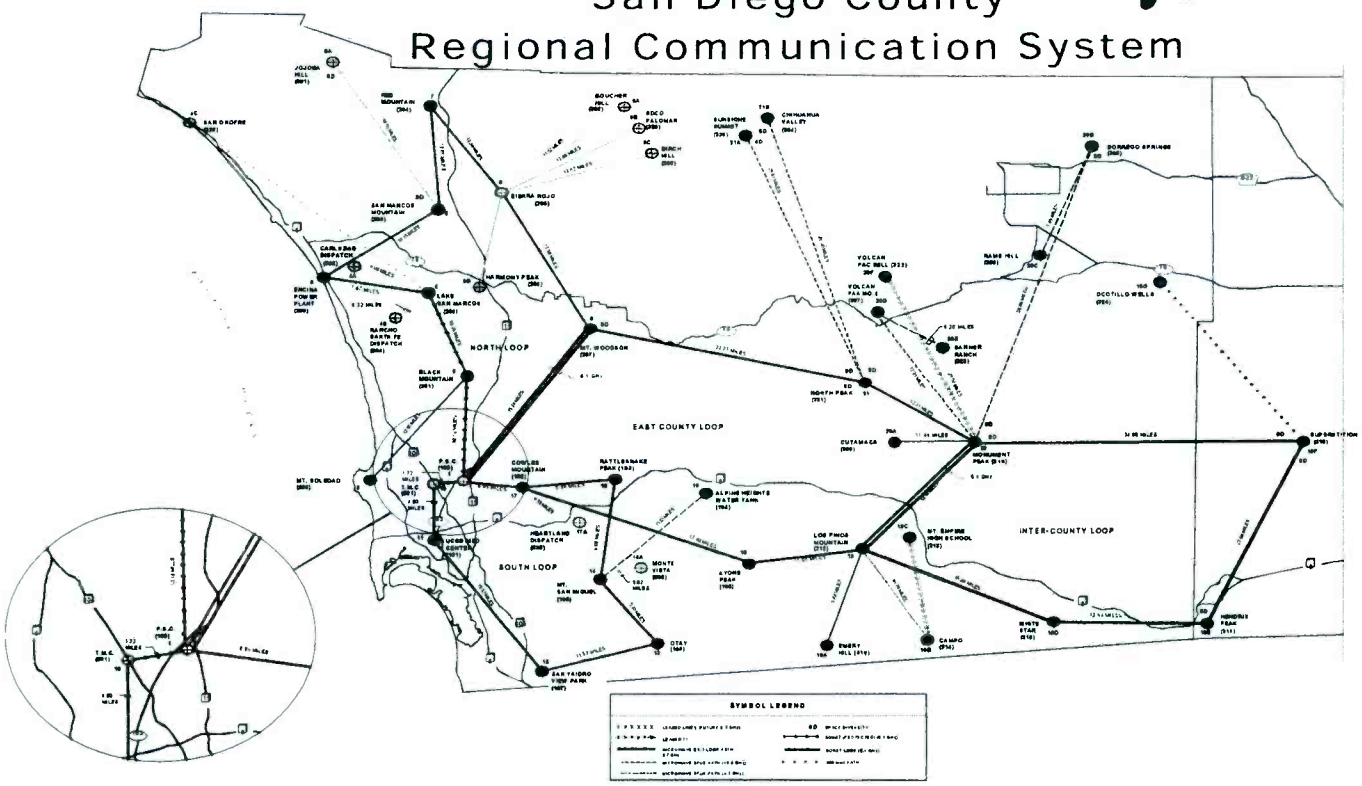
By Laura Quarantiello

San Diego County's new $83 million dollar public safety and public service radio network, known formally as the Regional Communications System or RCS, began as a bid to connect the dozens of public safety agencies in the area through an 800 MHz network. The plan was approved in 1992 and construction on the radio transmitter sites began in 1996. By early 1998, the first users were broadcasting.

Today, the RCS has taken this Southern California region squarely into the 21st century. More than 80 local, county, and state government agencies throughout the 4,500 square miles of the county will use the system as their primary voice and data network. Additionally, the system extends into Imperial County and will support agencies there, as well.

The RCS uses a total of 43 separate radio microwave repeater sites utilizing more than 153 frequency pairs to achieve radio coverage in this diverse county that covers terrain ranging from the coast to the mountains and beyond into the desert, including over 185 miles of U. S. - Mexico Border.

San Diego County presents the usual challenges to a communications system—geographical barriers, large areas with sparse population plus dense urban areas, and a huge variety of agencies requiring communications. The RCS is a good beginning, but still connects less than half of the potential users.



Sites and Microwave Paths

San Diego Convention Center

The system is a Motorola SmartZone trunked simulcast system supporting mixed mode analog and digital transmissions. There are more than 50 microwave repeater sites in both counties, as well as three simulcast cells with 18 repeaters and 29 stand alone, non-simulcast repeaters in the mountainous areas.

The system supports various data applications, including GPS based AVL/Personal Location devices. All law enforcement dispatch and tactical talkgroups are digital, though mutual aid and county tactical talkgroups are analog voice. All other agencies are analog voice and easily monitored.

Participating agencies include the San Diego County Sheriff's Department, Marshal's Office, Medical Examiner, Fire/EMS, Probation Department, Corrections, Animal Control, School and Water Districts and the public safety/public service departments from the cities of Carlsbad, Encinitas, Solana Beach, Del Mar, Imperial Beach, Lemon Grove, Santee, Poway, San Marcos, and Vista; as well as Imperial County, El Centro, Imperial, Holtville, Calipatria, Westmorland, Brawley, Calexico, and the State of California's CALTRANS District 11. Partners in the system include the cities of Escondido, Oceanside, La Mesa, El Cajon, Chula Vista, and National City.

SAN DIEGO COUNTY REGIONAL COMMUNICATIONS SYSTEM FREQUENCIES

North Zone
856.175 856.200 857.175 857.200 858.175
858.200 859.200 860.200 860.225 861.150
861.200 862.000 862.150 862.200 863.150

South Zone
866.0375 866.1375 866.4125 866.6375 866.8875
866.9125 867.1375 867.3875 867.4125 867.6125
867.6375 867.9125 868.075 868.1375 868.4125

Banner Ranch
867.775 867.275 866.775

Birch Hill
868.050 867.575 868.600 866.100

Boucher Hill
868.450 867.050 866.050

Campo
863.150 862.200 860.200

Chihuahua Valley
868.1875 867.1875 866.1875

Cuyamaca
867.950 867.5625 867.0375 866.575

Emery Hill
860.225 857.200 856.125

Hendrix Peak
861.200 858.175 857.175 856.175

Jojoba Hill
868.6625 868.1625 867.1625

Los Pinos
868.950 868.600 868.100 867.075
866.100 m/a 1 (conv.) 866.950 m/a 2 (conv.)

Lyons Peak
868.925 868.375 867.875 866.975

Monument Peak
868.475 867.100 866.475

North Peak
868.550 867.975 867.475

Rams Hill
868.8625 867.3625 866.8625 866.3625

Sierra Rojo
868.8375 868.3375 867.6875 866.6625

Sunshine Summit
868.6875 867.6625 866.6875

Superstition
863.250 862.250 861.250

Volcan Mtn.
867.8375 867.3375 866.8375 866.3375

White Star
862.150 861.150 859.200
866.100 m/a 1 (conv.) 866.950 m/a 1)conv.)

HFCA (Heartland)
868.050 867.4375 867.5875 867.050 866.4375
866.0625 868.4375
866.0875 (Conv. 1) 868.4375 (Conv. 2)

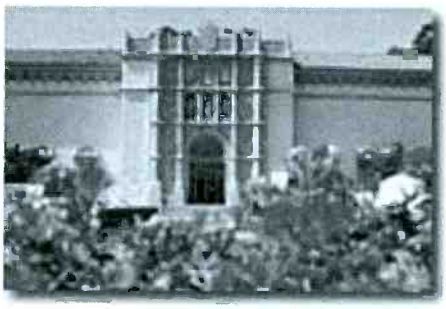
COUNTY OF SAN DIEGO REGIONAL COMMUNICATIONS SYSTEM TALKGROUPS

Talkgroup	Agency	Usage
16	City of Encinitas	Public Safety 1
48	City of Encinitas	Public Safety 2 - Lifeguards
80	City of Solana Beach	Public Safety
112	City of Solana Beach	
144	City of Solana Beach	Public Works
176	City of Solana Beach	
208	City of Solana Beach	
240	City of Solana Beach	Marine Safety
272	Rancho Santa Fe Security	Dispatch
304	Rancho Santa Fe Security	Tac 1
336	Rancho Santa Fe Security	Tac 2
368	Caltrans	Traffic Management Center
400	Caltrans	Maintenance
816	North Mutual Aid	Command 1
848	North Mutual Aid	Tac 1
880	North Mutual Aid	Tac 2
912	North Mutual Aid	Command 2
944	Northa Mutual Aid	Tac 3
976	North Mutual Aid	Tac 4
1008	North Mutual Aid	Command 3
1040	North Mutual Aid	Tac 5
1072	North Mutual Aid	Tac 6
1104	North Mutual Aid	Command 4
1136	North Mutual Aid	Tac 7
1168	North Mutual Aid	Tac 8
1200	North Mutual Aid	Command 5
1232	North Mutual Aid	Tac 9
1264	North Mutual Aid	Tac 10
1296	North Mutual Aid	Tac 11
1328	South Mutual Aid	Command 1
1360	South Mutual Aid	Tac 1
1392	South Mutual Aid	Tac 2
1424	South Mutual Aid	Command 2
1456	South Mutual Aid	Tac 3
1488	South Mutual Aid	Tac 4
1520	South Mutual Aid	Command 3
1552	South Mutual Aid	Tac 5
1584	South Mutual Aid	Tac 6
1616	South Mutual Aid	Command 4
1648	South Mutual Aid	Tac 7
1680	South Mutual Aid	Tac 8
1712	South Mutual Aid	Command 5
1744	South Mutual Aid	Tac 9
1776	South Mutual Aid	Tac 10
1808	South Mutual Aid	Tac 11
1840	East Mutual Aid	Command 1
1872	East Mutual Aid	Tac 1
1904	East Mutual Aid	Tac 2
1936	East Mutual Aid	Command 2
1968	East Mutual Aid	Tac 3
2000	East Mutual Aid	Tac 4
2032	East Mutual Aid	Command 3
2064	East Mutual Aid	Tac 5
2096	East Mutual Aid	Tac 6
2128	East Mutual Aid	Command 4
2160	East Mutual Aid	Tac 7
2192	East Mutual Aid	Tac 8
2224	East Mutual Aid	Command 5
2256	East Mutual Aid	Tac 9
2288	East Mutual Aid	Tac 10
2320	East Mutual Aid	Tac 11
2384	Emergency Medical Services	BLS - Alvarado
2416	Emergency Medical Services	ALS - Area 1
2448	Emergency Medical Services	ALS - Area 2
2480	Emergency Medical Services	ALS - Area 3
2512	Emergency Medical Services	ALS - Area 4
2544	Emergency Medical Services	ALS - Area 5
2576	Emergency Medical Services	ALS - Area 6
3640	Emergency Medical Services	Sharp Cabrillo Hospital
2800	Carlsbad Fire Department	Dispatch
2864	Carlsbad Fire Department	Command 1
2896	Carlsbad Fire Department	Command 2
2928	Carlsbad Fire Department	Tac 1
2960	Carlsbad Fire Department	Tac 2
3056	San Diego County Medical Examiner	Operations
3216	CLEMARS	VHF Patch
3280	Emergency Medical Services	Camp Pendleton
3312	County Mutual Aid	County Call
3344	County Mutual Aid	Tac 1
3376	County Mutual Aid	Tac 2
3408	County Mutual Aid	Tac 3
3440	County Mutual Aid	Tac 4

TALKGROUPS, CONTINUED

Talkgroup	Agency	Usage
3472	Emergency Medical Services	Coronado Hospital
3856	County Jails	Jail Call
4496	Animal Control Department	Central Tac 1
4528	Animal Control Department	Central Tac 2
4560	Animal Control Department	Coast Dispatch
4576	Animal Control Department	
4592	Animal Control Department	Central Dispatch
4624	Animal Control Department	North Dispatch
4656	Animal Control Department	Coast Tac 1
4688	Animal Control Department	Coast Tac 2
4720	Animal Control Department	North Tac 1
4752	Animal Control Department	North Tac 2
5360	City of Del Mar	Ch. 1
5392	City of Del Mar	Ch. 2
5424	City of Del Mar	Ch. 3
5456	City of Vista	Wastewater
5520	City of Del Mar	City
5616	Fire	Expansion 1
5552	Del Mar Fire Department	Command 1
5648	Fire	Expansion 2
5680	Fire	Expansion 3
5712	Del Mar Fire Department	Dispatch
5744	City of Del Mar	
5776	Fire	Expansion 4
5808	Fire	Expansion 5
5840	Fire	Expansion 6
5872	Fire	Expansion 7
5968	Fire	Expansion 8
6224	County Mutual Aid	Emergency 1
6256	County Mutual Aid	Emergency 2
6288	County Mutual Aid	Emergency 3
6320	County Mutual Aid	Emergency 4
6352	Emergency Medical Services	ALS - Scripps La Jolla Hospital
6384	Emergency Medical Services	ALS - Palomar Medical Center
6416	Emergency Medical Services	ALS - Tri-City Medical Center
6448	Emergency Medical Services	ALS - USCD Medical Center
6480	Emergency Medical Services	ALS - Mercy Hospital
6512	City of Encinitas	Ch. 1
6544	City of Encinitas	Ch. 2
6576	City of Encinitas	Ch. 3
6608	City of Encinitas	Tac 4
6640	City of Encinitas	City
6736	City of Encinitas	Lifeguards Tac 1
6768	City of Encinitas	Lifeguards Tac 2
6832	City of Encinitas	Lifeguards
6896	Law Enforcement East	Tac 1
6928	Law Enforcement East	Tac 2
6960	Law Enforcement East	Tac 3
6992	Law Enforcement East	Tac 4
7024	Emergency Medical Services	Fallbrook
7032	City of Encinitas	Lifeguards
7056	Fire to Air	
8112	City of Imperial Beach	Ch. 1
8272	Emergency Medical Services	BLS - Tri CityMedical Center
8304	City of Imperial Beach	City
8400	Emergency Medical Services	BLS - Scripps La Jolla Hospital
8432	Emergency Medical Services	BLS - Palomar Medical Center
8464	Emergency Medical Services	BLS - UCSD Medical Center
8596	Emergency Medical Services	BLS - Mercy Hospital
8528	Emergency Medical Services	BLS - Sharp Memorial Hospital
8592	Emergency Medical Services	BLS - Grossmont Hospital
8624	Emergency Medical Services	BLS - Scripps Chula Vista
8656	Emergency Medical Services	BLS - Children's Hospital
8688	Inland Fire	Dispatch
8695	Heartland Fire	Dispatch
8880	Emergency Medical Services	Kaiser Hospital
8912	Law Air	Hailing
8944	Law Enforcement East	Command
8976	Law Enforcement North	Command
9008	Law Enforcement South	Command

Aerospace Museum



Museum of Art

TALKGROUPS, CONTINUED

Talkgroup	Agency	Usage
9040	Law Enforcement SD	Command
9328	City of Lemon Grove	Ch. 1
9360	City of Lemon Grove	Ch. 2
9392	City of Lemon Grove	Ch. 3
9520	City of Lemon Grove	City
9584	Inland Fire	Command 1
9616	Heartland Fire	Command 2
9680	Inland Fire	Tac 1
9683	Inland Fire	Command 2
9712	Inland Fire	Tac 2
9744	Inland Fire	Incident Command 1
9808	Inland Fire	Incident Command 2
9840	Inland Fire	Incident Command 3
9872	Inland Fire	Incident Command 4
9904	Inand Fire	Incident Command 5
9936	Inland Fire	Incident Command 6
9968	Inland Fire	Incident Command 7
10030	MCAS Camp Pendleton Fire Dept.	Command 1
10064	MCAS Camp Pendleton Fire Dept.	Command 2
10096	MCAS Camp Pendleton Fire Dept.	Dispatch
10128	MCAS Camp Pendleton Fire Dept.	Tac 1
10160	MCAS Camp Pendleton Fire Dept.	Tac 2
10192	Medic to Air	
10224	Emergency Medical Services	BLS - MEDG
10288	Emergency Medical Services	Mission Bay Hospital
10320	Monte Vista Fire	Command 1
10352	Monte Vista Fire	Command 2
10384	Monte Vista Fire	Dispatch
10416	Monte Vista Fire	Tac 1
10448	Monte Vista Fire	Tac 2
10480	Emergency Medical Services	Navy
10512	North County Fire	Command 1
10544	North County Fire	Command 2
10576	North County Fire	Dispatch
10608	North County Fire	Tac 1
10640	North County Fire	Tac 2
10672	Law Enforcement North	Tac 1
10704	Law Enforcement North	Tac 2
10736	Law Enforcement North	Tac 3
10768	Law Enforcement North	Tac 4
10960	Emergency Medical Services	Paradise Valley Hospital
10992	Emergency Medical Services	BLS - Pioneer Hospital
11024	Emergency Medical Services	BLS - Pomerado Hospital
11056	City of Poway	Ch. 1
11088	City of Poway	Ch. 2
11120	City of Poway	Ch. 3
11184	City of Poway	City
11440	City of Poway	Public Works Command North
11568	Rancho Fire	Command 1
11600	Rancho Fire	Command 2
11632	Rancho Fire	Dispatch
11664	Rancho Fire	Tac 1
11696	Rancho Fire	Tac 2
11792	Rancho Santa Fe Patrol	Security
11824	Rancho Santa Fe Patrol	Security
11984	Emergency Medical Services	Scripps Encinitas Hospital
12080	Emergency Medical Services	Scripps East Hospital
12144	Emergency Medical Services	Sharp Chula Vista Hospital
12176	City of San Marcos	Public Works - Vallecitos Water
12208	City of San Marcos	Public Works - Streets
12240	City of San Marcos	Ch. 3
12272	Emergency Medical Services	ALS - Sharp Hospital
12304	San Marcos Fire Department	Chiefs
12336	Emergency Medical Services	BLS - El Centro Hospital
12368	City of San Marcos	City
12400	Fire	Expansion 9
12432	Fire	Expansion 10
12464	Fire	Expansion 11
12496	Fire	Expansion 12
12560	City of San Marcos	Public Works - Buildings
12592	Fire	Expansion 13
12624	Fire	Expansion 14
12656	Fire	Expansion 15
12688	City of San Marcos	Public Works - Parks
12720	City of San Marcos	Public Works
12752	Fire	Expansion 16
12816	City of San Marcos	Public Works - Streets
12880		
12912		
12944	City of Santee	Ch. 1
12976	City of Santee	Ch. 2
13008	City of Santee	Ch. 3
13136	City of Santee	City
13552	City of Solana Beach	Ch. 1
13584	City of Solana Beach	Ch. 2
13648	City of Solana Beach	City
13776	City of Solana Beach	Marine Safety Patrol
13840	City of Oceanside Fire Department	Dispatch
13936	County of San Diego	Probation
13968	Law Enforcement South	Tac 1
14000	Law Enforcement South	Tac 2
14032	Law Enforcement South	Tac 3
14064	Law Enforcement South	Tac 4
14256	Emergency Medical Services	UCSD Thornton Hospital
14352	Emergency Medical Services	Veterans Hospital
14384	Emergency Medical Services	Villa View Hospital
14400	City of Vista	Wastewater
14416	City of Vista	Ch. 1
14448	City of Vista	Ch. 2
14480	City of Vista	Ch. 3
14512	City of Vista	Wastewater
14576	City of Vista	
14640	City of Vista	Code Enforcement
14672	City of Vista	Traffic Engineering
14702	Emergency Medical Services	ALS - Grossmont Hospital
14736	City of Oceanside Fire Department	Command 1
14800	City of Vista	Parks and Recreation
14832	Emergency Medical Services	ALS - Scripps Chula Vista
14864	City of Oceanside Fire Department	Command 2
14896	City of Vista	Vehicle Maintenance
14928	City of Oceanside Fire Department	Tac 1
14992	City of Oceanside Fire Department	Tac 2
15024	City of Vista	
15056	City of Vista	Public Works
15280	City of Imperial Beach	Ch. 2
15312	City of Imperial Beach	Ch. 3
15696	Law Enforcement	Expansion 1
15728	Law Enforcement	Expansion 2
15760	Law Enforcement	Expansion 3
15792	Law Enforcement	Expansion 4
15824	Law Enforcement	Expansion 5
15856	Law Enforcement	Expansion 6
15888	Law Enforcement	Expansion 7
15920	Law Enforcement	Expansion 8
15952	Law Enforcement	Expansion 9
15984	Law Enforcement	Expansion 10
16016	Law Enforcement	Expansion 11
16048	Law Enforcement	Expansion 12
16080	Law Enforcement	Expansion 13
16112	Law Enforcement	Expansion 14
17200	Inland Fire	Tac 2
17232	Inland Fire	Tac 3
17264	Inland Fire	Tac 4
17296	Inland Fire	Tac 5
17328	Inland Fire	Tac 6
17360	Inland Fire	Training 1
17392	Inland Fire	Training 2
17424	Inland Fire	Chiefs
17456	HLT - Health	Oceanside
17488	HLT - Health	Escondido
17520	HLT - Health	El Cajon
17552	HLT - Health	NSD
17584	HLT - Health	South Bay
17648	HLT - Health	ROSE
17680	HLT - Health	ASKW
17712	HLT - Health	ESD
17744	HLT - Health	Fallbrook
17776	HLT - Health	EDGE
17808	HLT - Health	EMS
17840	HLT - Health	Hospital Administration
17872	HLT - Health	HLTGP

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Frequency Coverage: 29.000-54.000 MHz., 108.000-174 MHz., 216.000-512.000 MHz., 806.000-823.995 MHz., 849.0125–868.995 MHz., 894.0125-956.000 MHz.

The Bearcat 895XLT is superb for intercepting trunked communications transmissions with features like TurboScan™ to search VHF channels at 100 steps per second. This base and mobile scanner is also ideal for intelligence professionals because it has a Signal Strength Meter, RS232C Port to allow computer-control of your scanner via optional hardware and 30 trunking channel indicator annunciators to show you real-time trunking activity for an entire trunking system. Other features include ***Auto Store*** – Automatically stores all active frequencies within the specified bank(s). ***Auto Recording*** – Lets you record channel activity from the scanner onto a tape recorder. ***CTCSS Tone Board*** (Continuous Tone Control Squelch System) allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning enjoyment, order the following optional accessories: **PS001** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter $14.95; **PS002** DC power cord - enables permanent operation from your vehicle's fuse box $14.95; **MB001** Mobile mounting bracket $14.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached $19.95. The BC895XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, EDACS, ESAS or LTR systems.

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HEY, HEY, HEY - IT'S Y2K

By Haskell Moore

Unless you've been living in a cave for the past three or four years, you are surely aware of the potential for impending problems due to the year 2000 rollover. Some days I think if I hear "Y2k" or "The Millennium Bug" one more time, I'll be the first Year 2000 casualty because I'm going to jump out the nearest window!

But, ready or not, Y2k is coming and we need to make practical preparations for its arrival. (For a closer look at how the Y2k problem came about, please refer to the January 1999 issue of *Monitoring Times*.)

Just what is going to happen when the next century rolls around? I certainly don't claim to have any "inside knowledge" as to how severe the problems of moving to the year 2000 will be. The various scenarios range from "a minor bump in the road" to "the end of the world as we know it." I would prefer the first scenario, but the facts and my gut make me believe it will be a bit more serious than that. This is a situation that we have never faced before, and anyone who claims to know the eventual outcome is not to be trusted!

Before you turn the page ...

First let me say, I consider myself to be a very rational individual and am trying to present this information in an even, factual manner. It is not my intent to fan the flames of hysteria. My background is computer systems, and I've served in various capacities as a programmer, analyst and project manager for over twenty years, on both mainframe and client server systems. I don't sell Y2k related books, tapes or any other products, nor do I have connections to anyone who does. My mission is to simply raise the level of understanding of potential problems and help my fellow radio enthusiasts to be better prepared for whatever may arise.

On May 19th, 1998, I believe the world received a wakeup call concerning how much we have become dependent on systems where a single-point failure can have catastrophic results. On that day, the Galaxy 4 satellite failed, rendering inoperative 80 to 90 percent of the 40 million to 45 million U.S. pagers[1]. Millions of health care providers, various on-call technicians, and countless other critical personnel were, without warning, left out of touch.

Although this was not a Y2k-related failure, it still underscores how we as a nation often put our technological eggs in one basket. I cannot help but wonder how many other critical systems like this are subject to a single-point failure.

Modern-day dominoes

To compound the element of critical single-point failure, one must also consider how these problems can cascade. This is where one event can cause a series of other, often seemingly unrelated events to occur. After all, who could have ever made the connection that the Galaxy 4 satellite failure could affect health care services? They were, when many physicians were left unreachable because their pagers were rendered inoperative.

In Florida, the chairman of a governor's Y2k task force said many businesses have complained about the growing number of false Y2k-compliance claims. "In some cases, we've been told the Y2k lying rate is as high as 50 percent," said Tom McGurk, who is also secretary of the Department of Management Services. BellSouth Corp., for example, told state officials that more than half of the compliance claims by its vendors turned out to be incorrect when they were independently tested . . .

— Orlando Sentinel, July 1

The situation becomes even more ominous when we consider the interdependencies of many of the most critical of the infrastructures upon one another. For example, one model suggests that electricity, telephone and water comprise a triangle of critical services on which any modern society is dependant. Remove any one of these components, and the other two will fail.

It could also be argued that several more should be included in the equation, such as finance (banking), petrochemical, etc. Like a strand of old-fashioned Christmas lights, if one of these core systems were to fail, the impact would eventually have an effect on all of the rest.

To further exacerbate this problem, even though we are probably far behind where we need to be with Y2k remediation in the United States, we are probably years ahead of the rest of the world!

For the last several years, Europe has spent a large percentage of its programming resources on preparing for the Euro conversion. And many countries throughout the world which rely on American-made systems with their potential for date-related problems, are totally oblivious to the crisis that lies ahead. Even Senators Bennett and Todd in a February 24th, 1999 letter to the Senate stated "While the committee is growing more comfortable with the level of domestic preparedness, we have far less confidence in the international arena."

Who's telling the truth?

One of the most disturbing things to me are the stories I'm hearing from my Information Technology peers throughout various industries. While management is painting a rosy picture and filing the required documents with the government to guarantee their Y2k readiness, the troops in the trenches are often telling a different story.

For obvious reasons, no one wants to name names, and I'm always admonished that I can share the information as long as the sources remain anonymous. But the more programmers and analysts I talk to personally, the more I hear of my peers working feverishly to address the date issues while management claims they are already 100% prepared for the new millennium.

The Federal Bureau of Investigation recently notified all their agents that all leaves from Dec. 15 through mid-January are officially canceled.
... When asked what it was the FBI might be planning for, the unnamed informant who reported the internal memo admitted he wasn't sure. However, according to the agent, the memo said, "because of the year 2000."

— Stephen Archer, 1999 WorldNetDaily.com, Jul 8

The District of Columbia government, recognizing that its year 2000 repair program likely will not be completed on time, is feverishly planning for a "massive New Year's Eve mobilization of emergency personnel and other staff to ensure critical city services are not interrupted if computer systems fail," the Washington Post *reported in a June 26 scare story.*

— Drudge Report, June 27

For those who are trying to make sense of the potential of the Y2k problem, the challenge is daunting. You only have to spend a few hours surfing the Internet to see how confusing the problem of interpreting the data really is. On one hand, one faction, often with a highly credible industry professional as their spokesperson, are proclaiming gloom, doom and global recession. On the other hand, a different set of experts are claiming that January 1, 2000, will be just another day.

And if you are feeling frustrated trying to find credible information, you are not alone. These sentiments were echoed in *Executive Summary for the Senate Special Committee On The Year 2000 Technology Problem*[2], where it was stated: "The committee has found that the most frustrating aspect of addressing the Year 2000 (Y2k) problem is sorting fact from fiction. Reports from even the most reputable news sources fall prey to polarizing forces – either overemphasizing a handful of Y2k survivalists, or down-playing the event as a hoax designed to sell information technology equipment."

Help for the hobbyist

So how does this affect the scanner, CB and amateur radio community? Well, first, each person is going to have to decide for himself if preparing for potential Y2k-related problems is something he feels compelled to do. Then, having decided that preparing for Y2k problems is advisable, the level of readiness is the next consideration.

One of the most credible and logical sources I have found concerning power-related issues is Dick Mills' Power Prognostications Web page[3]. At the turn of the century, Mr. Mills predicts initial power outages for up to 72 hours, then possible problems in the summer months of 2000. Though I'm reluctant to endorse anyone's prediction for Y2k-related impact, his does seem to represent one of the more rational, logical opinions I've read.

Conduct your own research (perhaps starting with the local power provider), weigh the information, and then decide for yourself what degree of preparation is needed.

Regardless of how serious you perceive the Y2k impact, making preparations for emergency situations is always prudent. The same type of contingency planning for Y2k may also be a lifesaver in the event of a hurricane, flood, ice storm, or other natural disaster. And since a strategy of total Y2k or disaster preparedness is beyond the scope of this magazine, we will limit our discussion to only communications-related issues.

In next month's issue of *Monitoring Times*, I'll take an in-depth look at ways you can prepare for Y2k, as well as most other disaster scenarios that may come your way. This will include various types of radios, alternative power, general frequencies, and scanning strategies.

Publicly, Los Angeles Mayor Richard Riordan has been offering nothing but assurances that the city's Y2k problems will be addressed. But ... a series of high profile mishaps raised questions about the city's ability to deal with Y2k.

The latest problem occurred ... during a Y2k test of the emergency system at a city sanitation plant. A computer failure ended up pushing more than 4 million gallons of hazardous sewage into a nearby park – a park the city was considering for an official Millennium New Year's Eve celebration!

— Drudge Report, June 17

Footnotes:

[1] "Pager messages lost in space", CNN.COM, May 20, 1998
http://cnn.com/TECH/space/9805/20/satellite.outage/index.html

[2] "Executive Summary for the Senate Special Committee On The Year 2000 Technology Problem", Summary of the Committee's Work in the 105th Congress, February 24, 1999
http://www.senate.gov/~y2k/documents/report/

[3] "Summary of 1998 Power Prognostications" by Dick Mills
http://www.y2ktimebomb.com/PP/RC/dm9901.htm

Interesting Internet Reading:

"Beyond the Hype: Likely Y2K Impacts on U.S. Electricity Service," By Daniel P. Dolan
http://www.year2000.com/archive/dolan-2.html

"Electric Utilities and Year 2000", Business Impact
http://www.accsyst.com/writers/business.htm

"Government's top Y2K expert predicts failures for weeks, months," CNN.COM July 30th, 1999
http://cnn.com/TECH/computing/9907/30/failures.y2k.ap/
Poll: Three in 10 Americans will stock up in anticipation of Y2K problems
CNN.COM, July 23rd, 1999
http://cnn.com/US/9907/23/AM-Y2KPoll.ap/

"Preparing the Electric Power Systems of North America for Transition to the Year 2000," North American Energy Reliability Council, April 30, 1999
ftp://ftp.nerc.com/pub/sys/all_updl/docs/y2k/4-30-y2k-report-to-doe.pdf

"State Department: Y2K failures 'inevitable'," CNN.COM, July 26th, 1999
http://www.cnn.com/TECH/computing/9907/26/inevitable.y2k.idg/

U.S. Department Of Energy – Y2K
http://cio.doe.gov/y2k/

"Y2K Experts Poll," *CIO Magazine*, ISACA, & Dr. Ed Yardeni's Y2K Center, June 1999
http://www.peoplepolls.com/results/isaca/result.htm

Internet Link Pages:

Gary North's "Interesting Links and Forums"
http://www.garynorth.com/y2k/results_.cfm/Programmers'_Views#Choices

Michael S. Hyatt's "Y2K In The News"
http://www.michaelhyatt.com/news.htm

"Phenomenal Year 2000 Links"
http://ourworld.compuserve.com/homepages/roleigh_martin/y2klinks.htm

Americans may experience some disruption in state and local emergency services because they lag in preparation for the year 2000 computer problem, emergency officials told lawmakers on Monday. Fire service and 9-1-1 calling centers, in particular, need increased attention, said Mike Walker, deputy director, Federal Emergency Management Agency. [As of early March], only 17 percent of 9-1-1 centers and 35 percent of fire departments are prepared. . .

Panic among Americans, however, may be a greater danger than the actual anticipated minor interruptions, Walker said.

— Mary Mosquera, TechWeb, 3/22/99

Richard Barnett
ScanMaster@aol.com

Canadian Digital Scanners

Canadian scanning has always seemed a bit odd to the uninitiated down here in America. We would often hear people questioning whether scanners were legal in Canada. We then heard that there was no comparable Canadian FCC that made licensing data public, or that public safety licensing data was never supposed to be divulged.

Scanners are legal in Canada, but it is hard to gather accurate police and fire frequency data. (I always refer to the excellent Haruteq books when in need of data over the border.) While laws and regulations in Canada may be restrictive, there apparently is no ban on selling scanners that receive cellular phone communications. Certainly, Canadian government agencies always seemed ahead of the curve in comparison to the U.S. in regard to encrypted or digital communications systems. From what we're told, it's not easy to scan in Canada.

While whispered rumors of future digital scanners are overheard here in the U.S., apparently the Canadian government has already decided that such a product will – get this – actually require a license! I wonder on what basis a license may be refused? Does the applicant have to be a member of a public safety agency?

Luckily for the rest of us North Americans, it will be legal to monitor public safety (non-encrypted) digital communications in the future and we will not have to obtain any sort of license. (I just pray I haven't given someone in the FCC, the Congress, or some lobbyist any ideas.) Thanks to Dave Stark, we reprint a section of Canadian rules on digital scanners:

RSS-135, ISSUE 1 (Provisional)
PUBLICATION DATE: 26 October, 1996
EFFECTIVE DATE: 26 October, 1996
DIGITAL SCANNER RECEIVERS

1.0 SCOPE

1.1 This document sets out standards for digital scanner receivers. **Digital scanner receivers require a licence.** For information regarding the licensing policy applicable to these devices, please contact Industry Canada, Manager (DOS-PA), 300 Slater Street, Ottawa, K1A 0C8. Tel.: (613) 990-4747; Fax.: (613) 952-9871.

A technical acceptance certificate (TAC) is required for digital scanner receivers, pursuant to section 4(2) of the Radiocommunication Act and the Radiocommunication Regulations. Before certification is granted for digital scanners, the applicant shall show that the applicable standards have been complied with. **TACs issued for digital scanners contain a term and condition that limits the distribution of the equipment. Analogue scanner receivers require a TAC but are exempt from licensing.** For information on analogue scanners, please see RSS-210. This standard does not apply to:

(a) a receiver that scans radio frequencies for the purpose of enabling its associated transmitter to avoid transmitting in an occupied frequency but which does not have the capability of decoding the message (e.g. converting it to audio voice) contained in the radio signal;
(b) a manually tunable receiver not employing programmable or preset channel frequencies (with or without digital decoding capability);
(c) receiver test equipment that scans radio frequencies but is incapable of decoding digital signals; and
(d) receivers capable of receiving broadcasting signals only.
(e) Equipment intended for use by amateur radio operators and not capable of scanning frequency bands other than bands allocated for the amateur radio service.

2.0 DEFINITIONS

In this standard,

"scanner receiver" means any receiver capable of automatically scanning a frequency band, or several frequency bands, for RF signals, or a manually tunable receiver employing programmable or preset channel frequencies, and decoding the messages that are transmitted by other parties on those frequencies.

"analogue scanner receiver" means a scanner receiver capable of only decoding analogue signals;

"digital scanner receiver" means a scanner receiver capable of decoding digital signals.

Groton, CT, Fire Dispatch

David Carberry of coastal Connecticut writes us with information on Groton Fire Alarm (GFA) dispatch center (See Table 1.). David chides, "As far as implementation of the new VHF frequencies, childbirth is less painful!" (i.e. lots of technical problems).

Promoting Scanners

Robert Rouse of Bristol, Tennessee, writes with an interesting perspective on scanners:

"The scanner industry needs to focus more on retirees, sports fans and hunters to help boost the sale of scanners. These groups need to have more of their needs served. Here are some of the features and designs a scanner should include:

1. A built-in Family Radio Service (FRS) transmitter so people could communicate with each other. For example, a hunter could talk to his buddy in the field. A retiree could use it in a mall to talk with a spouse. Sports fans could confer with other fans at a sporting event.
2. A handheld scanner needs a weather alert system to advise of weather conditions. You might even add the radio control time (WWV) from Colorado for the correct time which would add to its appeal and importance. (*The new Radio Shack Pro92/94 trunk tracker will have weather alert with SAME capability - Editor*)
3. A scanner needs to be able to trunktrack more than one system at a time plus do conventional scanning at the same time (*How's that for timing? The Bearcat 245XLT fills the bill nicely now, as well as the upcoming RS Pro-92/94/2052 - Editor*).
4. A scanner needs to be small with *300 or fewer* channels.
5. They need to be bright colors like yellow, red and blue.
6. The scanners need AM and FM radio and audio from TV

Table 1: High Band Radio Channel Assignments
Groton Dispatch Center
Phase 1 (Revised 4/16/99)

Channel	Old Name	New Name	Freq.	PL	Base
F-1	PG	Fire Dispatch	151.295	DPL 025	GFA
F-1	LG	EMS Dispatch	155.025	156.7	GFA
F-1	Medic	Medic Dispatch	155.325	173.8	GFA
F-2	City FD	Tac 2	155.940	156.7	City
F-3	PG	Tac 3	151.460	DPL 025	GFA
F-4	Fireground	FAST	153.830	156.7 tx only	No base
F-5	MG	Tac 5	154.220	DPL 025	Hooks*
F-6	OG Repeater	Tac 6	150.775 in	156.7	Quant Hill
			154.070 out	156.7	
F-7	MG	Tac 7	154.340	DPL 025	Hooks*
F-8	Medic	Tac 8	155.325	173.8	GFA
F-9	MG	Fire Police	154.355	DPL 025	Hooks*
F-10	Talkaround	Talkaround	154.070	156.7	OG
F-11	HEAR	HEAR	155.340	203.5	GFA
F-12	GVAA EMS		Pending		
F-13	GFA EMS		Pending		
F-14	MRAA EMS		Pending		
F-15	GFA Fire		Pending		
F-16	Public Works		Pending		
F-17	Civil Prep	Civil Prep	153.965	162.2	GFA
F-18	HEAR	HEAR	155.340	203.5	GFA

** Bases scheduled for installation June 1999*

Notes:

1. F-1 (151.295) is simulcast on the low band channel 33.920 MHz (179.9 PL)
2. F-1 (155.025) is simulcast on the low band channel 47.500 MHz (118.8 PL)
3. Fire Department use Fire Dispatch as their channel 1
4. Ambulance services use EMS Dispatch as their channel 1
5. Medics use Paramedic Dispatch as their channel 1
6. All users (except dedicated Fire Police) use Tac 2 through Tac 11 as their channels 2 through 11 if space is available in their radios.
7. Dedicated Fire Police radios program channel 1 as 151.295 and channel 2 as 154.355.
8. Units to be programmed with G Star Unit ID if capable.
9. The frequency of 159.420 (DPL), which was formerly used by Poiquonnock Bridge Fire Department, may still be active if it has not been rescinded by the FCC.

channels 2 through 13 to hear the news.

7. A scanner should be so simple that a child or retiree could program one. Keep it simple to use. Nothing fancy, just the basics.

"We need to explore more with our scanner than just police, fire and rescue and (the industry) needs to advertise more in magazines about what scanners can do."

Consolidation Continues

An anonymous contributor sent this great report which is indicative of the trend toward consolidation in communications over the last few years:

"On January 4th, 1999, the municipalities of Union City, West New York, North Bergen, Weehawken and Guttenberg consolidated their respective fire departments into the North Hudson Regional Fire & Rescue Department (NHRFR). This new endeavor will be overseen by an autonomous agency made up of representatives from the participating communities. Dispatch for this entity will continue to be provided by the North Hudson Regional Communications Authority located in West New York on the Union City and Weehawken borders.

"Response patterns will be redeveloped so that the nearest four engines and two trucks will be dispatched regardless of the political and geographic boundaries. While units will continue to use their old numbers temporarily (Weehawken 200's, West New York 300's, etc.), this system will eventually be revamped to a single digit system more consistent of one large department.

"Presently, no houses or companies are scheduled for closure. The volunteer companies of Guttenberg (Eclipse Hose, Washington Hose and Hook & Ladder) will continue to function in a complimentary role, with the career firefighters of Guttenberg being absorbed by the regional department."

NOTICE: It is unlawful to buy cellular-capable scanners in the United States made after 1993, or modified for cellular coverage, unless you are an authorized government agency, cellular service provider, or engineering/ service company engaged in cellular technology.

F-1	154.145R	Administrative channel
F-2	154.325	Dispatch/operations
F-4	170.150	Guttenberg volunteers and mutual aid to Hoboken

Washington State Operations

Brad Estill provided us with some great data on tactical channels in Washington state:

"The following STATEOPS 800 MHz Channels have been established to provide 'talk-around,' simplex communications capability so that radios out of reach of their home system, or out of reach of an ITAC or ICALL conventional repeater, can communicate with other 800 MHz radios. It is required that STATEOPS3 be programmed in all radios; however, the other STATEOPS channels can be utilized to meet the operational requirments of participating agencies.

STATEOP1	867.5375	Primary for tactical fire and emergency medical use.
STATEOP2	867.5625	Primary for tactical law enforcement use.
STATEOP3	867.5875	Primary for tactial local government use and designated as a statewide "common" interoperable channel.
STATEOP4	867.6125	Primary for tactical fire and emergency medical use.
STATEOP5	867.6375	Primary for tactical law enforcment use.

"I have not heard any repeater activity on them in the Seattle area, and by the above description I doubt I will. I did notice the ITAC/ICALL repeaters are now on the air in King County."

Southern Linc Blues

Chris Johns of Brewton, Alabama, writes about a problem an increasing number of "scannists" have faced (full text appeared in the July "Letters to the Editor" column):

"Over the past couple of years a new type of radio system has been produced. It is called Southern Linc. The radio is used primarily for power companies in Alabama and northwest Florida (as well as Georgia). Now businesses, the State of Alabama, and even some individuals are using it. The radio contains a pager, radio and telephone all in one unit that clips to your belt.

"This radio system works great for the user, but there is one problem with it. *I can't hear it with my scanner.* The radio uses an 800 or 900 MHz frequency that ordinary scanners won't pick up *(what it's not picking up is the digital transmission scheme - Editor).*

"What can I do? Is this the way of the future? Are any of your subscribers having the same problems in other parts of the world or country? This is an issue that I think that those who like listening to scanners as I do should discuss.

"What makes me upset the most is that I can't hear the power company to know when my electricity will come on after a storm. So, I guess you could say that I'm in the dark literally and figuratively. Please help!"

We can't help Chris hear the Southern Linc communications, but we can provide some additional information. From what we understand Southern Linc utilizes Iden technology from Motorola, as do NEXTEL phones. The Georgia State Patrol have been using and testing Southern Linc in the Atlanta area, but we had heard no previous reports that the Alabama State Police would be utilizing the system.

Unfortunately, we don't foresee that there will ever be a scanner capable of tracking and decoding this type of digital signal. It's proprietary, it's not designed for public service applications, and the legal and lobbying communities would not look kindly upon a device that allowed you to follow these systems.

On the positive side of the equation, the assumption has always been that you wouldn't see many police and fire agencies flock to these systems as they were not designed with public safety applications in mind. Most police and fire departments have unique radio requirements, such as rapid access to channels (in a certain number of milliseconds), the ability to knock lower priority users off the air, 95% portable radio coverage in their communities, and the like, that these business-oriented radio systems were not necessarily designed to support.

Wilmington, NC, Trunking

New Hanover County and Wilmington, NC 800 MHz Motorola Trunked System Selected Talk Group IDs

ER-911	2160	
HazMat RRT	2960	
Mutual Aid 3, NC	2192	
Mutual Aid 4, NC	2224	
Mutual Aid 5, NC	2256	
Mutual Aid 6, NC	2000	
Mutual Aid 7, NC	2032	
NH County FD Dispatch	1616	
NH County FD Fire Marshall	1936	CF-1/CF-2 et. al
NH Emergency Management	1904	ES-10 et. al
NH International Airport PSO	50448	Airport Police
NH Regional EMS Administration 1	50352	Admin 1
NH Regional EMS Administration 2	50384	Admin 2
NH Regional EMS Dispatch	2096	(Also on 155.280)
NH Regional EMS ED Encode	50288	Encode to Cape Fear
NH Regional EMS ED Encode	50256	Encode to NHRMC
NH Regional EMS Operations	50224	EMS Ops
NH Regional EMS Training	50320	
NH Sheriff's Department	18192	Car-to-Car
NH Sheriff's Department	49616	Patrol & All # Cars
NH Sheriff's Department	50672	
NH Sheriff's Department	51568	Car-to-Car
NH Sheriff's Department	51600	Car-to-Car ("A")
NH Sheriff's Department	51696	
Special Events 10	1744	
Special Events 11	1776	
Special Events 12	1808	
Special Events 5	18032	
Special Events 6	18064	
Special Events 7	18096	
Special Events 8	18128	
Special Events 9	18160	
Tactical (TAC) 10	1712	
Tactical (TAC) 2	17712	
Tactical (TAC) 3	17744	
Tactical (TAC) 4	17776	
Tactical (TAC) 5	17808	
Tactical (TAC) 6	17840	
Tactical (TAC) 7	17872	
Tactical (TAC) 8	01648	
Tactical (TAC) 9	01680	
UNC-W Campus Police	18320	
VitaLink Dispatch	50416	
Wilmington FD Dispatch	1968	
Wilmington Police Department	22416	Channel ("C")
Wilmington Police Department	33616	Patrol - (100 # Cars)
Wilmington Police Department	33648	Patrol - (200 # Cars)
Wilmington Police Department	33744	(# 500, 600, 900 cars)
Wilmington Police Department	33808	Car-to-Car ("10")
Wilmington Police Department	34288	Car-to-Car ("6")
Wilmington Police Department	34320	Car-to-Car
Wilmington Police Department	35408	Car-to-Car (Vice)
Wilmington Police Department	35498	Vice-Special Ops
Wilmington Police Department	50576	Car-to-Car

Larry Van Horn, N5FPW
email: larry@grove-ent.com

Police Service Allocations

This month's *Service Search* column will be taking an in-depth look at the new Police service frequency allocations currently being licensed by the Federal Communications Commission. Scanner listeners should be listening for newly allocated splinter channels (VHF 7.5 kHz/UHF 6.25 kHz) to become active in their areas.

HF allocation (kHz) Base or Mobile
1722 1730 2366 2382 2390 2406
2430 2442 2450 2458 2482 2490

VHF Low Band (MHz) Base or Mobile
37.04 37.06 37.08 37.12 37.14
37.16 37.20 37.22 37.24 37.28
37.30 37.32 37.34 37.36 37.38
37.40 37.42 39.02 39.04 39.08
39.12 39.14 39.16 39.20 39.22
39.24 39.28 39.32 39.36 39.40
39.42 39.44 39.46 (Intersystem)
39.48 39.52 39.54 39.56 39.60
39.62 39.64 39.68 39.72 39.76
39.80 39.84 39.86 39.88 39.92
39.94 39.96 45.10 45.14 45.18
45.22 45.42 45.46 45.50 45.54
45.58 45.62 45.66 45.70 45.86
(Intersystem) 45.90 (Meteor burst communications systems only in Alaska) 45.94 45.98 46.02

VHF Low Band (MHz) Mobile Only
37.02 39.26 39.30 39.34 39.38
39.66 39.70 39.74 39.78 45.26
45.30 45.34 45.38 45.74 45.78
45.82

VHF High Band

154.650	Mobile
154.6575	Mobile
154.710	Mobile
154.7175	Mobile (1)
154.725	Base or mobile
154.7325	Base or mobile (1)
154.740	Base or mobile
154.7475	Base or mobile (1)
154.755	Base or mobile
154.7625	Base or mobile (1)
154.770	Mobile
154.7775	Mobile (1)
154.785	Base or mobile
154.7925	Base or mobile (1)
154.800	Base or mobile
154.8075	Base or mobile (1)
154.815	Base or mobile
154.8225	Base or mobile (1)
154.830	Mobile
154.8375	Mobile (1)
154.845	Base or mobile
154.8525	Base or mobile (1)
154.860	Base or mobile
154.8675	Base or mobile (1)
154.875	Base or mobile
154.8825	Base or mobile (1)
154.890	Mobile
154.8975	Mobile (1)
154.950	Mobile
154.9575	Mobile (1)
155.010	Base or mobile
155.0175	Base or mobile (1)
155.070	Base or mobile
155.0775	Base or mobile (1)
155.130	Base or mobile
155.1375	Base or mobile (1)
155.190	Base or mobile
155.1975	Base or mobile (1)
155.250	Base or mobile
155.2575	Base or mobile (1)
155.310	Base or mobile
155.3175	Base or mobile (1)
155.370	Base or mobile
155.3775	Base or mobile (1)
155.415	Base or mobile
155.4225	Base or mobile (1)
155.430	Base or mobile
155.4375	Base or mobile (1)
155.475	Base or mobile Nationwide Police Emergency Communications Net
155.4825	Base or mobile Nationwide Police Emergency Communications Net/No licenses currently issued or pending (1)
155.490	Base or mobile
155.4975	Base or mobile (1)
155.520	Base or mobile
155.5275	Base or mobile (1)
155.535	Base or mobile
155.5425	Base or mobile (1)
155.550	Base or mobile
155.5575	Base or mobile (1)
155.565	Base or mobile
155.5725	Base or mobile (1)
155.580	Base or mobile
155.5875	Base or mobile (1)
155.595	Base or mobile
155.6025	Base or mobile (1)
155.610	Base or mobile
155.6175	Base or mobile (1)
155.625	Base or mobile
155.6325	Base or mobile (1)
155.640	Base or mobile
155.6475	Base or mobile (1)
155.655	Base or mobile
155.6625	Base or mobile (1)
155.670	Base or mobile
155.6775	Base or mobile (1)
155.685	Base or mobile
155.6925	Base or mobile (1)
155.700	Base or mobile
155.7075	Base or mobile (1)
155.730	Base or mobile
155.7375	Base or mobile (1)
155.790	Base or mobile
155.7975	Base or mobile (1)
155.850	Mobile
155.8575	Mobile (1)
155.910	Mobile
155.9175	Mobile (1)
155.970	Mobile
155.9775	Mobile (1)
156.030	Mobile
156.0375	Mobile (1)
156.090	Mobile
156.0975	Mobile (1)
156.150	Mobile
156.1575	Mobile (1)
156.210	Base or mobile
156.2175	Base or mobile (1)
158.7225	Base or mobile (1)
158.730	Base or mobile
158.7375	Base or mobile (1)
158.790	Base or mobile
158.7975	Base or mobile (1)
158.850	Base or mobile
158.8575	Base or mobile (1)
158.910	Mobile
158.9175	Mobile (1)
158.970	Mobile
158.9775	Mobile (1)
159.030	Mobile
159.0375	Mobile (1)
159.090	Base or mobile
159.0975	Base or mobile (1)
159.150	Base or mobile
159.1575	Base or mobile (1)
159.210	Base or mobile
159.2175	Base or mobile (1)
173.075	Base or mobile Stolen vehicle recovery systems (shared with fed government)
220.8025	Base Channel 161 (Shared with PS) Mobile on 221.8025
220.8075	Base Channel 162 (Shared with PS) Mobile on 221.8075
220.8125	Base Channel 163 (Shared with PS) Mobile on 221.8125
220.8175	Base Channel 164 (Shared with PS) Mobile on 221.8175
220.8225	Base Channel 165 (Shared with PS) Mobile on 221.8225
220.8275	Base Channel 166 (Shared with PS) Mobile on 221.8275
220.8325	Base Channel 167 (Shared with PS) Mobile on 221.8375
220.8375	Base Channel 168 (Shared with PS) Mobile on 221.8375
220.8425	Base Channel 169 (Shared with PS) Mobile on 221.8425
220.8475	Base Channel 170 (Shared with PS) Mobile on 221.8475
460.0125	Mobile (1)
460.01875	Base or mobile (2)
460.025	Base or mobile
460.03125	Base or mobile (2)
460.0375	Base or mobile (1)
460.04375	Base or mobile (2)
460.050	Base or mobile
460.05626	Base or mobile (2)
460.0625	Base or mobile (1)
460.06875	Base or mobile (2)
460.075	Base or mobile
460.08125	Base or mobile (2)
460.0875	Base or mobile (1)
460.09375	Base or mobile (2)
460.100	Base or mobile
460.10625	Base or mobile (2)
460.1125	Base or mobile (1)
460.11875	Base or mobile (2)
460.125	Base or mobile
460.13125	Base or mobile (2)
460.1375	Base or mobile (1)
460.14375	Base or mobile (2)
460.150	Base or mobile
460.15625	Base or mobile (2)
460.1625	Base or mobile (1)
460.16875	Base or mobile (2)
460.175	Base or mobile
460.18125	Base or mobile (2)
460.1875	Base or mobile (1)
460.19375	Base or mobile (2)
460.200	Base or mobile
460.20625	Base or mobile (2)
460.2125	Base or mobile (1)
460.21875	Base or mobile (2)
460.225	Base or mobile
460.23125	Base or mobile (2)
460.2375	Base or mobile (1)
460.24375	Base or mobile (2)
460.250	Base or mobile
460.25625	Base or mobile (2)
460.2625	Base or mobile (1)
460.26875	Base or mobile (2)
460.275	Base or mobile
460.28125	Base or mobile (2)
460.2875	Base or mobile (1)
460.29375	Base or mobile (2)
460.300	Base or mobile
460.30625	Base or mobile (2)
460.3125	Base or mobile (1)
460.31875	Base or mobile (2)
460.325	Base or mobile
460.33125	Base or mobile (2)
460.3375	Base or mobile (1)
460.34375	Base or mobile (2)
460.350	Base or mobile
460.35625	Base or mobile (2)
460.3625	Base or mobile (1)
460.36875	Base or mobile (2)
460.375	Base or mobile
460.38125	Base or mobile (2)
460.3875	Base or mobile (1)
460.39375	Base or mobile (2)
460.400	Base or mobile
460.40625	Base or mobile (2)
460.4125	Base or mobile (1)
460.41875	Base or mobile (2)
460.425	Base or mobile
460.43125	Base or mobile (2)
460.4375	Base or mobile (1)
460.44375	Base or mobile (2)
460.450	Base or mobile
460.45625	Base or mobile (2)
460.4625	Base or mobile (1)
460.46875	Base or mobile (2)
460.475	Base or mobile
460.48125	Base or mobile (2)
460.4875	Base or mobile (1)
460.49375	Base or mobile (2)
460.500	Base or mobile
460.50625	Base or mobile (2)
460.5125	Base or mobile (1)
460.51875	Base or mobile (2)
460.525	Base or mobile (3)
460.53125	Base or mobile (2/3)
460.5375	Base or mobile (1/3)
460.54375	Base or mobile (2/3)
460.550	Base or mobile (3)
460.55625	Base or mobile (2/3)
460.5625	Base or mobile (1/3)
460.56875	Base or mobile (2/3)

Column Notes:
(1) Bandwidth not to exceed 11.25 kHz
(2) Bandwidth not to exceed 6 kHz
(3) Shared with Fire/Medical communications

For frequencies between 453-463 MHz, mobiles will utilize frequencies 5 MHz higher than the base/mobile frequencies listed below

Hugh Stegman, NV6H
driver8@netcom.com

Spooks around the Clock

It's Halloween again, and that's spook radio time. Remember that spooks are not just secret agents, but anyone with a reason for making covert, concealed, or deceptive communications on HF (high-frequency, i.e., shortwave radio). In today's jittery international situation, that's a lot of people.

Usually, though, we're referring to the "numbers" transmissions, those deeply encrypted call-ups, control codes, dummy messages, real messages, or whatever they are. Numbers are presumably aimed at low-level spies overseas, though other theories go clear from international terrorism to fish prices.

Numbers stations are brazenly overt, with bird-warming transmitter power and conspicuous carriers, music, or funny noises. It's clear that they don't care who's listening. A few spooks might even read columns like this one, and chuckle at all our speculations. Let's hope so.

More Cuban Strangeness

Antenna farms grow like sugar cane on this strategically placed island, and two more came up in 1999. According to Pablo Alfonso in *El Nuevo Herald*, which is published by *The Miami Herald* and read by many Cuban exiles, China has built large intercept stations near Havana and Santiago de Cuba. Alfonso claims that the Santiago site is for tracking US military satellites, while the Havana installation intercepts telephone communications.

China's supposed cover story is that they're helping Cuba modernize its long-standing, "electronic defense of the homeland." Cuba has always jammed anti-Castro stations, not to mention TV Martí, and occasionally directed its commercial broadcasters to intentionally interfere with those in the US. Now, a Chinese government broadcaster also uses a Cuban relay.

What's weirdest of all, though, is the claim in the *Herald* that these Chinese bases are deliberately "interfering with air traffic control communications" on several New York frequencies. The only example given is a fake transmission allegedly spoofing HF air-to-ground transmissions from "OPEC 21."

This OPEC callword is properly used by US Air Force refueling aircraft, being sort of a backhanded reference to the Organization of Petroleum Exporting Countries. Quite a few tanker callwords refer to gasoline or fuel.

Spook Radio Schedules

We've listed a lot of frequencies, though hardly all of them. The great majority were heard somewhere in the world during the past year. However, not every frequency will be active every day, and some will inevitably have been changed. Typically, you'll hear something on only one of two of them at a time. With some experience, you'll be able to sort out the ones that sound best where you are. Also, don't be surprised if numbers stations move as much as 3 kilohertz (kHz) either way for interference or just plain sloppiness.

Unless noted, all frequencies are either USB (upper sideband) or R3E (upper sideband which allows a reduced carrier). R3E can be tuned in either straight AM (double sideband, amplitude modulation) or USB mode, and it gets reported both ways. The only way to tell the difference is from the beat tone of the weak carrier when it's tuned in USB mode. Zeroing this gets you right on channel.

The Cuban **"Atención"** station is named for its callup, the Spanish word for "Attention!" The Cuban "Cut Number" station is so named because it follows the standard Morse code procedure of abbreviating numbers into letters, though in this case using the rather bizarre sequence ANDUWRIGMT for 1 through 0. Both come from south of Havana, probably using the same transmitters. Cuban frequencies rotate by day of the week.

The US CIA **"Counter"** is named for its repeated count from one through zero in the first several minutes of each transmission. The Counting Station uses both English and Spanish, and several different code group formats. Various US locations have been suggested, including south Florida and the US Army "Training Center" near Warrenton, Virginia.

If you think Israel's **Mossad** has a lot of broadcasts, you're right. The schedule of this undercover police and intelligence institute is expanding rapidly, and in fact most of its quarter-hourly transmissions were left out to keep this column below book length. Letters, when present, refer to particular phonetic alphabet callups ("Kilo, Papa, Alpha," and so on). Signal characteristics indicate locations both in and out of Israel.

"Lincolnshire Poacher" and **"Cherry Ripe"** are both British intelligence, the famous "MI6" (Military Intelligence, Group Six), now more accurately called SIS (Secret Intelligence Service). Both stations take their names from the British folk tunes played in the first few minutes of each hourly broadcast cycle. The Poacher is believed to transmit from Cyprus toward the Middle East, and Cherry Ripe appears to be on Guam, aimed at China. Both stations have attracted considerable jamming in the past, and so they use a lot of parallel frequencies, though not all at once.

The **"Russian Man," "English Man," "Czech Lady," "German Lady,"** and all the rest of the "Russian Family" are indeed from Russia, using an odd, computerized voice which can sound either male or female depending on conditions. Some of these multilingual broadcasts are disturbingly strong in the US. A possible Mexican transmitter has been suggested for these.

"New Star Broadcasting," or **"New Star Radio Station,"** depending on how one translates its name from Standard Chinese, is out of Taiwan. It's strongest in the Pacific and the western United States. Broadcasts of its five separate "services" are in 30 or 45 minute cycles, with at least the AM carrier on continuously from 2300 Coordinated Universal Time (UTC), ending the next UTC day at 1600 or 1700. Its format, with music and a most enthusiastic "lady," is truly bizarre in anyone's language. It's good for convincing people outside this hobby that we have all finally gone completely over the edge.

Increased solar activity is moving most stations to generally higher frequencies. Also, they'll always use the highest frequencies in the local day times. This suggests one clue for the intended target areas of these broadcasts.

