Scanning -- Shortwave -- Satellites -- Ham Radio -- Computers

Monitoring Times

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Volume 21, No. 10
October 2002

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Printed in the United States

High-Tech Watching ...e Weather

Plus -

Prime Season for Pirates

MT Reviews:

AOR AR8600 Mark 2 Wideband Receiver
Grundig FR-200 Emergency Radio
Cobra PR-950 GMRS/FRS Handi-Talkie

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7 25274 74654 5

AOR introduces the NEW AR8200 Mark II

NEW! AR8200 Mark III

- New TCXO for greater stability – performance not found in most *desktop* units!
- Covers 500 KHz ~ 3 GHz – world's first handheld with this range!*
- Ni-MH batteries included (1500mAH)
- 1,000 memory channels (20 banks X 50 channels)
- 40 search banks
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- Alphanumeric channel and bank labels
- Computer control and programming. *(requires optional connection cable)*
- Download free control software from AOR web site!
- "All Mode" reception includes "super narrow" FM plus wide and narrow AM in addition to USB, LSB, CW and standard AM and FM modes
- True carrier reinsertion in USB and LSB modes. Includes 3 KHz SSB filter!
- Detachable MW antenna with negative feedback
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- Tuning steps programmable in multiples of 50 Hz in all modes
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- Noise limiter and attenuator
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- Four-way side panel rocker switch allows one-hand operation
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- Wide choice of accessories

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Now you can own the world-class AR8200 Mark III portable receiver with unparalleled frequency coverage from 500 KHz to 3 GHz. An even better Temperature Compensated Crystal Oscillator for solid frequency stability. Improved RF circuits combine greater sensitivity, resistance to intermod products and enhanced Signal to Noise ratios. The Mark III features better audio frequency response and includes NiMH AA cells that can be charged while operating the receiver. When you're ready for the best, you're ready for AOR – The Authority on Radio.™

*Cellular blocked on USA models, unblocked version available to qualified agencies, documentation required. Specifications subject to change without notice or obligation.

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G3

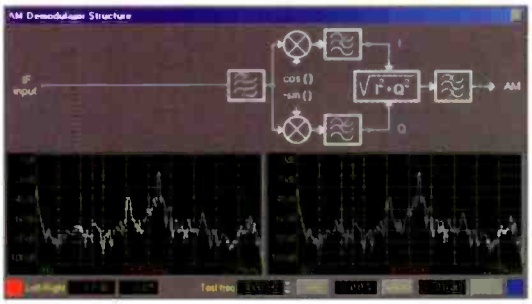
Introducing a breakthrough

Front Panel

An intuitive control panel features a wide variety of tuning and scan modes, memory functions, and many other facilities.

Demodulator

The Professional Demodulator (optional) is adjustable in many respects including the digital filter parameters.



The Professional Demodulator (optional) includes interactive block diagrams for all modes, with two real-time spectrum scopes and THD and SINAD measuring facilities.

Spectrum Scope

The secondary wide-band spectrum scope complements the primary narrow-band one.

Specifications

- Frequency range: 9 kHz to 30 MHz
- Tuning resolution: 0.1 Hz
- Modes: AM, AMN, AMS, LSB, USB, ISB*, DSB*, CW, FM3, FM6, FMN
- Antenna: 50ohm (SMA)
- Dynamic range: 95dB
- IP3: +8dBm

*Professional Demodulator Option only

System Requirements

- IBM PC compatible (CPU 500MHz or higher, PCI slot)
- Sound Blaster 16 (or compatible sound card)
- Windows 98/ME/NT/2000/XP

Just when you thought that there is nothing in shortwave that could surprise you anymore, here comes the new WiNRADiO G303i Receiver.

This new receiver continues in the fine tradition established by WiNRADiO's successful range of wide-band PC-based receivers. The "G3" stands for "the third generation": As the original, award-winning, first-generation WR-1000i receiver was the world's first commercially available wide-band receiver on a PC card when launched seven years ago, the newly introduced WR-G303i is the world's first dedicated shortwave receiver on a PC card. It is also the first commercially available receiver where the entire final intermediate frequency stage and an all-mode demodulator are entirely executed in software, running on a PC.

The advantages of this receiver are too numerous to list in this limited space: In addition to the flexible and friendly user interface of a PC-based receiver, with its numerous functions and facilities not normally available on any conventional receiver, the WiNRADiO G303i Software-Defined Receiver excells particularly by the ability of its demodulators: While the Standard Demodulator provides the performance of a highly respectable shortwave receiver including synchronous AM demodulation and a real-time spectrum scope, the optional Professional Demodulator offers even more: continuous IF bandwidth adjustment (in 1Hz increments), interactive block diagrams with two additional audio spectrum scopes, and even built-in THD and SINAD measurement facilities. Additional demodulators are planned as further options, including a DRM (digital radio) demodulator.

The WiNRADiO G303i - a ground-breaking shortwave receiver that will surely amaze you.

For more details, please visit our website or email us:

WiNRADiO®

www.winradio.com

info@winradio.com

Monitoring Times

Vol. 21, No. 10 October 2002

Lead Story

Prime Season for Pirates

By Andrew Yoder

October is the month for spooks, goblins, hi-jinks, and children dressing up like pirates. A few grown-ups like to play pirates, too, such as running without a license on the high frequency band. Andrew Yoder, editor of *Hobby Broadcasting* magazine and author of the book *Pirate Radio*, explains what pirate radio is and is *not* and speculates about what motivates these broadcasters to risk fines and confiscation of equipment. You'll also learn what you need to tune in, where and when to tune in, and which stations are best bets.

Story starts on page 10.

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On Our Cover

The US government has embarked on a series of science missions exploring climate changes, global warming, and other weather-related issues of critical importance. Monitors across the country will have many new opportunities to catch high-altitude research aircraft and ground-based environmental science teams. The unique Proteus aircraft on our cover was used in one project dubbed CRYSTAL-FACE. Read about monitoring this and other projects in the "Scanning Report" column, *Facing the Weather* (p. 28) Photos by Robert Wyman.

Tired of getting the "rubber glove" treatment from your radio dealer?

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With Grove, you always know you're getting a good deal. From our discount prices, to our exceptional service, hen you deal with Grove, you buy with confidence. Buy something and didn't like it? No problem, just return it in ew" condition, and we'll give you a full refund. No ridiculous "restocking" fees. Have a technical question about omething you bought from us? Give us a call! We always have techs on hand, ready to answer all your questions! 'e want you to be happy with your purchase, and we'll guarantee that you are!

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R8500	RCV 14	$1499.95

JAPAN RADIO COMPANY

NRD-545	RCV 21DS	$1799.95

GE

SUPERADIO III	RCV 5	$59.95

AOR

AR-5000 Plus 3	RCV 42P	$2119.95
AR-7030 Plus	RCV 17	$1469.95
AR-8600II	RCV 11	$889.95
AR-3000AB	RCV26	$1062.95

YAESU

VR5000	RCV51	$889.95*

SANGEAN

ATS-505P	RCV 7	$129.95
ATS-909	RCV 8	$239.95

GRUNDIG

Satellit 800	RCV 33	$499.95
Yacht Boy 400 PE	RCV 22	$149.95

DRAKE

R8-B	RCV 3	$1349.00

WiNRADiO

R-1550 (External)	RCV 47-E	$549.95
R-1550 (Internal)	RCV 47-I	$499.95
R-3150 (External)	RCV 48-E	$1849.95
R-3150 (Internal)	RCV 48-I	$1375.00**
R-3500 (External)	RCV 49-E	$2395.95
R-3500 (Internal)	RCV 49-I	$2395.95
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Reviews:

The **AOR AR8600 Mark 2** is a sophisticated, solidly built, wide-coverage multi-mode receiver... and a definite improvement on its predecessor, says Parnass (p.80).

The **Grundig FR-200** emergency radio is Grundig's biggest hit in years, says Reitz, and the radio is everywhere. It's inexpensive and fun, sports a flashlight, and doesn't require batteries. You provide the power! (See p.87).

Elliott puts the new **Cobra GMRS/FRS PR-950 Handi-Talkie** through its paces and finds it combines the best of both worlds at a very reasonable price (p.96).

Years ago Catalano embarked on a quest to avoid manual entry of printed frequency lists. Though he failed then, success seems almost within his grasp as he tests two OCR programs, **Textbridge** and **Cuneiform**, to see if they can handle a frequency list from *Monitoring Times* (p.82).

Our readers sent in some reviews, too. See what they have to say about scanner control programs and antennas on page 66.

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GRUNDIG SHORTWAVE

Leaders in Their Class

"Outstanding Performance... Unbeatable Audio Quality... Unbeatable Price..."

Lawrence Magne, Editor in Chief, Passport to World Band Radio

The LCD Big! Bold! Brightly Illuminated 6" by 3½". Liquid Crystal Display shows all important data: Frequency, Meter band, Memory position, Time, LSB/USB, Synchronous Detector and more.

The Signal Strength Meter Elegant in its traditional Analog design, like the gauges in the world's finest sports cars. Large. Well Lit. Easy to read.

The Frequency Coverage Longwave, AM and shortwave: continuous 100-30,000 KHz. FM: 87-108 MHz VHF Aircraft Band: 118-137 MHz.

The Tuning Controls

- For the traditionalist: a smooth, precise tuning knob, produces no audio muting during use. Ultra fine-tuning of 50Hz on LSB/USB, 100Hz in SW, AM and Aircraft Band and 20 KHz in FM.
- For Fixed-step Tuning: Big, responsive Up/Down tuning buttons.
- For direct frequency entry: a responsive, intuitive numeric keypad.

The Operational Controls Knobs where you want them; Buttons where they make sense. The best combination of traditional and high-tech controls.

The Sound Legendary Grundig Audio Fidelity with separate bass and treble controls, big sound from its powerful speaker and FM-stereo with the included high quality headphones.

The Many Features 70 user-programmable memories, Two 24 hour format clocks, Two ON/OFF sleep timers, Massive, built-in telescopic antenna, Connectors for external antennas – SW, AM, FM and VHF Aircraft Band, Line-out, headphone and external speaker jacks.

Size: 20.5" L x 9" H x 8" W **Weight:** 14.50 lbs.

Satellit 800

Yacht Boy 300PE AM/FM/SW Radio

Power and Performance with Affordability

Designed for the traveller, the titanium look digital AM/FM/SW radio provides incredible power and performance for an incredibly low price! Packed with features, including 3 AA batteries, AC adapter, earphones, supplementary Antenna and carrying case!

State-of-the-art features include:
Digital tuning with 24 user-programmable memory presets, 13 SW Bands (2.30-7.80 MHz; 9.10-26.10 MHz), Illuminated multi-function LCD display screen, AM/FM stereo via earphones, Clock, alarm and 10 to 90 minute sleep timer, Digital tuning display, Direct frequency entry, DX/ local selector, Titanium look finish, External antenna jack, Dynamic micro speaker, Earphone jack, Telescopic antenna.

Size: 5.75" L x 3.5" H x 1.25" W **Weight:** 9.92 oz.

Yacht Boy 400PE AM/FM/SW Radio

Most powerful and compact portable

The Big Breakthrough! Power, performance, and design have reached new heights! The Grundig 400 Professional Edition with its sleek titanium look is packed with features like no other compact radio in the world. **Pinpoint Accuracy!** The Grundig 400PE does it all: pulls in AM, FM, FM-Stereo, every shortwave band (even aviation and ship-to-shore)-all with lock-on digital precision. **Ultimate Features!** Auto tuning! The Grundig 400PE has auto tuning on shortwave that stops at every signal and lets you listen. With the exceptional sensitivity of the 400PE, you can use the auto tune to catch even the weakest of signals. Incredible timing features! The Grundig 400PE can send you to sleep listening to your favorite music. You can set the alarm to wake up to music or the morning traffic report, then switch to BBC shortwave for the world news. The choice is yours! **Powerful Memory!** Described as a smart radio with 40 memory positions, the Grundig 400PE remembers your favorites-even if you don't!

Size: 7.75" L x 4.5" H x 1.5" W **Weight:** 1 lb. 5 oz.

GRUNDIG

for the traveler in you!

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LETTERS TO THE EDITOR

Carrier Current Collaboration

Frank Lotito, K3DZ, is the *Old Timers Bulletin* column editor for "Below 535," a column about the world of communications below the standard AM Broadcast Band. He is trying to obtain information on "carrier current radio transmission" – a form of communication which uses the power lines strung around neighborhoods, buildings, museums, large manufacturing plants, underground mines, etc., for one or two-way transmission of RF energy containing music, voice and / or data.

He is looking for someone to author or co-author an article on present and historic uses of this mode. He's particularly interested in systems that were used by utility companies, heavy industry and mining. If you have knowledge or information to share with Frank, please email him at *K3DZ@aol.com*, or write him in care of the *Monitoring Times* editor and we will forward your response.

Canandaigua Monitoring Station

I promised Frank Lotito that *MT* readers are always surprising us with the level of knowledge and sometimes esoteric areas of expertise. A case in point is the following letter from Dick Holbert, K2HZ, which we received in response to the photo from Kevin Carey we ran in the August edition of *Letters*.

"I was interested to see the photos of the FCC remote HF/DF antenna at the former Canandaigua Monitoring Station site in the August issue of MT. I was hired by the FCC as an Engineer at Canandaigua beginning in 1966 and became Engineer in Charge of the facility in 1976 when it was downgraded to a 'Limited Enforcement Office' and remained there until it was shut down in 1978. With the development of remote control capability in the 1990s, the FCC reactivated the HF/DF system at the site.

"Canandaigua had a rotating Adcock HF/DF antenna in the 1960s. This was replaced by a Wullenwebber type in the 1970s, shortly before the decision was made to phase out the HF monitoring capability of the site. The FCC Wullenwebber antennas were smaller than the military 'elephant cages' and consisted of vertical elements about 20' high around the perimeter of the circle as compared to the 60' high military 'cage' structures.

"I believe the present HF/DF antenna used by the FCC at Canandaigua and other sites may use 'interferometric' technology to compare the phase difference of the received signal between the antenna elements. This is a pure guess on my part as I have not been associated with the FCC since 1978 but I have seen articles on this technology for military applications.

"The Adcock and Wullenwebber antennas used in my day depended on simply determining the null in the pair of antenna elements perpendicular to the direction of the received signal. It required some skill by the operator to line up a cursor on a crt screen with the displayed null pattern which was often shifting or ambiguous due to propagation variations.

There was always the 180 degree ambiguity, so a bearing from at least one other station was required to determine even the general direction of the signal. Each Monitoring Station reported their bearings to the Washington Watch Officer by teletype. The bearings were then manually plotted. I believe the present remote system probably gives the operator at Columbia, MD, an instant fix display.

"When Canandaigua was in full operation as a Monitoring Station the FCC property extended all the way to East Street. The DF was always in the field east of the station where the present DF is located. The area between the station building and East Street contained six 2-30 MHz rhombic receiving antennas which could be switched to be directional off of either end. At the station building there was a multi-band dipole, two vertical antennas and a longwire for HF monitoring. For VHF there was a 30-50 MHz biconical antenna and rotatable 150 and 450 MHz log periodics. At the rear boundary of the property, near the VA Hospital, there was another log periodic antenna aimed at Grand Island, NE, for the transmitter on our HF RTTY network that was the backup to the wire line teletype network.

"In the mid '70s, five UHF TV antennas, each aimed at a Toronto area TV station, were installed on the roof of the building for a research project to monitor tropospheric ducting over Lake Ontario as part of an effort to determine potential interference between US land mobile and Canadian TV stations in the UHF band.

"Most of the antennas were left in place for many years after the station closed in 1978 but all operations actually ceased at that time until only the HF/DF was reactivated in the '90s"

– Dick Holbert, K2HZ

Mexican DX Meeting

Carlos Jimenez V. sent a report of the 8th national shortwave listeners conference (Mexican DX Meeting) held in Veracruz, Mexico, the first of August. The program sounds so enjoyable, I think some of our readers would have enjoyed attending if they had known about it. (The next one, by the way, will be at Tizayuca, Hidalgo, Mexico, and the host will be Martin Herrera who can be contacted by e-mail at *mnhajz@hotmail.com*.)

More than seventy attendees came from all over Mexico and from abroad: China, Argentina, Ireland, Colombia, Spain, and the US. Activities included the annual DXpedition, a fiesta, superb Veracruz

meals, drinks, and music. Seminar topics included "DX and the Internet," discussion of the role radio plays in community education (Radio Huayacocotla as an example); a presentation on DRM (Digital Radio Mondiale) by Radio Netherlands; DX for Kids; presentations on shortwave broadcasting, utilities, and QSLing: how to build an antenna; Radio Netherlands 55th anniversary (with many shared recollections) and live recording of the RN Spanish-language program Cartas@RN. As many conferences do, it wrapped up with a SW broadcast roundtable. Participating were Radio Netherlands, Radio Mexico International, Radio Mil, Radio Miami International (by direct link), Radio Educacion, and host Radio Universidad de Veracruz (which actually does not broadcast SW).

Overall, the conference was very optimistic about the future of shortwave broadcasting and the hobby of DXing, as well as being a lot of fun. Participants suggested broadcasting the next conference over shortwave or the Internet, so perhaps you can tune in if you can't attend!

Super Website

"Lou Joseph's with some great '60s audio clips, including WNYW stuff. Super stuff indeed....."

http://www.ibcworks.net/rodio68.htm

– *Dave Zantow N9EWO*

Rack Up Those Scanners!

"Thought you'd be interested in my latest scanner idea. I purchased these racks at The Container Store for under $10. Since they are an open wire design, they don't trap heat, and the speakers are equally effective whether top mounted or bottom mounted."

– *Haskell Moore*

We welcome your ideas, opinions, corrections, and additions in this column. Please mail to ***Letters to the Editor,*** 7540 Highway 64 West, Brasstown, NC 28902, or email *editor@monitoringtimes.com.* Letters may be edited for length and clarity. Happy monitoring!

-Rachel Baughn, KE4OPD, editor

RADIO HONOR ROLL

Scanner Listener Nabs Robber

Brent Perez, 16, is a Dallas Police Explorer – a branch of the Boy Scouts for those interested in law enforcement. Never without his scanner, Brent heard about a robbery which had just occurred at a local bank, along with a description of the suspect. Brent suggested to his mother they drive to the bank.

On the way, they passed a convenience store, and Brent's mother spotted someone suspicious. "Actually, the fact that he was running was what first caught my eye. People don't run into stores, they walk," Ms. Perez said.

They drove to the bank and flagged down an officer, and within minutes, patrol cars descended on the convenience store and nabbed the suspect.

"The young man did the right thing by ... not trying to apprehend the suspect himself," said police spokeswoman Janice Houston. "It is a prime example of the police and the community working together."

Brent wants to become a police officer or firefighter. "I want to be somebody, to put my life on the line," he said. "I want to look back on my life and say 'I saved that person' or 'I put that guy in jail.' "

Cellphone Safety

The BBC recently reported on a British study of various devices which claim to shield mobile phone users from potentially harmful radiation. The report concluded that none of these devices are as effective as hands-free solutions.

The study looked at four types of shields: shields which cover the whole phone, ear pieces which cover earphones, buttons which can be placed on the phone, and antenna clips. Of these four, the report said that shield covers and antennae clips work the best, but reduce the phone's power and coverage. This may force the phone to use more power to establish a connection and cancel the effectiveness of the shield.

Meanwhile, the World Health Organization (WHO) has warned parents against allowing their children to spend too much time on mobile phones. "I would be cautious about letting children use mobile phones for hours every day, because we don't know enough about the damage," said WHO Director-General Gro Harlem Brundtland.

Music and Cellphones Don't Mix

Annoyed by ringing cell phones that interrupt concerts, operas and plays, local legislators in New York and Toronto are introducing proposals to ban the devices at public performances. During a recent Broadway performance, actor Stanley Tucci paused to ask an audience member to turn off a ringing cell phone. The audience applauded.

"I think there would be an enormous amount of support for banning cell phones in public performances and galleries," Toronto City Councillor Kyle Rae told *The Star* of Toronto, adding that people who think they need to be available 24 hours a day are "delusional."

Music-Cellphone Mix

A symphony composed by British composer Simon Turner for the cellular phone was premiered last summer at the Cheltenham International Music Festival, BBC News Online reported. The piece is entitled *The New Ring Cycle*.

The symphony begins with an exploration of the cell phone's history, includes audience participation and ends with a "celebratory finale." The piece is performed entirely by cell phones.

"At all concerts the one mobile phone that goes off is an anathema," conductor Marcus Moore told the BBC. "Here is one occasion when we can harness those fascinating tones in a positive way!"

Getting in the Loop

It's hard to believe that, in this country where so many people are tied to their cellphone or pager, there are whole communities who don't even rate a telephone system, much less internet access. A few cases in point which have made it into the news recently: eight counties in Northeastern Michigan and the Upper Peninsula; Iowa Hill, California; Inyo and Del Norte Counties in California, and the mountainous region above Ojai, California.

According to the *LA Times*, 112,000 people across the state of California live in areas so isolated they are not served by telephone or cellular systems. When population density may be two customers per mile or less, few phone companies want to invest in the required infrastructure. Residents' alternatives may be CB or shortwave radios, or driving twenty-five to 50 miles to the nearest pay phone or cellular tower, or three gunshots to signal an emergency!

These solutions are all less than ideal. The generally mountainous terrain of the California communities makes even radio communication unreliable. There are also privacy and business issues for realtors, therapists, doctors, etc. trying to conduct business over a radio telephone. So at least once a day, business people are making the drive to pick up their messages and return calls.

> *"The government has an almost impossible task trying to keep pace with the ever increasing demand for spectrum and continuing advances in wireless technology and applications."*
> *- FCC Chairman Powell, concerning the formation of the Spectrum Policy Task Force*

The Wolf fire, which roared through Los Padres National Forest, started outside Tom Wolf's bar, which has no phone or radio service. Twenty precious minutes were lost while a bar patron raced on his motorcycle to notify the Forest Service. Now Wolf is trying to organize an emergency network based on satellite telephones.

This past summer, California began accepting grant applications for $10 million allocated for communities without telephones. But how far will those dollars stretch? The system that recently provided first-time phone service to the town of Kennedy Meadows in the Sierra Nevadas cost $1.2 million and two years to construct. Some communities plan to apply for cellular service because the terrain is too rugged to erect phone lines, whether under or over ground.

Michigan's solution is creative. As in California, folks living in its northernmost counties *could* get phone service if they were willing and able to bear the expense of tens of thousands of dollars. The state's LinkMichigan program has given a $200,000 grant to help them improve regional telecommunications and internet services. Using these funds with some matching money from the counties, Michigan State University telecommunications students and their teacher who is also a Michigan State Public Utilities Commissioner, will set up the All Band Communications Cooperative as a nonprofit, customer-owned phone utility managed by MSU.

Getting Out of the Loop

At least two radio stations in the US have not only managed to be independent from the big broadcasting conglomerates, but also have man-

BULLETIN BOARD

October 5: Special Event Station

Station K3G U.S. Coast Guard Auxiliary will be operating from Coast Guard Base - Group Philadelphia to commemorate its 63rd Anniversary. 1400 to 2200 Hrs UTC on 7.270, 14.270, 21.330, 28.330 MHz. SSB. Send for a commemorative QSL via W3DI, 196 Dam View Drive, Media, Pa. 19063; More Information : Dan Amoroso nm3s@prodigy.net

October 12: Denton, TX

Denton Hamfest, at the Denton Civic Center, 321 E. McKinney St., Denton, Texas 76201, 8:00am - 1:00pm. Programs (including VE Testing), dealers, flea market, prizes. Information at http://www.dentonhamfest.org/

October 19: Seal Beach, CA

Southern California Area DXers (SCADS) meeting: Buying a Used Receiver. SCADS turns 29 years old this month! For updates – http://www.ocnow.com/community/groups/radiocommunications

October 20: Sellersville, PA

RH Hill ARC hamfest at Sellersville Fire House (Rt 152, 5 mi S of Quakertown, 8 mi N of Montgomery); Talk-in 145.31; adm $5. VE testing 10am-1pm. Hamfest hotline: Linda Erdman (215) 679-5764 (2220 Hill Road, Perkiomenville, PA 18074) http://www.rhhill.ampr.org

October 27: Westminster, MD

Carroll County ARC Mason-Dixon Hamfest, at Carroll County Ag Center, Talk-in 145.410 MHz. VE Testing, prizes, great food! Contact Steve Beckman N3SB, CCARC, PO Box 2211, Westminster MD 21158, n3sb@arrl.net; information http://www.qis.net/~k3pzn/mdhfest2002.htm

October 30: Queens, NY

Hall of Science ARC hamfest, New York Hall of Science parking lot, Flushing Meadows Corona Park, 47-01 111th St;. 9a.m.-? Talk-in 444.200 (PL 136.5), 146.52 simplex; admission $5 donation. Free parking, door prizes, food. VE exams 10a.m.. Visit http://www.qsl.net/hosarc or contact Stephen Greenbaum WB2KDG@Bigfoot.com, 718-898-5599.

aged to become largely independent of the power grid for the electricity required to run their stations.

WJFF, in the Catskill Mountains of New York, is powered by a trout stream. Owner Malcolm Brown says, "I'm more of a wind-power, waterpower guy than I am a radio guy. The radio station, you might say, was an afterthought." The area is served by only a few local stations; none of NYC's powerhouse stations can penetrate the forested, mountainous terrain.

All-news KBSJ transmits from Jackpot, Nevada, using electricity from three windmill generators. In this case, the wind-generating system was much less expensive than an 8-mile spur from the nearest power lines.

The area can now get storm alerts and emergency broadcasts. KBSJ, based in nearby Twin Falls, Idaho, is run by Boise State University and mostly offers programs from National Public Radio.

Neither KBSJ nor WJFF runs on nature's energy alone. The two FM stations use backup power in August, when the Nevada winds die and the Catskill rains dwindle.

In August, WJFF hosted the yearly Grassroots Radio Conference, which brought 200 representatives from dozens of stations across the continent, lured by WJFF's unique hydro-powered independence. "Many community stations are talking about it," said Paul Mischo, a board member of KGNU in Boulder, CO. "They're an example for us to start thinking longer and harder about getting off the grid, too."

FBI Scolded by Secret Court

In 1978 the secret intelligence court was established by the Foreign Intelligence Surveillance Act. This court – whose members were recently raised from 7 to 11 – is responsible for enforcing provisions of the law that limit the sharing of electronic surveillance from intelligence or terrorism cases with criminal investigators.

Because the standards of evidence required for electronic surveillance may be lower in intelligence investigations than in criminal investigations, the law is intended to prevent the dissemination of intelligence information to criminal investigators or prosecutors. But, according to the court opinion provided to the Senate Judiciary Committee in August, in more than 75 cases (most occurring during the Clinton Administration), the FBI and the Justice Department had made erroneous or misleading statements in eavesdropping applications.

In essence, the court said that the FBI and the Justice Department were violating the law by allowing information gathered from intelligence eavesdrops to be used freely in bringing criminal charges, without court review, and that criminal investigators were improperly directing the use of counterintelligence wiretaps.

The Senate Judiciary Committee is reviewing requests by the Justice Department for even broader investigative powers in the aftermath of Sept. 11.

FBI Advises Caution

An FBI office in Pittsburgh advised users of 802.11b (Wi-Fi) wireless networks to be on the lookout for signs of "warchalking," marks on buildings or pavement that indicate the presence of unsecured wireless networks. Hackers can use the unsecured networks to gain access to the Internet, as well as to obtain what could be sensitive information. Wi-Fi network users often don't take the necessary steps to secure their networks.

"Communications" is compiled by editor Rachel Baughn (*editor@monitoringtimes.com*) from newsclippings forwarded by our readers. A big thank-you to this month's reporters: Anonymous, Albany, NY; Mark Burns, Terre Haute, IN; Henry Gates, Salt Lake City, UH; Joe Glath Jr, Tarentum, PA; Doug Robertson, Oxnard, CA; Brian Rogers, Melvindale, MI; Bob Stewart, Ft Worth, TX; (via email) Stephen Crane, Rick Kissel, Mike L., Ed Muro, Jerry None, John Mayson, Polish Guy, Laura Quarantiello, Clem Small, Larry Van Horn, Barry Williams, Robert Wyman.

Prime Season for Pirates

By Andrew Yoder

Several decades ago, pirate radio was an obscure term that people would say, "I don't know what it is, but it sounds interesting." Nowadays, *Pirate Radio* is slapped around more than the "bad boy" of an afternoon soap opera or a pile of lunchmeat at a sub shop. *Pirate radio* is so often used incorrectly that its meaning is nearly as unknown as it was twenty years ago. The term is sometimes used to describe Internet broadcasters, legal low-power FM stations, clandestines, ham radio operations, and even licensed commercial stations.

It is important to remember that pirate stations broadcast directly to the public. They are not to be confused with amateurs (ham radio operators) or CBers. Hams and CBers are not broadcasting, because their transmissions are two-way, point-to-point communications and are not intended for the general public. Some CBers and hams, however, use fake callsigns and deliberately jam other stations with Morse code, music, or by "swishing" the transmitter's frequency control (VFO) back and forth across a frequency (producing an annoying "swishing" sound). These transmissions are both annoying and illegal. Even if the station is playing music, they are also not pirate broadcasts because the intent is to ruin someone else's signal, not broadcast to the general public.

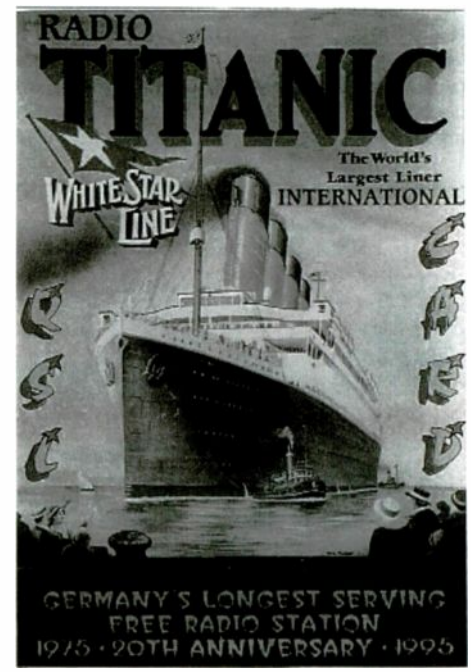
Radio Al Fansome is a current parody station, based in part on pirate radio posts on the www.frn.net Internet site.

To add to the confusion, clandestine (or guerilla) stations also get thrown into the illegal transmitting melting pot. Clandestines are politically motivated radio stations that are usually operated by an opposing government or as the voice of a revolutionary group. They usually beam their broadcasts toward countries offering little political freedom. They typically advocate (and sometimes help organize) the overthrow of these countries' governments. Although some pirates might be politically motivated or outspoken, the matter of violence and the lack of a large supporting organization separate the pirates from the clandestines.

In the US, the station most likely to fit the description of a clandestine occurred in 2001. Steve Anderson broadcasted an extremely conservative mix of commentaries and off-air satellite programming on his unlicensed United Patriot Radio. After logging hundreds of hours on the air, Anderson was pulled over by the local police for not having tail lights on his pickup truck. An argument ensued and the Middlesboro (KY) *Daily News* reported that Anderson shot numerous rounds from his rifle into the police cruiser. Anderson escaped in his truck, which was later found abandoned, but still containing several guns and pipe bombs. A year later, neither United Patriot Radio nor Steve Anderson have surfaced.

Changes in Pirate Activity

For the past few years, pirate radio activity has declined a little, probably due to a combination of factors. For starters, some people have been waiting for the new low-power FM licenses to become available. However, because of the tight restrictions, the LPFM licenses have met the needs of only a small portion of those who applied. Eventually, some of these people will discover or return to shortwave or mediumwave pirate radio. Pigmeat Martin of the Voice of the Angry Bastard notes, "If enforcement remains this lax and the licensing procedure for LPFM so Byzantine, I wouldn't be surprised to see more FMers making the switch to shortwave."



Radio Titanic (Germany) is one of the oldest shortwave pirates and its photo QSLs are among the most attractive.

Another creative radio outlet has been

Internet radio or Netcasting. The benefits of this medium are that, for no cost, anyone can put on a little "radio station" and be heard by a handful of people around the world. Doctor Napalm from Blind Faith Radio feels that Internet radio has already made a large impact on the number of shortwave pirates. "Internet broadcasting doesn't involve any risk. Many people choose to go this way." But recent legislation has meant that Internet radio stations must pay royalties through the music licensers, such as ASCAP and BMI.

The result is that, starting in September 2002, Internet stations now have to pay a small royalty for all of the songs aired, with a mininum payment of $500 per year. Even worse for many stations, the programmers will have to keep detailed running records of the music aired. Many have predicted that this legislation will end Internet radio for all but the largest stations. Again, some of these stations will begin looking for alternate routes to serve their listeners.

FCC enforcement, primarily on FM, has also discouraged some pirates from broadcasting over the past few years. Although the shortwave pirates have remained virtually untouched for a number of years now, the publicity surrounding the FM raids has discouraged some wanna-be pirates from the airwaves. But, as Pigmeat Martin notes, the lack of FCC raids is sure to attract some broadcasters. "What enforcement? I've been broadcasting in two-hour blocks on a regular schedule on the weekends since early May (2002) and haven't seen hide nor hair of the Shiny Shoe Brigade."

Why Be a Pirate?

The motivations why someone would break national communications rules and risk large fines (typically several thousands of dollars, but ranging up to $17,500 on shortwave) and equipment confiscations (sometimes even including towers, audio and receiving equipment, and records and CDs) are both nebulous and strong. For Dutch pirate Alfred, from Alfa Lima International, the answer is simple, "I just love the contact with listeners worldwide. They make me happy and I make them happy, I hope." And Alfred has already had one large, expensive transmitter confiscated and destroyed by the RCD (the Dutch equivalent of America's FCC).

Captain Ganja from Radio Free Euphoria goes one step further and says, "I felt we all had a right to free speech and didn't give a care if the FCC or anybody else didn't like it. In fact, I feel that many of the laws we have are a bunch of BS, so I just do what I want regardless of whether some buffoons said it was right or wrong. I feel if it doesn't physically harm anyone, than it ain't wrong!"

Doctor Napalm of Blind Faith Radio zeros in on the personal aspect of this mass medium. "What I like best about pirate radio is doing my broadcasts, waiting for the QSL requests, then fulfilling those requests. I know how I felt when I got QSLs from pirates: the anticipation of getting the response and watching for the mail to come because maybe, just maybe, I got a response."

The CD cover from W.D.C.D.'s Beatles audio collage program.

Others, such as Captain Ron focus on the technological mysteries of radio. "I have an inexplicable obsession with radio, specifically shortwave pirate radio. I am fascinated by the science and the technology that makes it possible. And it allows a person like myself to have 'a voice,' in a way that would otherwise not be possible." Some pirates, past and present, have been involved in the technical creativity of the hobby, such as experimenting with propagation at a given frequency, antenna types (verticals, dipole variations, inverted Ls, balloon-launched antennas, open-line antennas, etc.), grounds, low power, modes (such as ISB stereo, split-frequency AM stereo, FM, and NBFM), modulation (plate, grid, digital, carrier-controlled, etc.), and even transmitter types.

Two prime examples of technical creativity are the Chicago Tunnel Company's broadcasts from 10 years ago and the winter 2001/2002 tests from Radio Borderhunter in Belgium. Chicago Tunnel Company's broadcasts were fascinating because the station's operators built the transmitter on a piece of wood, following 1930s-era schematics.

Radio Borderhunter is a Belgian pirate that frequently tests to North America using high frequencies. Several times in early 2002, Frans from Borderhunter ran DX tests by scheduling a test and steadily dropping the power down from 100 watts. A few listeners across the Eastern and Central United States reported hearing Borderhunter with less than 100 milliwatts – two DXers could still copy a few words from the station down to 20 milliwatts! Considering that these powers are in the range of the legal limits in the U.S., maybe the Borderhunter tests will encourage more tests from other stations.

A Smorgasboard of Programming

I've said many times that there are as many types of pirate radio stations as there are personalities. Over the years, there have been music pirates of all sorts: hard rock, classical, punk, polka, acid rock, techno, new wave, country, big band, jazz, rap, etc.

Of course, because most pirates are at least somewhat dissatisfied with the current fare on the radio, you can expect a heavier dose of paro-

What's On?

Here is a sampling of recent stations:

Captain Morgan - 1950s through 1970s oldies music.

KIPM - With KIPM, Alan Maxwell tells long, strange science fiction stories of light, sometime psychedelic music. The stories are like a radio version of the old pulp science fiction magazines of the 1930s, except quite a bit darker.

KRMI - Radio Michigan International plays the long-time North American pirate favorite format: rock music, parody songs, and fake ads.

Oxycontin Radio - A drug-related program based on a new drug.

Psycho Radio - Rock, metal, punk, and rap music with plenty of homemade comedy skits.

United Patriot Militia Bingo - Audio collage from such pirates as Dr. Tornado, Ravi Brownyard, Steve Anderson, Jimmy the Weasel, and more. Still looking for Col. Steve Anderson and the bingo machine.

Voice of the Angry Bastard - Pigmeat Martin plays punk, blues, rockabilly, R&B, and other forms of "roots music." VOAB is always in AM and sometimes relays other programs.

Voice of Captain Ron Shortwave - Captain Ron plays rock, comedy, and talk, sometimes with co-host, Major Prick.

WHYP - Mostly pirate radio-related parody music and sometimes long comedy programs, plus a little metal, punk, and hard rock music. Some of James Brownyard's long programs include "Who Wants to Be a Pirate Radio Operator?," "The Brownyard Family Halloween Show," "A WHYP Christmas," and "How to Set up a Pirate Radio Station."

WMFQ - Rock or sometimes easy-listening music with chanted WMFQ

"Something's pulling me in...I want to listen to KIPM—I must listen!"

dies and "alternative" programming. For example, Radio Bingo is a strange mix of pirate radio sound bites, music, and bingo numbers. After a few months of nightly broadcasts from United Patriot Radio on 6900 kHz, Radio Bingo morphed into United Patriot Militia Bingo and added a bizarre mix of Steve Anderson quotes to the bingo game. And when Anderson disappeared, UPMB announced that Anderson had stolen their bingo game, the winnings, and everyone's prizes.

Another current fixture on the airwaves is KIPM, which features a fascinating format of disturbing science fiction stories, read by their author Allan Maxwell over a bed of eerie instrumental music. Of course, the pirates can't resist such material. WHYP has aired a KIPM parody that involved a bad batch of root beer. The Voice of Captain Ron Shortwave recently broadcasted the "Deadly Cardboard Box of Death" and its vicious attack with a brain probe, another KIPM-inspired bit.

The best time to hear parodies and other weird programming is near Halloween. Many of the broadcasts are somewhat passé, such as typical seasonal music as "Monster Mash," "Purple People Eater," "Frankenstein," "The Witch Doctor," etc. Others are more mysterious or peculiar. On Halloween 2000, WHYP's program featured homemade song parodies, such as "The Zeller Mash" (inspired by longtime *MT* columnist George Zeller) and what they considered to be scary music: sappy 1970s pop tunes. Ground Zero Radio went the other direction and featured heavy metal and Satanism-based parody ads.

Necessary Equipment

All that's necessary to receive shortwave pirate broadcasts is a medium-grade (or better) portable or nearly any tabletop model. One necessity for listening in North America is a receiver with a BFO or an SSB setting. More than half of the broadcasts are in SSB mode, usually USB. Remember that a pirate station could be eking 10 watts into an inefficient antenna 3000 miles away...or it could be some guy pumping out 1000 watts from the next block.

When the circumstances are in your favor, you could undoubtedly hear a broadcast great on any receiver; under poor conditions, you'll barely pull out a few bits of signal on a $4000 receiver. The same concepts hold true for antennas. But in general, the better the equipment, the more pirates you'll be able to hear.

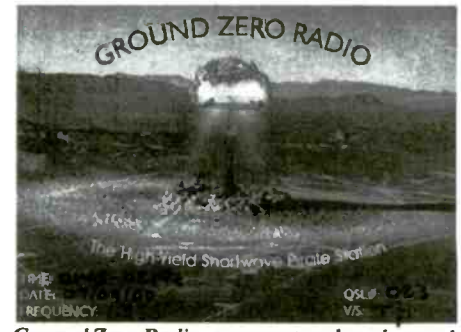
Tuning in

With a little patience, North American pirates aren't difficult to tune in. The biggest problem is being there: right place, right time. Most North Americans use SSB modulation and are audible across much of the continent in the evening and night hours.

Currently, most North American pirates operate on the frequencies between 6900 and 6960 kHz, with most activity occurring on 6900, 6925, 6950, and 6955 kHz. Over the past few years, the areas around 7500 to 7550 kHz, 9280 to 9340 kHz, and 15050 to 15070 kHz have occasionally been used. As of late, these odd-frequency tests have been more rare, but you can expect that the popularity of these tests will catch on again sometime in the next year or two.

Typically, North American pirates broadcast in the afternoon and evening hours on the weekends. For approximately 20 years, the prime times have been 2100 to 0400 UTC on Friday and Saturday nights.

(MT6) Alfred behind the controls of Alfa Lima International (The Netherlands), currently the easiest pirate to hear from Europe.



Ground Zero Radio, a current rock and comedy pirate, spares no expense—from full-color QSLs to giving out some new $25 pirate radio books as prizes to contest winners!

However, activity changes from time to time. Ten to 15 years ago, Sunday mornings were also popular; several stations have begun experiments on Saturday and Sunday mornings in the East Coast. In addition, several European pirates have conducted numerous successful experiments between 21880 to 21895 kHz over the past year between 1200 and 1400 UTC.

Several years ago, North American pirates were regularly active on weekday evenings between about 2300 and 0400 UTC. As pirate radio activity has dropped a bit in the years since, most (but not all) weekday broadcasting has dried up.

One current anomaly worth mentioning is KIPM marathon night. KIPM turns up occasionally on Friday or Saturday evenings and just keeps going. Other times, KIPM will take a break to change frequency, give other pirates a chance to broadcast, and presumably give the transmitter a break. When KIPM hits the air on a given weekend, be sure that the fridge is stocked.

The best way to find these pirates is to leave your radio on and just wait for them. My most successful listening has been when I've had a receiver on my desk beside the computer. Most of the time that I'm near my office, I just leave the radio on 6950 or 6955 kHz with the volume turned down. I can see from the level of the S-meter if a station of decent strength is on. I could also use the squelch, but I usually don't, because the static peaks set it off. From time to time, I turn up the volume and tune other frequencies, just to see if I can hear any stations.

I have had the most success hearing pirates when my office has been set up with a radio. Unfortunately, I've remodeled houses twice and my office space has changed several times in each house. I discover that when my office isn't available, I rarely pull out the radio and check it often enough to hear stations. So it helps to analyze your habits to find a place and time when you can leave your radio parked on a pirate frequency while you perform other tasks.

Whether you are a former pirate listener or are new to the concept, the weekends around Halloween are a great time to start listening. Not only does the holiday bring the pirates out of the woodwork, but the improved propagation in October typically makes for enjoyable listening – as opposed to the noise and static crashes that plague DXers in July. Give it a shot; you might have some fun listening to something a bit different or even get hooked on DXing pirates.

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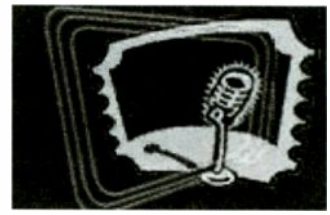

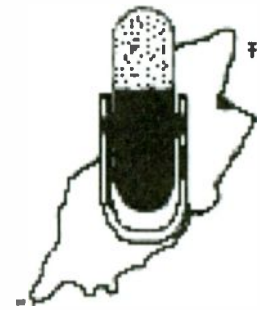

Tuning in the Longwave Broadcast Band

By Chris Brand
chris@sutton-brand.freeserve.co.uk

European radio listeners have it good: If there is nothing of interest to be heard on mediumwave, shortwave or FM, then they can scan through the 17 longwave frequencies allocated from 153 kHz to 279 kHz. Longwave broadcast stations can currently be found in 25 countries, covering geographical extremities from the far northwest of Europe in Iceland, down to North Africa in Morocco and Algeria. Eastwards the band is used as far away as Georgia, Jordan, and Azerbaijan.

In this article we will look at a selection of the radio stations currently heard on longwave, along with recent information on some stations hoping to hit the airwaves in 2003.