1999 Numbers Schedule

UTC	Agency	Station	kHz
0000	CIA, US	Counter (En.)	4640, 4670, 5046, 5812, 8085, 9219, 13450, 13465, 14425, 14448, 15732, 15822, 16198, 16273, 16343, 17499, 23461
0000	Cuba (AM)	Atencion	10129, 12215 (Saturday only)
0000	Cuba (CW)	Cut Numbers	5802, 5805
0000	MI6/SIS	Cherry Ripe	15624, 17499, 19884, 22108
0045	Mossad	CIO/VLB	3485, 3640, 4165, 4360, 4665, 5170, 5230, 5629, 6745, 7811
0100	CIA	Counter (En.)	4670, 5812, 10173, 11491, 11421, 14400
0100	CIA	Counter (Sp.)	13452, 13455, 15651, 16050
0100	Cuba (AM)	Atencion	3389. 3927, 5135, 6768, 7854
0100	Cuba (CW)	Cut Numbers	6767
0100	MI6/SIS	Cherry Ripe	19884, 21866
0100	Mossad	EZI/FTJ/ULX	4460, 6270, 6840, 7760, 9130, 11565, 13533, 15950, 21866
0115	Mossad	KPA/MIW	10970, 13921 (again 0215)
0200	CIA	Counter (En.)	11491, 14421
0200	CIA	Counter (Sp)	11491, 14421
0200	Cuba (AM)	Atencion	7887, 9260, 10317, 12135, 12634
0200	Cuba (CW)	Cut Numbers	6866, 4016, 5118
0200	Mossad	ULX/YHF	4880, 5820, 7918
0200	Russia	Russian Man	6867
0300	CIA	Counter (En.)	4645, 5407
0300	CIA	Counter (Sp.)	6802, 10665, 11491, 12300.5, 14421, 14450
0300	Cuba (AM)	Atencion	4174, 4479, 5800, 6768, 6782, 6826, 6830, 6856, 7482, 7555, 10446, 10715, 13564
0300	Cuba (CW)	Cut Numbers	4016, 4027, 5758
0300	Mossad	ART/FTJ	4461, 5435, 6658, 14866
0400	Cuba (AM)	Atencion	4329, 6768, 7482, 7734, 8637, 8749, 9268
0400	Cuba (CW)	Cut Numbers	4016, 4506.5, 7520, 7680
0430	Mossad	YHF	7918, 11566
0500	Cuba (AM)	Atencion	4028, 4174, 6797, 7726, 8012, 9153, 10446
0500	Cuba (CW)	Cut Numbers	6855, 8065, 10127
0500	Mossad	EZI	7918, 9130
0500	Russia	Russian Man	7529, 7726, 8126, 8166
0520	Russia	Russian Man	7926, 9326, 9366, 9429
0530	Mossad		9130, 13533
0540	Russia	Russian Man	9226, 10826, 10929, 11167
0545	Mossad		8025, 9270, 10352
0600	Cuba (AM)	Atencion	4028, 6786, 7472, 8097, 8909, 9238
0600	Cuba (CW)	Cut Numbers	6855, 9153 9238
0600	Mossad	EZI	9268, 9331, 11565, 13380, 13533, 15980, 17409
0600	Russia	Spanish Man	11147, 11149, 11166, 11461
0610	Russia	Spanish Man	12061, 12066, 12147, 12149
0640	Russia	Spanish Man	13361, 13849
0645	Mossad		12747, 14866 (again 0745)
0700	Cuba (AM)	Atencion	4174, 5417, 6869, 8176, 9468
0700	Cuba (CW)	Cut Numbers	9064, 9138, 9153, 9238, 10448
0700	Mossad		9130
0800	Cuba (AM)	Atencion	9260, 11432
0800	Cuba (CW)	Cut Numbers	6754, 6767, 8097, 8136, 9238, 10236, 10448
0830	Mossad		17410, 19714
0900	Cuba (CW)	Cut Numbers	5520, 6787, 6854, 9153, 9238, 9325, 10127
0930	Mossad		17410, 19714
1000	Cuba (AM)	Atencion	7583, 9153, 10510
1000	Cuba (CW)	Cut Numbers	9138, 9153, 9238, 9325
1000	MI6/SIS	Cherry Ripe	20474, 23461
1100	Cuba (AM)	Atencion	6983, 9153, 18305
1100	Cuba (CW)	Cut Numbers	8238, 9238, 10127, 10448
1100	MI6/SIS	Cherry Ripe	17499, 23461
1100	Mossad		14866, 15980, 17410, 20740
1200	CIA	Counter (En.)	13906, 14577, 15732, 16198, 17390
1200	MI6/SIS	Cherry Ripe	17499, 20474, 23461
1300	CIA	Counter (En.)	14739, 16198
1300	MI6/SIS	Cherry Ripe	17499, 22108
1300	Mossad		14866, 20740
1330	Mossad		15980, 17410
1400	CIA	Counter (En.)	13555, 15732, 15833, 15895
1400	Russia	Czech Lady	4485, 5027
1400	Russia	Russian Man	9237
1400	MI6/SIS	Linc. Poacher	10426, 11545, 12603, 13375, 14487, 15682, 16084, 16314
1400	N.Korea (AM)	R. Pyongyang	4770, 5872
1500	CIA	Counter (En.)	11072, 12175
1500	MI6/SIS	Linc. Poacher	7755, 8464, 10426, 11072, 11545, 12603, 13375, 14487, 15682, 16084, 16314
1600	CIA	Counter (En.)	9219, 10423, 15652, 15822, 16198
1600	MI6/SIS	Linc. Poacher	6485, 6959, 7755, 8464, 9251, 10426, 11545, 12603, 13375, 15682
1600	Mossad	CIO/YHF	7918, 10648, 13533
1700	CIA	Counter (En.)	7585, 8085, 9219, 13450, 14448, 15822
1700	MI6/SIS	Linc. Poacher	5422, 6485, 6959, 8125, 8464, 8485, 11545, 12603, 13375, 14487, 16084, 16475, 18467, 18647
1800	CIA	Counter (En.)	8080, 9160, 11072, 13444, 13465, 14448, 14905
1800	MI6/SIS	Linc. Poacher	5422, 5476, 6485, 6959, 7337, 8464, 9251, 11545, 12603, 13375, 14487, 16084, 16475
1800	Mossad		5435, 5820, 7918, 10648, 13533
1900	CIA	Counter (En.)	6970, 8085, 11072, 13465
1900	MI6/SIS	Cherry Ripe	17499, 22108
1900	MI6/SIS	Linc. Poacher	5422, 5746, 6485, 6959, 7337, 8464, 9251, 11545, 12603, 13375, 15682
1900	Mossad		2844, 2628, 3417, 3840, 4270, 4560, 4720, 4880, 5170, 5820, 6840, 8127, 11565, 12747
2000	CIA	Counter (En.)	7836, 9090, 11491, 12197
2000	MI6/SIS	Linc. Poacher	6900, 6959, 7337, 9251, 10426,11545, 12603, 13375, 15682
2000	Mossad		4270, 4463, 4665, 5091, 5339, 5435, 5530, 5630, 5820, 6840, 7445, 9130, 11565
2100	CIA	Counter (En.)	10423, 10583, 11580, 14425, 16343
2100	MI6/SIS	Linc. Poacher	5746, 6959, 7337, 9251, 11545, 11994, 12603
2100	Mossad		3150, 4165, 4270, 4560, 5091, 5339, 5435, 5629, 6840, 9130, 10820, 11565, 15980
2100	Russia	German Lady	5376, 5080
2100	Russia	English Man	11150
2200	CIA	Counter (En.)	10423, 11491, 12197, 12229, 14432, 15651, 17200
2200	MI6/SIS	Cherry Ripe	17499, 22108
2200	MI6/SIS	Linc. Poacher	5422, 5746, 6475, 6959, 7337, 8464, 9251, 10426, 11545, 12603
2200	Mossad		2270, 2628, 2953, 3840, 4165, 4270, 4461, 4665, 4880, 5091, 5339, 5435, 6840, 9130
2300	CIA	Counter (En.)	15651, 17200, 17390
2300	Cuba (AM)	Atencion	8014, 17384, 17400
2300	Cuba (CW)	CLP (diplo)	13312
2200	MI6/SIS	Cherry Ripe	17499, 22108
2300	Mossad		2743, 3150, 3417, 3840, 4270, 4461, 4560, 4880, 5530, 6575, 6658, 6745, 8127
2300-1700		Taiwan (AM)	New Star BC 8300, 9725, 11430, 13750, 15385
Any hr+40		France (CW)	8BY 7668, 10248, 12075, 14731, 14931, 18416, 20946

Utility Loggings

Hugh Stegman

Abbreviations used in this column

AFB	Air Force Base	FEC	Forward Error Correction teleprinter system
AM	Amplitude Modulation	ID	Station identifier
ARQ	Automatic Repeat Request teleprinter system	JSTARS	Joint Surveillance Target Attack Radar System
AWACS	Airborne Warning and Control System	MFA	Ministry of Foreign Affairs
CAMSLANT	Coast Guard Area Master Station, Atlantic	NAVTEX	Navigational Telex
CP	Command Post	Pol-ARQ	Polish ARQ teleprinting system
CW	Morse code telegraphy ("Continuous Wave")	RSA	Republic of South Africa
DSC	Digital Selective Calling	RTTY	Radio Teletype
EAM	Emergency Action Message	UK	United Kingdom
		Unid	Unidentified
		US	United States

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

518.0 Valencia-maritime coastal station with FEC NAVTEX warnings at 2040. Cullercoats, NAVTEX at 2048. Ijmuiden, NAVTEX at 2200 and 2215. Niton, NAVTEX for French coast at 2023 and 2140. Oostende, NAVTEX for UK coasts at 2200. Portpatrick, NAVTEX weather at 2130. Rogaland, NAVTEX warnings at 2148. Split, NAVTEX weather at 2241. (Day Watson-UK) *Automated direct printing bulletin system, worldwide on this frequency. Mediumwave is not dead! -Hugh*

3450.5 6PXJ-Unknown station repeating CW call "V ABYZ DE 6PXJ," at 1415. (Takashi Yamaguchi-Japan)

4479.0 Cuban "cut" numbers station, CW letter groups at 0302. Cuban "Atencion," Spanish voice numbers in AM, different day at 0305. (Camillo Castillo-Panama) *Note common frequencies -Hugh*

4567.0 6PXJ-Unknown station repeating CW call "V ABYZ DE 6PXJ," different day from 3450, at 1830. (Yamaguchi-Japan)

5696.0 "O-6-P"-US Coast Guard aircraft on search and rescue of burning small boat, previously on 8983, telling CAMSLANT Chesapeake that they'll have to land at US Navy Key West for fuel, at 0103. (Ron Perron-MD)

6643.0 "R"-Russian Navy Single-Letter CW beacon, Ustinov, new this frequency at 1815. (Yamaguchi-Japan)

8186.0 Cuban "Atencion," Spanish numbers in AM, at 1102. (Castillo-Panama)

8855.0 Belem Radio-South American air route net (SAM-2), Brazil, working flight 0063 in Portuguese, at 0628. (Perron-MD)

8864.0 Reach 6018-US Air Force Air Mobility Command, with position report for Shanwick (N. Atlantic air route net, NAT-B, Ireland) at 0628. (Perron-MD)

8971.0 Wrangler 05-Probable US military P-3, in radio check with (sounded like) Boxcar, at 0255. (Perron-MD)

8983.0 "O-6-P"-Same US Coast Guard aircraft as on 5696, working a District 7 search for burning small boat, found the vessel with flashing lights and flares, remaining in area, at 0032. (Perron-MD)

8992.0 Reach 5267-US Air Force C-141, tail number 50267, in patch via Thule to Mountain Home AFB at 0120. (Perron-MD)

9016.0 Best Idea-US military "Nightwatch" net, working Axe Knife, who checked him in at 1240. (Jeff Haverlah-TX)

10204.0 WAR 46-US Military Joint Alternate CP, PA, working WAR 46 Mobile, at 1345. (Haverlah-TX)

10345.0 Unid CW "numbers" in 5-letter groups, could be Cuban or Russian, at 1103. (Castillo-Panama)

10780.0 Sentry 63-Front end call of a US Air Force E-3, with patches through Cape Radio, US Air Force, FL, to Tinker AFB for arrival time, at 1610 and 1616. "3-Xray-Oscar" -US Navy, working Cape Radio ("Fisher"), for relay of arrival time to Navy, at 1953. Razor 01-US Air Force E-8C JSTARS with wing commander aboard, in patch through Cape Radio to Raymond 19 (Robins AFB), at 2021. (Allan Stern-FL)

10970.0 MIWE2-Abnormal Mossad phonetic callup, no message, at 1800. (Yamaguchi-Japan)

11175.0 "Blue Dog"-Male voice calling, "Breaker, breaker, one-nine, anyone have a copy on Blue Dog, c'mon?" more like Citizen's Band procedure. No answer, at 1736. (Tom Sevart-KS) *Someone picking up the wrong mike, or messing around? -Hugh*

11178.0 Falcon 01-Dutch Navy aircraft, in radio checks with PJC (Dutch Navy, Hato, Curacao), and PC8 (unid) at 1300. (Perron-MD)

11214.0 Dragnet Whiskey-US Air Force E-3B AWACS, in phone patch to Eagle 3, via Raymond 24 (control at Tinker), reporting electronic problems at 1907. (Perron-MD)

11232.0 Buzzby 02-Unknown aircraft with patch through Canadian Forces Trenton Military to Charleston AFB concerning thunderstorms, at 0315. (Perron-MD)

11244.0 Apple Pie-US military, Strategic Command Airborne Command Post with EAM similar to one passing on the Global network at the time, at 1333. (Haverlah-TX)

11267.0 Acid Test-US military, probably Strategic Command Airborne Command Post with coded messages, simulcast on 8969 and 9016, starting at 0306. (Haverlah-TX)

12135.0 Cuban "Atencion," with numbers in AM, and with a parrot clearly heard squawking through an apparently open mike in the room. Also on 12634, both heard right before the 0200 broadcast, at 0155. (John Maky-AR) *[John wonders if the parrot lives there, and, if so, can he recite numbers in Spanish! -Hugh]*

12135.0 Cuban "Atencion," Spanish numbers in AM, at 0302. (Castillo-Panama)

12634.0 Cuban Atencion numbers, in AM and with the parrot, also on 12135, at 0155. (Maky-AR)

13200.0 Reach 537-US Air Force, with patch through Thule to Lajes, at 0252. (Perron-MD) Meredith-US Air Force, working control at Andrews AFB, moved to 11175, at 1735. (Haverlah-TX)

13907.0 Red Handed-Unknown US military, testing at 1950 (Haverlah-TX)

14000.0 "Zulu Whiskey Lima"-Mossad, Israel, high priority transmission, covering up "phonetic alphabet" spook station "Nancy Adam Susan," possibly also Mossad, both chattering away at 1400. (Yamaguchi-Japan) *Nice catch! -Hugh*

14750.0 VLBC2-Abnormal Mossad callup, Israel, no message, at 2225. (Yamaguchi-Japan)

15016.0 Snoop 47-US Air Force RC-135, canceling mission due to bad weather, and trying to arrange landing at McConnell AFB in patch via Hickam, Told only B-2s can land after hours, at 0224. (Perron-MD)

16234.5 PWR44-Brazilian Navy, new callsign, with heavy RTTY traffic in naval exercise "Ermbra47," at 1615. (Bob Hall-RSA)

16315.0 Polemb Kinshasa-Polish Embassy, Zaire, with traffic in Pol-ARQ, at 1543. (Hall-RSA)

16418.0 Polemb Nairobi-Polish Embassy, Kenya, with ID and nil-traffic, Pol-ARQ, at 1615. (Hall-RSA)

16631.7 DLKGMK-Egyptian Embassy, Kinshasa, Zaire, with ARQ traffic to Cairo in Arabic, at 1544. (Hall-RSA)

16804.5 Various DSC calls received on this alerting channel, all in DSC packet mode, some with corrupt IDs, starting at 0823. (Watson-UK)

17976.0 Red Handed-Unknown US Military, with Mainsail (general call) at 1950. (Haverlah-TX)

19176.5 Deplu Jakarta-Indonesian MFA, with ARQ code groups to "Semua Perwakilan," at 1048. (Hall-RSA)

Stan Scalsky sscalsk@mail.ameritel.net
Mike Chace Mike.Chace@parexel.com

Two's Company, Thirty Six is a CROWD

Last month we profiled the British designed multi-tone system, Piccolo. The Russians also developed their own narrowband multi-frequency shift keyed (MFSK) communications system, but opting for a much larger number of tones. The system is variously known as URS Multitone, CIS-36, 10-11-11 MFSK, or most commonly CROWD-36.

Long-missing from digital decoding software, although relatively simple in signal structure, CROWD-36 has recently become available to the hobbyist, and is now included as a standard module in the Hoka and WaveComm decoder lines. However, like many more of these "declassified" systems, the ability to decode is limited by the fact that much traffic carried by this mode is heavily encrypted.

Like Piccolo, the multi-tone nature of CROWD-36 also gives the signal an unmistakable musical sound when sending traffic at the usual speed of 40 baud. The 32 tones used for normal traffic (i.e., one tone for every International Telegraph Alphabet-2, or Baudot character code), are arranged in three groups of 10, 11 and 11 tones, each tone separated by a shift of 40 Hz. Tones 1, 12, 24 and 36 are not usually used during traffic and give the signal its distinct grouping. Tone duration is 25 milliseconds (ms) when actively sending traffic while the 10 baud operator mode uses a tone duration of 100 ms. This tone arrangement is also quite unmistakable when seen on an audio spectrum display.

Why only 32 tones? Well, CROWD-36 uses the four remaining tones for other signalling purposes, for example, to provide an idling signal for tune-up. To increase its sophistication, CROWD-36 also provides a five-tone selective calling (selcal) mechanism, can be adaptive (automatically moves to an alternative channel when the signal quality drops to unacceptable levels) and also provides a slower "operator chit-chat" mode which keys at 10 baud.

Interestingly enough International Telecommunications Union (ITU) documents list four distinct types of CROWD-36 that vary in tone duration, baud speed and tone shift. The commonly found 40 bd 25 ms tone signal is often but not always encrypted and the 10 bd 100 ms tone operator mode is usually in the clear. A signal described in literature shows a signal of similiar structure but using a tone shift of only 10 Hz.

Who Uses CROWD-36

As far as we know, the use of CROWD-36 is exclusive to three distinct groups of Russian users. The first is the Russian Diplomatic Service, transmitting heavily encrypted messages from its huge HF transmission site at Penza, a few miles outside Moscow. Embassies also make use of CROWD-36 for communications, although the availability and added security of satcomms has limited this source of traffic over the past years. Next come the Russian Army and Air Force, but again, these are believed to make only sparing use of CROWD-36.

The third class of user is Russian Intelligence, specifically FAPSI (Federal Agency for Communications and Intelligence), who have been observed on numerous occasions using the same link identifiers, 5 letter group encryption scheme and operating procedures as that utilized by the infamous "SOUD" or "Brotherhood" 75 bd RTTY network.

Although much more prevalent in Europe, CROWD-36 is commonly heard in North America and the Far East. It's also clear from analyzing logs, that CROWD-36 traffic tends to cluster around a small range of frequencies, perhaps indicating the use of channelized equipment. Here are some recently monitored ranges and spot-frequencies:

Russian Diplomatic Service & Russian Forces

9150 to 9160
9265 to 9280
10150 to 10170
10470 to 10480
11050 to 11080
12150 to 12170
12200 to 12210
13850 to 13870
14440 to 14450
14700 to 14710
16110 to 16150
17400 to 17500
18200 to 18300

Russian Intelligence

9163 9335 12127 13877 13962 14385 14640
14912 16070 16150 16153 19139

Decoding CROWD-36

This is a tough signal to tune, in our opinion, because of the large number of tones involved. You would think that simply tuning around tone 18 would be a good starting location, but you would be wrong. It seems that the best way to tune the system is to wait for idle tone and then tune that to show tone 24 as active.

The Hoka and Wavecom decoders might be able to assist with centering the signal. Since the tones are only 40 Hz apart, a small error in tuning will start to induce errors in decoding, so keep an eye on frequency drift.

Check out the sites mentioned in last month's Piccolo article for examples of CROWD-36.

Chinese Diplo Confirmed as Moving to PSK

Only a year ago, by day or night, one would hear the rough, almost buzzsaw voice frequency telegraph (VFT) system called 4+4, the mainstay of the Chinese Diplomatic Service. Then without notice, an almost overnight disappearance of this mode took place.

A number of monitors speculated that the Chinese had moved to satcomms, but those with detailed logbooks soon noticed a correspondence between old 4+4 channels and the sudden appearance of MIL-188-110 39 tone HF modems, together with MIL-188-141 ALE (Automatic Link Establishment) signals.

Now, a fellow European monitor, aided by a native Chinese speaker, confirms that Chinese Embassies have indeed been heard confirming communications with the MIL-188 gear in plain USB voice after transmissions take place. However, whether the equipment in question is Western in origin or a Chinese copy is not known.

We'll bring you more on the continuing flight from traditional FSK communications to the world of PSK (phase shift keying) and multi-tone HF modems in the next column.

Glenn Hauser, P.O. Box 1684-MT, Enid, OK 73702
E-mail: wghauser@yahoo.com
Web: www.angelfire.com/ok/worldofradio

Deutsche Welle Faces Radical Cutbacks

Faced by government budgetary cuts, Deutsche Welle's Director-General Dieter Weirich has proposed the loss of 745 jobs, including the layoffs of 332 freelancers and 163 salaried staff. Six foreign-language sections in radio face closure, including Deutsche Welle's Japanese and Czech services, as well as the newsdesk of the English program. The plan, instead, is to provide English-language news from Deutsche Welle TV in Berlin. A final decision is to be made by Deutsche Welle's boards on October the 6th.

Referring to funding cuts submitted by federal culture minister Michael Naumann (starting next year with a drop of 54 million marks), Mr Weirich said the pressure on DW to make savings was heavier than austerities facing other German institutions. The layoffs would be singularly unprecedented in the history of public broadcasting, Mr Weirich said, and would hinder Germany's portrayal abroad. DW staff planned to demonstrate in Berlin in September. The chairman of the IG Medien trade union, Detlef Hensche, called on the government to rescind the budgetary cuts (DW News via Dan Atkinson, *swprograms*)

Six services to be closed: Czech, Slovak, Slovene, Hungarian, Japanese, Spanish. Eleven services to be reduced: Albanian, Bosnian, Croatian, Serbian, Macedonian, French, Portuguese, Polish, Romanian, Farsi, Indonesian. The planned Ukrainian service will not get off the ground (via Harold Sellers, *swprograms*)

Don't miss this Radio St Helena Day

Radio St Helena Day 1999, But Will It Be The Last? is the headline of this article found at the St Helena website **http://www.sthelena.se/radiosth.htm**

Reception reports for the 1998 Radio St. Helena Day amounted to just 50 percent of the previous year's reports. The station manager Tony Leo, said 15 June that Cable and Wireless has agreed to host a final transmission, which will take place from 1900Z Saturday the 23rd of October until midnight on 11092.5 USB.

This being the last transmission before the turn of the century, you will be able to hear all of the voices of the Radio St Helena presenters, who have all produced a world-wide transmission. There will be lots of Radio St Helena give-aways, competitions and much more – including audience participation – live. (Derek Richards, via Grishin, *Review Of International Broadcasting*)

ALBANIA R. Tirana, English to NAm 0145-0200 and 0230-0300, switches to and fro between 6115 and 6120. Parallel 7160, which spars with 7155. 6115 spars with 6110 BBC Spanish to SAm (Bob Thomas, CT)

ARGENTINA "FM Shalom 107.1," Mendoza, audible on 4880.6v all night or from before 0800 on 7 of the 31 mornings in May, and also heard one evening on 4881.0v. Continuous sermons and evangelical music side-by-side, ads for evangelical bookstores in the vicinity of Mendoza (Emilio Pedro Povrzenic, Rosario, May *Latinoamérica DX* via *Radio Nuevo Mundo*, report translated and interpreted by gh) My guess is that this was actually third harmonic of 1627 or so (gh)

AUSTRALIA RA picked up a new show in August, *The Margaret Throsby Interview* from the Classic FM network, M-F 0310-0400; includes music selected by guests à la *Desert Island Discs*; best on 15515 (gh) If you want to learn more about her and her show, go to: **http://www.abc.net.au/classic/present/throsby.htm** (Peter Bowen, Toronto, Canada, *swprograms*)

Special R. Australia QSL cards available on the occasion of 60th anniversary of R Australia on Dec 20, 1999. All reception reports of English between Aug 1 and Dec 20 will be verified using old QSL motives, like The Bell Bird [isn't that from NZ? -gh], The Kookaburra, The Koala and The Sydney Opera House. About 200 cards are in stock (John Wright, RA QSL Manager, on *Feedback* via Gregor Link, *BC-DX*)

BELARUS Programs relayed on 11960 at 1100-1200: Mon - Radio Gomel, Tue - Radio Vitebsk, Wed - Radio Brest, Thu - Radio Mogilev, Fri - Radio Grodno, Sat/Sun - Radio Stolitsa, Minsk (*Club DX*, V. of Russia via Klepov, *Cumbre DX*)

BRAZIL In the wake of reports that RNB's European service is closing down, I have been checking for the North American service, and not hearing it, either – English at 1200-1320 supposed to be on 15445. At 1227 check I heard nothing but FEBA on 15445 with IS, and into Nepali(?). After 1300 FEBA clashes with something else, presumably Romania (gh, *World Of Radio*)

The problem is that the president has extinguished RadioBras, which was responsible for the transmitters. Until it is decided which government agency becomes legally responsible for them, the transmissions, even if they continue, will be precarious. Hug (Luiz Cruz, Brazil, *radioescutas*)

CENTRAL AFRICAN REPUBLIC Radio Minurca: The original 20 kW transmitter was on "its last legs" and a "difficult technician" did not help matters. Another technician from Motorola got the station back on shortwave with a 125 watt converted-transceiver. This unit is on 9500 kHz 0600-1600 UT and 5900 kHz 1600-0600 UT. 9900 kHz is on with a 1 kW transmitter 24 hr/7 days. Trying to get a more powerful transmitter, but not much success. When the UN mission in the CAR ends, Radio Minurca is scheduled to go off, but there are talks to find someone to take over the station (David Smith, R. Minurca, on *International Radio Report* late July via Hans Johnson, *Cumbre DX*)

CHILE Voz Cristiana has been audible on 5675, //6070 in the daytime (Emilio P. Povrzenic, Rosario, Argentina, *Latinoamérica DX* via *Radio Nuevo Mundo*) 6070 plus 5675 equals 11745, which is another VC frequency, so this would be a difference mixing product (gh)

COSTA RICA Due to electrical storms blowing out equipment, RFPI is in need of modems and computers, especially for the Progressive News Network people, who make heavy use of them in gathering stories. If you have a discarded modem, a 28 or 14, and outboard/universal ones work best, RFPI would like to have it as backup, and you could get a tax write-off. Could also use older computers, such as IBM 200 to 500 MHz. Contact the Oregon office first, P O Box 20728, Portland, OR 97220; or direct to CR info@rfpi.org (RFPI *Mailbag* via gh)

RFPI's goals include increasing the ease of reception around the globe with the addition of six separate 100 kW transmitters, expanding the languages of broadcast, providing live interactive audio streaming on the internet, and expanding the tape distribution of programs produced by RFPI. The addition of a dedicated, continuous UN broadcast presence on shortwave, or UN channel, is seen as another key area for development (RFPI *Vista*)

CUBA [non] *Cuban Journalist Defects At PanAm Games* - Winnipeg (CP) - A Cuban journalist covering the Pan American Games has applied to defect, while another Cuban athlete has failed to show up for his event. Sources told the Associated Press the journalist is Lisette Cepero of Radio Rebelde (Toronto *Star* via Ivan Grishin)

All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; A-99=summer season, Mar-Oct; [non] = Broadcast to or for the listed country, but not necessarily originating there.

• *Remove Cuba Broadcasting Director, Panel Urges* - A panel appointed by Congress to oversee Radio and TV Martí has asked President Clinton to remove Miami lawyer Herminio San Román from the directorship of the Office of Cuba Broadcasting. It has also demanded an immediate investigation into irregularities outlined in a recent federal report.

"The credibility that the operation so proudly nurtured and guarded since its creation has been severely compromised," said the letter, which was signed by Christopher Coursen, the board's acting chairman.

The board's allegations are based on a *Report of Audit* performed in June by the State Department's Office of the Inspector General. The 67-page report contains the result of investigations into Radio Martí's broadcasts, conducted since early 1997. According to the report, Radio Martí has failed to provide quality programming and the station's internal procedures have declined in the past two years. (Wilfredo Cancio Isla, *El Nuevo Herald* via A. F. Mastrapa, *Clandestine Radio Watch*)

ECUADOR I received after 16 years finally a QSL letter from Radio Popular Independiente, Cuenca, 4800. Over the years I did send many follow-ups without any result. A few months ago the Dutch embassy has helped me to QSL; for them it was also not easy, but I was lucky to get the QSL. So this is really a very hard to QSL station. v/s was Manena E. de Villavicencio, Director-Gerente (Ruud Vos, Netherlands, *The Four Winds*)

A very rare QSL, indeed. I picked up QSLs there for several DXers in a 1985 visit and I can't recall seeing any reports of QSLs for them since. I visited them again in 1997. The station is really very disorganized and not particularly profitable.

Apparently it was a more prominent station many years ago when the founder was alive. The station's audience is the lowest classes (hence the name Radio Popular, or the people's radio). That limits revenue from advertisements, since advertisers aren't as interested in reaching an audience with little money. The shortwave transmitter has been off the air for some years. It has a bad tube and replacement would cost several thousand dollars. Considering the station's financial picture, it is unlikely the station will ever return to shortwave (Don Moore, *hard-core-dx*)

EUROPE Right now it's 0245z, 18th July and I'm listening to R. Pasteur via Shortwave Relay Service on 21860. I believe this is unscheduled and I am really surprised that it's making it to NZ on this frequency. There are NO other Europeans audible on 13mb (maybe no one else is using this band from there at this time). (Paul Ormandy, Oamaru, New Zealand, *swl@qth.net*) I'm not aware of any (gh)

GUATEMALA TGW La Voz de Guatemala, 6180 kHz, 2238-2259 UT, Spanish, presenting the program *Chapinlandia* with music from the TGW marimbas, and short notes on the history of the country. Then they announce several programs for the week, and at 2259 a full ID also mentioning their 107.3 FM frequency. SINPO=55444 (Elmer Escoto, Honduras, *Cumbre DX*)

HONDURAS 5890 is active at nights with Radio Misiones, Tegucigalpa with a 5 kW transmitter (per their announcements). Programs are produced by evangelic organizations. I've heard it around 0400 (Elmer Escoto, Honduras, *Cumbre DX*)

INDIA All stations of AIR will be operating round the clock from Oct 5 to 7 for broadcasting the results of the Indian elections. Many AIR stations on the tropical bands will remain on air all night, allowing propagation on frequencies not normally heard outside of Asia (Jose Jacob, India, *Electronic DX Press*)

IRAQ Mother of Battles Radio, 7161, *1600 with Arabic music followed immediately by Recital of Koran, ID at 1606 by woman as *Idha'at umm al-ma'arik, Idha atu kul al-arab*, then songs and talks mainly on Saddam Hussein and America. 1850 Recital of Koran followed by military music, probably anthem, time pips, short announcement and off at 1900*. Poor and very noisy reception August 5 and 6 (Mahendra Vaghjee, Mauritius)

ISRAEL Reshet Bet started August 4 a fortnightly show aimed at expatriates, Wed 2300-0200 Thu on 11585, [which would now be UT Thu 0000-0300; try 15615]. (Joel Rubin and Doni Rosenzweig) *The Israeli Connection - Conversations with Israelis Abroad*, live show is designed "to let Israelis talk about anything at all," said Elihu Ben-Onn, the program's originator, editor, and presenter. Will be in Hebrew, but English speakers will be welcome to call in, provided they have a basic Hebrew vocabulary, which "is wonderful for Jewish kids who've learned their Hebrew in Hebrew or Sunday school," Ben-Onn pointed out. Internet address is **http://bet.iba.org.il**, and a sound card is essential (Helen Kaye, *Jerusalem Post* via Rosenzweig via Lamb, *Cumbre DX*) (See "Hauser's Highlights" in SW Guide for schedule)

LATVIA Radio Latvia Int'l has made its last shortwave transmission. This was announced 31st July, in English 1900-1930 on 5935 kHz. They said that they would now only be on internet. So we have lost another SW service (Edwin Southwell, England, *World Of Radio*)

Dear Listeners, Latvijas radio is grateful for your listening to our programmes, at the same time informing you that with a view to a more efficient use of our financial resources, its short-wave transmitter on 50.6 m, 5935 kHz will be closed as from 1st of August 1999. Henceforth please listen to our programmes at our Internet address: **http://www.radio.org.lv** (note with QSLs via Mahendra Vaghjee, Mauritius)

But then R. Caroline was heard on Latvia's former frequency, 5935, at least on Saturdays between 1000 and 2100; seems too weak to be Merlin or DTK, likely using Latvian transmitter (Dave Kenny, British DX Club; Kai Ludwig, Germany)

LIBYA V. of Africa had been on 15435, 15415 and 15395, but 15435 disappeared and along with it 15395, leaving only 15415 in the evenings, including English news around 2330. 15395 may have been a mixing product between the other two frequencies. Libya constantly referred to only as The Great Jamahiriya (*al-Jamahiriya al-Kabir*) (Olle Alm, Sweden, *BC-DX*)

PALESTINE [non] Clandestine, Voice of Palestine, 11965//11735//13645//1080 – Heard all these but reception was clear on 11965 *1930 with ID in Arabic by man as *Sawt al-filistin, sawt al-thawrah al-Islamiyah al-filistiniyah* followed by a song *Vatan Vatan* then recital of Koran, and ID, frequency with patriotic song in background at 1938 (Mahendra Vaghjee, Mauritius)

PERU - *Dateline Bogotá* -- new address for the updated version covering my entire period in Bogotá 1993-1998. There is also a "primer" on Peruvian geography which has not been published elsewhere. I include a number of pictures. **http://www.algonet.se/~ahk/Dateline.htm** (Henrik Klemetz, Sweden)

• "R. Bethel," 5950, presumed from Arequipa. Finally, I could ID this religious station, first reported on 5949.32 in December last year. Signal strength enough to copy Peruvian NA at 1030, prayers, two religious ballads. IDing twice as Radio Bethel (the female name, sounding as "beh-tel", and stressed in last vowel "e"). Subsequent days, R. Arequipa definitely here before 1030 along with WYFR. So R. Bethel could be the name of a non-daily program on R. Arequipa (Horacio Nigro, Uruguay)

PHILIPPINES Another VOA shortwave transmitting site will closing. On September 30th, VOA's relay at Poro will be taken out of service. Site consists of seven shortwave transmitters with powers ranging from 35 to 100 kilowatts. The million-watt VOA medium wave relay at Poro, on 1143 kilohertz, will remain in service. Also remaining on the air is VOA's other shortwave relay in the Philippines, at Tinang. Some of the gap created by the closure of Poro will be taken up by the new VOA relay at Tinian, in the Northern Mariana Islands (Kim Elliott, VOA *Communications World* via John Norfolk)

PORTUGAL [and non] From August 2, Radio Portugal, RDP, introduced expanded transmissions to Portuguese Timor, Indonesia, and Australia daily, including high powered relays from Taiwan:

1000-1400 on 17740, from Portugal, 300 kW, beam 60 degrees
2100-2300 on 17600, from Portugal, 300 kW, beam 60 degrees
1000-1100 on 11550 from Taiwan, 250 kW, beam 205 degrees
2200-2300 on 11550 from Taiwan, 250 kW, beam 205 degrees

Transmissions include segments in Tetum (spoken in Timor), Indonesian, and Portuguese. As monitored here in Melbourne, there is a two second delay on broadcasts from Taiwan, as compared with direct transmissions from Portugal, suggesting a double satellite link. Signal strength is superb on 11550 and 17760, but variable on 17740. This service is also available directly via Asiasat and via RealAudio (Bob Padula, *Electronic DX Press*)

SUDAN [and non] The situation around 8000 kHz: Anti-Sudan clandestine V. of Sudan starts daily at 1600 UT on 7999.85 in full AM. Until 1700 it's in a vernacular, and 1700-1800 in Arabic. Full ID is normally heard at 1700. Two more stations are active on exactly 8000.0, one starting around 1600 and the other around 1630. It varies from day to day which of the two starts jamming first. In USB there is a strong station playing just local music without any announcements. It is active most days, but not every day. And in full AM the domestic service of Sudan with a full ID at 1700, followed by news in Arabic. All three leave 8000 around 1800, starting with the V. of Sudan (Harald Kuhl, Germany, *BC-DX*)

TAIWAN *Merlin Communications International Limited Signs Exclusive Agreement with the Central Broadcasting System of Taiwan* - On 13th July 1999 in Taipei, Merlin Communications International Limited signed an exclusive agreement with the Central Broadcasting System of Taiwan to market and broker its facilities globally. Merlin already has an exchange agreement with CBS where air time is exchanged between Taiwan and the UK. However, this agreement means that Merlin has the exclusive right to market around the world CBS' extensive facilities.

CBS has some 41 transmitters, both short and medium wave, based in Taiwan with excellent services into all the Asia Pacific regions.

CBS and Radio Taipei International programmes are broadcast via a transmission system connecting the South and North of Taiwan. CBS own nine transmission sites across Taiwan, with sixteen medium wave transmitters and twenty five shortwave transmitters which transmit programming into Indo-China, Mainland China and all over the Asia Pacific region. (Merlin Communications website via gh)

Merlin Communications Signs Exchange Shortwave Deal With Herald Broadcasting Syndicate, Inc & Central Broadcasting System Of Taiwan - Merlin signed a one year contract with Herald Broadcasting Syndicate Inc. (HBS) to provide shortwave audio transmission of The Christian Science Publishing Society's programs into South China, Beijing and India for three hours a day. The deal is part of an exchange with Central Broadcasting System of Taiwan (CBS). This replaces CS broadcasts via KHBI, Saipan.

Three hours of CBS programming in English, German and Mandarin will be transferred from their studio in Taiwan via the internet into the Merlin London Control Centre and then onto Merlin's GDS satellite. The shortwave signal will then be transmitted from Merlin's site in Cumbria, in the North West of England into Western Europe, Germany and Eastern Europe. (Merlin Communications website via gh)

Herald Broadcasting Syndicate from Taiwan:
0900-1000 on 11725 to the Far East and Northern China
1000-1100 on 11840 to South China
1300-1400 on 11725 to India
These transmissions are multi-lingual, including English
(Bob Padula, *Electronic DX Press*)

Radio Taipei International (CBS) relays via Merlin SW transmitters in the UK (Skelton 250 kW):
1800-1900 English 3955
1900-2000 German 6175
2300-0000 Mandarin 3975
(Dave Kenny, Aug 13, BDXC-UK E-mail news)

UKoGBaNI Sunrise Radio, 5850, told me that they had been off shortwave (via Julich) for about a week. They were having "problems with the transmissions" and "we're trying to sort it out." They could not say when or even if they would be back on shortwave (Hans Johnson *Cumbre DX* (C))

- Merlin Network One airs *Global Sound Kitchen* to Eu:

Fri 2100-2300 6140 7325 9720
Fri 2300-0100 Sat 6015 7325 9720
Sat 1300-1700 9750 12035 15235 (BBC Monitoring)

All via 250 kW Skelton; 1300 repeats the previous broadcast. (Dave Kenny, British DX Club) Program is contemporary youth dance music of all types, hosted by unknown French DJ Luna with guests (GSK website)

- Ex-Beatle Paul McCartney will host a four-part series on BBC World Service beginning October 20th. He will play songs from his coming album *Run Devil Run* and other rock tunes that inspired him (Kim Elliott, VOA *Communications World* via John Norfolk)

USA VOA's new director Sanford Ungar soon appeared on *Talk To America*. Came across as a young puppy – eager as all get-out to please, but totally clueless as to how to do that. Regarding Chinese jamming, he either played dumb or just wasn't aware of the longstanding jamming (Richard Cuff, *swprograms*) He's obviously very new to the job and apparently wasn't briefed at all or chose to dive right in on *TTA*. He didn't know if the VOA had any transmitters targeted to Europe, did not appear to know any details about the VOA's future plans, and generally came across as wholly uninformed. The only thing that "saved" him was his easygoing, open and positive manner on the air.

The VOA needs to significantly rethink its "News Now" format – The resistance to such rethinking was most evident in the responses of Mr. Ungar and the host's phrasing of questions to him on this issue (John Figliozzi, *swprograms*)

- Al Weiner announced on WBCQ 7415 a new "hacker's program" Tuesday 8 pm EDT or UT Wed 0000, a telecommunications info program, *Off the Hook* which we will really like (gh)

- *'Pirate' Comes In From The Cold -- 'Scream Of The Butterfly' Goes Legit* - Former part-time "pirate" broadcaster John Wisyanski, whose "Scream of the Butterfly" radio program has aired sporadically – and illegally – for the last year, has announced a tentative agreement to air his program regularly on legal shortwave station WRMI. The first broadcast is scheduled for UT Sunday, September 5, 1999, at 0400, on 7465.

The one-hour program, inspired by the "underground" FM scene of the late 1960s, is the brainchild of Wisyanski, 45, whose broadcast experience includes a two-year stint at CBS-owned all-news KCBS-AM in San Francisco and the Bay Area's jazz station, KCSM-FM. The show – the title of which is inspired by a song lyric from the 60s rock group, the Doors – will be broadcast on the first Saturday of every month. The show – allegedly broadcast from a mythical ship in the North Atlantic, safe from the clutches of the FCC – is peppered with advertising parodies for such businesses as "Caskets R Us," "Play it Again, Sex" (a used sex-toy emporium), and "Listen and Learn with Keith Richards," a diction course featuring the Rolling Stones' guitarist, known for his incoherent banter. Wisyanski – who teaches incarcerated and emotionally disturbed children in Sacramento, California – produces the show on his own personal computer, assembling it digitally. Note: UT time will change in November to 0500 (John Wisyanski)

- On a vacation in the Florida Keys, one mission on the drive to Key West was to confirm once and for all my hypothesis that the AFRTS sideband feeders on 4278.5 and 12689.5 were in fact via the CIA/US Navy broadcast complex on Saddlebunch Keys. While verifications have been flowing in from a USN public relations contact, claiming the transmitter site is at the Boca Chica NAS, I am unaware of any HF facility there.

On June 21, mid-day, I fired up the YB-400 when I was southbound near Cudjoe Key, home of the Cudjoe Key Air Force Site, where seemingly the sole remaining tethered TV Marti blimp is based. The blimp was on the ground (TV Marti broadcasts are in the early morning local time). The 4278.5 and 12689.5 signals were good with the antenna almost completely retracted and the radio on the car seat. Signal levels greatly increased and peaked within the next approximately five miles, at Saddlebunch Keys.

At the children's park across from the entrance to the USN complex, I compared the two frequencies with the antenna retracted and slightly detuned to other confirmed RTTY signals from the facilities (NAR), namely 7784, 9030, 11023 and 12915. (No other channels were located.) Boca Chica (about five miles, again), signals dropped to about the same level as Cudjoe Key. In Key West, signals were considerably weaker with the retracted antenna. The 6458.5 frequency was inaudible anywhere with the retracted antenna, so it indeed would appear to be from Puerto Rico or at least definitely not Florida (Terry Krueger, British DX Club *Communication*)

- 13596.21, WJCR, Upton, KY, 1300 Aug 14. Christian religious songs and ID. Are US religious shortwave stations exempt from frequency precision regulation? (Jay Novello, NC)

VENEZUELA R. Nacional de Venezuela, 9540, 1103-1128, LA Pop music with occasional announcements by man in Spanish. Fairly strong carrier but extremely weak modulation. One of the few days that the modulation was detected at all! And lucky to get an ID. Appears this is only on from 1100-1200, but not totally sure. (Dave Valko, PA, *Cumbre DX*)

VIETNAM The Voice of Vietnam has opened a Web site which provides access to the station's news in text, and programs in RealAudio format, in Vietnamese and English. Because shortwave reception of the Voice of Vietnam is usually difficult here in North America, this Web site gives us an opportunity to hear the station's programs. Music from VOV sounds fairly good via RealAudio. The URL is **http://www.vov.org.vn**

The director general of the Voice of Vietnam visited Radio Havana Cuba in July. He expressed appreciation to the staff of Radio Havana for its support during the Vietnam War. Some of us American shortwave listeners remember during the 1960s and 70s shortwave relays of Voice of Vietnam English programs via Cuba (Kim Elliott, VOA *Communications World* via John Norfolk)

ZANZIBAR Why QSLs are sparse from R. Tanzania Zanzibar: During my five-day visit to Zanzibar, I had the opportunity to visit the radio station, especially Ali Bakari Muombwa and Khalid Hassan Rajab. The latter is the chief of the SW radio transmitter and speaks very good English (he has attended training courses in the US).

Mr Ali Bakari Muombwa, a friendly 25-year old employee, is handling all incoming correspondence, including foreign mail. Ali's problem is that he does not read, speak or write English well enough to read or answer letters from foreign listeners. He has to have all English letters translated into Swahili!

This explains why most reports remain unanswered – Ali simply does not understand them. In certain cases, Mr. Khalid Hassan Rajab has answered, even though this does not fall into his area of responsibility. So don't be disappointed if you don't get an answer from RTZ. The employees I have met are extremely nice, they make very little money (about $30 per month), and they do what they can, but they receive far more foreign mail than they can handle. [So send your reports in Swahili! -gh]

RTZ employs more than 150 people, including 18 announcers and 10 technicians. 8 hrs a day on 11734 using a 50 kW Chinese made transmitter and a rhombic antenna directed towards Oman, where a large number of Zanzibar nationals reside. All in Swahili; English planned (Enzio Gehrig, Spain, A-DX, HC-DX, via NU via *BC-DX*)

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

Broadcast Loggings

GLOBAL FORUM

Gayle Van Horn

0000 UTC on 11705
JAPAN: Radio Japan. Economic news and trade report to freq schedule and ID. (William McGuire, Cheverly, MD)

0000 UTC on 9810
HUNGARY: Radio Budapest. Station ID to national news and items covering Serbia. (McGuire, MD)

0000 UTC on 6674
PERU: Radio Nueva Sensacion. Evening messages to "Radio Nueva Sensacion" identification. SINPO 34323. Peru's **Radio Huanta** 0030-0100, 4754.8. Spanish program with invitation to a cultural event in Ayacucho. Andean music to IDs, 0100*, frequency change from 4748v. **Radio Chota** 2350-0000, 4890.2 with ads and echo effect IDs. (Michael Schnitzer, Hassfurt, Germany/*Hard Core DX*)

0007 UTC on 4845
BOLIVIA: Radio Fides. Spanish. Full ID and extended music program, with minimal announcements. Easy listen, ID repeat 0112, fair signal by 0100 with QRM from **RTM Mauritania**. (Walter Mola, Torino, Italy/*Gatflash!*) **Radio Mosoj Chaski** 3310, 0050 in Quechua text to Spanish ID and religious text. (Renato Bruni, Ferrara, Italy/*Gatflash!*) **Radio Illimani** 6025 // 4945, 2320 with mentions of La Paz amid sports commentary. (Roberto Pavanello, Vercelli, Italy/*Gatflash!*)

0025 UTC on 6115
PERU: Radio Union. Spanish. Public service announcement to "Union la radio" ID and station jingle. Peru's **Radio Libertad** 5039.3, 0030 with ads and "Radio Libertad, para todo el Peru." Tentative ID for **Radio Paz y Vida** 5304, 0050; and **Radio Pacifico** 4975, 0105. (Duane Hadley, Savannah, GA)

0040 UTC on 4826.4
PERU: Radio Sicuani. Spanish. Peruvian huayno music and soccer match to ID. SINPO 23322. Other Peruvians logged: **Radio Altura** 0140-0150, 3340; **La Voz de la Selva** 0200-0210, 4824.4; **Radio Huanta** 0210-0220, 4748.3; **Radio Luz y Sonido** 0220-0230, 3234.8; **Radio Nor Andina** (tentative) 0230-0240, 4461.2 drift from 4460.8, very weak signal. (Schnitzer, Germany/*HCDX*)

0050 UTC on 9737.3
PARAGUAY: Radio Nacional. Strong interference for Spanish operatic vocals to 0051. String of IDs and promos including "Copa America Futbol"; newscast ("noticias de la hora") past 0100. (Harold Frodge, Midland, MI)

0100 UTC on 4800
LESOTHO: Radio Lesotho/LNBS. Noted continuous religious and regional music, very strong signal; noted India's **AIR-Hyderabad** had been covered at 0130 previously. (Mahendra Vaghjee, Rose Hill, Mauritius/*Cumbre DX*) 0300 national anthem, SeSotho ID. (Tom Banks, Dallas, TX)

0105 UTC on 6130
CANADA: CHNX Halifax. Fair signal quality for promos "the greatest memories of your life, Oldies 96, no other station spreads love like Oldies 96 CHNS." (Frodge, MI) Canada's **BBC-WS relay** 9515, 1430 *Meridian* program features film music. (Bob Fraser, Cohasset, MA) **Sackville relay** 9515, 1300 with *Health Matters*. (Sue Wilden, Noblesville, IN)

0200 UTC on 15105
ROMANIA: Radio Romania Int'l. English programming, // 11725. (Lee Silvi, Mentor, OH)

0200 UTC on 9665
RUSSIA: Voice of. Newscast to discussion on oil exploration in the Black Sea, and item on needed funds for the Mir spacecraft. (Wilden, IN) Top stories for program, *The 20th Century*. (Fraser, MA)

0230 UTC on 15485
PAKISTAN: Radio Pakistan. Station ID for South Asia services, fair signal; 15625, 1213 Bengali service. Fair to good signal via long path propagation. (Bill Thomas, MO/*Cumbre DX*)

0243 UTC on 5950
USA: Radio Taipei Int'l via Okeechobee, FL, relay. *Gardening* segment to *Elementary Spoken Chinese* program with Carson Wong; 5950 relay 0333 with essay contest promo for 2000. (Wilden, IN)

1530 UTC on 21550
CHILE: Radio Voz Christiana. Station ID into Spanish religious text. (McGuire, MD) Christian rock to 1956 ID and freq quote. "La Mejor Noticias" to ID spot at 2001 as, "Radio Voz Christiana transmitiendo a todos Americas desde Santiago Chile." (Frodge, MI) 6070.07, 0939 Spanish text // 11745, 11690. (Dave Valko, PA/*Cumbre DX*)

1645 UTC on 11734.10
ZANZIBAR: Radio Tanzania Zanzibar. Male announcer in Swahili with some pieces of music, Holy Koran at 1646 to 1648. Clear mentions of Tanzania followed by regional music to presumed newscast and regional music. Station ID 1659 as "Radio Tanzania Zanzibar" and announcement for relay news from Radio Tanzania Dar es Salaam. Station blocked at 1700 by **Radio Canada Int'l** Russian service on 11735. (Karl van rooy, Netherlands/*HCDX*)

1735 UTC on 15180
CYPRUS: BBC-WS relay. Arabic text and music to brief English language lesson at 1800 plus signal improvement noted (switch from Zyri to Skelton) station identification. (Dave Tomasko, IL/*Cumbe DX*)

1902 UTC on 11720
BULGARIA: Radio Bulgaria. English news to ID at 1907, (Frodge, MI) *Radio Bulgaria Calling* 11700, 2350. (Fraser, MA)

1910 UTC on 17660
ECUADOR: HCJB. *Studio 9*-Part 12 of *Origins, Mystery of Mysteries* on mass extinctions. (Fraser, MA)

1912 UTC on 15075
INDIA: All India Radio-Aligarh. English commentary regarding Pakistan, // 11620, SIO=353, 15075 better signal quality to vocals at 1918. (Frodge, MI) **AIR-Hyderabad** 4800, 1702 English news, // 4910 (**Jaipur**) 4950 (**Srinagar**) poor, SIO 242. (Antonello Napolitano, Italy/*Cumbre DX*)

1930 UTC on 6055
RWANDA: Radio Rwanda. Talk to Afro pops, instrumental performance. ID "this is Radio Rwanda broadcasting from Kigali." Swahili service 2000-2100, SINPO 44444. (Satoshi Hasebe, Japan/*Cumbre DX*)

2030 UTC on 15150
UNITED KINGDOM: Radio Canada Int'l relay. Audible to 2058, // 15235, 13650, 15470, 17820. No sign of U.K. relays 11690, 5995. (Silvi, OH)

2105 UTC on 3264.70
INDONESIA: (Celebes) RRI-Gorontalo. Indonesian. Announcers text to *Love Ambon* tune and choir music to 2106. (Mark Veldhuis, Borne, Netherlands/*HCDX*)

2200 UTC on 4885
BRAZIL: Clube do Para. Portuguese. National news topics to South America headlines. Good signal for Brazil's **Radio Nova Visao** 9530, 2250 with IDs and text. (Bank, TX)

2204 UTC on 6955
UNKNOWNISTAN: Poor signal for lite jazz, no voice heard. Peru? Pirate? Perhaps China...if so, suitable for elevators but not meditation! (Frodge, MI) - *I like your style Harold, guess all of us have logged* ***Unknownistan*** *more times than we care to admit! - ed.*

2228 UTC on 13640
TURKEY: Voice of Turkey. *Turkey & Greece* program on violations of the rights of Turkish minorities in Greece. (Fraser, MA)

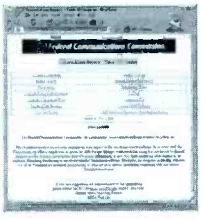
2252 UTC on 15820
ARGENTINA: Radio Rivadavia. Spanish. "Futbol" commentary to ID promotional at 2301. (Frodge, MI)

2323 UTC on 4471.9
BOLIVIA: Radio Movima. Spanish. Male speaker's text with mentions of Sanata Cruz and Santa Rosa plus regional music. Several IDs after 2343. (SINPO=34343. Tentative on Bolivia's **Radio Santa Ana** 4649, 2349-0006. Music to mentions of "Yacuma" at 0000 and commercial. Very weak and high noise level. (Vendhuis, NLD/*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)*
English broadcast unless otherwise noted.

Gayle Van Horn, gayle@grove.net

QSL VHF Low Band Stations



If the excitement of *MT*'s cover story this month has you sharpening your pencil to QSL some of those exotic DX targets, here are a few hints to get you started.

If the station you are monitoring has a license issued by the US government, then the Federal Communications Commission (FCC) website is your best bet to get an identity and address to QSL your intercept. The main FCC site for the land mobile services is located at the following internet address: **http://gullfoss.fcc.gov:8080/cgi-bin/ws.exe/beta/genmen/index.hts**. An alternate site can be found at: **http://svartifoss.fcc.gov:8080/cgi-bin/ws.exe/beta/genmen/index.hts.**

These sites allow you to search for a particular low band station by callsign, licensee/state, state/county, state/county/frequency, frequency, frequency/state and other parameters. The best part of the government database is that a mailing address, contact point and telephone number is included for each licensee.

Once you have determined who you are listening to, you can sent them a reception report following the guidelines that Skip Arey outlines in this month's *Beginners Corner*. Be sure to include a prepared confirmation card that the staff at the station can sign and return to you. Unlike interntional broadcasters, none of these stations are known to have printed QSL cards, so the enclosure above is important. Also be sure to include return postage.

AUSTRALIA

VNG Llandilo (Official Time Station, 16000 kHz. Verification card signed by Dr. Richard Brittain-Secretary National Time Committee, National Standards Commission. Photos plus seven pages of station technical info. Received in 18 days for one dollar. Email: <**richardb@ozemail.com.au**> Station address: National Standards Commission, P.O. Box 282, North Ryde, NSW 2113 Australia. (Canonica Daniele, Switzerland)

BRAZIL

Radio Aparecida, 6135 kHz. Full data QSL card signed by Ana Cristina Carvalho-Secretria da Direccion, plus postcard and tourist brochure. Received in 17 days for a Portuguese report. Station address: Avenida Getulio Vargas 185 12570-000 Aparecida, Brazil. (Daniele, SWI)

INDONESIA

(Java) Voice of Indonesia, 15150 kHz. Full data color QSL card unsigned, plus unsigned station letter with mention of enclosing IRCs to receive a QSL card. Received in nine months for an English report. Station address: Overseas Service, Jl. Medan Merdeka Barat, P.O. 157, Jakarta, Pusat, Indonesia. (Jim Boynton, Newton, MA)

ISRAEL

Galei Zahal (I.D.F. Radio), 6442 kHz. Full data yellow card in Hebrew, with microphone graphic, unsigned. Received in three months for an English report. Station address: Zahal, Military Mail No. 01005 Israel. (Mahendra Vaghjee, Mauritius)

KYRGYZSTAN

Kyrgyz Radio, 4010 kHz. Email verification received after three months from Nargis Atakanova-English Service, on behalf of Bayma Sutenova-Vice President. <**trk@kyrnet.kg**> Originally had mailed my report via snail mail. Station address: Jash Gvardia Blvd. 63, Bishkek, Kygyzstan. (Pentti Lintujarvi, Finland/*Hard Core DX*)

MEDIUM WAVE

KGOE 1480 kHz AM. Verification letter signed by Molly Atkinson. Received in five days for an AM report. Station address: 5640 South Broadway, Eureka, CA 95503. (Patrick Martin, Seaside, OR)

WJNZ 1680 kHz AM. Full data verification form letter signed by Jeff Shelp-Director of Engineering. Received in 118 days for a taped AM report. Station address: 2610 Horizon, Suite F, Grand Rapids, MI 49546. (Martin, OR)

WPHT 1210 kHz AM. QSL card signed by Sam A. Virgillo-Technician, plus letter and key chain. Station was former WCAU, and they enclosed two QSL cards with photo of the old WCAU station in 1950. Received in 21 days for a taped report. Station address: City Avenue & Monument Rd., Philadelphia, PA 19131. (Martin, OR)

MEXICO

Radio Mexico Int'l, 9705 kHz. Full data station card, plus view cards, program schedule, reception report forms, stickers, antenna construction manual and personal letter from Alejandro Joseph Estendou-Chief of English Dept. Received in 83 days for an English report, one U.S. dollar and origami souvenir. (Katayama via Gaku Iwata, Japan/*Cumbre DX*) Website: <**www.telecommex.com/imer/rmi**>

MOROCCO

Radio Medi Un, 9575 kHz. Full data QSL card unsigned, plus sticker and schedule. Received in two months after original French report 20 months ago. Station address: Boite Postal 2055, Tanger, Morocco. (George Maroti, NY/*Cumbre DX*) Website: <**www.medi1.com**>

PIRATES

KIPM, 6955.5 kHz USB. Full data oversized color card signed by Alan Maxwell. Received in 20 days for a pirate report and three mint stamps (returned). Station maildrop: P.O. Box 24, Lula, GA 30554. (Bill Wilkins, Springfield, MO)

WWRB, 6955 kHz USB. Full data *Cats* QSL sheet unsigned. Received in 36 days for a pirate report and three mint stamps. Station maildrop: P.O. Box 24, Lula, GA 30554. (Wilkins, MO)

ROMANIA

Radio Romania Int'l, 17735 kHz. Full data *Forest-Locked-Hut* QSL card plus personal letter from English Department. Program schedule, report forms and survey request sheet. Received in 67 days for an email report. <**rri@radio.ror.ro**> Station address: 60-62 Berthelot St., 70747 Bucharest, Romania, P.O. Box 111, R-70756 Bucharest, Romania. (Bill Flynn, OR/*CumbreDX*)

SWAZILAND

Trans World Radio, 4775 kHz. Full data transmitter site folder card unsigned. Received in 60 days for three IRCs and an English report. Schedule and religious pamphlet enclosed. Station address: Box 64, Manzini, Swaziland. (Wilkins, MO)

THAILAND

Bangkok Meteorological Radio, 11387 kHz. Verification letter signed by Chalermchai Eg-Karntrong. Received in one month for a utility report. Veri signer enclosed following schedule for the station's two services. Bangkok Radio volmet (air weather) broadcast 11387 23-12, 6676 24 hours, 2965 12-1300 UTC. The second service is for shipping 1 kW; 6765, 8743 (easy catch here in Scandinavia) 0000-0200, 0300-0500, 0600-0800, 0900-1100, 1200-1400, 1500-1700, 1800-2000, 2100-2300 UTC. Station address: Volmet Broadcast, Telecommunications Division, Meteorological Department, 4353 Sukhumvit Rd., Bangkok 10260 Thailand. (Jorma Mantyla, Finland/*HCDX*)

UNITED STATES

AAZ Army MARS, 13993 kHz USB. Partial data AAZ/MARS/50th *Armed Forces Day* card signed by Robert L. Sutton-Chief Army MARS. Received in 67 days for a HAM (amateur radio traffic) report and an SASE (used for reply) Station address: Commander USASC, Atten: AFSC-OPE-MA (31), Chief Army MARS, Ft. Huachuca, AZ 85613-5000. (Wilkins, MO)

WASHINGTON WHISPERS

By Fred Maia, W5YI
fmaia@prodigy.net

LPFM Broadcasting not RFI Threat

Earlier this year, the Federal Communications Commission proposed to create a new Low Power FM (LPFM) broadcast radio service. The objective was to create a wider diversity of voices on the FM broadcast airwaves at a time when broadcasters and viewpoints are consolidating.

LPFM broadcasting has the potential to create thousands of licensed, low-tech FM radio stations from 1 watt to 1,000 watts. The National Association of Broadcasters which represents broadcasters is fighting the proposal "tooth and nail."

The Commission's Notice of Proposed Rulemaking (NPRM) contemplates licensing one or more LPFM classes in the existing FM radio band. The three classes under consideration would have power levels of 1,000-watts, 100 watts and a low "microradio level" of one to ten watts. The NAB believes the Commission's microradio proposal would merely legalize pirate radio broadcasting. They say LPFM is an interference threat – not only to their signals but to their business plans, since it would siphon off listeners.

As part of its NPRM, the FCC requested studies of commercially available radio receivers to examine whether more stations could be supported on the dial without increased interference. The possibility that new, low power radio stations could interfere with full power stations currently in operation has been the most significant argument blocking adoption of the new service by the FCC. The public comment period closed on August 2nd.

The San Francisco-based Committee on Democratic Communications of the National Lawyers Guild has posted to the FCC's Electronic Comment Filing System (ECFS) the results of a technology study completed by a consortium of LPFM advocates. The study concludes that implementation of a Low Power FM radio broadcast service will *not* lead to a significant increase in interference with current, full-power stations.

A receiver engineering study, commissioned by a coalition of LPFM advocates, was also conducted by Broadcast Signal Lab, LLP. Highlights of the study include the exposure of ten commonly available radio receivers to incrementally greater levels of potentially conflicting signals, simulating the conditions that would result from the presence of LPFM stations on the FM radio dial. The study results suggested that there was indeed room to relax current FCC interference rules.

Full power radio stations are currently permitted to create "blanket" interference within a specified geographic radius near the transmission site, known as the blanketing area. LPFM signals were shown to create only minimal interference within several hundred feet of the transmitters, with many receivers showing no interference even within that small radius.

Any interference within this small blanketing area is easily remedied by low cost filters, which all radio stations (including the potential LPFM stations) are already required to provide to listeners encountering interference problems in that zone.

"The National Association of Broadcasters has consistently used buzzwords like interference to scare the American public," said Alan Korn, an attorney with the National Lawyers Guild Committee for Democratic Communications. "Our study shows that opening the airwaves to the public with LPFM will cause far less interference than that caused by existing full power stations. These results confirm that the only interference the NAB is really concerned with is interference with their monopoly over the radio dial."

"It's good to be able to lay this interference issue to rest," says Jeremy Lansman, owner of KYES-TV in Anchorage. "It is now more clear than ever that LPFM will create far less interference than many already licensed radio stations do. The listening public will only benefit from the many innovative new stations that will emerge in this wave of licensing. What the NAB fears is economic competition from low power signals, not the noise."

Low Power FM: "Not Working in Australia!"

Australia already has low power FM broadcasting and, according to a "discussion paper" released July 22nd entitled "Hoarding of Licenses for Low Power Open Narrowcasting (LPON) Services" it is not working out as planned. LPON services provide a wide range of niche program formats on the low end of the FM radio dial to reception areas about 2 to 10 miles in diameter, depending upon the location.

Output power for LPON services is limited to 1 watt ERP (effective radiated power) in residential areas and 10 watts ERP in rural areas. LPON licenses are also limited to a maximum field strength at a certain distance from the transmitting antenna which allows the same channel to be reused every 5 to 15 miles.

In most areas, only three LPON broadcasting frequencies at 87.6, 87.8 and 88 MHz are available. Typical formats include broadcasting to tourists, community news or music programming. A narrowcasting service is distinguished from mainstream FM broadcasting by the requirement that it target a narrow special interest group. Commercial advertising is permitted, and in recent years LPON services have been becoming more like commercial broadcasting, which certainly was not the original intent.

Like the proposed LPFM service here in the U.S., low cost LPON licensing was introduced into Australia in 1993 as a way to encourage greater diversity of radio programming.

The Australian Communications Authority (ACA, Australia's telecommunications regulatory agency) says they have issued more than 1,500 LPON licenses within the past five years. But ten LPON licensees hold over 50% of the licenses! And nearly two-thirds of these licenses have never been used to provide a radio service.

There is now a view in the community that several of these large holders submitted numerous applications in an anti-competitive attempt to "lock up the market" and to prevent genuine applicants from broadcasting, or obtained them with a speculative profit motive. LPON licensees are permitted by law to either sell or lease their license to others.

The discussion paper (which is similar to the FCC's "Notice of Inquiry") outlines options to address alleged hoarding of LPON radio licenses. Options outlined in the paper include the possibility of requiring use of the license or losing it ...or increasing the cost of LPON license fees.

Another bold option being considered by the ACA is to replace individual LPON licenses with a license class which would permit any prospective LPON operator to transmit from any location, providing that the standard LPON technical conditions are met. This amounts to legitimizing unlicensed broadcasting. Another possibility being considered is to permit "class licensing" only outside of the major urban areas.

The ACA said "If hoarding is as widespread as alleged, the ACA will take firm action to eliminate the problem." The ACA's discussion paper is available on the ACA Website at **http://www.aca.gov.au/issues/index.htm**.

How to Use the Shortwave Guide

Convert your time to UTC.

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

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

Find the station you want to hear.

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

If a broadcast is not *daily*, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Day Codes

s	Sunday
m	Monday
t	Tuesday
w	Wednesday
h	Thursday
f	Friday
a	Saturday

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

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

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

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and *MT* readers to make the Shortwave Guide up-to-date as of one week before publication.

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

Target Areas

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

Consult the propagation charts.

To further help you find a strong signal, we've included a chart on page 60 which takes into account conditions affecting the audibility of shortwave broadcasts. Simply pick out the section of the chart for the region in which you live and find the line for the region in which the station you want to hear is located. The chart indicates the optimum frequencies (in megahertz-MHz) for a given time in UTC. (Users outside North America can use the same procedure in reverse to find best reception from North America.)

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. Our program manager changes the stations and programming featured each month to reflect the variety available on shortwave, though BBC programs are almost always included.

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 capital letter stands for a day of the week, using the same day codes as in the frequency listing (see above), and the four digits represent a time in UTC.

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

Mark Fine, VA
fineware@erols.com

Dan Roberts, CA

Program Highlights

Jim Frimmel, Programming manager

Indonesia

This late night program schedule is intended to complement this month's feature article about Indonesia.