Like the rest of the AM band (medium and shortwaves), longwave reception cannot match the clarity of FM, but what it may lack in sound quality is compensated for by the quality and variety of its program content. On the other hand, many of the big boys broadcasting on longwave, such as Germany's Deutschlandfunk and Luxembourg's RTL, have such strong signals that there is no difficulty in hearing them throughout western and central Europe.

As most of the radio stations are aimed at a domestic audience, they understandably broadcast in the vernacular language. But shortwave listeners already know that you don't need to understand a language to be able to enjoy the atmosphere generated by local music or to form an accurate impression of a station, region or country.

What's on Tonight?

So, what's to be heard on a typical tuning across the longwave dial? There are a number of longwave stations that come in loud and strong here in the northwest of England using even the simplest and cheapest of receivers.

A personal favorite of mine is France-Inter, from Allouis in the centre of France, on 162 kHz. They have a good variety of music programs in the evenings, so you can tune into light classical on a Thursday, or jazz at the weekends presented by Julien Delli Fiori. I recently enjoyed a concert entitled *Festival Jazz in Marciac* that featured Gilberto Gil and Kenny Barron's Brazilian project. If you can't receive France-Inter on longwave, try it on the Internet at:
http://www.radio-france.fr/chaines/france-inter01/direct

The BBC has always used a longwave transmitter at Droitwich in the English midlands to broadcast one of its domestic stations. BBC Radio 4 has been on 198 kHz since the late 1970s, in parallel to its FM frequencies. The longwave program carries opt-out programming at certain times of the day, such as religious broadcasts, cricket commentary, and the shipping forecast. The BBC World Service is relayed overnight.

Both the cricket and the shipping forecast have become two great British radio institutions. The shipping forecast carries thrice-daily reports from the Meteorological Office on conditions at sea. It has a gently lilting theme tune called *Sailing By*, evoking the waves and motion of the sea. (Incidentally, a different version of the same tune is used in the maritime program *Seascapes*, heard on RTE1 Radio Telefis Éireann, on 567 kHz mediumwave. Have a listen via **http://www.radio1.ie/infocenter/**).

Although aimed at fishermen and trawlers at sea off of the British Isles, France and Northern Spain, many a landlubber tucked up in bed listens with fascination to the mystical language used. Strange sounding sea areas include Rockall, North Utsire, Dogger and Sole are followed by a forecast ... "Easterly veering northerly, 5 or 6, wintry showers, good."

Cricket commentaries are also broadcast on BBC Radio 4 longwave. International matches (*Test Matches*) last for up to five days, (and there might still not be a winner!) and the ball-by-ball commentary is just as popular with those with little knowledge of the game as it is with cricket aficionados. The best broadcasting comes when rain has stopped play, and English gentlemen commentators discuss the merits of chocolate cake sent to them by listeners, and observe all aspects of the genteel side of English life, from spotting buses to charity balls. Such is its place in English culture that even former Prime Minister John Major spoke out against proposed cuts in the service when he was in office. **http://www.bbc/radio4/**

From Kalundborg, Denmark, you can hear Danmarks Radio first program on 243 kHz, and on mediumwave 1062 kHz. Like BBC Radio 4 this has opt-outs for weather and religious programming. It also carries more unusual programming such as fish prices and gymnastics. If your Danish language skills let you down then you can always listen out for some of the light classical music often broadcast in the evenings. **http://www.dr.dk/p1/**

If you can receive the Danish station at your location you will be hard pressed to hear TRT Erzurum Radio and TRT-4 from Turkey, on that same 243 kHz frequency. The two other longwave frequencies used by the Turks also clash with stronger signals at my western European listening post. TRT 4 uses 162 kHz, as do France Inter and Radio Bashkortostana in Russia. TRT 1 competes on 225 kHz with Radio Polonia, which has English and German news at 1000 UTC. So, for a tantalizing Turkish taste I use the Internet instead: **http://www.trt.net.tr**

On 216 kHz Azerbaijani Radio 1 broadcasts in Azeri from Gyandza. However its 500 kW signal is swamped in the UK by Radio Monte Carlo's news and music format. This comes via Roumoules, Plateau de Valensole, France, with a 1400 kW directional antenna. **http://www.rmc.mc** TWR (Trans World Radio) 0200 to 0300 UTC and Radio Evangile also use the frequencies for half hour segments when Monte Carlo is off the air, which is overnight European time.

Germany has a major presence on longwave. At the top of the dial on 153 kHz comes Deutschlandfunk. Deutschlandradio programs out of Cologne are broadcast under the historical name of Deutschlandfunk and are mostly news and talk format, with Berlin programming under the name of Deutschlandradio on 177 kHz with a music format. Deutschlandfunk from Aholming can be

found on 207 kHz any time of day or night. **http://www.dradio.de**

There is also an independent commercial station in Germany called Europe 1 on 183 kHz. This broadcasts in French from the southwest German town of Saarlouis or Saarbrucken, close to the French border. It can usually be relied upon to play some interesting music in the European evenings or American afternoons. **http://www.europeinfos.com**

The tiny country of Luxembourg, sandwiched between France, Belgium and Germany may have a population of well under half a million, but it packs a strong radio punch. A 2000 kW transmitter pumps out programming in French 24 hours a day on 234 kHz. **http://www.rtl.fr**

Eastern European

Eastern European stations also have a strong presence on longwave. Romania Actualitata broadcast 24/7 from the Transylvanian city of Brasov on 153 kHz, as do Radio Yunost in Taldom (just north of Moscow), with youth music and programs.

The Czech Republic has a music station called Cesky Rozhlas 1 on 270 kHz, and a website at **http://radiozurnal.cro.cz**

From Sofia, capital of Bulgaria, you might strain to catch the 60 kW of Radio Horizont broadcasting the Bulgarian parliament on 261 kHz.

Other longwave stations are not as fortunate as the rich ones in western Europe. At the time of writing Georgia's Gruzinskoye Radio on 189 kHz

in Tbilisi is unable to afford to use the 500 kW transmitter, and it is only used occasionally for events such as President Edward Shevardnadze's weekly address to the nation. It is also scheduled to carry a daily 30 minute VOA relay in Georgian. **http://www.geotvr.ge/radio_erti/**

Politics are also at the forefront of a station set up by the Voice of Russia, namely Radio Chechnya Svobodnata (Radio Free Chechnya) on 171 kHz. This broadcasts predominantly in Russian with a couple of Chechen broadcasts each day. They have a bi-lingual website in Russian and English. **http://www.chechnyafree.ru**

Amongst other ex-Soviet republics now doing their own thing on longwave are: Belarus (White Russia) with Belaruskaye Radio on 171 and 279 kHz and Ukraine from Kiyev (Kiev) on 207 kHz.

The Long and Short of It

I haven't been able to tune in two other stations on 189 kHz, namely Iceland's Ríkisútvarpið Radio 1 and 2. They share the frequency, with Radio One broadcasting documentaries and classical music, and Radio 2 covering pop music and current affairs. For a taste of what you are missing you can hear them live in Reykjavík via audio streaming at **http://www.ruv.is**

Norway fits a lot of programming onto its 153 kHz frequency, with Norsk Rikskringkasting national programming (NRK 1 and NRK 2), sharing the frequency with regional stations NRK Finnmark in VadsØ, NRK IngØy and Radio Norway International. **http://www.nrk.no/p1** ; **http://www.nrk.no/p2**

Moving south to Italy, if you are in the vicinity of Sicily then you can hear one of the lowest powered longwave stations. RAI (Radiotelevisione Italiana) Radio 1 is on 189 kHz, from Caltanissetta with just 10kW. **http://www.radio.rai.it/radio1/**

In the Middle East, Radio Jordan can be heard in Arabic on 207 kHz, transmitting from Al Karanah, southeast of the capital Amman. **http://www.jrtv.com**

Some stations that you are unable to pick up on longwave or the Internet also broadcast on shortwave. Amongst these are 177 kHz Deutschlandradio from Berlin on 6005 kHz and

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Deutschlandfunk from Aholming on 207 kHz and 6190 kHz.

The two North African longwave broadcasters can also be heard on shortwave. Morocco's Radio Mediterranee Internationale broadcasts in Arabic and French on 171 kHz and 9575 kHz, from Nador in northeast Morocco. A second, all-Arabic Moroccan station is Radiodiffusion-Television Marocaine on 207 kHz.

Radio Alger International used to be an easy catch before Atlantic 252 used its 252 kHz frequency in the 1980s. It broadcasts in French, English, Spanish and Arabic on 252 kHz and primarily in Arabic on 153 kHz.

Armenia's Radio 1 and the Voice of Armenia use 234 kHz for multilingual broadcasts, including their English transmission. TWR and Radio Polonia are others who broadcast on shortwave as well as longwave.

Artist's concept of the Isle of Man antenna on its sea platform.

Current Developments

The 252 kHz frequency has seen a lot of change during the past 12 months. Atlantic 252 was a joint venture from RTE (Radio Telefis Éireann) and Radio Luxembourg, which broadcast from the late 1980s to the end of 2001, from Trim, County Meath, Ireland, with a transmitter at Clarkestown, and a London office. Its format was music aimed at an 18 to 34 yr old age group. **http://www.atlantic252.com**

However it was replaced by sports station Teamtalk 252 whose parent company Teamtalk Media Group bought Atlantic 252 in December 2001. After a series of test transmissions early in 2002, Team Talk 252 came on air in March. Many radio professionals and enthusiasts were doubtful that the station could survive, as sports in the UK were already well covered by BBC Radio 5 and TalkSport. The latter two were well established and also had the advantage of mediumwave frequencies, whereas coverage of the Teamtalk longwave frequency was patchy in some parts of the target area of the UK and Ireland. **http://www.teamtalk.com**

Perhaps the biggest concern of the skeptics was that the program content had no actual live sports rights, and consisted mostly of phone-ins and reports from sporting venues. During the soccer World Cup in Korean and Japan in the summer, Teamtalk (and TalkSport, for that matter), had no rights to actually commentate live from the matches. Instead, both stations had a commentator in the studio describing matches off the television, with an artificially generated soundtrack of the crowd.

Both stations had to publicize that this was how they were covering the World Cup. I can't imagine many listeners tuning in when they could receive real live match coverage from BBC radio just along the dial. It certainly did not help Teamtalk's cause, and the station went off air at the end of July, with over 370 people in danger of losing their jobs. A plus side of the station's short life was that Teamtalk donated Atlantic 252's 9000 strong CD library to a good cause: the UK Student Radio Association.

As to the future, as I write this, 252 kHz is relaying the Magic radio network, a pop music format. Other rumors as to its future include UBC Media – owners of Classic Gold; digital service Oneword broadcasting Oneword on the frequency; and Chris Cary wanting to bring back Radio Nova on 252 – a station that "changed the face of Irish radio in 1981."

Next Year on Longwave

Cruisin' 216 the AMazing AM is the working name for a new commercial radio station being developed in Norway these past seven years by Northern Star International Broadcasters AS. Personally I think the name *Northern Star* is a more distinctive branding. It is due to come on air in 2003 on 216 kHz and will cover Scandinavia and Northern Europe, broadcasting a "mature" music format, in English. Programs will include Norwegian and Scandinavian music, international news and weather reports and *Northern Lights* Christian programming. **http://www.northernstar.no**

There is also a second longwave commercial station set to come onto 279 kHz later next year. The Isle of Man International Broadcasting plc (IMIB) will broadcast from the Isle of Man, which is an island dependency of the British Crown located off the northwest coast of England in the Irish Sea. The station working title is *MusicMann 279* . This will target Britain and coastal western Europe, and primarily court an audience of women aged 25 to 55. There are also plans to make it available on shortwave, satellite, and the Internet. **http://www.longwaveradio.com**

The station plans a wide range of music and a news service. The approximately 50 strong workforce is expected to be mostly female and recruited from island residents. There are a number of celebrity presenters in the pipeline, such as rock keyboardist and showman Rick Wakeman. Paul Rusling, Chief Executive of IMIB, told me, "The station will have a Christian ethos and not include profane lyric content music etc. in output. We are also most likely to carry a bit of evangelical programming - Very likely to be *The World Tomorrow* and one or two selected others."

Paul is also excited by the transmitter "being a CFA (Cross Field Antenna) atop a platform, and one of very modern design." Developed by engineers Professor Maurice Hately and Dr Fathi Kabbary, it has been used in its initial format by the Egyptian Radio and TV Union since 1994. It is small, stays in tune, does not require constant adjustment, and has a much reduced induction field around it, thus reducing interference. This transmitter will be located offshore, and the studios will be in the town of Ramsey.

Example of a Cross Field Antenna similar to one which Music Mann 279 plans to use. The 9 meters high model is currently radiating 100 kilowatts from a site at Barnis is Southern Egypt, on 603 kilohertz (approx 495 meters Mediumwave)

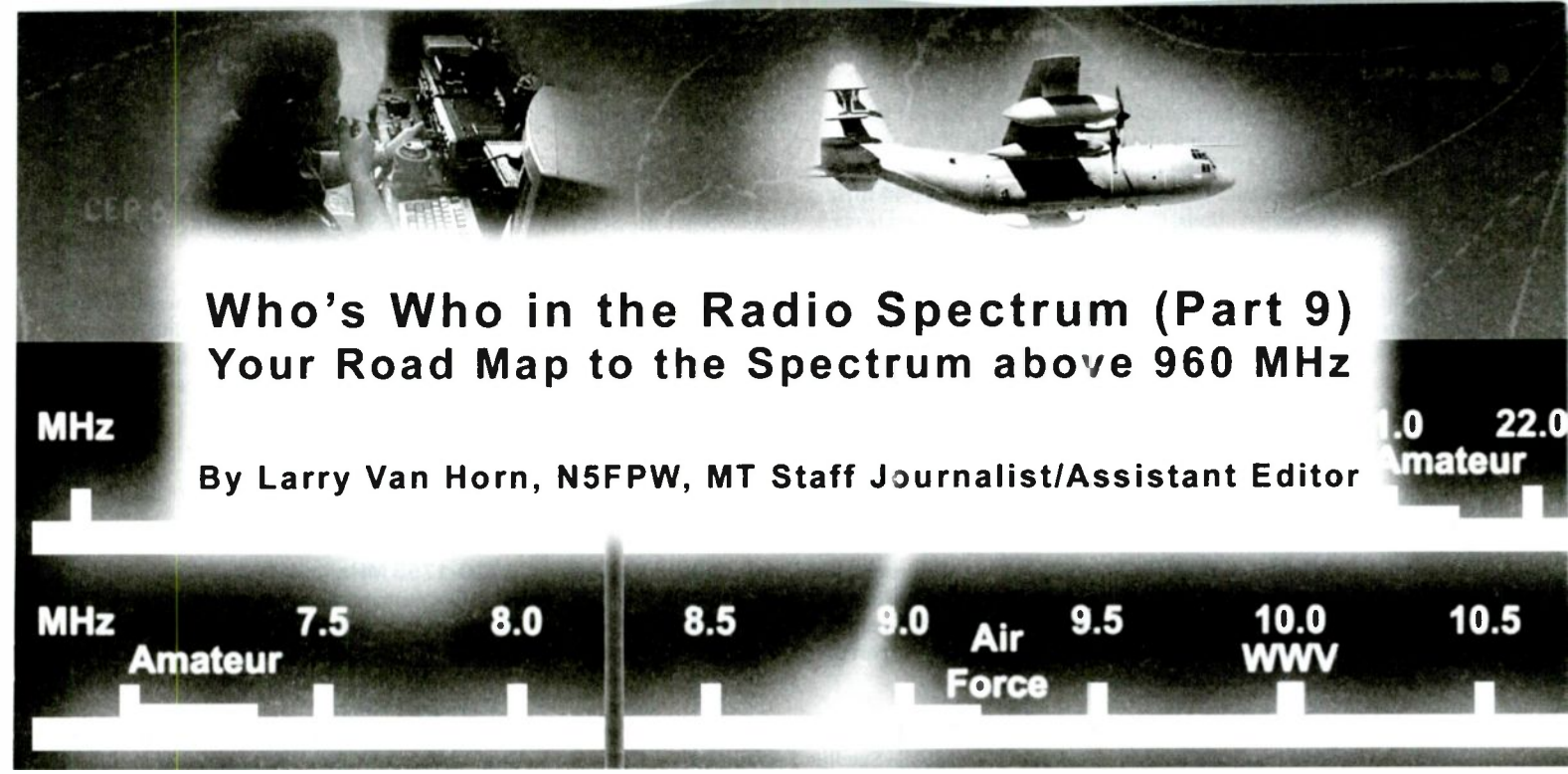
Conclusion

So as you can see, (and hopefully one day you might be able to hear), the longwave broadcast band in Europe is crammed full of varied and often interesting programs. Certainly there are many frequencies where four, five, or even six stations are broadcasting at the same time, albeit it from different parts of the continent. Longwave is a useful part of the spectrum for broadcasting signals over distances, and many a French vacationer in Spain has been grateful to hear a radio station from home; likewise an Englishman in Bordeaux might still be able to pick up the Saturday afternoon play whilst he sips a glass of claret in his farmhouse.

It is rare for a new longwave station to come on air, but if things go according to plan, there could be two English-speaking ones powering up within the next few months. Either way, the community of longwave broadcasting is thriving and worth investigating further, either with a longwave receiver or via the Internet. Happy hunting.

Sources.

Herman Boel's European Medium Wave Guide also contains details of longwave broadcast stations at **http://go.to/emwg**
British DX Club **http://www.bdxc.org.uk**



Who's Who in the Radio Spectrum (Part 9)

Your Road Map to the Spectrum above 960 MHz

By Larry Van Horn, N5FPW, MT Staff Journalist/Assistant Editor

One of the most commonly asked questions at the Grove Enterprises tech support line is, "With all these new wideband radios for sale in the marketplace what can I hear above 1000 MHz?"

The answer is fairly simple: With a few notable exceptions, once you pass the 960 MHz barrier there aren't any voice communications you are going to hear with your scanner.

You will not find any public safety or business/commercial traffic as on the lower frequencies. There are some ham bands above 960 MHz, but activity on them will primarily be heard only in major population areas. If you live in rural America, these amateur radio frequencies will be devoid of any communications and all you are going to hear is receiver noise.

Satellite enthusiasts have monitored analog voice communications from the Inmarsat geostationary satellite constellation for years using specialized equipment, but, with the advent of the new digital third generation spacecraft, even those communications will eventually become a memory. Though they are also digital, weather facsimile satellite transmissions can be monitored using specialized decoders and equipment.

There are other satellite communications as we move higher in frequency, but like the weather satellite and Inmarsat communications, to monitor these transmissions you will have to have specialized antennas and equipment. You won't hear any of these communications using one of the wideband handhelds with a rubber duck, whip or even with an outdoor antenna.

But let's get specific: Here's a radio tour of the frequencies from 960 MHz and above.

Monitoring the New Frontier

960-1215 MHz

This band is heavily used for safety-of-life services within the national and international airspace systems. Nearly all aspects of aircraft identification, tracking, control, navigation, collision avoidance, and landing guidance are carried out here. Major aeronautical radio navigation systems in this band include the Distance Measuring Equipment (DME), Air Traffic Control Beacons (ATCRBS), Mode-S, the military's tactical air navigation system (TACAN) and IFF/SIF (identification friend or foe/selective identification feature) systems, and the Traffic Collision Avoidance System (TCAS). These aeronautical systems are not only essential to civil and military aircraft, but also to special users such as the U.S. Space Shuttle Program.

Under U.S. footnote 224 to the table of frequency allocations, the government is allowed to use this band for communications, navigation, and identification services on the condition that interference will not be caused to aeronautical radio navigation services. These systems are handled on a case-by-case basis. The military services use this frequency range for their Joint Tactical Information Distribution System (JTIDS).

The frequency of 1176.45 MHz ±12 MHz will be a new civil Global Positioning System (GPS) downlink signal (L5). GPS is a 24-satellite constellation system with large numbers of U.S. and international users operated by the Department of Defense (DoD). As the U.S. moves toward a satellite-based aeronautical radio navigation system, land based DME/TACAN systems will be reduced to a minimum operational or backbone network. The starting date for the phase-out of these systems is 2008. However, sea-based TACAN systems will be required into the foreseeable future.

The Federal Aviation Administration (FAA) has also targeted this band for future navigation, surveillance and data communications systems for air traffic control support. A sub-band centered on 981 MHz is currently being utilized for initial trials of the Universal Access Transceiver (UAT).

1215-1240 MHz

Surveillance Radars: This band is jointly used by the FAA and DoD for radiolocation performing long range air surveillance and safety-of-flight enroute air traffic control under Joint Surveillance System agreements. The military services make use of the band for high-power long-range surveillance radars on land and ships in support of national defense missions. Both DoD and the FAA recently deployed a modernized Air-Route Surveillance Radar Model 4 (ARSR-4) in this band for air defense, drug interdiction and air traffic control missions.

GPS: 1227.6 MHz ±12 MHz is designated for the Global Positioning System (GPS) as part of the radio navigation satellite service.

Drug Interdiction: Radar equipment is mounted on tethered balloons along the southern border of the U.S. to detect low-flying aircraft entering U.S. airspace.

NASA: This sub-band is used for space research and Earth exploration satellite activities for active microwave sensor measurements of geological surfaces and ocean wave structure.

1240-1300 MHz

Surveillance Radars (see 1215-1240) and NASA Research: Space research and Earth exploration-satellite studies of geological surfaces and ocean wave structures are done by NASA using active microwave sensor systems.

Amateur Radio: 23 cm amateur radio band. A complete band plan for the 23 cm ham band is in Table One.

1300-1350 MHz

Surveillance radars and drug interdiction (see 1215-1240).

Military aeronautical radio navigation: The Air Force and Navy make use of these frequencies for high-power, long-range surveillance radars and air traffic control radars, in support of national defense missions.

Radio Astronomy: Observations are made of highly red shifted hydrogen spectral lines that occur in the 1330-1350 MHz band. Knowledge of other galaxies and the early universe comes from these observations.

1350-1400 MHz

Military radars (see 1215-1240) and radio astronomy (see 1300-1350).

Fixed/Mobile: This band is seeing increased use for fixed and mobile links since the Federal fixed and mobile service allocations were upgraded to primary in 1989.

GPS: GPS operates on 1381.05 to relay data on nuclear bursts detected by orbiting satellites. This specific requirement is limited to U.S. satellites.

Medical Telemetry: Various Federal agencies operate medical telemetry devices in the 1395-1400 MHz band throughout the United States.

Passive Research: NASA performs passive space research and Earth exploration-satellite observations.

Telecommand Operations: DoD uses 1369.05-1370 MHz for drone telecommand at military test ranges. 1390-1400 MHz was reallocated to the private sector on Jan 1, 1999; however, 17 Federal sites will continue to operate for 14 years.

1400-1427 MHz

You will not hear any terrestrial transmission in this band. This segment of the spectrum is allocated for satellite remote sensing (passive) and radio astronomy. This band contains the hydrogen spectral line at 1420.4 MHz that radio astronomers use to study distribution and motion within the universe. This is also the frequency band used by the various SETI (Search for Extraterrestrial Intelligence) groups looking for intelligent life in the universe.

1427-1429 MHz

This is another military frequency range used by DoD for air-to-ground telemetry and ground-to-air telecommand links on test ranges. The Army and National Guard also uses this spectrum for fixed tactical radio relay systems. This is another band that is being reallocated from government to private sector use.

1429-1435 MHz

Fixed/Mobile: Though this band was reallocated for exclusive non-Federal use, essential Federal operations will continue at 14 sites until January 2004.

Medical Telemetry: Various Federal agencies operate medical telemetry devices in the 1429-1435 MHz band throughout the United States.

1435-1525 MHz

Aeronautical Telemetry: Vital and extensive use of the band 1435-1535 MHz is for aeronautical telemetry and associated telecommand operations for flight testing of manned or unmanned aircraft and missiles, or their major components as well as for equipment development functions. Outside the United States from 1452-1492 MHz is where the World Space radio broadcast satellite digital downlinks are located.

1525-1544 MHz

Geostationary Mobile Satellite Service (GMSS): Satellite phones/data terminals –downlink

1544-1545 MHz

COSPAS/SARSAT system distress signals (1544.5 MHz) – downlink

1545-1559 MHz

Aeronautical Mobile Satellite Service (AMSS) – downlink

1559-1610 MHz

Aeronautical radio navigation / Radio Determination Satellite Service (RDSS) – downlink. GPS operates on 1575.42 MHz ±12 MHz (L1 link) as part of the radio navigation-satellite service.

1610-1610.6 MHz

Mobile Satellite Service (MSS) / Radio Determination Satellite Service (RDSS) – uplink. Also NASA operates a deep space system 70-meter antenna in support of radio astronomy observations. Radio Astronomy observations are performed in this band to study the hydroxyl radical spectral lines allowing study of stellar and expansion velocities, validate theories of the origins and evolution of the Universe.

1610-1626.5 MHz

Reserved worldwide for aeronautical radio navigation.

1610.6-1613.8 MHz

Mobile Satellite Service (MSS) – uplink/ Radio astronomy (see 1610-1610.6 above)

1613.8-1626.5 MHz

Mobile Satellite Service (MSS) – uplink

1626.5-1645.5 MHz

GMSS (satellite phones/data terminals) – uplink

1645.5-1646.5 MHz

Maritime distress signaling via Inmarsat E service – uplink

1646.5-1660.5 MHz

GMSS (satellite phones/data terminals)/ AMSS – uplink

1660.5-1668.5 MHz

NASA Deep Space Network (DSN) Radio Astronomy: NASA operates a deep space system 70-meter antenna in support of radio astronomy observations. Radio Astronomy observations are performed in this band to study the hydroxyl radical spectral lines allowing study of stellar and expansion velocities, validate theories of the origins, and evolution of the Universe.

1668.5-1670 MHz

Radio astronomy (see 1660.5-1668.5 above) and radiosonde meteorological aids

1670-1675 MHz

Mixed spectrum of government and civilian services. This band being reallocated. Geostationary Operational Environmental Satellite System (GOES) weather satellite – downlink

1675-1700 MHz

Polar Orbiting/Geostationary weather satellite, Defense Meteorological Satellite Program (DMSP) and NOAA/TIROS orbiting weather satellites orbiting weather satellites, and radiosonde meteorological aids.

1700-1710 MHz

Government and private sector industrial microwave stations

1710-1755 MHz

Government fixed microwave links and some defense systems. This band is being reallocated to the private sector.

1755-1850 MHz

Band identified for deployment of the International Mobile Telecommunications - 2000 (IMT-2000) system. That is a global PCS system service via terrestrial and satellite links. This is also a critical band in the defense/government infrastructure. There are extensive and nationwide federal/military assignments in this frequency range. Some of the more interesting include Department of Justice/Treasury links for law enforcement land mobile systems.

1850-1990 MHz

Fixed microwave systems and unlicensed personal communications service

1990-2025 MHz

Broadcast Auxiliary Service. Will be reallocated to the Mobile Satellite Service.

2025-2110 MHz

Broadcast Auxiliary Service. NASA: The primary telecommand band used for the control of Agency mission spacecraft. The band is used for uplinks direct from ground stations and for forward links via the TDRSS.

Weather Satellite: The NOAA GOES (I through M) meteorological satellites operate in this band.

2110-2130 MHz

NASA Deep Space Network (DSN) uplinks: NASA tracking and command (2110-2120 MHz) of deep space probes Voyager 1 (Jupiter and beyond), Voyager 2 (Jupiter, Saturn, and beyond), Galileo (Jupiter), and the NASA/ESA cooperative Ulysses mission (formerly International Solar Polar Mission). Primary station at Goldstone, CA, using 400 megawatts of transmit power. Broadcast Auxiliary Service (2110-2130 MHz)

2130-2150 MHz

Private, fixed service licensees (state and local government, railroad and utilities)

2150-2160 MHz

Old Multipoint Distribution System fre-

quency range. Primary use now is the Private Operational Fixed Point-to-Point Microwave Service.

2160-2165 MHz

Domestic Public Fixed, Public Mobile, and Fixed Microwave.

2165-2200 MHz

Common carrier fixed operations (microwave telephone network links) on the range of 2165-2180 and private fixed links used by utilities, railroads and local governments (2180-2200).

2200-2290 MHz

This is a very important government band. This frequency range is the primary telemetry downlink band used by NASA mission spacecraft. 2285-2290 MHz is used for direct downlinks to Earth stations and for some return links via the TDRSS. You will find most of the primary tracking, telemetry, and control (TT&C) links for the federal government and commercial expendable launch vehicles (ELV) in this range. Commercial launches are supported by DoD on a case-by-case basis.

2290-2300 MHz

NASA Deep Space Network downlinks (see 2110-2130 MHz).

2300-2305 MHz

The frequency range is not allocated to any service on a primary basis. Amateur Radio 13 cm allocation – secondary (see table one)

2305-2310 MHz

Fixed/Mobile/Radio location: Wireless Communications Service/Amateur Radio 13 cm band (see table one)

2310-2320 MHz

Fixed/Mobile/Radio location: Wireless Communications Service

2320-2345 MHz

Satellite Digital Audio Radio Service (U.S.) downlink: Sirius Satellite Radio (2320-2331.5) and XM Satellite Radio (2332.5-2345)

2345-2360 MHz

Fixed/Mobile/Radio location: Wireless Communications Service

2360-2390 MHz

Fixed and Mobile: Mobile use both on ground and airborne are for air-to-ground telemetry and robotics control.

Telemetry: The 2360-2385 MHz band is used for defense and commercial aerospace purposes for telemetry in the flight testing and operation of aircraft, spacecraft, missiles, and scientific balloons at military test ranges and NASA centers.

Radio Astronomy: Arecibo in Puerto Rico operates a planetary radar system on 2380 MHz. The 1000-foot diameter dish reflector permits a one-megawatt transmitter to achieve an effective radiated power of 20 terawatts.

Experimental: Various experimental test stations perform Research, Development, Test and Evaluation (RDT&E) activities in this band.

2390-2450 MHz

Amateur radio band (see Table One).

Unlicensed personal communications service.

NASA Downlinks: NASA operates an RF modem link to provide internet connectivity for international support of Russia/U.S. space missions (2400-2450).

Manned Flight: Band to be used on non-interference basis (NIB) for wireless LAN operations aboard the international space station (2400-2450).

ISM: The band 2400-2500 MHz (center frequency 2450 MHz) is designated for industrial, scientific and medical (ISM) applications.

Experimental: Various experimental test stations perform RDT&E activities in this band.

2450-2483.5 MHz

ISM and NASA downlinks (see 2390-2450 above).

Private Land Mobile Service (Part 90): wide bandwidth police surveillance systems, video links, etc.

2483.5-2500 MHz

Non-Geostationary Mobile Satellite Service – downlink.

Point-to-Point: NASA operates point-to-point microwave links at some of its centers to its outlying sites in support of space programs.

Manned Flight: Band to used on NIB basis for wireless LAN operations aboard the international space station.

Tactical and Training: Various tactical and training operations are conducted in various military test ranges.

ISM: see 2390-2450 above.

Experimental: NASA conducts experimental testing of satellite transmitters supporting the NASA Commercial Experimental Transporter (COMET).

2500-2690 MHz

Multipoint Distribution Service and Instructional Television Fixed Service.

Radio Astronomy: Observations of the cosmos are made in the band 2640-2750 MHz to study the low galactic background radiation and both the ionized hydrogen clouds and general diffuse radiation of the Galaxy.

2690-2700 MHz

No transmissions are permitted in this receive-only scientific band. The U.S. Naval Observatory Interferometer at Green Bank, West Virginia, uses this band to produce accurate position determinations.

Space Research: Space-based observations and measurements to advance many areas of global change research such as water salinity, soil moisture, etc. are made in this band.

2700-2900 MHz

Surveillance Radars: The FAA and military services operate airport surveillance radars in this band for the management and control of aircraft in and around airports and military installations.

Weather Radars: Large numbers of weather radars, including NEXRAD, operate in this band.

Radio Astronomy: Observations of the cosmos are made in the band 2640-2750 MHz to study the low galactic background radiation and both the ionized hydrogen clouds and general diffuse radiation of the Galaxy.

2900-3300 MHz

Maritime radio navigation: The Coast Guard and, to a lesser degree, the Navy operate numerous radar beacons and radiolocation systems providing maritime radio navigation services (2900-3100 MHz).

Military Radars: This band is used by the military services' radiolocation systems throughout the U.S.

Weather Radars: The Federal government's NEXRAD weather radars operate in this band (2900-3000 MHz).

3300-3700 MHz

Military Radars: This is a critical radar band and is used extensively by all the military services. In particular, the military services operate fixed and mobile radio navigational systems in this band as well as performing sensor and navigational system calibrations. Also the U.S. Navy uses (3500-3600 MHz) for surveillance and precision approach radars to support its naval air operations.

Amateur Radio band (3300-3500 MHz).

3625-3700 MHz is part of the extended C-band satellite band used primarily by Intelsat and Inmarsat constellations.

3700-4200 MHz

Geostationary Fixed Satellite Service (also known as the satellite C-band downlink).

4200-4400 MHz

Aeronautical radio navigation: Aircraft operate radio altimeters in this band.

Passive Sensing: NASA conducts passive remote sensing of sea surface topography and sea temperature, currents, and wind speed.

4400-4635 MHz

Tactical and Training. This band is heavily used for military tactical and training communications, both for line-of-sight and troposcatter. Additionally, DoD operates tactical data links, drone command and control systems, and numerous other systems.

NASA: Used on NIB basis for development of aircraft video downlinks.

Radio Astronomy: Continuum observations are performed in this band. One reference indicates that the DOE Nuclear Emergency Search Teams (NEST) use 4400-4990 MHz for telemetry, video and mobile communications.

4635-4825 MHz

Fixed and Mobile: On an NIB basis, numerous Federal fixed operations use this band for point-to-point microwave, air combat training systems, tactical data links, drone command and control systems, and numerous other systems.

Radio Astronomy: see 4400-4635 MHz.

4825-4950 MHz

Tactical and Training: see 4400-4635 MHz.

Radio Astronomy: Extremely useful in studying the brightness distributions of both galactic and extra-galactic objects such as ionized hydrogen clouds and supernova remnants.

4950-4990 MHz

Fixed and Mobile: This band is heavily used for military tactical and training communications, both for line-of-sight and troposcatter. Additionally, the DoD operates tactical data links, drone command and control systems, and numerous other systems.

Radio Astronomy: This band is extremely useful in studying the brightness distributions of both galactic and extragalactic objects such as ionized hydrogen clouds and supernova remnants.

4990-5000 MHz

Radio Astronomy: This band is extremely useful in studying the brightness distributions of both galactic and extra-galactic objects such as ionized hydrogen clouds and supernova remnants.

Passive Sensing: Passive remote sensing of estuarine temperatures is done in this band. Passive sensing flight instruments include R-600.

Final Note on Equipment

I should point out that from a monitoring equipment perspective, 4000 MHz is now the upper limit of our receiving capability. The WinRadio 3700 series receivers are the only receivers capable of receiving frequencies this high.

The following is a list of the receivers that Grove Enterprises carries and a summary of the frequency ranges covered by those scanners. (Note: Full coverage units are only available to qualified customers.)

Alinco DJ-X3T (SCN-11)	100 kHz-1300 MHz
Alinco DJ-X10T (SCN-1)	100 KHz-2000 MHz
Alinco DJ-X2000T (SCN-10)	100 kHz-2150 MHz
AOR AR-One	10 kHz-3300 MHz (For government sale only)
AOR AR-3000A (RCV26)	100 kHz-2036 MHz
AOR AR-5000+3 (RCV42-P)	10 kHz-2600 MHz
AOR AR-8200 (SCN-50)	500 kHz-2040 MHz
AOR AR-8600 (RCV-9D)	530 kHz-2040 MHz
AOR AR-8600 MK11 (RCV-11)	100 kHz-3000 MHz
Icom PCR-1000 (RCV-45-BON)	100 kHz-1300 MHz
Icom R-2 (SCN-5)	485 kHz-1300 MHz
Icom R-3 (SCN-7)	495 kHz-2450 MHz
Icom R-10 (SCN-4)	500 kHz-1300 MHz
Icom R-8500 (RCV-14)	100 kHz-1999.99 MHz
JRC NRD-545 (RCV-21DS)	100 kHz-30 MHz (up to 2000 MHz with optional converter)
Uniden BC-245XLT (SCN-35)	29-54, 108-174, 406-512, 806-956 MHz
Uniden BC-250D/BC-785D	25-512, 806-1300 MHz
Uniden BC-780XLT (SCN-49)	25-512, 806-956, 1240-1300 MHz
Uniden BC-895XLT (SCN-9)	29-54, 108-174, 216-512, 806-956 MHz
WinRadio 1550 Series	150 kHz-1500 MHz
WinRadio 3150 Series	150 kHz-1500 MHz
WinRadio 3500 Series	150 kHz-2600 MHz
WinRadio 3700 Series	150 kHz-4000 MHz
Yaesu VR-500 (SCN-6)	100 kHz-1300 MHz
Yaesu VR-5000 (RCV-51)	100 kHz-2599.99 MHz

Table One: Amateur Radio Bands

(above 960 MHz)

23 Centimeters (1240-1300 MHz)

1240-1246	Amateur TV channel 1
1246-1248	Narrow-bandwidth FM point-to-paint links and digital, duplex with 1258-1260.
1248-1258	Digital communications
1252-1258	Amateur TV channel 2
1258-1260	Narrow-bandwidth FM point-to-point links digital, duplexed with 1246-1252
1260-1270	Satellite uplinks, reference WARC 79
1260-1270	Wide-bandwidth experimental, simplex Amateur TV
1270-1276	Repeater inputs, FM and linear, paired with 1282-1288, 239 pairs every 25 kHz, e.g. 1270.025, .050, etc.
1271-1283	Non-coordinated test pair
1276-1282	Amateur TV channel 3
1282-1288	Repeater outputs, paired with 1270-1276
1288-1294	Wide-bandwidth experimental, simplex Amateur TV
1294-1295	Narrow-bandwidth FM simplex services, 25-kHz channels
1294.5	National FM simplex calling frequency
1295-1297	Narrow bandwidth weak-signal communications (no FM)
1295-1295.8	Slow Scan TV (SSTV), Facsimile (FAX), Amplitude Companded SSB, experimental
1295.8-1296	Reserved for Earth-Moon-Earth (EME), CW expansion
1296-1296.05	EME-exclusive
1296.07-1296.08	CW beacons
1296.1	CW and SSB calling frequency
1296.4-1296.6	Cross band linear translator input
1296.6-1296.8	Cross band linear translator output
1296.8-1297.0	Experimental beacons (exclusive)
1297-1300	Digital Communications

13 Centimeters (2300-2310 MHz)

2300.0-2303.0	High-rate data (HDR)
2303.0-2303.5	Packet
2303.5-2303.8	Radioteletype (RTTY) and packet
2303.9-2303.9	Packet, RTTY, CW, EME
2303.9-2304.1	CW, EME
2304.1	Calling frequency
2304.1-2304.2	CW, EME, SSB
2304.2-2304.3	SSB, SSTV, FAX, Packet AM, AMTOR
2304.30-2304.32	Propagation beacon network
2304.32-2304.40	General propagation beacons
2304.4-2304.5	SSB, SSTV, ACSSB, FAX, Packet AM, AMTOR experimental
2304.5-2304.7	Crossband linear translator input
2304.7-2304.9	Crossband linear translator output
2304.9-2305.0	Experimental beacons
2305.0-2305.2	FM simplex (25 kHz spacing)
2305.20	FM simplex calling frequency
2305.2-2306.0	FM simplex (25 kHz spacing)
2306.0-2309.0	FM Repeaters (25 kHz) input
2309.0-2310.0	Control and auxiliary links

2390-2450 MHz

2390.0-2396.0	Fast-scan TV (FSTV)
2396.0-2399.0	High-rate data (HDR)
2399.0-2399.5	Packet
2399.5-2400.0	Control and auxiliary links
2400.0-2403.0	Satellite
2403.0-2408.0	Satellite (HDR)
2408.0-2410.0	Satellite
2410.0-2413.0	FM repeaters (25 kHz) output
2413.0-2418.0	High-rate data (HDR)
2418.0-2430.0	FSTV
2430.0-2433.0	Satellite
2433.0-2438.0	Satellite (HDR)
2438.0-2450.0	Wideband FM, FSTV, FM TV, Spread spectrum experimental

3300-3500 MHz

3456.3-3456.4	Propagation beacons

5650-5925 MHz

5760.3-5760.4	Propagation beacons

10.00-10.50 GHz

10.368	Narrow band calling frequency
10.3683-10.3684	Propagation beacons
10.3640	Calling frequency

All modes and licensees (except Novices) are authorized on the following bands:

24.00-24.25 GHz
47.00-47.20 GHz
75.50-81.00 GHz
119.98-120.02 GHz
142.0-149.0 GHz
241.0-250.0 GHz
All frequencies above 300 GHz

KTWR Guam Celebrates 25

By Colin Miller

Some three-quarters of the earth's surface is covered by water – more specifically, salt water, an excellent conductor of radio waves. By far the largest expanse of water is the Pacific Ocean. More than 2 billion people, speaking 200 languages and hundreds of dialects, inhabit the Asia Pacific region. It is therefore not surprising that a number of international broadcasters have built stations on islands in the Pacific Ocean. One such station is KTWR in Agana, Guam, part of the worldwide ministry of religious broadcaster Trans World Radio. This year the station celebrates its 25th anniversary.

It was Admiral Chester Nimitz (1885-1966) who refused to deploy his men until they were thoroughly trained and equipped in every way. This precaution was so successful that the hill from which he operated was named after him. That hill on the western Pacific island of Guam, a territory of the United States, still bears the name Nimitz Hill. Some 15 miles to the south, in the village of Merizo at the southern tip of the island, the shortwave transmitters and towers of KTWR are located.

The Vision

Dr. Paul Freed, former President of Trans World Radio, put into these installations planning and preparation worthy of Admiral Nimitz' example. Dr. Freed had a vision of a powerful station on Guam, and in 1970 located the site of the present shortwave station. However, for a number of years the permission to construct such a station was not granted. Then on January 24, 1974, Dr. Freed announced that the permit to build an international Gospel radio station on the island had been granted by the FCC.

Norman Olsen, at that time Executive Secretary of Trans World Radio, visited the island to begin negotiations and the research necessary to establish a reliable link to more than one-third of the world's population. In subsequent months a small staff led by Project Manager V. Rodger Groff began the task of clearing the site for a local AM station on Nimitz Hill. The station, KTWG, was constructed in a few weeks – from mid May to mid August 1975 – and began broadcasting to the local populace and the surrounding Micronesian Islands on August 22, 1975. KTWG was recently sold to a local Christian businessman and is no longer part of TWR.

During this period careful investigation was being made for the shortwave station. Audience potential was studied, propagational possibilities were carefully plotted, language blocks mapped out, and technical difficulties faced. When construction of the shortwave station began, the staff was backed by volunteers who came from the United States to help.

The New Site

It takes all kinds of activity to erect and activate a transmitting station. Surveyor's stakes direct bulldozing and tower rigging. A spray gun paints towers flat on the ground while 171 holes swallow concrete to support the towers and their associated wires – and anchor them with typhoon-proof strength.

"The dry season is when it rains only once a day," a long-time Guam resident commented. Even that is too much when tropical torrents start with only minutes of warning.

"Once they add water to the mixture," missionary builder Burl Sommer observed, "we're committed. The countdown is irreversible on a costly load of ready-mixed concrete. There's no way to cancel a load after it has started its hour-long trip toward KTWR; either we use it or dump it. A downpour at the wrong time would ruin everything."

"Frequently after we'd prayed," former Chief Engineer Bob Schultz relates, "it would rain on both sides, but miss our transmitter site." More than once the rain held off until the concrete was in place, then come again so suddenly a bulldozer had to help the truck exit

the rain-slicked terrain.

Complex curtain antennas, an intricately woven tapestry of cables, were assembled on the ground and lifted into place between supporting towers. A series of concrete blocks, weighing up to 6,000 pounds each, connects to cables running to the top of the curtain antennas. When the wind velocity exceeds 60 miles an hour, the 3-ton blocks begin lifting – maintaining enough tension to keep the antenna cables intact, yet relaxing enough to keep them from snapping.