Sundays

0800	News
0812	Sunday Special
0820	Instrumental Music
0830	Listener's Mailbag
0845	Indonesian Regional Music
0855	News in Brief

Mondays

0800	News
0812	Sports Highlights
0820	Instrumental Music
0830	All About Indonesia
0845	Indonesian Pop Songs
0855	News in Brief
0800	News

Tuesdays

0812	Press Comments
0820	Vocal Program
0830	Neighbors
0845	Keroncong Music
0855	News in Brief

Wednesdays

0800	News
0812	Press Comments
0820	Jazz Music
0830	Tourism
0845	Indonesian Melody
0855	News in Brief

Thursdays

0800	News
0812	Commentary
0820	Vocal Program
0830	Women's World
0845	Indonesian Folk Songs
0855	News in Brief

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Frequencies

0000-0100	Anguilla,Caribbean Beacon	6090am			
0000-0100 vl	Australia, ABC/Katherine	5025do			
0000-0100 vl	Australia, ABC/Tent Creek	4910do			
0000-0100	Australia, Radio	9660pa	12080va	15240pa	17580va
		17750as	17795va	21740va	
0000-0015	Cambodia, Natl Radio Of	11940as			
0000-0100	Canada, CBC N Quebec Svc	9625do			
0000-0100	Canada, CFRX Toronto	6070do			
0000-0100	Canada, CFVP Calgary	6030do			
0000-0100	Canada, CHNX Halifax	6130do			
0000-0100	Canada, CKZN St John's	6160do			
0000-0100	Canada, CKZU Vancouver	6160do			
0000-0100	Costa Rica,RF Peace Intl	6975am	15050am	21460am	
0000-0027	Czech Rep, R Prague Intl	11615na	13580na		
0000-0100	Ecuador, HCJB	9745na	12015na	21455va	
0000-0030	Egypt, Radio Cairo	9900am			
0000-0100 vl	Guatemala, Radio Cultural	3300do			
0000-0100	Guyana, GBC/Voice of	5950do			
0000-0045	India, All India Radio	7410as	9705as	9950as	11620as
		13625as			
0000-0015	Japan, Radio/NHK	6155eu	6180eu	9665af	11705na
		11815as	13650as		
0000-0100	Kiribati, Radio	9810do			
0000-0100	Liberia,LCN/R Liberia Int	5100do			
0000-0100	Malaysia, Radio	7295do			
0000-0100	Malaysia, RTM Sarawak	7160do			
0000-0100 vl	Malaysia,RTM KotaKinabalu	5980do			
0000-0100	Namibia, NBC	3270af	3289af		
0000-0100	Netherlands, Radio	6165na	9845na		
0000-0100	New Zealand, R NZ Intl	17675va			
0000-0100	North Korea, R Pyongyang	3560am	11845am	13650am	15230am
0000-0100 vl	Papua New Guinea, NBC	9675do			
0000-0100	Philippines, FEBC R Intl	15450as			
0000-0100	Russia, IBC Tamil	9355as			
0000-0030	Serbia, Radio Yugoslavia	9580eu	11850eu		
0000-0100	Singapore,RCorp Singapore	6150do			
0000-0100	Spain, R Exterior Espana	15385na			
0000-0030	Thailand, Radio	9655af	9690af	11905af	
0000-0030	UK, BBC World Service	3915as	7110as	11945as	17615as
0000-0100	UK, BBC World Service	5965as	5970sa	5975am	6175am
		6195as	9410as	9590am	9915sa
		11955as	12095sa	15310as	15360as
		17790as			
0000-0100 a	UK, Merlin Network One	6015eu	7325eu	9720eu	
0000-0100	Ukraine, R Ukraine Intl	5905eu	6020eu	6090eu	
0000-0100	USA, KAIJ Dallas TX	5810na			
0000-0100	USA, KJES Vado NM	7555na			
0000-0100	USA, KTBN Salt Lk City UT	15590am			
0000-0100 vl	USA, KVOH Los Angeles CA	17625am	17775al		
0000-0100	USA, KWHR Naalehu HI	17510as			
0000-0030	USA, Voice of America	7215as	9770as	11760as	15185as
		15290as	17735as	17820as	
0000-0100 twhfa	USA, Voice of America	5995am	6130ca	7405am	9455af
		9775am	11695ca	13740am	
0000-0100	USA, WBCQ Monticello ME	7415na			
0000-0100	USA, WEWN Birmingham AL	5825na	13615na		
0000-0100	USA, WGTG McCaysville GA	5085am	9400am		
0000-0100	USA, WHRA Greenbush ME	7580na			
0000-0100	USA, WHRI Noblesville IN	5745na	7315na		
0000-0100	USA, WINB Red Lion PA	11950am			
0000-0100	USA, WJCR Upton KY	7490na			
0000-0100	USA, WRMI/R Miami Intl	9955am			
0000-0100	USA, WRNO New Orleans LA	7355na			
0000-0100	USA, WSHB Cypress Crk SC	7535al	9430na	15285ca	
0000-0100	USA, WWCR Nashville TN	3215na	5070na	7435na	13845na
0000-0100	USA, WYFR Okeechobee FL	6085na	9505na		
0000-0030 vl	Vanuatu, Radio	4960do			
0015-0100	Japan, Radio/NHK	6155eu	6180eu	9665af	11705na
0030-0100	Austria, R Austria Intl	9655na	9870na		
0030-0100	Iran, VOIRI	9022am	9795ca	11970na	
0030-0000	Lithuania, Radio Vilnius	9855am			
0030-0100 vl	Solomon Islands, SIBC	5020do			
0030-0100	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
0030-0100	Thailand, Radio	9655as	11905as	15395na	
0050-0100	Italy, RAI Intl	9675na	11800na	15240na	

Selected Programs

Daily

0000 USA, VOA Washington DC: VOA News Now Preview.
0001 USA, VOA Washington DC: World News.
0006 USA, VOA Washington DC: World News in Depth.
0010 USA, VOA Washington DC: Regional News.
0014 USA, VOA Washington DC: U.S. News.
0018 USA, VOA Washington DC: Sports.
0022 USA, VOA Washington DC: U.S. Feature.
0028 USA, VOA Washington DC: Station Break.
0030 USA, VOA Washington DC: News (Special English).

Sundays

0007 Canada (North-Quebec): Finkleman's 45s. A trip down memory lane--the best of the golden oldies from the 50s, 60s and 70s with Danny Finkleman.
0010 USA, VOA Washington DC: Regional News.
0040 USA, VOA Washington DC: Words and their Stories (Special English).
0045 USA, VOA Washington DC: People in America (Special English).

Mondays

0000 Canada (North-Quebec): News. See S 0300.
0005 Canada (North-Quebec): Onstage. See S 0300.
0040 USA, VOA Washington DC: Development Report (Special English).
0045 USA, VOA Washington DC: This is America (Special English).

Tuesdays

0000 Canada (North-Quebec): News. See S 0300.
0005 Canada (North-Quebec): Native Language Program. See S 0007.
0040 USA, VOA Washington DC: Agriculture Report (Special English).
0045 USA, VOA Washington DC: Science in the News (Special English).

Wednesdays

0000 Canada (North-Quebec): News. See S 0300.
0005 Canada (North-Quebec): Native Language Program. See S 0007.
0040 USA, VOA Washington DC: Science Report (Special English).
0045 USA, VOA Washington DC: Exploration (Special English).

Thursdays

0000 Canada (North-Quebec): News. See S 0300.
0005 Canada (North-Quebec): Native Language Program. See S 0007.
0040 USA, VOA Washington DC: Science Report (Special English).
0045 USA, VOA Washington DC: The Making of a Nation (Special English).

Fridays

0000 Canada (North-Quebec): News. See S 0300.
0005 Canada (North-Quebec): Native Language Program. See S 0007.
0040 USA, VOA Washington DC: Environment Report (Special English).
0045 USA, VOA Washington DC: American Mosaic (Special English).

Saturdays

0000 Canada (North-Quebec): News. See S 0300.
0000 Merlin Network One: Global Sound Kitchen.
0005 Canada (North-Quebec): This Morning. David Enright and Avril Benoit co-host this CBC magazine program.
0040 USA, VOA Washington DC: In the News (Special English).
0045 USA, VOA Washington DC: American Stories (Special English).

Thank You...

Additional contributors to this month's Shortwave Guide:

Harold Frodge, Midland, MI; Glenn Hauser, Enid, OK/*World of Radio,DX Report, Review of Int'L Broadcasters,* Hans Johnson/Ulis Fleming/*Cumbre DX*; Al Quaglieri/*NASWA Journal;* Bob Padula, Victoria, Australia, *EDXP*; Giovanni Serra/*The Four Winds*; Clayton B. Sherman, Hoosick Falls, NY; BBCM; *BBC On-Air; British DX Club; DX Ontario; Gatflash!; Hard Core DX* ; *New Zealand DX Times; Nordic SW Center*; Radio Netherlands/*Media Network*; Radio Sweden/*Media Scan*; Usenet Newsgroups; *World Wide DX Club.*

Frequencies

0100-0200	Anguilla,Caribbean Beacon	6090am			
0100-0200 vl	Australia, ABC/Katherine	5025do			
0100-0200 vl	Australia, ABC/Tent Creek	4910do			
0100-0200	Australia, Radio	9660pa	12080va	15240pa	15415as
		17580va	17750as	17795va	21740va
0100-0200	Canada, CBC N Quebec Svc	9625do			
0100-0200	Canada, CFRX Toronto	6070do			
0100-0200	Canada, CFVP Calgary	6030do			
0100-0200	Canada, CHNX Halifax	6130do			
0100-0200	Canada, CKZN St John's	6160do			
0100-0200	Canada, CKZU Vancouver	6160do			
0100-0129	Canada, R Canada Intl	5960na	9535am	9755am	11715am
		13670am			
0100-0156	China, China Radio Intl	9570na			
0100-0200	Costa Rica,RF Peace Intl	6975am	15050am	21460am	
0100-0200	Cuba, Radio Havana	6000na	9820na	11705na	13605na
0100-0127	Czech Rep, R Prague Intl	7345na	11615na		
0100-0200	Ecuador, HCJB	9745na	12015na	21455va	
0100-0145	Germany, Deutsche Welle	6040na	9640am	11810na	13720am
0100-0200 s	Germany, Good News World	9855eu			
0100-0130 m	Germany, V O Deliverance	9855na			
0100-0200 vl	Guatemala, Radio Cultural	3300do			
0100-0200	Guyana, GBC/Voice of	5950do			
0100-0130	Hungary, Radio Budapest	9560na			
0100-0200	Indonesia, Voice of	9525va			
0100-0130	Iran, VOIRI	9022am	9795ca	11970na	
0100-0110	Italy, RAI Intl	9675na	11800na	15240na	
0100-0200	Japan, Radio/NHK	9660me	11860as	11870me	15570as
		15590as	17685pa	17835sa	21670pa
0100-0200	Kenya, Kenya BC Corp	4885do			
0100-0130	Kiribati, Radio	9810do			
0100-0200	Liberia,LCN/R Liberia Int	5100do			
0100-0200	Malaysia, Radio	7295do			
0100-0200 vl	Malaysia,RTM KotaKinabalu	5980do			
0100-0200	Namibia, NBC	3270af	3289af		
0100-0125	Netherlands, Radio	6165na	9845na		
0100-0200	New Zealand, R NZ Intl	17675va			
0100-0200 vl	Papua New Guinea, NBC	9675do			
0100-0200	Philippines, FEBC R Intl	15450as			
0100-0200	Russia,Voice of Russia WS	7180na	9665na	12050na	15520na
		15595na			
0100-0200	Singapore,RCorp Singapore	6150do			
0100-0130	Slovakia, R Slovakia Intl	5930na	7300ca	9440sa	
0100-0200 vl	Solomon Islands, SIBC	5020do			
0100-0200	Spain, R Exterior Espana	15385na			
0100-0200	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
0100-0130	Switzerland, Swiss R Intl	9885am	9905am		
0100-0200	UK, BBC World Service	5970sa	5975am	6175am	6185am
		6195as	9410as	9590am	9915sa
		11955as	12095sa	15280as	15310as
		15360as	17790as		
0100-0200	USA, KAIJ Dallas TX	5810na			
0100-0200	USA, KJES Vado NM	7555na			
0100-0200	USA, KTBN Salt Lk City UT	7510na			
0100-0200	USA, KWHR Naalehu HI	17510as			
0100-0200	USA, Voice of America	7115as	7200as	9635as	11705as
		11725as	11820as	15250as	17740as
		17820as			
0100-0130 twhfa	USA, Voice of America	5995am	6130am	7405am	9455af
		9775am	13740am		
0100-0200	USA, WBCQ Monticello ME	7415na			
0100-0200	USA, WEWN Birmingham AL	5825na	13615na		
0100-0200	USA, WGTG McCaysville GA	5085am	6890am		
0100-0200	USA, WHRA Greenbush ME	7580na			
0100-0200	USA, WHRI Noblesville IN	5745na	7315na		
0100-0200	USA, WINB Red Lion PA	11950am			
0100-0200	USA, WJCR Upton KY	7490na			
0100-0200	USA, WRMI/R Miami Intl	9955am			
0100-0200	USA, WRNO New Orleans LA	7355na			
0100-0200	USA, WSHB Cypress Crk SC	7535al	9430na	15285ca	
0100-0200	USA, WWCR Nashville TN	3215na	5070na	5935na	7435na
0100-0200	USA, WYFR Okeechobee FL	6065na	9505na	15165as	
0100-0130	Uzbekistan, R Tashkent	7190as	9375as	9530as	9715as
0100-0127	Vietnam, Voice of	7250va			
0105-0120	Croatia, Croatian Radio	9925na			
0115-0145 vl	Libya, Voice of Africa	15235va	15415va	15435va	
0129-0200	Canada, R Canada Intl	5960na	9755am		
0129-0200 sm	Canada, R Canada Intl	9535am	11715am	13670am	
0130-0200	Slovakia, AWR Europe	11660as			
0130-0200	Sweden, Radio	13625as			
0130-0200	UK, RTE Radio	6155eu			
0130-0200 twhfa	USA, Voice of America	5995am	6130am	9455af	
0140-0200	Vatican City, Vatican R	9650au	12055au		
0145-0200	Albania, R Tirana Intl	6115na	6120al	7160na	

Selected Programs

Daily

0100 Canada, RCI Montreal: RCI News. News, weather, and sports from Radio Canada International.
0100 USA, VOA Washington DC: VOA News Now Preview.
0101 USA, VOA Washington DC: World News.
0106 USA, VOA Washington DC: World News in Depth.
0114 USA, VOA Washington DC: U.S. News.
0118 USA, VOA Washington DC: Sports.
0128 USA, VOA Washington DC: Station Break.
0130 USA, VOA Washington DC: Preview.
0131 USA, VOA Washington DC: World News.
0158 USA, VOA Washington DC: Local Station Break.

Sundays

0100 Canada (North-Quebec): CBC Radio News. News, sports, and weather from the Canadian Broadcasting Corporation.
0107 Canada (North-Quebec): Finkleman's 45s. See S 0007.
0107 Canada, RCI Montreal: Venture Canada. David Blair presents this weekly magazine that promotes Canadian business ventures.
0122 USA, VOA Washington DC: U.S. Feature.
0131 Canada, RCI Montreal: Earth Watch. The magazine on environment, science and ecology matters.
0136 USA, VOA Washington DC: Issues in the News.

Monday-Friday

0136 USA, VOA Washington DC: Dateline.
0145 USA, VOA Washington DC: Science/Medicine/Environment.
0149 USA, VOA Washington DC: Business and Economic News.
0153 USA, VOA Washington DC: Women's Business Minute.
0154 USA, VOA Washington DC: Feature.

Mondays

0100 Canada (North-Quebec): Onstage. See S 0300.
0107 Canada, RCI Montreal: The Arts in Canada. See S 0506.
0131 Canada, RCI Montreal: The Mailbag. See S 1336.

Tuesday-Saturday

0110 USA, VOA Washington DC: Regional News.
0130 USA, VOA Washington DC: News (Special English).
0155 Canada, RCI Montreal: News. News from either the Canadian Broadcasting Corporation (CBC) or Radio Canada International (RCI).

Tuesdays

0111 Canada, RCI Montreal: Spectrum. See M 1340.
0140 USA, VOA Washington DC: Agriculture Report (Special English).
0145 USA, VOA Washington DC: Science in the News (Special English).

Wednesdays

0111 Canada, RCI Montreal: Spectrum. See M 1340.
0140 USA, VOA Washington DC: Science Report (Special English).
0145 USA, VOA Washington DC: Exploration (Special English).

Thursdays

0111 Canada, RCI Montreal: Spectrum. See M 1340.
0140 USA, VOA Washington DC: Science Report (Special English).
0145 USA, VOA Washington DC: The Making of a Nation (Special English).

Fridays

0111 Canada, RCI Montreal: Spectrum. See M 1340.
0140 USA, VOA Washington DC: Environment Report (Special English).
0145 USA, VOA Washington DC: American Mosaic (Special English).

Saturdays

0111 Canada, RCI Montreal: Spectrum. See M 1340.
0122 USA, VOA Washington DC: U.S. Feature.
0136 USA, VOA Washington DC: Communications World (A).
0140 USA, VOA Washington DC: In the News (Special English).
0145 USA, VOA Washington DC: American Stories (Special English).
0145 USA, VOA Washington DC: Science/Medicine/Environment.
0149 USA, VOA Washington DC: Business News.
0153 USA, VOA Washington DC: Feature.

"As a shortwave broadcast aficionado, I eagerly await Monitoring Times each month and put red asterisks next to those shortwave broadcast stations I hope to log and eventually send reception reports to.

- Ronald Stokes Schwartz, Madison, WI

Frequencies

0200-0300	Anguilla,Caribbean Beacon	6090am			
0200-0300 twhfa	Argentina, RAE	11710am			
0200-0300 vl	Australia, ABC/Katherine	5025do			
0200-0300 vl	Australia, ABC/Tent Creek	4910do			
0200-0300	Australia, Radio	9660pa	12080va	15240pa	15415as
		15515va	17580va	17750as	21725pa
0200-0210	Bangladesh, Bangla Betar	4880as			
0200-0230 smwfa	Belarus, R Minsk	7210eu	11670eu		
0200-0300	Bulgaria, Radio	9400na	11700na		
0200-0300	Canada, CBC N Quebec Svc	9625do			
0200-0300	Canada, CFRX Toronto	6070do			
0200-0300	Canada, CFVP Calgary	6030do			
0200-0300	Canada, CHNX Halifax	6130do			
0200-0300	Canada, CKZN St John's	6160do			
0200-0300	Canada, CKZU Vancouver	6160do			
0200-0229	Canada, R Canada Intl	9535am	9755am	11715am	13670am
		15305am			
0200-0300	Costa Rica,RF Peace Intl	6975am	15050am	21460am	
0200-0205 vl	Croatia, Croatian Radio	9925na			
0200-0300	Cuba, Radio Havana	6000na	9820na	11705na	13605na
0200-0300	Ecuador, HCJB	9745na	12015na	21455va	
0200-0300	Egypt, Radio Cairo	9475na			
0200-0245	Germany, Deutsche Welle	9615as	9690as	11945as	11965as
		13690as	15560as		
0200-0300	Germany,Overcomer Ministr	9860na			
0200-0300	Guyana, GBC/Voice of	5950do			
0200-0300 irreg	Iraq, Radio Iraq Intl	11785am			
0200-0300	Kenya, Kenya BC Corp	4935do			
0200-0300	Malaysia, Radio	7295do			
0200-0230	Myanmar, Radio	7185do			
0200-0300	Namibia, NBC	3270af	3289af		
0200-0300	New Zealand, R NZ Intl	17675va			
0200-0300 vl	Papua New Guinea, NBC	9675do			
0200-0256	Romania, R Romania Intl	9510na	9570na	11725au	11740na
		11810as	17735as		
0200-0300	Russia,Voice of Russia WS	7180na	9665na	12020na	15520na
		15595na			
0200-0300	Singapore,RCorp Singapore	6150do			
0200-0300 vl	Solomon Islands, SIBC	5020do			
0200-0300	South Korea, R Korea Intl	7275as	11725sa	11810sa	15575na
0200-0300	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
0200-0300	Taiwan, Radio Taipei Intl	5950na	9680na	11740na	11745va
		11825pa	15345as		
0200-0300	UK, BBC World Service	5970sa	5975am	6175am	6185am
		6195eu	9410me	9770af	9915sa
		11955as	15280as	15310as	15360as
		17790as			
0200-0300	USA, KAIJ Dallas TX	5810na			
0200-0230	USA, KJES Vado NM	7555na			
0200-0300	USA, KTBN Salt Lk City UT	7510na			
0200-0300 vl	USA, KVOH Los Angeles CA	9975am			
0200-0300	USA, KWHR Naalehu HI	17510as			
0200-0300	USA, Voice of America	4960af	7115as	7200as	9635as
		11705as	11725as	11820as	15250as
		17740as	17820as		
0200-0300	USA, WBCQ Monticello ME	7415na			
0200-0300	USA, WEWN Birmingham AL	5825va			
0200-0300	USA, WGTG McCaysville GA	5085am	6890am		
0200-0300	USA, WHRA Greenbush ME	7580na			
0200-0300	USA, WHRI Noblesville IN	5745na	7315sa		
0200-0300	USA, WINB Red Lion PA	11950am			
0200-0300	USA, WJCR Upton KY	7490na			
0200-0300	USA, WRMI/R Miami Intl	9955am			
0200-0300	USA, WRNO New Orleans LA	7355na			
0200-0300	USA, WSHB Cypress Crk SC	5850al	7535na	9430na	
0200-0300	USA, WWCR Nashville TN	3215na	5070na	5935na	7435na
0200-0300	USA, WYFR Okeechobee FL	6065na	9505na		
0210-0215 thfa/vl	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
0215-0220	Nepal, Radio	5005as	7165as		
0229-0300 sm	Canada, R Canada Intl	9535am	9755am	11715am	13670am
0230-0300	Albania, R Tirana Intl	6115na	6120al	7160na	
0230-0300	Austria, R Austria Intl	9655na	9870ca	13730na	
0230-0300	Hungary, Radio Budapest	9840na			
0230-0245	Pakistan, Radio	9640as	11930as	15455as	15485as
		17660as	17895as		
0230-0300 vl	Philippines, R Pilipinas	11885as	15120as	15270as	
0230-0300	Sweden, Radio	9495na			
0230-0257	Vietnam, Voice of	7250va			
0250-0300	Vatican City, Vatican R	7305am	9605am		

Selected Programs

Daily

0200 Bulgaria, Radio: News. Ten or fifteen minutes of world and Bulgarian news.
0200 Canada, RCI Montreal: CBC Radio News. News, sports, and weather from the Canadian Broadcasting Corporation.
0200 USA, VOA Washington DC: VOA News Now Preview.
0201 USA, VOA Washington DC: World News.
0206 USA, VOA Washington DC: World News in Depth.
0210 USA, VOA Washington DC: Regional News.
0214 USA, VOA Washington DC: U.S. News.
0218 USA, VOA Washington DC: Sports.
0228 USA, VOA Washington DC: Station Break.
0230 USA, VOA Washington DC: Preview.
0245 USA, VOA Washington DC: Science/Medicine/Environment.
0249 USA, VOA Washington DC: Business and Economic News.
0258 USA, VOA Washington DC: Station Break.

Sundays

0206 Canada, RCI Montreal: The Vinyl Cafe. Host Stuart McLean with gossip and music from the neighborhood music store or with a live concert from around Canada.
0210 Bulgaria, Radio: News Behind the News. Background to specific items of current affairs.
0222 USA, VOA Washington DC: U.S. Feature.
0225 Bulgaria, Radio: Keyword Bulgaria. Interesting facts about things Bulgarian.
0230 Canada (North-Quebec): That Time of the Night. See S 1311.
0231 USA, VOA Washington DC: World News.
0235 Bulgaria, Radio: Timeout for Music. A wide variety of Bulgarian classical, pop and folk music is played.
0236 USA, VOA Washington DC: Encounter.
0245 Bulgaria, Radio: Radio Bulgaria Calling. A fifteen-minute program for shortwave listeners.
0253 USA, VOA Washington DC: Features.

Mondays

0200 Canada (North-Quebec): News/Sports. See S 0300.
0204 Canada, RCI Montreal: Tapestry. A look at the broad range of spiritual and human issues facing people of various cultures and religions.
0205 Canada (North-Quebec): Sunday Showcase. See S 1311.
0210 Bulgaria, Radio: Folk Studio. Myths, legends, customs, and rituals associated with Bulgarian holidays.
0225 Bulgaria, Radio: Plaza Bulgaria. See S 1130.

Tuesday-Saturday

0200 Canada (North-Quebec): News/Sports. See S 0300.
0210 Bulgaria, Radio: Events and Development. See M 2310.
0211 Canada, RCI Montreal: Spectrum. See M 1340.
0215 Canada (North-Quebec): Between the Covers. Dramatized book readings.
0231 USA, VOA Washington DC: World News in Depth.
0253 USA, VOA Washington DC: Music Feature.

Tuesdays

0240 Bulgaria, Radio: Keyword Bulgaria. See S 0225.

Wednesdays

0215 Canada (North-Quebec): Between the Covers. See T 0215.
0225 Bulgaria, Radio: Art and Artists. See T 2325.
0230 Bulgaria, Radio: Timeout for Music. See S 0235.
0241 Bulgaria, Radio: Keyword Bulgaria. See S 0225.

Thursdays

0215 Canada (North-Quebec): Between the Covers. See T 0215.
0225 Bulgaria, Radio: Timeout for Music. See S 0235.
0243 Bulgaria, Radio: Keyword Bulgaria. See S 0225.

Fridays

0215 Canada (North-Quebec): Between the Covers. See T 0215.
0225 Bulgaria, Radio: History Club. True stories about the Ottoman Empire period.
0233 Bulgaria, Radio: Timeout for Music. See S 0235.
0244 Bulgaria, Radio: Keyword Bulgaria. See S 0225.

Saturdays

0215 Canada (North-Quebec): Between the Covers. See T 0215.
0222 USA, VOA Washington DC: U.S. Feature.
0225 Bulgaria, Radio: The Way We Live. See H 2325.
0230 USA, VOA Washington DC: World News.
0235 Bulgaria, Radio: Timeout for Music. See S 0235.
0236 USA, VOA Washington DC: Press Conference USA.
0245 Bulgaria, Radio: Radio Bulgaria Calling. See S 0245.

WINB: Red Lion, PA

Freq Sked effective 8-22-99:

UTC	Freq
0000-0500:	11950
1600-2100:	13800
2100-0000:	13790

via Jim Frimmel

Frequencies

0300-0400	Anguilla,Caribbean Beacon	6090am			
0300-0400 vl	Australia, ABC/Katherine	5025do			
0300-0400 vl	Australia, ABC/Tent Creek	4910do			
0300-0400	Australia, Radio	9660pa	12080as	15240pa	15415as
		15515va	17580va	17750as	21725pa
0300-0400 vl	Botswana, Radio	4820do	7255do		
0300-0400	Canada, CBC N Quebec Svc	9625do			
0300-0400	Canada, CFRX Toronto	6070do			
0300-0400	Canada, CFVP Calgary	6030do			
0300-0400	Canada, CHNX Halifax	6130do			
0300-0400	Canada, CKZN St John's	6160do			
0300-0400	Canada, CKZU Vancouver	6160do			
0300-0356	China, China Radio Intl	9690na	11765na		
0300-0400	Costa Rica,RF Peace Intl	6975am	15050am		
0300-0400	Cuba, Radio Havana	6000na	9820na	11705na	13605na
0300-0327	Czech Rep, R Prague Intl	7345na	9955na	11615na	
0300-0400	Ecuador, HCJB	9745na	12015na	21455va	
0300-0330	Egypt, Radio Cairo	9475am			
0300-0345	Germany, Deutsche Welle	9535na	9640na	11810na	13780am
		15105na			
0300-0310	Greece, Voice of	7450na	9420na	11645na	12105na
0300-0400 vl	Guatemala, Radio Cultural	3300do			
0300-0400	Guyana, GBC/Voice of	5950do			
0300-0400	Japan, Radio/NHK	17825ca	21610pa		
0300-0400	Kenya, Kenya BC Corp	4885do	4935do		
0300-0400 vl	Lesotho, Radio	4800do			
0300-0400	Malaysia, Radio	7295do			
0300-0330 stwhfa	Mexico, Radio Mexico Intl	9705am			
0300-0325	Moldova, R Moldova Intl	7520am			
0300-0400	Namibia, NBC	3270af	3289af		
0300-0400	New Zealand, R NZ Intl	17675va			
0300-0330	Pakistan, Radio	6070do			
0300-0400 vl	Papua New Guinea, NBC	9675do			
0300-0330 vl	Philippines, R Pilipinas	11885as	15120as	15270as	
0300-0400	Russia,Voice of Russia WS	7125na	7180na	9665na	12050na
		15425na	15455na	15465na	15495na
		15595na	17565na	17630na	17660na
		17690na			
0300-0330	S Africa, AWR Africa	6015af			
0300-0330	S Africa, Channel Africa	6035af			
0300-0400	Singapore,RCorp Singapore	6150do			
0300-0400	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
0300-0400	Taiwan, Radio Taipei Intl	5950na	9680na	11745as	11825as
		15345as			
0300-0330	Thailand, Radio	9655am	11905am	15395na	
0300-0400	Turkey, Voice of	7270va	11655va	21715va	
0300-0400	Uganda, Radio	4976do			
0300-0400	UK, BBC World Service	3255af	5975am	6005af	6175am
		6185am	6190af	7160af	9410eu
		11760me	11765af	11955as	12095af
		15280as	15310as	15420af	17760as
		17790as	21660as		
0300-0400	Ukraine, R Ukraine Intl	6020eu	9620na		
0300-0400	USA, KAIJ Dallas TX	5810na			
0300-0400	USA, KTBN Salt Lk City UT	7510na			
0300-0400 vl	USA, KVOH Los Angeles CA	9975am			
0300-0400	USA, KWHR Naalehu HI	17510as			
0300-0330 smtwh	USA, Voice of America	4960af			
0300-0400	USA, Voice of America	6080af	6115af	7105af	7275af
		7290af	9575af	9885af	
0300-0400	USA, WBCQ Monticello ME	7415na			
0300-0400	USA, WEWN Birmingham AL	5825va			
0300-0400	USA, WGTG McCaysville GA	5085am	6890am		
0300-0400	USA, WHRA Greenbush ME	7580na			
0300-0400	USA, WHRI Noblesville IN	5745na	7315sa		
0300-0400	USA, WINB Red Lion PA	11950am			
0300-0400	USA, WJCR Upton KY	7490na			
0300-0330	USA, WRMI/R Miami Intl	7465am			
0300-0400	USA, WRNO New Orleans LA	7395na			
0300-0400	USA, WWCR Nashville TN	3215na	5070na	5935na	7435na
0300-0400	USA, WYFR Okeechobee FL	6065na	9505na		
0300-0310	Vatican City, Vatican R	7305am	9605am		
0300-0400	Zambia, Natl BC Corp	6165do	6265do		
0300-0400 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
0305-0320	Croatia, Croatian Radio	9925na			
0305-0320 mtwhfa	UK, BBC World Service	15360as			
0310-0340	Vatican City, Vatican R	9660af			
0330-0357	Czech Rep, R Prague Intl	11600as	15530as		
0330-0350 vl	Libya, Voice of Africa	15235va	15415va	15435va	
0330-0400 vl	Philippines, R Pilipinas	13770as	15330as	17730as	
0330-0400	Sweden, Radio	9495na	12060na		
0330-0400	Tanzania, Radio	5050af			
0330-0400	UAE, Radio Dubai	12005na	13675na	15400na	
0330-0400	USA, WRMI/R Miami Intl	7465am			
0330-0357	Vietnam, Voice of	9830va			
0345-0400	Tajikistan, Radio	7245as	9905as	11620as	
0359-0400	Zambia, Christian Voice	6065do			

Selected Programs

Sundays

0300 Canada (North-Quebec): News. News from either the Canadian Broadcasting Corporation (CBC) or Radio Canada International (RCI).
0300 USA, VOA Washington DC: VOA News Now Preview.
0301 USA, VOA Washington DC: World News.
0306 USA, VOA Washington DC: World News in Depth.
0308 Canada (North-Quebec): Sound of the Blues. See S 1208.
0310 USA, VOA Washington DC: Regional News.
0314 USA, VOA Washington DC: U.S. News.
0318 USA, VOA Washington DC: Sports.
0322 USA, VOA Washington DC: U.S. Feature.
0328 USA, VOA Washington DC: Station Break.

Monday-Friday

0300 Canada (North-Quebec): News. News from either the Canadian Broadcasting Corporation (CBC) or Radio Canada International (RCI).
0300 USA, VOA Washington DC: Daybreak Africa.
0330 USA, VOA Washington DC: Preview.
0331 USA, VOA Washington DC: World News.
0336 USA, VOA Washington DC: Dateline.
0345 USA, VOA Washington DC: Science/Medicine/Environment.
0349 USA, VOA Washington DC: Business and Economic News.
0353 USA, VOA Washington DC: Women's Business Minute.
0354 USA, VOA Washington DC: Feature.
0358 USA, VOA Washington DC: Local Station Break.

Mondays

0305 Canada (North-Quebec): Jazz Beat. See S 0007.

Tuesdays

0305 Canada (North-Quebec): That Time of the Night. See S 1311.

Wednesdays

0305 Canada (North-Quebec): That Time of the Night. See S 1311.

Thursdays

0305 Canada (North-Quebec): That Time of the Night. See S 1311.

Fridays

0305 Canada (North-Quebec): That Time of the Night. See S 1311.

Saturdays

0300 Canada (North-Quebec): News. News from either the Canadian Broadcasting Corporation (CBC) or Radio Canada International (RCI).
0305 Canada (North-Quebec): Music Program. See S 0007.
0336 USA, VOA Washington DC: Communications World (B).
0345 USA, VOA Washington DC: Science/Medicine/Environment.
0349 USA, VOA Washington DC: Business News.
0353 USA, VOA Washington DC: Feature.
0358 USA, VOA Washington DC: Station Break.

Program Highlights

Continued from page 40

Fridays

0800	News
0812	Talk on Economy
0820	Music Miscellany
0834	My Country, My People
0843	Indonesian Vocalists
0855	News in Brief

Saturdays

0800	News
0812	Press Comments
0820	Music for Millions
0830	The Week in Review
0845	Keroncong Music
0855	News in Brief

Frequencies

0400-0500	Anguilla,Caribbean Beacon	6090am			
0400-0430	Armenia, Voice of	4810va			
0400-0500 vl	Australia, ABC/Katherine	5025do			
0400-0500 vl	Australia, ABC/Tent Creek	4910do			
0400-0500	Australia, Radio	9660pa	12080va	15240pa	15415as
		15515va	17580va	17750as	21725pa
0400-0426	Belgium,R Vlaanderen Intl	11840na	15565na		
0400-0500 vl	Botswana, Radio	4820do	7255do		
0400-0500	Canada, CBC N Quebec Svc	9625do			
0400-0500	Canada, CFRX Toronto	6070do			
0400-0500	Canada, CFVP Calgary	6030do			
0400-0500	Canada, CHNX Halifax	6130do			
0400-0500	Canada, CKZN St John's	6160do			
0400-0500	Canada, CKZU Vancouver	6160do			
0400-0430	Canada, R Canada Intl	11835me	11975me	15215me	
0400-0457	China, China Radio Intl	9560na	9720na		
0400-0500	Costa Rica,RF Peace Intl	6975am	15050am		
0400-0500	Cuba, Radio Havana	6000na	9820na	11705na	
0400-0500	Ecuador, HCJB	9745na	12015na	21455va	
0400-0445	Germany, Deutsche Welle	7225af	9565af	9765af	11785af
		13690af			
0400-0500	Guyana, GBC/Voice of	5950do			
0400-0500	Kenya, Kenya BC Corp	4885do	4935do		
0400-0500 vl	Lesotho, Radio	4800do			
0400-0410 vl/m-f	Malawi, MBC	5993do			
0400-0500	Malaysia, Radio	7295do			
0400-0430 twhfa	Mexico, Radio Mexico Intl	9705am			
0400-0425	Moldova, R Moldova Intl	7520am			
0400-0500	Namibia, NBC	3270af	3289af		
0400-0500	New Zealand, R NZ Intl	17675va			
0400-0500 vl	Papua New Guinea, NBC	9675do			
0400-0456	Romania, R Romania Intl	9570na	11740na	11810as	17735as
0400-0500	Russia,Voice of Russia WS	7125na	9665na	12050na	15425na
		15455na	15465na	15495na	15595na
		17565na	17630na	17660na	17690na
0400-0430	S Africa, Channel Africa	5955af			
0400-0500	Singapore,RCorp Singapore	6150do			
0400-0430	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
0400-0430	Switzerland, Swiss R Intl	9885am	9905am	13635eu	
0400-0430	Tanzania, Radio	5050af			
0400-0500	Uganda, Radio	4976do			
0400-0500	UK, BBC World Service	3255af	3955eu	5975am	6005af
		6175am	6185am	6190af	6195eu
		7160af	9410eu	11760me	11765af
		11955as	15280as	15310as	15420af
		15575as	17640as	17760as	17790as
		21660as			
0400-0500	USA, KAIJ Dallas TX	5810na			
0400-0500	USA, KTBN Salt Lk City UT	7510na			
0400-0500 vl	USA, KVOH Los Angeles CA	9975am			
0400-0500	USA, KWHR Naalehu HI	17780as			
0400-0500	USA, Voice of America	6080af	7170va	7265af	7275af
		7290af	9575af	9885af	11965me
		15205va			
0400-0500	USA, WBCQ Monticello ME	7415na			
0400-0500	USA, WEWN Birmingham AL	5825va			
0400-0500	USA, WGTG McCaysville GA	5085am	6890am		
0400-0500	USA, WHRA Greenbush ME	7580na			
0400-0500	USA, WHRI Noblesville IN	5745na	7315sa		
0400-0500	USA, WINB Red Lion PA	11950am			
0400-0500	USA, WJCR Upton KY	7490na			
0400-0500 stwhfa	USA, WRMI/R Miami Intl	7465am			
0400-0500 m	USA, WRMI/R Miami Intl	9955am			
0400-0500	USA, WRNO New Orleans LA	7395na			
0400-0500	USA, WSHB Cypress Crk SC	7535eu	15195af		
0400-0405	USA, WWCR Nashville TN	2390na	5935na	7435na	
0400-0405 mtwhf	USA, WWCR Nashville TN	3215na			
0400-0405 as	USA, WWCR Nashville TN	3210na			
0400-0445	USA, WYFR Okeechobee FL	6065na	9505na		
0400-0500	Zambia, Christian Voice	6065do			
0400-0500	Zambia, Natl BC Corp	6165do	6265do		
0400-0500 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
0405-0420	Croatia, Croatian Radio	9925na			
0405-0500	USA, WWCR Nashville TN	2310na	3210na	5070na	5935na
0415-0440	Italy, RAI Intl	5975af	7150af		
0430-0500	Austria, R Austria Intl	6015am	6155na	13730na	
0430-0500 a	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
0430-0500	Netherlands, Radio	6165na	9590na		
0430-0500 vl	Nigeria, Radio/Ibadan	6050do			
0430-0500 vl	Nigeria, Radio/Kaduna	4770do			
0430-0500	Nigeria, Radio/Lagos	3326do			
0430-0500	Serbia, Radio Yugoslavia	9580eu	11850eu		
0430-0500	Swaziland, Trans World R	3200af	4775af		
0430-0500	Switzerland, Swiss R Intl	9885am	9905am		
0445-0500	USA, WYFR Okeechobee FL	9985eu			
0455-0500	Malaysia, Voice of	6175as	9750as	15295as	
0455-0500	Nigeria, Voice of	7255af	15120va		

Selected Programs

Daily

0400 Canada (North-Quebec): News/Sports. See S 0300.
0400 Canada, RCI Montreal: RCI News. See S 0100.
0400 USA, VOA Washington DC: VOA News Now Preview.
0401 USA, VOA Washington DC: World News.
0406 USA, VOA Washington DC: World News in Depth.
0410 USA, VOA Washington DC: Regional News.
0418 USA, VOA Washington DC: Sports.
0458 USA, VOA Washington DC: Local Station Break.

Sundays

0405 Canada, RCI Montreal: Venture Canada. See S 0107.
0408 Canada (North-Quebec): Sound of the Blues. See S 1208.
0414 USA, VOA Washington DC: U.S. News.
0422 USA, VOA Washington DC: U.S. Feature.
0428 USA, VOA Washington DC: Station Break.
0430 USA, VOA Washington DC: Preview.
0431 USA, VOA Washington DC: World News.
0436 USA, VOA Washington DC: Encounter.
0445 USA, VOA Washington DC: Science/Medicine/Environment.
0449 USA, VOA Washington DC: Business News.
0453 USA, VOA Washington DC: Features.

Monday-Friday

0414 USA, VOA Washington DC: U.S. News.
0428 USA, VOA Washington DC: Station Break.
0430 USA, VOA Washington DC: Preview.
0431 USA, VOA Washington DC: World News in Depth.
0445 USA, VOA Washington DC: Science/Medicine/Environment.
0449 USA, VOA Washington DC: Business and Economic News.
0453 USA, VOA Washington DC: Music Feature.

Mondays

0405 Canada (North-Quebec): Jazz Beat. See S 0007.
0407 Canada, RCI Montreal: The Mailbag. See S 1336.

Tuesdays

0407 Canada (North-Quebec): That Time of the Night. See S 1311.
0411 Canada, RCI Montreal: Spectrum. See M 1340.

Wednesdays

0407 Canada (North-Quebec): That Time of the Night. See S 1311.
0411 Canada, RCI Montreal: Spectrum. See M 1340.

Thursdays

0407 Canada (North-Quebec): That Time of the Night. See S 1311.
0411 Canada, RCI Montreal: Spectrum. See M 1340.

Fridays

0407 Canada (North-Quebec): That Time of the Night. See S 1311.
0411 Canada, RCI Montreal: Spectrum. See M 1340.

Saturdays

0407 Canada (North-Quebec): That Time of the Night. See S 1311.
0411 Canada, RCI Montreal: Spectrum. See M 1340.
0414 USA, VOA Washington DC: U.S. News.
0422 USA, VOA Washington DC: U.S. Feature.
0428 USA, VOA Washington DC: Station Break.
0430 USA, VOA Washington DC: World News.
0436 USA, VOA Washington DC: Press Conference USA.

Frequencies

0500-0600	Anguilla,Caribbean Beacon	6090am			
0500-0600 vl	Australia, ABC/Katherine	5025do			
0500-0600 vl	Australia, ABC/Tent Creek	4910do			
0500-0600	Australia, Radio	9660pa	12080va	15240pa	15515va
		17580va	21725pa		
0500-0600 as	Australia, Radio	17750as			
0500-0600 vl	Botswana, Radio	4820do	7255do		
0500-0600	Canada, CBC N Quebec Svc	9625do			
0500-0600	Canada, CFRX Toronto	6070do			
0500-0600	Canada, CFVP Calgary	6030do			
0500-0600	Canada, CHNX Halifax	6130do			
0500-0600	Canada, CKZN St John's	6160do			
0500-0600	Canada, CKZU Vancouver	6160do			
0500-0529	Canada, R Canada Intl	5995na	6145eu	7295eu	9595eu
		9755na	11710eu	11830na	13755eu
		15330eu	15400eu		
0500-0600	Costa Rica,RF Peace Intl	6975am	15050am		
0500-0600	Cuba, Radio Havana	9550na	9820na	9830na	
0500-0600	Ecuador, HCJB	9745na	12015na	21455va	
0500-0545	Germany, Deutsche Welle	9615am	9670na	11795na	11810na
0500-0600	Guyana, GBC/Voice of	5950do			
0500-0515	Israel, Kol Israel	9435va	11605va	17535au	
0500-0600 as/vl	Italy, IRRS	3985va			
0500-0600	Japan, Radio/NHK	6110na	7230eu	11715as	11760as
		11840as	11850pa	15230pa	15590as
		17825na			
0500-0600	Kenya, Kenya BC Corp	4885do	4935do		
0500-0600 vl	Lesotho, Radio	4800do			
0500-0600	Liberia,LCN/R Liberia Int	5100do			
0500-0510 vl/m-f	Malawi, MBC	5993do			
0500-0600	Malaysia, Radio	7295do			
0500-0600	Malaysia, RTM Sarawak	7160do			
0500-0600	Malaysia, Voice of	6175as	9750as	15295as	
0500-0525	Netherlands, Radio	6165na	9590na		
0500-0600	New Zealand, R NZ Intl	17675va			
0500-0600 vl	Nigeria, Radio/Ibadan	6050do			
0500-0600 vl	Nigeria, Radio/Kaduna	4770do			
0500-0600	Nigeria, Radio/Lagos	3326do			
0500-0600	Nigeria, Voice of	7255af	15120va		
0500-0600	North Korea, R Pyongyang	11710eu	13790as		
0500-0504	Pakistan, Radio	9645do			
0500-0600 vl	Papua New Guinea, NBC	9675do			
0500-0600	Russia,Voice of Russia WS	17625au	21790au		
0500-0530	S Africa, AWR Africa	5960af			
0500-0530	S Africa, Channel Africa	11720af			
0500-0600	Singapore,RCorp Singapore	6150do			
0500-0600 vl	Solomon Islands, SIBC	5020do			
0500-0556	Spain, R Exterior Espana	6055na			
0500-0505	Swaziland, Trans World R	3200af	4775af		
0500-0600	Uganda, Radio	4976do			
0500-0600	UK, BBC World Service	3255af	3955eu	5975am	6005af
		6175am	6180eu	6190af	6195eu
		7160af	9410eu	9740as	11760me
		11765af	11955pa	12095pa	15280as
		15310as	15360as	15420af	15575as
		17640af	17760as	17790as	17885af
		21660as			
0500-0600	USA, KAIJ Dallas TX	5810na			
0500-0600	USA, KTBN Salt Lk City UT	7510na			
0500-0600	USA, KWHR Naalehu HI	17780as			
0500-0600	USA, Voice of America	5970af	6035af	6080af	7170af
		7195af	9630af	11965me	12080af
		15205va			
0500-0600	USA, WBCQ Monticello ME	7415na			
0500-0600	USA, WEWN Birmingham AL	5825va			
0500-0600	USA, WGTG McCaysville GA	5085am	6890am		
0500-0600	USA, WHRA Greenbush ME	11565af			
0500-0600	USA, WHRI Noblesville IN	5745na	7315sa		
0500-0600	USA, WINB Red Lion PA	11950am			
0500-0600	USA, WJCR Upton KY	7490na			
0500-0600	USA, WRNO New Orleans LA	7395na			
0500-0600	USA, WSHB Cypress Crk SC	7535eu	9840af		
0500-0600	USA, WWCR Nashville TN	2390na	3210na	5070na	5935na
0500-0600	USA, WYFR Okeechobee FL	5985na	9985eu	11580eu	
0500-0520	Vatican City, Vatican R	4005eu	5883eu	7250eu	9660af
		11625af	15570af		
0500-0600	Zambia, Christian Voice	6065do			
0500-0600	Zambia, Natl BC Corp	6165do	6265do		
0500-0530 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
0505-0518	Croatia, Croatian Radio	9470va	13820au		
0505-0600 mtwhf	Swaziland, Trans World R	4775af	6100af	9500af	
0520-0530	Vatican City, Vatican R	9660af	11625af	15570af	
0525-0600	Ghana, Ghana BC Corp	3366do	4915do		
0530-0600	Austria, R Austria Intl	6015na			
0530-0600	Georgia, Georgian Radio	11805eu			
0530-0600	Kiribati, Radio	9810do			
0530-0600 mtwhfa	Malta, VO Mediterranean	7155eu			
0530-0600	Switzerland, Swiss R Intl	13635eu			
0530-0600	Thailand, Radio	9655eu	11905eu	15445eu	
0530-0600	UAE, Radio Dubai	15435au	17830au	21700au	
0530-0600 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		

Selected Programs

Daily

0500 Canada (North-Quebec): News. See S 0300.
0500 Canada, RCI Montreal: RCI News. See S 0100.
0500 Germany, Deutsche Welle: News. World news from Deutsche Welle.
0500 USA, VOA Washington DC: VOA News Now Preview.
0501 USA, VOA Washington DC: World News.
0506 USA, VOA Washington DC: World News in Depth.
0510 USA, VOA Washington DC: Regional News.
0514 USA, VOA Washington DC: U.S. News.
0518 USA, VOA Washington DC: Sports.
0528 USA, VOA Washington DC: Station Break.
0530 USA, VOA Washington DC: Preview.
0531 USA, VOA Washington DC: World News.
0558 USA, VOA Washington DC: Local Station Break.

Sundays

0506 Germany, Deutsche Welle: Weekend Review I. A Saturday update of current events and sports in Germany.
0506 Canada, RCI Montreal: The Arts in Canada. David Blair takes a look at Canadian cultural events taking place across the country and around the world.
0515 Germany, Deutsche Welle: Marks and Markets. Germany's role in world trade.
0522 USA, VOA Washington DC: U.S. Feature.
0536 USA, VOA Washington DC: Issues in the News.

Monday-Friday

0510 Canada, RCI Montreal: First Edition. Wojtek Gwiazda provides best way for listeners in Europe, Africa and the Middle East to get updated on the previous day's news and what's happening in Canada.
0536 USA, VOA Washington DC: Dateline.
0545 USA, VOA Washington DC: Science/Medicine/Environment.
0549 USA, VOA Washington DC: Business and Economic News.
0553 USA, VOA Washington DC: Women's Business Minute.
0554 USA, VOA Washington DC: Feature.

Mondays

0506 Germany, Deutsche Welle: Mailbag North America (4/5). Listener mail from the Americas is answered.
0506 Germany, Deutsche Welle: Religion and Society. News and developments concerning the world's major religions.
0515 Germany, Deutsche Welle: COOL. NEW! A youth Magazine.

Tuesdays

0506 Germany, Deutsche Welle: NewsLink. Global current affairs as seen from the heart of Europe.
0530 Germany, Deutsche Welle: Man and Environment. Various topics relating to the environment in industrial and developing countries.

Wednesdays

0506 Germany, Deutsche Welle: NewsLink. See T 0506.
0530 Germany, Deutsche Welle: Insight. A weekly analysis of major developments on the International scene.

Thursdays

0506 Germany, Deutsche Welle: NewsLink. See T 0506.
0530 Germany, Deutsche Welle: Living in Germany. A weekly look at the social and political issues in the 1990s.

Fridays

0506 Germany, Deutsche Welle: NewsLink. See T 0506.
0530 Germany, Deutsche Welle: Spotlight on Sport. Weekly magazine program with background stories and coverage of important events.

Saturdays

0506 Canada, RCI Montreal: Earth Watch. See S 0131.
0506 Germany, Deutsche Welle: NewsLink. See T 0506.
0522 USA, VOA Washington DC: U.S. Feature.
0530 Germany, Deutsche Welle: German by Radio. An advanced German language course for English speakers.
0536 USA, VOA Washington DC: Communications World (A).
0545 USA, VOA Washington DC: Science/Medicine/Environment.
0549 USA, VOA Washington DC: Business News.
0553 USA, VOA Washington DC: Feature.

Frequencies

0600-0700	Anguilla,Caribbean Beacon	6090am			
0600-0700 vl	Australia, ABC/Katherine	5025do			
0600-0700 vl	Australia, ABC/Tent Creek	4910do			
0600-0700	Australia, Radio	9660pa	12080va	15240pa	15415as
		15515va	17580va	17750as	21725pa
0600-0700 vl	Botswana, Radio	4820do	4830do	7255do	
0600-0700 vl	Canada, CBC N Quebec Svc	9625do			
0600-0700	Canada, CFRX Toronto	6070do			
0600-0700	Canada, CFVP Calgary	6030do			
0600-0700	Canada, CHNX Halifax	6130do			
0600-0700	Canada, CKZN St John's	6160do			
0600-0700	Canada, CKZU Vancouver	6160do			
0600-0700	Costa Rica,RF Peace Intl	6975am	15050am		
0600-0605	Croatia, Croatian Radio	9470va	13820au		
0600-0700	Cuba, Radio Havana	9550na	9820na	9830na	
0600-0700	Ecuador, HCJB	9745na	12015na	21455va	
0600-0645	Germany, Deutsche Welle	6140eu	11915af	13790af	15185af
		17820as	17860af	21680me	
0600-0700	Germany,Overcomer Ministr	13810au			
0600-0630	Ghana, Ghana BC Corp	3366do	4915do		
0600-0700	Guyana, GBC/Voice of	5950do			
0600-0630 vl	Italy, IRRS	3985va			
0600-0700	Japan, Radio/NHK	5975eu	7230eu	11740as	11840as
		11850pa	17825na		
0600-0700	Kenya, Kenya BC Corp	4885do	4935do		
0600-0700	Kiribati, Radio	9810do			
0600-0700 vl	Lesotho, Radio	4800do			
0600-0700	Liberia,LCN/R Liberia Int	5100do			
0600-0700	Malaysia, Radio	7295do			
0600-0700	Malaysia, RTM Sarawak	7160do			
0600-0700	Malaysia, Voice of	6175as	9750as	15295as	
0600-0700	Namibia, NBC	7165af			
0600-0700	New Zealand, R NZ Intl	17675va			
0600-0700 vl	Nigeria, Radio/Ibadan	6050do			
0600-0700 vl	Nigeria, Radio/Kaduna	4770do			
0600-0700	Nigeria, Radio/Lagos	3326do			
0600-0700	Nigeria, Voice of	7255af	15120va		
0600-0700 vl	Papua New Guinea, NBC	9675do			
0600-0641	Romania, R Romania Intl	11725na	11940na		
0600-0700	Russia,Voice of Russia WS	15490au	17625au	17655as	21790au
0600-0630	S Africa, Channel Africa	15215af			
0600-0700	Sierra Leone, SLBS	3316do			
0600-0700	Singapore,RCorp Singapore	6150do			
0600-0700 vl	Solomon Islands, SIBC	5020do			
0600-0700 mtwhf	Swaziland, Trans World R	4775af	6100af	9500af	

0600-0700	UK, BBC World Service	5975am	6005af	6175am	6190af
	6195eu	7145pa	7160af	9410eu	9740as
	11760me	11765af	11940af	11955pa	12095eu
	15310as	15360as	15400af	15420af	15565eu
	15575as 17640af	17760as	17790as	17885af	21660as
0600-0700	USA, KAIJ Dallas TX	5810na			
0600-0700	USA, KTBN Salt Lk City UT	7510na			
0600-0700	USA, KWHR Naalehu HI	17780as			
0600-0630	USA, Voice of America	5970af	6035af	6080af	7170va
		7195af	9630af	9680af	11805af
		11965me	11995af	12080af	15205va
0600-0700	USA, WBCQ Monticello ME	7415na			
0600-0700	USA, WEWN Birmingham AL	5825va			
0600-0700	USA, WHRA Greenbush ME	11565af			
0600-0700	USA, WHRI Noblesville IN	5745na	7315sa		
0600-0700	USA, WINB Red Lion PA	11950am			
0600-0700	USA, WJCR Upton KY	7490na			
0600-0700	USA, WRNO New Orleans LA	7395na			
0600-0700	USA, WSHB Cypress Crk SC	13650af			
0600-0700	USA, WWCR Nashville TN	2390na	3210na	5070na	5935na
0600-0700	USA, WYFR Okeechobee FL	5985na	7355eu		
0600-0700 vl	Vanuatu, Radio	4960do			
0600-0700	Yemen, Rep of Yemen Radio	9780do			
0600-0700	Zambia, Christian Voice	9865do			
0600-0700	Zambia, Natl BC Corp	6165do	6265do		
0600-0700 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
0605-0610 mtwhfa	Croatia, Croatian Radio	5945eu	7365eu	9830eu	
0610-0615 s	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
0630-0700	Austria, R Austria Intl	6015na			
0630-0700	Finland, YLE/R Finland	15250as	21670au		
0630-0700 t h	Georgia, Georgian Radio	6080me			
0630-0700 as	Italy, IRRS	7120va			
0630-0700 as	UK, BBC World Service	17885af			
0630-0700	USA, Voice of America	7170af	9680af	11805af	11965me
		15205va			
0630-0700 as	USA, Voice of America	5970af	6035af	6080af	7195af
		9630af	11995af	12080af	
0630-0645	Vatican City, Vatican R	11625va	13765af	15570af	
0630-0645 mtwhfa	Vatican City, Vatican R	4005eu	5883eu	7250eu	9645eu
		11740eu	15595eu		
0641-0700	Romania, R Romania Intl	9625eu	11725na	11775eu	11840eu
		11885eu	11940na	15270eu	
0645-0700	Germany, Deutsche Welle	6140eu			
0645-0655 as	Monaco, Trans World Radio	6045eu	9870eu		
0645-0700	Vatican City, Vatican R	11625va	13795af	15570af	
0655-0700 mtwhf	Monaco, Trans World Radio	6045eu	9870eu		

Selected Programs

Daily

0600 Germany, Deutsche Welle: News. See S 0500.
0600 USA, VOA Washington DC: VOA News Now Preview.
0601 USA, VOA Washington DC: World News.
0606 USA, VOA Washington DC: World News in Depth.
0610 USA, VOA Washington DC: Regional News.
0614 USA, VOA Washington DC: U.S. News.
0618 USA, VOA Washington DC: Sports.
0628 USA, VOA Washington DC: Station Break.
0630 USA, VOA Washington DC: Preview.
0658 USA, VOA Washington DC: Local Station Break.

Sundays

0606 Germany, Deutsche Welle: Weekend Review I. See S 0506.
0615 Germany, Deutsche Welle: Inside Europe. Helen Seeney, a native of Australia, hosts this radio magazine that offers a European perspective on events of the week.
0622 USA, VOA Washington DC: U.S. Feature.
0631 USA, VOA Washington DC: World News.
0636 USA, VOA Washington DC: Encounter.
0645 USA, VOA Washington DC: Science/Medicine/ Environment.
0649 USA, VOA Washington DC: Business News.
0653 USA, VOA Washington DC: Features.

Monday-Friday

0600 USA, VOA Washington DC: Daybreak Africa.
0631 USA, VOA Washington DC: World News in Depth.
0645 USA, VOA Washington DC: Science/Medicine/ Environment.
0649 USA, VOA Washington DC: Business and Economic News.
0653 USA, VOA Washington DC: Music Feature.

Mondays

0606 Germany, Deutsche Welle: Weekend Review II. A Sunday update of current events in Germany.
0615 Germany, Deutsche Welle: Marks and Markets. See S 0515.

Tuesdays

0608 Germany, Deutsche Welle: NewsLink. See T 0506.
0630 Germany, Deutsche Welle: Good Morning Africa. Music, gossip and listeners' messages for and from Africa.

Wednesdays

0608 Germany, Deutsche Welle: NewsLink. See T 0506.
0630 Germany, Deutsche Welle: Good Morning Africa. See T 0630.

Thursdays

0608 Germany, Deutsche Welle: NewsLink. See T 0506.
0630 Germany, Deutsche Welle: Good Morning Africa. See T 0630.

Fridays

0608 Germany, Deutsche Welle: NewsLink. See T 0506.
0630 Germany, Deutsche Welle: Good Morning Africa. See T 0630.

Saturdays

0608 Germany, Deutsche Welle: NewsLink. See T 0506.
0622 USA, VOA Washington DC: U.S. Feature.
0630 Germany, Deutsche Welle: German by Radio. See A 0530.
0630 USA, VOA Washington DC: World News.
0636 USA, VOA Washington DC: Press Conference USA.

FREQUENCIES

0700-0800	Anguilla,Caribbean Beacon	6090am			
0700-0800 vl	Australia, ABC/Katherine	5025do			
0700-0800 vl	Australia, ABC/Tent Creek	4910do			
0700-0800	Australia, Radio	9660pa	12080va	15240pa	15415as
		15515va	17580va	17750as	21725pa
0700-0726	Belgium,R Vlaanderen Intl	9925eu	15195eu		
0700-0800 vl	Botswana, Radio	4820do	4830do	7255do	
0700-0800	Canada, CFRX Toronto	6070do			
0700-0800	Canada, CFVP Calgary	6030do			
0700-0800	Canada, CHNX Halifax	6130do			
0700-0800	Canada, CKZN St John's	6160do			
0700-0800	Canada, CKZU Vancouver	6160do			
0700-0800	Costa Rica,RF Peace Intl	6975am			
0700-0705	Croatia, Croatian Radio	9470va	13820af		
0700-0727	Czech Rep, R Prague Intl	9880eu	11600eu		
0700-0800	Ecuador, HCJB	11730eu	11755pa	21455va	
0700-0800	Eqt Guinea, Radio Africa	15186af			
0700-0800	Germany, Deutsche Welle	6140eu			
0700-0800 s	Germany, Good News World	13740as			
0700-0800	Germany, Voice of Hope	5975eu			
0700-0800	Germany,Overcomer Ministr	13810au			
0700-0715	Ghana, Ghana BC Corp	3366do	4915do		
0700-0800	Guyana, GBC/Voice of	5950do			
0700-0800 as	Italy, IRRS	7120va			
0700-0800	Kenya, Kenya BC Corp	4885do	4935do		
0700-0800	Kiribati, Radio	9810do			
0700-0800 vl	Lesotho, Radio	4800do			
0700-0715	Liberia,LCN/R Liberia Int	5100do			
0700-0800	Malaysia, Radio	7295do			
0700-0800	Malaysia, RTM Sarawak	7160do			
0700-0800	Malaysia, Voice of	6175as	9750as	15295as	
0700-0800 mtwhf	Monaco, Trans World Radio	6045eu	9870eu		
0700-0705	New Zealand, R NZ Intl	17675va			
0700-0800 vl	Nigeria, Radio/Ibadan	6050do			
0700-0800 vl	Nigeria, Radio/Kaduna	4770do			
0700-0800 vl	Nigeria, Voice of	7255af	15120va		
0700-0800	Palau, KHBN/Voice of Hope	9965as	9985as	13840as	15725as
0700-0730 vl	Papua New Guinea, NBC	9675do			
0700-0756	Romania, R Romania Intl	15340af	17745af		
0700-0800	Russia,Voice of Russia WS	17495au	17625au	17665au	21790au
0700-0800	Sierra Leone, SLBS	3316do			
0700-0800	Singapore,RCorp Singapore	6150do			
0700-0730	Slovakia, R Slovakia Intl	9440au	15460au	17550au	
0700-0800 vl	Solomon Islands, SIBC	5020do			
0700-0730 mtwhf	Swaziland, Trans World R	4775af	6100af	9500af	
0700-0720 a	Swaziland, Trans World R	4775af	6100af	9500af	
0700-0705 s	Swaziland, Trans World R	4775af	6100af	9500af	
0700-0800	Taiwan, Radio Taipei Intl	5950na			
0700-0800	UK, BBC World Service	6005af	6190af	7145af	9410eu
		9740as	11760me	11765af	11835af
		11940af	11955pa	12095eu	15310as
		15360as	15400af	15485eu	15565eu
		15575as	17640eu	17760as	17790as
		17830af	21660as		
0700-0715 as	UK, BBC World Service	17885af			
0700-0800	USA, KAIJ Dallas TX	5810na			
0700-0800	USA, KTBN Salt Lk City UT	7510na			
0700-0800	USA, KWHR Naalehu HI	11565as	17780as		
0700-0800	USA, WEWN Birmingham AL	5825va			
0700-0800	USA, WHRA Greenbush ME	11565af			
0700-0800	USA, WHRI Noblesville IN	5745na	7315sa		
0700-0800	USA, WJCR Upton KY	7490na			
0700-0800	USA, WRNO New Orleans LA	7395na			
0700-0800	USA, WSHB Cypress Crk SC	13650af			
0700-0800	USA, WWCR Nashville TN	2390na	3210na	5070na	5935na
0700-0745	USA, WYFR Okeechobee FL	7355eu	9985eu	13695va	
0700-0800 vl	Vanuatu, Radio	4960do			
0700-0800	Zambia, Christian Voice	9865do			
0700-0800	Zambia, Natl BC Corp	6165do	6265do		
0700-0800 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
0705-0710 s	Croatia, Croatian Radio	5945eu	7365eu	9830eu	
0706-0800	New Zealand, R NZ Intl	9700va			
0715-0800	UK, BBC World Service	15575af	17885af		
0725-0800	Myanmar, Radio	9730do			
0730-0800	Austria, R Austria Intl	6155eu	13730eu	15410eu	17870eu
0730-0800	Georgia, Georgian Radio	11910eu			
0730-0800 vl	Papua New Guinea, NBC	4890do			
0730-0735 mtwhf	Swaziland, Trans World R	4775af			
0730-0800	Switzerland, Swiss R Intl	15545af	17685af	21750af	
0740-0800	Guam, TWR/KTWR	15200as			

0800-0900	Anguilla,Caribbean Beacon	6090am			
0800-0830 vl	Australia, ABC/Katherine	5025do			
0800-0830 vl	Australia, ABC/Tent Creek	4910do			
0800-0900	Australia, Radio	5995pa	9710pa	11650va	12080va
		13605va	15515va	21725pa	
0800-0900 vl	Botswana, Radio	4820do	4830do	7255do	
0800-0900 vl	Canada, CBC N Quebec Svc	9625do			
0800-0900	Canada, CFRX Toronto	6070do			
0800-0900	Canada, CFVP Calgary	6030do			
0800-0900	Canada, CHNX Halifax	6130do			
0800-0900	Canada, CKZN St John's	6160do			
0800-0900	Canada, CKZU Vancouver	6160do			
0800-0900	Costa Rica,RF Peace Intl	6975am			
0800-0805	Croatia, Croatian Radio	13820au			
0800-0900	Ecuador, HCJB	11730eu	11755pa	21455va	
0800-0900	Eqt Guinea, Radio Africa	15186af			
0800-0900	Germany, Deutsche Welle	6140eu			
0800-0900	Germany, Voice of Hope	5975eu			
0800-0900	Germany,Overcomer Ministr	13810au			
0800-0805	Ghana, Ghana BC Corp	4915do			
0800-0900	Guam, TWR/KTWR	15200as	15330as		
0800-0900	Guyana, GBC/Voice of	5950do			
0800-0900	Indonesia, Voice of	9525va			
0800-0900 as/vl	Italy, IRRS	7120va			
0800-0900	Kenya, Kenya BC Corp	4885do	4935do		
0800-0900	Kiribati, Radio	9810do			
0800-0900 vl	Lesotho, Radio	4800do			
0800-0900	Liberia,LCN/R Liberia Int	5100do			
0800-0900	Malaysia, Radio	7295do			
0800-0825	Malaysia, Voice of	6175as	9750as	15295as	
0800-0900 vl	Malaysia,RTM KotaKinabalu	5980do			
0800-0900 s	Malta, VO Mediterranean	11770eu			
0800-0820 mtwhf	Monaco, Trans World Radio	6045eu	9870eu		
0800-0830	Myanmar, Radio	9730do			
0800-0900	N Marianas, KFBS Saipan	11650as	15380as		
0800-0900	New Zealand, R NZ Intl	9700va			
0800-0900 vl	Nigeria, Radio/Ibadan	6050do			
0800-0900 vl	Nigeria, Radio/Kaduna	4770do			
0800-0900	Nigeria, Radio/Lagos	3326do			
0800-0900	Palau, KHBN/Voice of Hope	9955as	9985as	13840va	15725as
0800-0900 vl	Papua New Guinea, NBC	4890do			
0800-0900	Russia,Voice of Russia WS	15490au	17495au	17625au	21790au
0800-0900	Sierra Leone, SLBS	5980do			
0800-0900	Singapore,RCorp Singapore	6150do			
0800-0900	South Korea, R Korea Intl	9570au	13670eu		
0800-0900	UK, BBC World Service	6190af	9740as	11940af	11955pa
		12095eu	15310as	15360as	15400af
		15485eu	15565eu	17640eu	17760as
		17790as	17830af	21660as	
0800-0900 as	UK, BBC World Service	15575as	17885af		
0800-0900	USA, KAIJ Dallas TX	5810na			
0800-0900	USA, KNLS Anchor Point AK	9615as			
0800-0900	USA, KTBN Salt Lk City UT	7510na			
0800-0900	USA, KWHR Naalehu HI	11565pa	17780as		
0800-0900	USA, Voice of America	11775as	13610as	15150as	
0800-0900	USA, WEWN Birmingham AL	5825va			
0800-0900	USA, WHRA Greenbush ME	11565af			
0800-0900	USA, WHRI Noblesville IN	5745na	7315sa		
0800-0900	USA, WJCR Upton KY	7490na			
0800-0900	USA, WRNO New Orleans LA	7395na			
0800-0900	USA, WSHB Cypress Crk SC	9845pa	9860eu		
0800-0900	USA, WWCR Nashville TN	2390na	3210na	5070na	5935na
0800-0900 vl	Vanuatu, Radio	4960do			
0800-0900	Zambia, Christian Voice	9865do			
0800-0900	Zambia, Natl BC Corp	6165do	6265do		
0800-0900 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
0804-0820	Pakistan, Radio	15530eu	17835eu		
0805-0810 mtwhfa	Croatia, Croatian Radio	5945eu	7365eu	9830eu	
0815-0900 f	Seychelles, FEBA Radio	15460as			
0820-0830 t	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
0820-0850 s	Monaco, Trans World Radio	6045eu	9870eu		
0830-0900 vl	Australia, ABC/Alice Spgs	2310do			
0830-0900 vl	Australia, ABC/Katherine	2485do			
0830-0900 vl	Australia, ABC/Tent Creek	2325do			
0830-0900	Australia, Radio	17750as			
0830-0900	Austria, R Austria Intl	21650as	21765as		
0830-0900	Georgia, Georgian Radio	11910me			
0830-0900 vl	Solomon Islands, SIBC	5020do			
0830-0900	Switzerland, Swiss R Intl	9885as	13685as		
0845-0900 mtwhf	USA, WRMI/R Miami Intl	9955am			

FREQUENCIES

0900-1000	Anguilla,Caribbean Beacon	6090am			
0900-1000 vl	Australia, ABC/Alice Spgs	2310do			
0900-1000 vl	Australia, ABC/Katherine	2485do			
0900-1000 vl	Australia, ABC/Tent Creek	2325do			
0900-1000	Australia, Radio	11650va	13605as	17750as	21820as
0900-0910 s	Bhutan, Bhutan BC Service	6030do			
0900-1000 vl	Botswana, Radio	4820do	4830do	7255do	
0900-1000	Canada, CFRX Toronto	6070do			
0900-1000	Canada, CFVP Calgary	6030do			
0900-1000	Canada, CHNX Halifax	6130do			
0900-1000	Canada, CKZN St John's	6160do			
0900-1000	Canada, CKZU Vancouver	6160do			
0900-0956	China, China Radio Intl	11730pa	15210pa		
0900-1000	Costa Rica,RF Peace Intl	6975am			
0900-0929	Czech Rep, R Prague Intl	21745va			
0900-1000	Ecuador, HCJB	11775pa	21455va		
0900-1000	Eqt Guinea, Radio Africa	15186af			
0900-0945	Germany, Deutsche Welle	6140eu	6160pa	9565af	15210af
		15410af	17560as	17800af	21680as
		21790af			
0900-1000 a	Germany, Good News World	5995eu			
0900-1000	Germany, Voice of Hope	5975eu			
0900-1000	Germany,Overcomer Ministr	13810au			
0900-0915	Ghana, Ghana BC Corp	4915do	6130do		
0900-0930	Guam, TWR/KTWR	15330as			
0900-1000	Guyana, GBC/Voice of	5950do			
0900-1000 as/vl	Italy, IRRS	7120va			
0900-1000	Kenya, Kenya BC Corp	4935do			
0900-0930	Kiribati, Radio	9810do			
0900-1000 vl	Lesotho, Radio	4800do			
0900-0915	Liberia,LCN/R Liberia Int	5100do			
0900-1000	Malaysia, Radio	7295do			
0900-1000 vl	Malaysia,RTM KotaKinabalu	5980do			
0900-1000	N Marianas, KFBS Saipan	9495as	11650as	15380as	
0900-1000	N Marianas, KHBI Saipan	11660as	15665as		
0900-1000	New Zealand, R NZ Intl	9700va			
0900-1000 vl	Nigeria, Radio/Ibadan	6050do			
0900-1000 vl	Nigeria, Radio/Kaduna	4770do			
0900-1000	Nigeria, Radio/Lagos	3326do			
0900-1000	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840va
		15725as			
0900-1000 vl	Papua New Guinea, NBC	4890do			
0900-1000	Sierra Leone, SLBS	5980do			
0900-1000	Singapore,RCorp Singapore	6150do			
0900-1000 vl	Solomon Islands, SIBC	5020do			
0900-1000	Tanzania, Radio	5050af			
0900-1000	UK, BBC World Service	6065as	6190af	6195as	9580as
		9740as	11760me	11765pa	11940af
		11945as	11955as	12095eu	15190sa
		15310as	15360as	15400af	15485eu
		15565eu	15575as	17640eu	17760as
		17790as	17830af	17885af	21660as
0900-1000	USA, KAIJ Dallas TX	5810na			
0900-1000	USA, KTBN Salt Lk City UT	7510na			
0900-1000	USA, KWHR Naalehu HI	11565pa	17780as		
0900-1000	USA, Voice of America	11775as	13610as	15150as	15665as
0900-1000	USA, WEWN Birmingham AL	5825va			
0900-1000	USA, WHRA Greenbush ME	11565af			
0900-1000	USA, WHRI Noblesville IN	5745na	7315na		
0900-1000	USA, WJCR Upton KY	7490na			
0900-1000 mtwhf	USA, WRMI/R Miami Intl	9955am			
0900-1000	USA, WRNO New Orleans LA	7395na			
0900-1000	USA, WSHB Cypress Crk SC	9455sa	9860eu		
0900-1000	USA, WWCR Nashville TN	2390na	3210na	5070na	5935na
0900-1000	Zambia, Christian Voice	9865do			
0900-1000	Zambia, Natl BC Corp	6165do	6265do		
0900-1000 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
0905-0910 s	Croatia, Croatian Radio	7365eu	9830eu	13830eu	
0930-1000	Guam, TWR/KTWR	9865as			
0930-1000	Italy, AWR Europe	7230eu			
0930-1000	Lithuania, Radio Vilnius	9555eu	9710eu		
0930-1000	Netherlands, Radio	9820au	12065as	13710as	
0930-1000	Philippines, FEBC R Intl	11635as			
0945-1000	Germany, Deutsche Welle	6140eu			
0950-0945 a	UK, BBC World Service	6095as	9580as	11945as	11955as
		15280as			

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.

1000-1100	Anguilla,Caribbean Beacon	11775am			
1000-1030	Armenia, Voice of	4810eu	15270eu		
1000-1100 vl	Australia, ABC/Alice Spgs	2310do			
1000-1100 vl	Australia, ABC/Katherine	2485do			
1000-1100 vl	Australia, ABC/Tent Creek	2325do			
1000-1100	Australia, Radio	11650va	11880as	17750as	21820as
1000-1100 vl	Botswana, Radio	4820do	4830do	7255do	
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			
1000-1056	China, China Radio Intl	11730pa	15210pa		
1000-1100	Costa Rica,RF Peace Intl	6975am			
1000-1100	Ecuador, HCJB	15115pa	21455va		
1000-1100	Eqt Guinea, Radio Africa	15186af			
1000-1100	Germany, Deutsche Welle	6140eu			
1000-1100	Germany, Voice of Hope	5975eu			
1000-1100	Guam, AWR/KSDA	11560as			
1000-1100	Guam, TWR/KTWR	9865as			
1000-1100	Guyana, GBC/Voice of	5950do			
1000-1100	India, All India Radio	11585as	11737au	13700as	15020as
		17385au	17840as		
1000-1100 as/vl	Italy, IRRS	7120va			
1000-1100	Japan, Radio/NHK	9695as	11850pa	15590as	
1000-1100	Jordan, Radio	11690eu			
1000-1100	Kenya, Kenya BC Corp	4935do			
1000-1010 fa	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
1000-1100 vl	Lesotho, Radio	4800do			
1000-1100	Malaysia, Radio	7295do			
1000-1100 vl	Malaysia,RTM KotaKinabalu	5980do			
1000-1100	N Marianas, KFBS Saipan	9495as	11650as	15380as	
1000-1100	N Marianas, KHBI Saipan	11660as	15665as		
1000-1030	Netherlands, Radio	9820au	12065as	13710as	
1000-1100	New Zealand, R NZ Intl	9700va			
1000-1100 vl	Nigeria, Radio/Ibadan	6050do			
1000-1100 vl	Nigeria, Radio/Kaduna	4770do			
1000-1100 vl	Nigeria, Voice of	7255af	15120va		
1000-1100	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840va
		15725as			
1000-1100 vl	Papua New Guinea, NBC	4890do			
1000-1100	Philippines, FEBC R Intl	11635as			
1000-1100	Sierra Leone, SLBS	5980do			
1000-1030	Singapore, RTE Radio	11740as			
1000-1100	Singapore,RCorp Singapore	6150do			
1000-1100 vl	Solomon Islands, SIBC	5020do			
1000-1030	Switzerland, Swiss R Intl	15315eu			
1000-1030	Tanzania, Radio	5050af			
1000-1100	UK, BBC World Service	5965am	6195va	9740as	11760me
		11765pa	11940af	12095eu	15310as
		15360as	15485eu	15565eu	15575as
		17640eu	17760as	17790as	17885af
		21660as			
1000-1100 as	UK, BBC World Service	15190sa	15400af	17830af	
1000-1100	USA, KAIJ Dallas TX	5810na			
1000-1100	USA, KTBN Salt Lk City UT	7510na			
1000-1100	USA, KWHR Naalehu HI	9930as	11565pa		
1000-1100	USA, Voice of America	6165ca	7405ca	9590ca	9770pa
		11660as	11720as	15240as	15425as
		15665as			
1000-1100	USA, WEWN Birmingham AL	7425na	15745eu		
1000-1100	USA, WHRI Noblesville IN	6040na	9495am		
1000-1100	USA, WJCR Upton KY	7490na			
1000-1100 mtwhfa	USA, WRMI/R Miami INtl	9955am			
1000-1100	USA, WRNO New Orleans LA	7395na			
1000-1100	USA, WSHB Cypress Crk SC	6095am	9455sa		
1000-1100 as	USA, WWBS Macon GA	11900na			
1000-1100	USA, WWCR Nashville TN	2390na	5070na	5935na	12160na
1000-1100	USA, WYFR Okeechobee FL	5950na			
1000-1027	Vietnam, Voice of	12019as	13740as		
1000-1100	Zambia, Christian Voice	9865do			
1000-1100	Zambia, Natl BC Corp	6165do	6265do		
1000-1100 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1015-1030 mtwhfa	Vatican City, Vatican R	5883eu	9645eu	11740eu	15595eu
		21850va			
1030-1057	Czech Rep, R Prague Intl	9880eu	11615eu		
1030-1100	Ethiopia, Radio	5990do	7110do	9705do	
1030-1100	Malaysia, RTM Sarawak	7160do			
1030-1100	Netherlands, Radio	6045eu	9820as	9860eu	12065as
		13710as			
1030-1100	South Korea, R Korea Intl	11715na			
1030-1100 as	Tanzania, Radio	5050af			
1030-1100	UAE, Radio Dubai	13675eu	15370eu	15395eu	21605eu

Frequencies

1100-1200	Anguilla,Caribbean Beacon	11775am			
1100-1200 vl	Australia, ABC/Alice Spgs	2310do			
1100-1200 vl	Australia, ABC/Katherine	2485do			
1100-1200 vl	Australia, ABC/Tent Creek	2325do			
1100-1200	Australia, Radio	5995pa	6020pa	9580va	11650va
		21820as			
1100-1200 vl	Botswana, Radio	4820do	4830do	7255do	
1100-1200	Bulgaria, Radio	15700eu	17500eu		
1100-1200	Canada, CFRX Toronto	6070do			
1100-1200	Canada, CFVP Calgary	6030do			
1100-1200	Canada, CHNX Halifax	6130do			
1100-1200	Canada, CKZN St John's	6160do			
1100-1200	Canada, CKZU Vancouver	6160do			
1100-1200	Costa Rica,RF Peace Intl	6975am			
1100-1200	Ecuador, HCJB	12005ca	15115am	21455va	
1100-1200	Eqt Guinea, Radio Africa	15186af			
1100-1145	Germany, Deutsche Welle	6140eu	15370af	15410af	17680af
1100-1200 as	Ghana, Ghana BC Corp	4915do	6130do		
1100-1200	Guyana, GBC/Voice of	5950do			
1100-1200	Iran, VOIRI	15430me	17560as	21510as	
1100-1200 as/vl	Italy, IRRS	7120va			
1100-1200	Japan, Radio/NHK	6120na	9695as	15590as	
1100-1200	Jordan, Radio	11690eu			
1100-1120 fa	Kazakhstan, R Almaty	9620eu	11840as		
1100-1200	Kenya, Kenya BC Corp	4935do			
1100-1130 s	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
1100-1200 vl	Lesotho, Radio	4800do			
1100-1110	Liberia,LCN/R Liberia Int	5100do			
1100-1200	Malaysia, Radio	7295do			
1100-1200 vl	Malaysia,RTM KotaKinabalu	5980do			
1100-1200	N Marianas, KFBS Saipan	9495as	11650as	15380as	
1100-1200	N Marianas, KHBI Saipan	9355as			
1100-1125	Netherlands, Radio	6045eu	9820au	9860eu	12065as
		13710as			
1100-1105	New Zealand, R NZ Intl	9700va			
1100-1200 vl	Nigeria, Radio/Ibadan	6050do			
1100-1200 vl	Nigeria, Radio/Kaduna	4770do			
1100-1200 vl	Nigeria, Voice of	7255af	15120va		
1100-1200	North Korea, R Pyongyang	3560as	9640af	9850as	9975me
		11335am	13650va		
1100-1120	Pakistan, Radio	7110do	11835do		
1100-1200	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840va
		15725as			
1100-1200 vl	Papua New Guinea, NBC	4890do			
1100-1200	Sierra Leone, SLBS	5980do			
1100-1200	Singapore,R Singapore Int	6015as	6150as		
1100-1130 vl	Solomon Islands, SIBC	5020do			
1100-1200	Switzerland, Swiss R Intl	13735as	21770as		
1100-1200	Taiwan, Voice of Asia	7445as			
1100-1200 as	Tanzania, Radio	5050af			
1100-1130 mtwhf	UK, BBC Caribbean Report	6195ca	15220ca		
1100-1200	UK, BBC World Service	5965am	6190af	6195va	9580as
		9740as	11760me	11940af	11955as
		12095eu	15280as	15310as	15400af
		15485eu	15565eu	15575as	17640eu
		17705as	17790sa	17830af	17885af
		21660af			
1100-1130 as	UK, BBC World Service	15190sa	15220am		
1100-1200	Ukraine, R Ukraine Intl	21520au			
1100-1200	USA, KAIJ Dallas TX	5810na			
1100-1200	USA, KTBN Salt Lk City UT	7510na			
1100-1200	USA, KWHR Naalehu HI	9930as	11565pa		
1100-1200	USA, Voice of America	6160as	9355as	9645as	9760as
		9770as	11720as	15160as	15240as
		15425as			
1100-1130 mtwhf	USA, Voice of America	13675af	15510af	17690af	17780af
		21705af			
1100-1200	USA, WEWN Birmingham AL	7425na	15745eu		
1100-1200	USA, WHRI Noblesville IN	6040na	9495am		
1100-1200	USA, WJCR Upton KY	7490na			
1100-1200	USA, WRNO New Orleans LA	7395na			
1100-1200	USA, WSHB Cypress Crk SC	6095am	11660am		
1100-1200 as	USA, WWBS Macon GA	11900na			
1100-1200	USA, WWCR Nashville TN	5070na	5935na	7435na	12160na
1100-1200	USA, WYFR Okeechobee FL	5850na	5950na	6015na	
1100-1200	Zambia, Christian Voice	9865do			
1100-1200	Zambia, Natl BC Corp	6165do	6265do		
1100-1200 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1104-1120	Pakistan, Radio	15540eu	17835eu		
1105-1200 occsnal	New Zealand, R NZ Intl	6100va			
1115-1145	Nepal, Radio	5005as	7165as		
1120-1140 w	Kazakhstan, R Almaty	9620eu	11840as		
1125-1200	Netherlands, Radio	6045eu	9860eu		
1130-1156	Belgium,R Vlaanderen Intl	5985eu			
1130-1200	China, China Radio Intl	8660as	11700as		
1130-1135	Israel, Kol Israel	15650va	17535va		
1130-1200 vl	Libya, Voice of Africa	15235va	15415va	15435va	
1130-1200	Sweden, Radio	18960na	21810na		
1130-1200 as	UK, BBC World Service	15310as			
1130-1200 f	Vatican City, Vatican R	15595au	17550au		
1140-1200 t	Kazakhstan, R Almaty	9620eu	11840as		
1145-1200	Germany, Deutsche Welle	6140eu			

Selected Programs

Daily

1100 Bulgaria, Radio: News. See S 0200.
1100 USA, VOA Washington DC: VOA News Now Preview.
1101 USA, VOA Washington DC: World News.
1106 USA, VOA Washington DC: World News in Depth.
1110 USA, VOA Washington DC: Regional News.
1114 USA, VOA Washington DC: U.S. News.
1118 USA, VOA Washington DC: Sports.
1128 USA, VOA Washington DC: Station Break.
1130 USA, VOA Washington DC: Preview.
1131 USA, VOA Washington DC: World News.
1158 USA, VOA Washington DC: Local Station Break.

Sundays

1100 Canada (North-Quebec): News. See S 0300.
1105 Canada (North-Quebec): Fresh Air. See S 0007.
1122 USA, VOA Washington DC: U.S. Feature.
1130 Bulgaria, Radio: Plaza Bulgaria. Thirty minutes about Bulgaria and things Bulgarian.
1136 USA, VOA Washington DC: Issues in the News.

Monday-Friday

1136 USA, VOA Washington DC: Dateline.
1145 USA, VOA Washington DC: Science/Medicine/Environment.
1149 USA, VOA Washington DC: Business and Economic News.
1153 USA, VOA Washington DC: Women's Business Minute.
1154 USA, VOA Washington DC: Feature.

Mondays

1115 Bulgaria, Radio: Timeout for Music. See S 0235.
1130 Bulgaria, Radio: Plaza Bulgaria (biweekly). See S 1130.
1130 Bulgaria, Radio: Spectrum (biweekly). Thirty-minute digest on a wide variety of topics.

Tuesdays

1110 Bulgaria, Radio: Events and Development. See M 2310.
1125 Bulgaria, Radio: Timeout for Music. See S 0235.
1145 Bulgaria, Radio: Keyword Bulgaria. See S 0225.

Wednesdays

1110 Bulgaria, Radio: Events and Development. See M 2310.
1125 Bulgaria, Radio: Art and Artists. See T 2325.
1130 Bulgaria, Radio: Timeout for Music. See S 0235.
1141 Bulgaria, Radio: Keyword Bulgaria. See S 0225.

Thursdays

1110 Bulgaria, Radio: Events and Development. See M 2310.
1125 Bulgaria, Radio: Timeout for Music. See S 0235.
1143 Bulgaria, Radio: Keyword Bulgaria. See S 0225.

Fridays

1110 Bulgaria, Radio: Events and Development. See M 2310.
1125 Bulgaria, Radio: The Way We Live. See H 2325.

Saturdays

1100 Canada (North-Quebec): World Report/Sports. Ten minutes of CBC News.
1110 Bulgaria, Radio: Events and Development. See M 2310.
1122 USA, VOA Washington DC: U.S. Feature.
1125 Bulgaria, Radio: Keyword Bulgaria. See S 0225.
1136 USA, VOA Washington DC: Communications World (A).
1140 Bulgaria, Radio: Timeout for Music. See S 0235.
1145 USA, VOA Washington DC: Science/Medicine/Environment.
1149 USA, VOA Washington DC: Business News.
1153 USA, VOA Washington DC: Feature.

Hauser's Highlights

ISRAEL: Kol Israel

Schedule effective from 14 Sept [after DST] until 31 Oct – English:

0500-0515	Am/Eu/Au	9435	11605
		17535	
1130-1135	NAm/Eu	15650	17535
1500-1530	NAm/Eu	15650	17535
2000-2025	NAm/Eu/Af	11605	15640
		15650	17545

(via William Kitching, World DX Club *Contact*)

Frequencies

1200-1300	Anguilla,Caribbean Beacon	11775am			
1200-1300 vl	Australia, ABC/Alice Spgs	2310do			
1200-1300 vl	Australia, ABC/Katherine	2485do			
1200-1300 vl	Australia, ABC/Tent Creek	2325do			
1200-1300	Australia, Radio	5995pa	6020pa	9580va	11650va
		17750pa	21820as		
1200-1300 vl	Botswana, Radio	4820do	4830do	7255do	
1200-1300	Brazil, R Nacional Bras	15445am			
1200-1215	Cambodia, Natl Radio Of	11940as			
1200-1300 vl	Canada, CBC N Quebec Svc	9625do			
1200-1300	Canada, CFRX Toronto	6070do			
1200-1300	Canada, CFVP Calgary	6030do			
1200-1300	Canada, CHNX Halifax	6130do			
1200-1300	Canada, CKZN St John's	6160do			
1200-1300	Canada, CKZU Vancouver	6160do			
1200-1229	Canada, R Canada Intl	9660as	13650na	15195as	17765na
		17820na			
1200-1256	China, China Radio Intl	6950pa	7265pa	9715as	11660as
		11675pa	11980as		
1200-1230 vl	China, China Radio Intl	8660as	11700as	12110as	
1200-1300	Ecuador, HCJB	12005ca	15115am	21455va	
1200-1300	Eqt Guinea, Radio Africa	15186af			
1200-1300	France, Radio France Intl	9805eu	11600as	15155eu	15195eu
		15540af			
1200-1300	Germany, Deutsche Welle	6140eu			
1200-1300	Guyana, GBC/Voice of	5950do			
1200-1230	Iran, VOIRI	15430me	17560as	21510as	
1200-1300	Jordan, Radio	11690eu			
1200-1300	Kenya, Kenya BC Corp	4935do			
1200-1300 vl	Lesotho, Radio	4800do			
1200-1300	Malaysia, Radio	7295do			
1200-1300 vl	Malaysia,RTM KotaKinabalu	5980do			
1200-1230	Mongolia, Voice of	12015au			
1200-1300	N Marianas, KFBS Saipan	11650as	15380as		
1200-1300	N Marianas, KHBI Saipan	9355as			
1200-1225	Netherlands, Radio	6045eu	9860eu		
1200-1300 occsnal	New Zealand, R NZ Intl	6100va			
1200-1300 vl	Nigeria, Radio/Ibadan	6050do			
1200-1300 vl	Nigeria, Radio/Kaduna	4770do			
1200-1300	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840va
		15725as			
1200-1300 m-a/vl	Papua New Guinea, NBC	4890do			
1200-1300	Poland, Polish R Warsaw	6095eu	7270eu	9525eu	11820eu
1200-1300	Sierra Leone, SLBS	5980do			
1200-1300	Singapore,R Singapore Int	6015as	6150as		
1200-1230	Switzerland, Swiss R Intl	15315eu			
1200-1300	Taiwan, Radio Taipei Intl	7130as	9610au		
1200-1300 as	Tanzania, Radio	5050af			
1200-1300	UK, BBC World Service	5965am	6190af	6195va	9410eu
		9515am	9580as	9740as	11760me
		11940af	11955as	12095eu	15220am
		15280as	15310as	15485eu	15565eu
		15575me	17640eu	17705as	17830af
		17885af	21660af		
1200-1300	USA, KAIJ Dallas TX	5810na			
1200-1300	USA, KTBN Salt Lk City UT	7510na			
1200-1300	USA, KWHR Naalehu HI	9930as	11565pa		
1200-1300	USA, Voice of America	6160as	9355as	9645as	9760as
		11715as	15160as	15240as	15425as
1200-1300	USA, WEWN Birmingham AL	7425na	15745eu		
1200-1300	USA, WHRI Noblesville IN	6040na	9495am		
1200-1300	USA, WJCR Upton KY	7490na			
1200-1300 as	USA, WRMI/R Miami Intl	9955am			
1200-1300	USA, WRNO New Orleans LA	7395na			
1200-1300	USA, WSHB Cypress Crk SC	6095am	11660am		
1200-1300	USA, WWCR Nashville TN	5070na	7435na	13845na	15685na
1200-1245	USA, WYFR Okeechobee FL	5850eu	5950na	6015na	17750na
1200-1228	Uzbekistan, R Tashkent	7285as	9715as	15295as	17775as
1200-1300	Zambia, Christian Voice	9865do			
1200-1300	Zambia, Natl BC Corp	6165do	6265do		
1200-1300 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1204-1216 mtwhf	UK, BBC Caribbean Report	6195ca	15220ca		
1204-1216 as	UK, BBC World Service	15220am			
1215-1300	Egypt, Radio Cairo	17595as			
1229-1300	Canada, R Canada Intl	9640na	13650na	17765na	17820na
1230-1300	Austria, R Austria Intl	6155eu	13730na		
1230-1300	Bangladesh, Bangla Betar	7185as	9548as		
1230-1300	Finland, YLE/R Finland	15400am	17670am		
1230-1300	Guam, AWR/KSDA	15330as			
1230-1300	Italy, AWR Europe	11800eu			
1230-1300	South Korea, R Korea Intl	9570as	9640om	13670as	
1230-1300	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
1230-1300	Sweden, Radio	17895as	21810as		
1230-1300	Thailand, Radio	9655as	9885as	11905as	
1230-1300	Turkey, Voice of	15225eu	17560va		
1230-1257	Vietnam, Voice of	12019as	13740as		
1245-1300	USA, WYFR Okeechobee FL	5950na	11830na	17750na	

Selected Programs

Daily

1200 Canada, RCI Montreal: CBC Radio News. See S 0200.
1200 USA, VOA Washington DC: VOA News Now Preview.
1200 Canada, RCI Montreal (Asia): RCI News. News, weather, and sports from Radio Canada International.
1201 USA, VOA Washington DC: World News.
1206 USA, VOA Washington DC: World News in Depth.
1210 USA, VOA Washington DC: Regional News.
1214 USA, VOA Washington DC: U.S. News.
1218 USA, VOA Washington DC: Sports.
1228 USA, VOA Washington DC: Station Break.

Sundays

1200 Canada (North-Quebec): World Report. Ten minutes of CBC News.
1205 Canada, RCI Montreal: Quirks and Quarks. Bob McDonald with a what's new and what's next in science.
1207 Canada, RCI Montreal (Asia): The Mailbag. A program entirely devoted to listeners' letters in which host Marc Montgomery answers questions and reads comments on programs and impressions of Canada.
1208 Canada (North-Quebec): Quirks and Quarks. Bob McDonald with a what's new and what's next in science.
1222 USA, VOA Washington DC: U.S. Feature.
1230 USA, VOA Washington DC: Preview.
1231 USA, VOA Washington DC: World News.
1236 USA, VOA Washington DC: Encounter.
1245 USA, VOA Washington DC: Science/Medicine/ Environment.
1249 USA, VOA Washington DC: Business News.
1253 USA, VOA Washington DC: Features.
1258 USA, VOA Washington DC: Station Break.

Monday-Friday

1211 Canada, RCI Montreal (Asia): Spectrum. A weekday magazine program of current affairs, features, and a business report presented by Jim Craig.
1213 Canada, RCI Montreal: Ontario Morning. The third hour of CBC Radio One's wake-up program for people in Southern Ontario. Hosted by Joe Cote with newreader Ted Fairhurst, and sportscaster Bruce Dowbiggin.
1230 USA, VOA Washington DC: Preview.
1231 USA, VOA Washington DC: World News in Depth.
1245 USA, VOA Washington DC: Science/Medicine/ Environment.
1249 USA, VOA Washington DC: Business and Economic News.
1253 USA, VOA Washington DC: Music Feature.
1258 USA, VOA Washington DC: Local Station Break.

Saturdays

1200 Canada (North-Quebec): CBC Radio News. See S 0100.
1206 Canada, RCI Montreal (Asia): Earth Watch. The magazine on environment, science and ecology matters.
1211 Canada (North-Quebec): As It Happens. See M 2300.
1211 Canada, RCI Montreal: The House. A weekly program that takes you behind the scenes in the world of Canadian politics.
1222 USA, VOA Washington DC: U.S. Feature.
1230 USA, VOA Washington DC: World News.
1236 USA, VOA Washington DC: Press Conference USA.
1258 USA, VOA Washington DC: Station Break.

SYRIA: Radio Damascus

UTC	Targets	Language	Freqs
1600-1700	EuMEAs	TURKISH	12085
1700-1800	Eu	RUSSIAN	13610
1805-1905	EuAm	GERMAN	12085 13610
1905-2005	EuAm	FRENCH	12085 13610
2005-2105	Eu	ENGLISH	12085 13610
2105-2205	AuAm	ENGLISH	12085 13610
2215-2315	Am	ARABIC	12085 13610
2315-0015	EuAm	SPANISH	12085 13610

Broadcasts in Hebrew and Russian to Israel may be one hour LATER in winter.
via BBC Monitoring Service

Frequencies

1300-1400	Anguilla,Caribbean Beacon	11775am			
1300-1400 vl	Australia, ABC/Alice Spgs	2310do			
1300-1400 vl	Australia, ABC/Katherine	2485do			
1300-1400 vl	Australia, ABC/Tent Creek	2325do			
1300-1400	Australia, Radio	5995pa	6020pa	9580va	11650va
		17750pa	21820as		
1300-1400 vl	Botswana, Radio	4820do	4830do	7255do	
1300-1320	Brazil, R Nacional Bras	15445am			
1300-1400 vl	Canada, CBC N Quebec Svc	9625do			
1300-1400	Canada, CFRX Toronto	6070do			
1300-1400	Canada, CFVP Calgary	6030do			
1300-1400	Canada, CHNX Halifax	6130do			
1300-1400	Canada, CKZN St John's	6160do			
1300-1400	Canada, CKZU Vancouver	6160do			
1300-1400 mtwhf	Canada, R Canada Intl	17765na	17820na		
1300-1400 s	Canada, R Canada Intl	13650na	17800na		
1300-1400	China, China Radio Intl	11675pa	11900pa	11980as	15180as
1300-1329	Czech Rep, R Prague Intl	13580eu	17485as		
1300-1400	Ecuador, HCJB	12005ca	15115am	21455va	
1300-1330	Egypt, Radio Cairo	17595as			
1300-1400	Eqt Guinea, Radio Africa	15186af			
1300-1329	Germany, Deutsche Welle	6140eu			
1300-1400 a	Germany, Good News World	15330as			
1300-1400	Ghana, Ghana BC Corp	4915do	6130do		
1300-1400	Guyana, GBC/Voice of	5950do			
1300-1400	Jordan, Radio	11690eu			
1300-1400	Kenya, Kenya BC Corp	4935do			
1300-1400 vl	Lesotho, Radio	4800do			
1300-1310	Liberia,LCN/R Liberia Int	5100do			
1300-1400	Malaysia, Radio	7295do			
1300-1400 vl	Malaysia,RTM KotaKinabalu	5980do			
1300-1400	N Marianas, KFBS Saipan	9670as	11650as		
1300-1400	N Marianas, KHBI Saipan	9355as			
1300-1400 occsnal	New Zealand, R NZ Intl	6100va			
1300-1400 vl	Nigeria, Radio/Ibadan	6050do			
1300-1400 vl	Nigeria, Radio/Kaduna	4770do			
1300-1400	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840va
		15725as			
1300-1400 vl	Papua New Guinea, NBC	4890do			
1300-1400	Philippines, FEBC R Intl	11995as			
1300-1356	Romania, R Romania Intl	9690eu	15390eu	15445eu	17720na
1300-1400 as	S Africa, Channel Africa	11720af	17860af	21530af	
1300-1400	Sierra Leone, SLBS	5980do			
1300-1400	Singapore,R Singapore Int	6015as	6150as		
1300-1330	South Korea, R Korea Intl	9570as	9640om	13670as	
1300-1400	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
1300-1400 as	Tanzania, Radio	5050af			
1300-1325	Turkey, Voice of	15225eu	17560as		
1300-1400	Uganda, Radio	4976do			
1300-1400	UK, BBC World Service	5965am	5990as	6190af	6195va
		9410eu	9515am	9740as	11760me
		11940af	12095eu	15220am	15310as
		15420af	15485eu	15565eu	15575me
		17640eu	17705as	17830af	17885af
		21660af			
1300-1400 a	UK, Merlin Network One	9750eu	12035eu	15235eu	
1300-1400	USA, KAIJ Dallas TX	5810na			
1300-1400	USA, KJES Vado NM	11715na			
1300-1400	USA, KNLS Anchor Point AK	9615as			
1300-1400	USA, KTBN Salt Lk City UT	7510na			
1300-1400	USA, KWHR Naalehu HI	9930as	11565pa		
1300-1400	USA, Voice of America	6160as	9355as	9645as	9760as
		11715as	15160as	15425as	
1300-1400	USA, WEWN Birmingham AL	11875na	15745eu		
1300-1400	USA, WHRI Noblesville IN	6040na	15105am		
1300-1400	USA, WJCR Upton KY	7490na			
1300-1400 s	USA, WRMI/R Miami Intl	9955am			
1300-1400	USA, WRNO New Orleans LA	7395na			
1300-1400	USA, WSHB Cypress Crk SC	9430na	9455am		
1300-1400	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
1300-1400	USA, WYFR Okeechobee FL	11550as	11830na	11970na	13695na
		17750na			
1300-1400	Zambia, Christian Voice	9865do			
1300-1400	Zambia, Natl BC Corp	6165do	6265do		
1300-1400 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1315-1325 mtwhfa	Bhutan, Bhutan BC Service	5030do			
1325-1400	Germany, Voice of Hope	15715as			
1330-1400	Austria, R Austria Intl	13730am			
1330-1400	Canada, R Canada Intl	9535as	9640as	11795as	11935eu
		15325eu			
1330-1400	Guam, AWR/KSDA	11705as			
1330-1400	India, All India Radio	9545as	11620as	13710as	
1330-1400	Sweden, Radio	9435as	15240na	17505as	
1330-1400	UAE, Radio Dubai	13630eu	13675eu	15395eu	
1330-1400	Uzbekistan, R Tashkent	7285as	9715as	15295as	17775as
1330-1357	Vietnam, Voice of	9730eu	9840eu		
1345-1400	Vatican City, Vatican R	15500as	17550as		

Selected Programs

Daily

1300 USA, VOA Washington DC: VOA News Now Preview.
1301 USA, VOA Washington DC: World News.
1306 USA, VOA Washington DC: World News in Depth.
1310 USA, VOA Washington DC: Regional News.
1314 USA, VOA Washington DC: U.S. News.
1318 USA, VOA Washington DC: Sports.
1328 USA, VOA Washington DC: Station Break.
1330 Canada, RCI Montreal: RCI News. See S 0100.
1330 USA, VOA Washington DC: Preview.
1331 USA, VOA Washington DC: World News.
1358 USA, VOA Washington DC: Local Station Break.

Sundays

1300 Canada (North-Quebec): News. See S 0300.
1300 Canada, RCI Montreal: World Report. Ten minutes of CBC News.
1306 Canada, RCI Montreal: This Morning. David Enright and Avril Benoit co-host this CBC magazine program.
1311 Canada (North-Quebec): Sunday Morning (1st hour). CBC Radio's powerful and critically acclaimed three-hour current affairs program examines the events and ideas that shape our world.
1311 Canada, RCI Montreal: This Morning (hour 1). David Enright and Avril Benoit co-host the Sunday Edition of this CBC magazine program (hour 1 of 3 hours).
1322 USA, VOA Washington DC: U.S. Feature.
1336 Canada, RCI Montreal: The Mailbag. A program entirely devoted to listeners' letters in which host Marc Montgomery answers questions and reads comments on programs and impressions of Canada.
1336 USA, VOA Washington DC: Issues in the News.

Monday-Friday

1300 Canada, RCI Montreal: CBC Radio News. See S 0200.
1330 USA, VOA Washington DC: Preview.
1336 USA, VOA Washington DC: Dateline.
1340 Canada, RCI Montreal: Spectrum. A weekday magazine program of current affairs, features, and a business report presented by Jim Craig.
1345 USA, VOA Washington DC: Science/Medicine/Environment.
1349 USA, VOA Washington DC: Business and Economic News.
1353 USA, VOA Washington DC: Women's Business Minute.
1354 USA, VOA Washington DC: Feature.

Saturdays

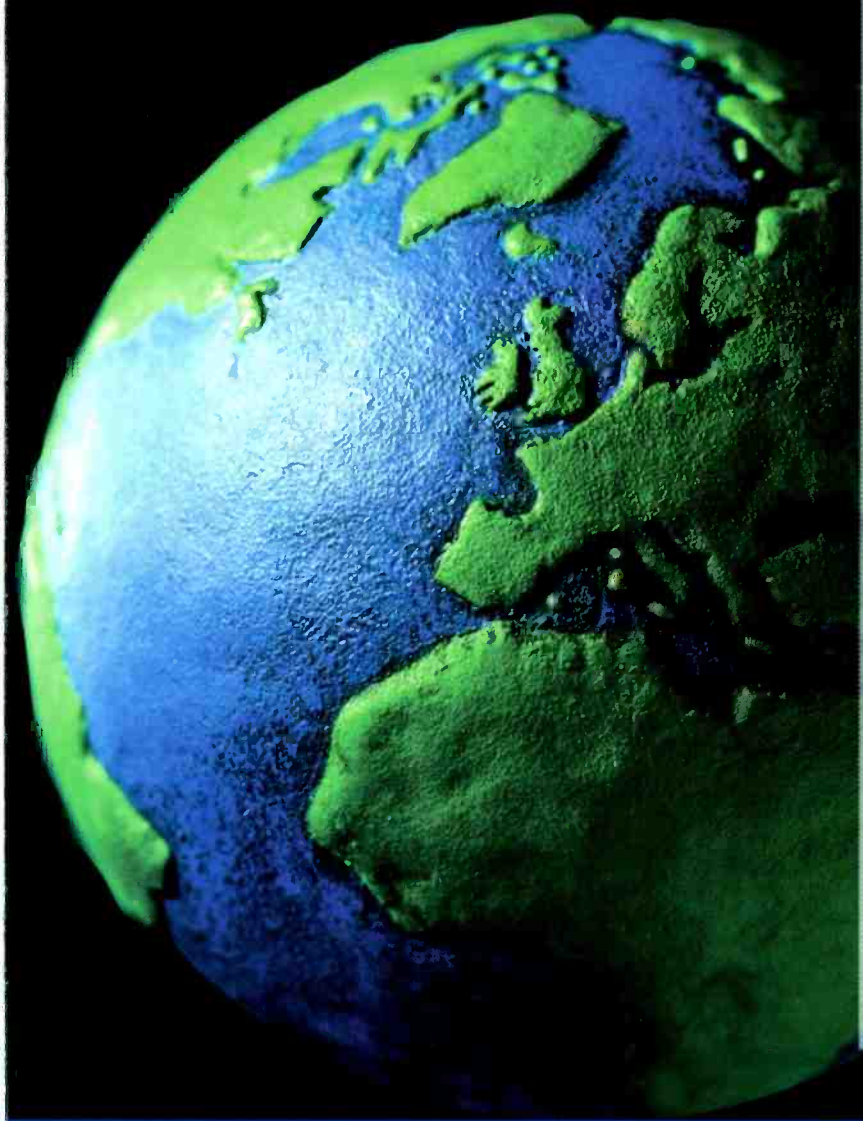
1300 Canada (North-Quebec): World Report/Sports. Ten minutes of CBC News.
1300 Merlin Network One: Global Sound Kitchen.
1311 Canada (North-Quebec): The House. A weekly program that takes you behind the scenes in the world of Canadian politics.
1322 USA, VOA Washington DC: U.S. Feature.
1335 Canada, RCI Montreal (Asia): Venture Canada. David Blair presents this weekly magazine that promotes Canadian business ventures.
1336 USA, VOA Washington DC: Communications World (B).
1337 Canada, RCI Montreal: Venture Canada. See S 0107.
1345 USA, VOA Washington DC: Science/Medicine/Environment.
1349 USA, VOA Washington DC: Business News.
1353 USA, VOA Washington DC: Feature.

VIETNAM: Voice of Vietnam

UTC	Targets	Language	Frequencies	
0000-0030	As	CAMBODIAN	7285	
0000-0100	Af	VIETNAMESE	9730	
0030-0100	As	LAO	7285	
0100-0130	Am	ENGLISH	7250-r	
0130-0230	Am	VIETNAMESE	7250-r	
0230-0300	Am	ENGLISH	7250-r	
0300-0330	Am	SPANISH	9830-r	
0330-0400	Am	ENGLISH	9830-r	
0400-0500	Am	VIETNAMESE	17595-r	
0830-0930	As	MANDARIN	9840	12020
0930-1000	As	INDONESIAN	9840	12020
1000-1030	AsAu	ENGLISH	9840	12020
1030-1100	As	INDONESIAN	9840	12020
1100-1130	As	ENGLISH	7285	
1100-1130	Af	SPANISH	9730	13740
1130-1200	As	RUSSIAN	9840	12020
1130-1200	As	THAI	7285	
1200-1230	As	CAMBODIAN	7285	
1200-1230	As	JAPANESE	9840	12020
1230-1300	As	ENGLISH	9840	12020
1230-1300	As	LAO	7285	
1300-1330	As	CAMBODIAN	7285	
1300-1330	Eu	FRENCH	9730	13740
1330-1400	Eu	ENGLISH	9730	13740
1400-1430	As	JAPANESE	9840	12020

Continued on page 53

GRUNDIG
Gives you the World



Grundig leads shortwave radio into the new Millennium!
When radio was introduced, back in the 1920's—to pluck voices and music out of thin air—people thought it was magic. With Grundig, it still is! No other manufacturer rivals Grundig for *"that European sound."* Voices have an *"in-the-room"* quality and clarity—even from half a world away.

German-engineered quality...German-engineered sound...when people think of shortwave, they think of Grundig. Grundig has specialized in shortwave since the late 1950's, and in North America, shortwave radios are all we sell.

Critics reviews of Grundig models include
Best of Category... Superior Performance... Ergonomically Better...Superb Sound Quality... An Excellent Choice

We listen, too.
We're very good at listening—to our customers. Our engineers design each model so it's easy, intuitive, and convenient to use. Critics call this *"great ergonomics!"* And Grundig models always deliver top performance for the price. Critics call this *"bang for the buck."*

GRUNDIG

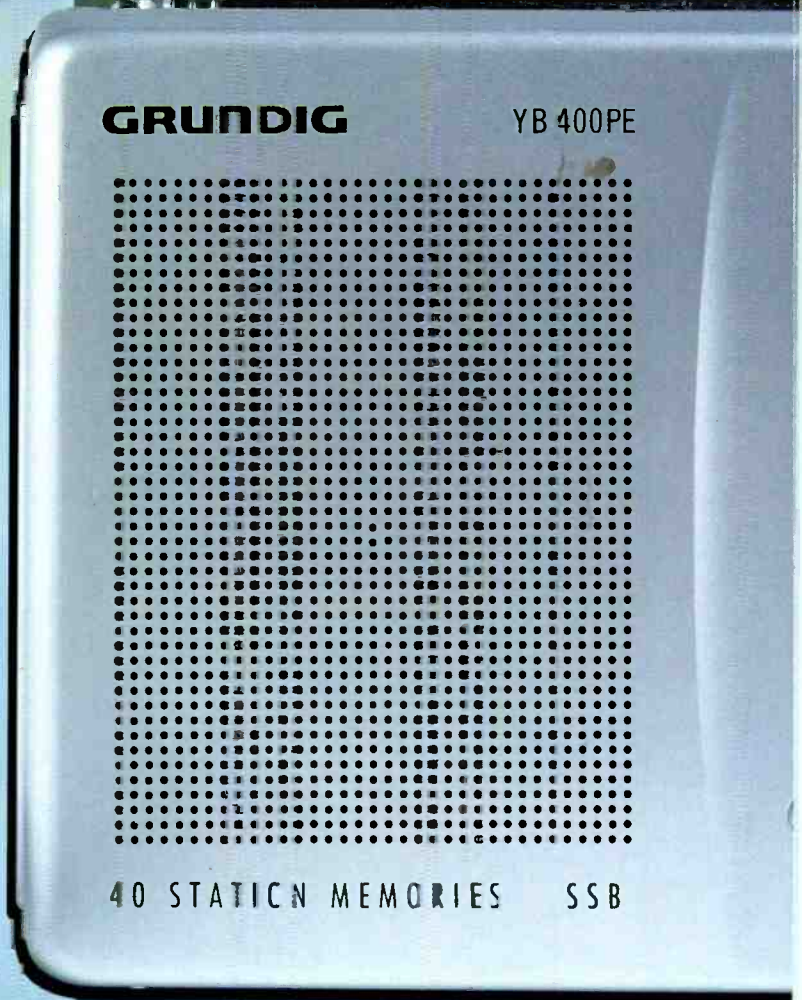
The Latest in Technology

Rated Best in Its Class.
Grundig's Yacht Boy 400PE has received rave reviews from the shortwave press for combining a wealth of sophisticated features in a sleek titanium-look package that doesn't cost a fortune. It incorporates features found on stationary shortwave systems that cost thousands, such as outstanding audio quality, precise 1 kHz increment tuning, up/down slewing, frequency scanning signal strength indication, and single-sideband signal demodulation.

But the advantage mentioned most often in the reviews is its ease of use for the novice listener. In moments you can listen to foreign broadcasts beamed to North America.

Soon, you will be scanning the airwaves to tune in exotic music programs and sports events from faraway locales. The YB-400PE even picks up shortwave amateur (ham radio) broadcasts and shortwave aviation/military frequencies (cockpit-to-tower communications). The possibilities for family fun, education, and enjoyment are boundless.

For travel or home use, Grundig adds a dual-time travel clock with snooze and sleep timer. The FM band is stereophonic with your headphones. The lighted LCD panel is easy to read in the



Yacht Boy 400PE

The Best in Value!

dark. Comes with a form-fitting pouch, integral telescoping antenna and advanced external antenna on a compact reel, carry-strap, ac-adapter, earphones and complete instructions.

Made by Germany's Grundig.
World leader in shortwave radios, the 400PE measures just 7-3/4"L x 4-1/4"H x 1-1/4"W; weighs only 20 oz. It slips easily into your carry-on for travel and fits on a nightstand, office credenza, or yacht cabin console. One-year warranty.

Grundig's Yacht Boy 400PE Named Editor's Choice.
Passport To World Band Radio is regarded as the leading authority of the shortwave industry Here's what their testing expert wrote about the Grundig Yacht Boy 400PE:

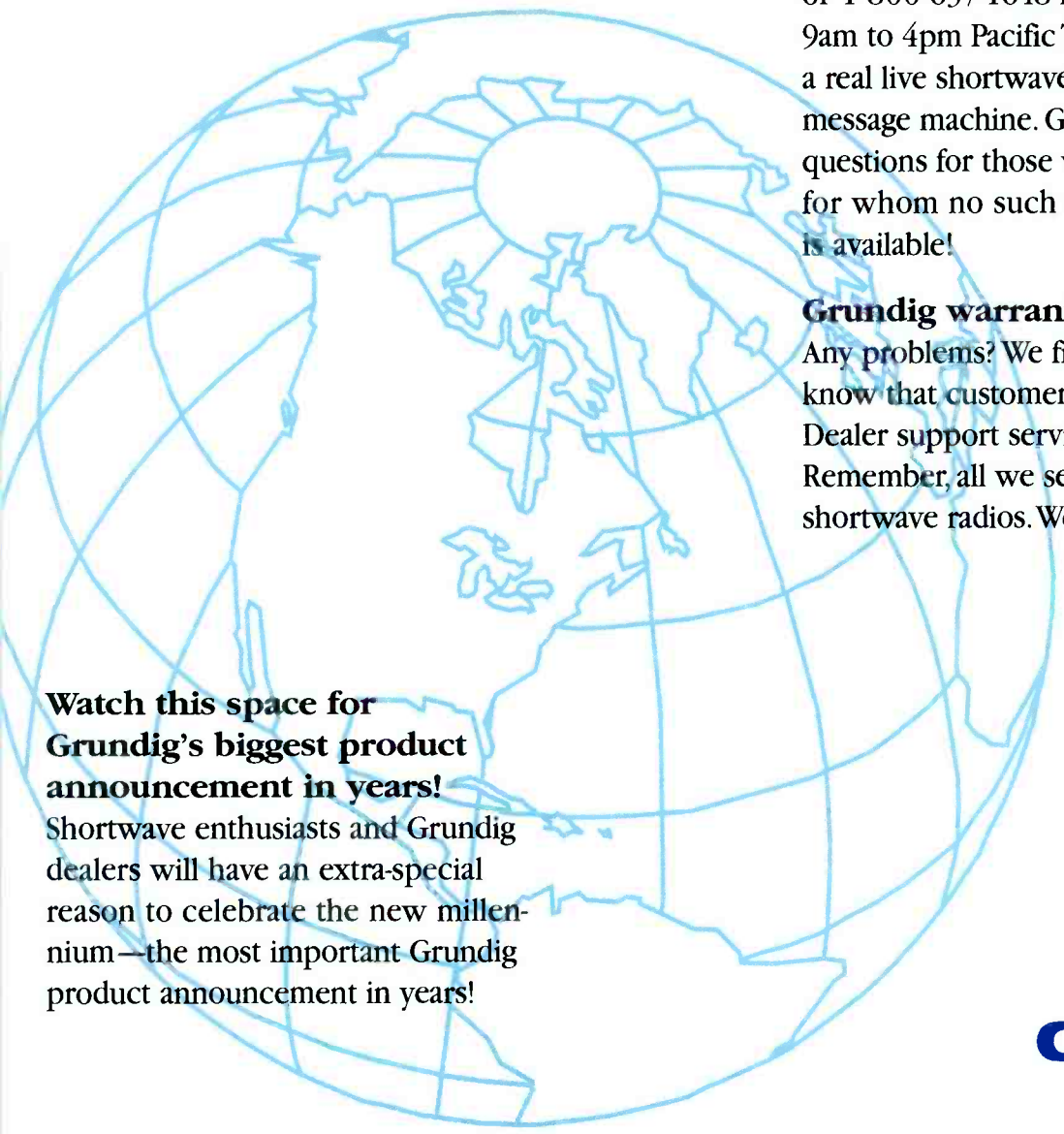
"Best performance for price size category, and among the choicest portables of any size, at any price."

"The 400's FM performance is right up there with the very best among world band radios."

Please call our shortwave hotline and talk to the experts: 800-872-2228.

Grundig sets the standard for customer service.
Grundig supports the industry's only Toll-free Shortwave Hotline. Consumers and dealers can call 1-800-872-2228 in the United States or 1-800-637-1648 in Canada weekdays from 9am to 4pm Pacific Time. You can speak with a real live shortwave expert, not an automatic message machine. Grundig even answers questions for those who own other brands, for whom no such toll-free hotline service is available!

Grundig warranty service is the best.
Any problems? We fix them fast. Dealers know that customers will be taken care of! Dealer support service is first-rate, too. Remember, all we sell in North America are shortwave radios. We specialize! We do it best!



Watch this space for Grundig's biggest product announcement in years!
Shortwave enthusiasts and Grundig dealers will have an extra-special reason to celebrate the new millennium—the most important Grundig product announcement in years!

GRUNDIG
made for you

Frequencies

1400-1500	Anguilla,Caribbean Beacon	11775am			
1400-1500 vl	Australia, ABC/Alice Spgs	2310do			
1400-1500 vl	Australia, ABC/Katherine	2485do			
1400-1500 vl	Australia, ABC/Tent Creek	2325do			
1400-1430	Australia, Radio	5995as	6180va	9580va	11650va
		17750pa			
1400-1500 vl	Botswana, Radio	4820do	4830do	7255do	
1400-1500 vl	Canada, CBC N Quebec Svc	9625do			
1400-1500	Canada, CFRX Toronto	6070do			
1400-1500	Canada, CFVP Calgary	6030do			
1400-1500	Canada, CHNX Halifax	6130do			
1400-1500	Canada, CKZN St John's	6160do			
1400-1500	Canada, CKZU Vancouver	6160do			
1400-1500 s	Canada, R Canada Intl	13650na	17800na		
1400-1456	China, China Radio Intl	7405na	11825as	15110af	
1400-1500	Costa Rica,RF Peace Intl	21460am			
1400-1500	Ecuador, HCJB	12005ca	15115am	21455va	
1400-1500	Eqt Guinea, Radio Africa	15186af			
1400-1500	France, Radio France Intl	11910as	17560va	17680as	
1400-1500	Germany, RTE Radio	15625eu			
1400-1500	Germany, Voice of Hope	15715as			
1400-1500	Germany,Overcomer Ministr	6010eu			
1400-1415	Ghana, Ghana BC Corp	4915do	6130do		
1400-1500	Guyana, GBC/Voice of	5950do			
1400-1500	India, All India Radio	9545as	11620as	13710as	
1400-1500	Japan, Radio/NHK	9505na	11730as	11880me	
1400-1500	Jordan, Radio	11690eu			
1400-1500	Kenya, Kenya BC Corp	4935do			
1400-1500 vl	Lesotho, Radio	4800do			
1400-1500	Malaysia, Radio	7295do			
1400-1500	Malaysia, RTM Sarawak	7160do			
1400-1500 vl	Malaysia,RTM KotaKinabalu	5980do			
1400-1430	Mexico, Radio Mexico Intl	9705am			
1400-1500	N Marianas, KFBS Saipan	9465as	9495as	9670as	
1400-1500 occsnal	New Zealand, R NZ Intl	6100va			
1400-1500 vl	Nigeria, Radio/Ibadan	6050do			
1400-1500 vl	Nigeria, Radio/Kaduna	4770do			
1400-1415	Pakistan, Radio	9645do			
1400-1500	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840va
		15725as			
1400-1500 vl	Papua New Guinea, NBC	4890do			
1400-1500	Philippines, FEBC R Intl	11995as			
1400-1500	Russia,Voice of Russia WS	12005as	12025as	15550as	
1400-1455 as	S Africa, Channel Africa	11720af	17860af	21530af	
1400-1500	Sierra Leone, SLBS	5980do			
1400-1500	Singapore,RCorp Singapore	6150do			
1400-1500	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
1400-1500	Switzerland, Swiss R Intl	9575as	17670as		
1400-1500	Taiwan, Radio Taipei Intl	15125as			
1400-1500 as	Tanzania, Radio	5050af			
1400-1430	Thailand, Radio	9580as	9655as	11905as	
1400-1500	Uganda, Radio	4976do			
1400-1500	UK, BBC World Service	3990as	6190af	6195as	9515am
		9740as	11865am	11940af	12095eu
		15220am	15310as	15485eu	15565eu
		15575ma	17640eu	17705as	17830af
		17840am	21470af	21660af	
1400-1500 a	UK, Merlin Network One	9750eu	12035eu	15235eu	
1400-1500	USA, KAIJ Dallas TX	13815na			
1400-1500	USA, KJES Vado NM	11715na			
1400-1500	USA, KTBN Salt Lk City UT	7510na			
1400-1500	USA, KWHR Naalehu HI	9930as	11565pa		
1400-1500	USA, Voice of America	6160as	7125as	7215as	9645as
		9760as	15160as	15255va	15395as
		15425as			
1400-1500	USA, WEWN Birmingham AL	11875na	15745eu		
1400-1500	USA, WGTG McCaysville GA	9370al	9400am		
1400-1500	USA, WHRI Noblesville IN	6040na	15105am		
1400-1500	USA, WJCR Upton KY	7490na			
1400-1500 irreg	USA, WMLK Bethel PA	9465am			
1400-1500 s	USA, WRMI/R Miami Intl	9955am			
1400-1500	USA, WRNO New Orleans LA	7395na			
1400-1500	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
1400-1500	USA, WYFR Okeechobee FL	11550as	11830na	11970na	17750na
1400-1405	Vatican City, Vatican R	15500as	17550as		
1400-1500	Zambia, Christian Voice	9865do			
1400-1500	Zambia, Natl BC Corp	6165do	6265do		
1400-1500 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1410-1420	Greece, Voice of	9425eu	15630eu		
1415-1420	Nepal, Radio	5005as	7165as		
1430-1500	Australia, Radio	5995as	6180va	9500as	9580va
		11650va	11660as	17750pa	
1430-1500 vl	China, China Radio Intl	8660as			
1430-1500	Guam, AWR/KSDA	11980as			
1430-1500	Guam, TWR/KTWR	15330as			
1430-1500	Netherlands, Radio	9890as	12075as	15590as	
1430-1500	S Africa, RTE Radio	21745af			
1430-1500	Slovakia, AWR Europe	17525as			

Selected Programs

Daily

1400 USA, VOA Washington DC: VOA News Now Preview.
1401 USA, VOA Washington DC: World News.
1410 USA, VOA Washington DC: Regional News.
1414 USA, VOA Washington DC: U.S. News.
1418 USA, VOA Washington DC: Sports.
1428 USA, VOA Washington DC: Station Break.

Sundays

1400 Canada (North-Quebec): CBC Radio News. See S 0100.
1400 Canada, RCI Montreal: CBC Radio News. See S 0200.
1405 Canada (North-Quebec): Sunday Morning (2nd hour). See S 1311.
1406 Canada, RCI Montreal: This Morning (hour 2). David Enright and Avril Benoit co-host the Sunday Edition of this CBC magazine program (hour 2 of 3 hours).

VIETNAM: Voice of Vietnam

UTC	Targets	Language	Frequencies		UTC	Targets	Language	Frequencies
1400-1430	As	LAO	7285	9730	1900-1930	Eu	RUSSIAN	12030
1430-1500	As	CANTONESE	9730		1900-1930	Eu	ENGLISH	9730 13740
1430-1500	As	INDONESIAN	9840	12020	1930-2030	Eu	VIETNAMESE	12030
1500-1530	As	MANDARIN	7285		1930-2000	Eu	FRENCH	9730 13740
1500-1530	As	THAI	9840	12020	2000-2030	Af	SPANISH	9730 13740
1530-1600	As	CANTONESE	9840	12020	2030-2100	Eu	ENGLISH	9730 13740
1600-1630	Eu	ENGLISH	9730	13740	2100-2130	Eu	FRENCH	9730 13740
1630-1700	Eu	RUSSIAN	9730	13740	2130-2200	As	JAPANESE	9840 12020
1700-1800	Eu	ENGLISH	12070-r		2200-2230	As	MANDARIN	9840 12020
1800-1830	Eu	ENGLISH	9730	13740	2230-2300	As	CANTONESE	9840 12020
1830-1900	Eu	FRENCH	9730		2300-2330	As	THAI	9840 12020
			12070-r	13740	2330-0000	As	ENGLISH	9840 12020

via BBC Monitoring Service

1406 USA, VOA Washington DC: World News in Depth.
1422 USA, VOA Washington DC: U.S. Feature.
1430 USA, VOA Washington DC: Preview.
1431 USA, VOA Washington DC: World News.
1436 USA, VOA Washington DC: Encounter.
1445 USA, VOA Washington DC: Science/Medicine/Environment.
1449 USA, VOA Washington DC: Business News.
1453 USA, VOA Washington DC: Features.
1458 USA, VOA Washington DC: Station Break.

Monday-Friday

1406 USA, VOA Washington DC: World News in Depth.
1430 USA, VOA Washington DC: Preview.
1431 USA, VOA Washington DC: World News in Depth.
1445 USA, VOA Washington DC: Science/Medicine/Environment.
1449 USA, VOA Washington DC: Business and Economic News.
1453 USA, VOA Washington DC: Music Feature.
1458 USA, VOA Washington DC: Local Station Break.

Saturdays

1400 Canada (North-Quebec): CBC Radio News. See S 0100.
1400 Merlin Network One: Global Sound Kitchen.
1405 Canada (North-Quebec): Basic Black. See M 2300.
1406 USA, VOA Washington DC: World News in Depth.
1422 USA, VOA Washington DC: U.S. Feature.
1430 USA, VOA Washington DC: World News.
1436 USA, VOA Washington DC: Press Conference USA.
1458 USA, VOA Washington DC: Station Break.

Frequencies

1500-1600	Anguilla,Caribbean Beacon	11775am			
1500-1600 vl	Australia, ABC/Alice Spgs	2310do			
1500-1600 vl	Australia, ABC/Katherine	2485do			
1500-1600 vl	Australia, ABC/Tent Creek	2325do			
1500-1600	Australia, Radio	5995as	6180va	9500as	9580va
		11650va	11660as	17750pa	
1500-1600 vl	Botswana, Radio	4820do	4830do	7255do	
1500-1600 vl	Canada, CBC N Quebec Svc	9625do			
1500-1600	Canada, CFRX Toronto	6070do			
1500-1600	Canada, CFVP Calgary	6030do			
1500-1600	Canada, CHNX Halifax	6130do			
1500-1600	Canada, CKZN St John's	6160do			
1500-1600	Canada, CKZU Vancouver	6160do			
1500-1600 s	Canada, R Canada Intl	13650na	17800na		
1500-1556	China, China Radio Intl	7160as	9785as		
1500-1600	Costa Rica,RF Peace Intl	15050am	21460am		
1500-1600	Ecuador, HCJB	12005ca	15115am	21455va	
1500-1600	Eqt Guinea, Radio Africa	15186af			
1500-1600	Germany, Voice of Hope	15715as			
1500-1600	Germany,Overcomer Ministr	6010eu			
1500-1600	Guyana, GBC/Voice of	5950do			
1500-1530	Israel, Kol Israel	15650va	17610va		
1500-1600	Japan, Radio/NHK	7200as	9505na	9750as	11730as
1500-1600	Jordan, Radio	11690eu			
1500-1600	Kenya, Kenya BC Corp	4935do			
1500-1600 vl	Lesotho, Radio	4800do			
1500-1510	Liberia,LCN/R Liberia Int	5100do			
1500-1600	Malaysia, Radio	7295do			
1500-1600	Malaysia, RTM Sarawak	7160do			
1500-1600 vl	Malaysia,RTM KotaKinabalu	5980do			
1500-1530	Mexico, Radio Mexico Intl	9705am			
1500-1530	Mongolia, Voice of	9720as	12015as		
1500-1600	Myanmar, Radio	5986do			
1500-1600	N Marianas, KFBS Saipan	9465as	9495as	9670as	
1500-1600	Netherlands, Radio	9890as	12075as	15590as	
1500-1600 occsnal	New Zealand, R NZ Intl	6145va			
1500-1600 vl	Nigeria, Radio/Ibadan	6050do			
1500-1600 vl	Nigeria, Radio/Kaduna	4770do			
1500-1600 vl	Nigeria, Voice of	7255af	15120va		
1500-1600	North Korea, R Pyongyang	3560eu	9640as	9975me	11335am
		11735am	13650va		
1500-1600	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	15725as
1500-1600 vl	Papua New Guinea, NBC	4890do			
1500-1600 vl	Russia, Voice of Assyria	6005me	9480me		
1500-1600	Russia,Voice of Russia WS	4730me	4940me	4975me	7325me
		9480eu	9730eu	11500as	12070me
1500-1530	S Africa, Channel Africa	17770af			
1500-1600	Seychelles, FEBA Radio	11600as			
1500-1600	Sierra Leone, SLBS	5980do			
1500-1600	Singapore,RCorp Singapore	6150do			
1500-1600	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
1500-1600 as	Tanzania, Radio	5050af			
1500-1600	Uganda, Radio	4976do			
1500-1600	UK, BBC World Service	5975as	5990as	6190af	6195as
		9410eu	9515am	9740as	11860af
		11940af	12095eu	15220am	15310as
		15400af	15420af	15485eu	15575eu
		17705as	17830af	17840am	21470af
		21490af	21660af		
1500-1600 a	UK, Merlin Network One	9750eu	12035eu	15235eu	
1500-1600	USA, KAIJ Dallas TX	13815na			
1500-1600	USA, KTBN Salt Lk City UT	15590na			
1500-1600	USA, KWHR Naalehu HI	9930as	11565pa		
1500-1600	USA, Voice of America	7125as	7215as	9645as	9700me
		15205va	15255va	15395as	
1500-1600	USA, WEWN Birmingham AL	11875na	15745eu		
1500-1600	USA, WGTG McCaysville GA	9370al	9400am		
1500-1600	USA, WHRI Noblesville IN	13760na	15105sa		
1500-1600	USA, WINB Red Lion PA	13800am			
1500-1600	USA, WJCR Upton KY	7490na			
1500-1600 irreg	USA, WMLK Bethel PA	9465am			
1500-1600 s	USA, WRMI/R Miami Intl	9955am			
1500-1600	USA, WRNO New Orleans LA	7395na			
1500-1600	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
1500-1600	USA, WYFR Okeechobee FL	11830na	17750na		
1500-1600	Zambia, Christian Voice	9865do			
1500-1600	Zambia, Natl BC Corp	6165do	6265do		
1500-1600 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1515-1600	Seychelles, FEBA Radio	11695as			
1530-1540	Bangladesh, Bangla Betar	4880as	15520as		
1530-1600	Georgia, Georgian Radio	6180me			
1530-1600	Guam, AWR/KSDA	9355as	11920as		
1530-1600	Iran, VOIRI	7250as	11680as	13605as	15150as
1530-1600	Tanzania, Radio	5050af			
1545-1600 sh	Bangladesh, Bangla Betar	4880as	15520as		
1545-1600 m	Guam, TWR/KTWR	15330as			
1550-1600 a	Vatican City, Vatican R	12065om	13765au	15500au	

Selected Programs

Daily

1500 USA, VOA Washington DC: News (Special English Broadcast).
1500 USA, VOA Washington DC: VOA News Now Preview.
1501 USA, VOA Washington DC: World News.
1506 USA, VOA Washington DC: All About English.
1506 USA, VOA Washington DC: World News in Depth.
1510 USA, VOA Washington DC: Regional News.
1514 USA, VOA Washington DC: U.S. News.
1518 USA, VOA Washington DC: Sports.
1528 USA, VOA Washington DC: Station Break.
1530 USA, VOA Washington DC: News (Special English).
1530 USA, VOA Washington DC: Preview.
1531 USA, VOA Washington DC: World News.
1558 USA, VOA Washington DC: Local Station Break.