In spite of these extensive precautions, the station has suffered some damage from typhoons. These powerful storms have their birthplace over the open ocean areas of the Western Pacific. Most of them are in their development stage while near Guam, but they occasionally strike the island with their full force. Over the last 25 years there have been some intense and destructive typhoons. In November 1984, Typhoon Bill damaged the antennas at KTWR, but the station was back on the air within a few days. In August 1992, Typhoon Omar hit the island, but fortunately the KTWR transmissions were not affected. However, in December 1997, super typhoon Paka ravaged the island with winds of up to 180 m.p.h., the worst storm in 30 years. Curtain antennas at KTWR were severely damaged, and the station was off the air for several days.

The Station Dedication

December 17, 1977, dawned bright and clear on Guam with just a few white clouds moving across the sky. At 8:45 a.m. the Governor's limousine called for Dr. Paul Freed and, after a brief stop at Government House, he and the Governor rode to Merizo where the new shortwave station was to be dedicated.

The transmitter site had been beautifully prepared and decorated by volunteers from Merizo under able direction of Rev. Daniel Harvey, KTWG Program Coordinator. A wood framed tent sheltered the guests from the hot sun and an ingeniously altered flatbed trailer served as a platform from which the speakers could view both the giant antenna and transmitter building.

Dan Harvey greeted the guests and introduced the Commissioner of Merizo, Mr. Joaquin Q. Acfalle, for a welcoming address. Rev. David L. Swineheart gave the invocation. Congressman A.B. Won Pat spoke to the assemblage, saying in part, "The intensity of your dedication to your cause is evident... We recognize the importance of the contribution Trans World Radio makes toward furthering the Gospel."

After a few more speeches and music, Dr. Freed gave the main address. He spoke of his gratitude to the people of Guam and their leaders. He emphasized the strategic significance of the new shortwave station, which he called "a communications center for the Gospel for almost one-third of the people in the world." Dr. Freed recalled the things which he had just experienced during his 11-day trip into the mainland of China and said, "When I view this massive antenna I see beyond it the masses of Asia to which it will proclaim the saving Gospel of Jesus Christ."

Regular Broadcasting Begins

Factory experts came from the United States mainland to check out the equipment before applying power. Acting Field Director V. Rodger Groff expressed satisfaction that the Guam missionary staff had been able to successfully install the curtain antennas and transmitters.

Cautiously the engineers turned on one transmitter. Soon it was running 20 kW, then up to 25 kW. But a suspicious symptom showed up on a meter. The designer of the unit readily replaced a faulty component. Then, as full power was reached, smiles indicated the successful completion of the first test.

KTWR made its first regular broadcast on September 4, 1977. Initially two 100 kW Harris transmitters were in use, with two more added later. The target areas are Japan, China, North Korea, South and Southeast Asia, eastern Australia and nearby islands. At first, broadcasts were made in English and the six major languages of these target areas, with other languages added later.

The latest English schedule is as follows:

UTC	Freq kHz	
0725 - 0900	15215	weekdays, to Southeast Asia
0730 - 0900	15215	weekends, to Southeast Asia
0815 - 1000	15330	weekdays, to Australia/New Zealand
0815 - 0930	15330	weekends, to Australia/New Zealand
1430 - 1600	15330	daily, to South and Southeast Asia

Programming

Today, KTWR broadcasts more than 240 hours in 15 languages each week to the Asia Pacific region, and also four languages to India. There is no local program production from the station anymore, though a small studio is used for short announcements. Programs are produced in studios in a number of other countries including Australia, Hong Kong and Singapore, and received via the Internet for on-air broadcasts. These programs are focused on sharing the message of Jesus Christ as recorded in the Bible.

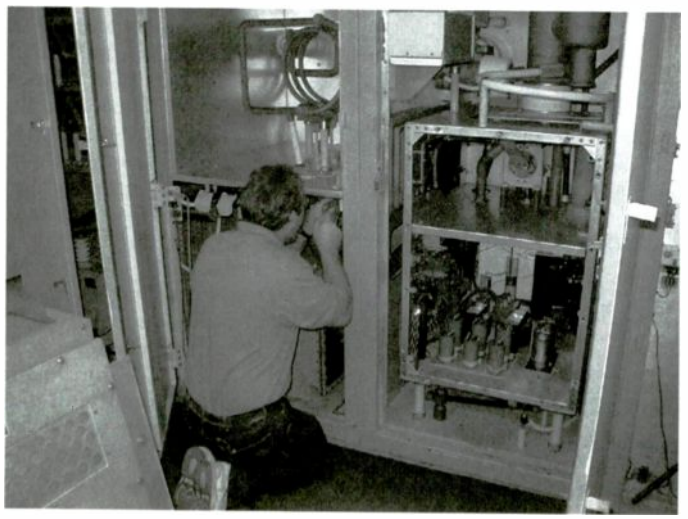
China is KTWR's largest target audience, with more than 140 hours of programming per week in five Chinese dialects. These broadcasts are divided into four channels: "Radio One", "Radio Two", "Radio Three", and "Radio Four":

Radio One channel airs evangelistic programs for children, youth, college students, and women.

Radio Two channel provides Bible teaching programs aimed at nurturing young Christians. It gives a solid Biblical foundation to their faith and includes the ministries of various North American cooperating broadcasters.

Radio Three channel is for Church leaders. It provides sound theological training for hard-pressed lay workers who have little opportunity for formal training.

Radio Four channel is dedicated to Christian broadcasting for minority language groups. There are many



different ethnic people groups in China, and TWR broadcasts to six of them (Kazakh, Kyrgyz, Korean, Russian, Tibetan, and Uzbek).

The KTWR broadcasts emphasize evangelism and discipleship, and feature programs for the family, women, and children. Other programs teach seminary courses to pastors and lay leaders. Through Trans World Radio's Chinese ministry's unique "Radio Church Kits," a radio, Bible, and program course curriculum as well as other relevant literature are distributed to Christians in China. Believers then invite five or six other people to listen to specific Bible teaching programs on the radio and to study and worship together for the purpose of planting the seed for a church.

The Transmitter Site

KTWR uses four Harris SW100A shortwave transmitters, each with a rated power output of 100 kW using pulse duration modulation (PDM), and one 100 kW HC100, manufactured by HCJB engineers at Elkhart, Indiana. The transmitter building has been expanded to include the administration offices, formerly situated at Nimitz Hill.

The site also includes four high gain TCI-611 slewable curtain antennas, and two TCI-611 non-slewable curtain antennas designed for normal SW operating frequencies between 9 and 18 MHz.

The Future

KTWR has a number of goals for the future. A high priority is developing better follow-up in all of the Asia Pacific language services. Another priority is the technical improvements that will come with using digital audio. The station also strives to acquire the best shortwave frequencies possible, to ensure that improved reception will provide listeners with the encouragement they need to help them in their daily Christian walk.

The Next Generation Network is a ministry to the youth of Australia and New Zealand, where few Christian radio programs are available for young people. It falls under the responsibility of TWR-ANZ, one of TWR's partners in the region.

Most KTWR listener mail is handled at their Australian office. However, reception reports and QSL requests may be sent to KTWR, Box 8780, Agat, Guam 96928.

Happy Birthday to you, KTWR!

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Powerful Additions to Your Listening Post

It starts out innocently enough: You buy a portable shortwave radio and somehow five years later you've got shelves groaning with electronic gear and wire draped and strung all over the house. There's got to be a more rational way to get started in the monitoring hobby!

Well, you can forget it, because there's not. That's right, monitoring the airwaves is, more or less, a disease, so you might as well succumb to it and enjoy! But, if you're *really* just starting out, there are two important additions to your listening post which you should consider getting before anything else.

❖ Power Supplies

In some ways power supplies are the heart of any electronic device. Without them our radios don't work at all and with a poor power supply they'll work unsatisfactorily at best. The theory and design of power supplies is quite technical and beyond the scope of this column. However, if you'd like to know more, Radio Shack has an excellent and inexpensive book called *Building Power Supplies* (RS #276-5025 $8) which covers components, function, theory, design, and explains the different types while giving plans for building power supply projects.

If you did, in fact, start out with a portable shortwave radio, the power supply (several batteries, in this case) was built-in or you used the optional AC/DC adaptor which plugs into the wall – commonly called a "wall wart." However, as you progress in the hobby, sooner or later you'll need a more versatile and better built power supply to handle some of the more expensive gear you'll buy.

Many expensive shortwave receivers, base-operated scanners, and virtually all amateur radio transceivers run on 12 volts DC and require an "outboard" power supply. It may seem a simple choice, but there are a number of things to consider and a number of useful features to look for when you go shopping for a power supply.

Power supplies are usually fixed voltage output, e.g. 13 VDC, and normally rated at a fixed current, e.g. 3 amps, 16 amps, 25 amps, etc. Some power supplies offer a variable voltage output, 5-15 VDC, for example. Some have meters which monitor the voltage being put out by the supply and current being used by the device. Some even have overload indicators and built-in cigarette lighter adaptors as well. The more options and features, the more expensive the power supply.

Suffice it to say that for our purposes, other than voltage output and current, what we're looking for in a basic power supply is a *regulated, filtered,* and *switching* power supply. This indicates that, regardless of changes in the AC input voltage or demand on the DC output, the power we get will be unvarying, without hum, and efficient. See our radios smile!

Power supplies for receive-only radios needn't have a high current rating because you're not transmitting. But, if you're looking to the future, you may need such a power supply if you get your ham ticket and decide to go on the air. Look for a power supply which can deliver the power most modern 100 watt transceivers require (15 or 20 amps). Now let's take a look at the price tags.

Astron RS-20M Power Supply. This versatile power supply gives you 13 volts at 20 amps and lets you read the voltage and current just to be sure. (Courtesy Astron Corp.)

❖ Four Typical Power Supplies

Astron Corp. makes a typical heavy duty power supply (the RS-20A) which I have used without a hitch for 14 years. It currently sells for $100. The same unit with separate amp and voltage meters (the RS-20M) sells for $120. Spend the extra $20 and get the meters.

This unit has rear mounted binding posts and a front mounted on/off switch. I bought the Radio Shack 12 VDC outlet (RS# 270-1556 $6) which includes an in-line fuse and adhesive tape to stick it to the side of the power supply and wire it directly to the power supply terminals. This allows me to plug all sorts of mobile cigarette-adaptor-powered devices and test them out or use them.

MFJ makes a similar model, the 4225MV, which is rated at 22 amps and features variable voltage output from 9-15 VDC, front mounted, 5-way binding posts; a built-in cigarette lighter adaptor; two large, illuminated meters for current and amperage; and an internal fan. The really interesting thing is that these units are only 5-3/4" x 4-1/2" x 6" and weigh just 3.7 pounds. This compares with the Astron units which measure 5" x 9" x 10-1/2" and weigh 18 pounds; it probably also explains the need for the internal fan in the MFJ unit.

Radio Shack's biggest power supply is rated at just 10 amps, does not have meters, but does have a built-in lighter socket and front mounted terminals. The RS #22-506 sells for $100.

Diamond Antenna's GZV-4000 features 40 amp rating, variable output 5-15 VDC with a center detent at 13.5 VDC, one meter with selectable monitoring of voltage or current, rear mounted DC terminals and a front mounted lighter socket. Size: 8-1/4" x 13" x 4-1/5" and weighs 8 lbs. Price: $180.

❖ A Truly Versatile Tuner

Regardless of the radio you listen to or the antenna you use, you'll find that you'll need at least four more items: an antenna selector switch, a tuner, and, if you ever become a ham, a metered SWR bridge and a dummy load. That's why my second recommended addition to your listening post is an all-in-one tuner, antenna selector, dummy load and SWR bridge/power meter.

You could spend hundreds of dollars buying all four separately or you could get the MFJ-949E deluxe tuner for just $150 and get them all. What I really like about the 949E is that it's well built, small (10-1/2" x 3-1/2"

MJF-949E Deluxe 300 Watt Tuner. Dubbed the Versa Tuner II, the 949E does multi-tasking in your listening post as an antenna coupler for three antennas, dummy load, transmatch, and SWR bridge. (Courtesy MFJ Enterprises)

x 7") weighs just a pound and is crammed with features for SWLers and hams alike.

The 949E has two 50 ohm coax sockets, one set of terminals for a balanced line (450 ohm ladder line) or a random wire. It has a built-in dummy load which can take up to 300 watts output. It features a lighted, switched, power/SWR meter which can be read in two ranges, 0-30 watts or 0-300 watts switched.

Since the 949E lets you have two coax-fed antennas, you could use one to feed a Beverage antenna pointed in your favorite direction and the other to feed the Grove Tunerless All-Band (GTAB) antenna, which is how I have mine configured. That still leaves another input for a big ladder line-fed loop. Three antennas to play with without having to plug or unplug one!

As an SWLer, using the 949E is simple: rotate the knob labeled "Antenna Selector" to "Coax 1". Now rotate the knob labeled "inductor selector" until the signal is the strongest. Now rotate the "antenna matching" knob for a peak signal. To check this signal out against a by-passed (without going through the tuner) signal, rotate the "Antenna Selector" switch to "Coax 1 Direct" and watch the signal meter on your radio or listen to the signal strength.

The meters on the 949E aren't used unless you're transmitting through the tuner. But, once you get your ham ticket you'll find them a valuable tool for peaking a maximum match to your antenna. You'll know right away if your SWL antenna will also be a good transmitting antenna. Just be sure to make your transmissions low power when testing a new antenna in case something went wrong in the construction of the antenna and there's an unacceptably high SWR present.

There are many other combination tuners on the market and I urge you to check them out, but I've found that, for the money, the 949E offers the most versatility. I have used the 949C, a predecessor, for 14 years without incident. My only complaint is that I'd like to see at least one more coax connector on the back for a third coax-fed antenna; then I'd be able to have a beam in addition to the GTAB, and a Beverage as well as a loop. Well, I guess I can't have everything!

❖ Mailbag

- In August the topic was *Your Beginner's Toolbox*. Dick Yount, W8RM, from Ohio wrote to add some items he's found useful: "...A Dremel set is great...some different size clamps that surgeons use...a set of hollow shank nut drivers from size 7/32 through 1/2" is a must.. I also took safety pins, cut off pointed end and soldered to the ends of a pair of meter leads for checking components on PC boards (they're also good for cleaning out desoldered holes on PC boards)." Nice tips, Dick!
- Kevin Neal, N5UU, wrote: "..I have a Ranger pickup with limited room...I have a glass mount cell phone antenna that was made for a bag phone on the truck." He wants to know if this antenna could be modified to use for cell phone, 2 meter HT or CB radio. He would like to know if the Radio Shack #20-011 antenna (25 MHz to 1.3 GHz) would work for all three.

It's a really interesting question because we all find ourselves with different rigs for different purposes in our vehicles and don't necessarily want to make a spectacle of ourselves riding down the highway sprouting an antenna for each. I think that the existing cell phone antenna will be of use only for your current cell phone, if you can connect it. It wouldn't work for either 2 meters or CB.

The 20-011 brings up two questions: Will it handle the output wattage of the 2 meter HT and the CB? And, how efficient will the antenna be at these very different frequencies? My own experience with the one-antenna-does-it-all at VHF and UHF frequencies is that, while they will receive a signal on all those frequencies, they are not particularly efficient transmitting on all advertised frequencies between the low and high ends. Unless you have an aversion to mag-mount antennas, (I'm not keen on them, either), the cheapest and best arrangement will be to have a CB antenna for the CB and a 2 meter antenna for the HT.

Unless you live in a very sparsely populated area, an external antenna for cell phone is really not needed. I've wrestled with this problem myself, trying to provide external antennas for optimum reception for the FM radio, 2 meters/440, CB and 10 meters without looking like a nutcase on wheels!

Getting Started

Ask Bob

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Q. *I noticed that Radio China International is very weak, and Radio Canada International very strong on 9560 kHz at 11:00 p.m. Central Time. How much power is Radio China using? (Bill Fair, Bentonville, AR)*

A. According to our intrepid Associate Editor, Larry Van Horn, Radio China International uses so many different transmitter sites in China and around the globe for relay of their broadcast, the question is nearly impossible to answer. In China alone there are five transmitter sites, and each uses two or more transmitters, each capable of different power levels. It all boils down to which of these is being used at the time and the frequency to which you are listening.

Stick around for the November *MT*. Gayle Van Horn's new feature on "Monitoring China" will appear in the issue, and it will have everything you ever wanted to know about listening to China on shortwave!

Q. *If a penny and a half-dollar were dropped from the same height, say, 50,000 feet above the earth, would they both strike the surface at the same time? (DMC, Cleveland, OH)*

A. Yes, discounting air currents, tumbling effects, etc. The gravitational acceleration would be identical.

Galileo fought this out with the repressive Church clergy four centuries ago using the dialog method of debate. The clergy insisted that every object possessed its own rate of fall, while Galileo said all would fall at the same rate. When Galileo posed the question, "If you tied two different objects together, how fast would they fall?" the clergy was dumfounded.

This identical gravitational acceleration is often demonstrated by the "penny and feather" experiment in which those two objects are shown falling at different rates in a long tube because of air friction on the feather. The air is then evacuated from the tube with a pump, now allowing both to fall at the same rate.

Q. *I recently acquired a stereo receiver with a circuit board gunked up with nicotine and sawdust. Is there a safe way to clean it? (Chris Harmon, Vilas, NC)*

A. It would appear that the previous owner of that stereo was quite a smoker! The problem you face is finding a solvent that will dissolve the goo without dissolving the components. You will probably have to do it a little at a time since no bathing of the entire board is likely to survive a chemical solvent.

First try removing as much as you can manually with a screwdriver blade or something similar so that you don't have to use a lot of solvent.

Next, try lighter fluid and a small brush; that usually doesn't hurt anything, but don't let any solvent get inside anything, like the pots, tuning capacitor, or tunable coil cans. Apply the solvent, scrub it around a bit to see if it is loosening the crud, and dab it off with a paper towel.

You might also try alcohol (rubbing alcohol first because it's cheap!), or wood alcohol (methanol) or grain alcohol (denatured). There are also commercial preparations like Oops you can get from Wal-Mart hardware shelves; read their labels to see what they will do and what they shouldn't be used on.

You can be less finicky with the solder-side of the board since there are probably no components on that surface.

Q. *How can I test a surge protector extension cord? When I simply measure resistance with an ohmmeter it's no different from a conventional power cord. (Ed DeFreitas, W1WEA, Farmington, CT)*

A. Unfortunately, there's no simple conductive test because a surge protector is invisible until voltage peaks several volts over its protective limit. You have to use a high-voltage power supply to trigger the avalanche potential of the surge protector.

An adjustable high-voltage power supply with two 120-volt bulbs in series with either lead (so that you don't blow out a 120 volt bulb) can be attached to the two flat pins on the plug. With a voltmeter across the power supply to measure the voltage, slowly increase the voltage above 120 until the bulbs just light; that would be the voltage level that would be protecting the circuit.

Q. *Does the CIA ever use shortwave radio in foreign countries to broadcast pro-American propaganda? (Propaganda - information that is spread for the purpose of promoting some cause.)*

A. Yes, considerably. In the early days, the agency operated Radio Swan (later Radio Americas), and later, Radio Liberty, Radio Free Europe, Voice of Free Iraq (Amman, Jordan), The Future (Kuwait), and Radio Freedom (Kurdistan). Oversight of these stations has been restructured, however, and none are directly connected with the CIA.

For more information about clandestine broadcasters, visit http://www.clandestineradio.com.

Q. *What ever became of the long-time Radio Moscow?*

A. Now called Voice of Russia, Radio Moscow went through a considerable downsizing when the Soviet Union broke apart a few years ago. The focus necessarily changed to solving internal rather than external problems. *Monitoring Times* carries regular English language schedules of the Russian broadcaster.

Q. *Is the CIA in Langley, VA, still jamming Soviet broadcasts to the United States?*

A. It probably never did. In the history of monitoring, we have never had a single report of such jamming by the CIA.

Q. *Does the Pentagon read* Monitoring Times *for updating information?*

A. Yes, but primarily subscribed to by individual agencies.

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

Getting Started

Bright Ideas

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October is Fire Prevention/ Awareness month. Most fire stations will announce an "Open House." Visit the local station, and let the kids crawl all over the shiny trucks. While the kids leave their fingerprints and shoe marks on everything, you can look for a firefighter with an HT. Tell him/her that you enjoy listening to your scanner. Perhaps they will share a new frequency or two. Ask to hold the radio. Turn it over and often you will find a list of the various channels and their designations. Quick: memorize it, or write it in the palm of your hand for later retrieval. Usually it will be in the form of colors i.e. Green Tactical, or Orange Tac. Sometimes it is by district or function, e.g., central dispatch. "FG" stands for Fire Ground tactical channel. Occasionally, you can find the same information in the engine cab next to the radio console. (This also applies to airshows, etc.)

As we move towards the change in Daylight Savings time, the Fire Department urges us to replace the battery in our smoke detectors. You can also use this yearly time reminder for some preventive maintenance for your radios. If it is mounted in a vehicle, clean the terminals on the vehicle battery. It is not much fun to do this in the middle of a blizzard. For your base and handheld scanners, tighten up all the small screws and clean the battery connectors. I really am a perfectionist, so I also clean everything with a mild detergent. Then I use a special plastic compound to buff and clean the LCD display screens. Test your antenna feed lines with a power meter and check SWR. Check for shorts between the center connector and the outside shield. Old Man Winter is coming.

On a recent Red Cross assignment, I lost a handheld transceiver (HT.) Well, that's what I deserve for carrying so many. I assumed it had disappeared in the big weed field where the fire trucks were staging for that particular forest fire. A couple of days later, I got my radio back. I lucked out because this radio did have my name and phone number on it. However, I realized that I had become lazy. Not ***all*** of my radios, batteries, and accessories had been so marked.

I created some peel-off labels in Word 2000. Under the Tools menu, I selected Letters and Mailings, then Envelopes and Labels. In the labels mode, I selected Options; then the 8162 Avery. You can use whatever one you want, but this worked well for me. I checked the box to "Print full page of the same label." In the white data entry box, I typed my first name and first letter of my last name, followed by my ham callsign. I used the space bar to enter some blank spaces, and then repeated my name, and callsign. I hit enter, and typed my area code, and phone number below my name. I did the same for the next tag. I hit enter again and made two more labels (within a label.) It looked like this:

Gary W. AB7NI 509-238-1122	Gary W. AB7NI 509-238-1122
Gary W. AB7NI 509-238-1122	Gary W. AB7NI 509-238-1122

A page of Avery labels style 8162 has seven labels down with two across. I have four "mini labels within each for a total of 56 labels. What a bargain! I used a paper cutter to carefully cut the new labels. They are small; about an inch and a quarter wide by half an inch high. I used black 12 point type, but you could use whatever you want. Now I was ready to peel and stick. I protected the labels with a piece of clear Scotch tape. Why not offer to make a sheet of labels for a friend, too?

While you are at the computer, here is another idea. I made up some business cards. I used the Avery 26551 inkjet Blue Border business cards. I carry a couple of the cards in case I run across any fellow scanning enthusiasts at an airshow or similar event. I can pass on my card in hopes they will contact me later for an exchange of ideas and frequencies. Now this next part is a bit tricky. As a very active Red Cross volunteer, I got approval to make up some Red Cross business cards. After I printed out the personal batch with the blue vertical strip, I turned the sheet over and made the Red Cross cards on the back. My personal card is shown here.

Radio Scanner Enthusiast
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Shopping for a used radio, scanner, receiver, or transceiver? Ebay is old hat, but many other sites have been established for used equipment. Try one of these:

- http://www.qrz.com/site.html
- http://www.northwestradio.com/interceptnw/swapbbs/index.htm
- http://www.k1dwu.net/hamtrader/
- http://www.strongsignals.net/access/boards/classifieds/board.cgi
- http://www.hamrad.com/hamtrade.htm
- http://www.ac6v.com/swap.htm
- http://www.eham.net/classifieds/

Buyer beware: always use your best instincts in purchasing a piece of equipment from an individual. I suggest using a US Postal Money order, and ship via US mail. Most amateur radio dealers have used equipment as well as new products. Try this one:
http://www.gigaparts.com/radioindex.php
or
http://www.grove-ent.com/hmpgbbb.html

Following my own advice, I bought a used radio via the internet site http://www.eham.net. I sent a US Postal Money Order, and in turn the seller shipped it US Priority mail. The radio arrived promptly with all the promised accessories, and the radio was near perfect; just a couple of very minor scratches. There was a catch. As soon as I opened the box, it was obviousthe seller had been a heavy smoker. The pervasive smell was really strong.

Well, I had not asked if the radio came from a smoke free environment, so it was my problem. First, I tried to clean it simply with a rag and water. No luck. Then I went to 409 spray cleaner. It helped, but the smell was still strong. So I placed the radio and all the accessories in a one gallon plastic freezer bag. I sprayed in a few shots of the odor remover Febreze®. I left the bag overnight. Next day, I could still smell smoke, but it was much less. I tried a more direct approach, and actually sprayed the Febreze onto the radio and the accessories. Back in the bag. Next morning I opened the bag, and then cleaned everything off with rubbing alcohol on a rag. Success! The odor was 99% gone. When you use these methods, just be careful not to spray liquids into the speaker cone or keypad.

Have a Happy Halloween. I will see you in November with more bright ideas.

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FACE-ing the Weather

This month we'll depart from the normal *Scanning Report* format to highlight a critically-important series of science missions being conducted by the U.S. government. In this issue, we'll look at some of the equipment used during a month-long field deployment that investigated climate changes and "global warming." We'll visit other phases of the project and speak with the scientists in next month's column. The research project will continue at government and private labs through the beginning of next year, when all data will be presented in a symposium of scientists and government officials.

Monitors will have many new opportunities to catch high-altitude research aircraft and ground-based environmental science teams, and not just in the hurricane-prone Southeast or the Tornado Alley of the Midwest. Government agencies and academic institutions worldwide are funding new environmental studies for a wide range of potentially-damaging events, including earthquakes, volcanoes, windstorms, polar icecap temperature fluctuations, ozone issues, sea-level changes, and atmospheric anomalies.

The Internet is the primary conduit for these science initiatives, and most websites are unrestricted and publicly accessible. As an example of a novel mix of science and technology, check out...

http://www.rsmas.miami.edu/rccl/

...for a real-time weather station and webcam aboard the Royal Caribbean International cruise ship *Explorer of the Seas*. You can see the ship's location, camera view across the bow, and current weather conditions. The onboard weather station is a joint project of Royal Caribbean, the University of Miami's Rosenstiel School of Marine and Atmospheric Science, NOAA and the National Science Foundation.

Other websites are overflowing with weather-related science information. Using the web and popular Adobe Acrobat .PDF files, we can now see data from ocean buoys, flight tracks of research aircraft, radar images inside of storm systems, real-time lightning strike locations and a worldwide library of "normal" temperature, pressure, precipitation, and wind information.

If you're interested in the weather, check with your local Weather Service office or do a web search for weather topics in your area. I'm sure you'll come up with new programs and new monitoring ideas, no matter what the season.

Entering CRYSTAL-FACE

As you drive through the old military base, you have a feeling that you're being watched. Perhaps it's just a touch of paranoia, since no other cars or people are visible on your route. Sure, you passed through the guard gate at the base entrance a few minutes ago, but the feeling persists. Your photo ID was checked and your body language was scrutinized by the attending (armed) guard. You were told to stay on the designated route and not stray for any reason. You were also told to leave your camera inside your camera bag...and keep the camera bag completely closed.

Your visit comes at a special time in the history of our country. For most Americans, life is good and prosperity attained ... or at least attainable. Scientific endeavors and achievements are fairly commonplace, but only the biggest science stories seem to be good enough for the news media to care about.

Our country still has enemies, of course. Old wars are over and new wars are still some months or years away. The population is in a precarious position, living with a heightened state of awareness for unseen enemies while trying to maintain a happy and productive lifestyle.

Some of the country's threats seem more ominous due to the language and cultural differences of our adversaries. The pursuit of science is an ongoing venture, nonetheless. Of all the science findings and lifestyle enhancements that were being enjoyed, one subject ultimately affected everything else: the weather.

Weeds grow through the old asphalt roads and adjacent aircraft ramps. Buildings are weathered and wind blown, signs are often faded, and roadside maintenance hasn't been attempted in many years. Like many old military airfields, its size was determined by its runway layout. Only a few additional acres were reserved for support and recreational facilities. Still, the base seems very large as you drive around the perimeter toward your destination.

The hangar then comes into view. Baking in the Florida sun for decades, the building again looks weathered and desolate, an artifact from when this base served a crucial role in Naval Aviation. You round the final corner and enter the parking lot, a bleached-out mix of gravel and crumbling asphalt. A hundred other cars are already there.

Your escort walks you toward a high fence at the rear of the hangar. An imposing security gate awaits, and the escort asks you to go first. A respectful gesture for sure, but also one that prevents you from seeing the code being punched into a noticeably modern cipher lock keypad.

Now inside the hangar, you sense a change. The paranoia of being watched is replaced by the excitement of witnessing something new and important. You wonder if others felt this same way in years past, at places like Wright-Pat, Muroc (Edwards), White Sands, Pax River...or even Cape Canaveral.

Is this a recollection from the '50s or '60s? No, this is Naval Air Facility Key West. It's the summer of 2002.

The famous "can do" attitude is alive and well amidst the 95-degree heat, 100% humidity and bite-a-minute mosquitoes. A group of scientists populates this hangar, some old enough to have worked on those famous, groundbreaking projects and discoveries that are now history...and some young enough to have missed that exciting era.

The hangar owns a share of history, too. Used only for occasional training deployments, naval aviators once walked the long hall on the second floor of the building, with windows arranged to overlook the hangar floor and aircraft below, on a daily basis. Squadron offices

are now quiet, and a decades-old air conditioner barely offsets Florida's summertime conditions. The hangar's roof has sheltered generations of naval aircraft, from Vigilantes to Avengers, Phantoms, Tomcats, and Hornets.

For a brief period in 2002, it witnessed six of the most sophisticated aerial platforms in our inventory.

Equipment

NASA ER-2

A "civilian" version of the USAF U-2 high altitude reconnaissance platform, the ER-2 has been used for atmospheric and terrestrial environmental studies related to pollution control, shoreline erosion, forest fires, floods, hurricanes and other issues. ER-2 operations are administered from NASA Dryden Flight Research Center at Edwards AFB, California.

NASA WB-57

Another "civilianized" military aircraft, the WB-57 has been flying high altitude research projects for NASA since the 1970s, while the airframe dates back to the 1960s and the design is from the 1950s' B-57 Canberra. The WB-57 is a weather reconnaissance version originally operated by the Air Force. WB-57 operations are administered by NASA Johnson Space Center and based at Ellington Field in Houston, Texas.

Proteus

This is a one-of-a-kind aircraft designed by Burt Rutan of Scaled Composites in Mojave, California, and now owned by Northrop-Grumman Corp. It could easily be a movie prop representing some futuristic trans-atmospheric interceptor, or suitable for James Bond to use as a top-secret transport. A chameleon of the aircraft world, Proteus can be configured with different wing extensions and equipment pods for a variety of payload requirements. Missions include high-altitude broadband telecommunications relay, atmospheric research, reconnaissance and surveillance, commercial imaging, and even the launching of small satellites. It can cruise at more than 60,000 feet for up to 18 hours.

Cessna Citation II

Owned and operated by the Department of Atmospheric Sciences at the University of North Dakota, this specially-instrumented aircraft is part of the Meteorological Studies program. The aircraft, scientists and undergraduate students have participated in environmental studies throughout the world, with topics including atmospheric chemistry, air pollution, acid rain, cloud physics, and meteorological issues related to radar, agriculture, aviation and weather modification. Research clients include the FAA, NASA, EPA and other federal agencies.

UV-18A Twin Otter

Similar to the DeHavilland DHC-6-300, this multi-role aircraft is used as a sensor platform and chase plane for Unattended/Unmanned Aerial Vehicles (UAV's). The aircraft is operated by the Center for Interdisciplinary Remotely-Piloted Aircraft Studies, a unit of the Office of Naval Research in Marina, California.

NP-3D Orion

The NP-3D Orion is operated by the Naval Research Laboratory at NAS Patuxent River, Maryland. Aircraft of this type have participated in studies concerning magnetic variation mapping, hydroacoustic research, bathymetry, electronic countermeasures, gravity mapping and radar.

Objective

We've all heard about global warming, right? The subject is argued almost daily on radio and television talk shows, with "heated" discussions concerning environmental issues and economic ramifications. But is it real and is it of concern?

Scientists and government officials now acknowledge a climate change is occurring. However, our frame of reference for weather fluctuations is only as good as our recorded data, and that databank only covers a brief period of Earth's history. Is the climate change a normal feature of Earth's environmental cycle, or is it caused by industrial and mechanical sources?

Instead of arguing about the subject, government agencies and contractors set out to find the answer. These six aircraft, along with 450 scientists and tons of equipment, implemented the Cirrus Regional Study of Tropical Anvils and Cirrus Layers – Florida Area Cirrus Experiment, more easily known as CRYSTAL-FACE.

CRYSTAL-FACE combines the resources of NASA, NOAA, the National Science Foundation, Department of Energy, Office of Naval Research, U.S. Weather Research Program and the academic community.

The program office provides this explanation: "Carbon dioxide and other greenhouse gases from human activities warm our climate. Two effects of this warming are the increase of clouds and the rise of water vapor in the atmosphere. Both of these in turn influence the impacts of the man-made gases on global warming. Clouds can reflect the sun rays away from the surface, cooling the climate, but they also act as blankets, trapping sun's radiative heat. These various interactions are complex and not fully understood. However, the processes are crucial in determining the eventual overall effect of manmade greenhouse gases on the earth's climate. The detailed measurements from the Crystal-Face mission will assist in improving our climate models."

For the first time, cloud characteristics were simultaneously measured at different altitudes by having the six aircraft fly in a somewhat stacked formation, from extremely low altitudes to over 50,000 feet. Flights were also coordinated with satellite overpasses, so the airborne measurements can be directly compared with data from ground-based radars, satellites, and existing atmospheric models.

Next month, we'll look at specific missions and the men and women who keep "The Right Stuff" inside NASA and NOAA.

Table One: Websites of Interest

Maritime weather stations:

Cruise ship real-time weather station:
http://www.rsmas.miami.edu/rcd/

Coastal buoy weather data:
http://www.ndbc.noaa.gov/

Lightning Strikes:

National information: Real-time or delayed strike maps
http://www.weather.com
http://www.accuweather.com
http://www.intellicast.com

Real-time and historical strike data (subscription service):
http://www.lightningstorm.com/ls2/lightningstorm.jsp

Many regions have their own strike pages, such as this example.

Tampa, Florida real-time lightning:
http://www.flamedia.com/lightning/lightmap.gif

CRYSTAL-FACE:

Home: http://cloud1.arc.nasa.gov/crystalface/index.html

Aircraft: http://cloud1.arc.nasa.gov/crystalface/platforms.html

Flight Track Logs: http://cloud1.arc.nasa.gov/cgi-bin/view_quicklook.cgi?/Flight_Tracks

University of North Dokota Dept. of Atmospheric Sciences: http://www.aero.und.edu/ats/

Table Two: CRYSTAL-FACE Frequencies

Mission Control

123.400	Primary interplane and air-to-ground
123.175	Secondary
122.950	Secondary
314.125	Secondary
327.575	Secondary

Air Traffic Coordination for flight levels up to 60,000 ft.

124.700	Miami Center remote @ Key West
132.200	Miami Center remote @ Key West
323.100	Miami Center remote @ Key West
353.800	Miami Center remote @ Key West
281.500	Miami Center
323.000	Miami Center
380.300	Miami Center

NAF Key West

124.450	Navy Key West approach
126.100	Navy Key West tower
277.200	Navy Key West ATIS
289.400	Navy Key West approach
340.200	Navy Key West tower

Scanning Canada

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The Pope Arrives in Canada

World Youth Day 2002: In between happy sessions writing columns for *Monitoring Times*, your *Scanning Canada* columnist has to earn an honest living in the computer industry. My office lies almost directly under the final approach flight path to runway 23 at Toronto's Lester B. Pearson international airport. Many lunchtimes are spent with a scanner in one hand and a sandwich in the other. I have witnessed many arrivals and departures at Canada's busiest airport from a vantage point at the end of runway 23. Foreign dignitaries come here frequently. The Prime Minister of Canada arrives in a plane identifying itself as "Canforce One." I have seen Concorde depart many times: The deep roar and the blue flames spitting out of the rear of the engines make this a memorable and exciting experience. I also remember the absolute silence of the airwaves and the airways on September 11th, 2001, when all air traffic in North America was grounded.

Just before 1 pm on July 23rd 2002, the small area of the Boeing factory parking lot, from which the public are allowed to watch air traffic, was particularly crowded. A large group of people had gathered to witness the arrival of one of the most distinguished guests ever to visit our country – his holiness Pope John Paul II.

I had arrived early and was sitting inside my car with my trusty Icom R10. My scanner has all the Pearson airport frequencies stored in memory and I was scanning through them looking for activity related to the Pope's arrival. A small group of people had gathered near my car. "Do you have a scanner in there?" a young man inquired. "Yes," I replied. "Any news yet?" he asked. Of course, he didn't need to specify what kind of news he was seeking. Nearly everybody in the city was focused on just one piece of news that day. I gave him an update on what I had heard so far. The tower frequency for runway 05 (118.70 MHz) was the most informative. The tower controller was referring to the VIP visitor simply as "he" or "him." Security was tighter than the eye of a Lilliputian needle and the controller was well aware that he was speaking on a clear channel monitored by many people.

All arrivals and departures except "his" had been transferred to runway 06R. The usual frequency for 06R (118.35 MHz) was linked to the frequency for runway 05 until contact with the Papal plane had been established. An inspection truck was made ready to check the runway exactly ten minutes prior to the scheduled landing time of the Pope. The tower came on the air again: ".... we have you at 45 miles from the field." I relayed that update to the gathering outside my car. The word was passed around quickly, "he's 45 miles away."

Pope John Paul II arrives in Canada

At that point I lost my entourage: they had moved across to the security fence and were scanning the sky visually, many of them with binoculars. Very soon a plane was seen on final approach. The tower controller confirmed the plane's identification by giving the Alitalia "heavy" permission for an immediate landing on runway 05. The very distinctive red and green tail markings of Alitalia's fleet quickly caught the attention of the crowd and some of the enthusiastic younger people started cheering loudly. The MD-11 made a smooth landing well short of the end of the runway and was instructed by the tower to contact ground on 121.90 MHz.

The Papal plane then taxied over to a hangar on the east side of the field where a reception of dignitaries, including the passenger from Canforce One, was waiting for a formal reception of the visitor. Activity on the airport frequencies had returned to normal and runway 05 was re-opened to regular air traffic even while the Papal plane was still moving across the apron. The gathering of enthusiasts that had assembled to hear my scanner was now gathered around a portable TV sitting on the hood of a nearby car.

◆ Monitoring Resolute Airport

Scanning Canada is on the final leg of our tour of the nation's airports. This leg takes us on a northward swing, up into the Arctic. The Arctic is a spectacular and remote area of Canada that does not receive as many visitors as it deserves. I made one trip up to Resolute in 1999 and on the basis of that I would highly recommend the region to other Canadians.

Resolute is six hundred miles north of the Arctic Circle and just a thousand miles from the North Pole. It is the second most northerly airport for scheduled passenger aircraft in Canada. There is an airport at the small community of Grise Fjord a little farther north, but Resolute is the major hub for Arctic expeditions and the scientific community who come to study the polar environment. Environment Canada maintains a weather station at the airport (watch for Radiosonde balloon launches at 11:15 and 23:15 UTC each day). The hamlet of Resolute Bay has two hotels nestled among a native Inuit community of just 170 people. The airport has just a single gravel over permafrost runway visited by Boeing 727 jets and a fleet of Twin Otters ("the workhorse of the Arctic") both operated by First Air.

Table 1: Air Traffic Control

Remote Communications Outlet (Arctic Radio): 126.70
Mandatory Frequency: 122.10

Table 2: Navigation Beacons

VOT (VHF Omnidirectional Test facility): 114.80
VOR/DME (VHF Omnidirectional Range/Distance Measuring Equipment):
"YRB": 112.10 (located at 74 43 41N, 94 55 22W)
"IRB": 110.3 (located at 74 42 40N, 94 57 36W)
ILS (Instrument Landing System): IRB – 110.3

Next month, *Scanning Canada*'s air tour will finish in a special feature on Canada's Arctic airline "First Air." This column will continue to explore our country's radio heritage starting with a look at the railroads. See you then.

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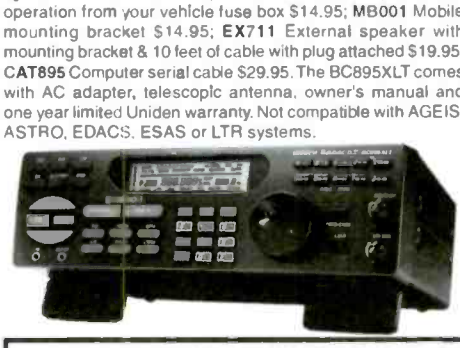

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Weather Changes: New Coast Guard FAX Again

In what's become something of an annual rite of summer, the United States Coast Guard changed about half of its National Weather Service (NWS) radiofacsimile (FAX) schedules again.

The big news is the addition of new 24, 48, and 72-hour surface forecast charts to the New Orleans, LA, broadcasts, which still begin at 0000, 0600, 1200, and 1800 Coordinated Universal Time (UTC). This necessitates moving the daily transmission of the full schedule from 1830 to 2025.

What's more, New Orleans now has an upper-sideband voice schedule. It's a direct simulcast of the offshore forecasts from Coast Guard Area Master Station, Atlantic (CAMSLANT) in Virginia. Therefore, the times are the same for both stations. Offshore forecasts are at 0330, 0930, 1600, 2200. High seas forecasts are at 0500, 1130, 1730, and 2330. New Orleans uses the same frequencies as for the FAX, namely 4316, 8502, and 12788 kilohertz (kHz). This means that if extra hurricane warnings need to be sent by FAX, they will pre-empt the high seas voice forecasts.

Voice broadcasts continue to use the Coast Guard's rather distinctive sounding synthesizer they've dubbed "Perfect Paul." As computer voices go, he's pretty good; in fact much better than the one being used for airport weather on VHF. Your editor likes the way "he" says "west" as "wes-T."

❖ Kodiak changes, too

Fewer changes have been made in the schedule for NOJ, Kodiak, Alaska. Kodiak's short transmissions are fun when they're clear copy, with Pacific satellite pictures and unique graphics like weather chart guides and Alaskan forecast tables in scanned text.

The NWS has also begun offering weather charts by Internet only. They note that many vessels don't have full World Wide Web capability to download these, but also that they decided to make them available anyway. 24, 48, and 72-hour surface forecasts for the Eastern tropical Pacific and Gulf (what would be New Orleans' area) are at **http://weather.noaa.gov/fax/gulf.shtml**. Northeastern Pacific 24, 48, and 72-hour forecasts (Kodiak's area) are at **http://weather.noaa.gov/fax/alaska.shtml**.

We are warned that the Kodiak schedule will probably change at least once more before the end of calendar 2002. Keep checking.

❖ So does Honolulu

The Coast Guard is quick to point out that the Hawaiian station KVM70 is run by the US Department of Defense, not the Guard, which is still at press time under the US Department of Transportation. In fact, there are some minor differences in the broadcasts.

This is another fun station, though it's hard to get a good, clear copy of the 5000-watt transmitters in the continental US. This, after all, is not the target area. Too bad, because Honolulu is great for keeping an eye on the tropical central Pacific, which can be a very busy place in late summer and fall, as hurricane season peaks and then winds down.

Honolulu FAX has been in a state of flux for about a year now, with charts being added and moved around. As with Kodiak, we are warned that this will continue, with at least one more change coming before the end of calendar 2002.

On the appropriate date of July 4, 2002, this transmission added Northeast Tropical Pacific 24, 48, and 72-hour forecasts. These come at various times throughout its complex daily schedule of broadcasts, which are at 0533, 1147, 1733, and 2350.

Honolulu transmits the schedule at 1132 and 2320, and it's highly recommended that any potential user tune in. Internet can also prove useful for schedules at **http://weather.noaa.gov/pub/fax/hfhi.txt**.

Unscheduled surprises are frequent, especially during hurricane season. There can be extra charts, extra simulcasts, or higher power. This station is rarely boring.

The schedules for Point Reyes, CA, and Boston, MA, remain the same. These were last changed in July of 2001 and November of 2000, respectively.

❖ New Freeware Decodes SYNOP

SYNOP, short for Synoptic Code, is a weather reporting format which achieves tremendous data compression by crunching observations into terse sequences of numbers. These are headed AAXX (land stations) and BBXX (ship observations). The message is usually broken into 5-number groups, leading most beginners to think they've discovered a new spy station.

No spooks here, but SYNOP is interesting in its own way. The numbers point to voluminous text tables at the receive end, expanding into comprehensive, plain-language, weather reports.

But who does the expanding? Well, that's what brings us to Bernhard de Vries, and his neat little *free* program for the IBM PC (either DOS or Windows). It really is small, and it downloads in a jiffy. It comes with a text database of world weather stations for use by the program, or you can look up your own intercepts from other modes. There are different versions for Dutch, English, German, or French, all available at his web site, **http://www.geocities.com/meteoware**.

I was impatient after I downloaded and unzipped it, so I cheated and grabbed a big file of the latest worldwide SYNOPs from the Internet. I picked one that looked good. It was:

"436 SMJM01 MKJS 250000 AAXX 25004 78388 32572 50705 10297 20248 40154 81802 333 00000 10337 20241 59007 81822 85074=" (Everything up to and including the AAXX is a standard header. The = at the end is a terminator, and in Morse code would be replaced by the short-break signal BT, sent as one character.)

I sent my SYNOP to the program, and it almost immediately spat out a much larger text file containing 24 different items concerning anything I might ever have wanted to know from a weather station in Montego, Jamaica. The weather there was clear, with some high cirrus clouds and a temperature of 29.7 degrees Celsius. In other words, just another crummy day in paradise.

With a quick search, I was able to pick out the SYNOP from our local airport, and soon I knew what the weather was like outside. Slower than poking one's head out the window, perhaps, but surely so much more fun.

Until next month, happy decoding.

Utility World

Utility Logs

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ABBREVIATIONS USED IN THIS COLUMN

ALE	Automatic Link Establishment
AM	Amplitude Modulation
ARQ	Automatic Repeat Request teleprinting system
BOM	Bureau Of Meteorology (Australia)
CAMSLANT	Communication Area Master Station, Atlantic
CW	Morse code telegraphy ("Continuous Wave")
DEA	Drug Enforcement Administration
E5	US 3/2 number group station, test count at start
E6	Russian, weird male English "voice," end 00000
E10	Israeli phonetic English female "numbers"
E10a	Israeli "numbers," callup only
EAM	Emergency Action Message
FAX	Radiofacsimile
FEC	Forward Error Correction teleprinting system
HFDL	High-Frequency Data Link (air digital system)
M16	French Morse code "numbers," callsign 8BY
M22	Israeli Morse code "numbers," callsign 4XZ
MARS	Military Affiliate Radio System
Meteo	Meteorological
MFA	Ministry of Foreign Affairs
Navtex	Navigational Telex
PR	Puerto Rico
RSA	Republic of South Africa
RTTY	Radio Teletype
SITOR-B	Simplex Teleprinting Over Radio
UK	United Kingdom
Unid	Unidentified
US	United States
V2	Cuban Spanish female "numbers"
VFT	Voice-Frequency Telegraphy (multiplex RTTY)
XPH	Russian Polytone, sends "numbers" as tones

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

60.0 MSF-Standard time/frequency station, Rugby, UK, CW beeps and receiver calibration check, at 1812. (Day Watson-UK)

77.5 DCF77-Standord time/frequency station, Mainflingen, Germany, CW beeps at 1824. (Watson-UK)

147.3 DDH47-Homburg Meteo, Germany, RTTY weather ot 2019. (Watson-UK)

160.7 Unid-Digital signal sounding like Datatrak vehicle location system, at 0352. (Bob Hall-RSA)

490.0 C-Portpatrick, UK, with SITOR-B NAVTEX bulletin at 2020. E-Corsen, France, NAVTEX in French at 2040. G-Monsanto, Portugal, NAVTEX in Portuguese at 2100. I-Niton, UK, at 2121. (Watson-UK)

518.0 W-Valentia, Ireland, SITOR-B NAVTEX at 1940. X-Valencia, Spain, NAVTEX at 1950. S-Niton, UK, NAVTEX at 1952. (Watson-UK)

2657.0 Unknown-Portuguese Navy, with warnings in Portuguese and English, after announcement on 2182, at 2105. (Patrice Privat-France)

2789.0 FUE- French Navy, Brest, RTTY channel status at 2109. (Privat-France)

3137.0 200076-US Air Force aircraft, sounding in ALE at 2237. (Watson-UK)

3390.0 MGJ-UK Royal Navy, Faslane, RTTY channel-availability marker at 1825. (Watson-UK)

3764.4 PBB-Dutch Navy, Den Helder, RTTY channel-availability marker at 2128. (Watson-UK)

4015.0 VLB A002 Z8M2030-very abnormal Israeli intelligence "numbers" callup (E10a), simulcast on 5170 and 6930, at 1816. VLB8M, indeed started at 2030, same frequencies, so part of the previous callup was a time schedule. VLB A181-another abnormal callup (E10), same frequencies at 2144, lasted until 2230. (Ary Boender-Netherlands) *[The Israel stuff is going crazy. -Hugh]*

4331.0 4XZ-Israel Navy, Haifa (M22), CW marker at 1823. (Boender-Netherlands)

4372.0 "R-8-Z"-US Navy, working "F-9-A" and "7-R-L," at 0206. (Ron Perron-MD)

5598.0 Gander Radio-North Atlantic air route control, giving an aircraft 5616 kHz alternate, at 0555. (Barry Williams-AL)

5616.0 Reach 4059-US Air Force Air Mobility Command, giving position to Shanwick at 0442. Continental 62, positian for Shanwick at 0456. (Privat-France)

5680.0 Kinloss Rescue-Royal Air Force, UK, working Rescue 51 at 0215. (Perron-MD)

5690.0 CAMSLANT Air to Ground-US Coast Guard, Chesapeake, VA, phone patching CAMSLANT Tech Control, apparently a vessel, to "270," at 0159. (Rick Baker-OH)

5696.0 Rescue 6003-US Coast Guard, enroute to a burning oil tanker, working CAMSLANT at 0608. *Eagle*-USCG sailing training barque, working CAMSLANT ir a rescue hoist, at 2349. (Baker-OH)

5841.0 Coast Guard 16C-US Coast Guard, calling Panther (DEA, Bahamas) on the "Bravo" frequency, at 0408. (Perron-MD)

6428.0 ABC2-Abnormal Israeli intelligence "numbers" callup (E10a), perhaps a new permanent identifier, at 2105, next day at 1557. (Boender-Netherlands)

6496.0 CFH-Canadian Forces, Halifax, NS, with RTTY weather at 0200. (Hall-RSA)

6496.4 CFH-Canadian Forces, Halifax, switching to FAX weather charts at 0210. (Hall-RSA)

6637.0 Cedar Rapids-Probable Long-Distance Operational Control, working a domestic Delta flight, at 0425. (Williams-AL)

6697.0 Alligator-US military, with a 28-character EAM, simulcast on 8992 and 11244, at 0307. (Jeff Haverlah-TX)

6712.0 Longhorn-US Air Force, came from 11175 for a series of phone patches through Andrews, at 0412. (Haverlah-TX)

6930.0 VLB2-Israeli intelligence "numbers" (E10a), callup only at 0410. (Williams-AL)

6970.0 US Central Intelligence Agency "Counting" station (E5), in progress at 2127. (Boender-Netherlands)

7505.5 FDG-French Air Force, Bordeaux, RTTY test with French "voyez le brick" at 2025. (Watson-UK)

7535.0 VMW-Australian BOM, Wiluna, with weather FAX at 1951. (Watson-UK)

7535.0 Unid-US Navy SESEF (Ship Electronic Systems Evaluation Facility), Norfolk, VA, working a vessel at 1340. (Boker-OH)

7611.0 "Default"-US Federal Aviation Agency, possibly forgot to reset address, sounding in ALE at 0650. (Watson-UK)

7632.0 100466-US Air Force transport, sounding in ALE at 0501. CEF-US Air Force, Westover, sounding at 0512. (Watson-UK)

7650.0 PAR-Rockwell-Collins, Paris, France, sounding at 1347. (Watson-UK)

7668.0 8BY-French Intelligence, Paris (M16), with morker and possible "numbers" callup at 2042. (Watson-UK)

7800.0 Unid-CW station with 5-figure groups, lots of ? characters, at 1338. (Watson-UK) *[Sounds Russian. -Hugh]*

7885.0 179-Chinese diplomatic, calling 162 in ALE, then voice contact in Chinese, at 2003. (Watson-UK)

7990.0 PAR-Rockwell-Collins, Paris, ALE sounding at 1836. (Watson-UK)

8040.0 GYA-UK Royal Navy, Northwood, weather FAX at 1024. (Watson-UK)

8103.0 4XZ-Israel Navy, Haifo (M22), CW marker at 1634. (Watson-UK)

8330.3 RFVI-French Forces, Le Port, with ARQ stuck in an endless loop, at 2037. (Watson-UK)

8333.0 Unid-US military, using Navy procedures, working aircraft "2810" at 0231. (Perron-MD)

8439.0 PBC38-Dutch Navy, Goeree, with channel-availability marker at 1105. (Boender-Netherlands)

8502.0 Unknown-Station with voice-synthesized weather at 0405. (Williams-AL) *[US Coast Guard New Orleans now simulcasts Chesapeake voice here, if there are no hurricane products to FAX. -Hugh]*

8640.3 MGJ-UK Royal Navy, Faslane, with 4-channel VFT at 1333. (Watson-UK)

8912.0 PR1-US Customs Service, ALE sounding at 2211. (Watson-UK)

8942.0 UP6807-United Parcel Service freight aircraft, giving position in HFDL at 1422. (Watson-UK)

8942.0 Northwest 67-Flight with HFDL downlink to Shannon, at 1645.

(Privat-France)

8965.0 2000182-US Air Force transport, ALE sounding at 2208. (Watson-UK)

8971.0 Blue Star-US Navy, PR, working aircraft at 2242. (Perron-MD)

8983.0 Coast Guard Rescue 2102-US Coast Guard, working CAMSLANT on a search, at 0435. (Allan Stern-FL)

8992.0 Andrews 5-US Air Force, in training exercise with Andrews 1, 2, and 4, at 0319. Clean Cut-US military, with EAM simulcast on 9016 and 11244, at 0333. Smoke Pot, EAM simulcast on 9016 and 13155, at 1211. Notebook, EAM also on 11229 and 11244, at 1527. (Haverlah-TX)

9017.0 Andrews 01-Same exercise as 8992, working Andrews 03, and stations emulating Diego Garcia, Andersen, and Hickam Globals, probably all actually in MD, at 0250. (Perron-MD)

9057.0 Alligator-US military, with EAM at 0311. (Haverlah-TX)

9996.0 RWM-Russian time beeps in CW, also 14996, at 1211. (Boender-Netherlands) *[Makes a real pretty 4-kHz audio beat if WWV is tuned in. -Hugh]*

10000.0 "Marco"-Spanish speaking male calling "Guatemala" between WWV announcements, at 0311. (Perron-MD)

10046.0 4XZ-Israel Navy, Haifa (M22), CW marker at 1420. (Watson-UK)

10087.0 SV1418-Saudia Airlines, log on and position in HFDL, at 1923. (Watson-UK)

10192.6 DRHF-German Navy intelligence ship, calling DHJ 59 (Wilhelmshaven), no joy, at 0055. (Perron-MD)

10215.0 HZN-Jeddah Meteo, Saudi Arabia, with coded RTTY weather observations at 2225. (Privat-France) *[These are SYNOP (synoptic) code, and can be decoded with available freeware. -Hugh]*

10555.0 VMW-Australian BOM, Wiluna, FAX weather charts at 0750. (Watson-UK)

10600.0 PAR-Rockwell-Collins, Paris, ALE sounding at 2011. (Watson-UK)

10658.0 1020-Red Crescent, unknown location, sounding in ALE at 2211. (Watson-UK)

11030.0 VMC- Australian BOM, Charleville, weather FAX at 0600. (Watson-UK)

11175.0 Longhorn-US Air Force, moved to 6712 by Andrews for an extended series of patches, at 0403. Chalice Foxtrot-US military, calling Trenton Military (Canadian Forces), no joy, at 1853. (Haverlah-TX)

11181.0 Tequila Sunrise-US military aircraft, calling Hogleg, no joy, at 1630. (Haverlah-TX)

11186.0 Pinto 801-US Navy, giving Keep Track a message for Prime Time 801, at 0026. (Perron-MD)

11232.0 Halifax Military-Canadian Forces, passing weather observations to Canforce 4130, at 0020. (Perron-MD) Trenton Military-Canadian Forces, giving weather info to an aircraft at 0237. (Williams-AL)

11246.0 "C-130 898"-US military, calling MacDill, no joy, at 0110. (Haverlah-TX)

11565.0 Unid-Very abnormal Spanish female AM "numbers" (possibly Cuban V2), echoey as from two playbacks out of sync, at 0412. Unid-Very abnormal Spanish Female AM "numbers" (V2?), with transmitter unkeying between each group (letting the usual Israeli EZI "numbers" come through, then with slight 1-kHz heterodyne when the carrier came back, as E10 was off-frequency that night), at 0432. (Williams-AL) *[Just a guess: Cuba is testing controlled-carrier AM? -Hugh]*

11570.0 VLB2-Israeli intelligence (E10), started in AM with usual null-message format at 0427, but cut carrier in mid-letter at 0428, then back up with EZI callup and message at 0430. (Williams-AL)

12593.5 A9M-Hamala Radio, Bahrain, ARQ sync marker at 1555. (Hall-RSA)

12599.5 UAT-Moscow Radio, Russia, with CW marker at 1040. (Boender-Netherlands)

12666.5 FUG-French Navy, La Regine, testing in RTTY at 1055. (Boender-Netherlands)

12745.5 JJC-Tokyo Radio, with a Japanese newspaper FAX (60/576), also on 22542, at 1515. (Hall-RSA)

12877.5 UIW- Kaliningrad Radio, Russia, RTTY messages for several vessels, at 1020. (Boender-Netherlands)

12983.0 4XZ-Israeli intelligence (M22), with CW marker, then "numbers" in 5-figure groups, at 1632. (Hall-RSA) VNG-Australian standard time station, mid-July at 2130. (Boender-Netherlands) *[Supposed ta have left the air at the end of June. -Hugh]*

13149.0 KUW-UK military or diplomatic, Kuwait, sounding in ALE at 2056. (Watson-UK)

13215.0 200173-US Air Force transport, calling CRO, Croughton, in ALE at 1347. (Watson-UK)

13455.0 SCLC442-Venezuelan Army, calling CLC in ALE, at 2038. (Watson-UK)

13475.0 CDDA-Venezuelan Navy, calling Margarita in ALE, at 2207. (Watson-UK)

13503.6 KMN93-US Government, Springfield, IL, sounding in ALE at 1017. KMN94-US Government, Ft. Lauderdale, FL, sounding in ALE at 2124. (Watson-UK)

13530.0 Unid-US Air Force, with RTTY weather at 1957. BRIM1-Colombian Navy, calling CESYP in ALE, at 2253. (Watson-UK)

13850.0 PAR-Rockwell-Collins, Paris, ALE sounding at 1823. (Watson-UK)

13892.0 4XZ-Israel Navy, Haifa (M22), CW marker at 1351. (Boender-Netherlands)

13907.0 CS5-US Customs Service, sounding in ALE at 1846. (Watson-UK)

13920.0 VMC-Australian BOM, Charleville, weather FAX at 0623. (Watson-UK)

13927.0 ACM4GE-US Air Force MARS, PR, informing AFN2AC of the Puerto Rico C-130 crash, at 0248. Omega 70-Omega Air contract tanker for US and UK air forces, in a MARS phone patch to Patuxent Base Ops, at 1850. Bolt 92, MARS patch to MacDill Tanker Ops, at 1920. (Stern-FL) *[If you get the idea that this frequency is getting as good as 11175, you're right. -Hugh]*

14495.0 4XZ-Israel Navy, Haifa (M22), CW marker at 1421. (Boender-Netherlands)

14739.0 US Central Intelligence Agency "Counting" station (E5), callup to "080," also on 16198, at 1500. (Boender-Netherlands)

15025.0 Smasher-US Flight Monitoring Facility, Key West, taking position from Shark 17 at 2152. (Perron-MD)

15615.0 VMW-Australian BOM, Wiluna, FAX weather charts at 0800. (Watson-UK)

15633.0 HMF26-Korean Central News Agency, Pyongyang, North Korea, with RTTY marker giving frequencies as 8152, 10580, 11430, and 15633, at 0957. (Watson-UK)

15867.0 PR1-US Customs service, sounding in ALE at 1602, 1647, 1733, 1818, 1948, and 2034. (Watson-UK)

16355.0 Unid-Russian "High-Pitched Polytone" station (XPH), with sequences of audio tones at 1830. (Boender-Netherlands)

16621.5 Unid-Total Oil rig, unknown location, with CW personal messages in Russian, at 1732. (Hall-RSA)

16789.5 Unid-Unknown vessel with SITOR-B relay of Philippine News Agency in Tagalog, signed "Resend by: r2cr(cahayan de oro city)," at 1122. (Watson-UK)

16828.0 DESUO-Unknown CW station, at 0405. (Williams-AL)

17430.0 Unid-Russian "English Man" (E6) with "numbers" at 1220. (Chris Smolinski-MD)

18060.0 VMW-Australian BOM, Wiluna, FAX weather charts at 0925. (Watson-UK)

18329.0 4XZ-Israel Navy, Haifa (M22), CW marker at 1937. (Boender-Netherlands)

19862.0 MGJ-UK Royal Navy, Faslane, RTTY channel-availability markers at 1610. (Hall-RSA)

19945.0 MAE-Algerian MFA, Algiers, working TRP (Tripoli, Lebanon) in ALE, at 1453. (Hall-RSA)

20469.0 VMC-Australian BOM, Charleville, weather FAX showing typhoon, at 0645. (Watson-UK)

20550.0 YT315A-Chinese diplomatic, calling ZT201A in ALE, 0848. (Watson-UK)

23370.0 HZN50- Jeddah Meteo, Saudi Arabia, coded RTTY weather at 1616. (Hall-RSA)

23523.0 JMH6-Tokyo Meteo, with clear FAX weather chart at 1240. (Hall-RSA)

25120.0 DP2-Unknown station calling GLOBAL in ALE at 1302 and 1303. (Watson-UK)

25222.0 S00-Swiss MFA, Stockholm, sounding in ALE at 1624. (Watson-UK)

26161.4 CPK-Globe Wireless digital node, Santa Cruz, Bolivia, CW channel-availability marker at 1249. (Watson-UK)

26170.4 CPK-Globe Wireless digital node, Santa Cruz, Bolivia, with a CW channel-availability marker at 1252. (Watson-UK)

26241.7 RFVI-French Forces, Le Port, with ARQ markers at 1256. (Watson-UK)

Utility World

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Remote Mail Delivery

This month we take a look at one of the oldest HF email and Internet Service Providers and we profile Globe Wireless, which is fast becoming the de-facto standard for commercial HF email for those at sea.

❖ BushMail

As their corporate mission statement says, BushMail is in the business of providing "reliable, affordable independent Radio Email Communication for honorable business people in the bush." The organization has been doing just this business for many years now from its headquarters in Pretoria, South Africa. It has a large user base extending from tourism, to humanitarian, industry and missionary groups but has remained hidden from the inquiring ears of HF utility listeners. Well, until now, that is.

WUN listener Peter Thompson reported in July that he had come across a cluster of BushMail stations connecting a number of tourist safari lodges in Kenya. The stations used PacTOR-II modems with the standard SCS file compression program enabling faster transfer of regular plain-text email messages. This particular part of the network was heard on the frequency of 18223.1 kHz. The stations used the following selective calls:

RC01 in Maputo Gateway, Mozambique
GALDESA1, REKERO1 and BORANA1 - tourist lodges in Kenya
IRC03, TDM01, 2JIVA and ME01 - unidentified, locations unknown

As we've frequently mentioned in this column, the Internet now contains a wealth of information to help track down the radio networks we listen to. In this case, Peter used various web search engines like Google (see Resources) to check for documents that quoted email addresses ending with "@bushmail.net" to tie the PacTOR selcals to probable locations.

Checking the BushMail website (see Resources), we find that the company is active from hubs in at least the following locations: Maputo (Mozambique), Accra (Ghana), Lagos and Abuja (Nigeria), a large number of tourist and eco-lodges in Zambia and Kenya as well as locations in Tanzania.

The BushMail operating manual also lists 7700 kHz (LSB) as a voice calling channel, 7755 kHz (LSB) and 12125 kHz (LSB) as alternatives, and lists the callsigns "Romeo Papa" (BushMail Operator Assistance), "Romeo Hotel" (Zimbabwe Assisstance) and "Romeo Juliet" (Johannesburg Assistance). Another BushMail server or gateway station is also reported to be operating on 26737 kHz.

❖ Globe Wireless Network Build-Out

As a regular reader, you may remember that we suggested a number of frequency bands that generally provide the most fruitful areas for hearing interesting and unusual utility stations (see the column in the December 2000 issue of *MT*). Among those bands were the ranges of 10000-11550 kHz, 13850-14000 kHz and 17000-17550 kHz.

Beginning in June of this year, the keen-eared listener couldn't have failed to notice a steady invasion throughout these bands from newly commissioned Globe Wireless stations. Up until recently, one could hear the distinctive idle signal of the GlobeData modem – a CW callsign identification in between a number of 100bd/170Hz SITOR-A-like phasing bursts – and occasional PacTOR-like GlobeData traffic (see Resources for representative audio clip). Now many of the new frequencies have dropped the CW identification.

Quick to spot a business opportunity by acquiring failing and outdated public coast stations (see figure 1 for locations) and reviving them as modern maritime data communications hubs, Globe Wireless now operates a large worldwide network of stations that provide a crucial set of services to ships and crews wishing to connect to businesses and families while at sea.

Here is the full list of new stations and frequencies (shown as ship frequency/coast station frequency) operated by the company:

8PO Barbados
4376.4/4084.4, 6379.5/5912.0, 8468.0/7967.0, 12680.4/12376.5, 12683.4/12372.5, 17155.4/16654.5, 17158.4/16624.5, 19741.4/18862.5, 19744.4/18614.0, 22461.4/22187.5, 26135.4/25156.5

9MG Penang, Malaysia
4430.4/4138.4, 6355.5/6292.5, 8492.0/8355.0, 8690.5/8332.5, 12831.0/12439.0, 12943.5/12442.0, 17045.6/16660.5, 17225.5/16630.5, 19751.0/18814.4, 22465.0/22271.5 26134.0/25163.5

A9M Bahrain
4256.0/4191.5, 6430.0/6292.5, 8541.0/8302.5, 12673.5/12457.0, 12709.0/12698.0, 12756.5/12403.5, 17066.5/16557.5, 19726.0/18853.5, 22456.0/22223.5

CPK Santa Cruz, Bolivia
17384.4/16502.4, 17396.4/16514.4, 19762.4/18787.4, 22847.4/22151.4, 22853.4/22157.4, 26161.4/25086.4, 26170.4/25095.4

HEC Berne, Switzerland
6493.5/6289.5, 8597.0/8346.0, 9157.0/9064.0, 10341.0/10238.5, 13002.0/12430.0, 17408.4/16526.4, 19655.0/19299.0

HLF Seoul, South Korea
4273.5/4188.5, 6344.0/6298.5, 8473.0/8371.5, 8497.0/8374.5, 12712.0/12469.0, 12727.0/12472.0, 17079.0/16678.5, 19910.0/18823.4

KEJ Molokai, HI, USA
6439.4/6247.5, 8663.4/8338.5, 12611.5/12509.0, 16842.5/16719.5, 26105.0/25177.0

KFS San Francisco, USA
4292.4/4183.0, 6368.5/6286.5, 6436.4/6253.5, 8526.4/8323.5, 8609.0/8320.5, 10349.0/10183.0, 13036.5/12460.0, 13039.5/12553.0, 13056.4/12475.0, 13059.4/12424.0, 13069.4/12400.5, 13072.4/12382.5, 17186.0/16633.5, 17189.0/16639.5, 17211.4/16608.5, 17378.4/16496.4, 18636.0/18636.0, 22557.0/22262.5, 26125.4/25141.5

KHF Guam
6374.0/6279.0, 7723.0/7321.0, 8456.0/8298.4, 10186.0/10156.0, 12691.5/12421.0, 12814.5/12551.0, 16906.0/16642.5, 16909.0/16645.5, 18211.5/18193.0, 19733.5/18896.5, 22464.0/22250.5, 26155.4/25080.4

KPH San Francisco, CA, USA
4459.0/4445.0, 6360.0/6289.5, 8450.0/8367.0, 8453.0/8326.5, 8606.0/8343.0, 8618.0/8370.0, 8762.4/8238.4, 13014.0/12409.5, 13017.0/12427.0, 13159.4/12312.4, 17179.0/16681.5, 17372.4/16490.4, 19730.5/18887.5, 19765.4/18790.4, 22554.0/22241.5

LFI Rogaland, Norway
4262.0/4194.5, 5768.0/5421.0, 6467.0/6250.5, 8683.5/8349.0, 8705.5/8317.5, 11145.0/10415.0, 12660.0/12454.0, 12678.0/12436.0, 16926.0/16572.5

LSD836 Buenos Aires, Argentino
4403.4/4111.4, 6502.4/6201.4, 8459.0/8311.5, 8594.0/8335.5, 12736.0/12379.5, 12779.0/12445.0, 13123.4/12276.4, 16976.0/16560.5, 17249.4/16367.4, 19706.0/18850.5, 19754.0/18856.5, 22600.0/22259.5

SAB Goteborg, Sweden
3264.4/3159.5, 4259.0/4166.5, 4347.0/4188.5, 5315.0/5295.0, 5433.0/5388.0, 6352.0/6244.5, 8489.0/8325.0, 8602.0/8352.0, 10360.0/10330.0, 10746.0/10213.0, 12818.0/12388.5, 12851.0/12397.5, 17024.0/16630.5, 17198.0/16568.0, 19708.0/18847.5, 19736.4/18859.5, 22469.4/22211.5, 22534.5/22280.5

VCS Halifax, Nova Scotia, Canada
6427.0/6295.5, 8675.5/8358.0, 13033.5/12463.0, 17234.5/16672.5, 22590.0/22246.5

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"Liberty," Argentina's Psyops Station

La Nación carried this story by Miriam Molero last April, on the 20th anniversary of the Malvinas War. Arnaldo Slaen posted it on *Conexión Digital*, and this is our (shortened) translation:

The radio that was born to discourage English soldiers in the Malvinas War was called Liberty and its task was secret.

Silvia Fernández Barrio and Enrique Mancini were recruited by the military government to be added to the intelligence strategy against enemy troops.

❖ Recovering Their Role

If World War II had Tokyo Rose to discourage allied troops, the Malvinas War had Liberty radio. Fourteen civilians participated in this communications strategy whose objective was to break Anglo-Saxon morale.

Silvia Fernández Barrio and Enrique Alejandro Mancini were two of the civilians who participated in the operation, and who desire today to reveal what had been restricted by a pact of silence, or pure prudence.

The first one, who had been part of *60 Minutes*, worked then for the Badia [station, network?] program *Everybody's Saturday;* the second was a regular in the well-known news cycle on the ATC channel.

"One day I am on *Everybody's Saturday* and they tell me, 'you have a call from the military committee.' What did I do? was my first thought," recalls Fernández Barrio, "They take me somewhere and tell me:

"We have made an intelligence study; you are the most reliable person who knows English. Do you remember Tokyo Rose?" "Yes," I answered. "Good, we want a kind of Tokyo Rose, but she will be called Liberty." And so was born Liberty radio.

"Who was in charge of the operation?"

"Theoretically, in charge of the Liberty operation was the Army Intelligence Service, which was quarreling with the Navy Intelligence Service."

"Who actually ran it?"

"We were all civilians."

"The editorial slant was military?"

"They would set a line, but afterwards between whoever wrote it, and myself, we would change the line. If it was cruel or hard, we would not let it through like that. We would make it much softer. We would never speak of deaths or ugly things. We put it out more that they were estranged from their country and they should not come to lands that they had no knowledge of. And that is what we did between June 7 and 14."

"Was it possible for you to say, 'No, I won't do it?'"

"Yes, absolutely. I could have said no."

"Why didn't you?"

"Because I understood that I was doing something peaceful, and that at the best I could help. I believe that when your country is at war, you don't have much time to think about which side to take. For me when the Malvinas march is played, tears erupt over what I lived through, for what we believed as innocent creatures, for the damage that was done to so many people. It freezes my heart."

❖ Alejandro, The Unforgetful

The exact details about Liberty are recalled by the prodigious memory of the announcer and director Enrique Alejandro Mancini, who coordinated the recording, and contributed from his own material – Irish, Welsh and English music, even the Beatles – which was included in the transmission.

Via shortwave, Liberty reached London, New Zealand, Australia, those populations which could identify with the English troops. And Mancini remembers that it bothered the British parliament so much that they created another station, with the same objective. However, since it did not have a vast Argentine record library, it always played records by Juan D'Arienzo.

"We recorded on the 14th floor of what is now the building of Radio Ciudad de Buenos Aires. We recorded very early in the morning a tape of about 45 minutes. Once it was ready, it was taken on motorcycle under the responsibility of a police official of the province of Buenos Aires, to the transmitter site of Transradio Internacional. From there it was broadcast on different frequencies, to which sometimes were added the shortwaves of Radio Nacional. The frequency was always changing, on a certain meterband, to avoid interference by British intelligence."

"Fernández Barrio, who spoke English, was the announcer. She spoke American English very well, so an Irish translator marked Victorian tones, [British] English pronunciation. The texts were written by several people, but the most important was a radio and TV script writer and sometime actor in TV sitcoms."

"The content of the programming was a very expressive text, about the setbacks the English had, in which was shown the grief over their death. They spoke, for example, to the father of a fallen British soldier, and told him they understood his grief, because his son had died, that he was going today to see the Tottenham [ship?] but would no longer be with his boy who came to lose his life to defend a factory 14 megameters from the city. He said that in his room would be found all alone his records, like this one, which his son listened to, and then they played the music in question, such as something by the Beatles."

The broadcasts of Liberty radio were prolonged up to 48 hours after the fall of Puerto Argentino [Stanley, Falkland Islands]. That day, Mancini remembers, a bilingual farewell was done, in English and Spanish: "The battle was lost, but not the intention of regaining the islands, because the Malvinas have been, are, and will be, Argentine."

John Cobb from Georgia adds this:

I listened to her (Silvia Fernandez Barrio) nightly as the conflict played out on TV news and BBCWS, a voice speaking from the other side, dreamlike, with all the bravado and naive psychology of that World War II seductress.

I think I actually learned of these transmissions on one of your early World Of Radio programs. "Argentine Annie," as she was being called, could be heard daily at midnight UT on 17740 kHz, usually with a good signal.

Since then I have been curious as to whom that syrupy voice belonged. Silvia Fernández Barrio styled herself as ."..a woman who can say today, more than ever, that the world listens when Argentina speaks." With her taunting words, breathless delivery, and a throaty laugh that she could hardly suppress while speaking about young British soldiers coming to die in the Malvinas, you could picture the wicked femme fatale, à la Marlene Dietrich or Hedy Lamarr, dressed in black satin, smiling into the microphone.

"Hel-lo! I'm back – were you waiting for me? Oh, yes! I am Liberty..." Every few minutes, she was interrupted by music guaranteed to make the UK servicemen homesick: Bee Gees, Rod Stewart, Matt Monro, Beatles; even the chimes of Big Ben. Then she would coo some more tidbits of intelligence, so we would know that they knew. The program always opened and closed with an instrumental recording of Yesterday. It was pure propaganda and pure kitsch, and I doubt that we shall hear anything like it again.

AFGHANISTAN [and non] R. Afghanistan verified by letter (17 stamps issued in 1989 on envelope) after 2 months for my reception report on Norway 18940 kHz. Signer was Mr. Mir Amanullah Sharifi, Head of planning and Foreign Relations. Confirmed that 18940 was over "one of the helper," and that 4774 kHz SW transmitter was destroyed in war and naw there is no SW transmitter in Afghanistan. The recent address is: Ministry of Information & Culture, General Presidency of Radio & TV, Planning & Foreign Relations Department, General Managing of Foreign Relations, P. O. Bax 544, Kabul, Afghanistan. Note that same box was used by "Voice of Shari'ah," and former "Radio Afghanistan"! (Takahito Akabayashi, Japan, *BC-DX*)

Mission complete? London-based Voice of Afghanistan has finished its SW broadcasts after nine months. The station broadcast news and comment during the transitional phase of the Taliban regime to the new Interim Government. Manned by a ten-strong editorial team of well-known broadcasters and journalists who had left Afghanistan to become refugees in London, the station was originally intended to be on air for just three months (*The Radio Magazine* via Mike Terry) Earlier plans were to come back after three months, mid-Oct (gh)

ALASKA High-frequency radio antennas under construction near Ninilchik on the Kenai peninsula have neighbors concerned that transmissions could be hazardous. The Army Corps of Engineers handed developers a cease and desist order because of possible wetlands violations, and the EPA is investigating the project. The complex is being built by Aurora Communications International Inc. Ninilchik-area neighbors, Paul and Sue Dionne, say they are concerned with the engineering and power of the transmitters. They filed an informal complaint with the FCC seeking to postpone Aurora's permit. Paul Dionne said Aurora did not properly notify the public regarding its FCC application (*The Anchorage Daily News* via Kim Elliott) This is the old KGEI transmitter (gh)

ALBANIA [non] Because of the lack of hydroelectric power in Albania, TWR is considering moving all Russian SW broadcasting to Moosbrunn, Austria (Vasily Gulyaev, Astrakhan, Russia, *dxbistro via Signal*)

BOUGAINVILLE Radio Free Bougainville was active July 16-22. Fade in here around 0955 till 1107*. Tok Pidgin and English. Clear IDs heard every day. Before signing off an IS was given and close announcements, choral before s-off. Weak signal, best in SSB mode, but the transmission is in AM! Some QRM from Indonesian hams. Modulation good, and exact even 3850. Again on air from Aug. 6. Never heard the call "Radio Independent Mokumui." (Roland Schulze, Margaldan, Philippines, *BC-DX*)

BRAZIL The government of the Goiás may have a SW radio station. One was authorized to start in September 2001, in the name of Agência Goiana de Comunicação - AGECOM (Célio Romais, @tividade DX)

Rádio Educação Rural, Tefé, Amazonas, plans to move from 3385 to 4925 by the end of Sept (station director via Paulo Roberto e Souza, Tefé, via Cláudio Rotolo de Moraes via Célio Romais)

Rádio Cultura do Amazonas, Manaus, 4845, at 1000-0200 belongs to the state government. It was originally a Radiobrás station, Rádio Nacional de Manaus; then transferred to the state and named Rádio Cabocla. In 1993 FUNTEC took it over and renamed it Rádio Cultura do Amazonas (Sávio Santos, *"Canta Amazônia"* via Paul Roberto e Souza, via Célio Romais, *@tividade DX*)

BURKINA FASO E-mail from R. Burkina gives this postal address: RTV Burkina, Boîte Postale 7029, Ouagadougou, Burkina Faso. Verie signer: Taheré Ouedraogo, Chef de Service des Programmes (Ivan Dias, Sorocaba, SP, *@tividade DX*)

CHINA Jamming with Chinese instrumental folk music, special nonstop compilation, loop playback from hard drive, duration of one cycle: 1 hr 00 min 00.2 sec. Modulation: AM (non-distorted). Most suitable time for reception in Europe: 1600-0900 UT. Frequencies, on which the musical jamming could be heard one or more hours per day: 21700, 21690, 21650, 21540, 21500, 17720, 1764C, 17615, 15680, 15665, 15515, 15510, 13690, 13675, 13670, 13625, 13610, 11945, 11935, 11795, 11785, 11750, 11700, 11520, 11510, 9955, 9945, 9915, 9455, 9355, 7515, 7190, 7160, 7150, 6035, 5925. Is a long distance high power (100-500 kW) skywave operation (R. Pleikys, Lithuania, *Clandestine Radio Watch*)

China Huayi Broadcasting, Fuzhou, 4990, 1104-1107 English news (Nicolás Eramo, Argentina)

COLOMBIA La Voz de tu Conciencia moved down from 6064.57 to 6060.21 on July 25, music and brief religious comments at 0900 (Chuck Bolland, Clewiston, FL) Rebroadcasting MW 1530, Alcaraván Radio (Rafael Rodriguez, Bogotá, *Conexión Digital*) On 6060 the modulation is better, and less fading. They were going to change antenna to favor North America more than the Southern Cone (José M. Valdés R., Venezuela, *ibid.*) Three nights in August between 0630-0820, Colombian style dance music and readings from Corinthians (Samuel Cássio, Brazil and Noel Green, UK, DSWCI *DX Window*) Putting out 6 kW from three 4CX5000A tubes, two as modulators and one in the final (Russ Stendal, LV de Tu Conciencia via Jan-Erik Österholm, Porvoo, Finland, *DXing.info*)

Pirate, R. Nueva Juventud, Pasto, at 0120-0220 with music, ID, on 5590.4, with better audio, clearer signal than on previous 5588.2. unID on 6226.2, probobly Colombia at 2210-2250* with rosary, harmonic from a parish outlet (Rafael Rodríguez, Bogotá, Conexión Digital) 4 x 1556.55? (gh)

CONGO DR David Smith, of UN HQ, is now in the Congo, heading R. Okapi, and confirms they will have three 10 kW Marconi SW transmitters working in September (Jerry Berg, DSWCI *DX Window*)

COSTA RICA RFPI can now receive donations over the internet safely and securely via PayPal. This will make it easier for you to help us. Simply go to **http://www.rfpi.org** and there is a button on the top left hand side of the index page. If you don't want to use PayPal, the mail still works fine, too. The address is: Radio for Peace International, P.O. Box 1094, Eugene, OR 97440 (RFPI)

DOMINICAN REPUBLIC On 4959.85, Radio Cima Cien, Santo Domingo, reactivated July 27, 0151-0200, merenque music and ID (Mark Veldhuis, Netherlands, *SWBC*) 4960, 0840-1000*, armchair level listening to nice bachata music. 0958 ID, anthem, jingle, and sign-off at 1000 (Mark Mohrmann, VT, *DX Listening Digest*, i.e. around sunrise, unusual (gh) **http://www.cima100fm.com/cima100.htm** takes an awful time to load, but the live stream gives plentiful reward – endless bachata music. IDs as "Cima Bachata." (Aart Rouw, Bühl, Germany, *Hard-Core-DX*)

ECUADOR HCJB will begin moving its SW transmitters and antennas to a new site near the coast now that the City of Quito has signed an agreement to build a new airport just six miles from the HCJB transmitters in Pifo. Final contract to be signed Sept. 15 with construction [of the airport] to begin in March 2003. In anticipation of the agreement, HCJB approved Project SERVE (Santa Elena: Renew the Voice from Ecuador), a $4.6-million, four-year project to move the site to Santa Elena. Initial broadcasts from the new site could begin as early as mid-2003. Engineers plan to install 11 shortwave transmitters and 17 antennas. Project will be financed primarily by sale of the 110-acre site in Pifo, but funds also will have to be raised to purchase at least one new 100 kW transmitter (HCJB website July 25)

GEORGIA English in the Direction of Oslo 0730-0800 11805, 2030-2100 11760; Munich 0930-1000 and 1930-2000 11910; Tel-Aviv 1030-1100 11910, 1730-1800 6180 (Nino Kandelaki, Georgian Radio, via Jean-Michel Aubier, France, *DXLD*)

GUATEMALA Radio Verdad, 4052.5: Dr. Édgar Amilcar Madrid, Director and Manager, says station was hit by lightning, destroying part of transmitter, now running 270 watts. Asks for reception reports to find out how signal is with only half the transmitter working. Estación Educativa Evangélica "Radio Verdad," 4a Ave. 2-24, zona 1, Apartado No. 5, Chiquimula, Guatemala, C.A. Also says they soon will start a program in English, "Back to Jesus Broadcast," at 0415 daily (Claes Olsson, Sweden, *Cumbre DX*)

GUINEA RTV Guinéenne, 7125, friendly e-mail verie from Issa Conde issaconde@yahoo.fr 3 weeks after sending a CD, US$1 and a French report for a March 2001 log. I have been trying to verify this one for many years! (Paul Ormandy, NZ)

HONDURAS R. Bethel, HRHZ (currently 1160 AM) has a good chance of putting on a new SW from Taujica, near the Caribbean. Might happen early next year; they want to apply for 5 kW on 60m (Larry Baysinger, KY, *Cumbre DX*)

INDIA AIR Bangalore (500 kW), 11645 ex-9425, relays AIR FM II Delhi at 0130-0530 and 0930-1230. The night service of AIR National channel is still on 9425 at 1320-0040 UT (Jose Jacob, VU2JOS India, *dxindia*)

IRAN IRIB website is disturbing. Animation shows Israeli soldier shooting doves of peace over the Dome of the Rock in Jerusalem, morphs into montages of frightened, bloodied and dead Palestinians; then to a US flag; stars are bombs and the stripes are running, as if bloody. More about the Intifada and Palestine than about Iran itself. You can listen to a week's archived broadcasts over the net. IRIB is hard to hear on shortwave; the internet is a bonus. IRIB is the 4th most prolific broadcaster in terms of hours of transmission after BBC, VOA and CRI (Fred Waterer, ODXA *Listening In*)

[non] KRSI website mentions 15740 and 17510. Also, extensive instructions for an anti-jamming antenna at **http://www.krsi.net/us-en/antijamming.asp** (Hans Johnson, *Cumbre DX*) See also IRAQ below

IRAQ Mother of All Battles Radio, 11785, *1658, ID in Arabic, prerecorded speech and patriotic songs to 1800*. On the same 'crud' carrier, V. of the Movement of the Mojahedin of Iranian Baluchestan *1800 with march music and ID in Persian by a male, some other vernacular ID heard at around 1825. S7 at peaks for both in poor modulation and mankey chatter mainly from China (Mahmud Fathi, Germany, *Cumbre DX*)

KAZAKHSTAN [non] Becoming the first clandestine station opposing Kazakhstan's leadership, DAT Radio, **http://datradio.com/indexeng.htm** has begun transmissions on 9775 at 0100-0200 and 1500-1600. On website station describes mission: *"DAT Radio breaks the veil of the lies created in the Kazakhstan state media belonging to the Nazarbayev family. DAT Radio offers its radio waves to all democratic forces and independent journalists in Central Asia."* DAT in Kazakh means *I demand a word*. The station can be contacted at info@datradio.com (Aleksandr Mak on *active_dx* via Vlad Titarev on *DXplorer* via *DXing.info*) First 30 minutes of political talks mostly anti-president, then repeat. Signal in Moscow is good enough (K. Gusev, Russia, *Clandestine Radio Watch*) Anyone know transmitter site? Or more info on what organization is behind it? (Mika Mäkeläinen, Vantaa, Finland, *DXing.info*)

KYRGYZSTAN Kyrgyz Radio on new 4795 // 4010 in Kyrgyz 0000-0030, then Russian (Olle Alm, Sweden, *DX Listening Digest*) 4795 *2300 with National Anthem (H. S. Brar, Punjab, *GRDXC*) At 1755 4010 and 4795 were in parallel with 4010 stronger here. 1757 Kyrgyz Radio ID in Kyrgyz and Russian (closing announcement), then NA until about 1800. Carrier remained on both until 1815 (Jari Savolainen, Kuusankoski, Finland, *DXLD*)

LEBANON [non] Sout al Mahaba, or V. of Love transmits via Vatican Radio 11715 at 0430 after VR's own Arabic program; mentioned **http://www.radiocharity.org.lb/** (Tarek Zeidan, Egypt, *BC-DX*)

LIBERIA WJIE, Kentucky, has put on new FM station in Monrovia, Voice of Liberty (**http://www.wjiesw.com/projects.htm**) We plan to be on the air with SW about the end of October. This station, co-located with FM, will cover entire continent of Africa! (Doc Burkhart, WJIE Newsletter) Nothing here about WJIE itself; guess that's pretty far on the back burner. See also USA (gh)

MÉXICO Radio Educación, 6185, DX program *Sintonía Libre* reported about the 8th annual Mexican DX meeting in early Aug; listen for show UT Thu and Mon 0330-0400 (Rafael Rodriguez, Colombia, *Conexión Digital*) Make that 0430 if DST ends as expected Sept 29 (gh)

At the Mexican DX meeting, Pepe González spoke about XERTA, Radio Transcontinental de América. It's always been on the air in an uncertain manner. Manager Ing. Nájera, ambitiously calls it the only Mexican commercial SW station. The truth is that it has required great effort to keep it going, with the homemade equipment and great limitations it has always confronted. I visited the original installation on a top floor of the Latin American Tower in Mexico City, and Ing. Nájera would tell me things like, "We'll soon be QSLing," "we're about to raise power," "we're in discussions over sponsorship," "we've improved the antenna, now with more radials," "from the new site they've

*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; B-02=winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

heard us in Australia," "I'm going to get crystals for two more frequencies," "my partner has permission for a UHF TV channel." But all of this remained nothing but dreams. This gentleman is quite a character and in spite of his age, has a contagious zest for life and his beloved station. Recently he has "rented" it to a gringo religious group, so that's the end of XERTA.