Sundays

1500 Canada (North-Quebec): News. See S 0300.
1500 Canada, RCI Montreal: RCI News. See S 0100.
1505 Canada (North-Quebec): Sunday Morning (3rd hour). See S 1311.
1506 Canada, RCI Montreal: This Morning (hour 3). David Enright and Avril Benoit co-host the Sunday Edition of this CBC magazine program (hour 3 of 3 hours).
1522 USA, VOA Washington DC: U.S. Feature.
1536 USA, VOA Washington DC: Issues in the News.
1540 USA, VOA Washington DC: Words and their Stories (Special English).
1545 USA, VOA Washington DC: People in America (Special English).

Monday-Friday

1536 USA, VOA Washington DC: Dateline.
1545 USA, VOA Washington DC: Science/Medicine/Environment.
1549 USA, VOA Washington DC: Business and Economic News.
1553 USA, VOA Washington DC: Women's Business Minute.
1554 USA, VOA Washington DC: Feature.

Mondays

1540 USA, VOA Washington DC: Development Report (Special English).
1545 USA, VOA Washington DC: This is America (Special English).

Tuesdays

1540 USA, VOA Washington DC: Agriculture Report (Special English).
1545 USA, VOA Washington DC: Science in the News (Special English).

Wednesdays

1540 USA, VOA Washington DC: Science Report (Special English).
1545 USA, VOA Washington DC: Exploration (Special English).

Thursdays

1540 USA, VOA Washington DC: Science Report (Special English).
1545 USA, VOA Washington DC: The Making of a Nation (Special English).

Fridays

1540 USA, VOA Washington DC: Environment Report (Special English).
1545 USA, VOA Washington DC: American Mosaic (Special English).

Saturdays

1500 Canada (North-Quebec): CBC Radio News. See S 0100.
1500 Merlin Network One: Global Sound Kitchen.
1505 Canada (North-Quebec): Basic Black. See M 2300.
1522 USA, VOA Washington DC: U.S. Feature.
1530 Canada (North-Quebec): The Great Northern. See S 1311.
1536 USA, VOA Washington DC: Communications World (C).
1540 USA, VOA Washington DC: In the News (Special English).
1545 USA, VOA Washington DC: American Stories (Special English).
1549 USA, VOA Washington DC: Business News.
1553 USA, VOA Washington DC: Feature.

Frequencies

1600-1700	Algeria, R Algiers Intl	11715af	15160me		
1600-1700	Anguilla,Caribbean Beacon	11775am			
1600-1700 vl	Australia, ABC/Alice Spgs	2310do			
1600-1700 vl	Australia, ABC/Katherine	2485do			
1600-1700 vl	Australia, ABC/Tent Creek	2325do			
1600-1700	Australia, Radio	5995as	6180va	9500as	9580va
		11650va	11660as	17750pa	
1600-1700 vl	Botswana, Radio	4820do	4830do	7255do	
1600-1700 vl	Canada, CBC N Quebec Svc	9625do			
1600-1700	Canada, CFRX Toronto	6070do			
1600-1700	Canada, CFVP Calgary	6030do			
1600-1700	Canada, CHNX Halifax	6130do			
1600-1700	Canada, CKZN St John's	6160do			
1600-1700	Canada, CKZU Vancouver	6160do			
1600-1656	China, China Radio Intl	9565af	9870af		
1600-1700	Costa Rica,RF Peace Intl	15050am	21460am		
1600-1627	Czech Rep, R Prague Intl	5930eu	21745af		
1600-1630	Ecuador, HCJB	12005ca	15115am	21455va	
1600-1700	Eqt Guinea, Radio Africa	15186af			
1600-1700	Ethiopia, Radio	7165af	9560af		
1600-1700	France, Radio France Intl	11615af	11995af	12015af	15210af
		17605af			
1600-1645	Germany, Deutsche Welle	6140eu	6170as	7225as	9735af
	9875as	11810af	15135af	17595as	21695af
1600-1700 s	Germany, Good News World	15105va			
1600-1630 irreg/s	Germany, Universal Life	15105af			
1600-1630	Germany, Voice of Hope	15715as			
1600-1700	Germany,Overcomer Ministr	13810me			
1600-1700	Guam, AWR/KSDA	9355as	11920as		
1600-1630 as	Guam, TWR/KTWR	15330as			
1600-1700	Guyana, GBC/Voice of	5950do			
1600-1630	Iran, VOIRI	7250as	11680as	13605as	15150as
1600-1630	Jordan, Radio	11690eu			
1600-1700	Kenya, Kenya BC Corp	4935do			
1600-1700 vl	Lesotho, Radio	4800do			
1600-1700	Malaysia, Radio	7295do			
1600-1700	N Marianas, KFBS Saipan	9465as	9495as		
1600-1625	Netherlands, Radio	9890as	12075as	15590as	
1600-1650 occsnal	New Zealand, R NZ Intl	6145va			
1600-1700 vl	Nigeria, Radio/Ibadan	6050do			
1600-1700 vl	Nigeria, Radio/Kaduna	4770do			
1600-1700	Nigeria, Voice of	7255af	15120va		
1600-1630	Pakistan, Radio	7230do	11570me	15319af	15465me
		17511me	17719af		
1600-1700	Palau, KHBN/Voice of Hope	9955as	9965as		
1600-1700 vl	Papua New Guinea, NBC	4890do			
1600-1700	Russia,Voice of Russia WS	9675me	9730eu	12005as	12070me
1600-1630	S Africa, Channel Africa	6150af			
1600-1629	Seychelles, FEBA Radio	11695as			
1600-1700	Sierra Leone, SLBS	5980do			
1600-1700	South Korea, R Korea Intl	5975om	9515af	9870af	
1600-1700	Swaziland, Trans World R	9500af			
1600-1615	Switzerland, Swiss R Intl	9575as	17670as		
1600-1700	Tanzania, Radio	5050af			
1600-1645	UAE, Radio Dubai	13630eu	13675eu	15395eu	21605eu
1600-1700	Uganda, Radio	4976do			
1600-1700	UK, BBC World Service	3915as	5975as	5990as	6190af
		6195as	7160as	9410eu	9515am
		9740as	11940af	12095eu	15310as
		15400af	15485eu	15575am	17705as
		17830af	17840am	21470af	21660af
1600-1700 mtwhf	UK, Merlin Network One	6175eu			
1600-1700 a	UK, Merlin Network One	9750eu	12035eu	15235eu	
1600-1700	USA, KAIJ Dallas TX	13815na			
1600-1700	USA, KTBN Salt Lk City UT	15590na			
1600-1700	USA, KWHR Naalehu HI	9930as			
1600-1700	USA, Voice of America	6035af	6110as	6160as	7125as
	7215as	9645as	9700as	9760as	13710af
	15205va	15225af	15255va	15395as	15410af
1600-1700	USA, WEWN Birmingham AL	11875na	13615na		
1600-1700	USA, WGTG McCaysville GA	9370al	9400am		
1600-1700	USA, WHRA Greenbush ME	17650af			
1600-1700	USA, WHRI Noblesville IN	13760na	15105sa		
1600-1700	USA, WINB Red Lion PA	13800am			
1600-1700	USA, WJCR Upton KY	7490na			
1600-1700 s	USA, WRMI/R Miami Intl	9955am			
1600-1700	USA, WRNO New Orleans LA	7395na			
1600-1700	USA, WSHB Cypress Crk SC	18915af			
1600-1700	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
1600-1700	USA, WYFR Okeechobee FL	11830na	15600na	15695eu	17555eu
		17750na	21525af		
1600-1615 a	Vatican City, Vatican R	12065om	13765au	15500au	
1600-1700	Zambia, Christian Voice	4965do			
1600-1700	Zambia, Natl BC Corp	6165do	6265do		
1600-1630 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1615-1700 a	UK, BBC World Service	9515am	11860af		
1615-1700 a	UK, BBC World Service	9515am			
1615-1630	Vatican City, Vatican R	4005eu	5883eu	7250eu	9645eu
		15595eu			
1630-1700	Austria, R Austria Intl	6155va	13730va	15240va	17560va
1630-1657	Canada, R Canada Intl	6140as	7150as		
1630-1700	Egypt, Radio Cairo	15255af			
1630-1700 sf	Seychelles, FEBA Radio	11695as			
1630-1700	Slovakia, R Slovakia Intl	5920eu	6055eu	7345eu	
1630-1657	Vietnam, Voice of	9730eu	9840eu		
1630-1700 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
1645-1700	Germany, Deutsche Welle	6140eu			
1645-1700	Tajikistan, Radio	7245as			
1645-1700 smwf	UK, BBC World Service	11860af			
1650-1700 twhfa	New Zealand, R NZ Intl	11675va			

Selected Programs

Daily

1600 USA, VOA Washington DC: News (Special English Broadcast).
1600 USA, VOA Washington DC: VOA News Now Preview.
1601 USA, VOA Washington DC: World News.
1606 USA, VOA Washington DC: All About English.
1606 USA, VOA Washington DC: World News in Depth.
1610 USA, VOA Washington DC: Regional News.
1614 USA, VOA Washington DC: U.S. News.
1618 USA, VOA Washington DC: Sports.
1628 USA, VOA Washington DC: Station Break.
1630 USA, VOA Washington DC: News (Special English).
1630 Canada, RCI Montreal (Asia): RCI News. See S 1200.
1658 USA, VOA Washington DC: Station Break.

Sundays

1600 USA, VOA Washington DC: Nightline Africa.
1622 USA, VOA Washington DC: U.S. Feature.
1630 USA, VOA Washington DC: Preview.
1631 USA, VOA Washington DC: World News.
1636 USA, VOA Washington DC: Encounter.
1637 Canada, RCI Montreal (Asia): The Mailbag. See S 1207.
1640 USA, VOA Washington DC: Words and their Stories (Special English).
1645 USA, VOA Washington DC: People in America (Special English).
1645 USA, VOA Washington DC: Science/Medicine/Environment.
1649 USA, VOA Washington DC: Business News.
1653 USA, VOA Washington DC: Features.

Monday-Friday

1600 Merlin Network One: Roy Masters.
1630 USA, VOA Washington DC: Africa World Tonight.
1630 USA, VOA Washington DC: Preview.
1631 USA, VOA Washington DC: World News in Depth.
1641 Canada, RCI Montreal (Asia): Spectrum. See M 1211.
1645 USA, VOA Washington DC: Science/Medicine/Environment.
1649 USA, VOA Washington DC: Business and Economic News.
1653 USA, VOA Washington DC: Music Feature.
1658 USA, VOA Washington DC: Local Station Break.

Mondays

1640 USA, VOA Washington DC: Development Report (Special English).
1645 USA, VOA Washington DC: This is America (Special English).

Tuesdays

1640 USA, VOA Washington DC: Agriculture Report (Special English).
1645 USA, VOA Washington DC: Science in the News (Special English).

Wednesdays

1640 USA, VOA Washington DC: Science Report (Special English).
1645 USA, VOA Washington DC: Exploration (Special English).

Thursdays

1640 USA, VOA Washington DC: Science Report (Special English).
1645 USA, VOA Washington DC: The Making of a Nation (Special English).

Fridays

1640 USA, VOA Washington DC: Environment Report (Special English).
1645 USA, VOA Washington DC: American Mosaic (Special English).

Saturdays

1600 Canada (North-Quebec): CBC Radio News. See S 0100.
1600 Merlin Network One: Global Sound Kitchen.
1600 USA, VOA Washington DC: Nightline Africa.
1609 Canada (North-Quebec): Quirks and Quarks. See S 1208.
1622 USA, VOA Washington DC: U.S. Feature.
1630 USA, VOA Washington DC: World News.
1636 Canada, RCI Montreal (Asia): Venture Canada. See A 1335.
1636 USA, VOA Washington DC: Press Conference USA.
1640 USA, VOA Washington DC: In the News (Special English).
1645 USA, VOA Washington DC: American Stories (Special English).

Frequencies

1700-1800	Anguilla,Caribbean Beacon	11775am			
1700-1800 vl	Australia, ABC/Alice Spgs	2310do			
1700-1800 vl	Australia, ABC/Katherine	2485do			
1700-1800 vl	Australia, ABC/Tent Creek	2325do			
1700-1800	Australia, Radio	5995as	6180va	9500as	9580va
		9660va	11880va		
1700-1730	Azerbaijan, R Dada Gorgud	9165me			
1700-1800 vl	Botswana, Radio	4820do	4830do	7255do	
1700-1800 vl	Canada, CBC N Quebec Svc	9625do			
1700-1800	Canada, CFRX Toronto	6070do			
1700-1800	Canada, CFVP Calgary	6030do			
1700-1800	Canada, CHNX Halifax	6130do			
1700-1800	Canada, CKZN St John's	6160do			
1700-1800	Canada, CKZU Vancouver	6160do			
1700-1756	China, China Radio Intl	5220af	7405af	9570af	11910af
		15300af	15310af		
1700-1800	Costa Rica,RF Peace Intl	15050am	21460am		
1700-1727	Czech Rep, R Prague Intl	5930eu	21745af		
1700-1800	Egypt, Radio Cairo	15255af			
1700-1800	Eqt Guinea, Radio Africa	15186af			
1700-1730	France, Radio France Intl	15210af	17605af		
1700-1730	Georgia, Georgian Radio	11910eu			
1700-1800	Germany, Deutsche Welle	6140eu			
1700-1800 a	Germany, Good News World	11795va			
1700-1800	Germany,Overcomer Ministr	3965eu	13810me		
1700-1800	Ghana, Ghana BC Corp	3366do	4915do		
1700-1800	Guyana, GBC/Voice of	5950do			
1700-1800 vl	Italy, IRRS	3985va			
1700-1800	Japan, Radio/NHK	7110eu	9535na	9825as	15355af
1700-1800	Kenya, Kenya BC Corp	4935do			
1700-1800 vl	Lesotho, Radio	4800do			
1700-1800	Malaysia, Radio	7295do			
1700-1800	N Marianas, KFBS Saipan	9465as			
1700-1800 twhfa	New Zealand, R NZ Intl	11675va			
1700-1800 vl	Nigeria, Radio/Ibadan	6070do			
1700-1800 vl	Nigeria, Radio/Kaduna	4770do			
1700-1800	Nigeria, Radio/Lagos	3326do			
1700-1730 t	Pakistan, Radio	11600me	13580me		
1700-1800	Palau, KHBN/Voice of Hope	9955as	9965as		
1700-1800 vl	Papua New Guinea, NBC	4890do			
1700-1800	Poland, Polish R Warsaw	6095eu	7285eu	9525eu	
1700-1756	Romania, R Romania Intl	15270eu	15380eu	17735eu	17865eu
1700-1800	Russia,Voice of Russia WS	7300eu	9480eu	9720eu	9775eu
		11510af	12065af		
1700-1800 smwhfa	Russia,Voice of Russia WS	9820eu	11675eu		
1700-1730	S Africa, Channel Africa	17860af			
1700-1800	Sierra Leone, SLBS	5980do			
1700-1800	Tanzania, Radio	5050af			
1700-1800	Uganda, Radio	4976do			
1700-1800	UK, BBC World Service	3255af	3915as	5975as	6005af
		6190af	7160as	9410eu	9510as
		9630af	9740as	11995me	12095eu
		15400af	15420af	15485eu	17830af
		17840am			
1700-1800	USA, KAIJ Dallas TX	13815na			
1700-1800	USA, KTBN Salt Lk City UT	15590na			
1700-1800	USA, KWHR Naalehu HI	9930as			
1700-1800	USA, Voice of America	6110as	6190as	7125as	7170as
		9645as	9700me	9760af	15255va
		15395as	15410af	15445af	17895af
1700-1800 mtwhf	USA, Voice of America	5990as	6045as	7150as	9550as
		9770as	11870as		
1700-1800	USA, WEWN Birmingham AL	11875na	13615na		
1700-1800	USA, WGTG McCaysville GA	9370al	9400am		
1700-1800	USA, WHRA Greenbush ME	17650af			
1700-1800	USA, WHRI Noblesville IN	13760na	15105na		
1700-1800	USA, WINB Red Lion PA	13800am			
1700-1800	USA, WJCR Upton KY	7490na			
1700-1800 irreg	USA, WMLK Bethel PA	9465am			
1700-1800	USA, WRNO New Orleans LA	7395na			
1700-1800	USA, WSHB Cypress Crk SC	18915af			
1700-1800	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
1700-1800	USA, WYFR Okeechobee FL	15695eu	17555eu		
1700-1727	Vietnam, Voice of	12070eu			
1700-1800	Zambia, Christian Voice	4965do			
1700-1800	Zambia, Natl BC Corp	6165do	6265do		
1700-1800 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
1715-1800 vl	Libya, Voice of Africa	15235va	15415va	15435va	
1715-1800	Swaziland, Trans World R	3200af			
1730-1756	Belgium,R Vlaanderen Intl	5910eu	9925eu	11840af	13685eu
1730-1800 as	Georgia, Georgian Radio	6080me			
1730-1800	Guam, AWR/KSDA	11560as	11965as		
1730-1800	Netherlands, Radio	6020af	7120af	11655af	
1730-1800	Philippines, R Pilipinas	11720as	15190as	17720as	
1730-1800	S Africa, AWR Africa	12130af			
1730-1800 mtwhfa	Sweden, Radio	6065eu			
1730-1800 s	Sweden, Radio	6065eu	9590eu		
1730-1800 s	UK, BBC World Service	12045as	15310as		
1730-1800	Vatican City, Vatican R	13765af	15570af	17550af	
1745-1800	Bangladesh, Bangla Betar	7185eu	7462eu	9548eu	15520eu
1745-1800	India, All India Radio	3315do	3345do	7410af	9635af
		9950eu	11620eu	11935af	13780af
		15200af			
1800-1900	Anguilla,Caribbean Beacon	11775am			
1800-1900 mtwhf	Argentina, RAE	15345eu			
1800-1900 vl	Australia, ABC/Alice Spgs	2310do			
1800-1900 vl	Australia, ABC/Katherine	2485do			
1800-1900 vl	Australia, ABC/Tent Creek	2325do			
1800-1900	Australia, Radio	6080pa	7240va	9500as	9580va
		9660va	11880va		
1800-1900	Bangladesh, Bangla Betar	7185eu	7462eu	9548eu	15520eu
1800-1900 vl	Botswana, Radio	4820do	4830do		
1800-1900	Canada, CFRX Toronto	6070do			
1800-1900	Canada, CFVP Calgary	6030do			
1800-1900	Canada, CHNX Halifax	6130do			
1800-1900	Canada, CKZN St John's	6160do			
1800-1900	Canada, CKZU Vancouver	6160do			
1800-1900	Costa Rica,RF Peace Intl	15050am	21460am		
1800-1830	Egypt, Radio Cairo	15255af			
1800-1900	Eqt Guinea, Radio Africa	15186af			
1800-1900	Germany, Deutsche Welle	6140eu			
1800-1900	Germany,Overcomer Ministr	3965eu			
1800-1830	Ghana, Ghana BC Corp	3366do	4915do		
1800-1815	Greece, Voice of	7450eu	9425eu	17705na	17765sa
1800-1900	Guyana, GBC/Voice of	5950do			
1800-1900	India, All India Radio	7410af	9950eu	11620eu	13780af
		15075af			
1800-1900 vl	Italy, IRRS	3985va			
1800-1900	Kenya, Kenya BC Corp	4935do			
1800-1900	Kuwait, Radio	11990am			
1800-1900	Lebanon, Voice of Hope	6280me	11515al	11530me	
1800-1900 vl	Lesotho, Radio	4800do			
1800-1815	Liberia,LCN/R Liberia Int	5100do			
1800-1900	Malaysia, Radio	7295do			
1800-1900	N Marianas, KFBS Saipan	9465as			
1800-1900	N Marianas, KHBI Saipan	13820as			
1800-1830	Netherlands, Radio	6020af	7120af	11655af	
1800-1900 vl	Nigeria, Radio/Ibadan	6050do			
1800-1900 vl	Nigeria, Radio/Kaduna	4770do			
1800-1900	Nigeria, Radio/Lagos	3326do			
1800-1900 vl	Nigeria, Voice of	7255af	15120va		
1800-1900	North Korea, R Pyongyang	6575eu	9335eu	11710am	13760am
1800-1900	Palau, KHBN/Voice of Hope	9965as			
1800-1900 vl	Papua New Guinea, NBC	4890do			
1800-1900	Philippines, R Pilipinas	11720as	15190as	17720as	
1800-1900	Russia,Voice of Russia WS	7300eu	7330eu	9480eu	9720eu
		9775eu	9820eu	9865eu	11510af
		11985eu	12025af	12065af	
1800-1830	S Africa, AWR Africa	5960af	6100af		
1800-1830	S Africa, Channel Africa	17870af			
1800-1900	Sierra Leone, SLBS	3316do			
1800-1900 vl	Solomon Islands, SIBC	5020do			
1800-1810	Somalia, Radio Mogadishu	6690af			
1800-1900	Sudan, Radio Omdurman	9200va			
1800-1830	Swaziland, Trans World R	9500af			
1800-1900	Swaziland, Trans World R	3200af			
1800-1900	Tanzania, Radio	5050af			
1800-1900	UK, BBC World Service	6035af	7415af	9760af	9770me
		11975af	13820as	15400af	15410af
		15580af	17830af	17895af	
1800-1900	USA, KAIJ Dallas TX	13815na			
1800-1900	USA, KJES Vado NM	15385na			
1800-1900	USA, KTBN Salt Lk City UT	15590na			
1800-1900	USA, KWHR Naalehu HI	17510as			
1800-1900	USA, Voice of America	6035af	7415af	9760af	9770me
		11975af	13820as	15410af	15580af
		17895af			
1800-1900	USA, WEWN Birmingham AL	11875na	13615na		
1800-1900	USA, WGTG McCaysville GA	9370al	9400am		
1800-1900	USA, WHRA Greenbush ME	17650af			
1800-1900	USA, WHRI Noblesville IN	9495sa	13760na		
1800-1900	USA, WINB Red Lion PA	13800am			
1800-1900	USA, WJCR Upton KY	7490na			
1800-1900 irreg	USA, WMLK Bethel PA	9465am			
1800-1900	USA, WRNO New Orleans LA	7395na			
1800-1900	USA, WSHB Cypress Crk SC	15665eu	18915af		
1800-1900	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
1800-1845	USA, WYFR Okeechobee FL	15695eu			
1800-1900 vl	Vanuatu, Radio	4960do			
1800-1827	Vietnam, Voice of	9730eu	9840eu		
1800-1900	Yemen, Rep of Yemen Radio	9780do			
1800-1900	Zambia, Christian Voice	4965do			
1800-1900	Zambia, Natl BC Corp	6165do	6265do		
1800-1900 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
1805-1810	Croatia, Croatian Radio	13830eu			
1830-1900	Ascension Is,RTE Radio	21630af			
1830-1900	Georgia, Georgian Radio	11760eu			
1830-1900 s	Germany, Universal Life	11785af			
1830-1900	Kiribati, Radio	9810do			
1830-1900	Netherlands, Radio	6020af	7120af	9895af	11655af
		13700af	17605af	21590af	
1830-1900 w	Philippines, FEBC R Intl	9465eu			
1830-1900	Serbia, Radio Yugoslavia	6100eu	9720eu		
1830-1900	Slovakia, R Slovakia Intl	5920eu	6055eu	7345eu	
1830-1900	Turkey, Voice of	9670eu	11765eu	13695eu	
1830-1900 as	USA, Voice of America	7170af	11940af	15525af	
1850-1900	New Zealand, R NZ Intl	11675va			

Frequencies

1900-2000	Anguilla,Caribbean Beacon	11775am			
1900-2000 vl	Australia, ABC/Katherine	2485do			
1900-2000 vl	Australia, ABC/Tent Creek	2325do			
1900-2000	Australia, Radio	6080pa	7240va	9500as	9580va
		9660va	11880va		
1900-2000 vl	Botswana, Radio	4820do	4830do		
1900-2000	Bulgaria, Radio	9400eu	11720eu		
1900-2000	Canada, CFRX Toronto	6070do			
1900-2000	Canada, CFVP Calgary	6030do			
1900-2000	Canada, CHNX Halifax	6130do			
1900-2000	Canada, CKZN St John's	6160do			
1900-2000	Canada, CKZU Vancouver	6160do			
1900-1956	China, China Radio Intl	9440af	11750af	13650af	15360af
1900-2000	Costa Rica,RF Peace Intl	15050am	21460am		
1900-2000	Ecuador, HCJB	17660eu	21455va		
1900-2000	Eqt Guinea, Radio Africa	15186af			
1900-1930	Finland, YLE/R Finland	6135eu			
1900-1945	Germany, Deutsche Welle	9640af	11785af	11810af	13790af
		15390af	17810af		
1900-2000	Germany,Overcomer Ministr	3965eu			
1900-2000	Guatemala, Adv World R	5980am			
1900-2000	Guyana, GBC/Voice of	5950do			
1900-1930	Hungary, Radio Budapest	6025eu	7170eu		
1900-1945	India, All India Radio	7410af	9635af	9950eu	11620eu
		11935af	13780af	15200af	
1900-2000 vl	Italy, IRRS	3985va			
1900-2000	Kenya, Kenya BC Corp	4885do	4935do		
1900-2000	Kiribati, Radio	9810do			
1900-2000	Kuwait, Radio	11990am			
1900-2000	Lebanon, Voice of Hope	6280me	11515al	11530me	
1900-2000 vl	Lesotho, Radio	4800do			
1900-1915	Liberia,LCN/R Liberia Int	5100do			
1900-2000	Malaysia, Radio	7295do			
1900-2000 mtwhfa	Malta, VO Mediterranean	12060eu			
1900-1930	Mongolia, Voice of	9720eu	12015eu		
1900-2000	N Marianas, KFBS Saipan	9465as			
1900-2000	Netherlands, Radio	6020af	7120af	9895af	11655af
		13700af	17605af	21590af	
1900-1950	New Zealand, R NZ Intl	11695va			
1900-2000 vl	Nigeria, Radio/Ibadan	6050do			
1900-2000 vl	Nigeria, Radio/Kaduna	4770do			
1900-2000	Nigeria, Radio/Lagos	3326do			
1900-2000	Nigeria, Voice of	7255af	15120va		
1900-2000	North Korea, R Pyongyang	6520eu	9600me	9975af	
1900-1930 m-a/vl	Papua New Guinea, NBC	4890do	9675do		
1900-1930	Philippines, R Pilipinas	11720as	15190as	17720as	
1900-1920	Russia,Voice of Russia WS	7350eu	11980eu	12000eu	
1900-2000	Russia,Voice of Russia WS	7300eu	7440eu	9480eu	9720eu
		9775eu	9820eu	12070eu	
1900-1930	Serbia, Radio Yugoslavia	7230au			
1900-2000	Sierra Leone, SLBS	3316do			
1900-2000 vl	Solomon Islands, SIBC	5020do			
1900-2000	South Korea, R Korea Intl	5975om	7275eu		
1900-2000	Swaziland, Trans World R	3200af			
1900-1930	Switzerland, Swiss R Intl	9885eu			
1900-1930	Tanzania, Radio	5050af			
1900-2000	Thailand, Radio	7210eu	9655eu	11905eu	
1900-1930	Turkey, Voice of	9670eu	11765eu	13695eu	
1900-2000	Uganda, Radio	4976do			
1900-2000	UK, BBC World Service	3255af	6005af	6180eu	6190af
		6195eu	9410eu	9630af	9740pa
	11835af	11995me	12095eu	15400af	17830af
1900-2000	USA, KAIJ Dallas TX	13815na			
1900-2000	USA, KTBN Salt Lk City UT	15590na			
1900-2000	USA, KWHR Naalehu HI	17510as			
1900-2000	USA, Voice of America	4950af	6035af	7375af	7415af
		9525pa	9760af	9770af	11870pa
	11975af	15180pa	15410af	15445af	15580af
1900-1930 as	USA, Voice of America	4950af			
1900-2000	USA, WEWN Birmingham AL	11875na	13615na		
1900-2000	USA, WGTG McCaysville GA	9370al	9400am		
1900-2000	USA, WHRA Greenbush ME	17650af			
1900-2000	USA, WHRI Noblesville IN	9495sa	13760na		
1900-2000	USA, WINB Red Lion PA	13800am			
1900-2000	USA, WJCR Upton KY	7490na			
1900-2000 a	USA, WRMI/R Miami INtl	9955am			
1900-2000	USA, WRNO New Orleans LA	7395na			
1900-2000	USA, WSHB Cypress Crk SC	15665eu	18915af		
1900-2000	USA, WWCR Nashville TN	9475na	12160va	13845na	15685na
1900-1945	USA, WYFR Okeechobee FL	15695eu			
1900-2000 vl	Vanuatu, Radio	4960do			
1900-1927	Vietnam, Voice of	9730eu	9840eu		
1900-2000	Zambia, Christian Voice	4965do			
1900-2000	Zambia, Natl BC Corp	6165do	6265do		
1900-2000 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
1915-1930	Albania, R Tirana Intl	7180eu	9510eu		
1930-2000 th	Belarus, R Minsk	7210eu	11960eu		
1930-1956	Belgium,R Vlaanderen Intl	5960eu			
1930-2000	Iran, VOIRI	7215eu	9022eu	9880as	
1930-2000	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	9525eu
1930-2000	Sweden, Radio	6065eu			
1935-1955	Italy, RAI Intl	5970eu	7160eu	9760eu	
1950-2000 smtwh	New Zealand, R NZ Intl	17675va			
1950-2000	Vatican City, Vatican R	4005eu	5883eu	7250eu	9645eu
1956-2000	S Africa, Voice of Hope	6290af			
1958-2000 smtwh	New Zealand, R NZ Intl	17675va			

2000 UTC

2000-2100	Algeria, R Algiers Intl	11715af	15160me		
2000-2100	Angola, Radio Nacional	3355af			
2000-2100	Anguilla,Caribbean Beacon	11775am			
2000-2100 vl	Australia, ABC/Alice Spgs	2310do			
2000-2100 vl	Australia, ABC/Katherine	2485do			
2000-2100 vl	Australia, ABC/Tent Creek	2325do			
2000-2100	Australia, Radio 9500as	9580va	9660va	11880va	12080va
2000-2100 vl	Botswana, Radio	4820do	4830do		
2000-2100	Canada, CFRX Toronto	6070do			
2000-2100	Canada, CFVP Calgary	6030do			
2000-2100	Canada, CHNX Halifax	6130do			
2000-2100	Canada, CKZN St John's	6160do			
2000-2100	Canada, CKZU Vancouver	6160do			
2000-2100	Canada, R Canada Intl	5995eu	11690eu	13650eu	13670eu
	15150eu	15325eu	15470eu	17570eu	17820eu
2000-2056	China, China Radio Intl	6950eu	7590eu	9440af	9535eu
		13675af	15500af		
2000-2100	Costa Rica,RF Peace Intl	15050am	21460am		
2000-2100 vl	Cuba, Radio Havana	13660eu	13750eu		
2000-2027	Czech Rep, R Prague Intl	5930eu	11600va		
2000-2100	Ecuador, HCJB	17660eu	21455va		
2000-2100	Eqt Guinea, Radio Africa	15186af			
2000-2045	Germany, Deutsche Welle	11970eu			
2000-2100	Germany,Overcomer Ministr	3965eu			
2000-2030	Ghana, Ghana BC Corp	3366do	4915do		
2000-2100	Guatemala, Adv World R	5980am			
2000-2100	Guyana, GBC/Voice of	5950do			
2000-2100	Indonesia, Voice of	15150va			
2000-2030	Iran, VOIRI	7215eu	9022eu	9880eu	
2000-2025	Israel, Kol Israel	11605va	15640af	15650va	17545va
2000-2100 vl	Italy, IRRS	3985va			
2000-2100	Kenya, Kenya BC Corp	4885do	4935do		
2000-2100	Kiribati, Radio	9810do			
2000-2100	Kuwait, Radio	11990am			
2000-2100	Lebanon, Voice of Hope	6280me	11515al	11530me	
2000-2100 vl	Lesotho, Radio	4800do			
2000-2055	Liberia,LCN/R Liberia Int	5100do			
2000-2100	Malaysia, Radio	7295do			
2000-2100	Namibia, NBC	3270af	3289af		
2000-2025	Netherlands, Radio	6020af	7120af	9895af	11655af
		13700af	17605af	21590af	
2000-2100	New Zealand, R NZ Intl	17675va			
2000-2015 vl	Niger, Voice du Sahel	5019do			
2000-2100 vl	Nigeria, Radio/Ibadan	6050do			
2000-2100 vl	Nigeria, Radio/Kaduna	4770do			
2000-2100	Nigeria, Radio/Lagos	3326do			
2000-2100	Nigeria, Voice of	7255af	15120va		
2000-2100 vl	Papua New Guinea, NBC	9675do			
2000-2030	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	9525eu
2000-2100	Russia,Voice of Russia WS	7300eu	9720eu	9775eu	9820eu
		11980eu			
2000-2005	S Africa, Voice of Hope	6290af			
2000-2100	Sierra Leone, SLBS	3316do			
2000-2100 vl	Solomon Islands, SIBC	5020do			
2000-2100 mtwhf	Spain, R Exterior Espana	9595af	15285eu		
2000-2100	Swaziland, Trans World R	3200af			
2000-2030	Switzerland, Swiss R Intl	13710af	13770af	15220af	17580af
2000-2100	Uganda, Radio	4976do			
2000-2100	UK, BBC World Service	3255af	3955eu	5975pa	6005af
	6180eu	6190af	6195va	9410eu	9630af
	9740pa	11835af	12095eu	15400af	17830af
2000-2100	USA, KAIJ Dallas TX	13815na			
2000-2100	USA, KTBN Salt Lk City UT	15590na			
2000-2100	USA, KWHR Naalehu HI	17510as			
2000-2100	USA, Voice of America	4950af	6035af	6095me	7375af
	7415af	9760af	9770af	11855af	11975af
	15410af	15445af	15580af	17725af	17745af
2000-2100	USA, WBCQ Monticello ME	7415na			
2000-2100	USA, WEWN Birmingham AL	11875na	13615na		
2000-2100	USA, WGTG McCaysville GA	9400am			
2000-2100	USA, WHRA Greenbush ME	17650af			
2000-2100	USA, WHRI Noblesville IN	5745sa	9495na		
2000-2100	USA, WINB Red Lion PA	13800am			
2000-2100	USA, WJCR Upton KY	7490na			
2000-2100 as	USA, WRMI/R Miami Intl	9955am			
2000-2100	USA, WRNO New Orleans LA	7395na			
2000-2l00	USA, WSHB Cypress Crk SC	15665eu	18915af		
2000-2100	USA, WWCR Nashville TN	9475na	12160va	13845na	15685na
2000-2045	USA, WYFR Okeechobee FL	15695eu	17750eu	17845af	
2000-2100 vl	Vanuatu, Radio	4960do			
2000-2010	Vatican City, Vatican R	4005eu	5883eu	7250eu	9645eu
		9660af	11625af	13765va	
2000-2100	Zambia, Christian Voice	4965do			
2000-2100	Zambia, Natl BC Corp	6165do	6265do		
2000-2100 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
2005-2100	Syria, Radio Damascus	12085eu	13610eu		
2010-2030	Vatican City, Vatican R	9660af	11625af	13765va	
2015-2100 vl	Libya, Voice of Africa	15235va	15415va	15435va	
2025-2045	Italy, RAI Intl	7220af	9710af	11880af	
2030-2100 th	Belarus, R Minsk	7210eu	11960eu		
2030-2100	Egypt, Radio Cairo	15375af			
2030-2100	Germany, AWR Europe	15560af			
2030-2055	Moldova, R Moldova Intl	7520eu			
2030-2100	S Africa, AWR Africa	9745af			
2030-2045	Thailand, Radio	9655eu	9680eu	11905eu	
2030-2100	Turkey, Voice of	7170va			
2030-2100 as	USA, Voice of America	4950af			
2030-2100	Uzbekistan, R Tashkent	9540eu	9545va		
2030-2057	Vietnam, Voice of	9730eu	9840eu	13740eu	
2045-2100	India, All India Radio	7150au	7410eu	9650eu	9910au
		9950eu	11620eu	11715eu	
2045-2100	USA, WYFR Okeechobee FL	15695na	17845va		

Frequencies

2100-2200	Anguilla,Caribbean Beacon	11775am			
2100-2130 vl	Australia, ABC/Alice Spgs	2310do			
2100-2130 vl	Australia, ABC/Katherine	2485do			
2100-2200 vl	Australia, ABC/Katherine	5025do			
2100-2130 vl	Australia, ABC/Tent Creek	2325do			
2100-2130	Australia, Radio	7240pa	9500as	9580va	9660pa
		11880va	12080va	17580va	21740va
2100-2200 vl	Botswana, Radio	3356do	4820do		
2100-2200	Bulgaria, Radio	9400eu	11720eu		
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	7235eu	11690eu	13650eu	13670eu
	15150eu	15325eu	15470eu	17570eu	17820eu
2100-2130	China, China Radio Intl	6950eu	7590eu	9535eu	11735af
		15415af	15500eu		
2100-2157	China, China Radio Intl	13675va			
2100-2200	Costa Rica,RF Peace Intl	15050am	21460am		
2100-2200 vl	Cuba, Radio Havana	13660eu	13750eu		
2100-2200	Ecuador, HCJB	17660eu	21455va		
2100-2200	Egypt, Radio Cairo	15375af			
2100-2200	Eqt Guinea, Radio Africa	15186af			
2100-2145	Germany, Deutsche Welle	9670as	9765as	9875af	11865af
		11915as	13780as	15135va	
2100-2200	Guyana, GBC/Voice of	5950do			
2100-2130	Hungary, Radio Budapest	6025eu			
2100-2200	India, All India Radio	7150au	7410eu	9650eu	9910au
		9950eu	11620eu	11715eu	
2100-2130 irreg	Iraq, Radio Iraq Intl	9685va			
2100-2200 vl	Italy, IRRS	3985va			
2100-2200	Japan, Radio/NHK	6035pa	9725eu	17825na	21610pa
2100-2130	Kenya, Kenya BC Corp	4885do	4935do		
2100-2130	Kiribati, Radio	9810do			
2100-2200	Lebanon, Voice of Hope	6280me	11515al	11530me	
2100-2200 vl	Lesotho, Radio	4800do			
2100-2115	Liberia,LCN/R Liberia Int	5100do			
2100-2200	Malaysia, Radio	7295do			
2100-2200	Namibia, NBC	3270af	3289af		
2100-2200	New Zealand, R NZ Intl	17675va			
2100-2200 vl	Nigeria, Radio/Ibadan	6050do			
2100-2200 vl	Nigeria, Radio/Kaduna	4770do			
2100-2200	Nigeria, Radio/Lagos	3326do			
2100-2200	North Korea, R Pyongyang	6575eu	9335as	11710am	13760am
2100-2200	Palau, KHBN/Voice of Hope	9985as			
2100-2200 vl	Papua New Guinea, NBC	9675do			
2100-2200	Romania, R Romania Intl	9570eu	11725eu	11810eu	11840eu
		15180eu			
2100-2130	Serbia, Radio Yugoslavia	6100eu	6185eu		
2100-2200	Sierra Leone, SLBS	3316do			
2100-2200 vl	Solomon Islands, SIBC	5020do			
2100-2130	South Korea, R Korea Intl	3970eu	6480eu	15575eu	
2100-2200 as	Spain, R Exterior Espana	9595af	15205eu		
2100-2200	Swaziland, Trans World R	3200af			
2100-2130	Turkey, Voice of	7170va			
2100-2200	UK, BBC World Service	3255af	3915as	3955eu	5965as
	5975va	6005af	6180eu	6190af	6195va
	9410eu 9740pa	11835af	11945as	12095sa	15400af
2100-2200 f	UK, Merlin Network One	6140eu	7325eu	9720eu	
2100-2200	Ukraine, R Ukraine Intl	5905eu	6020eu	6090eu	9560eu
		17715eu			
2100-2200	USA, KAIJ Dallas TX	13815na			
2100-2200	USA, KTBN Salt Lk City UT	15590na			
2100-2200	USA, KWHR Naalehu HI	17510as			
2100-2200	USA, Voice of America	6035af	6040me	7375af	7415af
	9535af	9705as	9760as	11870pa	11975af
	15185as 15410af	15445af	15580af	17725af	17735as
2100-2200	USA, WBCQ Monticello ME	7415na			
2100-2200	USA, WEWN Birmingham AL	9385eu	11875na	13615na	
2100-2200	USA, WGTG McCaysville GA	9400am			
2100-2200	USA, WHRA Greenbush ME	17650af			
2100-2200	USA, WHRI Noblesville IN	5745na	9495sa		
2100-2200	USA, WINB Red Lion PA	13790am			
2100-2200	USA, WJCR Upton KY	7490na			
2100-2200 as	USA, WRMI/R Miami Intl	9955am			
2100-2200	USA, WRNO New Orleans LA	7395na			
2100-2200	USA, WSHB Cypress Crk SC	11815af	15665eu		
2100-2200	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
2100-2200	USA, WYFR Okeechobee FL	15215eu	15695af	17845va	
2100-2200 vl	Vanuatu, Radio	4960do			
2100-2200	Zambia, Christian Voice	4965do			
2100-2200	Zambia, Natl BC Corp	6165do	6265do		
2100-2200 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
2105-2200	Syria, Radio Damascus	12085na	13610na		
2115-2145 mtwhfa	Armenia, Voice of	4810va	9965va		
2115-2200	Egypt, Radio Cairo	9990eu			
2115-2130 mtwhf	UK, BBC Caribbean Report	5975ca	15390ca	17715ca	
2115-2130 as	UK, BBC World Service	5975am			
2130-2200	Albania, R Tirana Intl	7160eu	9635eu		
2130-2200 vl	Australia, ABC/Tent Creek	4910do			
2130-2200	Australia, Radio	7240pa	9660pa	11880va	12080va
		17580va	21740va		
2130-2200	Austria, R Austria Intl	6155eu			
2130-2200 smtwha	Austria, R Austria Intl	5945eu	13730af		
2130-2157	Czech Rep, R Prague Intl	11600va	15545af		
2130-2200	Guam, AWR/KSDA	15550as			
2130-2200	Hungary, Radio Budapest	3975eu			
2130-2200	Iran, VOIRI	11740as	13745as		
2130-2155	Moldova, R Moldova Intl	7520eu			
2130-2200	South Korea, R Korea Intl	15575eu			
2130-2200	Sweden, Radio	6065eu	9430eu		
2130-2145 tf	UK, BBC Calling Falklands	11680sa			
2130-2200	USA, Voice of America	6040me	9535af	9705as	11870pa
		15185as	17735as		
2130-2200 smtwhf	USA, Voice of America	6035af	7375af	7415af	11975af
		15410af	15445af	15580af	17725af
2130-2200	Uzbekistan, R Tashkent	7105eu	9540eu		

2200 UTC

2200-2300	Anguilla,Caribbean Beacon	6090am			
2200-2300 vl	Australia, ABC/Katherine	5025do			
2200-2300 vl	Australia, ABC/Tent Creek	4910do			
2200-2300	Australia, Radio	17580va	17795va	21740va	
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	5960na	9755na	11705as	13670am
		15305am			
2200-2256	China, China Radio Intl	9880eu			
2200-2300	Costa Rica,RF Peace Intl	15050am	21460am		
2200-2245	Egypt, Radio Cairo	9990eu			
2200-2300	Eqt Guinea, Radio Africa	15186af			
2200-2215	Ghana, Ghana BC Corp	3366do	4915do		
2200-2300	Guyana, GBC/Voice of	5950do			
2200-2230	India, All India Radio	7150au	7410eu	9650eu	9910au
		9950eu	11620eu	11715eu	
2200-2230	Iran, VOIRI	11740as	13745as		
2200-2225	Italy, RAI Intl	9675as	11900as	15240as	
2200-2215	Liberia,LCN/R Liberia Int	5100do			
2200-2300	Malaysia, Radio	7295do			
2200-2230	Mexico, Radio Mexico Intl	9705am			
2200-2300	Namibia, NBC	3270af	3289af		
2200-2300	New Zealand, R NZ Intl	17675va			
2200-2300 vl	Nigeria, Radio/Ibadan	6050do			
2200-2300 vl	Nigeria, Radio/Kaduna	4770do			
2200-2300	Nigeria, Radio/Lagos	3326do			
2200-2300	Palau, KHBN/Voice of Hope	9985as			
2200-2300 vl	Papua New Guinea, NBC	9675do			
2200-2300	Sierra Leone, SLBS	3316do			
2200-2300 vl	Solomon Islands, SIBC	5020do			
2200-2215	Swaziland, Trans World R	3200af			
2200-2205	Syria, Radio Damascus	12085eu	13610na		
2200-2300	Taiwan, Radio Taipei Intl	11565eu	15600eu		
2200-2300	Turkey, Voice of	7190eu	13640na		
2200-2300	UK, BBC World Service	5965as	5975am	6175am	6195va
	7110as	9590am	9660as	9890as	9915sa
	11835af	11955as	12080pa	12095sa	15400af
2200-2300 f	UK, Merlin Network One	6140eu	7325eu	9720eu	
2200-2300	USA, KAIJ Dallas TX	13815na			
2200-2300	USA, KTBN Salt Lk City UT	15590na			
2200-2300	USA, KWHR Naalehu HI	17510as			
2200-2230 mtwhf	USA, Voice of America	6035af	7215as	7340af	7375as
	7415af	9705as	9770as	11760as	11975af
	15185as	15290as	15305as	17735as	17820as
2200-2300	USA, WBCQ Monticello ME	7415na			
2200-2300	USA, WEWN Birmingham AL	9385eu	13615na		
2200-2300	USA, WGTG McCaysville GA	6890am	9400am		
2200-2300	USA, WHRA Greenbush ME	17650af			
2200-2300	USA, WHRI Noblesville IN	5745na	9495sa		
2200-2300	USA, WINB Red Lion PA	13790am			
2200-2300	USA, WJCR Upton KY	7490na			
2200-2230 as	USA, WRMI/R Miami Intl	9955am			
2200-2300	USA, WRNO New Orleans LA	7395na			
2200-2300	USA, WSHB Cypress Crk SC	13770eu	15285sa		
2200-2300	USA, WWCR Nashville TN	5070na	7435na	9475na	12160na
		13845na			
2200-2245	USA, WYFR Okeechobee FL	11740na	15215af	17845va	
2200-2300 vl	Vanuatu, Radio	4960do			
2200-2210	Zambia, Natl BC Corp	6165do	6265do		
2229-2300	Canada, R Canada Intl	5960na	9755na	13670na	
2230-2256	Belgium,R Vlaanderen Intl	15565na			
2230-2300	Cuba, Radio Havana	9550am			
2230-2257	Czech Rep, R Prague Intl	11600na	15545na		
2230-2300	USA, Voice of America	7215as	9705as	9770as	11760as
	15185as	15290as	15305as	17735as	17820as
2245-2300	India, All India Radio	7410as	9705as	9950as	11620as
		13625as			
2245-2300	USA, WYFR Okeechobee FL	11740na			
2245-2300	Vatican City, Vatican R	9600as	11830as		
2300-0000	Anguilla,Caribbean Beacon	6090am			

Frequencies

2300-0000 vl	Australia, ABC/Katherine	5025do			
2300-0000 vl	Australia, ABC/Tent Creek	4910do			
2300-0000	Australia, Radio	9660pa	12080va	17580va	17795va
		21740va			
2300-0000	Bulgaria, Radio	9400na	11700na		
2300-0000	Canada, CBC N Quebec Svc	9625do			
2300-0000	Canada, CFRX Toronto	6070do			
2300-0000	Canada, CFVP Calgary	6030do			
2300-0000	Canada, CHNX Halifax	6130do			
2300-0000	Canada, CKZN St John's	6160do			
2300-0000	Canada, CKZU Vancouver	6160do			
2300-2330	Canada, R Canada Intl	5960na	9755na	11895am	13670am
		15305am			
2300-0000	China, China Radio Intl	5990na			
2300-0000	Costa Rica,RF Peace Intl	15050am	21460am		
2300-2330	Cuba, Radio Havana	9550am			
2300-0000	Egypt, Radio Cairo	9900am			
2300-2345	Germany, Deutsche Welle	9715as	9815as	11965as	
2300-0000 s	Germany, Good News World	9405sa			
2300-0000	Guyana, GBC/Voice of	5950do			
2300-0000	India, All India Radio	7410as	9705as	9950as	11620as
		13625as			
2300-2315	Liberia,LCN/R Liberia Int	5100do			
2300-0000	Malaysia, Radio	7295do			
2300-2330	Mexico, Radio Mexico Intl	9705am			
2300-0000	Namibia, NBC	3270af	3289af		
2300-0000	New Zealand, R NZ Intl	17675va			
2300-2330 vl	Nigeria, Radio/Ibadan	6050do			
2300-2330 vl	Nigeria, Radio/Kaduna	4770do			
2300-2330	Nigeria, Radio/Lagos	3326do			
2300-0000	North Korea, R Pyongyang	11335am	13760am	15130am	
2300-0000	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	
2300-0000 vl	Papua New Guinea, NBC	9675do			
2300-0000	Romania, R Romania Intl	9570eu	11810eu	11830na	15105na
2300-0000	Sierra Leone, SLBS	3316do			
2300-0000	Singapore,RCorp Singapore	6150do			
2300-0000 vl	Solomon Islands, SIBC	5020do			
2300-0000	UK, BBC World Service	3915as	5965as	5975am	6035as
		6175am	6195as	7110as	9590am
		9915sa	11945as	11955as	12095sa
		15280as			
2300-0000 f	UK, Merlin Network One	6015eu	7325eu	9720eu	
2300-0000	USA, KAIJ Dallas TX	13815na			
2300-0000	USA, KTBN Salt Lk City UT	15590na			
2300-0000	USA, KWHR Naalehu HI	17510as			
2300-0000	USA, Voice of America	7215as	9705as	9770as	11760as
		15185as	15290as	15305as	17735as
		17820as			
2300-0000	USA, WBCQ Monticello ME	7415na			
2300-0000	USA, WEWN Birmingham AL	9385eu	13615na		
2300-0000	USA, WGTG McCaysville GA	5085am	6890am		
2300-0000	USA, WHRA Greenbush ME	7580af			
2300-0000	USA, WHRI Noblesville IN	5745na	9495sa		
2300-0000	USA, WINB Red Lion PA	13790am			
2300-0000	USA, WJCR Upton KY	7490na			
2300-0000	USA, WRNO New Orleans LA	7355na			
2300-0000	USA, WSHB Cypress Crk SC	13770va	15285sa		
2300-0000	USA, WWCR Nashville TN	5070na	7435na	9475na	13845na
2300-2345	USA, WYFR Okeechobee FL	11740na			
2300-0000 vl	Vanuatu, Radio	4960do			
2300-2305	Vatican City, Vatican R	9600as	11830as		
2310-2320	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
2315-0000 vl	Libya, Voice of Africa	15235va	15415va	15435va	
2330-0000	Canada, R Canada Intl	5960na	9755na	13670am	
2330-0000 as	Canada, R Canada Intl	11895am	15305am		
2330-0000 vl	Guatemala, Radio Cultural	3300do			
2330-0000	Malaysia, RTM Sarawak	7160do			
2330-0000	Netherlands, Radio	6165na	9845na		
2330-2357	Vietnam, Voice of	12019as	13740as		
2345-0000	Ghana, Ghana BC Corp	3366do	4915do		

Selected Programs

Daily

2300 Bulgaria, Radio: News. See S 0200.
2300 USA, VOA Washington DC: VOA News Now Preview.
2301 USA, VOA Washington DC: World News.
2310 USA, VOA Washington DC: Regional News.
2314 USA, VOA Washington DC: U.S. News.
2318 USA, VOA Washington DC: Sports.
2328 USA, VOA Washington DC: Station Break.
2330 USA, VOA Washington DC: Preview.
2331 USA, VOA Washington DC: World News.
2358 USA, VOA Washington DC: Local Station Break.

Sundays

2300 Canada, RCI Montreal: CBC Radio News. See S 0200.
2305 Canada, RCI Montreal: Roots and Wings. Philly Markowitz plays the rare, the beautiful and the unexpected music from the four corners of our world.
2306 USA, VOA Washington DC: World News in Depth.
2310 Bulgaria, Radio: News Behind the News. See S 0210.
2322 USA, VOA Washington DC: U.S. Feature.
2325 Bulgaria, Radio: Plaza Bulgaria. See S 1130.
2336 USA, VOA Washington DC: Issues in the News.

Monday-Friday

2300 Canada (North-Quebec): As It Happens. Mary Lou Finlay and Barbara Budd host this daily phone-in show that introduces listeners to the newsmakers of the day and people whose stories might otherwise not be told.
2300 Canada, RCI Montreal: The World at Six. CBC radio's major newscast of the day, presenting the important stories in depth and in context.
2306 USA, VOA Washington DC: World News in Depth.
2336 USA, VOA Washington DC: Dateline.
2345 USA, VOA Washington DC: Science/Medicine/Environment.
2349 USA, VOA Washington DC: Business and Economic News.
2353 USA, VOA Washington DC: Women's Business Minute.
2354 USA, VOA Washington DC: Feature.

Mondays

2310 Bulgaria, Radio: Events and Development. A review of upcoming events this week.
2325 Bulgaria, Radio: Magazine Economy. Economic news briefs and financial developments in Bulgaria.
2340 Bulgaria, Radio: Keyword Bulgaria. See S 0225.

Tuesdays

2310 Bulgaria, Radio: Events and Development. See M 2310.
2325 Bulgaria, Radio: Art and Artists. A five-minute look at a cultural event in Bulgaria.
2330 Bulgaria, Radio: Timeout for Music. See S 0235.
2341 Bulgaria, Radio: Keyword Bulgaria. See S 0225.

Wednesdays

2310 Bulgaria, Radio: Events and Development. See M 2310.
2343 Bulgaria, Radio: Keyword Bulgaria. See S 0225.

Thursdays

2310 Bulgaria, Radio: Events and Development. See M 2310.
2325 Bulgaria, Radio: The Way We Live. A program that offers a broad range of topics on Bulgarian life.
2333 Bulgaria, Radio: Timeout for Music. See S 0235.
2344 Bulgaria, Radio: Keyword Bulgaria. See S 0225.

Fridays

2300 Merlin Network One: Global Sound Kitchen.
2310 Bulgaria, Radio: News Behind the News. See S 0210.
2325 Bulgaria, Radio: Keyword Bulgaria. See S 0225.
2335 Bulgaria, Radio: Timeout for Music. See S 0235.
2345 Bulgaria, Radio: Radio Bulgaria Calling. See S 0245.

Saturdays

2300 Canada (North-Quebec): News/Sports. See S 0300.
2300 Canada, RCI Montreal: CBC Radio News. See S 0200.
2305 Canada, RCI Montreal: Global Village. Vignettes about music in the little corners of the world.
2306 USA, VOA Washington DC: World News in Depth.
2310 Bulgaria, Radio: News Behind the News. See S 0210.
2322 USA, VOA Washington DC: U.S. Feature.
2325 Bulgaria, Radio: Keyword Bulgaria. See S 0225.
2336 USA, VOA Washington DC: Communications World (C).
2340 Bulgaria, Radio: Answering Your Letters. Replies to listener letters and Bulgarian Music.
2345 USA, VOA Washington DC: Science/Medicine/Environment.
2349 USA, VOA Washington DC: Business News.
2353 USA, VOA Washington DC: Feature.

Hauser's Highlights

NEW ZEALAND: RNZI

Schedule 05 September - 31 October:

1650-1950	11675	Tue-Sat
1850-1950	11675	Sun-Mon
1950-0705	17675	Sun-Thu
1958-0705	17675	Fri-Sat
0705-1105	9700	Daily

Usual Closedown 1105-1650; however, for occasional overnight broadcasts:

1105-1500	6100
1500-1650	6145

(Adrian Sainsbury, RNZI)

Jacques d'Avignon
monitor@rac.ca

Where to Listen in 1999

The predictions for the occurrence of the peak of the present sun cycle seem to tell us that the maximum will occur in mid to late 2000. This means that the present DX season – fall/winter 1999-2000 – should be very good to excellent.

As DX conditions improve, with a marked increase in the MUF (Maximum Usable Frequency) and the OWF (Optimum Working Frequency), SW broadcasters may choose from a greater number of frequencies for their transmissions. Many international broadcasters have been able to migrate from the lower frequencies of 49 and 41 meter bands to the higher frequencies, especially at night. The time and/or frequency conflicts that afflicted broadcasters during the start of the present cycle have largely been resolved.

Below is a listing of the frequencies available to broadcasters, and the best time of the day to listen to them if you live in North America. Even if the propagation forecasts do not seem to indicate that the 15, 13 and 11 meter bands will be open, give them a try; you never know what is really up there!

Meter Band	Frequency in MHz	What Can Be Heard in North America
2000(!)	0.153-0.279	This is a broadcast band in Europe and North Africa. East coast listeners can occasionally hear these stations. Using the longest antenna possible in a quiet surrounding will increase your chances. Listen only after 16:00 hr EST. You have not lived till you have heard Christmas carols sung in Icelandic! Real fun DX down there.
120	2.300-2.495	Tropical domestic. Some Australian stations can be heard at times in Eastern North America if you are located in an RF quiet environment. These Australian stations have been designed and built to cover only the area surrounding the stations using the NVIS propagation mode!
90	3.200-3.400	Tropical domestic. African stations can heard late afternoon and early evening when the noise level is low.
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. This band is normally filled "wall to wall" with international broadcasters when the sun cycle is low.
41	7.100-7.350	Very good evening band. It is used extensively by the European broadcasters for transmission to North and South America late afternoon and at night.
31	9.400-9.900	Good all around-the-clock band. Depending on the time of day, you can hear signals from Europe and/or Asia. A reliable station is Radio Australia on 9.580 MHz around 1000-1200 UTC in Eastern North America. This signal is not aimed to North America but "happens" to reach us!
25	11.600-12.100	Excellent band for mid-day listening; also can be good at night.
22	13.570-13.870	Many broadcasters are using this "new" band extensively. Good daytime band; also can be good at night.
19	15.100-15.800	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 also be heard at night.
16	17.480-17.900	This also a good daytime band, but not used as much as the 19 meter band.
15	18.900-19.020	Good morning and early daytime. One of the new bands for the broadcasters. Not used much at present.
13	21.450-21.780	Good early daytime and early morning band, also signals from Australia and Pacific area heard around 0500 UTC, when the solar flux is mid to high.
11	25.670-26.100	Early daytime band when the propagation conditions are very good: high sunspots number. Has very limited use at other times.

OPTIMUM WORKING FREQUENCIES (MHz)

For the Period 15 October to 14 November 1999 Flux=199 SSN=155

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
TO/FROM US WEST COAST																								
SOUTH AMERICA	29	27	24	20	17	15	14	13	13	12	11	11	10	13	22	30	32	33	32	31	30	30	30	31
WESTERN EUROPE	10	10	10	9	9	9	9	10	10	10	9	9	*	10	13	19	23	23	21	19	16	14	13	11
EASTERN EUROPE (P)	10	10	10	10	11	14	13	11	11	11	*	*	10	10	12	18	22	19	17	14	12	*	*	10
MEDITERRANEAN	18	17	17	16	15	15	14	13	13	12	*	*	*	13	17	23	27	30	28	25	23	21	19	18
MIDDLE EAST (P)	13	13	13	18	18	15	13	12	*	*	*	11	11	11	13	17	22	19	16	14	14	14	13	13
CENTRAL AFRICA	26	25	24	20	17	15	14	13	*	*	*	*	*	*	21	28	28	27	25	24	25	27	29	27
SOUTH AFRICA	23	21	19	17	15	15	14	13	*	*	*	*	*	15	23	28	28	28	28	28	27	27	25	24
SOUTH EAST ASIA (P)	32	32	29	26	22	17	14	*	*	*	10	10	10	10	10	12	17	24	23	19	17	15	14	19
FAR EAST	30	29	27	23	20	16	13	11	10	10	10	9	9	9	9	11	12	11	11	11	14	22	30	31
AUSTRALIA	27	27	28	27	25	21	18	16	15	14	14	13	12	11	11	14	18	16	16	17	23	26	27	28
TO/FROM US MIDWEST																								
SOUTH AMERICA	25	21	18	15	14	13	12	12	11	10	10	10	12	20	27	29	29	29	29	28	27	27	27	27
WESTERN EUROPE	13	12	12	11	11	11	11	11	12	12	12	12	13	19	25	27	28	26	24	22	19	17	15	14
EASTERN EUROPE	9	9	9	9	10	12	13	13	12	12	11	11	12	16	21	25	23	20	17	14	12	11	10	10
MEDITERRANEAN	18	17	16	16	15	14	14	14	13	12	*	*	15	21	26	29	32	31	28	25	23	21	20	19
MIDDLE EAST (P)	13	13	13	15	16	14	14	13	13	13	12	12	13	17	22	26	23	20	18	15	15	14	14	13
CENTRAL AFRICA	26	24	21	18	17	16	16	15	14	*	*	*	19	26	29	29	28	28	26	25	26	28	30	28
SOUTH AFRICA	23	21	19	17	15	16	16	15	14	*	*	*	18	26	29	28	28	28	28	28	27	27	25	24
SOUTH EAST ASIA (P)	29	27	24	20	17	15	*	*	*	*	11	11	11	12	15	21	24	22	21	18	16	14	13	17
FAR EAST	30	28	25	21	17	15	12	11	11	11	10	10	10	11	13	13	12	12	12	*	14	22	31	31
AUSTRALIA	27	27	27	23	19	17	15	13	13	13	13	12	12	12	16	20	18	16	16	17	22	25	27	27
TO/FROM US EAST COAST																								
SOUTH AMERICA	20	17	15	14	13	13	12	11	10	9	8	11	18	24	26	27	26	26	25	24	24	24	24	22
WESTERN EUROPE	13	12	12	11	11	11	10	11	12	12	12	16	23	29	31	31	30	28	26	23	20	17	15	14
EASTERN EUROPE	10	10	10	9	10	11	14	13	12	12	11	14	22	27	28	26	23	20	18	15	13	11	10	10
MEDITERRANEAN	19	18	16	15	14	14	15	14	13	13	13	19	27	31	33	33	33	31	28	25	23	22	20	20
MIDDLE EAST (P)	14	13	14	15	16	16	15	14	14	13	13	17	24	30	31	27	25	22	19	17	16	16	15	14
CENTRAL AFRICA	24	21	19	18	18	17	15	14	13	*	16	26	28	29	29	30	29	29	27	26	27	29	29	27
AFRICA	23	21	19	17	15	17	15	14	*	*	15	24	30	29	29	28	28	28	28	28	27	27	25	24
SOUTH EAST ASIA (P)	23	22	20	18	16	15	14	14	13	13	12	13	17	23	28	28	24	21	20	19	16	14	13	14
FAR EAST	29	26	22	20	17	15	15	14	13	13	13	12	14	14	14	14	13	13	13	13	15	22	31	32
AUSTRALIA	26	25	21	18	16	15	14	14	13	12	12	12	14	21	20	19	17	15	15	17	21	24	26	26

* *Unfavorable conditions: Search around the last listed frequency for activity.*

(P) denotes circuit across polar auroral zone; reception may be poor during ionospheric disturbances.

When a band is labeled "Tropical Domestic" (the 90 and 60 meter bands), it indicates that by international convention these bands can be used for domestic broadcasting within the Tropic of Cancer and the Tropic of Capricorn – a band of 46 degrees of latitude on each side of the Equator.

Because of the extremely high absorption of radio signals in the tropical environment, NVIS (Near Vertical Incidence Skywave) propagation mode is used. This mode is very dependent on the frequency transmitted to achieve the proper coverage. (See *MT* July and August 1997, page 63, for a discussion of this mode.)

Experiment and good DX!

John Figliozzi
jfiglio1@nycap.rr.com

Music on Shortwave - Morning Prime

It may not be the optimum medium for listening to music, but the sheer variety of music broadcast on shortwave demands that the music lover, especially the one with broad and eclectic tastes, not dismiss it.

Besides, with the right receiver, a clear signal, and a little audio enhancement, music on shortwave can sound surprisingly good. Receivers like the Lowe HF-150 and the AOR 7030 are renowned for their superior audio. There are also larger portables like the Grundig Satellit 700 (discontinued, but still widely available on the used market) that have a reputation for pleasing sound.

Good receivers not noted for their audio attributes can be markedly improved by connecting a moderately priced amplified bookshelf speaker to the "audio out" or "earphone" jack. Even smaller portables can be made more listenable simply by adding a few feet of insulated wire to the whip antenna and using a quality set of earbuds or headphones instead of relying on their tiny speakers.

This month, in our second of three consecutive columns devoted to music on shortwave, we list music programs broadcast by English language services during morning prime time hours across the continent. Since fewer stations target North America with their broadcasts during our mornings, this list is considerably shorter than last month's, which highlighted evening prime time hours. Next month's list will point toward music programs from non-English language services.

Don't forget: You can use this column to share the music discoveries you make while scanning the bands. Drop me a note or e-mail about what you're hearing and I'll pass it along here.

VOA Should Overhaul 'News Now'

A little over a year ago, the **Voice of America (VOA)** jumped into a "rolling news" format with both feet, abandoning many of its popular and long-standing feature programs. In August, the VOA's new director, Sanford Ungar, was a guest on the station's *Talk to America* daily phone-in program. From the comments of the callers that day – as well as those by listeners in other forums over the past year – it is clear that the VOA needs to significantly rethink its **News Now** format. It has had more than ample time to catch on.

The use of short reports and features is designed both to entice prospective "broadcast partners" at local stations worldwide to use some VOA segments within their own regular schedules and to respond to a perception about how audiences listen to radio today.

However, again judging from the callers and letters, the VOA's MW/FM effort has apparently hurt its ability to be heard via shortwave and not helped all that much to expand its *actual* audience (although perhaps its *potential* audience is larger). This is a bad exchange. There are still large areas of the world (China, for example) where listening to shortwave still represents a lone and vital information lifeline.

This soundbite approach to programming has also made the VOA much less attractive to, what have been up to now, its loyal listeners. (Incredibly, when a listener complained to Mr. Ungar about the redundancy of **News Now**, Mr. Ungar suggested that the caller was listening to the VOA too much!) The **News Now** format – at least in the way it has been implemented to date – has been inadequate to the task of offering the deeper and broader perspective on American life and ideas that listeners say they look to the VOA to provide.

The design of programming and use of transmission technologies must be balanced in a way that ***both*** *preserves existing audiences and reaches new ones.* It is a grave mistake for international broadcasters like the VOA to abandon their existing audiences in a drive to reach new and larger audiences. Maintaining a core audience and identifying a service niche is vital for survival in today's increasingly fragmented media universe.

What the VOA needs to do is to better identify that core audience and then overhaul **News Now** in a way that serves the needs of that audience. The problem may not be the **News Now** concept itself, but the way it has been implemented. Most listeners apparently would prefer the VOA just step back a little and restore some of its prior format and programs.

The listeners are talking. The question is, 'Is the VOA listening?'

*[Days and times are UT. Day and station abbreviations are the same as those used in MT's Shortwave Guide. Use the Guide also to locate frequencies for the listed programs. Be sure to try all the frequencies listed to find which one gives best results for your listening location. "D" in the Day column means "Daily"; *means one hour later during winter, except New Zealand one hour earlier. BBC listings are for Europe/Americas stream only. Programs and times are subject to change.]*

UT	Station	Day	Program
1000*	USA,WWCR3	M-F	World Wide Country Radio (5070 kHz)
1005*	USA,WHRI1	M-A	Christian/country/gospel (9495 kHz)
1012*	NewZealand	A	Deep Purple (soft/nostalgic)
1030	Australia,Radio	S	Oz Sounds (Australian)
		A	Jazz Notes
1040*	NewZealand	S	Sing Praise (hymns)
1045*	SouthKorea,RKI	F	Notes of Nostalgia (Korean traditional)
1100	HCJB	S	Morning Song (Christian)
1100*	USA,WWCR1	T	Powerline (rock-12160 kHz)
1105	Australia,Radio	S	Jazz Notes
1105*	USA,WHRI2	M-F	Christian/country/gospel (6040 kHz)
1115*	USA,WWCR1	S	Wonderful Words of Life (hymns-12160 kHz)
		Th	Big Backyard (Australian country-12160 kHz)
	USA,WHRI1	M-F	Christian/country/gospel (9495 kHz)
1125	Japan,Radio/NHK	M	Music Reflections (global)
		W	Music Journey Around Japan
		F	Music Beat (contemporary Japanese)
1130	Australia,Radio	A	Fine Music Australia (classical music)
1130*	Sweden,Radio	S	Sounds Nordic (Swedish rock)[fortnightly]
1202*	USA,WWCR3	A	Rock the Universe (Christian rock-5070 kHz)
1205	Australia,Radio	S	Country Club (country)[to 1400]
		F	Sound Quality (eclectic)
1205	UK,BBC	A	Wright Around the World (requests)
1230*	Poland,PRW	M	Jazz/Folk/Rock & Pop from Poland
		T	Request Concert (classical)
		F	Discovering Chopin
	RMexicoIntl	A/S	Mexican traditional/contemporary
1235	RAustriaIntl	S	Music from Austria (varied)
1305*	USA,WHRI1	M-F	Christian/country/gospel (15105 kHz)
1315	Australia,Radio	M-F	The Planet (varied)[to 1500]
1330*	Sweden,Radio	S	Sounds Nordic (Swedish rock)[fortnightly]
1330*	RMexicoIntl	D	Mexican traditional and contemporary
1335	Romania	S	Skylark (Romanian folk)
		M	Romanian Hits (Romanian pop/rock)
		W	Romanian Musicians
1340		H	Skylark (Romanian folk)
		F	Romanian Folk Music at its Best
1400*	USA,WJCR	D	Southern Gospel/Christian Country
1405*	USA,WHRI2	A	Christian/country/gospel (6040 kHz)
1430	RFPeaceIntl	H	Oyate Ta Olowan (indigenous)
1430*	RMexicoIntl	D	Mexican traditional and contemporary
	USA,WHRI1	S	Christian/country/gospel (15105 kHz)
1440	China,ChinaRIntl	S	Song of the Week (Chinese traditional/modern music)
		A	Music From China (traditional to pop)
1505	Australia,Radio	A	Melisma (eclectic)[to 1700]
1505*	USA,WHRI1	S	Christian/country/gospel (15105 kHz)
1515	UK, BBC	S	Concert Hall (classical)
1525	Japan,Radio/NHK	M	Music Reflections (global)
		W	Music Journey Around Japan
		F	Music Beat (contemporary Japanese)
1530	UK,BBC	M	Composer of the Month (classical)
		W	Jazzmatazz (jazz magazine)
		H	Greenfield Collection (classical requests)
		F	Vintage Chart Show (past British top twenty hit lists)
	HCJB	A	Songtime Weekend (hymns)
1530*	RMexicoIntl	SMWF	Mexican traditional and contemporary
	USA,WHRI1	M-F	Christian/country/gospel (15105 kHz)
1533*	USA,WHRI2	S	Christian/country/gospel (6040 kHz)
1540	ChinaRIntl	S	Song of the Week (Chinese traditional and modern)
		A	Music From China (traditional to pop)
1600	RFPeaceInt	S	Music Medicine (new age/folk)
1605*	USA,WHRI1	A	Christian/country/gospel (15105 kHz)
1605	Australia,Radio	M	Music Deli (varied)
1630*	USA,WHRA	A	Christian/country/gospel

INTERNATIONAL SHORTWAVE BROADCASTERS (via satellite)

By Larry Van Horn, *MT* Assistant Editor

WRN One English to North America

Galaxy 5, 125 degrees West, transponder 6 (TBS) 3.820 GHz, V-Pol, audio subcarrier 6.80 MHz. WRN program details can be heard at 0625, 1525 and 1955 Eastern. Program information is also available on TBS Text page 204. You can reach WRN by email at online@wrn.org or through their website on the internet at http://www.wrn.org. Many programs can also be heard in Canada on *CBC English Overnight*. WRN is relayed 24 hours a day on many cable systems via the CSPAN Audio One Network. All times are U.S. Eastern Time and all programs in English.

ET	Station
0000	Radio Telefis Eireann (RTE) – Dublin, Ireland (Irish Collection)
0100	Swiss Radio International – Berne, Switzerland
0130	Monday-Friday: Channel Africa – Auckland Park, South Africa Saturday: *The Way Ahead and New Horizons* Sunday: Glenn Hauser's *World of Radio*
0200	Polish Radio – Warsaw, Poland
0230	Radio Vlaanderen International – Brussels, Belgium (Brussels Calling)
0300	Radio Australia – Melbourne, Australia
0400	Voice of Russia – Moscow, Russia
0430	Radio Canada International – Montreal, Canada (Monday-Friday) Saturday: *Network Plus and Health Watch* Sunday: United Nations Radio: *World in Review and Scope*
0500	Radio Prague – Prague, Czech Republic
0530	Radio Vlaanderen International – Brussels, Belgium (Brussels Calling)
0600	Swiss Radio International – Berne, Switzerland
0630	YLE Radio Finland – Helsinki, Finland
0700	Radio Australia – Melbourne, Australia
0800	Radio Telefis Eireann (RTE) – Dublin, Ireland
0900	Radio Prague – Prague, Czech Republic
0930	Radio Sweden – Stockholm, Sweden
1000	Monday-Saturday: Channel Africa – Auckland Park, South Africa Sunday: Voice of America *Communications World* – Washington, DC USA
1030	Radio Vlaanderen International – Brussels, Belgium (Brussels Calling)
1100	Radio France International – Paris, France
1200	Monday-Friday: *Caribbean Tempo* from CANA Radio Saturday: Glenn Hauser's *World of Radio* Sunday: *Norden This Week* and *Health Watch*
1215	Monday-Friday: Vatican Radio – Vatican City (World News)
1230	Radio Austria International – Vienna, Austria
1300	Monday-Friday: Radio Slovakia International – Bratislavia, Slovakia Saturday: Radio New Zealand International – Wellington, New Zealand Sunday: Radio Denmark – Copenhagen, Denmark (Copenhagen Calling)
1330	Radio Telefis Eireann (RTE) – Dublin, Ireland
1400	Radio Vlaanderen International – Brussels, Belgium (Brussels Calling)
1430	Kol Israel – Jerusalem, Israel
1500	Radio Budapest – Budapest, Hungary
1530	Radio Sweden – Stockholm, Sweden
1600	Swiss Radio International – Berne, Switzerland
1630	Polish Radio – Warsaw, Poland
1700	Radio Telefis Eireann (RTE) – Dublin, Ireland
1900	Kol Israel – Jerusalem, Israel
1930	Swiss Radio International – Berne, Switzerland
2000	Radio Australia – Melbourne, Australia
2030	Monday-Friday: Radio Slovakia International – Bratislava, Slovakia Saturday: United Nations Radio: *World in Review and Scope* Sunday: *Network Plus and Health Watch*
2100	YLE Radio Finland – Helsinki, Finland
2130	Radio Sweden – Stockholm, Sweden
2200	Radio Prague – Prague, Czech Republic
2230	Radio Austria International – Vienna, Austria
2300	Polish Radio – Warsaw, Poland
2330	Radio Budapest – Budapest, Hungary

WRN Two Multi-Lingual to North America

Galaxy 5, 125 degrees West, transponder 6 (TBS) 3.820 GHz, V-Polarization, Audio subcarrier 6.2 MHz. Note that some programs listed below are subject to pre-emption without notice. All times are U.S. Eastern Time.

ET	Station
0000	World Radio Network from National Public Radio
0600	YLE Radio Finland – Helsinki, Finland (News in Finnish). On Saturdays a phone-in for children in Finnish until 0630.
0610	YLE Radio Finland – Helsinki, Finland (Easy listening music with announcements in Finnish and English)
0630	YLE Radio Finland – Helsinki, Finland (News of the past 24 hours in Finnish)
0700	Interval signal
0800	Raidio na Gaeltachta (News in Irish)
0900	Radio Prague – Prague, Czech Republic (Programming in Czech)
0927	Interval signal
1000	YLE Radio Finland – Helsinki, Finland (Regional broadcasts from various parts of Finland in Finnish)
1030	YLE Radio Finland – Helsinki, Finland (News in Finnish)
1100	YLE Radio Finland – Helsinki, Finland (Variable programming in Finnish–often light music)
1200	Radio Prague – Prague, Czech Republic (Programming in Spanish)
1300	Voice of Russia – Moscow, Russia (Russian Programming)
1400	Radio Vlaanderen International – Brussels, Belgium (Brussels Calling with Dutch programming)
1430	Identification tone
1630	Radio Austria International – Vienna, Austria (German Programming)
1700	Radio Budapest – Budapest, Hungary (Hungarian Programming)
1800	Polish Radio – Warsaw, Poland (Polish programming)
1830	YLE Radio Finland – Helsinki, Finland (Devotional programming in Finnish)
1855	YLE Radio Finland – Helsinki, Finland (News in Finnish)
1900	YLE Radio Finland – Helsinki, Finland (News of the past 24 hours in Finnish)
1925	YLE Radio Finland – Helsinki, Finland (News in Swedish)
1930	YLE Radio Finland – Helsinki, Finland (French programming)
1945	YLE Radio Finland – Helsinki, Finland (Light music in Finnish)
2030	YLE Radio Finland – Helsinki, Finland (Easy listening music). Announcements partially in English. Saturdays a phone-in for children in Finnish
2100	YLE Radio Finland – Helsinki, Finland (Documentaries and Theater of the Air in Finnish). Sunday: Classical music with a preview in English.
2200	YLE Radio Finland – Helsinki, Finland (English programming)
2230	Identification tone Friday: Voice of America *Communications World* – Washington, DC USA
2300	Interval signal
2330	Radio Austria International – Vienna, Austria (German programming)

WRN One English to Europe

Astra 1B, 19 degrees East, transponder 22 (VH-1) 11.538 GHz, V-Polarization, audio subcarrier 7.38 MHz. All programs in English and WRN program information can be heard daily at 0125 and 2025 UTC. Program information is also available on VH-1 Text page 222, 223, 224.

INTERNATIONAL SHORTWAVE BROADCASTERS / SCPC SERVICES

WRN Two Multi-Lingual to Europe

Hotbird-4, 13 degrees East, transponder 121 (Quantum TV) 10.933 GHz, H-Polarization, audio subcarrier 7.74 MHz.

WRN3 German to Europe

Astra 1B, 19 Grad Ost, Transponder 16 (Sky Movies), 11.436 GHz vertikal, Audio Tonunterträger 7.38 MHz und Astra Digital Radio (ADR) Astra 1C, Transponder 33 (ZDF), 10.964 GHz horizontal, auf Monokanal B, 7.56 MHz. Alle Programme auf Deutsch.

WRN to Eastern Europe, Middle East and Africa

WRN1 & 2 may be received throughout Africa and the Middle East via satellite on Intelsat 707 at 1 degree West.

The signal can be picked on DVB receivers such as those manufactured by Nokia, Humax etc). The service is on C-band and antennas of 3 meters in diameter are required. The receiver setting are as follows: 3.9115 GHz, Right-hand Circular-Pol, Symbol Rate 8.022 Mbaud, FEC 3/4, MPEG2. From the menu select audio stream "WRN1" and listen to the left channel for WRN1 and the right for WRN2.

In Africa WRN1 is available on the MultiChoice DSTV service which is available in many parts of Africa via the Panamsat 4 satellite at, 68.5 degrees East. Tune into audio channel 51 in Southern Africa and to and audio channel 25 in other parts of the continent. Contact a Multichoice dealer in your area for details of how to subscribe.

In North Africa and the Middle East WRN2 (which largely carries WRN1 Europe) and can tuned in via Eutelsat Hot Bird at 13 degrees East using a dish of 60 to 90 cm in diameter. The frequency is 10.933 GHz (horizontal polarization) audio subcarrier 7.74 MHz on Quantum 24 TV.

LOCAL RELAYS

WRN can be heard overnight in South Africa from 0000 to 0500 local time on SAfm 104-107 daily. SAfm is also available via an analogue satellite channel on Panamsat 4 (68 degrees East) 12.664 GHz (horizontal polarization) audio 7.2 MHz

WRN will soon be heard again in the Middle East on 954 kHz AM from 2000-0500 UTC. Further locals relays on FM are planned.

WRN One English to Asia-Pacific

AsiaSat-2, 100.5 degrees East, 4.000 GHz, Vertical-Polarization, MPEG2 DVB, Symbol Rate 28.125 Mbaud, FEC 3/4, Select "WRN" from audio menu.

WRN Two Multi-National to Asia-Pacific

AsiaSat-2, 100.5 degrees East, 4.000 GHz, Vertical-Polarization, MPEG2 DVB, Symbol Rate 28.125 Mbaud, FEC 3/4, Select "WRN" from audio menu and listen to the right hand audio channel.

Single Channel Per Carrier (SCPC) Services

By Robert Smathers
roberts@nmia.com

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-Vertical 13 (C-band)

1179.40 (80.6)	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
1204.25 (55.75)	Wisconsin Voice of Christian Youth (VCY) America Radio Network–religious programming
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 Broacaster) Taipei, Taiwan
1443.60 (56.4)	KBLA-AM (1580) Santa Monica, CA–*Radio Korea*
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–*Radio Vision Christiana de Internacional*

Galaxy 6 Transponder 3-Horizontal (C-band)

1404.80 (55.2)	KOA-AM (850)/KTLK-AM (760) Denver, Colo–news and talk radio
1404.60 (55.4)	WGN-AM (720) Chicago, IL–news and talk radio
1404.40 (55.6)	Illinois News Network/WMVP-AM (1000) Chicago, IL–"ESPN Radio 1000

SINGLE CHANNEL PER CARRIER (SCPC) SERVICES

1404.20 (55.8) Tribune Radio Networks/Wisconsin Radio Network
1402.90 (57.1) USA Radio Network
1402.70 (57.3) WLAC-AM (1510) Nashville, TN–news and talk/*Road Gang* trucker program (overnight)
1402.20 (57.8) NorthWest Ag News Network - Agriculture info for the Pacific Northwest
1402.00 (58.0) Occasional audio
1401.80 (58.2) For the People Radio Network with Chuck Harder – talk radio format
1401.50 (58.5) Agrinet Ag info/USA Radio Network
1399.00 (61.0) Sports Byline USA/Sports Byline Weekend
1398.80 (61.2) Talk Radio Network (TRN) – talk radio format
1398.50 (61.5) Occasional audio
1398.30 (61.7) WSB-AM (750) Atlanta, GA– news/talk
1397.80 (62.2) Occasional audio
1397.50 (62.5) Minnesota Talking Book Radio Network–reading service for the blind
1397.10 (62.9) Wisconsin Radio Network/Wisconsin college sports
1396.90 (63.1) Dallas Cowboys Spanish Radio Network (occ)
1396.70 (63.3) Radio America Network/Business News Network
1396.40 (63.4) Georgia News Network (GNN)–network news feeds
1396.00 (64.0) WHO-AM (1040) Des Moines, IA–talk radio/Iowa News Network
1395.80 (64.2) WTMJ-AM (620) Milwaukee, WI–talk radio
1395.60 (64.4) WGST-AM/FM (640/105.7) Atlanta, GA ID *Planet Radio*–news and talk radio
1395.40 (64.6) Michigan News Network–network news feeds
1395.00 (65.0) Occasional audio
1394.70 (65.3) WJR-AM (760) Detroit, MI–news and talk radio/Michigan News Network
1394.30 (65.7) Michigan News Network – network news feeds
1385.40 (74.6) WDUQ-FM (90.5) Pittsburgh, PA – Jazz format
1384.60 (75.4) WDUQ-FM (90.5) Pittsburgh, PA – Jazz format
1384.40 (75.6) KOA-AM (850)/KTLK-AM (760) Denver, CO–news and talk radio sports
1384.20 (75.8) WSB-AM (750) Atlanta, GA – news/talk
1383.10 (76.9) KIRO-AM (710) Seattle, WA–news and talk radio
1382.60 (77.4) Soldiers Radio Satellite (SRS) network–U.S. Army information and entertainment radio/Army college sports
1382.30 (77.7) Motor Racing Network (occasional audio) NASCAR racing
1382.00 (78.0) Occasional audio
1381.60 (78.4) KEX-AM (1190) Portland, OR–news and talk radio
1381.40 (78.6) Occasional audio
1381.20 (78.8) KJR-AM (950) Seattle, WA– sports talk radio
1377.10 (82.9) In-Touch–reading service
1376.00 (84.0) Kansas Audio Reader Network–reading service

Galaxy 6 Transponder 4-Vertical (C-band)

1376.00 (64.0) Data Transmissions

Galaxy 6 Transponder 6-Vertical (C-band)

1347.00 (53.0) WCRP-FM (88.1) Guayama, PR–Spanish language religious programming

Anik E2 Transponder 1-Horizontal (C-band)

1446.00 (54.0) Canadian Broadcasting Corporation (CBC) Radio–North (Quebec) service

Anik E2 Transponder 5-Horizontal (C-band)

1366.00 (54.0) Canadian Broadcasting Corporation (CBC) Radio–North (Eastern Arctic) service

Anik E2 Transponder 7-Horizontal (C-band)

1326.00 (66.0) Canadian Broadcasting Corporation (CBC) Radio–North (MacKenzie) service
1325.50 (65.5) Canadian Broadcasting Corporation (CBS) Radio–Occasional feeds/events

Anik E2 Transponder 17-Horizontal (C-band)

1126.00 (54.0) Canadian Broadcasting Corporation (CBC) Radio–North (Western Arctic) service
1125.50 (54.5) Canadian Broadcasting Corporation (CBC) Radio–North (Newfoundland and Labrador) service

Anik E2 Transponder 23-Horizontal (C-band)

1006.00 (54.0) Societe Radio-Canada (SRC) Radio–AM Network
1005.50 (54.5) Canadian Broadcasting Corporation (CBC) Radio-North (Yukon) service

Solidaridad 1 Transponder 1-Vertical (C-band)

1447.90 (52.1) Antenna Radio Noticias
1447.60 (52.4) Antenna Radio Noticias
1447.20 (52.8) La Grande Cadena Raza

Anik E1 Transponder 21-Horizontal (C-band)

1036.70 (63.3) In-store music
1037.00 (63.0) In-store music
1037.50 (62.5) In-store music

SBS5 Transponder 2-Horizontal (Ku-band)

1013.60 (80.4) Wal-Mart in-store network
1013.20 (80.8) Wal-Mart in-store network
1012.80 (81.2) Sam's Wholesale Club in-store network
1004.50 (89.5) Wal-Mart in-store network
1004.00 (90.0) Wal-Mart in-store network
1003.60 (90.4) Sam's Wholesale Club in-store network
1003.20 (90.8) Wal-Mart in-store network

RCA C5 Transponder 3-Vertical (C-band)

1404.60 (55.4) Wyoming News Network–network news feeds
1400.60 (59.4) Learfield Communications/Stan Solomon Talk Show (occ)
1400.40 (59.6) Learfield Communications/MissouriNet
1400.20 (59.8) Occasional audio
1400.00 (60.0) Learfield Communications/Stan Solomon Talk Show (occ)
1396.60 (63.4) Kansas Information Network/Kansas Agnet–network news feeds
1396.40 (63.6) Liberty Works Radio Network – talk radio
1396.20 (63.8) MissouriNet
1396.10 (63.9) MissouriNet
1395.90 (64.1) Western Montana Radio Network/Red River Farm Network
1395.70 (64.3) MissouriNet
1386.40 (73.6) Learfield Communications
1386.20 (73.8) Radio Iowa/Iowa college sports
1384.60 (75.4) Capitol Radio Network
1384.00 (76.0) Occasional audio/ABC Direction Network–network news feeds
1383.80 (76.2) Occasional Audio
1383.40 (76.6) Capitol Radio Network
1382.90 (77.1) MissouriNet
1382.50 (77.5) Virginia News Network–network news feeds/
1382.10 (77.9) Learfield Communications/MissouriNet

The long-awaited UNIDEN BC245XLT is HERE!

This hand-held communications marvel has stunned the scanner marketplace with its dual trunking capabilities! Imagine scanning through conventional channels as well as both Motorola and GE-Ericsson EDACS channels simultaneously, stopping to hear any communications—your choice—on any of these systems!

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Hot Tips on Cold LNBs

If you're a shortwave radio listener or amateur radio operator, you're already familiar with this concept: the less noise you generate in your antenna the more signal you'll be able to hear. Satellite TV systems are the same; the big difference is that they operate in a much higher frequency range. This month I'll delve into the subject of noise temperature in the Low Noise Block Down converter – whatever that is and whatever that means.

Whenever you get a bunch of satellite TV enthusiasts together they're likely to start bragging about their gear and you might hear something like this: "Yeah, well, I just got a 20 degree Phase Locked Loop LNB for C-band and a .7 dB for Ku-band, what are you using?" Just what does this mean and why should we be impressed?

How It All Works

When you see a satellite "dish" antenna, the dish part is actually just a reflector. The antenna is a small, inch-long or so, piece of wire which sits in a cylindrical opening at the *feed horn*. That's the device which you see mounted as if it's looking into the center of the dish. The reflector is parabolic in shape because it allows signals from a satellite, at which the dish is aimed, to bounce off the reflector's surface and go directly into the feed horn.

The signals from the satellite come into the feed horn in both vertical and horizontal polarities. The antenna, or probe, in the feed horn can be switched from a horizontal position to a vertical position by a small servo motor to receive either horizontally or vertically polarized signals.

Now that we have the signals safely in the feed horn it's necessary to amplify them. To do this we use what's called a *Low Noise Amplifier* (LNA) at the feed horn. But, wouldn't you know it: there's a hitch. The signals coming from the satellite are in the 3.7 to 4.2 GHz range, but our satellite receiver tunes only from 950 to 1450 MHz. We'll have to convert the signals down from 3-4 GHz to the 950-1450 range our receiver can tune.

We can do this by putting a *down converter* after the LNA. Now all the signals from the satellite are bounced off the reflector, into the feed horn, amplified by the LNA, converted to a "block" of frequencies the receiver can tune.

In the early days of satellite TV all of these components were separate items. The down converter was usually kept in the house, out of the weather and temperature extremes, and a very expensive cable was run from the LNA to the converter. Nowadays the LNA and the block down converter are in one little device called an *LNB* (Low Noise Block down converter) and the cable is now inexpensive RG/6 . In fact, all three components can be found combined into an *LNBF* (Low Noise Block down converter Feed horn). Pretty neat!

In Pursuit of Lower Noise

Receiving signals from a satellite can be a tricky business. In addition to *sky noise* which is occurring at C and Ku-band frequencies, there's also *ground noise*, and *component noise*. All this noise can combine to make a formidable wall through which a signal must penetrate. Factoring inadequate dish size and poor receiving components, it's a wonder we can pick up any programming.

In the early days of satellite TV – the late 70s to the mid-80s – virtually all satellites were in the C-band frequency range and the output of the transponders was typically 4 watts. Reception of these satellites required a minimum 10-ft dish with 12-ft dishes not uncommon. This compares to current Ku-band satellites used today in direct-to-home broadcasting which have outputs of 240 watts. It's easy to see how such modern systems need only 18-inch dishes for reception!

But, it's not just the higher power which helps over-ride the noise. Better dishes with more accurate reflective surfaces, much better quality amplifiers, and more sensitive receivers have all combined to make noise less of a factor. Transmission mode has had a great effect as well. Digital transmissions with effective Forward Error Correction (FEC) schemes can provide noise-free images where analog transmissions may not.

Another advantage to digital transmissions is that the signals can be compressed. This allows up to 10 compressed digital channels to be sent on one analog transponder. Thus a satellite such as DBS 2, operated by DirecTV at 100.75° west, and DBS 3 also operated by DirecTV and located at 100.85°, each have eight transponders. At 10:1 compression you get 160 channels on the two satellites so close together that it appears to dishes on the ground to be one satellite!

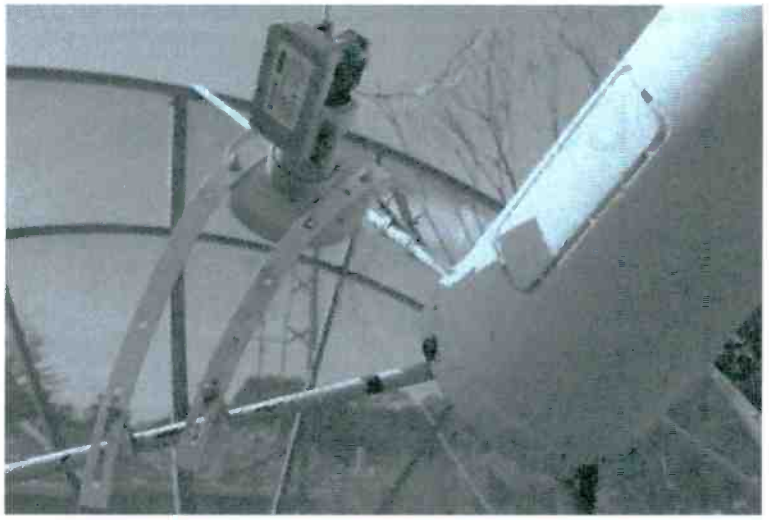
What's All the Noise?

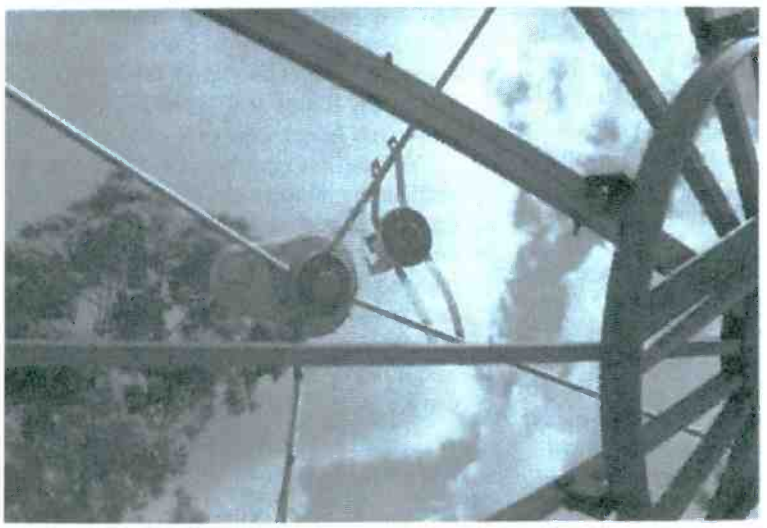
Frank Baylin, in his book *Digital Satellite TV*, defines noise as "an unwanted signal which interferes with reception of the desired information. Noise is often expressed in degrees Kelvin or in decibels." He further describes Noise Temperature as "a measure of the amount of thermal noise present in a system or a device. The lower the noise temperature, the better the performance." And, finally, he describes Noise Figure as "the ratio of the actual noise power generated at the input of an amplifier to that which would be generated in an ideal resistor. The lower the noise figure, the better the performance."

By tradition, LNBs for C-band are characterized by their noise temperature and those for Ku-band are known for their noise figure. Fifteen years ago a good C-band LNA (the LNB hadn't been invented yet) was 120°K. Now a good C-band LNB will be under 20°K. Ten years ago a good Ku-band LNB would have a noise figure of 1.7 dB. Today .7 is not uncommon. These figures can be converted to give you an idea of how much they've changed. A 1.7 dB Ku-band LNB is the equivalent of a 140°K LNB.

So, how are these devices measured? Ah, now you've hit on a bit of a sore point. In radio, antennas are measured by the Variable Standing Wave Ratio (VSWR). As an example, the 10 meter band is huge and an antenna designed to receive and/or transmit on that band will cover a frequency range from 28 MHz to 29.999 MHz. Over that vast territory the VSWR will be optimal, say 2:1,on only a small portion.

Guess what the manufacturer will claim as the antenna VSWR? You got it: 2:1. Yet, transmitting on either ends of the band with that antenna may give you a whopping VSWR. It's the same with LNBs. The C and Ku-bands are huge chunks of frequencies and the noise figure or temperature of an LNB will be optimal only at certain points. Where it's the best is the figure usually promoted by the manufacturer.

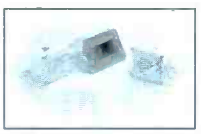




Roger Woodward's multiple-feed system

Blazing the Noise Frontier

The desire to use smaller C-band dishes has led to the development of LNBs with much lower noise figures and receivers with greater sensitivity. The result is that, in most parts of the U.S., a 6-ft dish with a 20 degree C-band LNBF will give excellent results. My experience is that 4.5 feet is about as small as you can get with today's LNBs and get a noise-free picture on the most powerful (20 watts) C-band satellites.



The best LNBs available today have high stability Phase Locked Loop (PLL) circuitry which are most commonly used in the industry for ultra narrow bandwidth applications such as digital SCPC reception. These LNBs have the disadvantage of being very expensive. Expect to pay $200 and up for PLL capability.

I'm currently using a 17°K Zinwell C-band LNB from Direct Marketing Source (the same folks who make the Zinwell ZDX-9111 DVB receiver reviewed in the August column). The advantage of such a low noise LNB is apparent on analog channels of nominally powered C-band satellites, but it's most apparent when trying to receive digital transmissions on weaker C-band satellites.

The other advantage is that this LNB is one of the least expensive for such a low noise figure C-band LNB I've found. For more information on this product contact Tim Heinrichs of DMSI at 888-591-4416.

And, finally...

I didn't have space in the August issue of this column for the photos sent in by *MT* reader Roger Woodward of Australia who responded to an earlier column about stationary dishes with multiple feeds. So, here they are. Roger uses a 10-ft dish with three C-band feed horns positioned so that the prime focus feed is looking at Palapa C2, another looking at Asiasat 3S and the third looking at Asiasat 2. As he says, "...it all works quite well and I rarely need to move the dish!"

BEGINNER'S CORNER

UNCLE SKIP'S GUIDE TO MONITORING

Skip Arey, N2EI
tjarey@home.com

Developing Logging and Confirmation Skills

We all like to collect things and we all like to keep score. As a matter of fact, this process is at the very root of the radio monitoring hobby. Listening to radio signals, whether down the block or around the world, becomes more meaningful when you keep track of what you have heard.

Logging the many signals we seek will usually lead to a desire to **confirm** these loggings. This is most often done by seeking some form of verification from the originating station. Yes, folks, even in the hobby world there is paperwork! But it need not be drudgery. Once you get the hang of things, it can be as much fun as listening.

Your log is a permanent record of your listening experiences and accomplishments. But it's more functional than simply a nostalgic reminder for you to look back on in another twenty-five years. A log book is the repository of all the data you will need to go about the process of seeking confirmation of what you have heard. More on this later.

A log, coupled with the information from columns such as *Shortwave Guide* and *Utility World*, will help you get a handle on your listening needs. You have to be listening when the stations are transmitting. If your log indicates you do all of your listening on weekends and Radio Freedonia only broadcasts on Tuesdays, you are going to have to rearrange your life a bit if you want to make that catch.

A log book is a matter of personal style. It does not need to be very fancy. I know of one world class amateur radio DXer who has kept his records on stenographer tablets for over twenty years. Commercial log books are available from many of the advertisers in the pages of *MT*. Or, put your computer to work: any commercial database management program can be used to make an electronic "paperless" log. My personal preference, over the years, has been to design my own log sheets, making copies via any nearby photocopy machine.

What you choose to use as a log book is secondary to the information you collect in it. Whatever you choose, use something that is sturdy enough to stand up over the years and make your entries LARGE. Your old eyes will thank you when you show your log to your great grandchildren.

Now let's take a look at the basic information you will want to keep track of.

DATE AND TIME

If you are a shortwave listener, you will want to keep track of your loggings based upon UTC (Coordinated Universal Time) time and date. UTC, also known as GMT (Greenwich Meridian, or Mean, Time) is the time standard commonly recognized around the radio world. I also log local time and date.

If you are a scanner monitor, you may want to track time using a 24-hour format if your local public services use this format over the air. Don't forget to log the time you began listening and stopped listening to a station.

FREQUENCY

This might sound a bit obvious, but it can give you additional insight into a station's patterns. For example, most American pirate broadcasters hang out in the area of 6955 kHz these days. Hearing a pirate operating at some distance from this frequency might just give you something worth sharing with the readers of *The Outer Limits* column.

STATION NAME AND/OR CALLSIGN

The callsign or station name is important. So is the Country, State, City, or transmitter location, depending on your listening habits.

LANGUAGE

Getting this right is important to seeking a verification. Also, make note of the gender of the announcer.

SIGNAL QUALITY

This is where you record what is important to shortwave stations. Radio hobbyists have adopted a system called SINPO over the years. SINPO stands for a signal's Strength, Interference, atmospheric Noise, Propagation disturbance (fading), and Overall merit. Rating a signal from 1 to 5 (5 being excellent) should allow you to write a thorough report to a station for verification.

Use the SINPO code in your log, but not in your report. The person who reads your letter is not likely to be a radio hobbyist and may not have the faintest notion of what SINPO means. Some folks prefer the more abbreviated SIO system of Signal, Interference and Overall merit, but I maintain that the SINPO system gives much more useful information in a very brief format.

OTHER INFORMATION

Most stations want to know more than how well you enjoyed their programming. A few notes on the program content and how it appealed to you will go a long way in "greasing the wheels" that can lead to a verification.

Many hobbyists use more than one receiver or antenna during a monitoring session. Make note of what you used to catch each station. Over the years it is fun to see just how many things you heard with each receiver you have owned.

You can use your log to keep track of the verification process. Make note of which stations you sent confirmation letters to, which ones responded and how quickly. This information is useful to your fellow listeners and can be shared in the *QSL Corner* column in *MT*. Also, if your log shows that a station hasn't responded in a reasonable period, you can try to send out another report.

Writing a Confirmation Letter

How do you use the information in your log to seek confirmation of what you have heard from the transmitting stations? This process is commonly called "QSLing" – QSL being an old Morse code operator's abbreviation for "I am acknowledging receipt."

Sending out a verification report is a win-win situation. The station receiving the report gets an idea about its listeners and how well it is being heard. In return, the dedicated listener gets a QSL card or a letter verifying reception. Even non-hobbyists seem to enjoy QSL collections. You can begin yours with a few simple rules and a little wrestling with the international postal service.

Always type or print your reports. Cursive writing is confusing enough if you are from the same country as the writer. Include your name, full address with no abbreviations, zip-code and finish your address with The United States of America.

Next put in the date you monitored the station. Always spell out the month's name completely. 2/1/93 can be interpreted as either February first or January second depending on who is reading your letter and what country they are in.

Yes, even in the hobby world there is paperwork!

Include the name and address of the station you heard. This is not simply common letter writing practice. It is also another step in letting the reader know exactly who you heard. Many broadcasters will include their mailing address over the air. If not, addresses can be found in the *QSL Report* column in *MT* or in common hobby books such as *The World Radio TV Handbook* and *Passport To Worldband Radio.*

With the top of the letter completed, you can move on to the "meat and potatoes" information. Start with a short paragraph informing the station that you are a radio hobbyist who enjoys listening to stations from all over the world, especially those at some distance away. You can even mention a little bit about yourself (e.g., I am an 18 year old engineering student).

In the second paragraph, restate the date and give the time you began to monitor the station. Always use UTC, as this is commonly respected. If you want to be sure to get the point across, use a world time chart (one can be found in any good world atlas) to include the local time at the *broadcaster's* location.

In the next few paragraphs, report exactly what you heard with as much detail as possible. (Now you can see why you kept all of that information in your log.) Pay attention to program content. Was the announcer male or female? Was the broadcast just in English or did you hear another language used? Make note of the time that programs begin and end, making special mention of station identifications, sign-ons and sign-offs.

Tell the station what you thought of their programming. Tell them what you enjoyed. Tell them if you liked the music. If you learned something new about the station or the country, let them know. Nothing can sour the QSL process faster than making the station operators feel that the only reason you listened was to get a QSL card. Also, if you disagree with a station's politics or religious perspective, keep it out of your letter. Arguing politics or religion will work against a favorable reply.

After you have reported what you heard and why you liked it, include a solid paragraph about the conditions. This is where you take into account the signal information you logged using the SINPO code. Stations especially appreciate information about any interfering signals. But remember, don't use the SINPO format in your letter. Most stations won't know what you're talking about. Instead translate the SINPO entry into plain language. You may want to include a few lines indicating the receiving equipment and antennas you used, as well as your local weather conditions.

Finally, after you have given the station operators information that may be of use to them, include a closing paragraph *politely* asking for verification of your report. Don't get pushy! No station is obligated to write back. State what you have enclosed in terms of return postage and thank the station profusely for their time and kind consideration.

Mailing Your Confirmation

Sending a letter around the world is different from sending one across town. There are pitfalls all along the pathway of the international postal system. A few tips will help to see your letter arrives at its destination.

Use common (not fancy) air mail stamps and use plain envelopes that are thick enough that the contents cannot be examined when the letter is held up to a lightbulb. This will prevent your letter from being sidetracked by some unscrupulous postal clerk.

On the outside of the envelope include the complete addresses, yours and the station's. Do not use abbreviations. Spell out the full name of the countries. Avoid using improper country names. Mail sent to The Peoples Republic of China addressed as RED CHINA just gets tossed in the dust bin. Don't be offensive. The people on the other end are just as proud of their homeland as we are of ours.

You can include return postage either by using International Reply Coupons (IRCs), available from large post offices, or by enclosing mint (unused) stamps from the country you are writing to. Mint stamps can be purchased through any store catering to stamp collectors (check your yellow pages) or you can use The DXers Stamp Service, operated by William J. Plum, 12 Glen Road, Flemington, NJ 08822. A self-addressed, stamped envelope (SASE) will bring you a list of Bill's offerings.

Entire books have been written on the subject of QSLing. These basic hints will get you started down the road to the first fifty or so countries. Remember to be patient because mail moving around the world can take some time. The longest period I waited for a QSL card was *three years*! However, after a few months, you may want to consider sending another report.

Logging and QSLing will grow on you as you begin to respond to those primal urges to keep score and collect things. Have fun!

VIEW FROM ABOVE

WATCHING THE WEATHER SATELLITES

Lawrence Harris
Lawrence@itchycoo-park.freeserve.co.uk
http://www.itchycoo-park.freeserve.co.uk/wxsats.html

Way to Go, GOES !

The two main Geostationary Operational Environmental Satellites – currently GOES-8 and GOES-10 – provide a weather monitoring service for America and the world that is unmatched. Meteosat-7, Europe's geostationary weather satellite (WXSAT) compares well, but does not provide the diversity of imagery enjoyed by users of GOES-8 weather facsimile (WEFAX). This month I am starting a series that takes a more detailed look at the images transmitted by GOES-8.

Operational WXSATs

Although the new oceanographic satellite Okean-O was launched successfully on July 17, as of nearly mid-August no reports have yet been heard concerning reception of its expected (occasional) telemetry on 137.40 MHz. By early August I had logged three transmissions from Okean-4, one of which coincided with a simultaneous pass of Okean-O and caused me to check carefully which satellite was actually transmitting. Unfortunately very few transmissions from Okean-4 or Sich-1 have been reported over the US.

Meteor 3-5 temporarily ceased transmissions in early July but is expected to resume operations in early September. This was a routine 'rest' period for the satellite. The three operational polar orbiting National Oceanographic and Atmospheric Administration (NOAA) WXSATs continued full automatic picture transmissions (APT). High resolution picture telemetry (HRPT) operations are listed on NOAA's status reports for July as being nominal for the three satellites, with yellow (operational with limitations) for NOAA-10 and red (non-operational) for NOAA-11.

NOAA systems status reports:
http://www.nnic.noaa.gov/SOCC/polsub.html

Getting into GOES

If you set up a satellite tracking program and enter Kepler elements for the various operational geostationary WXSATs, including GOES-8, you will notice that its footprint includes West Africa, Spain, a little of western France, and parts of western Britain. Areas in Wales and western Britain can receive a usable signal, especially if efforts are made while positioning the antenna, to avoid obvious obstacles.

The satellite's elevation is only three degrees above the horizon from Plymouth, UK, so to obtain a clear line-of-site I mounted my Yagi at the top of a small mast, clearing neighbor's bushes. This provided a significant improvement in the signal, compared with that received at ground level.

For American users the signal is easily received on either a fixed position 1691MHz Yagi or small dish, just as we do in Britain for Meteosat WEFAX reception.

Hardware for GOES-8 reception

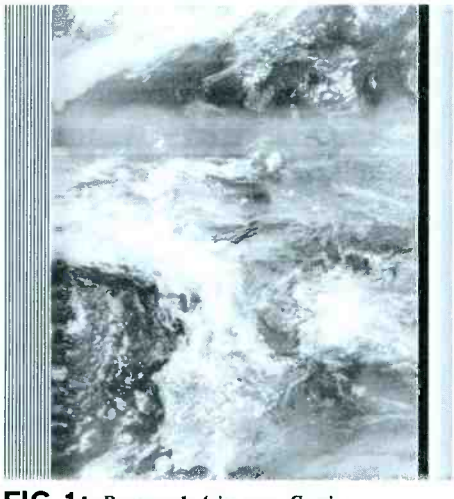


FIG 1: *Resurs 1-4 image, Spain northwards, August 4, 1999 at 1101 UTC*

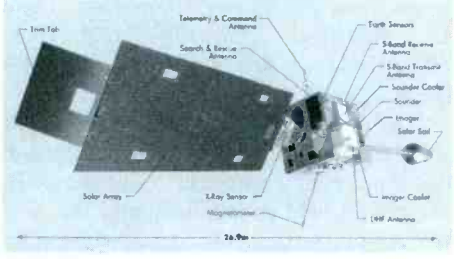


FIG 2: *GOES engineering model*

As with all worthwhile hobbies, the cost of setting up the right equipment is not insignificant. Monitoring geostationary WXSATs is not unreasonably expensive when you realize the wealth of information available. To receive and decode WEFAX from GOES-8 (and GOES-10) on 1691.00 MHz, you require a system comprising an antenna, low noise preamp (this may include a down-converter), cabling, receiver and decoder. Complete systems are available from various companies including those advertising in *MT*.

The antenna can be either a mounted 1m dish or multi-element Yagi. When the system is installed, the antenna must be carefully aligned on the satellite; suppliers provide detailed instructions on this procedure, and it is normally straightforward. Although a large dish may negate the need for a low noise preamp, the use of a small dish is environmentally acceptable and should not displease your neighbors.

There are two options for conveying the WEFAX signal. One involves down converting the 1691.0 MHz signal to 137.50 MHz for subsequent feeding to a standard polar WXSAT receiver. Such receivers already have an input for 137.50 MHz, so can be used, saving the cost of a separate WEFAX receiver). The second involves taking the feed to a direct reception (1691.0 MHz) GOES receiver.

When you buy a complete system, this decision has already been made for you. My own preference – having used both types extensively – is for the independent use of a direct reception (1691.0 MHz) receiver, rather than using a down-converter that requires your polar WXSAT receiver.

Having first connected your antenna and preamp to feed the receiver, and secondly, after aligning the antenna, you should hear the carrier tone from the satellite. The receiver's output is fed to the interface provided by your supplier, and the software can be configured to recognize the data stream and decode it. WEFAX images from GOES are transmitted in fixed time slots, following the published schedule – see later.

Figure 3 is the first transmission of the "day" starting at 00:02 UTC, and it originates from GOES-10, located to the west of continental USA. This image is one of several different GOES-10 formats transmitted during the day. It is an infrared image of the northern hemisphere and updated images are transmitted at: *(Individual transmission times are given first, with the actual originating time from GOES-10 shown in brackets)*

00:02 UTC (21:00), 02:02 (00:00), 04:38 (03:00), 07:30 (06:00), 12:02 (09:00), 14:02 (12:00), 16:38 (15:00), and 19:46 UTC (18:00 UTC)

Consequently, images of this format are

FIG 3: *GOES-10 infrared image (NH IR) from 2100UTC–retransmitted from GOES-8*

FIG 4: *GOES-10 full disc (FD IR) infrared image format*

available every three hours of the day, and have lines of latitude and longitude superimposed. Being an infrared image, darker areas indicate higher temperatures. At this time (figure 3 at 21:00 UTC) the sun has passed its peak over the West Coast, but the land is warmer (darker) than the sea.

If you monitor these images regularly you will be amongst the first to identify new weather systems developing in the eastern Pacific ocean. Many hurricanes are first spotted in this region during their formative days. If you subscribe to the Daily Operational Significant Event Imagery Report – freely available on the Internet from the O S E I Support Team – you will be amongst the first to be notified of all new significant weather systems as they occur around the world. The comprehensive transmissions from GOES-8 take you there!

OSE web site
http://www.osei.noaa.gov/

Another GOES-10 image series is the full disc, infrared – FD IR – see figure 4 – also transmitted regularly, starting at 00:18 UTC, and the series includes the three-hour scans as for GOES-8. While the northern hemisphere format images provide better detail of the weather systems around the eastern Pacific, the full disc images have an appeal of their own, giving a complete view of the planet as seen from the GOES satellites. Most WEFAX software provides options for animating these "fixed" view images, although the three-hour interval may produce some jerky sequences. Color is often an added software facility, but is quite artificial – the satellites do not sense color.

The first non-GOES images are those from Meteosat-7, transmitted at 00:06 UTC as a sequence of infrared images of the various sectors. The very first image that I received from GOES-E several years ago, was a retransmitted Meteosat image! Just for the moment, I thought I was pointing at a reflection of the Meteosat satellite signal off a nearby roof!

After several minutes the resumed flow of GOES-E images confirmed that I was on the correct satellite.

NOAA information sites:

NOAA, NESDIS (National Environmental Satellite, Data and Information Service) and associated organizations maintain various web pages concerning WEFAX operations from which current transmission schedules and operational events can be obtained. The latest East Wefax (GOES-8) schedule is dated July 22, 1998, and is published in the file WEFAXG8.ASC, downloadable from this site.

http://140.90.207.25:8080/COB/wefax.html
http://140.90.207.25:8080/EBB/ml/nic31.html
NOAA's list of manufacturers of hardware for WXSAT reception:
http://140.90.207.25:8080/EBB/ml/manulst.html
General information on satellites:
http://140.90.207.25:8080/EBB/ml/nic1.html

Sources of current Kepler elements

There are numerous sites on the Internet where the latest Kepler elements can be obtained for virtually every satellite, but a reasonable starting place is at Goddard Space Flight Center (GSFC) – see below. On this site, Goddard and numerous other Services and Projects provide access to unclassified satellite orbital data that has been received from United State Space Command (USSPACECOM). This orbital data consists of two-line element (TLE) sets, satellite catalog messages, satellite decay messages, predicted decay forecasts, and Satellite Reports (amongst other information!) The data is available in various forms, but the most useful seems to be the compressed zip files.

Orbital Information Group
http://oig1.gsfc.nasa.gov/scripts/foxweb.dll/app01?

From this page, select the OIG main page (bottom link). When you see the length of the URL, you will appreciate my reason for not quoting it! The page offers numerous options that you can explore at your leisure, but for our purposes select the "*downloadable files*" option. You have now triggered a timer that will limit your stay, but even downloading the entire collection should not cause problems, and you are free to return later when the counter is reset.

The link page again offers numerous options, but "special interest tle" is third from the end, and the file takes a few seconds to download. Unzipping the file results in a collection of TLEs for weather, amateur radio, visible, thirty recent launches, Iridium, Orbcomm and further selected groups. The WXSAT group includes geostationary and polar orbiting constellations and can be input automatically into virtually every tracking program. The files are updated several times each week, but experience suggests that updating twice weekly is more than adequate.

FREQUENCIES

NOAA-14 transmits APT on 137.62 MHz
NOAA-12 and -15 transmit APT on 137.50 MHz
Meteor 3-5 usually transmits APT on 137.30 MHz when in sunlight
Resurs 1-4 transmits APT on 137.85 MHz
Okean-4, Sich-1 and Okean-O sometimes transmit APT briefly on 137.40 MHz
GOES-8 and GOES-10 use 1691 MHz for WEFAX

Larry Van Horn, N5FPW
email: larry@grove-ent.com

The Fed Files Mailbag

We have been swamped with mail and as always I love hearing from our *MT* reader family. Your input and frequency lists are always appreciated here in the *Fed Files* column.

We start out this edition with a report from Mike Kalbaugh, N3HLK, in Middletown, Pennsylvania, who writes:

"After reading your February 1999 Fed Files column on *Where Have All the Fed Freqs Gone*, I put the frequencies you listed in my scanner and forgot about them. Then on March 19, one of the frequencies came alive with activity. That frequency was 168.350.

"The event was The Hershey II Bipartisan Retreat for 186 House Members. The location was the Hershey Motor Lodge and Convention Center in Hershey, Pennsylvania. I think that the frequency was used by the Secret Service who provided the security for the House Members. 'Control' coordinated the activities of the agents who cleared the luggage and parking lots with K9 units. Also they checked out employees and media members who were on the premises. On the whole, a lot of the activity was escorting the members on tours to the Hershey Chocolate Factory, Lancaster Amish Country and the Gettysburg Battlefield.

"Thank you for providing an excellent article with very useful frequencies. I always look forward to receiving my *Monitoring Times* and reading your column."

North Carolina Feds

Donald Miskanen from Frisco, North Carolina, recently phoned his contribution in to the *MT* offices and passed along some fed frequencies for eastern North Carolina.

U.S. Customs

165.2375 MHz repeater	Bodie Island, NC (166.4375 MHz input)
165.2375 MHz simplex	Cape Hatteras, NC

National Park Service

164.725 MHz repeater	Buxton, NC (USCG tower) (164.200 MHz input)
163.075 MHz repeater	Bodie Island, NC (164.200 MHz input)
166.275 MHz simplex (tactical)	

U.S. Fish and Wildlife Service

163.150 MHz repeater	Manteo (164.625 MHz input and simplex)

More FBI Aircraft Frequencies

We recently covered a variety of frequencies being used by the Federal Bureau of Investigation (FBI) aircraft, callsign Ross (fixed wing). A source which wishes to remain anonymous passes along a frequency heard recently in the New England area with Ross aircraft talking air-to-air: 123.050 MHz.

This frequency is interesting since it is supposed to be allocated as an aeronautical multicom (air-to-air) for helicopters. Monitors in major metropolitan areas often report broadcast station traffic helicopter reporters on this frequency. Looks like another intriguing frequency to keep an eye on for federal communications activity.

Since this frequency has shown some promise for fed monitors, here is a complete list of all the various Unicom/Multicom frequencies in the civilian aircraft bands.

Unicom/Multicom frequencies

122.700	Unicom: uncontrolled airports
122.725	Unicom: uncontrolled airports-private aircraft only
122.750	Unicom: private air-to-air fixed wing
122.800	Unicom: uncontrolled airports
122.850	Multicom: NOAA severe storms study aircraft and U.S. Forest Service helicopter operations reported.
122.900	Multicom: U.S. Coast Guard search and rescue, U.S. Forestry Service fire cache air operations and other numerous government agencies and military services reported.
122.925	Multicom: NOAA severe storms study aircraft, NASA research aircraft, National Park Service aircraft, and other numerous government agencies/military services reported
122.950	Unicom: controlled airports
122.975	Unicom: high altitude aircraft and U.S. Forest Service air operations
123.000	Unicom: uncontrolled airports
123.025	Unicom: helicopters (air-to-air) and U.S. Forestry Service helicopter operations
123.050	Unicom (heliports): NOAA severe storms study aircraft and U.S. Forestry Service helicopter operations
123.075	Unicom (heliports): U.S. Forestry Service helicopter operations
123.450	Multicom (air-to-air): Very informal frequency. This one is fun and sometimes spicy to listen to.
136.100	Reserved for future unicom or automatic weather observation stations
136.200	Reserved for future unicom or automatic weather observation stations
136.275	Reserved for future unicom or automatic weather observation stations
136.375	Reserved for future unicom or automatic weather observation stations
136.475	Reserved for future unicom or automatic weather observation stations

Photo credit: National Park Service

Asateague National Seashore

Another anonymous contributor recently passed along the following frequency information for the **Little River National Preserve** at Fort Payne, Alabama:

172.450 repeater output/169.550 repeater input

U.S. Fish and Wildlife Update

Our U.S. Fish and Wildlife contributor to the last edition of the Fed Files, Mark Cobbeldick, has checked in again with an update courtesy of our old friend John Wilson.

1- **Chincoteague National Wildlife Refuge** communications are on the Assateague National Seashore repeater system, that covers up into Maryland.

2- **Assateague National Seashore** repeater system is: 170.0500 output / 166.375 input.

3- **Antiem National Battlefield** (Antiem, Maryland) repeater system is: 170.0500 output / 169.4000 input

As for **Presque National Wildlife Refuge,** it is not know whether they are still allocated on 34 MHz. While in Richmond recently, Mark thought he heard some local traffic on 34.830 MHz. It did not sound like skip.

As far as VHF-high band repeaters in Virginia, Mark personally has yet to hear one. But he thinks he isn't listening at the active times. In 1998 Mark spotted 17-inch

Photo credit: National Park Service

whips on vehicles at the Eastern Shore National Wildlife Refuge in Cape Charles, which would support VHF operations.

Some other Virginia frequencies sent by Mark:

Blue Ridge Parkway

167.1750 output/166.375 input (carrier squelch)

Thomas Jefferson & George Washington National Forests:

F-1	171.575 simplex	Jefferson National Forest
F-2	171.575 output/172.250 input	Jefferson National Forest
F-3	171.525 simplex	Washington National Forest
F-4	171.525 output/172.325 input	Washington National Forest

A hearty thanks to Mike, Donald, Mark, John, and our anonymous contributors who took the time to support the column this month.

MT's Government Master File

We continue our exploration of the VHF high government frequency band, started in the December 1998 issue of the *Fed Files*, by profiling the 167.0-167.9875 MHz range in Table 1. See you in two months for another edition of *MT*'s *The Fed Files*, when we will be posting our exclusive Y2K federal agency monitoring list. But until then, good hunting.

TABLE ONE: FEDERAL FREQUENCY ALLOCATIONS: 167-167.9875 MHZ

167.0000	IRS (Nationwide)
167.0125	Bureau of Land Management (Interior), Fisheries and Wildlife Services (Nationwide), NASA (Nationwide), National Park Service (Interior)
167.0250	Bureau of Indian Affairs (Interior), Bureau of Land Management (Interior), Bureau of Reclamation (Interior), Energy Department, Geologic Survey, Interior Department (Nationwide), National Park Service (Interior), Secret Service (Whiskey-DC), TVA, WHCA (Whiskey-Nationwide)
167.0375	Bureau of Land Management (Interior), Fisheries and Wildlife Services (Nationwide), National Park Service (Interior)
167.0500	FCC (Nationwide)
167.0625	Bureau of Land Management (Interior), Fisheries and Wildlife Services (Nationwide), National Park Service (Interior)
167.0750	Bureau of Indian Affairs (Interior), Bureau of Land Management (Interior), Environmental Protection Agency, FBI, Fisheries and Wildlife Services (Nationwide), Geologic Survey, Interior Department (Nationwide), National Park Service (Interior), TVA
167.0875	Bureau of Land Management (Interior), Fisheries and Wildlife Services (Nationwide), National Park Service (Interior)
167.1000	Bureau of Land Management (Interior-Nationwide), Interior Department (Nationwide), IRS, TVA
167.1125	Bureau of Land Management (Interior), Fisheries and Wildlife Services (Nationwide), National Park Service (Interior)
167.1250	Bureau of Indian Affairs (Interior), Bureau of Mines (Interior), Bureau of Reclamation (Interior-Nationwide), Energy Department, FBI, Fish and Wildlife Service, Interior Department (Nationwide), National Park Service (Interior), Navy, Post Office, TVA
167.1375	Bureau of Land Management (Interior), Fisheries and Wildlife Services (Nationwide), National Park Service (Interior)
167.1500	Bureau of Indian Affairs (Interior), Bureau of Land Management (Interior), Bureau of Reclamation (Interior), Environmental Protection Agency, FBI, Interior Department (Nationwide), IRS, National Park Service (Interior), TVA
167.1625	Bureau of Land Management (Interior), Fisheries and Wildlife Services (Nationwide), National Park Service (Interior)
167.1750	Army, Bureau of Land Management (Interior), Bureau of Reclamation (Interior), FAA, FBI, Interior Department (Nationwide), National Park Service (Interior), TVA
167.1875	(No reported activity)
167.1906	Low power, non-voice 5 kHz bandwidth splinter frequency (until January 1, 2005)
167.1937	Low power, non-voice 5-10 kHz bandwidth splinter frequency (until January 1, 2005)
167.1968	Low power, non-voice 5 kHz bandwidth splinter frequency
167.2000	FBI (DC), Low power, non-voice up to 11 kHz bandwidth splinter frequency (after January 1, 2005)
167.2031	Low power, non-voice 5 kHz bandwidth splinter frequency (after January 1, 2005)
167.2125	FBI (Nationwide)
167.2250	FBI
167.2375	FBI (Nationwide)
167.2500	FBI
167.2625	FBI (Nationwide)
167.2750	Coast Guard (Nationwide), FBI
167.2875	FBI (Nationwide)
167.3000	FBI (NE Corridor)
167.3125	FBI (Nationwide)
167.3250	FBI
167.3375	FBI (Nationwide)
167.3500	FBI, NASA (Nationwide)
167.3625	FBI (Nationwide)
167.3750	FBI, Immigration and Naturalization Service
167.3875	FBI (Nationwide)
167.4000	FBI, NASA (Nationwide)
167.4125	FBI (Nationwide)
167.4250	NASA
167.4375	FBI (Nationwide)
167.4500	Forest Service (Region 1), NASA
167.4625	FBI (Nationwide)
167.4750	FBI
167.4875	FBI (Nationwide)
167.5000	FBI, Navy
167.5125	FBI (Nationwide)
167.5250	FBI
167.5375	FBI (Nationwide)
167.5500	(No reported activity)
167.5625	Army, FBI (Nationwide)
167.5750	(No reported activity)
167.5875	FBI (Nationwide)
167.6000	FBI
167.6125	FBI (Nationwide)
167.6250	FBI
167.6375	FBI (Nationwide)
167.6500	FBI
167.6625	FBI (Nationwide)
167.6750	FBI
167.6875	FBI (Nationwide)
167.7000	FBI
167.7125	FBI (Nationwide)
167.7250	FBI
167.7375	FBI (Nationwide)
167.7500	(No reported activity)
167.7625	FBI (Nationwide)
167.7750	FBI, NASA (Nationwide)
167.7875	FBI (Nationwide)
167.7968	Low power, non-voice 5 kHz bandwidth splinter frequency (after January 1, 2005)
167.8000	Low power, non-voice up to 11 kHz bandwidth splinter frequency (after January 1, 2005)
167.8031	Low power, non-voice 5 kHz bandwidth splinter frequency
167.8062	Low power, non-voice 5-10 kHz bandwidth splinter frequency (until January 1, 2005)
167.8093	Low power, non-voice 5 kHz bandwidth splinter frequency
167.8125	Low power, non-voice up to 11 kHz bandwidth splinter frequency (after January 1, 2005)
167.8156	Low power, non-voice 5 kHz bandwidth splinter frequency (after January 1, 2005)
167.8250	Air Force, Bureau of Land Management (Interior), Energy Department (Nationwide), FBI, NASA, Veterans Administration
167.8375	Energy Department
167.8500	Energy Department (Nationwide), FBI, Post Office, Veterans Administration
167.8625	(No reported activity)
167.8750	Energy Department (Nationwide), NASA, Navy, Nuclear Regulatory Commission
167.8875	(No reported activity)
167.9000	Bureau of Land Management (Interior), Coast Guard (Nationwide), Energy Department, Geologic Survey, Secret Service, WHCA (Hotel)
167.9125	(No reported activity)
167.9250	Army, Energy Department (Nationwide), NASA, Veterans Administration
167.9375	(No reported activity)
167.9500	Bureau of Land Management (Interior-Nationwide), FBI, Geologic Survey, Interior Department (Nationwide), National Park Service (Interior)
167.9625	(No reported activity)
167.9750	Air Force, Energy Department (Nationwide), IRS, NASA, Veterans Administration
167.9875	(No reported activity)

Jean Baker, KIN9DD

Airport Hopping

Welcome aboard! We have frequencies galore today for your monitoring pleasure. Our first stop is the Baltimore/Washington, D.C., area where we have frequencies from three busy airports to monitor. I can vouch for these freqs – I live in the area and check them out regularly!:

ABBREVIATIONS

ACARS	Aircraft Communication and Reporting System
ATIS	Automated Terminal Information System
VOR	VHF Omni Range navigation aid
VORTAC	VOR plus tactical navigation aid

BALTIMORE WASHINGTON INTERNATIONAL (BWI):

Elevation - 146'; BAL; Runways - 10/28, 15/33, 04/22
VORTAC - 115.100
ATIS - 127.800
Clearance Delivery - 118.050
Ground - 121.900
Tower - 119.40
Approach -
119.0 (20°-100°)
124.55 (101°-130°)
119.700 (131°-180°)
128.700 (181°-019°)
Departure -
133.750, 124.550, 128.700

WASHINGTON REAGAN NATIONAL (DCA):

Elevation - 16'; Runways - 8/36, 15/33, 03/21
VOR - 111.000
ATIS - 132.650
Clearance Delivery - 128.250
Ground - 121.700
Tower - 119.100
Helicopters - 119.950
Approach -
118.300 (east)
124.700 (west)
Departure -
121.050 (west 10,000 - 230*)
118.950 (west 9500 & below)
125.650 (east 9500 & below)
126.550 (east 10,000 - 190)

**at flight level 18,000 and above, the last three digits are dropped*

DULLES INTERNATIONAL (IAD):

Elevation - 313' Runways - 01/19 (right & left), 12/30
VORTAC - 115.350
ATIS - 134.850
Clearance Delivery - 127.350
Ground - 121.900
Tower - 120.100
Approach -
126.100 (331°-90°)
124.650 (091°-240°)
120.450 (241°-330°)
Departure -
126.650 (121°-229°)
125.050 (300°-120°)

I don't have a handle on all company operations freqs just yet, but I am slowly building a data base for them and will publish them when I can. Next month, we will look at Washington D.C. Center frequencies.

Next stop, Chicago

Thanks to Denny Biagioli, who confirmed usage and contributed all of these frequencies.