In the station forum at the meeting, we heard that R. Mil's Encuentro DX program will be revived; R. Educación will resume six hours of shortwave programming; and Ana Cristina del Razo revealed she is leaving her post as director of XERMX (Iván López Alegría, and Carlos Jiménez V., *DX Listening Digest*)

R. Mil has completed a new antenna for SW 6010; hope this improves reception, reports wanted to: XEOI Radio Mil Onda Corta, Apartado Postal 21-1000, 04021 - Mexico D.F. MEXICO (Hector Garcia Bajorge, *Encuentro DX, DX Listening Digest*) No improvement here; in fact there is het from something now; what kind of antenna? Directional? (gh)

MYANMAR 5985.84, Radio Myanmar, one of my favorite targets. Wonderful local music 1410 until 1415 followed by English program (Walt Salmaniw, Victoria BC, *DX Listening Digest*)

Defence Forces Station, 6570, *1328-1630*. Signs on with Burmese music, soon followed by beating a gong for about 30 seconds (Victor A. Goonetilleke, Sri Lanka, *BC-DX*)

NEW ZEALAND RNZI until 27 Oct: 1650-1750 11725, 1750-2050 15160, 2050-0458 17675, 0500-0700 15340, 0700-1100 11675, 1105-1305 15175 (E. Timor); (overnight) 6095 (if needed) (Adrian Sainsbury, *Mailbox*, via Joel Rubin, *swprograms*)

PARAGUAY Dom Adán Mur of R. América kept us posted on their low-power tests. 7300 was testing with 25 watts, and reported correctly by Joe Talbot in Alberta with recordings of bells in the 0230-0400 period; the transmitter is capable of 2.4 kW, and aimed at Buenos Aires. Mur thought the reception must have been long-path, but we doubt it. 15185 ran five watts for about a week in late July, but received no reports before being taken off. Then Michael Schnitzer in Germany reported that he had heard and verified it. Mur said power supply was a problem at their rural Villeta site, using a large group of accumulators, recharging them from rectifiers – in a sense, a stationary, non-submersible equivalent of a diesel submarine. DX Reports may be sent to ramerica@rieder.net.py or fax: 595 21 963 149; Post: Casilla de Correo 2220, Asunción, Paraguay. Mur asked Talbot to check another frequency, 4830, the third harmonic of 1610 kHz. Then a report from Norway was also received for 7300; and was considering resuming a previous frequency, 7740, which drew reports from Paraguay and neighboring countries. Relatively close listeners, Nicolás Eramo in Argentina, and Tony Jones in Paraguay, were concerned that they had not been able to hear anything on 7300 or 15185. The testing hours for 7300 were then reported to be 1400-2030 UT on weekdays, subject to interruptions, and 24 hours on weekends, so nighttime propagation would only be possible then (*DX Listening Digest*)

PHILIPPINES 11885/15120/15270, R. Pilipinas, Tinang, *0200-0330*, Overseas Service with English, but still announced old 12015 instead of 11885 (Roland Schulze, Philippines, DSWCI *DX Window*)

POLAND [non] Luftwaffe pilot was startled to hear Polish talk about R. Maryja on a Bundeswehr communications frequency, 7400. This is perfectly legal, a relay via Russia of the Polish Catholic station (RFE/RL ***Media Matters***)

PORTUGAL RDP has a program of traditional fado and guitar music, presented by Luis Sarmento, Sats 1805-2000 on 21655, 21800 (Célio Romais, Brasil, *@tividade DX*) RDP Portuguese service on 11655 with good signal to NAm M-F at 2300-0200 includes a wealth of local music, some of it quite beautiful (John Figliozzi, NY, *swprograms*)

SPAIN IBB SW transmitters at Playa de Pals, closed in May 2001, might be reopened, now that the US has additional need for facilities to reach Islamic countries. However, the antennas are partly dismantled, and the site been handed over to RNE, which had no plans to use it (*ABC*, Spain, via Dario Monferini; *Vanguardia* via Francisco Rubio) Spaniards living in the coastal housing areas just outside the gate were suffering from heavy electronic disturbances ("Their refrigerators spoke Kazakh!"). (Anker Petersen, Denmark, DSWCI *DX Window*)

SRI LANKA All Asia English Service at 0025-0430, 1230-1550:
6005 10 kW (Philips transmitter)
9770 100 kW (Marconi from Radio SEAC 1949 running at 80 kW)
15425 35 kW (pushing out about 28 kW ex VOA Collins)

I often listen to it because of the nice oldies music of the '60s (which I love!) which the Anglo-Indian community in India appreciates very much and treats more or less as their home radio service. The Service to the Middle East/Gulf Area where there are many thousand Sri Lankans working, including my son-in-law and daughter, is at 1600-1900 on 11775 mainly in Sinhala via NHK 250 kW Kokosai transmitters (Victor Goonetilleke, Sri Lanka, DSWCI *DX Window*)

SYRIA [non] A new clandestine has emerged, first reported July 24 by K. M. Patel in New Delhi, India, in Arabic at 1500-1530 on 12085 and 12110. By August 6 the latter had changed to 12115, and there was another broadcast at 0330-0400 on 9950. Both 12085 and 9950 are known Syrian frequencies, but modulation was better than customary from Damascus. Reception was poor to zero here, so we asked European monitors to check it out. Wolfgang Büschel in Germany found that Damascus turned off its 12085 transmission around 1500 as if to accommodate this! – and that the same programming on 12115 was displaced by 27 seconds or more, as if played from two independent sites. 12115 also had tune-up tones before the hour typical of Russian sites. Then Tarek Zeidan in Cairo monitored, and found the ID to be *Soul Al-Watan*, i.e. Voice of the Homeland, with anti-Syrian content.

Another day, Noel Green in England found the two 12 MHz outlets to be 43 seconds apart. Zeidan reported that the evening broadcast was a repeat of the morning, on behalf of the Syrian Muslim Brotherhood Movement. The opening song is always the well-known *Watani Habibi* - "my beloved homeland," released upon the Egyptian-Syrian unification in the mid '60s. Readings from the Qur'an had musical background, which was inappropriate; and were more extensive on Friday. Other days programming was non-religious. Some of the programs are mainly about human rights in Syria and those jailed for criticizing the Syrian regime, and also about the banning of the Movement. Büschel points out that 12115 is also used for Ethiopian clandestines brokered by TDP, but in the 17009 hour. Andy Sennitt found another version of the song at **http://gamal.topcities.com/songs/watanil.html** In DSWCI *DX Window*

Anker Petersen suggests that the 9950 and 12085 site is Krasnodar, and 12115 is from Samara, Russia. After all this, it emerged that 12085 and 12115 were already heard but without any ID as early as June 20 by Mahmud Fathi, Germany, *Cumbre DX*. And Junichi Kobe in Japan had reported it also unID to *Clandestine Radio Watch*, July 13 and August 1.

THAILAND R. Thailand's domestic SW transmitters which stopped home service (HS) relays some weeks back are carrying the 1200-1215 Bahasa Malaya program on both 6070 and 7115 (Victor A. Goonetilleke, 4S7VK, Sri Lanka, *BC-DX*) It looks like we lost another domestic service on SW. I don't think it's temporary (though I hope so); otherwise they wouldn't be carrying the foreign service on the usual HS frequencies. From the efficiency point of view, 6070 and 7115 are much more suited for regional transmission than frequencies higher up in the SW band (Richard Lam, Singapore, *Cumbre DX*) New RT website also links to current external schedule: **http://www.geocities.com/hsk9th/OverseasBgEng.html** (gh)

TIBET *Voice of Holy Tibet*, 0700-0715 and 1630-1645 in English. One 0700-0720 show on 9490, 6130 talked about mineral production, listener mailbag; address: Holy Tibet, Foreign Affairs Office, China Tibet Peoples Broadcast Company, Lhasa 850000. Hostess was Ms. Zhuin Dighi (Partha Sarathi Goswami, West Bengal, *DX Listening Digest*) English at 1100-1113 on 9490 had very weak signals in July. This will probably improve in eastern North America by September with near-grayline conditions. Best on LSB to avoid splatter from 5 kHz up (John Cobb, GA, *DXLD*) Another 0700-0720 English broadcast from China Tibet Broadcast Company was about Tibet Opera; Mon-Sat on 9490 (Harjot Singh Brar, *GRDXC*) On 5240, 6130, 7385 at 1630-1650* told us the height of nearly every mountain peak in Tibet (Jari Lehtinen, Lahti, Finland, *hard-core-dx*)

TURKEY VOT 0300-0400 UT English to North America changed from 11655 to 9650 as of 2 September (Bill Westenhaver, QC, *DX Listening Digest*)

U S A VOA Arabic service, called *Sawa*, is a slang word for together. In original Arabic, together would be *ma'an*. I was really surprised that VOA chose such a name but as the target is teens, what else would be better than slangish Arabic (Tarek Zeidan, SU1TZ, Cairo, Egypt, *BC-DX*) VOA Director Bob Reilly offered to find the $1 million needed for a new Iranian popular culture program by shutting down five VOA bureaus in Asia, Latin America, and Europe: Hong Kong, Mexico City, Tokyo, Brussels and Geneva (Sarah Birns, *Washington Times*)

A View from Europe, quirky commentaries by Harvey Thomas, now scheduled on WWCR, Sun 1710-1715 on 12160, in addition to less convenient times of Sat 1110 on 15825, Sun 1010 on 5070 (WWCR)

WBCQ moved an EVM Jewish show into Tue-Fri 0415-0515 on 7415, bumping the timely play of *WORLD OF RADIO* at 0415 from UT Thu to UT Mon; also *Radio D.C.*, vintage music which follows at 0445-0515 (gh)

WWRB's website **http://www.wwrb.org** claims to undertake propagation studies, but have not yet discovered the auroral zone, as coverage maps show unhampered reach directly over the pole. August 15 was the big day when new antennas were to become operational. Note that WWFV site in Georgia still exists as a 'back-up'. Does this mean there are still transmitters available there? The rationale for moving does not go into big problems with the neighbors Dave Frantz had in Georgia and told me all about. Looked thru entire WWRB program schedule and found nothing but gospel hucksters and far right wackos topped by the neo-Nazi show of the just-late William Pierce, and the not-late Kevin Alfred Strom, which is too repulsive for any other SW station to carry: *American Dissident Voices* (Glenn Hauser, *DX Listening Digest*) *ADV* continued with Kevin Alfred Strom the speaker per National Alliance website (Hans Johnson, WY, *Cumbre DX*)

[and non] WJIE and High Adventure Ministries have a joint venture. The corporate staff of HAM will be moving to Kentucky. KVOH will continue to be solely owned by HAM. The HAM shortwave operation planned for Nigeria is being moved to Liberia [q.v.]. In spite of what their website says, WJIE SW is not operating at 50 kW. They were on with about 30 kW their first day and then went off for quite some time. They didn't even have the 7490 kHz exciter running into the antenna until I was at the site working on backup FM transmitter and notified them. WJIE then turned the exciter back on. As for as having "two 50-kW transmitters" – I had to remove several components from the 13595 transmitter in order to repair the 7490 transmitter, so they only have two "working" 100-watt exciters – not 50-kW transmitters (Larry Baysinger, *Cumbre DX*) In the Fall of 2002, WJIE Transmitter #1 will become "The Voice of Jerusalem." With live broadcasts from studios in the ancient city, VOJ will be heard in Eu, Af, ME, NAm on SW and on SkyAngel satellite service (**http://www.wjiesw.com/projects.htm**) We might believe any of this when they actually have transmitters over 100 watts on the air

Brother Stair E-mailed me August 2 that he was out on bond, but still waiting for trial. Once he was out, his website removed all references to his ever having been in jail. ... Then on an anti-Brother Stair broadcast August 15 at 0100 on 7415 (WBCQ) it was alleged that the only reason Brother Stair got himself out on bond is that he coughed up $400,000! These guys on 7415 are very anti-Brother Stair. They want to nail Brother Stair and might be over-zealous in that process. His trial is set for "after the first of the year." I also heard that Brother Stair had the two dropped charges reinstated (by a grand jury) and has had two more charges added for a total now of six (Robert Arthur, *DX Listening Digest*)

WMLK at 1732-1800+ fabulous signal on 9465 without the usual QSB but overmodulated. ID at +32 and +02 (Liz Cameron, MI, *World Of Radio*) Maybe finally testing new 250 kW at 125? Exactly 24 hours later I found only traces (gh)

I visited the authorized site for a new SW station, KIMF, at the edge of a vast basin near remote Piñón, New Mexico. One small building could be seen in the distance beyond a locked gate, but there was no sign of construction activity, no tower, and this is in an area with no water, a big problem for a transmitter site (George Glotzbach, NM, *Cumbre DX*)

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

Global Forum

Broadcast Logs

Gayle Van Horn
gaylevanhorn@monitoringtimes.com

0020 UTC on 6797.6
PERU: Radio Ondas Del Rio Mayo. Spanish. Peruvian music at tune-in to announcer's ID, barely audible to monitor in LSB. Traditional Peruvian huaynos music. Peru's **La Voz del Campesino** 0035, 6956.7 (Gayle Van Horn, NC) **Radio Bethel** 1042-1101, 5940.1; **Radio Melodia** 1031-1040, 5996.6 (Arnaldo Slaen, Buenos Aires, ARG) **Radio Tacna** 1100, 9504.8 (*WWDX Club*)

0026 UTC on 9720.4
PERU: Radio Victoria. Very good signal including identification as, "Radio Victoria una radio para ti...". SIO 333. (Daniel Canonica, Switzerland) Peru's **Radio Twantinsuyo** 1055-1100, 6173.5 including IDs, local time checks. Signal drifted to 6173.8v on rechecks. (Slaen, ARG)

0151 UTC on 4959.85
DOMINICAN REP: Radio Villa. Merengue music with short slogans and Spanish jingles. Full ID audible at 0157 with location and station info. (Mark Veldhuis, Netherlands/*Cumbre DX*)

0250 UTC on 11710
ARGENTINA: RAE. Late evening English service with signal interferences noted. (Delia Lopez-Barton, El Paso, TX) RAE 2355, 15344.97 // 11710.02. (Salmaniw, CAN/*CDX*)

0300 UTC on 5995
USA: BBC Delano, CA, relay. Spanish BBC *Mundial* covering soccer news, *El Circuito* live from Harrods store. *London Art Gallery* segment to 0330 mailbag, followed by 0345*. (Fernando Garcia, Baltimore, MD)

0500 UTC on 17735
RUSSIA: Radio Ezra. Initial very poor reception, peaking to S7-S9 strength. Jewish religious program with signal deteriorating near end of programming. Closing announcements 0528, transmitter off at 0530. (Salmaniw, CAN/*CDX*)

0754 UTC on 6064.5
COLOMBIA: La Voz de Conciencia. Freq noted from 6060, with stronger signal quality. ID 0756 & 0801 into religious music. (Paul Ormandy, New Zealand/*HCDX*) Colombia's **Radio Autentica** 0830, 5975 "con la Palabra de Dios" to religious text. **Radio Caracol** 1100, 5955 national news, sports update, chocolate and Corona ads. (Garcia, MD).

0830 UTC on 3365
PAPUA NEW GUINEA: Radio Milne Bay. Station noted active again with island music and Pidgin announcements. Signal steadily gaining strength past 0850. PNGs audible; **Radio Sandaun** 3205; **Radio Morobe** 3220; **Radio West New Britain** 3235; **Radio Gulf** 3245; **Radio Southern Highlands** 3275; **Radio Central** 3290; **Radio Western** 3305; **Radio Manus** 3315, 1025 (Van Horn, NC) **Radio Bougainville** 3325; **Radio Simbu** 3355; **Radio Western Highlands** 3375; **Radio East New Britain** 3385; **Radio New Ireland** 3905, 1028-1102 (Van Horn, NC) **NBC** 4890. (Ormandy, NZL/*HCDX*; Van Horn, NC)

0902 UTC on 6090
CHILE: Radio Esperanza. Spanish Christian vocals to ID as, "estamos en su Radio Esperanza". SINPO 34433. (Slaen, ARG)

0905 UTC on 3290
GUYANA: Voice of. Announcer's regional morning announcements. Hindu/subcontinental instrumentals to pop US vocals. (Frank Hillton, Charleston, SC)

0923 UTC on 5970
BRAZIL: Radio Itatiaia. Portuguese "sertaneja" local music. Station ID, news bulletins and time check. (Slaen, ARG) Brazil's **Radio Difusora Roraima** 0035, 4875. Rich DeAngelo, USA/ *NASWA, WWDX*)

1015 UTC on 3905
INDONESIA: (Java) Voice of Indonesia 1130 (Juichi Yasmada, Japan) 2007-2015+ (Harold Frodge, Midland, MI); 1836 German service 15150.03. (Al Quaglieri, Albany, NY/*DX Window & Jembatan DX*) **RRI-Gorontalo** (Sumatra) 1250, 3266.4.(Yasmada, *WWDX*); **RRI-Palangkaraya** (Kalimantan) 1355, 3325. (Yasmada, *WWDX*) **RRI-Sorong** (Irian Jaya) 1058, 4874.6. (Yasmada, *WWDX*)

1020 UTC on 3220
ECUADOR: HCJB. Usual fair signal quality (SIO 322) for Spanish religious text, mixing with PNG's Radio Morobe 3220. (Van Horn, NC) *DX Partyline* 2000, 17660. (Bob Fraser, Cohasset, MA) Ecuador's **Radio Centro** 1040-1046, 3289.9. Spanish messages to ID and local ads. (Slaen, ARG/DX Camp-Villa Loguercio, ARG)

1034 UTC on 3329.6
PERU: Radio Ondas del Huallaga. Spanish religious texts to scriptures. Peruvians logged as; **Radio Bethel** 2220-2229, 5990; **Radio Santa Rosa** 2251-2259, 6045.6; **Radio San Miguel** 2351-0020, 5500.2. (Slaen, ARG/DX Camp, ARG)

1045 UTC on 5025
CUBA: Radio Rebelde. Announcer's Cuban music to ID 1053. "Muy buenas dias" greeting at 1100. (Barton, TX)

1220 UTC on 5965
CANADA: Radio Netherlands Sackville relay. *Newsline* on Spain and Morocco argue over a rock isle! (Fraser, MA)

1630 UTC on 15140
OMAN: Radio Oman. Lady's Arabic script with poor audio level's SIO 221. Monitored in LSB to 1652. (Van Horn, NC) Poor signal's English service 1445-1452, Arabic music and talk. (Sam Wright, Biloxi, MS) Arabic 1917-1923, 6190. Nicolas Eramo, ARG/*CDX*)

1930 UTC on 4760
INDIA: AIR-Port Blair. On late with cricket commentary (UK vs India). Noted with Hindi music and talk during breaks. AIR's audible; **AIR-Lucknow** 4880; **AIR-Jaipur** 4910. (Ormandy, NZL/ *HCDX*)**AIR-Delhi** 11620, 2209-2216 +. **AIR-Bangalore** 7410 audible in Iceland 2106-2110 // 11620. (Frodge, MI)

1940 UTC on 4930
TURKMENISTAN: Turkmen Radio. (Tent.) English agricultural news amid very weak signal. Turkmen language resumption after brief musical interlude at 1944. (Ormandy, NZL/*HCDX*)

1946 UTC on 15345
MOROCCO: RTV Marocaine. Classic Moroccan music to French text. Frequency shift to 15335 at 2208. Morocco's **Radio Medi Un**, 9575 at 2210 with S9 signal quality. Combined Arabic/ French service to dominant Arabic at 2328 recheck. (Van Horn, NC) **VOA-Morocco** relay 15410 at 1705. (Fraser, MA)

1950 UTC on 15735
RUSSIA: Voice of. *Christian Message from Moscow* program // 11675. (Fraser, MA)

2029 UTC on 9580
GABON: Afrique Numero Un. Instrumental lite Afro pop music. Announcer's French news and possibly ad/jingle. ID, "Ici Africa un." SIO 342. (Frodge, MI)

2103 UTC on 9400
BULGARIA: Radio Bulgaria. Newscast to ID and instrumental music at 2107, RTTY interference noted on 9403. Station logged in Iceland 2128, 11900 with ID and news features. (Frodge, MI)

2123 UTC on 11940
ROMANIA: Radio Romania Intl. World news updates to Romanian news features, // 11740 good. Logged in Iceland. (Frodge, MI)

2204 UTC on 15240
AUSTRALIA: Radio Australia. Announcer duo's *Radio Australia News* segment to 2210. Commentary on latest Middle East mayhem. SIO 2+53. (Frodge, MI)

2220 UTC on 7255
NIGERIA: Voice of. English interviews on national culture to regional African vocals. SIO 433, local evening time check and program preview. (Van Horn, NC) 2225-2245, 7255 monitored from Iceland. (Frodge, MI)

2235 UTC on 12000
TURKEY: Voice of. *Legends of Cities* segment // 11960; 2030, 9525. (Fraser, MA)

2240 UTC on 9935
GREECE: Macedonia. Greek vocal music to lady's Greek program preview. Traditional Greek music to station ID, freq quotes, info, martial anthem to 2251*. (Van Horn, NC)

2321 UTC on 4950
ANGOLA: Radio Nacional de Angola. Portuguese musical program to announcer's ID as, "Radio Nacional da Angola". SINPO 33343. (Eramo, ARG/*CDX*)

*Thanks to our contributors – Have you sent in YOUR logs? Send to Gayle Van Horn, c/o Monitoring Times (or e-mail gayle@webworkz.com) **Please note:** paper strips and cassette recordings will no longer be accepted.*
English broadcast unless otherwise noted.

Global Forum

The QSL Report

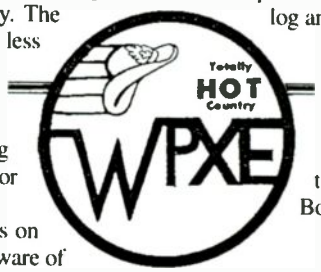
Gayle Van Horn
gaylevanhorn@monitoringtimes.com

DXing the Graveyards

After midnight and on Monday mornings, the world of medium wave becomes more intriguing. Some stations leave the air, allowing less powerful ones to be heard on the same frequency. The post-midnight period is the best time to monitor these less powerful stations on 1230, 1240, 1340, 1400, 1450, and 1490 kHz.

Graveyard DXing requires a great deal of patience, yet to enthusiasts it can be very rewarding. Tape recording is essential to record the top-of-the-hour identification or sign-off announcements.

When first tuning the graveyard frequencies, focus on the strongest signal, and use it as a reference point. Be aware of operating schedules from any local stations that may block the graveyard frequencies. This "silent period" may be an excellent opportunity to log and QSL dozens of stations.



Verifying the graveyards requires the same courtesies as regular medium wave: Return postage is always appreciated along with your personal letter.

For additional information on DXing the graveyards and the world of medium wave, refer to the National Radio Club Inc., **http://www.nrcdxas.org/** (or) P.O. Box 164, Dept. W., Mannsville, NY 13661-0164 USA.

Who knows what you'll unearth in the graveyard?

AMATEUR RADIO

Kazakhstan-UN6P, 10 meters. SSB. Full data QSL map card via UN5PR QSL Manager. Received in 50 days for two U.S. dollars and a nested Euro self-addressed envelope. (used for reply).QSL address: UN6P-UN5PR, Romeo Y. Loparev, P.O. Box 73, Temirtau, 472300 Kazakhstan. (Larry Van Horn N5FPW, NC)

Jordan-JY9NX, 10 meters SSB. Two full data QSL cards via JH7FQK QSL Manager. Received in 162 days for two U.S. dollars and a nested Euro self-addressed envelope (used for reply). QSL address: JH7FQ Ichio Ujjie, 162 Kohata Towa, Adachi Fukushima, Japan 964-02. (DXCC county # 148. (Van Horn, NC)

AUSTRIA

Radio Austria International, 17860 kHz. Full data initialed verification letter. Received in 14 days for an English report. Station address: English Service, Argentinierstrasse 31, A-1040 Vienna, Austria. (Joe Squashic, Wake Forest, NC) Station website: **<http://roi.orf.at/>** *-ed.*

BHUTAN

Bhutan Broadcasting Service Corp., 5025 kHz. Full data QSL logo card signed by Dorji Wangchuk-Chief Engineer, plus personal letter. QSL card and envelope noted as made from traditional Bhutanese paper. Received in 110 days for an email follow up with attached wav.file. Station website: **http://www.bbs.com.bt**. Station address: Department of Information & Broadcasting, Ministry of Communications, P.O. Box 101, Thimphu, Kingdom of Bhutan. (Mick Delmage, Sherwood Park, Alberta, Canada) *Thanks, great to see another verification from this station-ed.*

CZECH REPUBLIC

Radio Prague, 7345 kHz. Full data signed QSL card plus station pennant, stickers, schedule and station history booklet. Received for an English and two U.S. dollars. Station address: English Service, Vinohradska 12, 12099 Prague, Czech Republic. (Squashic, NC)

MEDIUM WAVE

CHW, 740 kHz AM. Full color QSL card signed by Brian Smith-QSL Manager, plus station souvenirs. Received in 19 days for a taped AM report and one U.S. dollar. QSL address: c/o ODXA, P.O. Box 61, Station "A", Willowdale, ON Canada M2N 5S8. (Patrick Martin, Seaside, OR)

KFAQ, 1170 kHz AM. Verification on station letterhead signed by Michael Del Giorno-Program Director. Received in six days for an AM report. Station address: 4590 East 29th, Tulsa, OK 74114. (Martin, OR)

KNRC, 1510 kHz AM. Full data verification letter singed by Daniel Hyatt, plus station window sticker. Received in 30 days for an AM report on test transmissions and first day broadcast. Letter states they use Kahn Powerside. Station address: 1201 18th Street, Suite 250, Denver, CO 80202. (Patrick Griffith, Westminster, CO)

KRJO, 1680 kHz AM. Nice computer printed 3-color QSL letter from Russell Kendrick-Chief Engineer, plus a black/yellow *Rejoice* bumper sticker. Received in 23 days for an AM report. Station address: The Radio People, 1109 Hudson Lane, Monroe, LA 71201. (Griffith, CO)

PIRATE RADIO

Radio Time Machine, 6955 kHz. Full data *Old Man Listening to Radio* card unsigned. Received in 20 days for a pirate report and one U.S. dollar. QSL maildrop: Box 69, Elkhorn, NE 68022. (Bill Wilkins, Springfield, MO)

WMFQ, 6950 kHz AM. Verification/parody of DXers QSLs (including Zeller & Van Horn) letter, signed by Mr. Q. Esselle. Received in 103 days for a pirate report and three mint stamps. QSL maildrop: P.O. Box 28413, Providence, RI 02908 USA. (Jeffrey Hodgis, Virginia Beach, VA)

RUSSIA

Radio Ezra, 17735 kHz. Full data yellow card signed by John Hill-Station Owner. Received in 23 days for an English report and two IRCs. Station address: Box 16, Stockton-on-Tee, T^ 18 3 GN United Kingdom. (Wilkins, MO)

UNITED KINGDOM

(via Rampisham, UK) Wales Radio International/Radio Rhyngwladol Cymru, 9795 kHz. Full data verification signed by Jenny O'Brien. Received in 390 days for an English report. Station address: Pros Kairon, Crymych, Pembrokeshire, SA 41 3QE, Wales, United Kingdom. (Joe Kenneth Wood, Gray, TN) Station website: **http://wri.cymru.net/** Email: **jenny@wri.cymru.net**

UTILITY

Bermuda, ZBM-Bermuda Harbour Radio, 2582 kHz USB. No data letter signed by Danny Little (for C.R.O.). Received in 15 days for a utility report. Station address: 9 Fort George Hill, St George's, Bermuda GE02. (John Wilkins, Wheat Ridge, CO/ *WUN*)

Bulgaria, LZW-Varna Radio, 8421.5 USB. Verification letter signed by Stefan Dimitrov. Received for a utility report. Station address: Navigation Maritime Bulgare, Varna Radio LZW, 1 Primorski Blvd., 9000 Varna, Bulgaria. (Wilkins, CO/*WUN*)

Lithuania, LYL-Klaipeda Radio, 17138.4 kHz USB. No data letter signed by Romas Leonavicius, plus a postcard. Received in 34 days for a utility report. Station address: Ministry of Transport & Communications, Dept. Of Communications, Gedimino Ave. 17, Vilnius 2679, Lithuania. (Wilkins, CO/ *WUN*)

USA, NPL San Diego, 14463.5 kHz USB. Full data prepared card signed by Craig Williams, ITC, USN, Director, Region Five. Received in 19 days for an English utility report, SASE (used for reply), SWL card and flag stickers. Verification was for the Armed Forces Day amateur crossband tests. Station address: NAVMARCORMARS Sta. NPL, 937 N. Harbor Dr., San Diego, CA 92132-5100. (Wilkins, MO)

John Figliozzi
johnfigliozzi@monitoringtimes.com

Yankee Doodle Shortwave III
The Independents

Prior to WWII, non-governmental commercial broadcasting was all there was on shortwave in the US. Shortwave stations owned by Crosley Radio, RCA, General Electric and others simulcast their domestic AM radio stations, mostly on an experimental basis. When the government created an official US voice to counter Axis propaganda outlets in Germany and Japan, the Voice of America (VOA) secured use of these transmitters by agreement for the duration of the war.

After the war, with the advent of FM, enthusiasm for shortwave waned among US broadcasters. The VOA purchased some of these privately owned transmitters for its own service. Meanwhile, for a number of reasons, the FCC became reluctant to issue licenses to independents and the number of such broadcasters shrunk to four.

In 1982, the late Joe Costello of WRNO Worldwide, after concerted effort, became the first privately owned shortwave station to be licensed in many years. By 1989, the number of independents had grown to 16 stations. Today, there are 27 such licensees.

❖ International Rock Radio

The last U.S. shortwave outlet that had attempted to broadcast a popular domestic radio format internationally was WNYW – Radio New York Worldwide, which left the air in the early 1970s. In 1989, with its new license in hand, WRNO Worldwide attempted to graft the staple domestic radio format of our time – rock music radio – onto shortwave, adding to it a handful of programs focusing on Louisiana's distinctive cultural elements and tourism. These "early years" of this shortwave renaissance of sorts were heady days as KUSW Worldwide, Salt Lake City, and KYOI, Saipan, largely copied WRNO's format with regional variations. The theory behind this approach, in essence, was to take a locally successful business model national and international, greatly expanding the capacity for revenue generation by use of shortwave.

But domestic rock radio depended, as it does today, on the sale of advertising that targets that most desirable demographic group – teens. Since there were no means available to measure shortwave audiences to the satisfaction of potential advertisers, advertising dollars quickly dried up. The stations found that they could not cover their costs. KUSW and KYOI were sold soon thereafter. Costello, whose attachment to shortwave was more emotional than practical, adjusted by simulcasting his New Orleans FM outlet most of the day and supplementing with the aforementioned cultural and tourism programs and limited sales of air time.

❖ International News Radio

Another notable attempt at providing popular general interest programming in the mid and late '80s was that of the Christian Science Monitor World Service (employing WSHB, WCSN – now WHRA – and KHBI; the latter two were later sold off). The CSM World Service was a service of the Christian Science church, which underwrote an effort to provide a worldwide broadcast version of its respected international newspaper. Unfortunately, financial and organizational problems within the Church resulted in closedown of the news service in 1996. A religious programming service remains.

❖ The Prevailing Models

If there is one thing that can be said about private independent U.S. international broadcasting today, it is that it has truly *evolved* over time. It has become, at this point, perhaps only what it was destined to become – no more and no less.

As a medium seemingly incapable of generating advertising dollars, private shortwave broadcast costs can be covered in only three ways: through (1) private or religious foundation or organizational support; (2) listener support in the form of contributions; (3) lease of air time.

Most independent U.S. international broadcasters employ a combination of these to stay on the air. The programming that is broadcast clearly reflects these sources of funding. The result is a heavy emphasis on religious programming, ranging from mainstream to fringe groups. Most of these religious groups are compelled by their faith to proselytize and the monetary costs of doing so are viewed as an institutional imperative, almost regardless of costs or proven results.

A significant amount of air time is purchased by individuals and groups that profess a peculiar mix of beliefs, from doctrinal religious and archconservative political orientations to nontraditional medical and economic theories. Leased time on shortwave stations is relatively inexpensive and available, as opposed to other domestic media. Although, under FCC regulations, US independent shortwave broadcast licensees are required to target overseas – not domestic – listeners, in reality this requirement is ignored. These factors combine to make shortwave an attractive outlet for these programmers.

In contrast, only a relatively small amount of general interest programming is broadcast on just a few stations. *(Listings for these regularly appear in MT's Shortwave Guide.)* Most of it is made available to them without charge and is used to fill slots that have not otherwise been sold. This is how, for example, Glenn Hauser's *World of Radio* and Marie Lamb's *DXing with Cumbre* appear on some stations' schedules. It also explains why some broadcast times for these programs change rather frequently. WBCQ and WRMI have made special efforts to encourage the broadcast of more general interest programming on their respective stations on a leased time basis, with only limited success. Nonetheless, some of this fare is both unique and innovative and worthy of a listeners' time.

Times and frequencies for all U.S domestic shortwave broadcasters can be found in the MT Shortwave Guide frequency section. Until November, good listening!

Growth of the Independents

On the Air in 1982:
- KGEI Redwood City, CA
- KTWR Guam
- WINB Red Lion, PA
- WYFR Okeechobee, FL

Licensed from 1982-1989:
- KCBI Dallas, TX
- KFBS Saipan
- KHBI Saipan (Formerly KYOI)
- KNLS Anchor Point, AK
- KSDA Guam
- KUSW Salt Lake City, UT
- KVOH Rancho Simi, CA
- KYOI Saipan
- WCSN Scotts Corner, ME
- WHRI Noblesville, IN
- WMLK Bethel, PA
- WRNO New Orleans, LA
- WWCR Nashville, TN

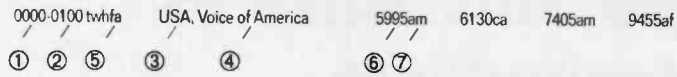
Source: National Association of Shortwave Broadcasters (NASB)

Licensed Independents

(as of 7/26/02)
- KAIJ Dallas, TX+
- KFBS Northern Mariana Islands%
- KHBN Medarn,A meliik,Palau%
- KIMF Pinan, NM+
- KJES Vada, NM+
- KNLS Anchor Point, AK%
- KSDA Agat, GU@
- KTBN Salt Lake City, UT<
- KTWR Agana, GU%
- KVOH Rancha Simi, CA%
- KWHR Naalehu, HI+
- WHRA Greenbush, ME+
- WHRI Noblesville, IN+
- WBCQ Manticelle, ME*
- WEWN Vandiver, AL^
- WGTG McCaysvil e, GA+
- WINB Red Lion, PA+
- WJCR Millerstown, KY+
- WMLK Bethel, PA#
- WRMI Miami, FL*
- WRNO New Orleans, LA+
- WSHB Furman, SC~
- WTJC Newport, NC+
- WWBS Macan, GA+
- WWCR Nashville, TN+
- WWFV McCaysville, GA+
- WYFR Okeechabee, FL&

Source: FCC
religious: + evangelical Protestant, ^ Catholic, #Assemblies of Yahweh, %Christian missionary stations, @Adventist World Radio, &Family Radio Network, <Trinity Broadcasting Network, ~Christian Science
non-religious: *independent (but carry some religious/political programs by contract)

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

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

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

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

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

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

Target Areas

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

Choose a program or station you want to hear.

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

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

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

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Program Highlights

John Figliozzi

A02 to B02

Israel has already made its seasonal time change and New Zealand will do so mid-month. North America and the rest of the world catch up by October 27. As far as most shortwave frequency schedules are concerned, summer (in the Northern Hemisphere, that is) is seven months long and winter is five months short. The HFCC (High Frequency Coordinating Committee) refers to the season just passed as A02 and the one to come as B02.

There will be numerous changes to frequency schedules and some fewer alterations to transmitting times and programming schedules. So, if you open this issue of the magazine at the end of the month and find that things are not what they were, you'll know what happened. We'll have all the updates in November.

Brain of Britain

This perennially popular general knowledge quiz has returned to the **BBC World Service** schedule and will continue for 15 weeks from this month. As usual, Robert Robertson will be in the chair to ask the questions; but he will be without the advice of his sidekick Mycroft, the pseudonym of question-setter Ian Gillies, who died earlier this year. Kevin Ashman, a former Brain himself, takes his place. Check *MT*'s Program Guide for all the broadcast times.

RCI AM Programs to Change

Radio Canada International draws much of its schedule from the *CBC Radio One* domestic network. The latter is planning significant changes to its schedule, which will – in turn – affect RCI's output. Listeners will first notice these changes in the weekday morning schedule (1200-1500 UT), reportedly by mid-October. Unfortunately, full details were not available by the time this column was prepared; but you are forewarned.

YLE English to End

The 0000 UT October 27 broadcast is set to be **YLE Radio Finland**'s last in English. During the run-up to this regrettable date, we should expect to hear some special features on the station, reflecting on the service and its legacy. See 1230 UT and 0000 UT in *MT*'s frequency listings to find where to tune.

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

0000	0015		Cambodia, National Radio Of	11940as				
0000	0015		Japan, Radio	6145na	13650as	17810as		
0000	0027		Czech Rep, Radio Prague Intl	7345na	11615na			
0000	0030		Egypt, Radio Cairo	9900na				
0000	0030		Mexico, Radio Mexico Intl	9705am	11770am			
0000	0030	mtwht/vl	Solomon Islands, SIBC	5020do				
0000	0030		Thailand, Radio	9690va				
0000	0030	vl	Vanuatu, Radio	4960do	7260do			
0000	0045		India, All India Radio	9705as	9950as	11620as	13605as	
0000	0055		Spain, R Exterior Espana	15385na				
0000	0100		Anguilla, Caribbean Beacon	6090am				
0000	0100		Australia, ABC NT Alice Springs	4835do				
0000	0100		Australia, ABC NT Katherine	5025do				
0000	0100		Australia, ABC NT Tennant Crk	4910do				
0000	0100		Australia, Radio	9660pa	12080pa	15240pa	15415as	
				17580pa 17750as	17775pa	17795pa	21725as	
0000	0100		Canada, CBC Northern Service	9625do				
0000	0100		Canada, CFRX Toronto ON	6070do				
0000	0100		Canada, CFVP Calgary AB	6030do				
0000	0100		Canada, CKZN St John's NF	6160do				
0000	0100		Canada, CKZU Vancouver BC	6160do				
0000	0100		Canada, Radio Canada Intl	9640as	11895as			
0000	0100		Costa Rica, R for Peace Intl	7445usb	15040va			
0000	0100		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am 13750na					
0000	0100	m/vl	Guatemala, Radio Cultural	3300do	5955do			
0000	0100		Guyana, Voice of	3290do	5950do			
0000	0100		Malaysia, Radio	7295do				
0000	0100		Namibia, NBC	3270af	3290af			
0000	0100		Netherlands, Radio	6165na	9845na			
0000	0100		New Zealand, Radio NZ Intl	17675pa				
0000	0100		Russia, University Network	9940as				
0000	0100		Singapore, SBC Radio One	6150do				
0000	0100		UK, BBC World Service	3915as	5875as	5970as	5975am	6195va
			9410as 9825sa	11835ca	11765me	11945as	11955as	12095sa
			15280as 15310as	15360as	17615as			
0000	0100		Ukraine, R Ukraine Intl	5905as	7320as	12040as		
0000	0100		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	
			6458usb 10320usb	10940usb	12579usb	12689usb	13362usb	
0000	0100		USA, KAIJ Dallas TX	13815va				
0000	0100		USA, KTBN Salt Lk City UT	15590na				
0000	0100		USA, KWHR Naalehu HI	17510as				
0000	0100	twhfa	USA, Voice of America	5995am	6130am	7405am	9455am	9775am
			11695am 13790am					
0000	0100		USA, WBCQ Kennebunk, ME	7415na	9335na			
0000	0100		USA, WEWN Birmingham AL	5825na	9355na	15745na		
0000	0100		USA, WHRA Greenbush ME	7580va				
0000	0100		USA, WHRI Noblesville IN	5745va	7315am			
0000	0100		USA, WINB Red Lion PA	12160am				
0000	0100		USA, WJIE Louisville KY	7490am	13595am			
0000	0100	mtwh	USA, WRMI Miami FL	7385am				
0000	0100		USA, WRMI Miami FL	9955am				
0000	0100		USA, WRNO New Orleans LA	7355am				
0000	0100		USA, WSHB Cypress Creek SC	7535am	9430sa	15285sa		
0000	0100		USA, WTJC Newport NC	9370na				
0000	0100	sm	USA, WWBS Macon GA	11900na				
0000	0100		USA, WWCR Nashville TN	3210na	5070na	7435na		
			13845na 15685na					
0000	0100		USA, WWRB Manchester TN	3270va	5085va	6890va	9320va	
0000	0100		USA, WYFR Okeechobee FL	6085na	9505na			
0000	0100		Zambia, Christian Voice	4965af				
0000	0115	vl	Pakistan, Radio	11580as	15455as			
0003	0010		Croatia, Croatian Radio	9925sa				
0015	0100		Japan, Radio	6145na				
0025	0100		Sri Lanka, SLBC	6005as	9700as	15425as		
0030	0100		Iran, VOIRI	9610am	11970na			
0030	0100		Lithuania, R Vilnius	9855na				
0030	0100	as/vl	Solomon Islands, SIBC	5020do				
0030	0100		Thailand, Radio	15395na				
0030	0100		UAE, AWR	6035as	6055as			
0030	0100		USA, Voice of America	7215va	9770va	11760va	15185va	15290va
			17740va 17820va					
0055	0100		Italy, RAI Intl	9675na	11800na			

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

0100	0115		Italy, RAI Intl	9675na	11800na			
0100	0125		Netherlands, Radio	6165na	9845na			
0100	0127		Czech Rep, Radio Prague Intl	6200na	7345na			
0100	0127		Vietnam, Voice of	6175na				
0100	0130	s	Germnay, Universal Life	9435as				
0100	0130		Hungary, Radio Budapest	9560na				
0100	0130		Iran, VOIRI	9610am	11970na			
0100	0130		Slovakia, R Slovakia Intl	5930na	6190ca	9440sa		
0100	0130	twhfa	USA, Voice of America	5995am	6130am	7405am	9455am	
			13790am					
0100	0130		Uzbekistan, Radio Tashkent	5025as	7190as	9375as	9530as	
0100	0145		Germany, Deutsche Welle	6040na	9640am	11810na		
			13720am					
0100	0156		North Korea, Voice of	6195as	7140as	9345as	11735ca	
			13760ca 15180ca					
0100	0159		Canada, Radio Canada Intl	5960am	13670am	15170am		
			15305am					
0100	0200		Anguilla, Caribbean Beacon	6090am				
0100	0200		Australia, ABC NT Katherine	5025do				
0100	0200		Australia, ABC NT Tennant Crk	4910do				
0100	0200		Australia, Radio	9660pa	12080pa	15240pa	15415as	
			17580pa 17750as	17775pa	17795pa	21725as		
0100	0200		Canada, CBC Northern Service	9625do				
0100	0200		Canada, CFRX Toronto ON	6070do				
0100	0200		Canada, CFVP Calgary AB	6030do				
0100	0200		Canada, CKZN St John's NF	6160do				
0100	0200		Canada, CKZU Vancouver BC	6160do				
0100	0200		China, China Radio Intl	9580na	9790na			
0100	0200		Costa Rica, R for Peace Intl	7445usb	15040va			
0100	0200		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am 13750na					
0100	0200		Cuba, Radio Havana	6000na	9820na	11705usa		
0100	0200		Ecuador, HCJB	9745na	11960na	21455usa		
0100	0200	m/vl	Guatemala, Radio Cultural	3300do	5955do			
0100	0200		Guyana, Voice of	3290do	5950do			
0100	0200		Indonesia, Voice of	9525pa	11785al	15150as		
0100	0200		Japan, Radio	11860as	11870me	11880me	15325as	
			17685pa 17810as	17835sa	17845as			
0100	0200		Malaysia, Radio	7295do				
0100	0200		Namibia, NBC	3270af	3290af			
0100	0200		New Zealand, Radio NZ Intl	17675pa				
0100	0200		Russia, University Network	9940as				
0100	0200		Russia, Voice of Russia	7180na	9725na	11825na	12000na	
			17595na					
0100	0200		Singapore, SBC Radio One	6150do				
0100	0200	vl	Solomon Islands, SIBC	5020do				
0100	0200		Sri Lanka, SLBC	6005as	9700as	15425as		
0100	0200		UK, BBC World Service	5975am	6195as	9410as	9825as	
			11955sa 15280as	15310as	15360eu	17615as	17790af	
0100	0200		USA, Armed Forces Network	4319usb	4993usb	5765usb		
			6350usb 6458usb	10320usb	10940usb	12579usb	12689usb	
			13362usb					
0100	0200		USA, KAIJ Dallas TX	5755va				
0100	0200		USA, KTBN Salt Lk City UT	7505na				
0100	0200		USA, KWHR Naalehu HI	17510as				
0100	0200		USA, Voice of America	7115me	9635va	11705va	11725va	
			11820va 13650va	17740va	17820va			
0100	0200		USA, WBCQ Kennebunk, ME	7415na	9335na			
0100	0200		USA, WEWN Birmingham AL	5825na	9355na	15745na		
0100	0200		USA, WHRA Greenbush ME	7580va				
0100	0200		USA, WHRI Noblesville IN	5745va	7315am			
0100	0200		USA, WINB Red Lion PA	9320am				
0100	0200		USA, WJIE Louisville KY	7490am	13595am			
0100	0200		USA, WRMI Miami FL	9955am				
0100	0200		USA, WRNO New Orleans LA	7355am				
0100	0200		USA, WSHB Cypress Creek SC	7535am	9430sa	15285sa		
0100	0200		USA, WTJC Newport NC	9370na				
0100	0200		USA, WWCR Nashville TN	3210na	5070na	5935na	7435na	
			15685na					
0100	0200		USA, WWRB Manchester TN	5085va	6890va			
0100	0200		USA, WYFR Okeechobee FL	6065na	9505na	15060as		
0100	0200		Zambia, Christian Voice	4965af				
0103	0110		Croatia, Croatian Radio	9925sa				
0130	0145	vl	Libya, Voice of Africa	15435im	17750im			
0130	0200		Austria, Radio Austria Intl	9870na				
0130	0200		Sweden, Radio	13625va				
0130	0200		UK, RTE Radio	6155na				
0130	0200	twhfa	USA, Voice of America	5995am	6130am	7405va	9455am	9775va
			13740va					
0140	0200		Vatican City, Vatican Radio	9650au	12055au			
0145	0200	twhfa	Albania, Radio Tirana Intl	6115na	7160na			

SELECTED PROGRAMMING BEGINS ON PAGE 55

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

0200	0230		Austria, AWR	9820as				
0200	0230	sm w fa	Belarus, Radio Belarus Intl	6070eu	7210eu			
0200	0230		Myanmar, Radio	7185do				
0200	0230	as/vl	Solomon Islands, SIBC	5020do				
0200	0245		Germany, Deutsche Welle	11965as	13720as	15370as		
0200	0256		North Korea, Voice of	11845as	15230as			
0200	0257		Canada, Radio Canada Intl	15260as	17860as			
0200	0300		Anguilla, Caribbean Beacon	6090am				
0200	0300	twhfa	Argentina, RAE	11710am				
0200	0300		Australia, ABC NT Alice Springs	4835do				
0200	0300		Australia, ABC NT Katherine	5025do				
0200	0300		Australia, ABC NT Tennant Crk	4910do				
0200	0300		Australia, Radio	9660pa	12080pa	15240pa	15415as	
			15515pa	17580pa	17750as	21725as		
0200	0300		Bulgaria, Radio	9400na	11700na			
0200	0300		Canada, CBC Northern Service	9625do				
0200	0300		Canada, CFRX Toronto ON	6070do				
0200	0300		Canada, CFVP Calgary AB	6030do				
0200	0300		Canada, CKZN St John's NF	6160do				
0200	0300		Canada, CKZU Vancouver BC	6160do				
0200	0300		Costa Rica, R for Peace Intl	7445usb	15040va			
0200	0300		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am	13750na				
0200	0300		Cuba, Radio Havana	6000na	9820na	11705usb		
0200	0300		Ecuador, HCJB	9745na	11960na	21455usb	21470as	
0200	0300		Egypt, Radio Cairo	9475na				
0200	0300	m/vl	Guatemala, Radio Cultural	3300do	5955do			
0200	0300		Guyana, Voice of	3290do	5950do			
0200	0300		Kenya, Kenya BC Corp	4885do	4935do			
0200	0300		Malaysia, Radio	7295do				
0200	0300		Namibia, NBC	3270af	3290af			
0200	0300		New Zealand, Radio NZ Intl	17675pa				
0200	0300		Philippines, Radio Pilipinas	12015as	15120as	15270as		
0200	0300		Romania, R Romania Intl	9510na	11940na	15105as	15180as	
			17815pa					
0200	0300		Russia, University Network	9940as				
0200	0300		Russia, Voice of Russia	7180na	9725na	12000na	17595na	
0200	0300		Singapore, SBC Radio One	6150do				
0200	0300	mtwhf/vl	Solomon Islands, SIBC	5020do				
0200	0300		South Korea, R Korea Intl	7275as	9560na	11725sa	11810sa	
			15575na					
0200	0300		Sri Lanka, SLBC	6005as	9700as	15425as		
0200	0300		Taiwan, R Taipei Intl	5950na	9680na	11740na	15320as	15345as
0200	0300		UK, BBC World Service	5975am	6195as	9410as	9510eu	9770af
			9825sa	11835ca	12095sa	15280as	15310as	15360eu	15470af
			17790af					
0200	0300		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	
			6458usb	10320usb	10940usb	12579usb	12689usb	13362usb	
0200	0300		USA, KALJ Dallas TX	5755va				
0200	0300		USA, KJES Vado NM	7555na				
0200	0300		USA, KTBN Salt Lk City UT	7505na				
0200	0300		USA, KWHR Naalehu HI	17510as				
0200	0300		USA, Voice of America	7115va	9635va	11705va	11725va	11820va
			13650va	17740va	17820va			
0200	0300		USA, WBCQ Kennebunk, ME	7415na	9335na			
0200	0300		USA, WEWN Birmingham AL	5825na	9355na	15745na		
0200	0300		USA, WHRA Greenbush ME	7580va				
0200	0300		USA, WHRI Noblesville IN	5745va	7315am			
0200	0300		USA, WINB Red Lion PA	9320am				
0200	0300		USA, WJIE Louisville KY	7490am	13595am			
0200	0300		USA, WRMI Miami FL	7385am				
0200	0300		USA, WRNO New Orleans LA	7355am				
0200	0300		USA, WSHB Cypress Creek SC	5850am	7535eu	9430af		
0200	0300		USA, WTJC Newport NC	9370na				
0200	0300		USA, WWCR Nashville TN	3210na	5070na	5935na	7435na	
			15685na					
0200	0300		USA, WWRB Manchester TN	5085va	6890va			
0200	0300		USA, WYFR Okeechobee FL	6065na	9505na			
0200	0300		Zambia, Christian Voice	4965af				
0200	1215		Cambodia, National Radio Of	11940as				
0203	0210		Croatia, Croatian Radio	9925na				
0215	0220		Nepal, Radio	3230as	5005as			
0230	0257		Vietnam, Voice of	6175na				
0230	0300		Albania, Radio Tirana Intl	6115eu	7160eu			
0230	0300		Hungary, Radio Budapest	9570na				
0230	0300		Slovakia, AWR	7235as				
0230	0300		Sweden, Radio	9490na				
0230	0300	a	UK, Wales Radio Intl	9795na				
0230	0300	vl	Zambia, Radio ZNBC	4910do	6265al			
0250	0300		Vatican City, Vatican Radio	7305am	9605am			

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

0300	0310		Vatican City, Vatican Radio	7305am	9605am			
0300	0327		Czech Rep, Radio Prague Intl	7345na	7385na	9870na		
0300	0330		Ecuador, HCJB	11960na	21470as			
0300	0330		Egypt, Radio Cairo	9475na				
0300	0330		Philippines, Radio Pilipinas	12015as	15120as	15270as		
0300	0330		S Africa, Channel Africa	6035af				
0300	0330		Thailand, Radio	15395na				
0300	0330		USA, KJES Vado NM	7555na				
0300	0330		USA, KVOH Los Angeles CA	9975na				
0300	0345		Germany, Deutsche Welle	9535na	9640na	11935am		
			15105na					
0300	0356		China, China Radio Intl	9560na	9690na			
0300	0356		North Korea, Voice of	6195as	7140as	9345as		
0300	0400		Anguilla, Caribbean Beacon	6090am				
0300	0400		Australia, ABC NT Alice Springs	4835do				
0300	0400		Australia, ABC NT Katherine	5025do				
0300	0400		Australia, ABC NT Tennant Crk	4910do				
0300	0400		Australia, Radio	9660pa	12080pa	15240as	15415as	
			15515pa	17580pa	17750as	21725as		
0300	0400	vl	Botswana, Radio	3356do	4820do	7255do		
0300	0400		Canada, CBC Northern Service	9625do				
0300	0400		Canada, CFRX Toronto ON	6070do				
0300	0400		Canada, CFVP Calgary AB	6030do				
0300	0400		Canada, CKZN St John's NF	6160do				
0300	0400		Canada, CKZU Vancouver BC	6160do				
0300	0400		Costa Rica, R for Peace Intl	7455usb	15040va			
0300	0400		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am	13750na	17645as			
0300	0400		Cuba, Radio Havana	6000na	9820na	11705usb		
0300	0400		Ecuador, HCJB	9745na	21455usb			
0300	0400	vl	Guatemala, Radio Cultural	3300do	5955do			
0300	0400		Guyana, Voice of	3290do	5950do			
0300	0400		Japan, Radio	17825ca	21610pa			
0300	0400		Kenya, Kenya BC Corp	4885do	4935do			
0300	0400		Malaysia, Radio	7295do				
0300	0400		Namibia, NBC	3270af	3290af			
0300	0400		New Zealand, Radio NZ Intl	17675pa				
0300	0400		Oman, Radio	15355va				
0300	0400		Russia, University Network	17765as				
0300	0400		Russia, Voice of Russia	11750na	12000na	15455na	17650na	
			17660na	17690na				
0300	0400		Singapore, SBC Radio One	6150do				
0300	0400	mtwhf/vl	Solomon Islands, SIBC	5020do				
0300	0400		Sri Lanka, SLBC	6005as	9700as	15425as		
0300	0400		Taiwan, R Taipei Intl	5950na	9680na	11875as	15320as	
0300	0400		Turkey, Voice of	7270va	9650va			
0300	0400		Uganda, Radio	4976do	5026al	7195al		
0300	0400		UK, BBC World Service	3255af	6005af	6190af	6195eu	7120af
			7160af	9410eu	11730as	11835am	12095sa	15280as	15310as
			15360as	15420af	15575me	17790as		
0300	0400		Ukraine, R Ukraine Intl	7150as	12040as			
0300	0400		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	
			6458usb	10320usb	10940usb	12579usb	12689usb	13362usb	
0300	0400		USA, KALJ Dallas TX	5755va				
0300	0400		USA, KTBN Salt Lk City UT	7505na				
0300	0400		USA, KWHR Naalehu HI	17510as				
0300	0400		USA, Voice of America	5855af	6080af	7105af	7290af	7340af
			9575af	9885af	17895af			
0300	0400		USA, WBCQ Kennebunk, ME	7415na	9335na			
0300	0400		USA, WEWN Birmingham AL	5825na	7425na	15745na		
0300	0400		USA, WHRA Greenbush ME	7580va				
0300	0400		USA, WHRI Noblesville IN	5745va	7315am			
0300	0400		USA, WINB Red Lion PA	9320am				
0300	0400		USA, WJIE Louisville KY	7490am	13595am			
0300	0400		USA, WMLK Bethel PA	9465eu				
0300	0400		USA, WRMI Miami FL	7385am				
0300	0400		USA, WRNO New Orleans LA	7395am				
0300	0400		USA, WSHB Cypress Creek SC	5850am	7535eu	9455eu	11550va	
0300	0400		USA, WTJC Newport NC	9370na				
0300	0400		USA, WWCR Nashville TN	3210na	5070na	5935na	7435na	
			15685na					
0300	0400		USA, WWRB Manchester TN	5085va	6890va			
0300	0400		USA, WYFR Okeechobee FL	6065na	9505na			
0300	0400		Zambia, Christian Voice	6065af				
0300	0400	vl	Zambia, Radio ZNBC	4910do	6265al			
0310	0315		Vatican City, Vatican Radio	7305am	9605am	9660af		
0315	0340		Vatican City, Vatican Radio	9660af				
0330	0345	vl	Libya, Voice of Africa	15435irr	17750irr			
0330	0350		UAE, Emirates Radio	12005na	13675na	15395na	15435na	
0330	0357		Czech Rep, Radio Prague Intl	11600va	15620va			

0330	0357		Vietnam, Voice of	6175na				
0330	0400		Ecuador, HCJB	11960na				
0330	0400		Malaysia, RTM Kota Kinabalu	5979do				
0330	0400		Nigena, Radio/Kaduna	4770do				
0330	0400		Nigeria, Radio/Lagos	3326do	4990al			
0330	0400		Sweden, Radio	9490na				
0330	0400		UAE, AWR	17780as				
0345	0400	l	Seychelles, FEBA Radio	11880af				
0345	0400		Tajikistan, Radio	4760as	7245al			

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

0400	0415		Israel, Kol Israel	9435na	15640va	17600va		
0400	0425		Belgium, RVI Flanders R Intl		15565na			
0400	0430	mtwhf	France Radio France Intl	9550af	15155af			
0400	0430	vl	Guatemala, Radio Cultural		3300do	5955do		
0400	0430	twhfas	Mexico, Radio Mexico Intl		9705am	11770am		
0400	0430		S Africa, AWR	7235af				
0400	0430		S Africa, Channel Africa	5955af				
0400	0430		Sri Lanka, SLBC	6005as	9700as	15425as		
0400	0445		Germany, Deutsche Welle		6180af	7225af	12045af	13690af
0400	0458		New Zealand, Radio NZ Intl		17675pa			
0400	0500		Anguilla, Caribbean Beacon		6090am			
0400	0500		Australia, ABC NT Alice Springs		4835do			
0400	0500		Australia, ABC NT Katherine		5025do			
0400	0500		Australia, ABC NT Tennant Crk		4910do			
0400	0500		Australia, Radio	9660pa	12080pa	15240pa	15415as	
				15515pa	17580pa	17750as	21725as	
0400	0500	vl	Botswana, Radio	3356do	4820do	7255do		
0400	0500		Canada, CBC Northern Service		9625do			
0400	0500		Canada, CFRX Toronto ON		6070do			
0400	0500		Canada, CKZN St John's NF		6160do			
0400	0500		Canada, CKZU Vancouver BC		6160do			
0400	0500		China, China Radio Intl	9730na				
0400	0500		Costa Rica, R for Peace Intl		7455usb	15040va		
0400	0500		Costa Rica, University Network		5030am	6150am	7375am	9725sa
				11870am	13750na	17645as		
0400	0500		Cuba, Radio Havana	6000na	9820na	11705usb		
0400	0500		Ecuador, HCJB	9745na	11960na	21455usb		
0400	0500		Germany, Voice of Hope	15715me				
0400	0500		Guyana, Voice of	3290do	5950do			
0400	0500		Kenya, Kenya BC Corp	4885do	4935do			
0400	0500		Malaysio, Radio	7295do				
0400	0500		Malaysia, RTM Kota Kinabalu		5979do			
0400	0500		Malaysia, Voice of	6175as				
0400	0500		Namibia, NBC	3270af	3290af			
0400	0500		Nigeria, Radio/Kaduna	4770do	6090do			
0400	0500		Nigeria, Radio/Lagos	3326do	4990al			
0400	0500		Nigeria, Voice of	7255af				
0400	0500		Romania, R Romania Intl		9510na	11940na	17735as	21480as
0400	0500		Russia, University Network		17765as			
0400	0500		Russia, Voice of Russia	11750na	12000na	15455na	17650na	
				17660na	17690na			
0400	0500		Singapore, SBC Radio One		6150do			
0400	0500	mtwhf/vl	Solomon Islands, SIBC	5020do				
0400	0500		Uganda, Radio	4976do	5026al	7195al		
0400	0500		UK, BBC World Service	3255af	6005af	6190af	6195af	7120af
				7160af	9410eu	11835am	12095va	15280as	15310as	15420af
				15575va	21660as	21830as		
0400	0500		USA, Armed Forces Network		4319usb	4993usb	5765usb	6350usb
				6458usb	10320usb	10940usb	12579usb	12689usb	13362usb	
0400	0500		USA, KAIJ Dallas TX	5755va				
0400	0500		USA, KTBN Salt Lk City UT		7505na			
0400	0500		USA, KWHR Naalehu HI	17780as				
0400	0500		USA, Voice of America	4960af	5855af	6080af	9530va	7275af
				7290af	9575af	11965va	15205va	17895af		
0400	0500		USA, WBCQ Kennebunk, ME		7415na			
0400	0500		USA, WEWN Birmingham AL		5825na	7425na	15745na	
0400	0500		USA, WHRA Greenbush ME		7580va			
0400	0500		USA, WHRI Noblesville IN		5745va	7315am		
0400	0500		USA, WINB Red Lion PA	9320am				
0400	0500		USA, WJIE Louisville KY	7490am	13595am			
0400	0500		USA, WMLK Bethel PA	9465eu				
0400	0500		USA, WRMI Miami FL	7385am				
0400	0500		USA, WSHB Cypress Creek SC		5850am	7535eu	9455eu	
				11550am	15195am			
0400	0500		USA, WTJC Newport NC	9370na				
0400	0500		USA, WWCR Nashville TN		3210na	5070na	5935na	7560na
				15685na				
0400	0500		USA, WWRB Manchester TN		5085va	6890va		
0400	0500		USA, WYFR Okeechobee FL		6065na	9355eu	9505na	11580eu
0400	0500		Zambia, Christian Voice	6065af				
0400	0500	vl	Zambia, Radio ZNBC	4910do	6265al			
0403	0410		Croatia, Croatian Radio	9925na				
0427	0500	a	Madagascar, Radio VO Hope		12060af	15320af		
0430	0500		Netherlands, Radio	6165na	9590na			
0430	0500		Nigeria, Radio/Enugu	6025do				
0430	0500		Nigeria, Radio/Ibadan	6050do				
0430	0500		S Africa, AWR	11975af				
0430	0500		Swaziland, TWR	4775af				
0430	0500	mtwhfa	Swaziland, TWR	3200af				
0430	0500		UK, BBC World Service	6010eu	9815eu	13645me	21735me	
0445	0500		Italy, RAI Intl	7235af	9875af			

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

0500	0520		Vatican City, Vatican Radio	4005eu	5890eu	7250eu	9660af	
				11625af	15570af			
0500	0525	a	Madagascar, Radio VO Hope		12060af	15320af		
0500	0530	mtwhf	France Radio France Intl	11685af	17800af			
0500	0530	twhfa	Mexico, Radio Mexico Intl		9705am	11770am		
0500	0530		Netherlands, Radio	6165na	9590na			
0500	0530		S Africa, AWR	5960af	6015af			
0500	0530		S Africa, Channel Africa	11710af				
0500	0530		Uganda, Radio	4976do	5026al	7195al		
0500	0545		Germany, Deutsche Welle		9670na	9785na	11985na	
0500	0600		Anguilla, Canbbean Beacon		6090am			
0500	0600		Australia, ABC NT Alice Springs		4835do			
0500	0600		Australia, ABC NT Katherine		5025do			
0500	0600		Australia, ABC NT Tennant Crk		4910do			
0500	0600		Australia, Radio	9660pa	12080pa	15240pa	15415as	
				15515pa	17580pa	17750as	21725as	
0500	0600	mtwhf	Bhutan, Bhutan BC Service		5030al	6035do		
0500	0600	vl	Botswana, Radio	3356do	4820do	7255do		
0500	0600		Canada, CBC Northern Service		9625do			
0500	0600		Canada, CFRX Toronto ON		6070do			
0500	0600		Canada, CKZN St John's NF		6160do			
0500	0600		Canada, CKZU Vancouver BC		6160do			
0500	0600		China, China Radio Intl	9560na				
0500	0600		Costa Rica, R for Peace Intl		7455usb	15040va		
0500	0600		Costa Rica, University Network		5030am	6150am	7375am	9725sa
				11870am	13750na	17645as		
0500	0600		Cuba, Radio Havana	9550am	9665usb	9820na		
0500	0600		Ecuador, HCJB	9745na	11960na	21455usb		
0500	0600		Germany, Voice of Hope	15715me				
0500	0600		Guyana, Voice of	3290do	5950do			
0500	0600		Japan, Radio	5975eu	6110na	7230eu	11715as	11760as
				13630na	15195as	17810as	21755pa			
0500	0600		Kenya, Kenya BC Corp	4885do	4935do			
0500	0600		Liberia, R Liberia Intl	6100do				
0500	0600		Malaysia, Radio	7295do				
0500	0600		Malaysia, RTM Kota Kinabalu	5979do				
0500	0600		Malaysia, Voice of	6175as	9750as	15295as		
0500	0600		Namibia, NBC	3270af	3290af			
0500	0600		New Zealand, Radio NZ Intl		15340pa			
0500	0600		Nigeria, Radio/Enugu	6025do				
0500	0600		Nigeria, Radio/Ibadan	6050do				
0500	0600		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
0500	0600		Nigeria, Radio/Lagos	3326do	4990al			
0500	0600		Nigeria, Voice of	7255af				
0500	0600		Russia, University Network		17765as			
0500	0600		Russia, Voice of Russia	17635au	17685au	17795as	21790au	
0500	0600		Singapore, SBC Radio One		6150do			
0500	0600	vl	Solomon Islands, SIBC	5020do				
0500	0600		Swaziland, TWR	4775af	6035af	9500af		
0500	0600		UK, BBC World Service	6005af	6190af	6195eu	7160af	9410eu
				9875eu	11675eu	11760me	11765af	11940af	11955as	12095eu
				13645as	15280as	15310as	15360as	15420af	17640as	17790as
				17885af	17790as	21735me				
0500	0600		USA, Armed Forces Network		4319usb	4993usb	5765usb	6350usb
				6458usb	10320usb	10940usb	12579usb	12689usb	13362usb	
0500	0600		USA, KAIJ Dallas TX	5755va				
0500	0600		USA, KTBN Salt Lk City UT		7505na			
0500	0600		USA, KWHR Naalehu HI	11565as	17780as			
0500	0600		USA, Voice of America	5970af	6035af	6080af	7195af	9530va
				11965va	12080af	13670af	15205va			
0500	0600		USA, WBCQ Kennebunk, ME		7415na			
0500	0600		USA, WEWN Birmingham AL		5825na	7425na	15745na	
0500	0600		USA, WHRA Greenbush ME		11730va			
0500	0600		USA, WHRI Noblesville IN		5745va	7315am		
0500	0600		USA, WJIE Louisville KY	7490am	13595am			
0500	0600		USA, WMLK Bethel PA	9465eu				
0500	0600		USA, WRMI Miami FL	7385am				
0500	0600		USA, WRNO New Orleans LA		7395am			

0500	0600		USA, WSHB Cypress Creek SC 11550va	5850am	7535eu	9455eu	9840eu
0500	0600		USA, WTJC Newport NC 9370na				
0500	0600		USA, WWCR Nashville TN 15685na	3210na	5070na	5935na	7560na
0500	0600		USA, WWRB Manchester TN	6890va			
0500	0600		USA, WYFR Okeechobee FL	9355eu			
0500	0600		Zambia, Chnstian Voice 6065af				
0503	0510		Croatia, Croatian Radio 9925na				
0520	0530		Vatican City, Vatican Radio	9660af	11625af	15570af	
0525	0600	vl	Ghana, Ghana BC Corp	3366do	4915do		
0530	0550		UAE, Emirates Radio 15435au	17830au	21695au		
0530	0600	mtwhf/vl	Italy, IRRS 13840va				
0530	0600		S Africa, AWR 15105af				
0530	0600		Thailand, Radio 21795eu				
0532	0600		Austria, Radio Austria Intl	6155eu	13730eu	17870me	

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

0600	0615		S Africa TWR 11640af				
0600	0630	mtwhf	France Radio France Intl 11710af	17800af	21620af		
0600	0630	mtwhf/vl	Italy, IRRS 13840va				
0600	0630		S Africa, AWR 15105af				
0600	0630		S Africa, Channel Afrca 15215af				
0600	0630	vl	Zimbabwe, ZBC Corp 5975do				
0600	0645		Germany, Deutsche Welle	6140eu	11925af	13790af	17860af
0600	0700		Anguilla, Caribbean Beacon	6090am			
0600	0700		Australia, ABC NT Alice Springs	4835do			
0600	0700		Australia, ABC NT Katherine	5025do			
0600	0700		Australia, ABC NT Tennant Crk	4910do			
0600	0700		Australia, Radio 9660pa 15515pa 17580pa 17750as	12080pa	15240pa	15415as	21725as
0600	0700	vl	Botswana, Radio	4820do	7255do		
0600	0700		Canada, CFRX Toronto ON	6070do			
0600	0700		Canada, CFVP Calgary AB	6030do			
0600	0700		Canada, CKZN St John's NF	6160do			
0600	0700		Canada, CKZU Vancouver BC	6160do			
0600	0700		Costa Rica, R for Peace Intl	7455usb	15040va		
0600	0700		Costa Rica, University Network 11870am 13750na 17645as	5030am	6150am	7375am	9725sa
0600	0700		Cuba, Radio Havana	9550am	9665usb	9820na	
0600	0700		Ecuador, HCJB 11680eu				
0600	0700	vl	Ghana, Ghana BC Corp	3366do	4915do		
0600	0700		Guyana, Voice of 3290do	5950do			
0600	0700		Japan, Radio 17870pa 21755pa	7230eu	11740as	13630na	15195as
0600	0700		Kenya, Kenya BC Corp	4885do	4935do		
0600	0700	irreg	Liberia, ELWA	4760do			
0600	0700		Liberia, R Liberia Intl	6100do			
0600	0700		Malaysia, Radio	7295do			
0600	0700		Malaysia, Voice of	6175as	9750as	15295as	
0600	0700		Namibia, NBC	3270af	3290af		
0600	0700		New Zealand, Radio NZ Intl	15340pa			
0600	0700		Nigeria, Radio/Enugu	6025do			
0600	0700		Nigeria, Radio/Ibadan	6050do			
0600	0700		Nigeria, Radio/Kaduna	4770do	6090do	9570do	
0600	0700		Nigeria, Radio/Lagos	3326do	4990al		
0600	0700		Nigeria, Voice of	7255af			
0600	0700		Romania, R Romania Intl	9635na	11940na		
0600	0700		Russia, University Network	17765as			
0600	0700		Russia, Voice of Russia 15490au 21790au	17635au	17685au	17795as	
0600	0700		Singapore, SBC Radio One	6150do			
0600	0700	vl	Solomon Islands, SIBC 5020do				
0600	0700		Swaziland, TWR	4775af	6035af	9500af	
0600	0700		UK, BBC World Service 11955as 12095eu 17640as 17790as	6055af	6190af	9410eu	11765af 11940af 13645as 15280as 15310as 15360as 15420af 17885af 17790as 21735me
0600	0700	mtwhf	UK, BBC World Service	15400af	15575me		
0600	0700		USA, Armed Forces Network 6458usb 10320usb 10940usb	4319usb	4993usb	5765usb	6350usb 12579usb 12689usb 13362usb
0600	0700		USA, KAIJ Dallas TX	5755va			
0600	0700		USA, KTBN Salt Lk City UT	7505na			
0600	0700		USA, KWHR Naalehu HI	11565as	17780as		
0600	0700		USA, Voice of America 9760va 11965va	5970af	6035af	6080af	7195af 9530va 11995af 12080af 13670af 15205va
0600	0700		USA, WEWN Birmingham AL	5825na	7425na	15745na	
0600	0700		USA, WHRA Greenbush ME	11730va			
0600	0700		USA, WHRI Noblesville IN	5745va	7315am		
0600	0700		USA, WJIE Louisville KY	7490am	13595am		
0600	0700		USA, WMLK Bethel PA	9465eu			
0600	0700		USA, WRMI Miami FL	7385am			
0600	0700		USA, WRNO New Orleans LA	7395am			
0600	0700		USA, WSHB Cypress Creek SC	9455sa	11550am		
0600	0700		USA, WTJC Newport NC 9370na				
0600	0700		USA, WWCR Nashville TN 15685na	3210na	5070na	5935na	7560na
0600	0700		USA, WWRB Manchester TN	6890va			
0600	0700		USA, WYFR Okeechobee FL	7355eu	11580eu		
0600	0700	vl	Vanuatu, Radio 4960do	7260do			
0600	0700		Yemen, Rep of Yemen Radio	9780me			
0600	0700		Zambia, Christian Voice 9865af				
0600	0700	vl	Zambia, Radio ZNBC 4910do	6265al			
0630	0700		Ecuador, HCJB 21455usb				
0630	0700		Vatican City, Vatican Radio	11625af	13765af	15570af	
0637	0656		Romania, R Romania Intl	7105eu	9625eu	9550eu	11775eu
0645	0655	as	Monaco, TWR 9870eu				
0645	0700		Germany, Deutsche Welle	6140eu			
0645	0700	as	Germany, TWR 6045eu				
0655	0700	mtwhf	Germany, TWR 6045eu				
0655	0700		Monaco, TWR 9870eu				

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

0700	0704	vl	Pakistan, Radio 17520as	21465as			
0700	0725		Belgium, RVI Flanders R Intl	5985eu			
0700	0727		Czech Rep, Radio Prague Intl	9880eu	11600eu		
0700	0730		Austria, AWR 7230va				
0700	0730		Slovakia, R Slovakia Intl 9440va	15460va	17550va		
0700	0750		Germany, TWR 6045eu				
0700	0750		Monaco, TWR 9870eu				
0700	0750		Swaziland, TWR 4775af	6035af	9500af		
0700	0800		Anguilla, Caribbean Beacon	6090am			
0700	0800		Australia, ABC NT Alice Springs	4835do			
0700	0800		Australia, ABC NT Katherine	5025do			
0700	0800		Australia, ABC NT Tennant Crk	4910do			
0700	0800		Australia, Radio 9660pa 17580pa 17750as 21725as	12080pa	15240pa	15415as	
0700	0800	vl	Botswana, Radio	4820do	7255do		
0700	0800		Canada, CFRX Toronto ON	6070do			
0700	0800		Canada, CFVP Calgary AB	6030do			
0700	0800		Canada, CKZN St John's NF	6160do			
0700	0800		Canada, CKZU Vancouver BC	6160do			
0700	0800		Costa Rica, R for Peace Intl	7455usb	15040va		
0700	0800		Costa Rica, University Network 11870am 13750na 17645as	5030am	6150am	7375am	9725sa
0700	0800		Ecuador, HCJB	11680eu	11755pa	21455usb	
0700	0800	mtwhf	Eqt Guinea, Radio Africa	15185af			
0700	0800	as/vl	Eqt. Guinea, Radio East Africa	15185af			
0700	0800	mtwhf	France Radio France Intl 15605af				
0700	0800		Germany, Deutsche Welle	6140eu			
0700	0800		Germany, Voice of Hope 5975eu				
0700	0800	vl	Ghana, Ghana BC Corp	3366do	4915do		
0700	0800		Guyana, Voice of	3290do	5950do		
0700	0800		Kenya, Kenya BC Corp	4885do	4935do		
0700	0800	irreg	Liberia, ELWA	4760do			
0700	0800		Liberia, R Liberia Intl	6100do			
0700	0800		Malaysia, Radio	7295do			
0700	0800		Malaysia, RTM Kota Kinabalu	5979do			
0700	0800		Malaysia, Voice of	6175as	9750as	15295as	
0700	0800		Myanmar, Radio	9730do			
0700	0800		New Zealand, Radio NZ Intl	11675pa			
0700	0800		Nigeria, Radio/Enugu	6025do			
0700	0800		Nigeria, Radio/Ibadan	6050do			
0700	0800		Nigeria, Radio/Kaduna	4770do	6090do	9570do	
0700	0800		Nigeria, Radio/Lagos	3326do	4990al		
0700	0800		Palau, KHBN/VO Hope	9965as	9985as	15725as	
0700	0800		Papua New Guinea, NBC	4890do	9675al		
0700	0800		Romania, R Romania Intl	21530af			
0700	0800		Russia, University Network	17765as			
0700	0800		Russia, Voice of Russia 15490au 17685au 17795as	17495au	17525au	17635au	17675as
0700	0800		Singapore, SBC Radio One	6150do			
0700	0800	vl	Solomon Islands, SIBC 5020do				
0700	0800		Taiwan, R Taipei Intl	5950na			
0700	0800		UK, BBC World Service 12095eu 15310as 17790as 17885af	6190af	11760me	11765af	11940af 11955as 15360as 15400af 15565eu 17640af 17760as 21660as 21735me
0700	0800		USA, Armed Forces Network 6458usb 10320usb 10940usb	4319usb	4993usb	5765usb	6350usb 12579usb 12689usb 13362usb
0700	0800		USA, KAIJ Dallas TX	5755va			
0700	0800		USA, KTBN Salt Lk City UT	7505na			
0700	0800		USA, KWHR Naalehu HI	11565as	17780as		
0700	0800		USA, WEWN Birmingham AL	5825na	7425na	15745na	

0700	0800		USA, WHRA Greenbush ME	11730va				
0700	0800		USA, WHRI Noblesville IN	5745va	7315am			
0700	0800		USA, WJIE Louisville KY	7490am	13595am			
0700	0800		USA, WMLK Bethel PA	9465eu				
0700	0800		USA, WRNO New Orleans LA	7395am				
0700	0800		USA, WSHB Cypress Creek SC	9455sa	11550am			
0700	0800		USA, WTJC Newport NC	9370na				
0700	0800		USA, WWCR Nashville TN 15685na	3210na	5070na	5935na	7560na	
0700	0800		USA, WWRB Manchester TN	6890va				
0700	0800		USA, WYFR Okeechobee FL	7355eu	13695af	15170af		
0700	0800	vl	Vanuatu, Radio	4960do	7260do			
0700	0800		Zambia, Christian Voice	9865af				
0700	0800	vl	Zambia, Radio ZNBC	4910do	6265al			
0715	0800		Guam, TWR 11850as	11980as				
0730	0800	t h	Georgia, Georgian Radio	11805me				
0730	0800		Switzerland, Swiss R Intl	15445af	17685af	21750af		
0730	0800	as	UK, BBC World Service	15575as				
0750	0800	smtwhf	Germany, TWR	6045eu				
0750	0800	smtwhf	Monaco, TWR	9870eu				

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

0800	0815		Guam, TWR 15215as					
0800	0820	smtwhf	Germany, TWR	6045eu				
0800	0820	smtwH	Monaco, TWR	9870eu				
0800	0830	s	Armenia, Voice of	15270eu				
0800	0830		Australia, ABC NT Alice Springs	4835do				
0800	0830		Australia, ABC NT Katherine	5025do				
0800	0830		Australia, ABC NT Tennant Crk	4910do				
0800	0830		Malaysia, RTM Kota Kinabalu	5979do				
0800	0830		Malaysia, Voice of	6175as	9750as	15295as		
0800	0830		Myanmar, Radio	9730do				
0800	0900		Anguilla, Caribbean Beacon	6090am				
0800	0900		Australia, Radio 15415as 21725as	5995pa	9580pa	9710pa	12080pa	15240as
0800	0900	mtwhf	Bhutan, Bhutan BC Service	5030al	6035do			
0800	0900	vl	Botswana, Radio	4820do	7255do			
0800	0900		Canada, CFRX Toronto ON	6070do				
0800	0900		Canada, CFVP Calgary AB	6030do				
0800	0900		Canada, CKZN St John's NF	6160do				
0800	0900		Canada, CKZU Vancouver BC	6160do				
0800	0900		Costa Rica, University Network 11870am 13750na 17645as	5030am	6150am	7375am	9725sa	
0800	0900		Ecuador, HCJB	11755pa	21455usb			
0800	0900	mtwhf	Eqt Guinea, Radio Africa	15185af				
0800	0900	as/vl	Eqt. Guinea, Radio East Africa	15185af				
0800	0900		Germany, Deutsche Welle	6140eu				
0800	0900	vl	Ghana, Ghana BC Corp	3366do	4915do			
0800	0900		Guyana, Voice of	3290do	5950do			
0800	0900		Indonesia, Voice of	9525pa	11785al	15150as		
0800	0900	as/vl	Italy, IRRS 13840va					
0800	0900		Kenya, Kenya BC Corp	4885do	4935do			
0800	0900	irreg	Liberia, ELWA	4760do				
0800	0900		Liberia, R Liberia Intl	6100do				
0800	0900		Malaysia, Radio	7295do				
0800	0900	vl/s	Malta, VO Mediterranean	9605eu				
0800	0900		New Zealand, Radio NZ Intl	11675pa				
0800	0900		Nigeria, Radio/Enugu	6025do				
0800	0900		Nigeria, Radio/Ibadan	6050do				
0800	0900		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
0800	0900		Nigeria, Radio/Lagos	3326do	4990al			
0800	0900		Nigeria, Voice of	7255af				
0800	0900		Palau, KHBN/VO Hope	9965as	9985as	15725as		
0800	0900		Papua New Guinea, NBC	4890do	9675al			
0800	0900		Russia, University Network	17765as				
0800	0900		Russia, Voice of Russia 17685au 17795as	15490au	17495au	17525au	17635au	17675as
0800	0900		Singapore, SBC Radio One	6150do				
0800	0900		South Korea, R Korea Intl	9570am	13670eu			
0800	0900		UK, BBC World Service 15310as 15360eu 15485eu 21470af 21660as 21735me	6190af	9410eu	11940af	11955as	12095eu 15565eu 17640af 17760as 17885af
0800	0900	mtwh*	UK, BBC World Service	15400af	17830af			
0800	0900		USA, Armed Forces Network 6458usb 10320usb 10940usb	4319usb	4993usb	5765usb	6350usb	12579usb 12689usb 13362usb
0800	0900		USA, KAIJ Dallas TX	5755va				
0800	0900		USA, KNLS Anchor Point AK	11765as				
0800	0900		USA, KTBN Salt Lk City UT	7505na				
0800	0900		USA, KWHR Naalehu HI	11565as	17780as			
0800	0900		USA, Voice of America	11930va	13610va	15190va		
0800	0900		USA, WEWN Birmingham AL	5825na	7425na	15745na		
0800	0900		USA, WHRI Noblesville IN	5745va	7315am			
0800	0900		USA, WJIE Louisville KY	7490am	13595am			
0800	0900		USA, WMLK Bethel PA	9465eu				
0800	0900		USA, WRMI Miami FL	7385am				
0800	0900		USA, WRNO New Orleans LA	7395am				
0800	0900		USA, WSHB Cypress Creek SC	9845au	9860eu	11550am		
0800	0900		USA, WTJC Newport NC	9370na				
0800	0900		USA, WWCR Nashville TN 15685na	3210na	5070na	5935na	7560na	
0800	0900		USA, WYFR Okeechobee FL	13570af				
0800	0900	vl	Vanuatu, Radio	4960do	7260do			
0800	0900		Zambia, Christian Voice	9865af				
0815	0900		Guam, TWR 15215as	15330as				
0830	0900		Australia, ABC NT Katherine	2485do				
0830	0900		Australia, ABC NT Tennant Crk	2325do				
0830	0900		Austria, AWR	17780af				
0830	0900		Greece, Voice of	15630eu	17905eu			
0830	0900	vl	Solomon Islands, SIBC	5020do				
0830	0900		Switzerland, Swiss R Intl	21770af				
0840	0850		Turkmenistan, Turkmen Radio	5015as				

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

0900	0915	mtwhf/vl	Solomon Islands, SIBC	5020do				
0900	0929		Czech Rep, Radio Prague Intl	21745va				
0900	0930		Austria, AWR	17780af				
0900	0930		Guam, TWR 15330as					
0900	0930	irreg	Liberia, ELWA	4760do				
0900	0945		Germany, Deutsche Welle 15410af 15470as 17715as 21780af 21790pa	6140eu	6160va	9510am	12035af 17770pa 17800af 17820as 21560af	
0900	1000		Anguilla, Caribbean Beacon	6090am				
0900	1000		Australia, ABC NT Katherine	2485do				
0900	1000		Australia, ABC NT Tennant Crk	2325do				
0900	1000		Australia, Radio	9580va	11880as	15240as	17750as	21820as
0900	1000		Australia, Voice International	13685as	17645as			
0900	1000	v	Botswana, Radio	4820do	7255do			
0900	1000		Canada, CFRX Toronto ON	6070do				
0900	1000		Canada, CFVP Calgary AB	6030do				
0900	1000		Canada, CKZN St John's NF	6160do				
0900	1000		Canada, CKZU Vancouver BC	6160do				
0900	1000		China, China Radio Intl	11730pa	15210pa			
0900	1000		Costa Rica, University Network 11870am 13750na 17645as	5030am	6150am	7375am	9725sa	
0900	1000		Ecuador, HCJB	11755pa	21455usb			
0900	1000	mtwhf	Eqt Guinea, Radio Africa	15185af				
0900	1000	cs/vl	Eqt. Guinea, Radio East Africa	15185af				
0900	1000		Germany, Voice of Hope	21590me				
0900	1000	vi	Ghana, Ghana BC Corp	4915do				
0900	1000		Guyana, Voice of	3290do	5950do			
0900	1000	as/vl	Italy, IRRS 13840va					
0900	1000		Kenya, Kenya BC Corp	4885do	4935do			
0900	1000		Liberia, R Liberia Intl	6100do				
0900	1000		Malaysia, Radio	7295do				
0900	1000		New Zealand, Radio NZ Intl	11675pa				
0900	1000		Nigeria, Radio/Enugu	6025do				
0900	1000		Nigeria, Radio/Ibadan	6050do				
0900	1000		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
0900	1000		Nigeria, Radio/Lagos	3326do	4990al			
0900	1000		Palau, KHBN/VO Hope	9965as	9985as	15725as		
0900	1000		Papua New Guinea, NBC	4890do	9675al			
0900	1000		Russia, University Network	17765as				
0900	1000		Singapore, SBC Radio One	6150do				
0900	1000	as/vl	Solomon Islands, SIBC	5020do				
0900	1000		UK, BBC World Service 11760me 11940af 15565eu 17640af	6190af	6195eu	9605as	9740as 11945as 12095eu 15310as 15360as 15485eu 17760as 17790as 21470af 21735me	
0900	1000	mtwhf	UK, BBC World Service	15190sa	17830af			
0900	1000		USA, Armed Forces Network 6458usb 10320usb 10940usb	4319usb	4993usb	5765usb	6350usb	12579usb 12689usb 13362usb
0900	1000		USA, KAIJ Dallas TX	5755va				
0900	1000		USA, KTBN Salt Lk City UT	7505na				
0900	1000		USA, KWHR Naalehu HI	11565as	17780as			
0900	1000		USA, Voice of America	11930va	13610va	15190va		
0900	1000		USA, WEWN Birmingham AL	5825na	7425na	15745na		
0900	1000		USA, WHRA Greenbush ME	11730va				
0900	1000		USA, WHRI Noblesville IN	5745va	7315am			
0900	1000		USA, WJIE Louisville KY	7490am	13595am			
0900	1000		USA, WRMI Miami FL	9955am				
0900	1000		USA, WSHB Cypress Creek SC	9455sa	9860eu	11550am		
0900	1000		USA, WTJC Newport NC	9370na				
0900	1000		USA, WWCR Nashville TN 15685na	9475na	5070na	5935na	7560na	