CHICAGO MIDWAY AIRPORT (MDW):

UNICOM-Signature Flight Support - 122.950
ATIS - 132.750.
Clearance Delivery/Pre-Taxi Clearance - 121.850
Ground Control - 121.700
Tower - 118.700/226.300, 135.200 ("Copter Control")
Approach/Departure -
118.4/388.0
119.350
126.050
133.500
Midway Radar (Class C Airspace) - 119.450 (also used as APP/DEP)
Red Carpet Aviation Svcs (Pvt Flight Service Station) - 123.300
Aviation Network (Pvt. FSS) - 123.500

Company Stations:

ACARS - 131.550.
AirMed One (University of Chicago Air Medical Net) - 129.475
AirTran (Citrus) Operations (formerly Valujet "Critter") Airlines - 130.050
America West ("Cactus") Flight Ops & Maintenance - 130.175
America West Airlines ("Cactus Midway Ops") Operations - 131.500. Also heard on this frequency will be ProAir (Pro Hawk) Flights and Mesa Air ("Air Shuttle") Flights. Both use an America West gate and are handled by their personnel.
American TransAir ("AmTran") Midway Ops - 130.975
AmeriTech (corporate aviation operations) - 130.500
Atlantic Aviation Midway (formerly Aero Svcs) Midway Operations - 131.425
BP-Amoco ("BP-Amoco Aviation Ops") for their corporate aircraft) - 129.425
Casino Express & National Air Operations (serviced by America West at gate B-7) - 130.525
Chicago Express ("Windy City") Midway Ops (operates as American TransAir Express - 129.575
Comair Delta Express ("Comair Midway Ops) & Delta Air Lines Operations - 131.025
Continental Airlines - 131.200
Frontier Airlines Operations - 130.825
Great Lakes Aviation ("Lakes") Operations at Meigs Airport. When they are diverted to MDW, they are handled by Signature and use their frequency - 130.300
Million Air Midway Operations - 130.950
Monarch Air Flight Service - 129.650
Northwest Airlines "Dispatch and Maintenance" - 130.275
Northwest Airlines Midway Operations & Mark Air (serviced by Northwest) - 130.675
Sears Roebuck Helicopter Flight Operations Services (base also in Hoffman Estates) - 129.625
Signature Flight Service Midway Operations - 128.925
Southwest Airlines "Chicago Maintenance & Dispatch" - 129.275
Southwest Airlines "Midway Ops" - 130.125
Vanguard Operations - 131.000

Ground Support Frequencies:

America West Airlines - 464.475.
American TransAir "Dispatch and Operations" - 464.3375
Chicago PD units patrolling airport - 460.400
Chicago Express ("Maintenance & Operations") 460.775
Continental Airlines - 460.800
Dept. of Aviation "Midway Control" - 853.2125
Northwest Airlines - 460.750
Signature Flight Service - 462.550
Southwest Airlines gate personnel, maintenance, gates, ticket counters, talk of refueling - 463.6125

Touch Down in Kansas

St. Louis' Lambert Field (STL) is our next destination, whose frequencies and Kansas City's were contributed by Steve Davidson:

ATIS - 119.925
Clearance Delivery - 119.950
Ground - 121.900, 121.650
Tower - 118.500, 120.050
Approach/Departure Control - 123.700, 125.150, 126.500, 118.950, 119.150, 119.750, 124.900

Since TWA has both a hub here and STL is where they are domiciled, here are a few of their **company frequencies:**
Southwest Ramp - 131.700.
TWA Maintenance - 129.850
TWA Load Planning - 129.900
TWA Service and Catering - 129.625 & 130.975
TWA Flight Information Center - 130.725
TWA Ramp Control - 129.775, 130.625

Now on to **Kansas City International (MCI)**:
ATIS - 128.350
Clearance Delivery - 135.700
Ground - 121.800, 121.650
Tower - 128.200, 125.750
Approach/Departure Control - 132.950
124.700
119.825
119.000
118.900

Airline Company Frequencies:
American - 129.200
America West - 130.175
ARINC Enroute (Midwest/West)- 131.300.
Continental - 129.925
Delta "Atlanta Radio" - 131.850
Delta "MCI Ramp" - 131.450
Midwest Express - 130.650
Northwest - 130.850
Southwest - 131.700
TWA "MCI Ramp" - 130.325
TWA "MCI Maintenance Control" - 128.900
United - 130.150
Vanguard - 130.800

"Light" Humor

Bob Bell, our Down Under correspondent, contributes a hilarious aero-related story to *Plane Talk*:

"Larry Waters lived in Los Angeles, and wanted to be a pilot. He joined the US Air Force and wanted to learn to fly fast jets, but an eyesight problem kept him from that.

"He left the Air Force, but he loved and spent every waking minute thinking about flying and watching planes flying over his backyard. Eventually, he could stand it no more; he had to actually fly. So he went to a hardware store and bought 45 helium balloons and helium cylinders with the gas to put into them. He joined the balloons together and inflated them, tying them to his jeep's pullbar.

"Larry then attached a garden chair, tying that to what was now a four-feet wide platform of balloons. He got a six pack of Coors Lite, and some sandwiches, and then a pellet pistol, then tied himself in to the contraption, releasing his rope. Larry was intending to only ascend to about 30 feet, and fly over his neighborhood, and drink his beer on the "tour," but things didn't quite go to plan.

"It climbed to 11,130 feet, according to United 0005, whose captain radioed to LAX that he had traffic off to his starboard side, 'a guy in a garden chair.' Larry drifted even closer to the airport and by now it was dark, and he had been aloft for 14 hours. He didn't wish to use his pellet gun to deflate any of the balloons any more in order to descend, as he was terrified thinking the whole thing would become too unstable.

"A helicopter was sent to the rescue; however, the wash from the blades pushed him westbound, out to sea. The copter eventually flew above him, and when convinced he wasn't going to try and sabotage the chopper, hauled him up. Larry grabbed the line and was rescued.

"Once on the ground, the Los Angeles Police Department locked him up, charging him with violating LAX airspace; the cops also presented him with 1997's 'Darwin Award,' which is for people who kill themselves in the most stupid way imaginable. He was lucky, old Larry was; he had won this award and was one of the few people to have done so to actually survive! This story is confirmed by LAPD."

Doug Smith, W9WI
w9wi@bellsouth.net

Fading – is it inevitable?

It's one of the most frustrating things the DXer can face: having a station disappear into the interference just as it's about to give its call letters. Of course, Murphy's Law requires it can never fade UP at station identification time! Why do AM signals fade, and can the DXer do anything about it?

There are two ways that an AM signal can travel from the transmitter to your receiver. The station's regular service is provided through the ***groundwave***. As the name suggests, this signal travels along the ground. The groundwave coverage depends both on the station's power and its frequency; the groundwave coverage is greater on lower frequencies. The groundwave coverage of a U.S. station rarely exceeds 300 miles over land, though it can go much further over water.

The other route an AM signal can take is ***skywave***. Again, the name suggests the method – the signal goes up into the sky and is reflected or, actually, is bent by a refracting layer of the upper atmosphere. The distance a skywave signal can travel is nearly unlimited, though the heavy interference in the AM band puts a practical limit on skywave coverage.

Before the skywave signal can reach the reflecting layer, it must pass through the lower D layer. This layer, which is most active during the day and almost disappears at night, absorbs signals passing through it and prevents them from reaching the reflecting layer. This is why AM DX is better at night.

The reflecting and absorbing layers are not uniform, and they do change with time. As these layers become more and less efficient, the signals they bend into your receiver become stronger and weaker. The amount of this fading can vary widely among nearby locations.

Augmenting and canceling

An even more annoying type of fading involves the station actually interfering with itself! If you live within the groundwave coverage of a station, but a fair distance from it – say, 100-200 miles – you can receive both the groundwave and skywave signals with similar strengths. These two signals aren't arriving at the same time. Again, the groundwave signal travels along the ground from the transmitter to your receiver, taking the most direct path possible. But the skywave signal travels up into space and back down.

One radio wave at 1000 kHz is 300 meters – about 1,000 feet – long. If the length of the skywave path is some multiple of 1,000 ft. longer than the groundwave, the "peaks" of the groundwave and skywave signals will arrive at the same time; the two signals will reinforce. But what happens if the difference in the lengths is a multiple of 500 feet, half of a wavelength? Now, the "peak" of the groundwave signal happens at the same time as the "valley" of the skywave signal. The two signals cancel each other out, and the station actually disappears! As the atmosphere changes, the difference in path lengths can vary anywhere between these two extremes. *Voilà*: fading ...

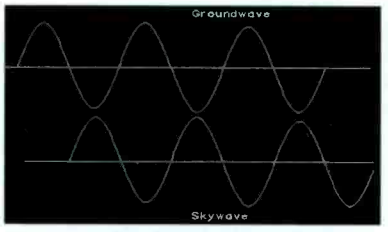
An even more annoying phenomena can occur. The length of the skywave path is different at different frequencies – sometimes, even frequencies that are relatively close. This causes the amount of fading at different nearby frequencies to be very different. For example, the signal at exactly 1000 kHz may disappear while those at 999 and 1001 kHz are only reduced in strength by 50%. Now, your receiver no longer sees a "carrier" signal from the station, but both "sideband" signals are still present. As anyone who's tried to listen to an SSB ham station on a receiver with no BFO can tell you, the signal will be so distorted as to be completely unintelligible.

Fighting back

As an act of nature, it would appear there's nothing you can do about fading. This is not strictly true. For years, AM stations have tried to find the perfect anti-fading transmitting antenna. The famed diamond-shaped towers of WSM and WLW were designed for this reason – more recent attempts have been less exotic in appearance. The idea is to reduce the skywave signal as much as possible, concentrating the power into the groundwave.

At the receiving end, frequency-selective fading can be battled with synchronous detection, as offered in the Sony ICF-2010 and Drake R-8, among other sets. Synchronous detection involves generating another "carrier" signal within the receiver. This carrier is always present, regardless of fading. In the presence of frequency-selective fading, there will still be some distortion, but the signal will probably remain intelligible.

If you don't have a receiver with synchronous detection but you do have a BFO or SSB mode, you can still "fake it." Turn on the BFO,



If two radio signals from the same transmitter travel paths that differ in length by exactly half of a wavelength, those signals will cancel out.

or select SSB, USB, or LSB (it doesn't matter which). Tune to the desired station; you'll probably hear a sharp "whine." As you tune, the "whine" should vary in pitch. Tune for the lowest possible pitch, and at some tuning setting the "whine" should completely disappear.

Some commercial shortwave services use "diversity" reception. This takes advantage of the fact that the amount of fading may be very different at two nearby locations. Two antennas are installed, and the operator switches to the antenna that delivers the strongest signal at any given time. You might get a coax switch, put up a few wire antennas, and arrange to switch between them and any loop antenna you might have.

Bits and Pieces

- A rather amazing piece of historic film has surfaced. A four-minute film, made in 1938, shows off-air reception of the pre-war BBC TV station at Alexandra Palace in London; it's believed to be the only recording of pre-WW2 television in existence. Even more surprising, this material was filmed in the United States – thus making it probably the first recording of VHF TV DX in existence as well! These BBC broadcasts were on VHF, 41.5 MHz, I believe. Thanks to Bill Brock for forwarding this item from the *Times* of London.
- A number of AM stations have disappeared in recent years, as the land their towers are built on becomes more valuable than the station itself. The most recent victim is KCBQ-1170 in San Diego, whose tower field is about to become a Lowe's home-improvement store...
- DX season should be in full swing as you read this. Several high-powered Canadian stations are off the air – what are you hearing on 690, 740, and 940 kHz? Write me at Box 98, Brasstown NC 28902-0098, or by email to *w9wi@bellsouth.net*. Good DX!

OUTER LIMITS

THE CLANDESTINE, THE UNUSUAL, THE UNLICENSED

George Zeller
George.Zeller@acclink.com

La Voz de Alpha 66 Founder Dies

Diego Medina, Vice-Secretary General of the anti-Castro Alpha 66 group and founder of quasi-clandestine station **La Voz de Alpha 66,** died July 23 in Miami. Medina, a medical doctor, transmitted Alpha 66 programs from a mobile van in South Florida on 6666.6 kHz until a FCC bust. The shows are currently heard on local Miami medium wave stations and over licensed USA shortwave station **WRMI.**

According to Jeff White at WRMI, Medina, who suffered complications from the flu, recorded shows the evening before his death. He will be remembered as a pioneer in the anti-Castro movement, and as the operator of one of the last pure clandestine stations in the Western Hemisphere.

South American Pirates

Although they are not on every week, **Radio Cochiguaz** turns up on 43 meters about once a month, normally on UTC Saturdays and Sundays. Their lower sideband transmitter on 6980 kHz sometimes gets a signal into North America. Logs of this one are always exciting, since it's real DX!

If you're interested in updates to their schedule, try contacting them using **radio.cochiguaz@usa.net** with an e-mail inquiry. This month we feature Enrique Wembagher's rare QSL card from Radio Mariquita, one of the stations relayed by Cochiguaz.

Another Micropirate Bust

The FCC, in association with local law enforcement personnel, busted **The Flick** on 89.7 MHz from Federal Heights, Colorado, on July 14. The thirty watt FM pirate had been well heard within the Denver metropolitan area, reportedly from a transmitter near a pager sales office. Despite regular raids like this one, many scores of FM pirates remain active across the USA, so scans of your local FM band can sometimes produce unexpected pirate programming. Thanks go to *MT* reader Patrick Griffith, N0NNK, for this news.

Zantow Web Site

Dave Zantow, a regular *MT* contributor, points out that he has a web site devoted to radio monitoring. Dubbed "Dave's Radio Receiver Page," the site is chock-full of receiver information, audio recorded from

The Slick Radio Mariquita QSL

stations under different reception conditions, and a huge collection of useful material for DXers. The site's **http://www.ticon.net/!davez** address is well worth a visit!

What's on the Air

Our readers heard these shortwave pirate stations last month. Given less Peruvian interference from Radiodifusora Paraton, frequencies within 500 kHz of 6955 kHz are still active, normally from two or three hours before sunset until at least 0500 UTC. Morning and afternoon broadcasts increase on the weekends; with most evening activity on weekends as well. We list programming formats and contact maildrops here:

Ask Julie Show- Several sent in logs for this one; it's a Radio Metallica program. (Blue Ridge Summit)
Blind Faith Radio- Dr. Napalm's classic rock shows are well produced. (Merlin)
Crazy Elmo's Relay World- CERW relays other pirates when not featuring Crazy Elmo himself. (crazyelmo@youpy.com e-mail)
Deliverance Radio- The dueling banjos are back again. (none)
KMART Radio- Stone Cold features rock music on his station. (stonecold6955@hotmail.com e-mail)
KRFI- A mix of off-air pirate recordings and comedy sketches. (None)
Radio Azteca- Bram Stoker's long-running DX comedy station is in a class by itself. (Belfast)
Radio Beaver- Bucky Beaver is back with his "really Canadian" station and Leave it to Beaver music. (Merlin)
Radio Bingo- John T. Arthur always wins this radio game, but he says they never sent him any winnings! (None, try logs in *The ACE*)
Radio Eclipse- Steve Mann recently aired a WMPR "Dance Party" parody. (Providence)
Radio Free Oz- A mysterious station has returned with this classic ID and rock music. (Belfast)
Radio Metallica Worldwide- Dr. Tornado, with his powerful 15 kilowatt transmitter, is by far the best heard North American pirate. (Blue Ridge Summit)
Radio Midi- This new electronic music station said to send logs to *MT* for QSL's, but they should work with one of the maildrops listed below. (None)
Radio Nonsense- Don't be fooled by the name; their comedy is funny. (Belfast)
Radio Smooth- A new one with rock and talk, allegedly from Fort Bragg, NC. (None yet).
Radio Tornado Worldwide- This parody still features actual Radio Metallica off-air recordings. (QSLs logs in *The ACE*)
SWRS- The best-heard Europirate in North America now uses 3905, 7465, 11470, and new 21860 on weekends, relaying numerous pirates. (Wuppertal)
WDRR- J. D. Tiger, back after a long absence, hosts a live show with rock music. (wdrr@juno.com e-mail)
WHYP- The James Brownyard memorial station gives springtime weather for NY and PA. (QSL's logs in *The ACE*)
WMPR- They still transmit techno-rock dance parties. (None)
WRX- Jimmy the Weasel is back, discussing Y2K and Stinkin' Mamas. (Manomet)
WWRX- Like Tornado, this WRX parody plays off-air Jimmy the Weasel recordings. (QSL's logs in *The ACE*)
WRYT- Rock music and comedy sketches, a classic pirate format, dominate things here. (Belfast)

Reception reports to pirate stations require 3 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 1464, Manomet, MA 02345; PO Box 293, Merlin, Ontario N0P 1W0; and Postfach 220342, 42373 Wuppertal, Germany. For information on *The ACE*, send an SASE to PO Box 15830, Chesapeake, VA 23328.

Thanks!

Your input is always welcome via PO Box 98, Brasstown, NC 28902, or via the e-mail addresses atop the column. We appreciate material sent in this month by John T. Arthur, Belfast, NY; Ranier Brandt, Hoefer, Germany; Ross Comeau, Andover, MA; Joe Filipkowski, Providence, RI; Bill Finn, Philadelphia, PA; Harold Frodge, Midland, MI; Patrick Griffith, Federal Heights, CO; William Hassig, Mt. Prospect, IL; Harald Kuhl, Germany; Greg Majewski, Oakdale, CT; Mike Prindle, New Suffolk, NY; Al Quaglieri, Albany, NY; Martin Schoech, Merseburg, Germany; Enrique Alejandro Wernbagher, Buenos Aires, Argentina; Jeff White, Miami, FL; DJ Stevie, Basel, Switzerland; Niel Wolfish, Toronto, Ontario; Dave Zantow, Janesville, WI; and Dr. Zaius.

BELOW 500 KHZ

DXING THE BASEMENT BAND

Kevin Carey, WB2QMY
lowband@gateway.net

Natural Radio: The Hardware

Last month we identified four types of radio signals that have populated the airwaves for eons—namely Sferics, Tweeks, Dawn Chorus and Whistlers. These sub-10 kHz signals highlight the Natural Radio spectrum. Having defined these signals, it's now time to look at the equipment you'll need to tune in for yourself.

It may surprise you to know that, although the equipment for natural radio listening is specialized, it is also rather uncomplicated. A natural radio receiver can even be built from scratch if you are so inclined. (Construction articles have appeared in many magazines over the years. If you are interested in seeing such a project here, please let me know.)

A natural radio receiver is essentially a high gain audio amplifier with an antenna connected to its input. In fact, the first people to hear whistlers were WWI soldiers using such amplifiers to eavesdrop on enemy landline circuits. At first they thought they were hearing the grenades fly at the battlefront, but in fact they were hearing radio signals carried on audio frequencies.

Many new listeners attempt to use an audio amplifier with a very long antenna to hear natural radio signals. It is possible to succeed with this arrangement, but there is one major obstacle – 60 Hz hum. With aboveground electric wires blanketing most parts of the country, it's tough to find a location that is Natural Radio Quiet (NRQ). The wires act as effective transmitting antennas for the 60 Hz hum and usually mask out any legitimate signals that might be present.

For success with natural radio, you need a means for filtering out (or at least reducing) 60 Hz energy. Even with filtering in place, you'll want to be at least a half-mile from the nearest power lines to achieve the best results.

Current Offerings

Today, there are at least three commercial suppliers of natural radio receivers. One of the original firms to explore this niche market was **LF Engineering Co. (17 Jeffry Road, East Haven, CT 06111)**. Long known for their preamplifiers and longwave converters, LFE carries a small, portable receiver known as the L-500. It has a switchable bandpass/high pass filter, gain control record jack and earphone jack. You can attach wire antenna, or use the tree-tapping probes included with the unit. (Yes, it is possible to use a tree as an antenna!)

Natural radio recordist **Stephen P. McGreevy (P.O. Box 928, Lone Pine, CA 94545-0928)** has offered the WR-3/3E (Figure 1) hand-held natural radio receiver for many years. It is a quality hand-held unit with built-in filtering controls and a telescopic antenna. Among the units available, this is probably is the easiest one to put into operation. You simply pull up the antenna, turn the power on, and plug in an earphone.

One caveat is in order for those interested in the WR-3/3E. Stephen reports via his web site **(www.triax.com/vlfradio/wr3e2.htm)** that his time for filling orders has become extremely limited due to recently starting a new job in the field of meteorology. He intends to continue handling a limited number of sales, but cautions that delivery could take up to two months. He encourages prospective customers to write him by postal mail and he will answer back with a date he believes he can ship one out.

Kiwa, a well known manufacturer of antennas and receiving accessories is a relative newcomer to the field. They made a big splash last year with the introduction of their Earth Monitor designed to receive signals from 10 Hz to 15 kHz. (See review in *MT*—Nov. 1998.)

Since then, the Earth Monitor has been further improved with a new type of antenna system. It features a remote field probe antenna that is inserted into the ground for grounding. The top end of the probe comes with a wire spool where up to 20 feet of wire can be unreeled for maximum sensitivity. The unit has a tunable bandpass filter and fixed high pass filter for eliminating 60 Hz hum and related interference. A cassette tape comes with the Earth Monitor with listening tips and sound samples.

You can get more information on the Earth Monitor from **Kiwa Electronics, 612 South 14th Avenue, Yakima WA 98902 (Tel. 509.453.5492)**.

Well, as you can see, there's no reason for anyone to miss out on the fun of natural radio. Between the array of equipment currently available and increasing sunspot numbers (expected to peak around the year 2000), the next five years should hold some of the best listening ever for "primal radio" enthusiasts. Let me know what you're hearing.

Stephen P. McGreevy's WR-3/3E hand-held receiver (left) and LF Engineering Co. L-500 with tree-tapping probes.

Loggings

Loggings this month are from Gary Ponte, W6GY (CA), and newcomer Camilo Castillo, HP1AC (Panama). These loggings show the excellent variety of catches that can be had during the warmer months of the year. By the time this issue appears, conditions should be even better on the low frequencies. Happy hunting!

Freq.	ID	Location	By
200	AOC	Arco, IN	G.P. (CA)
242	EL	El Paso, TX	G.P. (CA)
248	WG	Winnepeg, Man	G.P. (CA)
257	HCY	Cowley, WY	G.P. (CA)
260	YAR	Yanitagua, Venz.	C.C. (PAN)
270	MLK	Malta, MT	G.P. (CA)
284	MXR	Raton, NM	G.P. (CA)
287	SMR	Santa Marta, Col.	C.C. (PAN)
293	TOR	Torrington, WY	G.P. (CA)
293	CRD	Conrad, MT	G.P. (CA)
300	ABL	Abalena, Col.	C.C. (PAN)
317	IBM	Kimball, NE	G.P. (CA)
332	QT	Thunder Bay, ON	G.P. (CA)
344	BKU	Baker, MT	G.P. (CA)
345	LFA	Klamath Falls, OR	G.P. (CA)
346*	YXL	Sioux Lookout, ON	G.P. (CA)
356	PTT	Pratt, KS	G.P. (CA)
365	PAL	Palma. Guayaquil, Ecuador	C.C. (PAN)
365	ADT	Atwood, KS	G.P. (CA)
368	SIR	Sinclair, WY	G.P. (CA)
371	ITU	Great Falls, MT	G.P. (CA)
372*	MF	Mansfield, OH	G.P. (CA)
375	BUN	Buenaventura, Col.	C.C. (PAN)
380	AJL	Abejorral, Medellin, Col.	C.C. (PAN)
380	GC	Gillette, WY	G.P. (CA)
380	OEL	Oakley, KS	G.P. (CA)
384	SPP	San Andres Island, Col.	C.C. (PAN)
390	HBT	Sand Point, AK	G.P. (CA)
391	DDP	San Juan, PR	C.C. (PAN)
395	ULS	Ulysses, KS	G.P. (CA)
396	PAR	Unidentified	C.C. (PAN)
404	HEQ	Holyoke, CO	G.P. (CA)
410	DAO	Sierra Vista, AZ	G.P. (CA)
415	SLS	Salinas, Ecuador	C.C. (PAN)

* *Excellent catches from California!*

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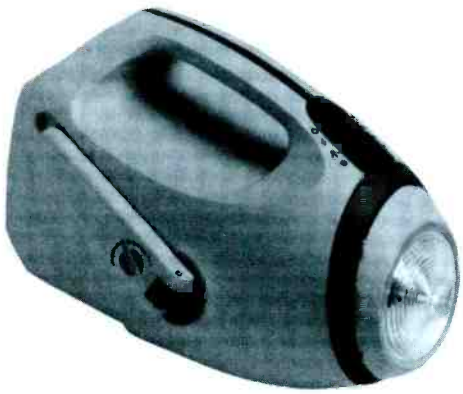

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Iridium Woes

The world's first global satellite telephone company has filed for bankruptcy. In August Iridium LLC filed for Chapter 11 protection from creditors after defaulting on two loans totaling more than $1.5 billion. A series of technical glitches, lack of equipment, poor marketing, expensive pricing, and overall lack of consumer interest hampered the service since its introduction in November 1998.

Iridium began ten years ago, so the story goes, when the wife of a Motorola engineer decided not to go on a Caribbean vacation because she wouldn't be able to keep in touch with her Arizona real estate business. Her husband, along with several other Motorola engineers, eventually came up with a design to provide worldwide telephone service through a series of low earth orbiting satellites.

In partnership with a large number of other investors, Motorola created Iridium LLC and began the long, expensive process of building and launching satellites and constructing earth stations. In 1997 Iridium began launching satellites, eventually lofting more than 80 into orbit while suffering numerous hardware failures and recurring software problems. By late 1998 a dozen gateways were in operation and legal agreements were in place with many governments' licensing authorities.

Finally, on November 1, 1998, Iridium opened for business, boasting that by year-end they would have 100,000 phones in use on the system.

Signs of trouble soon appeared as Iridium reported a total of 3,000 subscribers at the end of 1998. At the end of March 1999, Iridium had just over 10,000 customers, far short of the 500,000 needed to reach financial break-even. A number of excuses were floated for such a small response, including a lack of handsets and a ill-conceived marketing plan. More telling, though, was that by the end of May several senior executives had fled the company, including the Chief Executive Officer and Chief Financial Officer.

In an attempt to attract more customers, in June Iridium introduced a simpler, less expensive pricing structure. Fifteen different price zone rates became four and airtime rates dropped to less than $4 per minute, but the market reaction was limited. By mid-summer only an estimated 20,000 customers had signed up for service, and stories were circulating about finicky phone connections and uneven voice quality. Layoffs soon followed.

After a series of debt extensions and negotiations, on August 11, 1999, Iridium defaulted on two bank loans, one for $800M and the other for $750M. Two days later Iridium filed for bankruptcy, seeking protection from creditors and time to reorganize. Iridium stock, which went public at $20 per share in June 1997 and reached a peak of nearly $71 a share in May of 1998, dropped below $3 just prior to bankruptcy.

Despite the marketing pitch to globe-hopping business executives, the primary customer for Iridium up to this point appears to be the United States Goverment. Besides purchasing a dedicated earth station in Hawaii, the federal government has contracted for several thousand handsets and airtime for military and federal use. Even in the midst of their financial difficulties, for example, heavy Motorola lobbying helped Iridium to sell 1,000 phones to the U.S. State Department for $1.4 million. Whether such tactics will succeed in the future remains to be seen.

Motorola holds about 18 percent of Iridium equity and is the guarantor of the $750 million loan. Motorola has promised full operational support for the 20,000 existing customers and any future subscribers during the reorganization. Motorola also announced that they expect to develop the next generation of Iridium products, although that may be problematic after having laid off or transferred the entire satellite development group.

Should Iridium be liquidated or otherwise cease operation, don't expect other companies to rush in and acquire the system. Most satellites are "bent-pipe" transponders, relaying signals from the ground without regard to content, and may be used effectively with a variety of signals and equipment. Iridium satellites, on the other hand, process signals on-board and are only good for communicating with Iridium telephones and pagers. (Amateur skywatchers have found another use for Iridium satellites, since the shiny aluminum main mission antennas cause the satellite to "flare" as they pass overhead – more information on that phenomenon is on my website.)

Iridium's failure in the marketplace

	Iridium	Globalstar
Uplink (User to Satellite)	1616 MHz - 1626.5 MHz	1610 MHz - 1626.5 MHz
Downlink (Satellite to User)	1616 MHz - 1626.5 MHz	2483.5 MHz - 2500 MHz
Feederlink (Up to Satellite)	29.1 GHz - 29.3 GHz	5091 MHz - 5250 MHz
Feederlink (Down to Gateway)	19.4 GHz - 19.6 GHz	6875 MHz - 7055 MHz
Operational Satellites	66	48
Altitude	420 nautical miles	750 nautical miles
Orbital Period	100 minutes	113 minutes
System Cost	$5 billion	$2.5 billion

doesn't bode well for other satellite telephone systems. The next big LEO to try, Globalstar, has been steadily launching satellites at an average rate of four per month, having 36 in orbit as of August. Twenty more satellites are scheduled to be in orbit by the end of the year, when Globalstar plans to be in commercial operation with essentially the same type of service and potential customer base. Lower operational costs and more robust equipment may help, but Globalstar faces the same challenge of finding customers who are willing and able to pay for service.

It appears that the primary competition for Iridium, Globalstar, and other satellite telephone systems is terrestrial cellular networks. Satellite phones are currently expensive and bulky compared to their cellular counterparts, and don't work indoors or in cars. Costs for cellular telephone service continue to drop, especially with competition, and buildout continues to increase coverage areas.

FBI Stalls Satphone Licenses

Apparently satellite telephones are a threat to national security. The Federal Bureau of Investigation (FBI) is currently blocking several license applications until it can work out exactly how to eavesdrop on satphone subscribers.

The FBI has long complained that advances in technology are eroding their ability to wiretap telephone calls. In 1994 Congress responded to law enforcement lobbying and passed the Communications Assistance for Law Enforcement Act (CALEA), which mandates that telephone companies make their networks easily accessible to government eavesdroppers. While much of that law is still embroiled in controversy, the FBI is adamant in wanting the ability to eavesdrop on satellite telephone users just as they do with terrestrial cellular and traditional landline phones.

Legal wiretaps on wireless networks are almost always perfomed at the switch, where the call may be intercepted regardless of which base station the caller is using. The corresponding access point for satellite networks is the gateway, usually a satellite earth station with a connection to the public switched telephone network (PSTN).

The international nature of satellite telephone service creates a legal problem, however, when the gateway is not located in the same country as the caller. Globalstar, Iridium, and a few other companies hope to use gateways located in Canada to serve customers in the United States, but have seen their operating licenses held up due to FBI demands.

Case in point is TMI Communications, a Canadian-based service provider using the MSAT-1 satellite to sell voice and data service across North America and the Caribbean. TMI filed a license application with the FCC in early 1998, after the FCC began openly promoting competition in the satellite services market. The FBI promptly blocked approval of the license on national security grounds, demanding to be given the ability to intercept all calls made by U.S. citizens or placed on U.S. soil and to know the exact location of the caller.

The FBI would like TMI to pay for retrofitting all of their existing satellite phones with Global Positioning System (GPS) receivers, thus providing location information that could be used to determine the point of origin for a call. TMI explained that they could not afford such an expensive undertaking, but offered to pass along all calls made from American handsets. The FBI rejected this idea, fearing that the bad guys would simply purchase a phone from a Canadian or other foreign dealer, thus having a non-U.S. identification code and bypassing any interception. As of this writing, the issues remain unresolved.

For their part, the Canadian government isn't happy about the FBI listening to Canadian citizens, although they have expressed some interest in a bilateral agreement whereby each spies on the other's citizens, much as the national intelligence organizations already do.

Besides having their privacy violated, the consumer may suffer as prices remain higher due to limited competition. The U.S. is already blocking foreign competition, and other countries may choose to block license applications from U.S. satellite providers as a way to protect their own industries or negotiate for the ability to wiretap satphone users within their own borders.

Dial 911 Anywhere

According to the best estimates, more than 77 million wireless telephones are in use in the United States. With so many phones in so many hands, it's never been easier to report an emergency. The trick is, what number should you dial? More than 20 different wireless emergency numbers are presently operating in different areas of the country, including such non-intuitive ones as *55 in Missouri, *999 in Illinois, *DUI in Ohio, and *77 in Maryland.

For the 100,000 or so emergency calls placed by wireless phones each day, having one nationwide emergency number makes sense. Senate Bill 800, introduced by Conrad Burns (R-MT) and passed by the Senate in August, establishes 911 as the nationwide emergency assistance number for both wired and wireless networks. The bill also extends to wireless systems the same type of liability protection enjoyed by wireline telephone companies, should an emergency call not get through or be routed to the wrong place.

In most areas of the country emergency calls are delivered to a Public Safety Answering Point (PSAP), where dispatchers answer phones and coordinate emergency service responses. Enhanced 911 service on landline telephone systems provides dispatchers with the name, address, and number of the calling telephone, from which they can determine the physical location of the caller.

Locating wireless telephones is a more complicated problem, as covered in the August 1998 PCS *Front Line* column, but it boils down to the dispatcher not being sure where a cellular call is coming from. Since between a quarter and a third of all calls coming into PSAPs are from wireless phones, this is a significant problem. The Federal Communications Commission (FCC) is currently overseeing a series of demonstrations to provide PSAPs with wireless 911 location information, but the final solution has yet to be determined.

Another problem faced by emergency service dispatchers is "PSAP flooding," where many wireless callers all phone in reports of the same incident at the same time. An accident on a busy highway may overwhelm a PSAP as dozens of helpful Samaritans all call in as they pass the accident site. To complicate matters, many mobile callers aren't sure of their own location and end up creating more work for the dispatcher as they sort out whether the caller is seeing a different accident.

That's all for this month. More information is available on my website at www.decode.com, and I welcome electronic mail at dan@decode.com. Until next time, happy monitoring!

EXPERIMENTER'S WORKSHOP

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Bill Cheek
email: bcheek@comtronics.net

Computer Tools, Utilities, and Tips for Radio

The June-97 *Experimenter's* column discussed some great tools and utilities for computer-based radio hobbyists. It's time to update and explore new turf.

Update

In July-97, the Pentium II reigned supreme. Now we have the Pentium III (to 550 MHz). The old Pentium (I) at any speed (60-233 MHz) is slipping into antiquity. The Pentium II (233-450 MHz) remains current, probably the "sweet spot" for cost-conscious hobbyists.

Offshoot Pentiums (Pro, Celeron, and Xeon) are still around, but avoid them unless you know exactly what you're doing and why. Likewise, low cost Cyrix-based PC's can snare the unwary. The confused radioist should paddle the mainstream to avoid pitfalls and limitations of competitive "look-alikes."

This isn't so critical for strictly home and small office needs – Cyrix CPUs probably run Word Perfect and Lotus 1-2-3 just fine, but radio applications aren't so likely to be trouble-free on Cyrix machines. After all, radio software isn't exactly "mainstream." However, I haven't seen compatibility or technical issues with AMD processors. AMD seems to follow the Intel mainstream on a technical par, but at lower prices.

At this writing, the most bang for the buck seems to be the mid-range Pentium II and the upper end AMD processors. For the moment, even the most demanding radio applications still call for only a Pentium (I) 133 MHz or better, and most are still capable of running on 486s and perhaps even 386s. In other words, we're not at a critical juncture to upgrade, but the budget-minded who are about to build or buy a new PC should consider the Pentium II (300-400 MHz). Ignore any fire-sale "deals" on Pentium (I) machines.

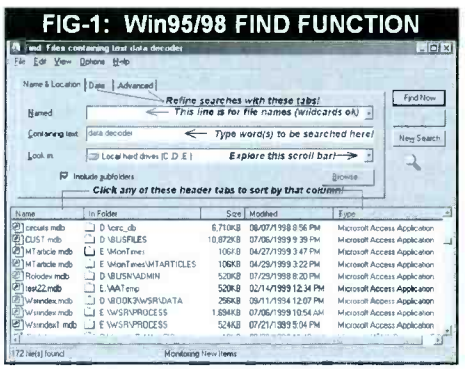
TOOLS & UTILITIES

FINDing Stuff

Serious radioists need to find information quickly and easily. The Windows FIND feature is a very powerful, albeit underutilized, tool. Let's use FIND to the max: click START > FIND > FILES OR FOLDERS. Refer to Figure 1, and:

1. Click the scroll bar of the "Look in:" dialog line

FIG-1: Win95/98 FIND FUNCTION



2. Scroll and look for a choice of "Local hard drives (C: D: E:)"
   If you have just one hard drive, then choose C:
3. Make sure "Include subfolders" is checked.
4. Suppose you know you have a file about data decoders, but you can't remember what or where. So enter "data decoder" on the "Containing text:" line.
5. Click "Find now" and be patient.

Text searches take longer, but you'll get a list of all files on your PC that contain the specified text. My example found 172 – far too many to be initially useful, but the search was easily refined with the Date tab. I just clicked "during the previous _ month(s)" and added a "3" in the blank since I knew the desired file was fairly recent. This produced a list of four files from which it was easy to select the one I needed.

In most cases, a large search result is even easier to refine. See Figure 1 and the five column headers: Name; In Folder; Size; Modified; and Type. Click any one of these header tabs to sort that column in ascending order. Click it again for a descending sort. If I knew an approximate date of the desired file, then a Date sort would let me quickly scroll to a range of dates. Sorting by Size and Type are also useful to exploiting the FIND function.

Double-click a file found by FIND to open it on the fly! Right-click on it to learn more about the file's PROPERTIES.

If you know a file name (or even a part), you can dispense with the "Containing text:" entry and instead type what you know of the filename in the "Named:" box. Wildcards (* and ?) make it easy. For example, "decode*.*" finds any file that begins with "decode" like "decode.txt" and "decoders.doc". It won't find "decoding.rtf". For that, you'd search for "decod*.*" or "decod*.rtf" The asterisk wildcard is for continuous strings of characters while the question mark is for one character in one position.

"decod?.*" finds any six character file name that starts with "decod". However, "decod*.*" finds any 5-255 character filename including "decod.txt". A similar variation, "??code.*" finds files named "encode.*" or "decode.*"

File Names

A file name is a string of characters to the left of a decimal. The file extension (denotes file type) usually consists of a decimal and three characters to the right. Windows 95/98/NT file names can contain up to 255 chars, including spaces, but NOT these eight characters: \ / | * ? " < > It can have one decimal, but only as a delimiter between the name and the 3-character extension.

System Info

Microsoft got serious in Win95/98 with a little known tool called MSINFO32.EXE. Use your FIND function to locate it. When found, right-click on it and create a shortcut out on the Desktop. Run it whenever you have a few minutes of idle time. Read the HELP menu. You may be pleasantly surprised at this "sleeper."

System Maintenance

I used to scoff at Symantec's Norton Utilities back in the olden days, but now I can't do without them. The Norton Utilities v4.0 are a suite of maintenance/repair tools far beyond Microsoft's meager offerings.

WinDoctor performs a complete physical exam and optionally fixes most oddities and errors. Speed Disk is a much faster and more thorough disk defragmenter than Microsoft's Defrag. See: **http://www.symantec.com** for more info.

Microsoft's free RegClean v4.1a for Windows95/98/NT keeps the registry clean and relatively problem-free. Versions earlier than 4.1a are buggy. Get RegClean at: **http://support.microsoft.com/support/kb/articles/q147/7/69.asp**

Virus Protection

Norton's AntiVirus v5.0 is probably the premier virus detector/killer. Best of all, it's

easy to go on line and download the latest virus update files. You can even do updates automatically while you sleep or work. The best deal is Norton System Works containing the Utilities, AntiVirus, and several other great tools, all for barely more than the price of just one. See your computer store or **http://www.symantec.com** for details.

Productivity

Microsoft Works for Windows v4.5 is a potent productivity package for the radioist with a word processor, spreadsheet, and database manager. The spreadsheet and database manager easily organize frequency lists and loads of other radio information. The cost of WORKS, even at full retail, is well under $100. See: **http://www.microsoft.com/insider/works/default.htm** .

TIPS & HINTS

Teach Your "My Computer"

As a consultant working on a "strange" computer, I first need to "get acquainted" using MY COMPUTER. Most of the time, the first view resembles Figure 2, a default view. :(. I guess it's not intuitive that MY COMPUTER can be "power trained". :) The differences are analogous to "idiot lights" versus analog meters on a radio. Compare Figures 2 and 3.

If you appreciate the improvement, then customize your Windows 95/98 MY COMPUTER as follows:

Open a My Computer. On the Menu bar, click:

1. View > choose Details
2. View > choose Status Bar
3. View > Toolbars > choose Standard Buttons
4. View > Toolbars > choose Address Bar
5. View > Toolbars > choose Links
6. View > Toolbars > choose Text Labels
7. View > Folder Options > View > ...
   A. choose Display Full Path in Title Bar
   B. choose Show All Files
   C. choose (Don't) Hide File Extensions

FIG-2: DEFAULT MY COMPUTER

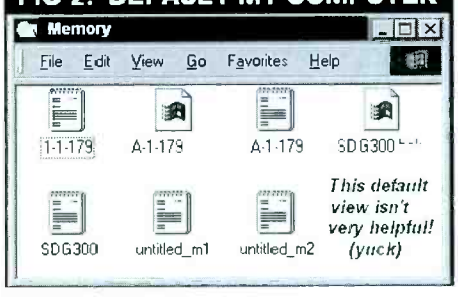
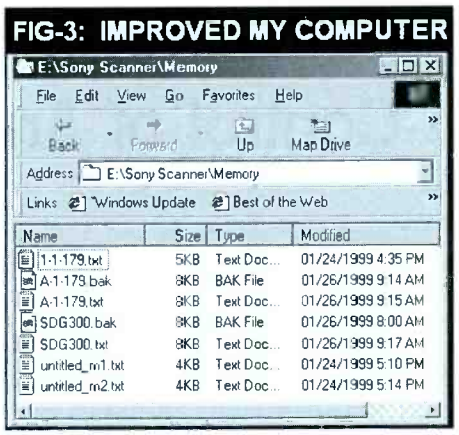


FIG-3: IMPROVED MY COMPUTER



8. Look around for the setting to "Open each folder in the same window" (as opposed to a "new window for each folder".

These settings are for Windows 98, but Windows 95s are the same, just laid out a little differently. Look around – you'll find them.

This tip won't have an overnight impact on your computing prowess, but three months from now, you'll be way ahead. Read my lips!

Eliminate Desktop Themes

Is your Windows Desktop decorated with fancy graphics and themes? If so, much of your computer's power is wasted! "Wallpaper" and themes consume resources and memory. This "eye candy" doesn't do anything useful, but it might be detrimental to underpowered 486's and earlier Pentiums. My AMD K6-233 workstation performs better with the standard lean, mean, green Windows Desktop. Yours will, too.

Make a Lean Startup

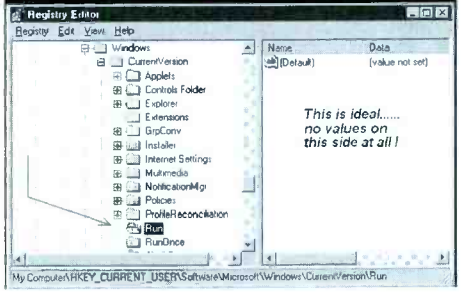
It's "cool" to start a whole slew of tasks and applications on bootup. That's as bad or worse than wallpaper and themes, and it may well cause system instability. The first step to a lean, mean fighting machine is to clean out the C:\WINDOWS\Start Menu\Programs\StartUp folder. Highlight all the shortcuts in there and cut and paste them to a new folder on your Desktop called OldStart. You can then open items as needed. Now reboot and see the improvement in startup time and performance!

Open SYSEDIT.EXE and click the WIN.INI file. Look for a line that begins with: "run=" (without the quotes.) If there is more text to the right of the "run=", place a semicolon at the beginning of the line, like this: ;run=c:\windows\something.exe and then reboot the computer.

With grave caveats and at your own risk, open REGEDIT.EXE and navigate to the Run Key:
Hkey_Current_User\Software\Microsoft\Windows\CurrentVersion\Run (See Fig-4)

Values in the right pane launch applets automatically. Don't delete willy-nilly, but remove anything that you know is left over from incomplete, previous uninstalls. Reboot the computer.

FIG-4: A REGISTRY TWEAK



Operate Conservatively

If you have a Pentium III (550 MHz) with 256-MB of RAM, then I suppose you can operate however you want. Lacking a nuclear reactor, it's best to run fewer applications and open windows. You don't have to be schizoparanoid about it, but several applications running at the same time with a dozen open windows eats up system resources and slows the machine. A simple rule of thumb is to open what you need and close it when done.

Use Task Scheduler

First provided as "System Agent" on the optional Windows 95 Plus Disk, "Task Scheduler" is now free with Windows 98 and/or MS Internet Explorer 4.0/up. I don't have the space for a full intro, but see: **http://www.zdjournals.com/w9p/9903/w9p9931.htm** for details. In a word, TS lets you schedule and automate a host of different operations. It's especially ideal for radio where schedules and timing are critical!

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ANTENNA TOPICS

BUYING, BUILDING AND UNDERSTANDING ANTENNAS

Clem Small, KR6A
email: clemsmal@bitterroot.net

Remote-Control of Antennas

Remote-control radio installations of various sorts have been around for many decades; however, the advent of digital computer technology has increased the ease and reliability of such operations. It is not uncommon for commercial or government radio installations to have remote locations for transmitters and/or receivers, and also for receiving and/or transmitting antennas. Control of remote facilities is by a radio link or by telephone lines.

For installations with multiple transmitters it is sometimes also often necessary to have the transmitting antennas located a few miles away from the receiving antennas to prevent overloading the receivers by the station's own transmissions.

Recent years have seen the introduction of equipment and computer programs designed specifically for remote control of amateur radio stations and hobby-radio monitoring stations. Some have been devised for control via radio links (HTs or mobile rigs), but most are oriented toward using a remote telephone with its touch-tone pad for control of frequency, beam-antenna orientation, and other functions utilized in station operation. The telephone's microphone and earphone can serve for receiving and transmitting auditory information.

Few of us actually get involved in outfitting our stations for complete remote control as just described. Probably the most common example of remote control at a monitoring station or amateur radio station is the orientation of the radiation and reception (R&R) pattern of the station's antennas. There are two principle ways in which the R&R patterns are controlled: by physically moving the entire antenna or some of its elements, and by electrically changing the phase relationship of the currents in various elements of the antenna.

Moving the Antenna or its Elements

The most common means of remotely changing the orientation of an antenna's R&R pattern is the use of an electric motor to rotate a beam antenna. The motor is controlled by means of a long connecting cable and an appropriate control circuit. The beam in this situation is typically a Yagi-Uda or some kind of quad; the relatively high level of horizontal directivity of these antennas makes it advantageous to point them in the compass direction of the desired communication.

At practical heights the vertical R&R pattern of a horizontal antenna is highly dependent on the antenna's height above electrical ground. Depending on that height, a horizontal dipole antenna will provide increased vertical radiation at lower angles at 1/2 wavelength height, or at higher angles at 1/4 wavelength height. Remotely controlling such an antenna's height can allow steering the antenna's vertical R&R pattern to follow changing arrival angles of incoming signals.

Pattern Steering by Phase Control

Most beam-antenna designs shape the antenna's response pattern by the interaction of the radiation from the various elements of the antenna. In the Yagi-type antennas, both the proximity of the elements to one another and the electrical length of the elements help determine the phase relationship of the currents between the various elements. The resulting addition and cancellation of RF energy forms the beam's R&R pattern.

The vertical reception pattern of one old-time, trans-Atlantic, rhombic antenna system, the "Multiple Unit Steerable Array," utilized an array of sixteen in-line rhombic antennas which stretched for two miles! The vertical angle of the array's reception pattern was controlled by shifting the phase of signals from each antenna appropriately.

It is possible to remotely control the phase difference between an antenna's elements by varying the inductance and/or capacitance in the feed system. It is also possible to control the phase fed to an antenna's various elements by feeding different elements from the same RF source, but with different lengths of feedline.

For example, switching between taps on the phasing line in fig. 1* remotely steers the nulls of an array consisting of two vertical, high-frequency antennas. For receiving, this can at times help considerably in reducing interference. Before the advent of the Yagi, design several beams whose horizontal patterns were switched remotely by changing phasing-line length were common.

RADIO RIDDLES

Last Month:

I said: "Speaking of DX, what is the minimum transmitter-input power required for DX communication? Is it closer to 50,000 watts, 5,000 watts, 500 watts, 50 watts, 5 watts, .5 watt, .05 watt, .005 watt, or is this even a sensible question?"

Well, the term "DX" is typically used when talking about long-distance communications on the high-frequency (HF) band, so let's

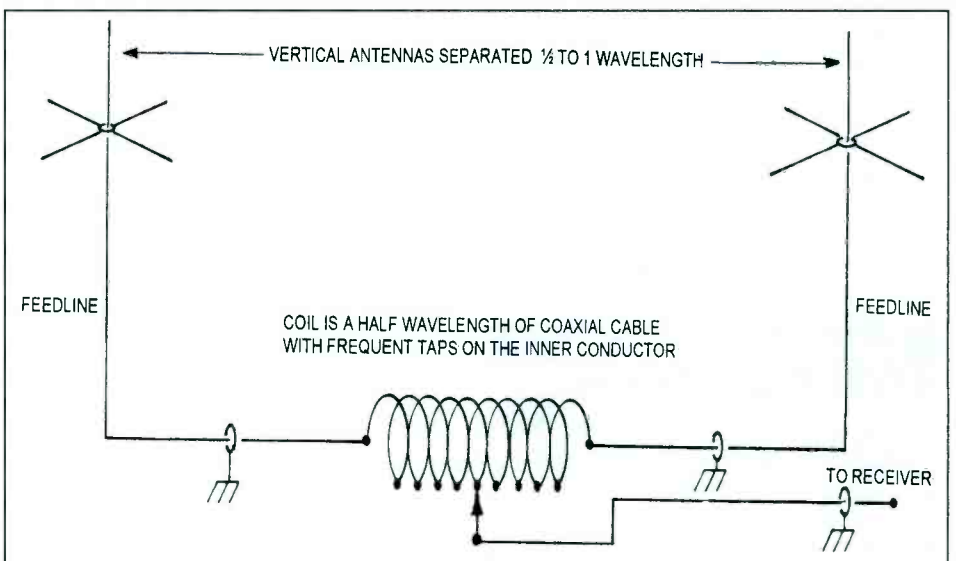


FIG. 1. *Receiving antenna system with steerable nulls.*

answer in terms of HF signals. Last month we said DX was measured in thousands of miles on the HF band, so we'll say that reception from an HF station a minimum of 1000 miles away qualifies as DX. Now let's talk about the power required for some surprising DX accomplishments.

In one instance** a record low power of .004 watt (yes, four thousandths of a watt!) was used to communicate 1400 miles between Sydney, Australia, and Queensland. A more recent low-power DX contact*** of 1600 miles in the US between Seattle and Arkansas was accomplished using only 1 milliwatt (yes, one one-thousandth of a watt!). Other equally impressive DX contacts are made daily by hams who are low-power (QRP) enthusiasts.

And so, when propagation is favorable, DX can be worked with transmitter power in the low-milliwatt range. Now, what do antennas have to do with it?

Well, DX is often worked with very modest antennas when propagation conditions are favorable and signals are strong. On the other hand, when signals are weak, as they often are in DX work, we are more likely to have acceptable reception if we use an antenna with gain and directivity. For instance, a transmitting antenna with 3-dB gain over a halfwave dipole (3 dBd) performs, in the direction most favored by its radiation pattern, as though it had twice the transmitter power driving it as would the dipole. That means twice the power arrives at the distant receiving antenna as would arrive using the dipole as the transmitting antenna.

If the receiving antenna also has 3-dBd gain in the direction from which the received signal is arriving, there is a doubling of received power compared to what would be received by a dipole. With 3-dB gain in both the transmitting and the receiving antennas it is as if the transmitter had four times the power output that it had when utilizing dipole antennas.

Antennas with high gain levels also have significant directivity (vertical or horizontal) in their reception-radiation patterns. In transmitting, this directivity helps avoid sending portions of the transmitted signal where it is of no use or could cause needless interference.

On the receiving end of the propagation path, directivity in a receiving antenna's R&R pattern can reduce the antenna's responsiveness to noise and interference coming from directions other than that of the desired signal. With the desired signal's strength enhanced by gain, and competing noise and interference reduced by directivity the signal-to-noise ratio for the desired signal can be much improved at times. Often this makes an otherwise unreadable signal readable.

By the way, those of you who thought that we should include in our answer such things as antenna-system efficiency and feedline loss are right. But space limitations dictate that we leave such concepts till another time.

This Month:

What relationship, if any, exists between our eyes and radio antennas, and between fiber optic lines and coax feedlines or waveguides?

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

* similar to fig. 13.131, Radio Society of Great Britain, 35 Doughty Street, London, WCI, *Radio Communication Handbook*, 4th edition, pg 13.80.

** American Radio Relay League, West Hartford, Connecticut, *Two Hundred Meters and Down*, Clinton B. DeSoto, 1936, pg 85.

***Hale, Jim, "Milliwatting: A Radio Frontier You Can Explore," *QST*, August, 1999, pgs 53-54.

ON THE HAM BANDS ...

THE FUNDAMENTALS OF AMATEUR RADIO

Ike Kerschner, N3IK
email: n3ik@hotbot.com

Cutting Your Losses

I never dreamed so many of you were interested in reducing line losses in your VHF antenna systems. I received an e-mail from Jim Berry K8UGL before I received my own copy of the August issue of *MT*. He wanted a circuit for a VHF transmatch. By the end of one week there were a handful of letters and quite a few e-mail requests for this information. Figure one is an easy to build circuit from the 1954 *ARRL Handbook*.

I built this unit to use with an eight element collinear array on two meters and have used it on 220 with a similar antenna. The following component information comes from my own version of this unit. C1 is 50 pF per section (I removed one rotor plate from each end, so the actual value is about 35 pF per section. L2 is made of bare #14 copper wire, 12 turns at one inch diameter. L1 is two turns around the center of L2.

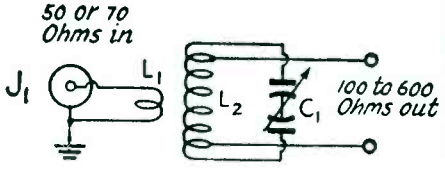
My transmatch is built on a piece of plywood that was coated with varnish; the coil is mounted across two pieces of plastic about 1 x 1 x 1/4 inch. At the rear of my transmatch I have connected two screw terminals for connecting the feedline. From these terminals, two 18 gauge insulated wires about 2 inches long, connect via wire clips (screw type) to L2. An aluminum L bracket supports the coax connector.

To use your transmatch connect a standing wave ratio (SWR) bridge between J1 and your rig, tune the rig for the portion of the band you want to work, and set C1 to the center of the range. Next begin to tap down about one half turn at a time until you hear an increase in noise from your receiver. With a small amount of power out of the rig tune for minimum SWR. If the SWR is too high, continue tapping down on the coil (use the least number of turns you can for optimum results).

This transmatch can be scaled for any band you wish; just adjust the coils and capacitor. (For example, on six meters I would make L2 about 10 or 12 turns of 14 gauge about 1-1/2 inches diameter, and C1 should be about 60 to 75 pF. L1 will want two or three turns wound around the center of L2).

Note: I tried building a six and two meter version of this unit. It did work, but was very difficult to tune on two meters!

3



Courtesy ARRL Handbook, 1954

Another Idea

Stepping 300 ohm line down to coax can also be accomplished using a quarter wave matching section (see figure two). Normally the matching section is designed to match 300 ohm line to 75 ohm coax (yes, 75 ohm coax will work fine with your modern VHF rig). There is a slight mismatch using 75 ohm line (1.25:1), but this is not a problem – your rig will function just fine, and you will transfer a lot more energy to and from the antenna.

The formula for finding the length of a quarter wave matching section is Lft=492V/FMHz, where L is the length in feet, V is the velocity factor of your coax and F is frequency in MHz on two meters. The matching section will be 26.5 inches when using Radio Shack RG-59U coax.

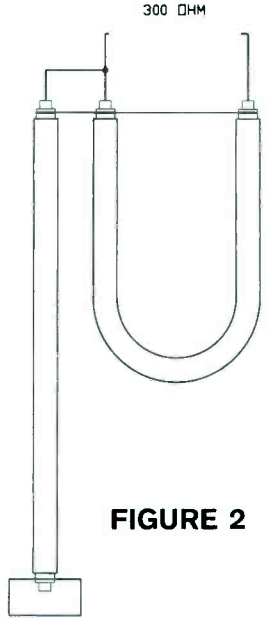


FIGURE 2

$$L(FEET) = \frac{492V}{F\ MHZ}$$

Mosley Antennas

Mosley has been a name associated with ham radio since the earliest years of commercial antennas. I have used Mosley antennas since the early 50s and have always been extremely satisfied with their product. A few nights ago, while checking antennas on the internet I came across their web page and found several antennas that may be of interest to you.

The first is a mini HF beam for 10 - 15 - 20 meters that spans 17 feet, with a six foot boom; front to back ratio is 10 12 dB and forward gain runs from 3.2 to 4 dB. This mini tribander can be turned with a TV rotor and should fit easily in even the smallest lot. Price is $339.95.

This company offers mini single band beams for 10 and 15 meters at $159.95 and $199.95, respectively. Visit their web site and check out their classic beams, VHF antennas and antenna accessories. Their web address is **http://mosley-electronics.com/con_main_2.htm** or phone 1-800-966-7539; Mosley Electronics, 1325 Style Master Drive, Union, MO 63084.

The Internet

Since acquiring the ability to snoop on the Internet, I have looked into many ham radio pages. What I find runs from good to so-so. I do like to check out the various links and web pages and gain a lot of information from them. If you are able to surf the web please do so and let me know what links/pages you find that interest you.

Propagation

Summer 99 has been a real roller coaster ride so far. I have worked rare DX on all bands with my QRP rig on SSB with ease. Other days – in fact, days on end – there has been no propagation at all due to severe solar storms. VHF propagation so far has not been exactly outstanding. With the coming of fall, let's hope for more and better DX.

Did You Know

Many hams are in the entertainment business and some big names in the field are K0WHY Tex Beneke, band leader; WB4KCG Ronnie Milsap, singer; Joe Walsh, singer; KA6HVK Burl Ives, singer; KA7EVD Donny Osmond, entertainer; KD4WUJ Patty Loveless, country singer; KD6OY Garry Shandling, comedian; KN4UB Larry Junstrom, Rock Musician; W6UK Alvino Rey, musician; WA2MKI Larry Ferrari, organ player; WA4CZD Chet Atkins, guitar player; WB4KVB Paul Yandell, musician; WN6RNR Priscilla Paris of the Paris Sisters. Next time you hear the call, you will know to whom you are in QSO!

73 all de Ike N3IK

Jock Elliott, KB2GOM
lightkeeper@sprintmail.com

First Alert WX-67

There is one piece of radio gear that every household – without exception – should have: a National Oceanic and Atmospheric Administration (NOAA) weather radio with alert capability. In my view, this is an essential piece of survival gear that you would be foolish to omit.

A number of writers have already remarked that our modern lifestyle puts us severely out of touch with the natural world around us. We're so busy that many of us scarcely look at the sky and have no grasp of what's really going on with the weather. On top of that, when we are working on computers, watching videotapes, or playing videogames, we won't see that urgent message of impending severe weather that scrolls across the broadcast or cable TV screen.

But there is an alternative to relying on television. In the United States, we are truly blessed to have the NOAA Weather Radio system which broadcasts National Weather Service warnings, watches, forecasts and other hazard information 24 hours a day. There are more than 480 NOAA weather radio stations in the 50 states, Puerto Rico, the U.S. Virgin Islands and U.S. Pacific Territories.

Weather radio broadcasts are found in the public service band at these seven frequencies (MHz): 162.400, 162.425, 162.450, 162.475, 162.500, 162.525, and 162.550. Generally the range of these stations is about 40 miles.

Weather radio receivers equipped with alert capability can sit in standby mode until a special tone is received from the nearby NOAA weather radio station. When that happens, the receiver turns itself on, sounds a tone, and can give immediate information about a life-threatening situation.

Since threatening weather happens in one form or another in every state in the Union, it just makes good sense to have one of the radios in the house and on standby all the time. (The hearing and visually impaired can receive these watches and warnings by connecting their weather radios alert capability to alternate attention-getting devices, such as strobe lights, pagers, bed-shakers, personal computers and text printers.)

There is, however, a rub: most weather radio stations cover a number of counties encompassing a broad area. Where I live, for example, the local NOAA weather radio station covers some 19 counties. In addition, in most areas of the country, weather generally proceeds from west to east. The practical result is, since I live on the eastern end of the forecast area, that when a threatening line of thunderstorms enters our area from the west, I begin to hear weather alerts literally hours before the threat will be near.

It's a little annoying to hear the alert keep popping off for something that doesn't concern me (yet), and it gets very tempting to turn off the Weather Radio alert function. Dumb idea.

The First Alert WX-67 delivers excellent performance in an essential communications tool.

First Alert WX-67

Technology, though, can come to the rescue. SAME (Specific Area Message Encoding) technology, a new feature in the NOAA Weather Radio system, lets listeners preselect the National Weather Service alerts based on the county where they live. The only requirement is that you have a radio that is SAME capable.

Recently, I tested a SAME-equipped Weather Radio receiver: the First Alert WX-67. Manufactured by Wireless Marketing (the same folks who make Cherokee Family Radio Service units) under license to First Alert, this 5.5-in. x 8.25-in x 1.75-in. radio has a 21-inch telescopic rod antenna, a wall wart transformer for AC power, a rechargeable 9-volt battery for backup power, an external RCA connector for an external antenna, an external remote alert connector, and all seven weather channels.

A small liquid crystal display shows the time, but when an alert is transmitted, it displays the type of threat: FLOOD, HIGHWIND, HURRICAN or TORNADO, as well as others. Three small light-emitting diodes indicate the level of alert: watch, warning, or statement. So, if you see TORNADO displayed on the LCD and the LED above "watch" is lighted, then you know that the Weather Service has issued a tornado watch.

The WX-67 stores up to 10 alert messages on a first-in-first-out basis. So, if you've just come into the house and alert pops off, you can review any previous alert messages that have been issued.

The WX-67 is straightforward to program, using a combination of buttons and a knob on the right side. If you want to receive all alerts in your forecast area (even those that are not for your county), simply program code 999999 into location 1. You can find the specific SAME code for your area by visiting **http://www.nws.noaa.gov/nwr/indexnw.htm#sametable** on the Internet.

A knob on the left side of the case controls the volume. A red button stops the alert tone, and a small slide switch near the LCD allows the alert function to be turned off. Any time you wish to hear the NOAA Weather Radio broadcast, you can do so by pressing the largest button on the face, labeled "Weather Radio On/Off."

The best part about the WX-67 is its performance. The audio is crisp and clear, and the receiver is sensitive yet quiet. It is, hands down, the best weather radio I've tested to date. I give this radio my highest personal recommendation.

Suggested retail price is $99.95. For additional information, contact Wireless Marketing Corporation 1-800-259-0959, Monday - Friday, 8:00 am, - 5:00 pm CST.

John Catalano, PhD
j_catalano@conknet.com

AirNav 3 - NOT Just a Revision!

A few months ago we looked at a program called AirNav version 2.xx which allowed us to map aircraft positions heard from voice reports on VHF, shortwave and the digital mode of ACARS. Although mostly a manual data entry program, AirNav 2 brought to aircraft monitoring some very useful concepts: near-realtime plotting of aircraft, maps covering the world, a flight database, multiple display modes and ... the list went on!

In my opinion, that was one of its problems. It had so much, but lacked simple, concise instructions, either in printed form or on-line. All the makings of a great package were almost in place. However, the user interface had been neglected. Was I in for a surprise when I used the latest version AirNav 3 (not AirNav 4 as I had erroneously reported last month). What kind of surprises? Read on to find out.

I received AirNav 3 on CD-Rom. However, it is also available as a downloadable file over the Internet. Installation was quick and easy on my Pentium 233MMX workhorse desktop. ACARS data was fed to it from a Pro-2006 and an FRG-9600 using an outdoor mounted groundplane and an Austin Ferret, respectively.

The program's minimum requirements are: a 80486 running at 66 MHz with 8 MB of RAM and 25 Meg of hard drive space. Windows 95 or 98 is a must. The only anxious time I had occurred when a screen was displayed warning the user not to go any further until a "blue screen appeared." The warning, and I, just sat there for about five minutes until I got tired of waiting and hit the button to continue the installation. It installed, operational, without a problem.

At this point the CD-ROM is no longer needed – which makes operation very convenient. No fumbling through stacks of CDs! Initially, AirNav installs in a partially functional Demo mode. Upon purchase the buyer is supplied with codes which allow full functionality.

As in AirNav 2, there are a number of display modes which have almost similar data content. This can be challenging to the new user. But AirNav 3 was made with a very comprehensive, yet easy-to-use HELP system that can be accessed in a number of ways. Every screen has a Help button which brings the user right to the operational level of that screen. The user is given concise definitions of operation and use for each of the operations displayed on that screen. The instructions are well laid out and color coded for ease of use. The Help screens are so comprehensive that I did not require use of the tutorials in order to get started. In my mind, this is a major positive change from AirNav 2.

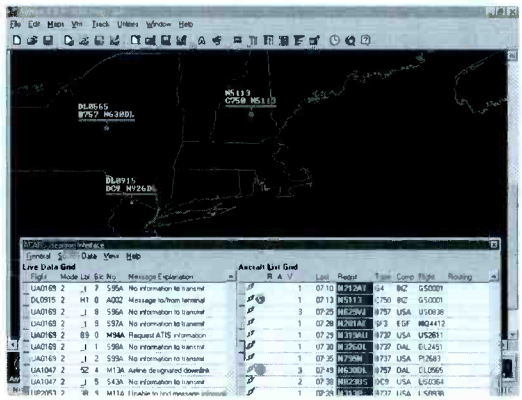


FIGURE 1 - *AirNav 3's terminal mode main screen and ACARS realtime interface*

A major feature of AirNav 3 is its ability to interface to an ACARS decoder program, in order to provide automatic, hands-off, flight mapping and tracking. AirNav 3 is compatible with commercial ACARS programs such as Airmaster 2000, Airmaster 3.x and SkySpy. It also will work with the shareware Wacars (**http://www.mike.mcmail.com/acars.html**). Since SkySpy 1.5 (**http://www.pervisell.com/ham/skyspy.htm**) is one of my favorite ACARS programs, I chose to use it to test the capabilities of AirNav 3.