0900	1000	vl	Vanuatu, Radio	4960do	7260do			
0900	1000	mtwhf	Vatican City, Vatican Radio		5890eu			
0900	1000		Zambia, Christian Voice	9865af				
0930	0950		Greece, Voice of	15630eu	17900eu			
0930	1000		Georgia, Georgian Radio		11910me			
0930	1000	mtwhf	Guam, TWR	15330as				
0930	1000		Lithuania, R Vilnius	9710eu				
0930	1000		Netherlands, Radio	9790pa	12065as	13710as		
0945	1000		Germany, Deutsche Welle		6140eu			
0945	1000	mtwhf/vl	Solomon Islands, SIBC	5020do				

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

1000	1005	vl	Pakistan, Radio	17520as	21465as			
1000	1027		Vietnam, Voice of	9840au	12020au			
1000	1030		Guam, AWR	11560as	11930as			
1000	1030		Mongolia, Voice of	12085as				
1000	1030		Netherlands, Radio	9790pa	12065as	13710as		
1000	1030		UK, RTE Radio	15280au				
1000	1056		North Korea, Voice of	9335ca	11710ca	11735as	13650as	
1000	1100		Anguilla, Caribbean Beacon		6090am			
1000	1100		Australia, ABC NT Katherine		2485do			
1000	1100		Australia, ABC NT Tennant Crk		2325do			
1000	1100		Australia, Radio	9580va	11880as	15240as	17750as	21820as
1000	1100		Australia, Voice International		13685as			
1000	1100	as	Bhutan, Bhutan BC Service		5030al	6035do		
1000	1100	vl	Botswana, Radio	4820do	7255do			
1000	1100		Canada, CFRX Toronto ON		6070do			
1000	1100		Canada, CFVP Calgary AB		6030do			
1000	1100		Canada, CKZN St John's NF		6160do			
1000	1100		Canada, CKZU Vancouver BC		6160do			
1000	1100		China, China Radio Intl	11730pa	15210pa			
1000	1100		Costa Rica, University Network 11870am 13750na		5030am 17645as	6150am	7375am	9725sa
1000	1100		Ecuador, HCJB	11755pa	21455usb			
1000	1100	mtwhf	Eqt Guinea, Radio Africa		15185af			
1000	1100	as/vl	Eqt. Guinea, Radio East Africa		15185af			
1000	1100		Germany, Deutsche Welle		6140eu			
1000	1100	vl	Ghana, Ghana BC Corp		4915do			
1000	1100		Guyana, Voice of	3290do	5950do			
1000	1100		India, All India Radio 17510au	11585as 17800au	13695au 17895au	15020as	15260as	
1000	1100	as/vl	Italy, IRRS	13840va				
1000	1100		Japan, Radio	9695as	15590as	21755pa		
1000	1100		Liberia, R Liberia Intl	6100do				
1000	1100		Malaysia, Radio	7295do				
1000	1100		New Zealand, Radio NZ Intl		11675pa			
1000	1100		Nigeria, Radio/Enugu	6025do				
1000	1100		Nigeria, Radio/Ibadan	6050do				
1000	1100		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
1000	1100		Nigeria, Radio/Lagos	3326do	4990al			
1000	1100		Nigeria, Voice of	7255af				
1000	1100		Palau, KHBN/VO Hope	9965as	9985as	12160as	15725as	
1000	1100		Papua New Guinea, NBC		4890do	9675al		
1000	1100		Russia, University Network		17765as			
1000	1100		Singapore, SBC Radio One		6150do			
1000	1100	vl	Solomon Islands, SIBC	5020do				
1000	1100		UK, BBC World Service 11760me 15485eu	6190af 11945af 15565eu	6195va 12095eu 15575as	9605as 15280as 17640af	9740as 15310as 17790as	15335as 17885af 21730af
				21470as	21660as			
1000	1100		USA, Armed Forces Network 6458usb		4319usb 10320usb	4993usb 10940usb	5765usb 12579usb	6350usb 12689usb 13362usb
1000	1100		USA, KAIJ Dallas TX		5755va			
1000	1100		USA, KTBN Salt Lk City UT		7505na			
1000	1100		USA, KWHR Naalehu HI	9930as	11565pa			
1000	1100		USA, Voice of America 15425va		5745am	7370am	9590am	9770va 15240va
1000	1100		USA, WEWN Birmingham AL 15745eu			7425na	7520na	9465na 15405eu
1000	1100		USA, WHRI Noblesville IN		6040na	9495am		
1000	1100		USA, WINB Red Lion PA	13570am				
1000	1100		USA, WJIE Louisville KY	7490am	13595am			
1000	1100		USA, WRMI Miami FL	9955am				
1000	1100		USA, WRNO New Orleans LA		7395am			
1000	1100		USA, WSHB Cypress Creek SC		6095am	9455am		
1000	1100		USA, WTJC Newport NC	9370na				
1000	1100		USA, WWCR Nashville TN 15685na		5070na	5935na	7560na	
1000	1100		USA, WYFR Okeechobee FL		5950na			
1015	1030		Israel, Kol Israel	15640va	17545va			
1030	1045	mtwhf	Ethiopia, Radio	5990do	7110do	9704do		
1030	1057		Czech Rep, Radio Prague Intl		9880eu	11615eu		
1030	1100		Georgia, Georgian Radio		11910me			
1030	1100		Guam, AWR	11560as				
1030	1100		Netherlands, Radio 13710as	5965na	6045eu	9790pa	9860eu	12065as
1030	1100		UAE, Emirates Radio	13675eu	15370eu	15400eu	21597eu	

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

1100	1105		New Zealand, Radio NZ Intl		11675pa			
1100	1120	fa	Kazakhstan, R Almaty	9620eu	11840eu			
1100	1127		Vietnam, Voice of	7285as				
1100	1130	as	Bhutan, Bhutan BC Service		5030al	6035do		
1100	1130		Netherlands, Radio 13710as	5965na	6045eu	9790pa	9860eu	12065as
1100	1130	mtwhf	UK, BBC World Service	15220am				
1100	1130		UK, BBC World Service	15400af	17790as			
1100	1145		Germany, Deutsche Welle 21525af	21665af	6140eu	11785af	15410af	17860af
1100	1200		Anguilla, Caribbean Beacon		11775am			
1100	1200		Australia, ABC NT Katherine		2485do			
1100	1200		Australia, ABC NT Tennant Crk		2325do			
1100	1200		Australia, Radio 11650pa	11880as	5995pa 12080pa	6020pa 15240as	9475as 21820as	9580pa
1100	1200		Australia, Voice International		13685as			
1100	1200	vl	Austria, Radio Africa Intl	17815eu				
1100	1200		Bulgaria, Radio	15700eu	17500eu			
1100	1200		Canada, CFRX Toronto ON		6070do			
1100	1200		Canada, CFVP Calgary AB		6030do			
1100	1200		Canada, CKZN St John's NF		6160do			
1100	1200		Canada, CKZU Vancouver BC		6160do			
1100	1200		Costa Rica, University Network 11870am 13750na		5030am 17645as	6150am	7375am	9725sa
1100	1200		Ecuador, HCJB	12005am	15115na	21455usb		
1100	1200	mtwhf	Eqt Guinea, Radio Africa		15185af			
1100	1200	as/vl	Eqt. Guinea, Radio East Africa		15185af			
1100	1200	vl	Ghana, Ghana BC Corp		4915do			
1100	1200		Guyana, Voice of	3290do	5950do			
1100	1200		Iran, VOIRI	15215as	15585as	15600as	21470as	21730au
1100	1200	as/vl	Italy, IRRS	13840va				
1100	1200		Japan, Radio	6120na	9695as	15590as		
1100	1200		Jordan, Radio	11690eu				
1100	1200		Malaysia, Radio	7295do				
1100	1200		Palau, KHBN/VO Hope	9965as	9985as	12160as	13840as	
1100	1200		Papua New Guinea, NBC		4890do	9675al		
1100	1200		Russia, University Network		17765as			
1100	1200		Singapore, R Singapore Intl		6150as	9600as		
1100	1200		Taiwan, R Taipei Intl	7445as	11985as			
1100	1200		UK, BBC World Service 11760me 15310as 17760as	6190af 11945as 15400af 17830af	6195va 12095eu 15485eu 17885af	9605as 12105sa 15565eu 21470af	9740as 15190va 15575as 21660as	15220am 15280as 17640af 17700eu
1100	1200		Ukraine, R Ukraine Intl	11840na	15520na			
1100	1200		USA, Armed Forces Network 6458usb		4319usb 10320usb	4993usb 10940usb	5765usb 12579usb	6350usb 12689usb 13362usb
1100	1200		USA, KAIJ Dallas TX		5755va			
1100	1200		USA, KTBN Salt Lk City UT		7505na			
1100	1200		USA, KWHR Naalehu HI	9930as	11565pa			
1100	1200		USA, Voice of America 15240va	6160va	9645va 15425va	9760va	9770va	15190va
1100	1200		USA, WEWN Birmingham AL 15745eu		7425na	7520na	9465na	15405eu
1100	1200		USA, WHRI Noblesville IN		6040na	9495am		
1100	1200		USA, WINB Red Lion PA	13570am				
1100	1200		USA, WJIE Louisville KY	7490am	13595am			
1100	1200		USA, WRMI Miami FL	9955am				
1100	1200		USA, WRNO New Orleans LA		7395am			
1100	1200		USA, WSHB Cypress Creek SC		6095am	9455am	11660am	
1100	1200		USA, WTJC Newport NC	9370na				
1100	1200		USA, WWCR Nashville TN 15685na		5070na	5935na	7560na	
1100	1200		USA, WYFR Okeechobee FL		5850na	5950na	11725sa	
1106	1200		New Zealand, Radio NZ Intl		15175pa			
1115	1145		Nepal, Radio	3230as	5005as			
1120	1140	w	Kazakhstan, R Almaty	9620eu	11840eu			
1130	1145	vl	Libya, Voice of Africa	15435irr	17750irr			
1130	1155		Belgium, RVI Flanders R Intl		9865as			
1130	1200		Austria, Radio Austria Intl		6155eu	13730eu	21780as	
1130	1200		Netherlands, Radio	5965na	6045eu	9860eu		
1130	1200		South Korea, R Korea Intl		9650na			
1130	1200		Sweden, Radio	17505va	18960na			
1130	1200	mtwhf	UK, BBC World Service	11835am	15190sa			

1130	1200	f	Vatican City, Vatican Radio	15595va	17515va	
1140	1200	t	Kazakhstan, R Almaty 9620eu	11840eu		
1145	1200		Germany, Deutsche Welle	6140eu		
1155	1200	vl	Zimbabwe, ZBC Corp 5975do			

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

1200	1215		UK, BBC World Service 7135af				
1200	1225		Netherlands, Radio 5965na	6045eu	9860eu		
1200	1230		France Radio France Intl 15540af	25820af			
1200	1230		Iran, VOIRI 15215as	15585as	15600as	21470as	21730as
1200	1230		Mongolia, Voice of 12015eu				
1200	1230		South Korea, R Korea Intl	9650na			
1200	1230		Uzbekistan, Radio Tashkent 17775as	5975as	7285as	9715as	15295as
1200	1230	vl	Zimbabwe, ZBC Corp 5975do				
1200	1259		Poland, Radio Polonia 6095eu	9525eu	11820eu		
1200	1300		Anguilla, Caribbean Beacon	11775am			
1200	1300		Australia, ABC NT Katherine	2485do			
1200	1300		Australia, ABC NT Tennant Crk	2325do			
1200	1300		Australia, Radio 5995pa 11650pa 11880as	6020pa 21820as	9475as	9580pa	
1200	1300		Australia, Voice International	13685as			
1200	1300		Bangladesh, Bangla Betar	7185as	9550as		
1200	1300		Canada, CBC Northern Service	9625do			
1200	1300		Canada, CFRX Toronto ON	6070do			
1200	1300		Canada, CFVP Calgary AB	6030do			
1200	1300		Canada, CKZN St John's NF	6160do			
1200	1300		Canada, CKZU Vancouver BC	6160do			
1200	1300		Canada, Radio Canada Intl	9660as	15190as		
1200	1300	mtwhf	Canada, Radio Canada Intl	9515na	13655na	17820na	
1200	1300		China, China Radio Intl 9730as 15415pa	9760as	11760pa	11855pa	11980as
1200	1300		China, Voice of Hope 7485as				
1200	1300		Costa Rica, University Network 11870am 13750na	5030am 17645as	6150am	7375am	9725sa
1200	1300		Ecuador, HCJB	12005am	15115na	21455usb	
1200	1300		Germany, Deutsche Welle	6140eu			
1200	1300		Germany, Overcomer Ministries	5975eu			
1200	1300		Guyana, Voice of	3290do	5950do		
1200	1300		Jordan, Radio	11690eu			
1200	1300		Malaysia, Radio	7295do			
1200	1300		New Zealand, Radio NZ Intl	15175pa			
1200	1300		Palau, KHBN/VO Hope 9965as	9985as	12160as	13840as	
1200	1300	mtwhfa	Papua New Guinea, NBC	4890do	9675al		
1200	1300		Russia, University Network	17765as			
1200	1300		Russia, Voice of Hope 13590as				
1200	1300		Singapore, R Singapore Intl	6150as	9600as		
1200	1300		Taiwan, R Taipei Intl 7130as	9610au			
1200	1300		UK, BBC World Service 6190af 11760me 11945as 15565eu 15575as 21660as	6195va 12095eu 17640af	9605as 12105sa 17700eu	9740as 15190va 17760as	15310as 15280as 17830aft 17885af
1200	1300		USA, Armed Forces Network 6458usb 10320usb	4319usb 10940usb	4993usb 12579usb	5765usb 12689usb	6350usb 13362usb
1200	1300		USA, KALJ Dallas TX	13815va			
1200	1300		USA, KTBN Salt Lk City UT	7505na			
1200	1300		USA, KWHR Naalehu HI 9930as	11565pa			
1200	1300		USA, Voice of America 6160va 15425va	9645va	9760va	15160va	15240va
1200	1300		USA, WEWN Birmingham AL 15745eu	9465na	11550na	11875na	15405eu
1200	1300		USA, WHRI Noblesville IN	6040na	9495am		
1200	1300		USA, WINB Red Lion PA 13570am				
1200	1300		USA, WJIE Louisville KY 7490am	13595am			
1200	1300		USA, WRMI Miami FL 15725am				
1200	1300		USA, WRNO New Orleans LA	7395am			
1200	1300		USA, WSHB Cypress Creek SC	6095am	9455am	11660am	
1200	1300		USA, WTJC Newport NC 9370na				
1200	1300		USA, WWCR Nashville TN 13845na 15685na	5935na	7560na	12160na	
1200	1300		USA, WYFR Okeechobee FL 17750na	5850na	5950na	13695na	
1230	1257		Vietnam, Voice of 9840as	12020as			
1230	1300		Sri Lanka, SLBC 6005as	9700as	15425as		
1230	1300		Sweden, Radio 17505va	18960na	21530as		
1230	1300		Thailand, Radio 9885va				
1230	1300		Turkey, Voice of 17615as	17830eu			
1230	1300	a	UK, Wales Radio Intl 17845au				
1245	1300	tfa	Seychelles, FEBA Radio 15535me				

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

1300	1305		New Zealand, Radio NZ Intl	15175pa			
1300	1310	mtwhfa	Turkmenistan, Turkmen Radio	5015as			
1300	1330		Guam, AWR 15385as				
1300	1330		Turkey, Voice of 17615as	17830eu			
1300	1330		UAE, AWR 17740as				
1300	1356		North Korea, Voice of 9335eu	11710na	13760eu	15244eu	
1300	1357		Czech Rep, Radio Prague Intl	13580eu	21735as		
1300	1400		Anguilla, Caribbean Beacon	11775am			
1300	1400		Australia, ABC NT Katherine	2485do			
1300	1400		Australia, ABC NT Tennant Crk	2325do			
1300	1400		Australia, Radio 5995pa 11650pa 11880as	6020pa 21820as	9475as	9580pa	
1300	1400		Australia, Voice International	13685as			
1300	1400		Canada, CBC Northern Service	9625do			
1300	1400		Canada, CFRX Toronto ON	6070do			
1300	1400		Canada, CFVP Calgary AB	6030do			
1300	1400		Canada, CKZN St John's NF	6160do			
1300	1400		Canada, CKZU Vancouver BC	6160do			
1300	1400		Canada, Radio Canada Intl	9515na	13655na		
1300	1400	as	Canada, Radio Canada Intl	17820na			
1300	1400		China, China Radio Intl 7405na	9570pa	11760pa	11980as	15180as
1300	1400		China, Voice of Hope 7485as				
1300	1400		Costa Rica, University Network 11870am 13750na	5030am 17645as	6150am	7375am	9725sa
1300	1400		Ecuador, HCJB	12005am	15115na	21455usb	
1300	1400		Germany, Deutsche Welle	6140eu			
1300	1400		Germany, Overcomer Ministries	13810me			
1300	1400		Jordan, Radio 11690eu				
1300	1400		Malaysia, Radio 7295do				
1300	1400		Palau, KHBN/VO Hope 9965as	9985as	12160as	13840as	
1300	1400	mtwhfa	Papua New Guinea, NBC	4890do	9675al		
1300	1400		Russia, University Network	17765as			
1300	1400	as	S Africa, Channel Africa 11720af	17780af	21725af		
1300	1400		Singapore, R Singapore Intl	6150as	9600as		
1300	1400		South Korea, R Korea Intl	9570as	13670am		
1300	1400		Sri Lanka, SLBC 6005as	9700as	15425as		
1300	1400		UK, BBC World Service 6190af 11760me 11940af 15565eu 15420af 17795af 17830af	6195va 12095eu 15485eu 17885af	9605as 12105sa 15575eu 21470af	9740as 15190va 17640af 21640af	15285as 15310as 17720eu 17760as
1300	1400		USA, Armed Forces Network 6458usb 10320usb	4319usb 10940usb	4993usb 12579usb	5765usb 12689usb	6350usb 13362usb
1300	1400		USA, KALJ Dallas TX	13815va			
1300	1400		USA, KNLS Anchor Point AK	11565as			
1300	1400		USA, KTBN Salt Lk City UT	7505na			
1300	1400		USA, KWHR Naalehu HI 9930as	11565pa			
1300	1400		USA, Voice of America 6160va	9645va	9760va	15160va	15425va
1300	1400		USA, WBCQ Kennebunk, ME	17495na			
1300	1400	s	USA, WBCQ Kennebunk, ME	7415na			
1300	1400		USA, WEWN Birmingham AL	11550na	11875na	15405eu	15745eu
1300	1400		USA, WHRI Noblesville IN	6040na	15105am		
1300	1400		USA, WINB Red Lion PA 13570am				
1300	1400		USA, WJIE Louisville KY 7490am	13595am			
1300	1400		USA, WRMI Miami FL 15725am				
1300	1400		USA, WRNO New Orleans LA	7395am			
1300	1400		USA, WSHB Cypress Creek SC	9430na	9455am		
1300	1400		USA, WTJC Newport NC 9370na				
1300	1400		USA, WWCR Nashville TN 15685na	9475na	12160na	13845na	
1300	1400		USA, WWRB Manchester TN	9320va	9400va	9495va	12172va
1300	1400		USA, WYFR Okeechobee FL 11970na 17510sa	11550as 17750na	11830na	11865sa	
1310	1400	occasional	New Zealand, Radio NZ Intl	6095pa			
1330	1350		UAE, Emirates Radio 13630eu	13675eu	15400eu	21597eu	
1330	1357		Vietnam, Voice of 7145eu	9730eu			
1330	1400		Austria, Radio Austria Intl	6155eu	13730eu		
1330	1400		Germany, Voice of Hope 17550as				
1330	1400		Guam, AWR 11705as	11980as			
1330	1400		India, All India Radio 9690as	11620as	13710as		
1330	1400		Laos, Lao National Radio	7145as			
1330	1400		Sweden, Radio 17505va	18960na			
1330	1400		UAE, AWR 15320as				
1330	1400		Uzbekistan, Radio Tashkent 17775as	5975as	7285as	9715as	15295as

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

1400	1415	mtwhf	UK, BBC World Service	11860af	21490af	
1400	1430		Ecuador, HCJB	12005am	15115na	21455usb

1400	1430		Germany, Voice of Hope	17550as				
1400	1430		Thailand, Radio	9830va				
1400	1500		Anguilla, Caribbean Beacon		11775am			
1400	1500		Australia, ABC NT Katherine		2485do			
1400	1500		Australia, ABC NT Tennant Crk		2325do			
1400	1500		Australia, Radio	5995pa	9580pa	11650pa	11660as	
1400	1500		Australia, Voice International		13685as			
1400	1500		Canada, CBC Northern Service		9625do			
1400	1500		Canada, CFRX Toronto ON		6070do			
1400	1500		Canada, CFVP Calgary AB		6030do			
1400	1500		Canada, CKZN St John's NF		6160do			
1400	1500		Canada, CKZU Vancouver BC		6160do			
1400	1500		Canada, Radio Canada Intl		9515na	13655na	15305na	17820na
1400	1500		China, China Radio Intl	7405na	9700as	11675pa	13685va	15125as 17720na
1400	1500		China, Voice of Hope	7485as				
1400	1500		Costa Rica, University Network		5030am	6150am	7375am	9725sa 11870am 13750na 17645as
1400	1500		France Radio France Intl	11610af	17620af			
1400	1500		Germany, Deutsche Welle		6140eu			
1400	1500		India, All India Radio	9690as	11620as	13710as		
1400	1500		Japan, Radio	7200as	9505na	11730as	17755me	
1400	1500		Jordan, Radio	11690eu				
1400	1500	occasional	New Zealand, Radio NZ Intl		6095pa			
1400	1500		Oman, Radio	13725va				
1400	1500		Palau, KHBN/VO Hope	9965as	9985as	12160as	13840as	
1400	1500	mtwhfa	Papua New Guinea, NBC		4890do	9675al		
1400	1500		Romania, R Romania Intl		15250eu	17735eu		
1400	1500		Russia, University Network		17765as			
1400	1500		Russia, Voice of Russia	7390as	9745as	12055as	15560as	17645as
1400	1500	as	S Africa, Channel Africa	11720af	17780af	21725af		
1400	1500		Singapore, SBC Radio One		6150do			
1400	1500		Sri Lanka, SLBC	6005as	9700as	15425as		
1400	1500		Taiwan, R Taipei Intl	15265as				
1400	1500		UK, BBC World Service	6190af	6195va	9605as	9740as	12095eu 12105sa 15105af 15190va 15285as 15310as 15365as 15420af 15575eu 15595eu 17640af 17810sa 17830af 21470af
1400	1500		USA, Armed Forces Network		4319usb	4993usb	5765usb	6350usb 6458usb 10320usb 10940usb 12579usb 12689usb 13362usb
1400	1500		USA, KAIJ Dallas TX	13815va				
1400	1500		USA, KJES Vado NM	11715na				
1400	1500		USA, KTBN Salt Lk City UT		7505na			
1400	1500		USA, KWHR Naalehu HI	9930as	11565pa			
1400	1500		USA, Voice of America	6160va	7125va	9760va	15160va	15255va 15425va
1400	1500		USA, WBCQ Kennebunk, ME		17495na			
1400	1500	s	USA, WBCQ Kennebunk, ME		7415na			
1400	1500		USA, WEWN Birmingham AL		11550na	11875na	15375na	15745eu
1400	1500		USA, WHRI Noblesville IN		6040na	15105am		
1400	1500		USA, WINB Red Lion PA	13570am				
1400	1500		USA, WJIE Louisville KY	7490am	13595am			
1400	1500		USA, WRMI Miami FL	15725am				
1400	1500		USA, WRNO New Orleans LA		7395am			
1400	1500		USA, WTJC Newport NC	9370na				
1400	1500		USA, WWCR Nashville TN		9475na	12160na	13845na	15685na
1400	1500		USA, WWRB Manchester TN		9320va	9400va	12172va	
1400	1500		USA, WYFR Okeechobee FL		11550as	11830na	11865sa 11970na 17510sa 17750na	
1415	1420		Nepal, Radio	3230as	5005as			
1430	1500		Guam, TWR	15330as				
1430	1500		Myanmar, Radio	4725do	5985do			
1430	1500		Netherlands, Radio	9890as	11835as	12075as	15220na	
1445	1500	f	Seychelles, FEBA Radio	11600as				

1500 UTC - 11AM E / 10AM C / 8AM P

1500	1515		Pakistan, Radio	11570me	15100me	15725af	17750af	
1500	1530		Mexico, Radio Mexico Intl		9705am	11770am		
1500	1530		Mongolia, Voice of	12015eu				
1500	1530		S Africa, Channel Africa	17770af				
1500	1550		Sri Lanka, SLBC	6005as	9700as	15425as		
1500	1556		North Korea, Voice of	9335na	11710na	13760eu	15245eu	
1500	1559		Canada, Radio Canada Intl		15455as	17720as		
1500	1559	as	Canada, Radio Canada Intl		9515na	13655na	17800na	
1500	1600		Anguilla, Caribbean Beacon		11775am			
1500	1600		Australia, Radio	5995pa	9580pa	11650pa	11650pa 11650pa 11660as	
1500	1600		Australia, Voice International		11930as			
1500	1600	vl	Austria, Radio Africa Intl	17895eu				
1500	1600		Canada, CBC Northern Service		9625do			
1500	1600		Canada, CFRX Toronto ON		6070do			
1500	1600		Canada, CFVP Calgary AB		6030do			
1500	1600		Canada, CKZN St John's NF		6160do			
1500	1600		Canada, CKZU Vancouver BC		6160do			
1500	1600		China, China Radio Intl	7160as	9785as	17720as		
1500	1600		China, Voice of Hope	7485as				
1500	1600		Costa Rica, University Network		5030am	6150am	7375am	9725sa 11870am 13750na 17645as
1500	1600		Germany, Deutsche Welle		6140eu			
1500	1600	a	Germany, Overcomer Ministries		6015eu			
1500	1600		Germany, Voice of Hope	15715me				
1500	1600		Guam, TWR	15330as				
1500	1600		Japan, Radio	7200as	9750as	11730as		
1500	1600		Jordan, Radio	11690na				
1500	1600		Myanmar, Radio	4725do	5985do			
1500	1600		Netherlands, Radio	9890as	11835as	12075as	15220na	
1500	1600	occasional	New Zealand, Radio NZ Intl		6095pa			
1500	1600		Palau, KHBN/VO Hope	9965as	9985as	12160as	13840as	
1500	1600	mtwhfa	Papua New Guinea, NBC		4890do	9675al		
1500	1600		Russia, Voice of Russia	4940me	4965me	4975me	7325me	7390as 11500as 11985me
1500	1600		Singapore, SBC Radio One		6150do			
1500	1600		UK, BBC World Service	5975am	6190af	6195va	9740as	11685as 11860af 12095eu 15190va 15310as 15400af 15420af 15565eu 17700as 17830af 17860af 21470af 21490af
1500	1600		USA, Armed Forces Network		4319usb	4993usb	5765usb	6350usb 6458usb 10320usb 10940usb 12579usb 12689usb 13362usb
1500	1600		USA, KAIJ Dallas TX	13815va				
1500	1600		USA, KJES Vado NM	11715na				
1500	1600		USA, KTBN Salt Lk City UT		15590na			
1500	1600		USA, KWHR Naalehu HI	9930as	11565pa			
1500	1600		USA, Voice of America	6160va	7125va	9590va	9700va	9760va 9845va 12040va 15205va 15255va 15550va
1500	1600		USA, WBCQ Kennebunk, ME		17495na			
1500	1600	s	USA, WBCQ Kennebunk, ME		7415na			
1500	1600		USA, WEWN Birmingham AL		11550na	11875na	15375na	15745eu
1500	1600		USA, WHRA Greenbush ME		17650va			
1500	1600		USA, WHRI Noblesville IN		13760na	15105am		
1500	1600		USA, WINB Red Lion PA	13570am				
1500	1600		USA, WJIE Louisville KY	7490am	13595am			
1500	1600		USA, WRMI Miami FL	15725am				
1500	1600		USA, WRNO New Orleans LA		7395am	15420am		
1500	1600		USA, WTJC Newport NC	9370na				
1500	1600		USA, WWCR Nashville TN		9475na	12160na	13845na	15685na
1500	1600		USA, WYFR Okeechobee FL		6280as	11830na	15520as 17750na 17800as	
1515	1600	mtwhf	Seychelles, FEBA Radio	11600as				
1530	1600		Austria, Radio Austria Intl		17860na			
1530	1600		Iran, VOIRI	7245as	9635eu	11775as		
1530	1600	as	Seychelles, FEBA Radio	11600as				
1540	1550		Turkmenistan, Turkmen Radio		4930as			
1550	1600		Vatican City, Vatican Radio		12065au	13765au	15235au	

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

1600	1610		Vatican City, Vatican Radio		12065au	13765au	15235au	
1600	1625		Netherlands, Radio	9890as	11835as	12075as	15220na	
1600	1627		Czech Rep, Radio Prague Intl		5930eu	21745af		
1600	1627		Vietnam, Voice of	7145eu	9730eu			
1600	1630		Iran, VOIRI	7245as	9635eu	11775as		
1600	1630		Israel, Kol Israel	15615va	17545va			
1600	1630		Mexico, Radio Mexico Intl		9705am	11770am		
1600	1630		S Africa, Channel Africa	9525af				
1600	1630		USA, KWHR Naalehu HI	9930as				
1600	1635		Germany, Voice of Hope	13810af				
1600	1640		UAE, Emirates Radio	13630eu	13675eu	15400eu	21597al	
1600	1645		Germany, Deutsche Welle		6140eu	6170as	7225as	9735af 11665af 17595as 21840af
1600	1650	occasional	New Zealand, Radio NZ Intl		6095pa			
1600	1656		North Korea, Voice of	9975af	11735af			
1600	1700		Algeria, Radio Algiers Intl		11715eu	15160eu		
1600	1700		Anguilla, Caribbean Beacon		11775am			
1600	1700		Australia, Radio	5995pa	9475as	9580pa	11650pa	11660as
1600	1700		Australia, Voice International		11930as			
1600	1700		Canada, CBC Northern Service		9625do			
1600	1700		Canada, CFRX Toronto ON		6070do			
1600	1700		Canada, CFVP Calgary AB		6030do			
1600	1700		Canada, CKZN St John's NF		6160do			
1600	1700		Canada, CKZU Vancouver BC		6160do			
1600	1700		China, China Radio Intl	7190af	13650af			
1600	1700		Costa Rica, University Network		5030am	6150am	7375am	9725sa

			11870am 13750na					
1600	1700		Ethiopia, Radio 11800af	5990do	7110af	7165af	9560af	9704af
1600	1700		France Radio France Intl 17850af	11615af	11995af	12015af	15605af	17605af
1600	1700	a	Germany, Overcomer Ministries		6015eu			
1600	1700	a	Greece, Voice of	9420eu	15630eu	17705na		
1600	1700		Jordan, Radio	11690na				
1600	1700		Palau, KHBN/VO Hope	9965as				
1600	1700		Russia, Voice of Russia 15540me	7350as	11720as	11985me	12055as	
1600	1700		South Korea, R Korea Intl		5975am	9515af	9870af	
1600	1700		Taiwan, R Taipei Intl	11550as				
1600	1700	as	UK, BBC World Service	9635af	12095eu			
1600	1700		UK, BBC World Service 9410eu 9510as 15400af 15485eu 21490af 21660af	3915as	5975as	6190af	6195va	7160af 11860af 11940af 12095eu 15190va 15310as 15565eu 17700eu 17830af 17860af 21470af
1600	1700		USA, Armed Forces Network 6458usb 10320usb		4319usb 10940usb	4993usb 12579usb	5765usb 12689usb	6350usb 13362usb
1600	1700		USA, KAIJ Dallas TX	13815va				
1600	1700		USA, KJES Vado NM	11715na				
1600	1700		USA, KTBN Salt Lk City UT		7505na			
1600	1700		USA, Voice of America 17810af 17895va	6035af	6160va 13600va 13710af	7125va 15205va	9700va 15225af	9760va 15255va 15410af 15445va
1600	1700		USA, WBCQ Kennebunk, ME		17495na			
1600	1700	s	USA, WBCQ Kennebunk, ME		7415na			
1600	1700		USA, WEWN Birmingham AL		11550na	13615na	15375na	15745eu
1600	1700		USA, WHRA Greenbush ME		17650va			
1600	1700		USA, WHRI Noblesville IN		13760na	15105am		
1600	1700		USA, WINB Red Lion PA	13570am				
1600	1700		USA, WJIE Louisville KY	7490am	13595am			
1600	1700		USA, WMLK Bethel PA	9465eu				
1600	1700		USA, WRMI Miami FL	15725am				
1600	1700		USA, WRNO New Orleans LA		7395am	15420am		
1600	1700		USA, WSHB Cypress Creek SC		18910af			
1600	1700		USA, WTJC Newport NC	9370na				
1600	1700		USA, WWCR Nashville TN 15685na		9475na	12160na	13845na	
1600	1700		USA, WYFR Okeechobee FL 21455eu 21525af		11830na	17750na	17800as	18980eu
1610	1625		Armenia, TWR	5855eu				
1615	1630		Vatican City, Vatican Radio 15595eu		4005eu	5890eu	7250eu	9645eu
1630	1700		Guam, AWR	9385me	11850me	17630me		
1630	1700		Slovakia, R Slovakia Intl	5920eu	6055eu	7345eu		
1630	1700		UAE, AWR	9600me				
1630	1700		UK, BBC World Service	11955as	15645eu			
1645	1700		Germany, Deutsche Welle		6140eu			
1645	1700		Tajikistan, Radio	4760as	7245al			
1650	1700	mtwhf	New Zealand, Radio NZ Intl		11725pa			

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

1700	1727		Czech Rep, Radio Prague Intl		5930eu	21745af		
1700	1730		Azerbaijan, Voice of	6110eu				
1700	1730		France Radio France Intl	15605af	17605af			
1700	1730		S Africa, Channel Africa	17860af				
1700	1750	mtwhf	New Zealand, Radio NZ Intl		11725pa			
1700	1759		Poland, Radio Polonia	5995eu				
1700	1800		Anguilla, Caribbean Beacon		11775am			
1700	1800		Australia, Radio 11880pa	5995pa	9475as	9580pa	9815pa	
1700	1800		Canada, CBC Northern Service		9625do			
1700	1800		Canada, CFRX Toronto ON		6070do			
1700	1800		Canada, CFVP Calgary AB		6030do			
1700	1800		Canada, CKZN St John's NF		6160do			
1700	1800		Canada, CKZU Vancouver BC		6160do			
1700	1800		China, China Radio Intl	7150af	9570af	9675as	11910af	15205af
1700	1800		Costa Rica, University Network 11870am 13750na	5030am	6150am	7375am	9725sa	
1700	1800	mtwhf	Eqt Guinea, Radio Africa		15185af			
1700	1800	a	Germany, Overcomer Ministries		6015eu			
1700	1800		Germany, Voice of Hope	9495eu				
1700	1800		Japan, Radio	9505na	11970eu	15355af		
1700	1800		Romania, R Romania Intl		11740eu	15380eu	15365eu	17805eu
1700	1800		Russia, Voice of Russia	7310eu	9745af	9775eu	11510af	11985af
1700	1800	as	Russia, Voice of Russia	7360eu	9480eu	9820eu	11675eu	
1700	1800		Taiwan, R Taipei Intl	11550as				
1700	1800		UK, BBC World Service 7160af 7230af	3255af	3915af 9410eu	5975as 9510as	6190af 9630af	6195eu 11860af 12095eu
			15310as 15400af		15420af	17830af	17860af	21470af
1700	1800		USA, Armed Forces Network 6458usb 10320usb		4319usb 10940usb	4993usb 12579usb	5765usb 12689usb	6350usb 13362usb
1700	1800		USA, KAIJ Dallas TX	13815va				
1700	1800		USA, KTBN Salt Lk City UT		7505na			
1700	1800		USA, Voice of America 15205va 15255va	6160va	7125va 15410af	7170va 15445af	9700va	9645va 17895af
1700	1800	mtwhf	USA, Voice of America	5990va	6045va	7215va	9770va	9785va
1700	1800		USA, WBCQ Kennebunk, ME		17495na			
1700	1800	s	USA, WBCQ Kennebunk, ME		7415na			
1700	1800		USA, WEWN Birmingham AL		11550na	13615na	15745eu	17595eu
1700	1800		USA, WHRA Greenbush ME		17650va			
1700	1800		USA, WHRI Noblesville IN		9495am	13760va		
1700	1800		USA, WINB Red Lion PA	13570am				
1700	1800		USA, WJIE Louisville KY	7490am	13595am			
1700	1800		USA, WMLK Bethel PA	15265eu				
1700	1800		USA, WRMI Miami FL	15725am				
1700	1800		USA, WRNO New Orleans LA		7395am	15420am		
1700	1800		USA, WSHB Cypress Creek SC		18910af			
1700	1800		USA, WTJC Newport NC	9370na				
1700	1800		USA, WWCR Nashville TN 15685na		9475na	12160na	13845na	
1700	1800		USA, WYFR Okeechobee FL		18980eu	21455eu	21680eu	
1730	1745	vl	Libya, Voice of Africa	15435irr	17750irr			
1730	1745		UK, BBC World Service	9525af				
1730	1745	mtwhf/vl	UK, United Nations Radio		7150af	17570af	17710eu	
1730	1755		Belgium, RVI Flanders R Intl		9925eu	13690eu	13710eu	
1730	1800		Georgia, Georgian Radio		6180me			
1730	1800	irreg	Liberia, ELWA	4760do				
1730	1800	vl/mtwhfa	Malta, VO Mediterranean		9605eu			
1730	1800		Netherlands, Radio Swaziland, TWR	6020af 9500af	7120af	11655af		
1730	1800	mtwhfa	Sweden, Radio	6065va	13580va			
1730	1800		Switzerland, Swiss R Intl	15220va	17735va	21720va		
1730	1800		Vatican City, Vatican Radio		13765af	15570af	17515af	
1735	1745	vl/th	Paraguay, Radio Nacional		9739sa			
1745	1800		Bangladesh, Bangla Betar		7185eu	9550eu	15520eu	
1745	1800		India, All India Radio 15155af 17670af	7410eu	11620eu	11935af	13605af	15075af
1751	1800	mtwhf	New Zealand, Radio NZ Intl		15160pa			

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

1800	1827		Vietnam, Voice of	5970eu	7145eu	9725eu	9730eu	
1800	1830	s	Germnay, Universal Life	15750af				
1800	1830	s	Greece, Voice of	9420eu	15630eu	17705na		
1800	1830		Netherlands, Radio	6020af	7120af	11655af		
1800	1830		S Africa, AWR	5970af	6095af	7170af		
1800	1830		S Africa, Channel Africa	17860af				
1800	1830		UK, RTE Radio	15315me				
1800	1830	vl	Zimbabwe, ZBC Corp	4828do				
1800	1900		Anguilla, Caribbean Beacon		11775am			
1800	1900		Australia, Radio 11880pa	6080pa	7240pa	9475as	9580pa	9815pa
1800	1900		Bangladesh, Bangla Betar		7185eu	9550eu	15520eu	
1800	1900		Canada, CBC Northern Service		9625do			
1800	1900		Canada, CFRX Toronto ON		6070do			
1800	1900		Canada, CFVP Calgary AB		6030do			
1800	1900		Canada, CKZN St John's NF		6160do			
1800	1900		Canada, CKZU Vancouver BC		6160do			
1800	1900		Costa Rica, University Network 11870am 13750na	5030am	6150am	7375am	9725sa	
1800	1900	mtwhf	Eqt Guinea, Radio Africa		15185af			
1800	1900		Germany, Voice of Hope	15715me				
1800	1900		India, All India Radio 15155af 17670af	7410eu	11620eu	11935af	13605af	15075af
1800	1900		Kuwait, Radio	11990va				
1800	1900	irreg	Liberia, ELWA	4760do				
1800	1900		Liberia, R Liberia Intl	5100do				
1800	1900	mtwhf	New Zealand, Radio NZ Intl		15160pa			
1800	1900		Russia, Voice of Russia 9745af 9775eu	5950eu	7300eu 9820eu	7310eu 11510af	7360eu 11870af	9480eu
1800	1900		Swaziland, TWR	9500af				
1800	1900		Taiwan, R Taipei Intl	3955eu				
1800	1900		UK, BBC World Service 9410eu 9510as 17885af 21470af	3255af	5975as 12095eu	6050eu 15310me	6190af 15400af	6195eu 15420af 17830af
1800	1900		USA, Armed Forces Network 6458usb 10320usb		4319usb 10940usb	4993usb 12579usb	5765usb 12689usb	6350usb 13362usb
1800	1900		USA, KAIJ Dallas TX	13815va				
1800	1900		USA, KTBN Salt Lk City UT		7505na			

1800	1900		USA, Voice of America 15410af 15580af 17895af	6035af	7415af	9760va	9770va	11975af
1800	1900		USA, WBCQ Kennebunk, ME		17495na			
1800	1900	s	USA, WBCQ Kennebunk, ME		7415na			
1800	1900		USA, WEWN Birmingham AL		11550na	13615na	15745eu	17595eu
1800	1900		USA, WHRA Greenbush ME		17650va			
1800	1900		USA, WHRI Noblesville IN		9495am	13760va		
1800	1900		USA, WINB Red Lion PA	13570am				
1800	1900		USA, WJIE Louisville KY	7490am	13595am			
1800	1900		USA, WMLK Bethel PA	15265eu				
1800	1900		USA, WRMI Miami FL	15725am				
1800	1900		USA, WRNO New Orleans LA		7395am	15420am		
1800	1900		USA, WSHB Cypress Creek SC		15665eu	18910af		
1800	1900		USA, WTJC Newport NC	9370na				
1800	1900		USA, WWCR Nashville TN 15685na		9475na	12160na	13845na	
1800	1900		USA, WYFR Okeechobee FL		18980eu			
1800	1900		Yemen, Rep of Yemen Radio		9780me			
1830	1900		Austria, Radio Austria Intl		5945eu	6155eu		
1830	1900		Greece, Voice of	11645eu				
1830	1900	s	Greece, Voice of	9420eu	15630eu	17705na		
1830	1900		Netherlands, Radio 17605af 21590af	6020af	7120af	9895af	11655af	13700af
1830	1900		S Africa, AWR		7170af			
1830	1900		Slovakia, R Slovakia Intl	5920eu	6055eu	7345eu		
1830	1900		Turkey, Voice of	9785eu				
1830	1900		UK, RTE Radio		13640na	21630af		
1830	1900	as	USA, Voice of America	11690af	13835af	15525af		
1845	1900	mtwhfa	Albania, Radio Tirana Intl		7210na	9520na		