Hands off

Getting to automatic ACARS data input was very easy. After starting AirNav 3, click the yellow "A" in the command line near the center top of the main screen. The ACARS Realtime Interface screen appears. Clicking "Source Data" allows you to select which ACARS program to use.

After selecting SkySpy as my decoder, I chose to use the DDE method to link the two programs. A File based linking method is also provided in AirNav 3. Now start SkySpy and you're on the air ... literally!

So Let's See It, Already!!

Figure 1 shows the Terminal Mode main screen in the top half, displaying a map of Northeastern US (the location of my ACARS monitoring site). The ACARS Realtime Interface screen, with the data received from SkySpy, is displayed on the lower half of Figure 1. The top portion shows graphical-map presentations of the data shown in text form below. Say again?! OK, slowly this time.

Take a look at the second entry in the list on the rightside lower half of Figure 1. Do you see an entry received via SkySpy at 07:13 with registration number N5113? Right. Also on this line, notice that the aircraft type is given as C750 (Cessna Citation 750) and it is a business jet denoted by Biz. Now, if we check above on the map for the location of N5113, we can see its current position is in the center of New Hampshire.

Similarly, we can see that a Delta Airlines Flight DL0565 is reporting over central New York State, near Syracuse. Its aircraft type is a Boeing 757 (B757) and its registration number, or as pilots call it, tail number, is N630DL. Another Delta jet, this time a DC9, can be seen in northern New Jersey.

They just appear!

People, let me tell you that I was mesmerized watching AirNav 3's automatic display of aircraft all over the Northeast for hours ... actually days! It felt just like the first time my flight instructor brought me into the control room of Air Traffic Control's New York Center. That was so long ago that their screens only emitted green im-

ages. But the excitement of seeing aircraft appear and move like ghosts across the screen, without the operator lifting a finger, is very addictive.

But you will probably not be sitting idle. With all the added features in AirNav 3 you'll be clicking away as new aircraft appear. For example, finding out more information from the program's flight database or using the distance calculation feature to determine how far away you can receive reliable ACARS signals.

Figure 2 shows what a session can yield on a slow weekend day. When an aircraft is first "heard" it is assigned a symbol of an x in a circle. When that aircraft reports a new position its symbol is changed to an airplane.

Tracking fun

AirNav 3 can display so much more. The tracking display is one of my favorites. Look at Figure 2 again. This is aircraft N513MW, a Grumman Gulfstream 5 (G5), first reported over southern Connecticut. Its track shows that it then flew to the coast of southern Maine, threading its way past lots of commercial flights (remember vertical separation). N513MW then turned back around and its last ACARS' reported position was on the Connecticut coast, east of where it started. How would you like to pay for the gas for that joyride?!

The ACARS dream team

AirNav 3 provides a database of aircraft and their last known air routes. I found it to be useful but limited in its number of entries and accuracy. However, the user can add and edit entries from information gleaned from their monitoring.

FIGURE 2 - *The terminal mode screen in all its glory!*

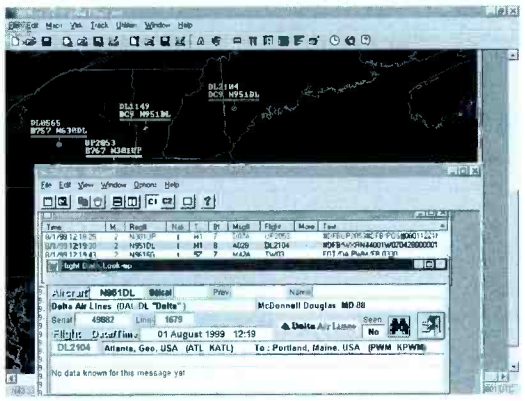


FIGURE 3- *The ACARS Dream Team: AirNav, SkySpy and Flight Database Plus*

But, suppose we could connect the powerful combination of AirNav 3 and SkySpy 1.5 to a comprehensive aircraft database, such as Flight Database Plus from Rainford Software (reviewed last month in this column)? We would have the World Cup of ACARS.

Would they work together?

YES! Just check Figure 3 for the answer in the affirmative. Here we see AirNav 3 at the top showing the position of flight DL2104 in Maine. Next, I've displayed the SkySpy ACARS screen showing DL2104 (registration number N951DL) entry. Finally we see Flight Database Plus' screen telling us this that this flight's route is Atlanta, Georgia, to Portland, Maine. Just what is displayed on AirNav 3. Isn't science wonderful!

Can this be?

Not only are there no "Features I'd Like To See ...," but we have not even touched on many of those already available in AirNav – for example, using other sources of almost realtime flight data. AirNav 3 provides an Internet data capture feature that I'm dying to try.

The combination of AirNav 3 and a good ACARS decoding program such as SkySpy is unbeatable for any air monitoring/spotting enthusiast. Rarely do I persuade Carol, my proof reader and partner-in-crime, to sit and watch a program. But she was glued to the ACARS ballet for hours with me. If you have a scanner capable of receiving commercial aircraft (117 to 136 MHz) and a computer, you should have AirNav 3 and an ACARS program.

AirNav 3 is available from a number of sources including direct file downloading from their Website at **http://www.airnavsystems.com/** for $70. It is also available from Simon Collings, telephone 012242514429, in Europe, at 53 pounds sterling.

Bob Grove, W8JHD
bgrove@grove-ent.com

WiNRADiO WR1500 PC Receiver

A few years back, an entrepreneurial company released a computer-hosted receiver, announcing it at the Dayton Hamvention. It drew considerable attention, and the price—around $1400—was attractive. The receiver had very good specifications, and the software was easy to use. Unfortunately, the market was not ready for the revolutionary concept, and there were a few bugs that needed to be corrected. The product never went into full production.

Other short-term efforts managed to couple computers with scanners, and many government security agencies utilized small runs of tiny scanners operated by laptop computers. All of these, however, were initial efforts to merge existing technologies.

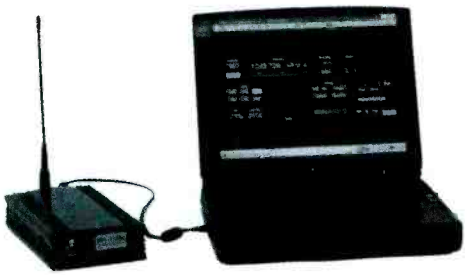
But times are different; clearly, the computer is no longer an annoyance, it is a staple of business and technology. Software is becoming easier to use, and computers are coming closer and closer to standardization. It seems that only the limits of our imaginations restrict the use of these space-age machines.

Many old-timers (including me!) scoff at radios that have no knobs, requiring a computer-screen emulation even to recognize what the device is. This isn't real radio—or is it? After all, more and more of these strange devices are coming on the market, and people actually seem to like them!

At this point it time, the major players are WiNRADiO, Icom, Kachina, and Ten Tec. Among these contenders, WiNRADiO has the largest number of choices, from the entry-level WR1000 to the advanced WR3100 and WR8000 series. At the present time, the WR1500i (internally computer-hosted) and WR1500e (external module) seem to be drawing the most attention, so let's take a second look. (Note: *MT* reviewed the WR1500e originally in October and November of 1998.)

The WR1500i internal radio is well shielded from the computer environment.

There seems to be some confusion as to just what these radios are intended to do. Are they communications receivers? Scanners? What is the performance difference, say, between the WR1500 and a comparable stand-alone receiver?



The WR1500e offers the ultimate in portability.

It is probably fair to compare the WR1500 to a scanner rather than to a wide-frequency-coverage communications receiver; after all, the WiNRADiO costs around $500, while the tabletop Icom and AOR receivers push toward the $2000 mark.

More specifically, the WR1500 could be favorably compared to a computer-hosted AOR AR8002, Icom R10, or Alinco DJX10T. After all, these are also wide-frequency-coverage scanners with multi-mode reception, and are similarly priced.

Specsmanship

Specifications mean different things to different people, and not only do manufacturers often use different methods to measure their specs, they aren't always true. And finally, there are individual variances among units. It is rare to find an independent laboratory whose figures exactly corroborate the manufacturers' published specs.

In any case let's take a look at the most important specs or, at least, those with which most of us are familiar:

Sensitivity: The ability of a receiver to reach into the noise and pull out a weak signal is of paramount importance. Sensitivity is most often stated in microvolts (abbreviated μV or uV), the lowest signal strength which is actually readable above a standard noise level. The sharper the selectivity (narrower filter bandwidth), the better the sensitivity for a given radio.

Our three hand-held scanners specify a nominal 0.45 uV sensitivity, while the WR1500 boasts 0.35 uV. But high sensitivity comes with a price—literally. It is more expensive to build a receiver with wide dynamic range—the ability to respond both to very weak and very strong signals without compromising performance. The WR1500 is no exception; in the presence of very strong signals, just like other scanners, interference will be heard from those blockbusters, even though they may be way across the spectrum from the tuned frequency.

Most radios, including the WiNRADiO, have an attenuator switch to allow the signals—all signals—to be reduced in strength to minimize this overload effect. Only the more rigorously designed radios have wide dynamic range so that their sensitivity isn't compromised by strong local signals.

Selectivity

The ability of a receiver to discriminate between two closely-spaced signals is vital in densely-packed radio spectrum. Since scanners are first of all designed for VHF/UHF monitoring, where signals are neatly spaced by official allocation, inexpensive filtering suffices.

But when these scanners are extended in their frequency range down to the worldwide high frequency ("shortwave") spectrum, crowded conditions can frustrate reception. This is true of all wideband, hobby-type scanners currently sold, and the WiNRADiO as well, since it does not have a wide/narrow selectivity option.

Self-generated interference

There is one point of vulnerability that computer-hosted receivers share: radio frequency interference (RFI) from the computer. After all, computers operate at radio frequencies, and if they are not properly shielded, they radiate a myriad spurious signals throughout the spectrum.

Fortunately, most of this is predictable and can be overcome. The card-slot WR1500i is, mercifully, well-shielded from its computer environment, and the external

WR1500e module is encased in a rigid, interference-immune brick. Even so, the computer's monitor is the worst culprit, so it is best to place the antenna as far from the computer as possible. This is true with the WiNRADiO products and computer-connected scanners alike. Even with all these precautions, there may be some detectable RFI leak-through, especially on quiet parts of the spectrum.

Bottom Line

The WiNRADiO products have two distinct advantages over virtually any other contender on the market: first, it is upgraded by software, available periodically from the WiNRADiO Web site; and second, it has a spectrum display capability which shows all the signals present on up to 100 megahertz bandwidth. The display can be stored for later recall, and even compared over several sweeps to give a histogram of signal activity over time.

A choice of software options allows decoding of several digital modes, and the spectrum display permits the user to drag a mouse cursor rapidly to any signal spike and monitor the transmission as the window displays the exact frequency. Pretty nifty.

So what is the bottom line? Is the WiNRADiO the ultimate receiving instrument? No equipment model can make that claim because there may be as many possible variations on a radio's requirements as there are people listening to them. But the WiNRADiO is first and foremost a spectrum surveillance receiver, an agile instrument which permits the detection and monitoring of AM, FM, and SSB signals over the first 1.5 GHz of radio spectrum. And it is a basic spectrum analyzer as well. For 500 bucks, that ain't bad!

The WR1500i is available for $499.95, and the WR1500e for $549.95 from Grove Enterprises; also available from other MT advertisers.

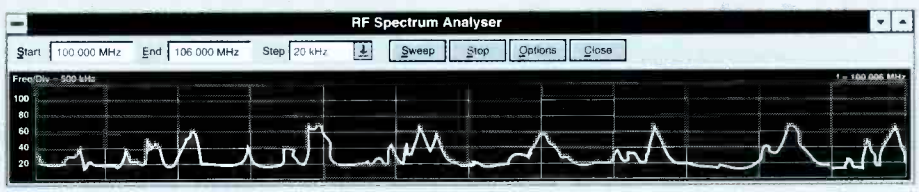
RADIO DATABASE INTERNATIONAL WHITE PAPER® reports contain virtually everything found during exhaustive tests of premium shortwave receivers and outdoor antennas. For a complete list, please send a self-addressed stamped envelope to RDI White Papers, Box 300M, Penn's Park PA 18943 USA; or go to www.passband.com.

So Is the WR1500e for You?

The WR1500e is first and foremost a wide-frequency-coverage, spectrum surveillance receiver – a tool for navigating through the radio spectrum in search of signals and identifying them.

The VHF/UHF spectrum is where the 1500 really shines, and its capability of extending frequency coverage to 1500 MHz – with spectrum display – is extraordinary for a budget receiver

Spectrum display units typically cost upwards of $1000, and require a separate host receiver. The WR1500e has its own SDU, allowing not only a visible display of up to 100 megahertz width of signals on the spectrum, but instant selection of any one of those signals simply by dragging a mouse cursor to it and clicking on it to listen to its contents in any mode (AM/USB/LSB/CW). Commercial spectrum analyzers with such capability begin at about $10,000.



For scanner fanciers, the WR1500e offers 50 channel-per-second scanning/searching speed, and infinite memory storage limited only by the capacity of the host computer's hard drive. The frequency-logging program is very flexible, and the optional data decoding software (Digital Suite, $99.95) is impressive and effective.

Computer interference can be kept to a minimum in both the external and internal models, provided the antenna is located away from the equipment, recommended for any computerized radio installation.

All in all, the functions and flexibility in the WR1500e package are remarkable at such a low cost. Will it perform as well as a full-blooded communications receiver? No. But where will you find a communications receiver that provides 100 MHz-wide spectrum display, instant signal access, virtually unlimited memory, and software upgrades? And all for $500?

With its limitations – limited dynamic range and factory-set selectivity – clearly in mind, the WR1500e offers remarkable signal-intercept power at a budget price.

Bob Parnass, AJ9S
parnass@megsinet.net
www.megsinet.com/parnass

Plectron R700 Monitor Receivers

Our January 1996 column about Plectron and Motorola Alert monitor receivers proved popular. We heard from former Plectron employees and David W. Collins, whose father, Arlyn H. Collins, co-founded Plectron with Keith Wycoff in 1955. Several *MT* readers were eager to learn more about these radios.

Plectron crystal controlled FM receivers were standard equipment for many fire fighters and ambulance squad members in the 1960s and 1970s. They have since been replaced by tiny pagers, but the desktop Plectron radios still make good receivers for hobbyists who can find them at hamfests for $5 - $25.

The most common model is the R700 series (Figure 1). We recommend these over the earlier P1 and economy 500 models. The R700s can be powered from 117 Vac or 12 Vdc with the proper mobile cord. The audio quality of a Plectron 700 is better than a consumer grade scanner, and the sensitivity, image rejection, and intermod immunity is outstanding when properly aligned.

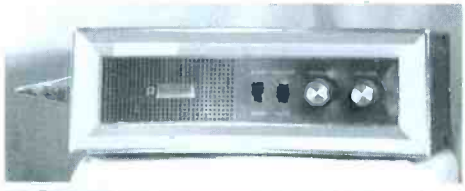


FIGURE 1: *Plectron R720 Chief receiver*

Models and Frequency Coverage

The Plectron monitors are single band receivers: VHF-low, VHF-high, or UHF. No single Plectron could cover the entire 30-50 MHz or 148-174 MHz band, so there were versions optimized for each band segment (Table 1).

TABLE 1: PLECTRON MONITOR SERIES

RF Range (MHz)	Y1 (MHz)	Y2 (MHz)
25-29	(f+10.7)/3	11.155
29-32.6	(f+10.7)/3	11.155
32.5-35	(f-10.7)/2	10.245
35-41	(f-10.7)/2	11.155
41-47	(f-10.7)/2	11.155*
47-54	(f-10.7)/3	11.155
148-158	(f-10.7)/9	11.155
158-175	(f-10.7)/9	10.245
450-470	(f-10.7)/18	11.155

* (use 10.245 MHz for Y2 on 44.62 MHz)

Although UHF versions of the R700 series were made, they are rare and coverage is limited to 470 MHz and below. Plectron made several models with dozens of different options, including tone decoding and RSO (remote switching option) features.

The R700 series have black cabinets with brown front panels and are slightly smaller than the older P1 receivers. R700s were made in the Chief (tone decoder and carrier squelch) and Patrol (carrier squelch only) models (Table 2).

The Plectron FM Receiver/Recorder is a collector's item. It is essentially an R700 series Chief receiver with a built-in cassette tape recorder. The recorder is carrier-activated and can tape transmissions while the receiver is unattended. A connector on the rear panel allows for all kinds of remote control possibilities.

The tape recorder inside the Receiver/Recorder employs two rubber belts. Replacement belts made by the Projector Recorder Belt Company (Whitewater, WI) work fine, though they may not be the original equipment: PRB SCA8.6 (218 mm) and PRB SCQ 2.5 (64 mm).

TABLE 2. PLECTRON 700 MODELS

Crystal calculations and front end component values depend on the band

Band (MHz)	Chief	Patrol
25-54	R719	R715
148-174	R720	R716
450-470	R723	R721

Crystals

There are two crystals (Y1, Y2) used in the Plectron R700 series, one for each local oscillator (Figure 3). Plectron receivers require special crystals for Y1, the crystal that determines receive frequency. We have used Radio Shack's generic 3rd overtone scanner crystals in the Plectron monitors but they oscillate on frequencies hundreds of kHz away from their marked frequencies. That's because the Plectron oscillator is designed to be used with a crystal which oscillates on its fundamental, not its overtone, frequency.

The best source for crystals is International Crystal Manufacturing Co., 11 N. Lee Ave., Oklahoma City, OK 73102, tel. (405)236-3741, (800)725-1426. You need

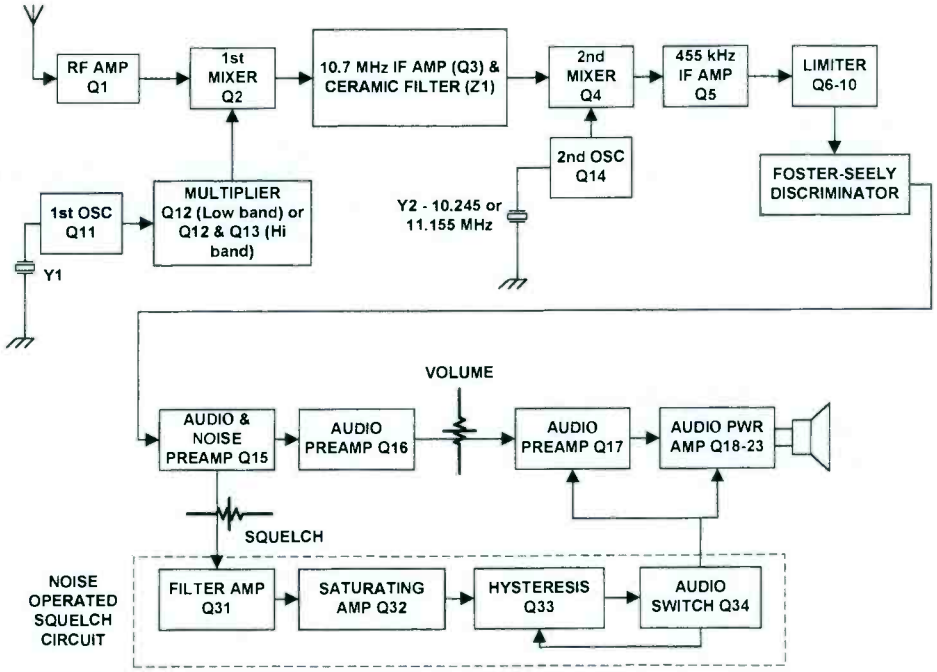


FIGURE 2: *Plectron R700 series VHF-low and VHF-high band models (tone decoder and remote switching options not shown).*

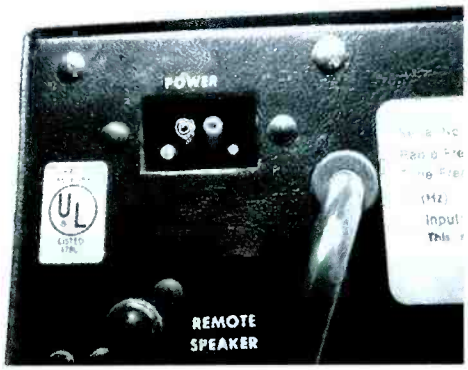


FIGURE 3: *Permanent AC line cord installed through rubber grommet. Note insulation installed over top terminals on power connector to prevent shock.*

not bother with calculating the crystal fundamental frequency. Furnish International with the receiver model number, printed on the rear label, and the frequency you want to monitor. They will perform the necessary calculations.

Your Plectron receiver may require realignment if you install a crystal for a frequency a few MHz away from where the receiver was last aligned. We don't have the space in this column to describe full RF alignment. Sensitivity will be poor if you try to crystal a Plectron receiver for a frequency in a different "split" – for example, trying to use a 158 - 175 MHz model on 150 MHz.

Component designations are clearly labeled on the printed circuit boards. After installing a new crystal in socket Y1, connect a calibrated RF signal generator to your receiver's antenna jack and a high impedance voltmeter to test point TP2. Set the generator to produce an unmodulated signal at the desired receive frequency. Use a nonmetallic alignment tool and adjust the core in coil L1 (located adjacent to Y1) to tweak the oscillator on frequency until the voltage at TP2 decreases to zero.

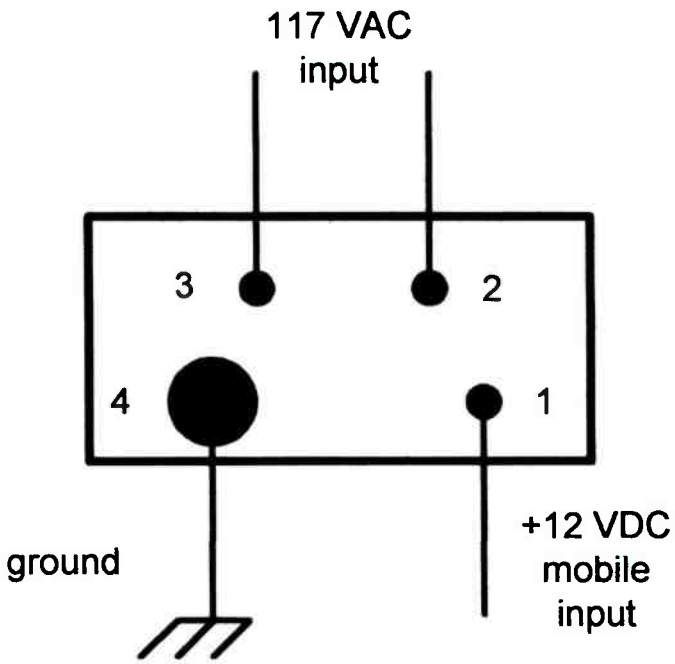
Another way to adjust coil L1 is to listen for the Plectron's local oscillator signal using a nearby receiver. When properly adjusted, the local oscillator produces a signal 10.7 MHz away from the desired operating frequency.

Power Cords

AC power cords for R700 receivers are unique and scarce. A pinout diagram of the Plectron power connector appears elsewhere in this column. You can buy the proper replacement power cords, but it's much cheaper to drill a hole on the rear panel and solder a permanent power cord to the rear of the upper two contacts on the inside of the power connector. Use a rubber or plastic grommet in the hole to prevent the metal chassis from chafing the line cord (Figure 3). Insulate the external pins on the outside of the power connector because they are electrically "hot" and pose a shock hazard if left bare!

Many Plectron monitors were equipped with an internal NiCd battery pack, intended to power the receiver if the AC power fails. It's unusual to find a used monitor receiver with the NiCd pack still capable of holding a charge. More often, the batteries have died and series charging resistor R1 (22 ohm, 2 watt) has overheated and burned. Be sure to remove the dead batteries, as they often leak.

FIGURE 4: *Chassis mounted power connector, as viewed from the outside rear of the Plectron R700.*



Squelch and Minimum Volume Setting

If you find the squelch on your Plectron 700 series receiver has too much hysteresis, replace R96, a 180 K resistor, with a 560 K resistor.

Plectron monitor receivers are designed purposely to have a minimum volume setting that is still audible. The intent was to prevent firemen from turning the volume down completely, forgetting it was down, then missing an important call.

This "feature" was usually implemented by having resistor R64 (1000 ohm) in series between one end of volume control R1 and ground. You could decrease the lowest volume setting by decreasing the value of R64. Alternatively, you could replace the resistor with a jumper wire to completely silence the receiver at minimum setting of the volume control.

Repair and Replacement Parts

Repair service and replacement parts for the Plectron P1 and R700 models is offered by: Weber Electronics, PO Box 212, 5138 Laurel Lane, Broad Run, VA 20137, tel. (540) 347-7760, email: **weber@citizen.infi.net**

Plectron Alternatives

It's too bad Plectron is out of business. If you wish to purchase a new receiver with "Plectron-like" signaling capabilities, contact Reach Electronics, 1311 West Pacific, Lexington, NE 68850. tel. (308) 324-6661, (800) 445-0007, FAX: (308) 324-4985. Reach sells tone and voice pagers, alerting monitors, and encoders. They also do contract manufacturing.

ASK BOB

ANSWERS TO YOUR RADIO QUESTIONS

Bob Grove, W8JHD
bgrove@grove-ent.com

***Q.** Is there any way to anticipate the distance you can hear medium wave broadcasters? (R. Clapp)*

A. No, because reception is dependent upon quite a number of factors, including: Absorption and reflection of signals by the ionosphere depending upon the sun's position, the distribution of electrical storms around the country, frequency (remember 530-1700 kHz is more than a 3:1 change in wavelength, with consequential changes in propagation), type of receiving antenna, receiver sensitivity and selectivity, power of the transmitting station, ground conductivity, presence of adjacent channel and co-channel interference, and directivity and gain of the station's antenna(s).

***Q.** Do you believe that flying saucers may have programmed human brains to make the mistake of Y2k through telepathic brain waves, so that all missile bases would malfunction, triggering a launch to invade all of planet earth? (Donald Michael Choleva, Euclid, OH)*

A. No.

Bob's Tip of the Month

More Sony ICF-2010 Audio Improvements

Few portable radios have deserved the attention that has been given the popular Sony ICF-2010 multiband receiver. Its success is reflected by its endurance; now approaching 15 years in age, it may well have the record for the longest product life in the history of shortwave receivers.

Edgar Gardner III of Sacramento, California, recently shared with us a list of improvements he has made to his 2010. We share those with our readers, but caution no one to try these unless he feels confident with printed circuit boards and their tiny components. We are not responsible for any damage resulting from these modifications.

Better Audio

Carefully remove the rear of the cabinet to reveal the circuit board next to the speaker; avoid snagging the fragile wires attached to the ferrite rod antenna.

(1) To increase the low frequency range of the audio, locate C301 and replace it with a 1000 µF electrolytic capacitor (Radio Shack 272-1032 or equivalent).

(2) If you're a purist, substitute heavier-gauge speaker wire for the thin leads installed at the factory.

(3) For smoother high-frequency roll-off, locate tape-output connector J304; solder a .047 µF capacitor (Radio Shack 272-1068 or equivalent) across the two square solder pads next to the cabinet.

Better bandwidth

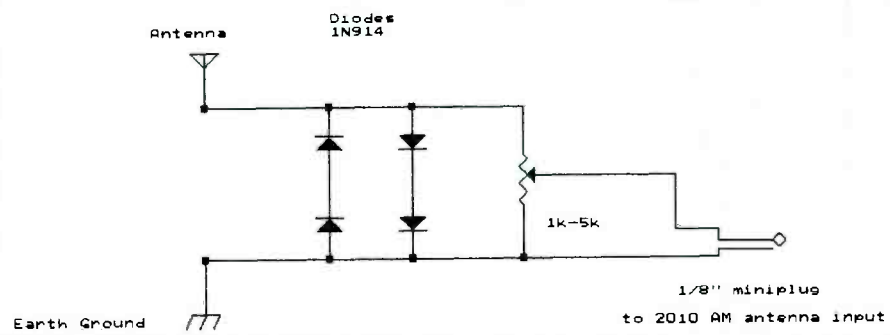
Still feeling adventurous? Although these mods help the audio in the wide-selectivity AM mode, there is room for improvement in narrow bandwidth, but that requires changing a filter. Here's how to do it – if you can find the replacement filter. You may need to contact Sony's parts department (800-222-7669).

Remove the three mounting screws of the main circuit board and unsolder the brown wire. On the reverse side of the board, locate CFW2, a Murata 455 kHz filter marked "55JT." Carefully unsolder it and replace it with a Murata 55G, the same part number used for the wide filter.

For room-filling sound, try connecting the tape output of the 2010 to your home stereo system (you will need a stereo-to-mono adaptor like the Radio Shack 42-2154). Hear shortwave the way it was meant to be heard!

Circuit Correction

Other Sony 2010 improvements were provided by Steve Johnston in a feature article in the August 1999 issue. However, Lou Loria W0QQG, pointed out two errors in the antenna attenuator/protector circuit (Fig 3 on p. 24). The antenna should not have been shorted to ground as depicted. Also, on the 1/8" mini plug, the wiper of the pot should go to the center conductor of the mini plug. Below is the illustration as it should have appeared.



Q. *How do the proposed "smart guns" work? Can the registered owner let someone else shoot it? Are they going to be cost effective enough for people to buy? (Mark Burns, Terre Haute, IN)*

A. With the recent flurry of mind-numbing shootings, these questions have been asked over and over. There are several technologies, including fingerprint identification, the presence of a small magnetic finger ring, and a wrist beacon transponder.

Additional access could be built into the fingerprint codes, or the finger ring and wrist transponder could be shared. All of these devices raise the price of the weapon considerably, so success will depend upon the willingness of the public to adopt them.

Q. *I recently saw a wireless communications system called InterLink which looks like a cell phone, but has no antenna. What can you tell me about it? (Andrew Burnett, Westphalia, MO)*

A. A rapidly growing segment of the telecommunications market is Personal Communications Systems (PCS), of which InterLink – a Boulder, Colorado, company – is an example. The InterLink supports up to 720 users within an in-building environment to have instant telephone contact over millions of square feet through multi-cellular antennas.

Basically, then, the InterLink phone is a private, cordless telephone system designed for internal hospital, school, warehouse, business, and industrial complexes.

Q. *Do the scanner manufacturers plan to make their upcoming models compatible with the FCC's new spectrum refarming with narrower channel splits? (Bill Brigham)*

A. Even though current scanners can receive the new channel splits, reception may be somewhat distorted because the exact signal frequency from the new bandplan cannot be entered as assigned. As a result, the discriminator (FM detector) is mistuned, distorting the recovered audio.

The degree of the distortion will depend upon the model of the scanner, how close to the actual frequency it can respond to the unfamiliar keyboard command, and how wide the selectivity filtering is.

At this writing I am awaiting a call back from Uniden to find out their position in all this, but my assumption is yes, they are working on it. If they aren't, I'll let you know, because they should be!

Q. *Is there any way a laboratory can examine the atomic structure of a conductor to determine whether or not current had flowed through it? (Mark Burns, Terre Haute, IN)*

A. The short answer is no, because the only dynamic change which occurs in a conductor when a voltage (electrical pressure) is applied to it is that electrons simply shift positions at nearly the speed of light from one atom to the next, on down the line. When the voltage is disconnected, all the atoms resume their neutral (normal) state once again, each with the same number of electrons.

There is a longer answer: If a conductor is subjected to excessive current, there are obvious, gross, physical changes which may be observed such as pitting, melting, deformation, discoloration, and surface corrosion. But, these physical and chemical changes only occur when the current-carrying capacity of the wire is exceeded.

Q. *Does anyone still make an external frequency display that can be attached to an older analog receiver? (Frank Shoemaker, Wilson, WY)*

A. Due to the universal availability of inexpensive radios with digital frequency displays, there is little need for these anymore. But there is one available from Palomar Engineers, PO Box 462222, Escondido, CA 92046; phone (619) 747-3343.

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

Cutting Edge HF Communications The KACHINA 505DSP

By Bob Grove

It was only a matter of time before computers and communications merged into the blend offered by this elegant product. And its appearance isn't the only thing in its favor – it performs, too!

The 505DSP is a multi-mode (AM/USB/LSB/CW), 100 watt, HF amateur band transceiver with 30 kHz-30 MHz receive capability. It occupies a handsome 11"W x 4-1/2"H computer-styled cabinet. A commercial/government version with continuous-coverage transmit is available, and a stand-alone receiver model is forthcoming. The commercial/government version of this advanced transceiver even allows an Internet e-mail option!

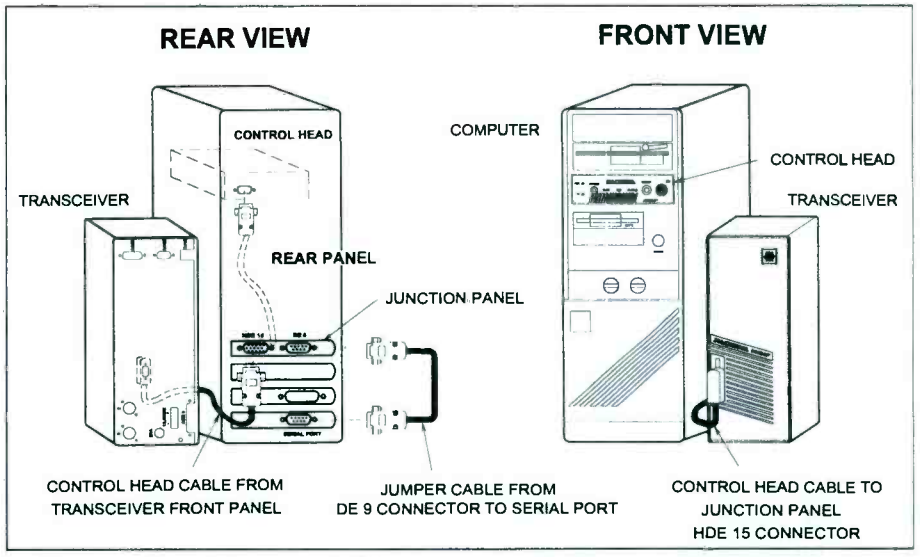
Kachina offers a remote control option for single PSTN (public switched telephone network) telephone line, 900 MHz wireless modem, or your existing VHF/UHF duplex RF link.

Connected to an optional 13.8 Vdc (2A receive, 25A transmit) power supply, the elegant and flexible transceiver is completely controlled by your host computer (386 and above, with Windows 3.1, 95, 98, or NT), allowing extraordinary 1 Hz tuning increments and automatic frequency calibration from time standard station WWV for laboratory accuracy.

The host computer's function keys (F1-F8, Alt F1- Alt F8) provide 16 custom presets for any of the transceiver's parameters; for example, you could set one for an evening LSB net, another for a CW net, and so forth.

The 100 memory channels save mode, automatic gain control, selectivity, and separate transmit and receive frequencies. The memory scan function includes channel lockout, and there is a search mode for any frequency range which includes step size selection.

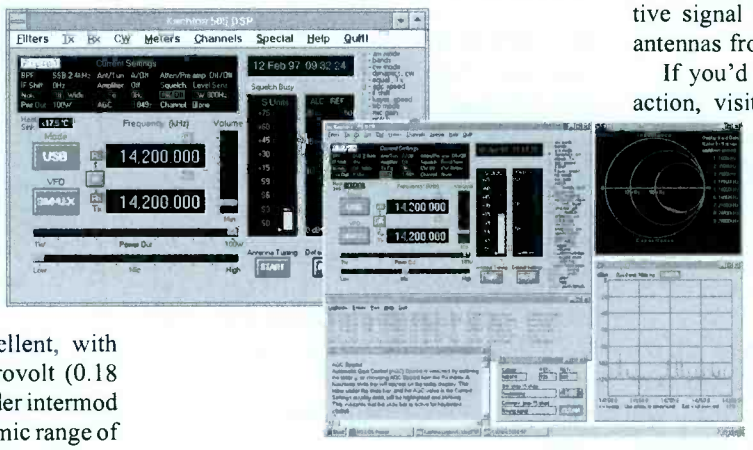
The receiver's signal handling characteristics are excellent, with SSB sensitivity of 0.35 microvolt (0.18 with preamp on) and a third-order intermod product of plus 18 dB – a dynamic range of 96 dB! Spurious signal rejection, including images and IF, is better than 80 dB.



Cable connections, internal control head

Looking for even better intermod rejection? Kachina's optional preselector filter improves the already-impressive minus 49 dB second order intercept by some 30 dB. And the PSK31 data mode allows narrow 100 Hz LSB/USB bandwidth. An optional XHS crystal oven provides +/- 10 Hz stability.

Digital signal processing (DSP) at the intermediate frequency (not audio as in lesser radios) assists in automatic noise reduction and single- and automatic multi-tone notch filtering. If shift and DSP filters (5 SSB, 4 CW, 2 data) permit the user to massage the signal band to reduce adjacent channel interference. Audio output is a whopping 5 watts.



The beauty, of course, is on the screen, and here the 505 really shines. Its colorful display allows instant menu selection of the transceiver's options, or you can select the logging program, or a receiver band-sweep analyzer to spot those elusive signals, or an antenna-analyzing Smith chart. Up to 34 separate operational parameters, from AGC timing to VOX (voice operated relay) delay, may be set on this powerful screen.

Want the best signal? Compare the relative signal strengths from your external antennas from the dual ports.

If you'd like to see this transceiver in action, visit the Kachina home page at **www.kachina-az.com** and download a demo version of their latest control program.

The Kachina 505 DSP is available from Grove Enterprises for $1995 plus shipping (800-438-8155 or visit **www.grove-ent.com**); accessories and new models will be available upon release from the manufacturer.

WHAT'S NEW?

TELL THEM YOU SAW IT IN MONITORING TIMES

Y2k Testing

This month's feature article on the year 2000 roll-over points out how difficult it is to know your true level of preparedness. And, if your livelihood depends upon technology, not only must you ensure your systems are ready, but it may be just as important that you document your testing processes in the event of future litigation.

A program called Due Diligence 2000 is a comprehensive Y2k testing software that will thoroughly analyze and test hardware, software and data files on both personal and business computers. Due Diligence was created in strict accordance with the recognized standards of the British Standards Institute's definition for Year 2000 Conformity.

A suite of prepared letters, templates, and checklists are provided to aid in making compliance and documentation simple and straightforward. DD2000 automatically diagnoses and classifies all potential Y2k problems. It does not attempt to fix equipment and software problems of other manufacturers, but it does include "remediation tools" which provide specific options for the identified problems, as well as the most current internet links to the sites where your solutions may be found.

DD2000 is capable of testing virtually all PCs and is available in three versions: for DOS, Windows single users, and Windows MultiUsers. The price is $59.95 regardless of the version. Non-profit and charity organizations may apply to receive DD2000 free of charge.

For more information, call 604-792-6677, email *information@Due-Diligence2000.com* or visit **www.Due-Diligence2000.com**, where you can download a comparative product review.

New trunking scanners from Radio Shack

Two impressive trunk following handheld scanners are now available from Radio Shack, and a desktop model is due out in November.

The PRO-92 500-channel scanner will track Motorola analog type I, II, I/II, GE/Ericsson (EDACS), and EF Johnson (LTR) systems, and can scan up to 10 trunked systems at a time, or trunked and conventional channels together. The radio features alpha-numeric display, weather alert with SAME (specific area message encoding), CTCSS/DSC decoding, and a cloning interface using an optional cable. It requires six AA batteries or adapter (not included). Frequency coverage: 29-54, 108-174, 380-512, 806-960 (cellular excluded). List price is $349.99.

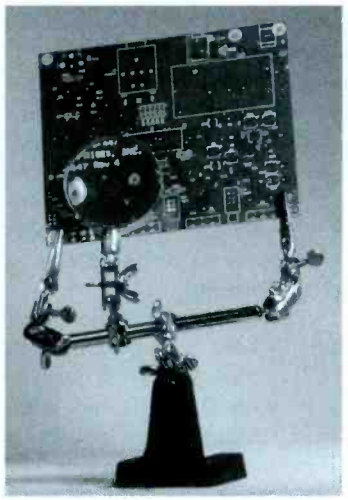
The PRO-94 follows the Motorola and EDACS systems, but not LTR. On the other hand, its extended frequency coverage includes the 220 MHz and 1240 MHz ham bands, and it sports twice the memory channels – arranged in 20 banks of 50 channels – and 20 priority channels. The PRO-94 also includes SAME weather alert and service search for police, fire, weather, aircraft, marine and amateur radio. It requires four AA batteries or an adapter. Frequency coverage: 29-54, 108-174, 216-225, 406-512, 806-960 (exc. cellular), 1240-1300 MHz. List price is $299.99.

The PRO-2052 is a desktop version expected in mid-November. It will follow the Motorola and EDACS systems and its extended frequency coverage will also include military aircraft. A built-in RS-232C serial interfce will allow computer control with separate cable and software. Frequency coverage: 29-54, 108-512, 806-960 (exc. cellular), 1240-1300 MHz. Retail price is listed at $369.99.

Watch for these new models at your local Radio Shack store or by mail order from Grove Enterprises (PO Box 98, Brasstown, NC 28902). Call Grove at 800-438-8155 or visit **www.grove-ent.com** for discount pricing and availability.

Help is Here!

It's just not fair: as the eyes get older and the hands less steady, electronic components get correspondingly smaller! But don't give up on kit building; get



yourself some "Helping Hands" – a new line of kit tools from MFJ Enterprises.

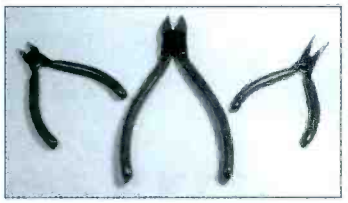
VEC-7400 - Helping Hands with 2-inch magnifying glass holds objects at any angle and leaves both hands free. Six ball joints, nickel-plated fittings, heavy cast-iron base, alligator spring clips, locking thumb screws. $14.95.

MFJ-7104 - 4 inch tapered head diagonal cutter pliers, suitable for soft wire below diameter of 1.0mm. Green cushion grips. $6.95.

MFJ-7106 - All purpose, 6 inch wire cutters of exceptional strength, suitable for cutting coax and other thicker wire. Red plastic cushion grips. $11.95

MFJ-7114 - 4 inch needle nose pliers, green plastic coated cushion grips.

To order call 800-647-1800, write MFJ Enterprises, Inc., PO Box 494, Mississippi State, MS 39762; or visit **www.mfj enterprises.com**.



Quick Draw Holster

Don't put up with being poked in the ribs or elbow by the antenna of your handheld transceiver every time you walk or sit down! Cutting Edge Enterprises has one of their glove-leather pouches specifically designed to carry your radio upside down in what they term "a great union of form and function."

The pouch hooks onto your belt and will not come unfastened when you pull your radio out. The pouch is designed to fit the new pocket radios – C508A, C108A, DJ-C1T, DJ-C4T, DJ-C5T, FR-460, IC-Q7, IC-R5, and VX-1R.

The PowerPort Quick Draw Holster is $19.95 from Cutting Edge Enterprises, 1803 Mission Street, Suite 546, Santa Cruz, CA 95060, 800-206-0115 or email *cee@cruzio.com*

HAMCALC 40

"Aversion to mathematics is not an acquired distaste, it comes naturally," reads George Murphy's press release on the 40th edition of HAMCALC – the freely distributed diskette of software for amateurs and radio hobbyists everywhere.

Over 200 painless math and design programs are used by radio amateurs and professionals worldwide. All programs have the option to work in either metric or imperial/USA units of measure. Examples of computations include the G5RV antenna (subject of several raves by Ike Kerschner), NiCd battery discharger rates, battery schedule to log your battery-powered devices, meteor shower predictor, UTC and standard time zones, transmission line losses and performance, center frequency and wavelength calculator, and on and on.

HAMCALC is written in GWBASIC and requires a GWBASIC.EXE file in your root directory. To order your FREE 3-1/2" 1.44 Mb diskette, send US$5 check or money order to cover cost of materials and airmail anywhere in the world (no stamps or IRCs, please) to George Murphy VE3ERP, 77 McKenzie St., Orillia ON L3V 6A6, Canada (email *ve3erp@encode.com*). If you want a GWBASIC.EXE diskette included, add $1.

Trunked Radio Systems (California)

With the intricate web of radio communications interlinking all of the state of California, it is appropriate for a trunking directory to help sort out the details. Robert Kelty does this with his new monitor's guide.

The author has chosen to arrange his guide by county, state bureau, federal and military agency, and talk groups. Listings are given for user, location, trunking channel identifier, and frequency.

While the contents concentrate, as would be expected, on public safety organizations, industrial licensees are profiled as well.

Trunked Radio Systems is available as a printed book $18, or as a disk in Word Perfect $25; from Mobile Radio Resources, 1224 Madrona Ave., San Jose, CA 95125.

Wire Antenna Classics

This is the first edition of a

wide-ranging collection of some of the best wire antennas that have appeared in publications by the American Radio Relay League (ARRL). These wire antennas are classics, ideal for planning for Field Day amateur operation or for use at home as a ham or shortwave listener. One chapter is devoted to receiving antennas.

ARRL's Wire Antenna Classics is $14 from ARRL dealers or direct from 225 Main St, Newington, CT 06111-1494; call toll-free 888-277-5289 or visit **www.arrl.org/catalog**.

RF Bug

Radio frequency (RF) signals are being used in an increasing number of applications, which is why a new little detector called the "RF Bug" is so entertaining. When little device detects a nearby radio frequency, it vigorously blinks chasing red lights.

Using the attached cord to hang it on a CEL/PCS phone antenna, it can provide notice of an incoming call with the ringer turned off – a thoughtful gesture at the theater, during meetings or classes, etc. It continues its visual antics while the phone is in use or the RF field exists.

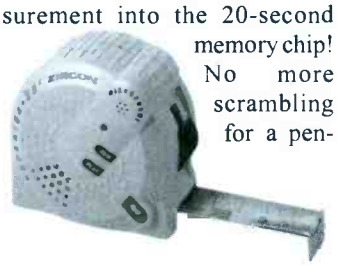
Although the range of sensitivity is not mentioned, the company also suggests using it to check leaks around your microwave oven, coaxial leaks, or remote listening devices (the *real* RF bugs).

The RF Bug is available in blue or red versions for $15.95 each. For more information, contact NCG Companies, 1275 North Grove Street, Anaheim, CA 92806, Phone: (714) 630-4541 or visit **www.rfbug.com**

Skyvision catalog is down-to-earth

Skyvision recently sent us their product catalog, and we found it a real eye-opener – The catalog is just the kind of gadget-oriented miscellany we know our readers like!

First to catch my eye was the Repeater™ – a 25-foot tape measure that you can hold in position while you simply speak the measurement into the 20-second memory chip! No more scrambling for a pencil or carrying around your "memo plank"! The Repeater sells at $34.95.



Or, for five dollars more you can get the Seiko ProTape measure with a digital read-out, which can also store your measurements in memory.

The Dynamo solar-powered AM/FM radio/flashlight/siren has

an internal battery which can be charged by the sun or with a hand-crank, and it's on sale for $39.95.

Of course there is satellite equipment galore and related books, all at reasonable prices and ready to be shipped directly to you. To view their catalog contact Skyvision at 800-500-9274 (outside the US call 218-739-5231), or write Skyvision, Inc., 1010 Frontier Drive, Fergus Falls, MN 56537, or visit their website at **http://www.skyvision.com**.

Dish owners will want to visit their website frequently for Skyvision's free, comprehensive guide to analog C/Ku band satellite programming!

Ni-MH Batteries

MFJ Enterprises can supply you with the latest in rechargeable batteries – the nickel metal-hydride batteries with twice the staying power of standard Ni-Cads. MFJ's super high-capacity AA batteries are $2.99 each (MFJ-92AA1) or $24.95 for a 10-pack. To order call 800-647-1800 or visit **www.mfjenterprises.com**.

Guard your ears!

Lee Reynolds pointed out an item in Damark's catalog which claims to reduce cellular phone RF emissions. "By applying the CellGuard adhesive buttons to your phone, you may decrease the Specific Absorption Rate (SAR), which has been recommended by several federal agencies including the FDA," says the text. Damark (800-328-3100; **www.damark.com**) sells the CellGuard for $19.99 plus $6.99 s/h!

There was no accompanying picture in Damark's online catalog, but the description sounds remarkably like the product pictured in this advertisement for

Safe Guard, which appeared in a Panama City, Panama, newspaper sent us by Camilo Castillo. Safe Guard (normally 14.95 Balboas) is only B/4.95 with the purchase of a phone from Mobile Cable & Wireless. The adhesive button is applied to the speaker next to your ear and claims to absorb 99.9 percent of electromagnetic waves.

Now let's stop and think about this: what part is it exactly of a cellphone or a radio that transmits radio frequencies?! Could it be the *antenna*?

Business News

Grove Enterprises has been told by company representatives that RELM Communications has discontinued their MS200 and HS200 scanners and is getting out of the scanner business for a second time. RELM - with its roots going back to Regency Electronics - sold its scanner line to Uniden a dozen years ago, but reentered the market in 1997. RELM still manufactures two-way land mobile radios.

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 mteditor@grove-ent.com.

Eyewitness at the Solar Eclipse

By Lawrence Harris, *MT columnist*

Here in Plymouth we had our once-in-a-life-time experience of a total eclipse of the sun. I have been anticipating this eclipse for several decades, and during the last few months I was planning to use my Meade LX200 SCT telescope to photograph totality, apart from using other equipment. With the path of totality going straight through my backyard I was looking forward to the event.

I write a column on astronomy for our local evening paper and do a weekly chat for the local BBC Radio Devon. Radio Devon almost made me fall off my chair by asking me to go to Plymouth Hoe for the eclipse and provide live commentary during the eclipse for their programme! Ummmmm! After much deliberation, I agreed.

On the day, leaving my weather satellite equipment on 'automatic' I joined some 40-50,000 people on the Hoe. From the start, the sky was clouded out. A glance during the partial phase was possible during a brief clearance of the thick rain cloud, so I saw the moon had reached about half-way across the sun's diameter. Within minutes of totality the sky darkened dramatically; I explained to the audience exactly what was happening.

In the space of a minute, the light dropped to almost nothing – nearly as dark as night – and within seconds an image of the sun appeared on the giant monitor screen erected by a brewery company. High above the clouds of Cornwall (westernmost UK county) a Hercules aircraft carried a video system to capture the eclipse. Such was the thickness of the cloud layer that it was flying well above its normal operational limits!

The picture was superb and showed everything: the corona, a prominence or two, and the diamond ring all shone brightly. I admit I was carried away by the sheer majesty of it, and later realised that my voice had raised in pitch and I was exclaiming sheer wonder about the detailed features of the corona.

The darkness passed all too soon as the shadow crossed the region and moved on into Europe. Plymouth experienced totality at 10:11 UTC, then cities across Europe saw the shadow crossing. Many locations were clouded out but the sun did get through in some areas along the track, so pictures of totality were gradually released.

My own weather satellite system worked perfectly and I found all the formats saved correctly. Eumetsat maintained full encryption of all images from Meteosat-7, but kindly made available a set of pictures for me, so figure 1 shows the huge area of darkness over Spain, France and much of western Europe.

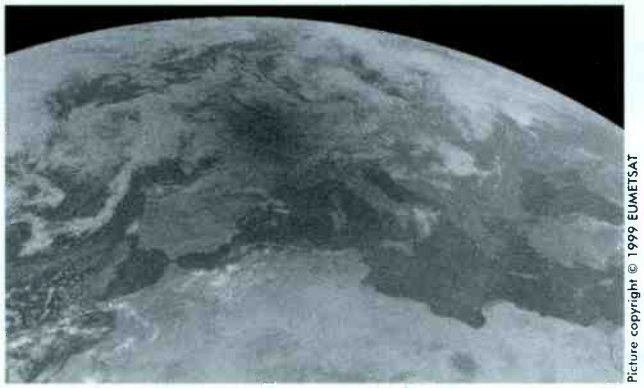


Figure 1: Meteosat picture of August 11, 1999, at 1030 UTC

After the event I was struck by the public perception of the eclipse; everyone had acquired eclipse chasing fever! I was asked by a friend whether I thought we might travel to South Africa to see the next one in 2001. Many others in the crowd were asking the same questions. But that's the fun of watching an eclipse with other people. I am glad I did!

LETTERS TO THE EDITOR

NEWS AND VIEWS FROM OUR READERS *Rachel Baughn, Editor*

Sunny Weather

"The reason for my writing is to tell you, after all these years, being the tight wad I am, I have just subscribed to this wonderful publication.

"I have been really interested in weather stations here as of late. I had gone to the Asheville hamfest and bought my next copy as always. Well, what do I flip to right off the bat, but page 16, August edition...*Building Your Own Weather Station*...!

"So, today, I have called, subscribed and also, I have called all the companies in Chart 1 for information and catalogs! All of these companies ask me where/how I heard about them. I told them *MT*, they were all excited and pleased. So, there you have it! A new customer and some happy companies out there knowing their name is out and about...

"Anyway, love *MT*! It is truly the very best out there. In fact, no one comes near it at all. Keep up the great work!"

– *Eric W. Reese, KE4VID*

"A note about Mr Reitz's article about building your own weather station: He suggests calling your airport to get a barometric reading to set your barometer. 'They may call it the altimeter reading,' he says, and he's almost right. It's the altimeter setting – pilots use it to set their altimeters to get a correct altitude reading.

"It is not barometric pressure, however, unless your airport is at sea level. Air traffic people use a correction factor. Your barometer should read about one inch lower for each 1000 feet elevation.

"Now, if someone would please inform those TV 'meteorologists'..."

– *Randall Keils, Kalamazoo, MI*

"Here is another vote to bring back the announcers on NOAA weather radio (*Scanning Report*, Jul 99). Here in North Texas, as a Skywarn operator, I have listened to the announcers long enough to recognize each one.

"There have been reports here that budget cutbacks made the decision about going to digital voice broadcasts. Budget issues also apparently fueled a re-organization of NOAA offices and facilities nationwide.

"Isn't it ironic that there is insufficient funding for what it appears to be one of the finest and most efficient agencies in our federal government? I have been impressed with the professionalism of NOAA personnel for years. They are a highly dedicated group with the public's best interest in mind.

"My thanks also to Jon Van Allen for an excellent article on Yellowstone National Park communications (July). You have an excellent publication. Keep up the good work."

– *Kent Conway, KC5CCZ*

Berry McDaniel of Montgomery, Alabama, shows off his receivers – both new and old

First Time Beacon Collector

When *Greg KB2QQM (Albany, NY)* started reading *Below 500 kHz* in May 99, he turned on the old Yaesu FT840 and started listening. He says, "I am a commuter pilot and use the navigational aids from 190-535 kHz on a regular basis; they help me 'shoot' instrument approaches into airports in Canada and the Northeastern U.S.

"I was amazed at how many beacons I could pick up at home. I have my Yaesu FT-840 set up in my apartment, and a 400 foot dipole up between 40 and 80 feet. I feed it with 450 ohm ladder line. Times are in UTC. Observations took place on June 02, 1999.

FREQ	ID	UTC
219	AL	0324
332	YFM	0326
340	YY	0328
351	YKQ	0333
354	HEU	0334
360	PN	0337
364	YMW	0338
414	BC	0342
515	YWA	0347

Larry Putman, WB3ANQ, Maryland, is another *Below* reader who says, "Although I have been a ham for 33 years and have tried nearly every mode of operation, I have until now, not tried VLF! Recently I have become very interested in VLF and have turned all of my energy to this fascinating mode!

"In the last few weeks I have logged many nondirectional beacons (NDBs) some as far as 1200 miles away. However, I have yet to log any LOWFER (low frequency experimental radio) stations even though I have listened all hours of the day and night. I am looking forward to the quiet winter nights that might yield better results.

"I have joined the Long Wave Club of America (LWCA) and have surfed the net for all info I could find on VLF. I think I have found a mode that really challenges me! :)"

What Digital Spread Spectrum?

"As a follow-on to your August 99 *Closing Comments* column, I wish to add my own experiences and comments with regard to Panasonic's Gigarange Digital Spread-Spectrum cordless phones.

"In their advertising literature, they state that 'Panasonic GigaRange phones with DSS continually change frequency within their bands of operation. Therefore, conversations are difficult to monitor and eavesdropping is highly unlikely.' (Something of an understatement I feel for *true* DSS transmissions.)

"When *Consumer Reports* published in March that, 'we didn't see anything that justified a 'giga' claim... We also couldn't substantiate the KX-TG200's claims for bet-

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Letters, continued from page 101

ter security. We were able to eavesdrop on the phone using a scanner,' I called Panasonic's Customer Service line (1-800-922-0028). I was told their attorneys were investigating the matter and that I could call back later to find our their determination. For this I was given a Case ID Number.

"Now, after reading your column and some five months since my initial call, I thought the time was right for an explanation.

"Well, forget it. With someone obviously coaching her from the sidelines, I was essentially told that 'all cordless phones were subject to eavesdropping with a scanner.' With her apparent lack of knowledge and unwillingness to discuss the matter in any detail, I elected to refrain from further comments concerning the 'technical inaccuracies/misrepresentations' in their advertising literature.

"For myself, Panasonic's obvious attempt to deceive the consumer will always leave me suspicious. "

– Gerald Guske, Spring Hill, FL

In Remembrance

Haskell Moore asked us to remember a fellow ham and close friend who was killed when the Hermann Life Flight helicopter he was riding crashed into a muddy field south of Houston July 17.

Mac Atteberry, W0MAC, age 32, and the two other crew members were killed in the first fatal crash involving a Life Flight helicopter since the program began in Houston in 1976. The pilot had 30 years of flying experience, including 10 years as a Life Flight pilot. Please remember Mac and all those public service employees – such as those featured in our August cover story – who put their lives at risk to save others.

Your letters and comments are welcome at Letters to the Editor, Rachel Baughn, PO Box 98, Brasstown, NC 28902 or at mteditor@grove-ent.com.

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CLOSING COMMENTS

By Bob Grove, Publisher

Y2k – Myth or Monster? Read this Q & A, then you decide!

A little history - Any calculation that takes into account a time or date past midnight, December 31, 1999, is suspect. This is because PCs use two numerals to indicate a four-numeral date (99 for 1999). This worked fine from 1900-1999, but not after. Macintosh and Apple machines have always been compliant since they used all four numerals.

Q. *What types of computers are affected?*

A. All computers which utilize pre-Windows 95 such as DOS286 or 386, Windows 3.1, etc.

Q. *What is bad?*

A. The BIOS (Basic Input/Output System)

Q. *How can it be fixed?*

A. By replacing the entire motherboard, which also enhances other operations, plus newer software.

Q. *What software programs are non-compliant?*

A. Date-sensitive programs like spread sheets, accounting programs, etc.

Q. *Are video games affected?*

A. No.

Q. *Why is the year 2000 so symbolic?*

A. It isn't, historically speaking. First of all, it's only 2000 in the Christian calendar, which is rather recent compared to many others. The new year will be between 5760 and 5761 in the Jewish calendar, 1420-1421 Islamic, 4698 Chinese Year of the Dragon, 2753 Old Roman, 1716 Coptic, and 2544 Buddhist.

Q. *Will the world come to an end?*

A. No more likely than when such a catastrophy was predicted by eminent religious leaders previously for the years 1260, 1420, 1843, 1844, 1874, 1914, 1925, 1941, 1954, 1975, 1976, 1988, 1991, 1994, and 1995. But fanning the flames of doom is profitable; many cult leaders and quick-buck charlatans are reaping revenue from the hysteria whipped up by prophesying Armageddon and the Apocalypse.

Q. *Will power systems go out, banks fail, and planes fall out of the sky?*

A. No. Major government and financial institutions as well as utilities have been running Y2k checks for years – banks, military agencies, stock market, hospitals, insurance companies, airlines, travel agents, and on and on. Results are encouraging, and continuing. By the beginning of this year, 98% of the nation's power generating companies were already fully compliant.

(That said, you may want to read this month's feature on Y2k preparedness; BellSouth is reported to have said that 50% of vendors who claimed compliance were proved to have been lying when the system was put to the test. Of course, that's just the phone company...rb)

Q. *What may happen?*

A. If hysterical consumers run on the banks, this would create a temporary cash flow problem,Year 2000 or not. The same with a food frenzy in the grocery stores and gas crunches at the pumps. It has nothing to do with Y2k, but with human fears *about* Y2k. It happened during the gas shortage, and it happens during storms. If you are fearful, bottle some water, fill some fuel cans, and stock some canned food (but don't depend on an electric can opener!).

All of these scenarios, however, will be temporary. The only wild cards are the underdeveloped third world countries. We suspect that they are unprepared, but, because they are also the least industrialized, they are least dependent upon computers as well. The problem is, which of *our* industries are dependent upon *them*, and will this have future impact well after January 1st? And remember, the New Year is mid-winter and it's on a weekend, so low temperatures and snow or ice storms could complicate things!

Q. *How can I prepare?*

A. (1) Keep bank statements, receipts, credit card statements, and payment stubs for 1999.
(2) Do a backup on all your critical computer programs and database records before January 1, 2000.
(3) Have a responsible computer company do a Y2k check on your hardware and software.
(4) Keep adequate cash on hand through that weekend just in case an ATM goes down.
(5) Submit any substantial medical or insurance claims before the end of the year.
(6) Safely store written copies of all important papers from your birth certificate and marriage license, to insurance policies and wills.
(7) Decide what level of year-round emergency preparedness is reasonable for you, and check the readiness of your monitoring station by reading next month's feature article.

Then, on the night of December 31, 1999, you can sit back, relax, and enjoy listening to the year turn over by using the shortwave and scanner frequencies you'll find in our December edition of *Monitoring Times*!

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- Noise limiter and attenuator
- Band activity "scope" display with "save trace" capability
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- Large display includes A and B VFO frequencies and signal strength meter
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- Operates on 12 VDC external power
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- BNC antenna connector
- Wide choice of accessories

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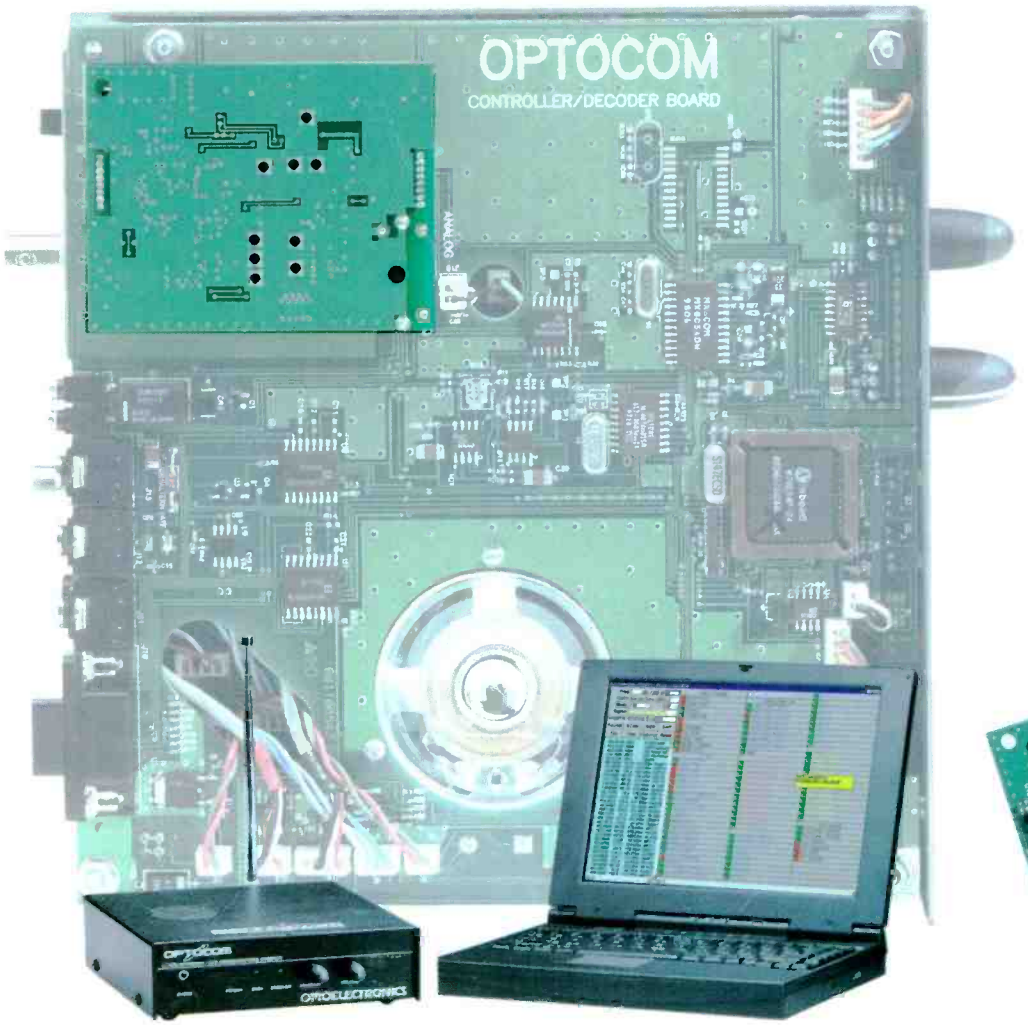
*Cellular frequencies blocked in compliance with USA regulations. Continuous coverage model available for authorized users/agencies, documentation required. AOR engages in ongoing efforts to improve its products. As such, design and performance parameters may change without notice or obligation on the part of the manufacturer and/or distributor(s).



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