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

1900	1925		Israel, Kol Israel	9435va	11605va	15615va	15640af	17545va
1900	1927		Vietnam, Voice of	7145eu	9730eu			
1900	1930		Hungary, Radio Budapest		6025eu	7130eu		
1900	1930		Turkey, Voice of	9785eu				
1900	1945		Germany, Deutsche Welle 17810af		11805af	11965af	13720af	15390af
1900	1945		India, All India Radio 15155af 17670af	7410eu	11620eu	11935af	13605af	15075af
1900	1945		Iraq, Radio Iraq Intl	7157irr	9887irr	11787irr		
1900	1945	vl	Zimbabwe, ZBC Corp	4828do	5012do			
1900	1956		North Korea, Voice of	13760eu	15245eu			
1900	2000		Anguilla, Caribbean Beacon		11775am			
1900	2000	mtwhf	Argentina, RAE	9690eu	15345eu			
1900	2000		Australia, Radio 11880pa	6080pa	7240pa	9500as	9580pa	9815pa
1900	2000	vl	Botswana, Radio	3356do	4820do	7255do		
1900	2000		Bulgaria, Radio	9400eu	11900eu			
1900	2000		Canada, CBC Northern Service		9625do			
1900	2000		Canada, CFRX Toronto ON		6070do			
1900	2000		Canada, CFVP Calgary AB		6030do			
1900	2000		Canada, CKZN St John's NF		6160do			
1900	2000		Canada, CKZU Vancouver BC		6160do			
1900	2000		China, China Radio Intl	9440af	9585af			
1900	2000		Costa Rica, University Network 11870am 13750na 17645as		5030am	6150am	7375am	9725sa
1900	2000	mtwhf	Eqt Guinea, Radio Africa		15185af			
1900	2000		Germany, Voice of Hope	15715me				
1900	2000	vl	Ghana, Ghana BC Corp		3366do	4915do		
1900	2000		Guyana, Voice of	3290do	5950do			
1900	2000		Kenya, Kenya BC Corp	4885do	4935do			
1900	2000		Kuwait, Radio	11990va				
1900	2000	irreg	Liberia, ELWA	4760do				
1900	2000		Liberia, R Liberia Intl	5100do				
1900	2000		Malaysia, Radio	7295do				
1900	2000	smtwha	Malta, VO Mediterranean		12060eu			
1900	2000		Namibia, NBC	3270af	3290af			
1900	2000		Netherlands, Radio 17605af 21590af	6020af	7120af	9895af	11655af	13700af
1900	2000		New Zealand, Radio NZ Intl		15160pa			
1900	2000		Nigeria, Radio/Enugu	6025do				
1900	2000		Nigeria, Radio/Ibadan	6050do				
1900	2000		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
1900	2000		Nigeria, Radio/Lagos	3326do	4990al			
1900	2000		Nigeria, Voice of	7255af				
1900	2000	mtwhfa	Papua New Guinea, NBC		4890do	9675al		
1900	2000		Russia, Voice of Russia 9820eu 15735am	7330eu	7350eu	7360eu	7440eu	9775eu
1900	2000		South Korea, R Korea Intl		5975am	7275eu		
1900	2000		Thailand, Radio	7155eu				
1900	2000		Uganda, Radio	4976do	5026al	7195al		
1900	2000		UK, BBC World Service 9410eu 9630af 17830af 17885af	3255af	5975as	6005af	6190af	6195eu 11720as 12095eu 15105af 15310as 15400af
1900	2000		USA, Armed Forces Network 6458usb 10320usb 10940usb		4319usb	4993usb	5765usb	6350usb 12579usb 12689usb 13362usb
1900	2000		USA, KAIJ Dallas TX		13815va			
1900	2000		USA, KJES Vado NM		15385au			
1900	2000		USA, KTBN Salt Lk City UT		7505na			
1900	2000		USA, Voice of America 7375af 7415af 9525va 13635va 15180va 15410af		4950af	6035af	6095va	6160va 7260va 9680va 9770va 11770va 11975af 15445af 15580af
1900	2000		USA, WBCQ Kennebunk, ME		17495na			
1900	2000	s	USA, WBCQ Kennebunk, ME		7415na			
1900	2000		USA, WEWN Birmingham AL		11550na	13615na	15745eu	17595eu
1900	2000		USA, WHRA Greenbush ME		17650va			
1900	2000		USA, WHRI Noblesville IN		9495am	13760va		
1900	2000		USA, WINB Red Lion PA	13570am				
1900	2000		USA, WJIE Louisville KY	7490am	13595am			
1900	2000		USA, WMLK Bethel PA	15265eu				
1900	2000		USA, WRMI Miami FL	15725am				
1900	2000		USA, WRNO New Orleans LA		7395am	15420am		
1900	2000		USA, WSHB Cypress Creek SC		15665eu	18910af		
1900	2000		USA, WTJC Newport NC	9370na				
1900	2000		USA, WWCR Nashville TN 15685na		9475na	12160na	13845na	
1900	2000		USA, WYFR Okeechobee FL		3230eu	18930eu	18980eu	
1900	2000	vl	Vanuatu, Radio	4960do	7260do			
1900	2000		Zambia, Christian Voice	4965af				
1900	2000	vl	Zambia, Radio ZNBC	4910do	6265al			
1930	1955		Belgium, RVI Flanders R Intl		9925eu	13690eu		
1930	2000		Austria, AWR		7130eu			
1930	2000	t h	Belarus, Radio Belarus Intl		7105eu	7210eu		
1930	2000		Georgia, Georgian Radio		11760eu			
1930	2000		Iran, VOIRI	9800eu	11670eu	11750af	11855eu	
1930	2000		Poland, Radio Polonia	7165eu	7265eu			
1930	2000	mtwhf/vl	Solomon Islands, SIBC	5020do				
1930	2000		Sweden, Radio	6065va				
1930	2000		Switzerland, Swiss R Intl	13645af	15220af	17580af	17735af	
1930	2000	mtwhf	USA, Voice of America 13715va 15235va	9550va	9840va	11780va	11970va	12015va
1935	1955		Italy, RAI Intl	5970eu	9745eu			
1940	2000	mtwhfa	Armenia, Voice of	4810eu	9960eu			
1950	2000		Vatican City, Vatican Radio		4005eu	5885eu	7250eu	9645eu

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

2000	2010		Vatican City, Vatican Radio 9660af 11625af 13765af		4005eu	5885eu	7250eu	9645af
2000	2015	s/vl	Solomon Islands, SIBC	5020do				
2000	2025		Netherlands, Radio 17605af 21590af	6020af	7120af	9895af	11655af	13700af
2000	2027		Czech Rep, Radio Prague Intl		5930eu	11600va		
2000	2027		Iran, VOIRI	9800eu	11670eu	11750af	11855eu	
2000	2029		Poland, Radio Polonia	7165eu	7265eu			
2000	2030		Mongolia, Voice of	12015eu				
2000	2030	mtwhf/vl	Solomon Islands, SIBC	5020do				
2000	2030		Switzerland, Swiss R Intl	13645af	15220af	17580af	17735af	
2000	2030		USA, Voice of America 11975af 15410af 15445af	4950af	6035af	7375af	7415af	11855af 15580af 17745af 17895af
2000	2045		Germany, Deutsche Welle		6140eu			
2000	2045		Iraq, Radio Iraq Intl	7157irr	9887irr	11787irr		
2000	2050		New Zealand, Radio NZ Intl		15160pa			
2000	2059		Canada, Radio Canada Intl 12015va 15325va 15470va		5850va	5995va	11690va	11965va 17870va
2000	2100		Algeria, Radio Algiers Intl		11715eu	15160eu		
2000	2100		Anguilla, Caribbean Beacon		11775am			
2000	2100		Australia, ABC NT Katherine		2485do			
2000	2100		Australia, ABC NT Tennant Crk		2325do			
2000	2100		Australia, Radio 12080pa	9500as	9580pa	9815pa	11880pa	
2000	2100	vl	Botswana, Radio	3356do	4820do	7255do		
2000	2100		Canada, CBC Northern Service		9625do			
2000	2100		Canada, CFRX Toronto ON		6070do			
2000	2100		Canada, CFVP Calgary AB		6030do			
2000	2100		Canada, CKZN St John's NF		6160do			
2000	2100		Canada, CKZU Vancouver BC		6160do			
2000	2100		China, China Radio Intl	5965eu	9840eu	11640eu	13640af	
2000	2100		Costa Rica, University Network 11870am 13750na 17645as		5030am	6150am	7375am	9725sa
2000	2100		Ecuador, HCJB	17660eu				
2000	2100	mtwhf	Eqt Guinea, Radio Africa		15185af			
2000	2100		Germany, Voice of Hope	6175eu	15715me			

2000	2100	vl	Ghana, Ghana BC Corp	3366do	4915do			
2000	2100		Indonesia, Voice of	9525pa	11785af	15150as		
2000	2100		Kenya, Kenya BC Corp	4885do	4935do			
2000	2100		Kuwait, Radio	11990va				
2000	2100	irreg	Liberia, ELWA	4760do				
2000	2100		Liberia, R Liberia Intl	5100do				
2000	2100		Malaysia, Radio	7295do				
2000	2100		Namibia, NBC	3270af	3290af			
2000	2100		Nigeria, Radio/Enugu	6025do				
2000	2100		Nigeria, Radio/Ibadan	6050do				
2000	2100		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
2000	2100		Nigeria, Radio/Lagos	3326do	4990al			
2000	2100		Nigeria, Voice of	7255af				
2000	2100		Russia, Voice of Russia 15735am	7330eu	7350eu	9775eu	9820eu	11980eu
2000	2100		S Africa, AWR	9745af				
2000	2100	mtwhf	Spain, R Exterior Espana	9570af	15290af			
2000	2100		Uganda, Radio	4976do	5026al	7195al		
2000	2100		UK, BBC World Service 9410eu	3255af	5975ca	6005af	6190af	6195eu
				9630af	11835af	11955eu	12095eu	15400af
2000	2100		USA, Armed Forces Network 6458usb	10320usb	10940usb	12579usb	12689usb	13362usb
				4319usb	4993usb	5765usb	6350usb	
2000	2100		USA, KAIJ Dallas TX	13815va				
2000	2100		USA, KJES Vado NM	15385na				
2000	2100		USA, KTBN Salt Lk City UT	7505na				
2000	2100		USA, Voice of America	6095va	6160va	9770va		
2000	2100		USA, WBCQ Kennebunk, ME	7415na	9335na	17495na		
2000	2100		USA, WEWN Birmingham AL 17595eu	11530na	11550na	13615na	15745eu	
2000	2100		USA, WHRA Greenbush ME	17650va				
2000	2100		USA, WHRI Noblesville IN	5745va	9495am	13760va		
2000	2100		USA, WINB Red Lion PA	13570am				
2000	2100		USA, WJIE Louisville KY	7490am	13595am			
2000	2100		USA, WMLK Bethel PA	15265eu				
2000	2100		USA, WRMI Miami FL	15725am				
2000	2100		USA, WRNO New Orleans LA	7395am	15420am			
2000	2100		USA, WTJC Newport NC	9370na				
2000	2100		USA, WWCR Nashville TN 15685na	9475na	12160na	13845na		
2000	2100		USA, WWRB Manchester TN	9320va	9400va	12172va		
2000	2100		USA, WYFR Okeechobee FL 18980eu	3230eu	15195eu	17725sa	17845af	
2000	2100	vl	Vanuatu, Radio	4960do	7260do			
2000	2100		Zambia, Christian Voice	4965af				
2000	2100	vl	Zambia, Radio ZNBC	4910do	6265al			
2000	2100	vl	Zimbabwe, ZBC Corp	5975do	6045al			
2000	2100		USA, WSHB Cypress Creek SC	15665eu	18910af			
2005	2100	vl	Syria, Radio Damascus	12085eu	13610eu			
2010	2030		Vatican City, Vatican Radio	9660af	11625af	13765af		
2025	2045		Italy, RAI Intl	6185af	9760af	11880af		
2030	2045	vl	Libya, Voice of Africa	15435irr	17750irr			
2030	2045		Thailand, Radio	9680eu				
2030	2057		Vietnam, Voice of	7145eu	9730eu			
2030	2100	t	Belarus, Radio Belarus Intl	7105eu	7210eu			
2030	2100		Cuba, Radio Havana	13660usb	13750eu			
2030	2100		Ecuador, HCJB	21455usb				
2030	2100		Georgia, Georgian Radio	11760eu				
2030	2100	vl	Solomon Islands, SIBC	5020do				
2030	2100		Turkey, Voice of	9525va				
2030	2100	f	UK, Wales Radio Intl	7325eu				
2030	2100		USA, Voice of America 15455af	6035af	7375af	7415af	11975af	15410af
				15580af	17745af	17895af		
2030	2100	as	USA, Voice of America	4950af				
2030	2100		Uzbekistan, Radio Tashkent	5025eu	9545eu	11905eu		
2045	2100		India, All India Radio	7150eu	9650eu	11620eu	11715au	
2051	2100		New Zealand, Radio NZ Intl	17675pa				

2100 UTC - 5PM E / 4PM C / 2PM P

2100	2130		Australia, ABC NT Katherine	2485do				
2100	2130		Australia, ABC NT Tennant Crk	2325do				
2100	2130		Australia, Radio 11880pa	7240pa	9500as	9580pa	9660pa	
				12080pa	17715pa	21740pa		
2100	2130		Canada, Radio Canada Intl 17870va	5850va	7235va	13690va	15325va	
2100	2130		Cuba, Radio Havana	13660usb	13750eu			
2100	2130		Hungary, Radio Budapest	3975eu	6025eu			
2100	2130		Kenya, Kenya BC Corp	4885do	4935do			
2100	2130		Nigeria, Radio/Ibadan	6050do				
2100	2130		South Korea, R Korea Intl	3955eu	15575eu			
2100	2130		Turkey, Voice of	9525va				
2100	2145		Germany, Deutsche Welle	9670as	9765as	9830af	11865af	
				11915as	15135af			
2100	2156		North Korea, Voice of	13760eu	15245eu			
2100	2200		Anguilla, Caribbean Beacon	11775am				
2100	2200		Austria, AWR	15355af				
2100	2200	vl	Botswana, Radio	3356do	4820do			
2100	2200		Bulgaria, Radio	9400eu	11900eu			
2100	2200		Canada, CBC Northern Service	9625do				
2100	2200		Canada, CFRX Toronto ON	6070do				
2100	2200		Canada, CFVP Calgary AB	6030do				
2100	2200		Canada, CKZN St John's NF	6160do				
2100	2200		Canada, CKZU Vancouver BC	6160do				
2100	2200		China, China Radio Intl	5965eu	9840eu	11735eu	13630af	
2100	2200		Costa Rica, University Network 11870am	5030am	6150am	7375am	9725sa	
				13750na	17645as			
2100	2200		Ecuador, HCJB	17660eu	21455usb			
2100	2200	mtwhf	Eqt Guinea, Radio Africa	15185af				
2100	2200	vl	Ghana, Ghana BC Corp	3366do	4915do			
2100	2200		Guyana, Voice of	3290do	5950do			
2100	2200		India, All India Radio	7150eu	9650eu	11620au	11715au	
2100	2200		Japan, Radio 11855af	6035pa	6055eu	6180eu	11830eu	
				17825na	17860pa	21670pa		
2100	2200	irreg	Liberia, ELWA	4760do				
2100	2200		Liberia, R Liberia Intl	5100do				
2100	2200		Malaysia, Radio	7295do				
2100	2200		Namibia, NBC	3270af	3290af			
2100	2200		New Zealand, Radio NZ Intl	17675pa				
2100	2200		Nigeria, Radio/Enugu	6025do				
2100	2200		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
2100	2200		Nigeria, Radio/Lagos	3326do	4990al			
2100	2200		Palau, KHBN/VO Hope	9985as				
2100	2200	mtwhfa	Papua New Guinea, NBC	4890do	9675al			
2100	2200		Romania, R Romania Intl 11940eu	9510eu	9725eu	11740eu		
2100	2200	vl	Solomon Islands, SIBC	5020do				
2100	2200	as	Spain, R Exterior Espana	9570af	9840eu			
2100	2200	vl	Syria, Radio Damascus	12085eu	13610eu			
2100	2200		Taiwan, R Taipei Intl	15600eu				
2100	2200		UK, BBC World Service 9410eu	3255af	3915as	6005af	6190af	6195eu
				11675va	11835af	11945as	12095sa	15400af
2100	2200		Ukraine, R Ukraine Intl 11950eu	5905eu	6020eu	9950eu	11705eu	
2100	2200		USA, Armed Forces Network 6350usb	6458usb	10320usb	10940usb	12579usb	12689usb
				4319usb	4993usb	5765usb		
			13362usb					
2100	2200		USA, KAIJ Dallas TX	13815va				
2100	2200		USA, KTBN Salt Lk City UT	7505na				
2100	2200		USA, Voice of America 9530va	6035af	6040va	6095va	7375af	7415af
				9705va	9760va	11870va	11975af	13765va
			15185va	15410af	15455af	15580af	17740va	17820va
			17895af					
2100	2200		USA, WBCQ Kennebunk, ME	7415na	9335na	17495na		
2100	2200		USA, WEWN Birmingham AL 17595eu	11530na	11550na	13615na		
2100	2200		USA, WHRA Greenbush ME	17650va				
2100	2200		USA, WHRI Noblesville IN	5745va	9495am	13760va		
2100	2200		USA, WINB Red Lion PA	13570am				
2100	2200		USA, WJIE Louisville KY	7490am	13595am			
2100	2200		USA, WMLK Betel PA	15265eu				
2100	2200		USA, WRMI Miami FL	15725am				
2100	2200		USA, WRNO New Orleans LA	7395am	15420am			
2100	2200		USA, WSHB Cypress Creek SC	15665eu	18910af			
2100	2200		USA, WTJC Newport NC	9370na				
2100	2200		USA, WWCR Nashville TN 15685na	9475na	12160na	13845na		
2100	2200		USA, WWRB Manchester TN	9320va	9400va	12172va		
2100	2200		USA, WYFR Okeechobee FL 17845af	15120af	15770eu	17725sa		
			18980eu					
2100	2200	vl	Vanuatu, Radio	4960do	7260do			
2100	2200		Zambia, Christian Voice	4965af				
2100	2200	vl	Zambia, Radio ZNBC	4910do	6265al			
2100	2200	vl	Zimbabwe, ZBC Corp	5975do	6045al			
2130	2157		Czech Rep, Radio Prague Intl	11600va	15545af			
2130	2200	mtwhfa	Albania, Radio Tirana Intl	7130eu	9540eu			
2130	2200		Australia, ABC NT Alice Springs	4835do				
2130	2200		Australia, ABC NT Katherine	5025do				
2130	2200		Australia, ABC NT Tennant Crk	4910do				
2130	2200		Australia, Radio 17715pa	7240pa	9660pa	11880pa	12080pa	
				21740pa				
2130	2200	mtwhf	Austria, Radio Austria Intl	5945va	6155eu			
2130	2200		Guam, AWR	11850as	11980as			
2130	2200		Iran, VOIRI	9570as	13655au			
2130	2200		South Korea, R Korea Intl	15575eu				
2130	2200		Sweden, Radio	6065va	15255va			
2130	2200		Uzbekistan, Radio Tashkent	5025eu	9545eu	11905eu		

Shortwave Guide

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

2200	2205	vl	Syria, Radio Damascus	12085eu	13610eu			
2200	2230		Azerbaijan, Voice of	6110as				
2200	2230		Canada, Radio Canada Intl	6175am	9590am	11920am	13670am	15170am
			17695am	17880am				
2200	2230		India, All India Radio	7150eu	9650eu	11620au	11715au	
2200	2230		Iran, VOIRI 9570au	13655au				
2200	2230	as	USA, Voice of America	5855af	6035af	7375af	7415af	11975af
2200	2230	vl	Zambia, Radio ZNBC	4910do	6265al			
2200	2230	vl	Zimbabwe, ZBC Corp	5975do	6045al			
2200	2300		Anguilla, Caribbean Beacon	6090am				
2200	2300		Australia, ABC NT Alice Springs	4835do				
2200	2300		Australia, ABC NT Katherine	5025do				
2200	2300		Australia, ABC NT Tennant Crk	4910do				
2200	2300		Australia, Radio	13620as	15240as	17715pa	17795va	21470pa
2200	2300		Canada, CBC Northern Service	9625do				
2200	2300		Canada, CFRX Toronto ON	6070do				
2200	2300		Canada, CFVP Calgary AB	6030do				
2200	2300		Canada, CKZN St John's NF	6160do				
2200	2300		Canada, CKZU Vancouver BC	6160do				
2200	2300		China, China Radio Intl 7170eu					
2200	2300		Costa Rica, R for Peace Intl	7445usb	15040va			
2200	2300		Costa Rica, University Network	5030am	6150am	7375am	9725sa	11870am
			13750na	17645as				
2200	2300	mtwhf	Eqt Guinea, Radio Africa	15185af				
2200	2300	vl	Ghana, Ghana BC Corp	3366do	4915do			
2200	2300		Guyana, Voice of	3290do	5950do			
2200	2300		Liberia, R Liberia Intl	5100do				
2200	2300		Malaysia, Radio	7295do				
2200	2300		Namibia, NBC	3270af	3290af			
2200	2300		New Zealand, Radio NZ Intl	17675pa				
2200	2300		Nigeria, Radio/Enugu	6025do				
2200	2300		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
2200	2300		Nigeria, Radio/Lagos	3326do	4990al			
2200	2300		Palau, KHBN/VO Hope	9965as	9985as			
2200	2300	vl	Solomon Islands, SIBC	5020do				
2200	2300		Taiwan, R Taipei Intl	15600eu				
2200	2300		Turkey, Voice of	11960va	12000va			
2200	2300		UK, BBC World Service	3915as	5965as	5975am	6195as	7105as
			9580eu	9740as	11685as	11945as	11955as	12095af
			15390ca	15400af				
2200	2300		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	6458usb
			10320usb	10940usb	12579usb	12689usb	13362usb	
2200	2300		USA, KAIJ Dallas TX	13815va				
2200	2300		USA, KTBN Salt Lk City UT	7505na				
2200	2300		USA, KWHR Naalehu HI	17510as				
2200	2300		USA, Voice of America	7215va	9705va	9770va	11760va	13765va
			15185va	15290va	15305va	17740va	17820va	
2200	2300		USA, WBCQ Kennebunk, ME	7415na	9335na			
2200	2300		USA, WEWN Birmingham AL	9975eu	11530na	11550na	15745eu	17595eu
2200	2300		USA, WHRA Greenbush ME	7580eu	17650af			
2200	2300		USA, WHRI Noblesville IN	5745va	9495am	13760va		
2200	2300		USA, WINB Red Lion PA	13570am				
2200	2300		USA, WJIE Louisville KY	7490am	13595am			
2200	2300		USA, WRMI Miami FL	15725am				
2200	2300		USA, WRNO New Orleans LA	7395am	15420am			
2200	2300		USA, WSHB Cypress Creek SC	13770eu	15285sa			
2200	2300		USA, WTJC Newport NC	9370na				
2200	2300		USA, WWCR Nashville TN	7435na	9475na	12160na	13845na	15685na
2200	2300		USA, WWRB Manchester TN	6890va	9320va	9400va	12172va	
2200	2300		USA, WYFR Okeechobee FL	11740na	15695af	15770eu	17845af	
2200	2300	vl	Vanuatu, Radio	4960do	7260do			
2200	2300		Zambia, Christian Voice	4965af				
2205	2230		Italy, RAI Intl	11900as	15625as			
2230	2255		Belgium, RVI Flanders R Intl	15565na				
2230	2257		Czech Rep, Radio Prague Intl	11600na	15545na			
2230	2300		Canada, Radio Canada Intl	6175na	9590na	13670na	17695na	
2230	2300		Cuba, Radio Havana	9550am				
2245	2300		India, All India Radio	9705as	9950as	11620as	13605as	

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

2300	0000		Anguilla, Caribbean Beacon	6090am				
2300	0000		Australia, ABC NT Alice Springs	4835do				
2300	0000		Australia, ABC NT Katherine	5025do				
2300	0000		Australia, ABC NT Tennant Crk	4910do				
2300	0000		Australia, Radio	9660pa	12080pa	13620as	15240as	17715pa
			17795pa	21740pa				
2300	0000		Bulgaria, Radio	9400na	11700na			
2300	0000		Canada, CBC Northern Service	9625do				
2300	0000		Canada, CFRX Toronto ON	6070do				
2300	0000		Canada, CFVP Calgary AB	6030do				
2300	0000		Canada, CKZN St John's NF	6160do				
2300	0000		Canada, CKZU Vancouver BC	6160do				
2300	0000		China, China Radio Intl 5990na	13680na				
2300	0000		Costa Rica, R for Peace Intl	7445usb	15040va			
2300	0000		Costa Rica, University Network	5030am	6150am	7375am	9725sa	11870am
			13750na	17645as				
2300	0000		Egypt, Radio Cairo	9900na				
2300	0000	vl	Ghana, Ghana BC Corp	3366do	4915do			
2300	0000		Guyana, Voice of	3290do	5950do			
2300	0000		India, All India Radio	9705as	9950as	11620as	13605as	
2300	0000		Liberia, R Liberia Intl	5100do				
2300	0000		Malaysia, Radio	7295do				
2300	0000		Namibia, NBC	3270af	3290af			
2300	0000		New Zealand, Radio NZ Intl	17675pa				
2300	0000		Palau, KHBN/VO Hope	9965as	9985as			
2300	0000		Romania, R Romania Intl	9570eu	11740na	11775na	15105na	
2300	0000		Singapore, SBC Radio One	6150do				
2300	0000		Sri Lanka, SLBC	4940do				
2300	0000		UK, BBC World Service	3915as	5965as	5975am	6195as	7105as
			9580eu	9740as	11685as	11945as	11955as	12095af
			15390ca	15400af				
2300	0000		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	6458usb
			10320usb	10940usb	12579usb	12689usb	13362usb	
2300	0000		USA, KAIJ Dallas TX	13815va				
2300	0000		USA, KTBN Salt Lk City UT	7505na				
2300	0000		USA, KWHR Naalehu HI	17510as				
2300	0000		USA, Voice of America	7215va	9705va	9770va	11760va	13765va
			15185va	15290va	15305va	17740va	17820va	
2300	0000		USA, WBCQ Kennebunk, ME	7415na	9335na			
2300	0000		USA, WEWN Birmingham AL	9355na	9975eu	15745na	17595eu	
2300	0000		USA, WHRA Greenbush ME	7580eu				
2300	0000		USA, WHRI Noblesville IN	5745va	9495am	13760va		
2300	0000		USA, WINB Red Lion PA	12160am				
2300	0000		USA, WJIE Louisville KY	7490am	13595am			
2300	0000	smtwhf	USA, WRMI Miami FL	7385am				
2300	0000		USA, WRMI Miami FL	9955am				
2300	0000		USA, WRNO New Orleans LA	7355am				
2300	0000		USA, WSHB Cypress Creek SC	13770eu	15285sa			
2300	0000		USA, WTJC Newport NC	9370na				
2300	0000	as	USA, WWBS Macon GA	11900na				
2300	0000		USA, WWCR Nashville TN	5070na	7435na	9475na	13845na	15685na
2300	0000		USA, WWRB Manchester TN	6890va	9320va	9400va	12172va	
2300	0000		USA, WYFR Okeechobee FL	5895sa	11740na	11855sa	15255sa	17750sa
2300	0000	vl	Vanuatu, Radio	4960do	7260do			
2300	0000		Zambia, Christian Voice	4965af				
2300	2230		Mexico, Radio Mexico Intl	9705am	11770am			
2300	2330		Cuba, Radio Havana	9550am				
2300	2330		Nigeria, Radio/Enugu	6025do				
2300	2330		Nigeria, Radio/Kaduna	4770do	6090do			
2300	2330		Nigeria, Radio/Lagos	3326do	4990al			
2300	2330	vl	Solomon Islands, SIBC	5020do				
2300	2330		USA, Voice of America	7190va	7200va	9545va	11925va	13755va
2300	2345		Germany, Deutsche Welle	9815as	12000as	17560as	21790as	
2303	2310		Croatia, Croatian Radio	9925na				
2330	0000		Canada, Radio Canada Intl	6175na	9590na	13670na	17695na	
2330	0000		Lithuania, R Vilnius	9875eu				
2330	0000		Netherlands, Radio	6165na	9845na			
2330	0000	a	Russia, Radio Ezra	17665na				
2330	0000		Switzerland, Swiss R Intl	9885sa	11905sa			
2330	0000		USA, Voice of America	7190va	7200va	7225va	7260va	9545va
			11805va	11925va	13735va	13775va	15205va	
2330	2345	vl	Libya, Voice of Africa	15435irr	17750irr			
2330	2357		Vietnam, Voice of	9840as	12020as			
2345	0000	vl	Pakistan, Radio	11580as	15455as			

Notes:

1. Please be advised that New Zealand changes to summer time on October 13, which will cause some programs in these listings for **RNZI** to shift one hour later UT mid-month. The remainder of the world will have made their seasonal time shifts by October 27. November's *MT* will have the revised schedules.
2. **BBCWS stream abbreviations: (am)**=Americas; **(eu)**=Europe/N. Africa; **(me)**=Middle East, SW Asia, CIS (former Soviet Union); **(wcaf)**=West and Central Africa; **(esaf)**=East and Southern Africa; **(af)**=both (wcaf) and (esaf); **(sas)**=South Asia; **(eas)**=East Asia.
3. Frequencies, reported audible in North America, are provided with the listings for the various **BBCWS** streams, and also for the U.S based independent shortwave stations, to assist listeners in determining which program streams are carried on which frequencies. For frequencies for all other stations, refer to *MT*'s frequency listings in this *SWG*.
4. Listings for the U.S. based independent shortwave stations include only those programs that depart from their primary formats of political and religious fore.
5. An even more comprehensive schedule of programs broadcast globally on shortwave is available from my *WWW Shortwave Listening Guide* web site, hosted by NASWA and located at **http://www.anarc.org/naswa/swlguide**.
6. Corrections and updates to these schedules FROM YOU via postal mail and e-mail are welcomed and much appreciated and will be credited!

0000 UTC/ 8pm E/5pm P - Page 43 Freqs

BBC WORLD SERVICE (am) - *5975, 11835, 12095*
0000 S/M World Briefing, T-A News; 0005 T Meridion-Masterpiece, W Meridian-Screen, H Meridian-Writing, F The Music Biz, A Arts in Action; 0020 S/M Sports Roundup; 0030 S Agenda, M The World Today, T Charlie Gillett, W UK Top 20, H Revolver, F John Peel, A Jazzmatazz.

BBC WORLD SERVICE (eas) - *15280, 15360*
0000 D World Briefing; 0020 D Sports Roundup; 0030 S Agenda, M World Business Review, T-A World Business Report; 0045 M Letter from America, T/W/F/A Analysis, H From Our Own Correspondent

RADIO AUSTRALIA
0000 D News; 0005 S The Europeans, A Feedback (letters/station news); 0010 M AWAYE! (Aboriginal culture), T The Science Show, W The National Interest (Australian politics), H Background Briefing (documentary), F Hindsight (Australian history); 0030 A Country Breakfast (rural life); 0034 S Ockham's Razor (a science issue).

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

RADIO NETHERLANDS
0000 S/W Music 52-15 (international music), M Dutch Horizons, T Research File (science), H Documentary, F Aural Tapestry (cultural magazine), A A Good Life (global development); 0030 S Roughly Speaking (Euro youth culture), M Aural Tapestry, ~ EuroQuest (Europe in context), W A Good Life, H Dutch Horizons, F Research File, A Documentary.

RADIO NEW ZEALAND INT.
0000 S/A News; M-F Midday Report; 0012 S This Week in Parliament, A Focus on Politics; 0033 S Spectrum (life in NZ), A The Sampler (latest CDs).

RADIO FOR PEACE INT., Costa Rica
0000 S World of Radio M Spiritual Awakening, T-A Freespeech Radio News; 0030 S RFPI Mailbag, M One World—One Family (Bahai program), T/H/A Hightower Radio (commentary), W Radio Nation ("The Nation"), F This Way Out (gays magazine); 0035 T/H/A Earthwatch (ecology); 0040 T/H/A Earth & Sky (astronamy); 0045 T Tropical Conservation Newsbureau (rainforests), H World Citizen's Weekly Commentary, A Women (UN program).

RADIO PRAGUE
0000 D News; 0005 S Readings from Czech Literature, M Letter from Prague, T-A Newsview; 0010 S Saturday Music (classical/folk/jazz), M The Arts, W Witness, H ABC of Czech; 0015 M Mailbox, T One on One (interview), W Talking Point or Insight Central Europe, H Czechs in History or Profile, F Economic Report, A Magazine.

RADIO UKRAINE INT.
0000 D News; 0006 M Hello From Kiev (listener letters/music); 0010 T-S Ukraine Today (magazine); 0018 S Baroque (the arts); 0020 M Music from Ukraine; 0025 T-F Closeup (current issues).

SPANISH FOREIGN RADIO
0000 S Visitors' Book, M Window on Spain (culture/arts), T-A News; 0016 S/M repeat of weekday fecture programs, T-A Spanish pop music; 0020 T-A Press Review; 0025 Feature programs (including 'Radio Waves' for DXers, 'Chronicles' on Spain's foreign relations, 'Entremeses' on food and travel, 'Africa Today' and 'Radio Club', a mailbag program); 0040 S Radio Waves (for hobbyists), M Radio Club (listener contact), T-A Spanish Language Lesson.

VOICE OF AMERICA (News Now)
0000 T-A News; 0015 T-A Focus; 0023 T-A Sports; 0030 T-A Headlines; 0033 T-A Coast to Coast (American magazine).

WBCQ, Maine
7415 kHz.: 0000 S Different Kind of Oldies Show, M Radio New York International (to 0400), W Off the Hook, A Allan Weiner Worldwide.
9335 kHz.: 0000 S American Bizarre.

WHRI, Indiana
7580 kHz.: 0000 M 20, The Countdown Magazine (to 0200).

WWCR, Tennessee
3210 kHz.: 0000 S The Big Backyard (Australian country music).

YLE, Radio Finland
0000 S Capitol Weekend (magazine).

0100 UTC/ 9pm E/6pm P - Page 43 Freqs

BBC WORLD SERVICE (am) - 5975, 11835, 12095
0100 S The World Today, M-A News; 0105 M Wright Around the World (musical variety), T Health Matters, W Ga Digital, H Discovery, F One Planet (ecology), A Science in Action; 0130 S Music Review, T Everywomar, W Omnibus (documentary), H Sports International, F True Lives, A Documentaries.

BBC WORLD SERVICE (me) - 9410
0100 S The World Today, M-A News; 0105 M Wright Around the World (musical variety), T Health Matters, W Ga Digital, H Discovery, F One Planet (ecology), A Science in Action; 0130 S World Business Review, T Everywoman, W Omnibus (documentary), H Sports International, F True Lives, A Documentaries; 0145 S Letter from America.

BBC WORLD SERVICE (eas) - 15280, 15360
0100 S The World Today, M-A News; 0105 M Talking Point, T-A Outlook (magazine); 0130 In Praise of God (warship service); 0145 M-F Off the Shelf (serialized readings), A Patterns of Faith (belief systems).

CHINA RADIO INT.
0010 D News; 0110 S Report on Developing Countries, M-F Current Affairs, A Biz China; 0120 S In the Spotlight (cultural magazine), A Cutting Edge (sci/tech); 0130 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in Chino, A Listeners' Garden.

DEUTSCHE WELLE
0010 D News; 0105 S Talking Point (journalists), M Religion & Society, T-A Newslink (European current affairs); 0115 S Inside Europe, M Arts on the Air; 0130 T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCJB, Ecuador
0010 S DX Partyline, M Musical Mailbag, T-A Latin American & World News; 0110 T-A Studio 9 (Latin American regional report including T Inside HCJB, W/F Did You Hear? (news comment), H Ham Radio Today, A Musica del Ecuador); 0130 S Saludos Amigos, M Mountain Meditations, T-A A New Beginning; 0145 T-A A Time for Truth.

RADIO AUSTRALIA
0010 D News; 0105 S In Conversation, A Asia Pacific (regional current affairs); 0110 M-F Asia Pacific, 0130 S Oz Sounds (new releases), M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor, A RA Arts.

RADIO AUSTRIA INT.
0130 D Report from Austria (magazine); 0135 S Insight Central Europe, M Network Europe; 0150 S Listener Letters.

RADIO BUDAPEST
0010 D News; 0110 S Insight Central Europe; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine); 0120 A DX Corner.

RADIO CANADA INT.
0010 D News; 0105 S Business Sense, M Maple Leaf Mailbag (w/CIDX report bimonthly); 0110 T-A Canada Today (current events magazine); 0135 S/A Canada in the World, M/H Spotlight (arts & culture), T Media Zone (journalists discuss), W Maple Leaf Mailbag (w/CIDX report bimonthly), F Business Sense.

RADIO HABANA CUBA
0010 D International News; 0110 M Weekly Review, T-S National News; 0115 T-S Viewpoint; 0130 M Reports & Music, T-S News Bulletin; 0135 T-A Time Out (sports); 0140 S/W DXers Unlimited, M Mailbag Show, T/H/F Caribbean Outlook, A Weekly Review; 0150 M Breakthrough (science report).

RADIO NETHERLANDS
0010 S/M News, T-A Newsline; 0105 S Europe Unzipped, M Wide Angle (week in review).

RADIO NEW ZEALAND INT.
0010 D RNZ News; 0106 S At the Movies, M-F Codenza (light classics), A Your Money; 0130 S Bookmarks, A The Lord of the Rings (serialized reading in 26 parts).

RADIO FOR PEACE INT., Costa Rica
0010 S Making Contact, M Every Living Thing (nature), T Disability Radio Worldwide, W World of Radio, H A Public Affair, F For Right Radio Review, A Continent of Media; 0130 S Alternative Radio (political/social analysis), T This Way Out (gays magazine), W RFPI Mailbag, A World of Radio.

RADIO PRAGUE
0010 D News; 0105 S Readings from Czech Literature, M Letter from Prague, T-A Newsview; 0110 S Saturday Music (classical/folk/jazz), M The Arts, W Witness, H ABC of Czech; 0115 M Mailbox, T One on One (interview), W Talking Point or Insight Central Europe, H Czechs in History or Profile, F Economic Report, A Magazine.

RADIO SLOVAKIA INT.
0010 M Sunday Newsreel, T-S News; 0105 S Insight Central Europe, T-A Topical Issue; 0110 M Listeners Tribune (letters/Slovak music), T Tourism and Local Life, W Sport, H Business, F Culture, A History.

RTE, Ireland
0130 S/M Sportsnews; T-A The News at Six.

VOICE OF AMERICA (News Now)
0010 T-A News; 0110 T-A Analysis; 0123 T-A Sports; 0130 T-A Headlines; 0133 T-F Business Report, A VOA News Review; 0145 T-F Doteline (news magazine); 0155 T-A Editorial.

VOICE OF AMERICA (Special English)
0130 T-A News; 0140 T Agriculture Today, W/H Science Report, F Environment Report, A In the News; 0145 T Science in the News, W Explorations, H Making of a Nation, F American Mosaic; A American Stories.

VOICE OF RUSSIA
0010 D News; 0111 S News & Views, M Sunday Panorama, T-A Commonwealth Update; 0124 M Russia: People & Events; 0130 D News in Brief; 0132 S Moscow Yesterday & Today, M Timelines, T Folk Box, W Jazz Show, H Musical Portraits of the 20th Century, F Yours for the Asking, A Christian Message from Moscow; 0146 F Music At Your Request; 0154 H Russia: People & Events.

VOICE OF VIETNAM
0010 D News; 0105 D Current Affairs; 0110 Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; 0115 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0120 S Music, A Literature and Arts.

WBCQ, Maine
7415 kHz.: 0010 S Marion's Attic (vintage recordings), M Radio New York International (from 0000), F Tasha Takes Control.

WHRI, Indiana
7580 kHz.: 0105 S Music (Christian contemporary/gospel), M 20, The Countdown Magazine (from 0010).

WWCR, Tennessee
5070 kHz.: 0145 S Ask WWCR (letters).

Shortwave Guide

0200 UTC/ 10pm E/7pm P - Page 44 Freqs

BBC WORLD SERVICE (am) - 5975, 11835
0200 D The World Today; 0230 S World Business Review, M Assignment, T-A World Business Report; 0245 S Letter from America, T/W/F/A Analysis, H From Our Own Correspondent.

BBC WORLD SERVICE (me) - 6195, 9410, 12095
0200 D The World Today; 0230 S From Our Own Correspondent, A Global Business.

BBC WORLD SERVICE (eas) - 15280, 15360
0200 S/A The World Today, M-F News; 0205 M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Writing, H The Music Biz, F Arts in Action; 0230 S From Our Own Correspondent, M Charlie Gillett (world music), T UK Top 20, W Revolver, H John Peel (eclectic music), F Jazzmatazz, A Music Review.

HCJB, Ecuador
0200 S Rock Solid, M Hour of Decision, T-A Insight for Living; 0228 T-A Money Minute; 0230 M Renewing Your Mind, T-A Back to the Bible; 0255 T-A Joni and Friends.

RADIO AUSTRALIA
0200 D News; 0205 S Margaret Throsby (interviews and music), A Background Briefing (documentary); 0210 M-F The World Today (ABC Radio flagship news program).
[Special service: 0205 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO BUDAPEST
0230 D News; 0240 S Insight Central Europe; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine); 0250 A DX Corner.

RADIO BULGARIA
0200 D News; 0210 S Views Behind the News, M Folk Studio (Bulgarian folk music), T-A Events and Developments; 0220 T Sports; 0225 W-S Timeout for Music; 0230 T Bulgarian Plazo (cultural magazine) or Walks and Talks (interesting places); 0235 T Answering Your Letters, W-M Keyword Bulgaria (Bulgaria and things Bulgarian); 0245 S RADIO BULGARIA Calling (for radio hobbyists), W Magazine Economy, H Arts and Artists, F History Club, A The Way We Live.

RADIO HABANA CUBA
0200 D International News; 0210 M From Habana (Cuban musicians), T-S National News; 0215 T-S Reports and music; 0230 M The Jazz Place or Top Tens, T-S News Bulletin; 0235 S World of Stamps, T-A Reports and music; 0250 S Cuban music.

RADIO KOREA INT.
0200 D News; 0210 S Seoul Report (week in review), M Korean Pop Interactive (requests), T-A News Commentary; 0215 T-A Seoul Calling (magazine); 0230 S From Us to You (letters), M Multiwave Feedback (letters/DX news), T Exploring the New Millennium, W Cultural Promenade, H Economic Radar, F Korea & Its Splendors, A Notes of Nostalgia (traditional music).

RADIO NEW ZEALAND INT.
0200 D RNZ News; 0205 S Feature program/series*, M-F In Touch with New Zealand (music/variety), A Eureka! (science)*; 0230 A Health Matters or Environment Matters*.
[*may be preempted by live sport].

RADIO FOR PEACE INT., Costa Rica
0200 S Alternative Radio (from 0130), M New Dimensions, T University Forum (interviews), W Continent of Media, H WINGS (women's news), F Disability Radio Worldwide, A RFPI Mailbag; 0230 S Far Right Radio Review, T Honoring Mother Earth: Indigenous Voices, W Earthspan (War & Peace Foundation), H Global Community Forum (interviews), F A Woman's Voice, A University Forum (peace studies).

RADIO ROMANIA INT.
0200 D Radio Newsreel; 0210 S The Week, M Focus, T-A Commentary; 0215 S World of Culture, M Sunday Studio, T Pro Memoria (history), W Business Club, H Society Today, F Cards on the Table (debate) or The Romanian Next to You (interview), A Challenge for the Future or Terra 2001; 0220 S RRI Encyclopedia, T Political Flash, W European Horizons; 0225 S Roots (culture/traditions), M Romanian by Radio, T/H/A Business Update, W Tourist News, F Listeners' Letterbox; 0230 S Radio Pictures, M Romanian Itineraries, T Pulse of Transition, W W Mother Nature (ecology), H Visit Romania, A Practical Guide; 0235 S Romanian Itineraries, M Listeners' Letterbox, T Performing Arts, W Youth Club, H Partners in a Changing World, A Cultural Survey; 0240 S, Bucharest Along the Centuries, T Pages of Romanian Literature, W/F Skylark (folk music), H Stage and Screen, A Spectator (voice of the people); 0245 S DX Mailbag, T Romanian Hits, H Romanian Musicians, A Romanian Folk Music At Its Best; 0250 M Romanian Folk Music At Its Best, T Sports Roundup, W Athlete of the Week, H Sports Club, F Football Flash, A Sports Weekend.

RADIO SWEDEN
0230 S Network Europe (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); 0245 T Sports Scan, W Close Up (profiles of Swedes-1st/3rd), H Money Matters, F Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

RADIO TAIPEI INT.
0200 D News; 0215 S Great Wall Forum (discussing the mainland), M Jade Bells & Bamboo Pipes (traditional music), T Culture Express, W Taiwan Today, H Discover Taiwan, F Taipei Magazine, A Groove Zone; 0230 S Mailbag Time, T Trends, W Confucius and Inspiration Beyond, H Life Unusual, F People; 0245 M-F Let's Learn Chinese (M/W/F elementary, T/H intermediate), A Kaleidoscope (life in Taiwan).
[This schedule also airs at 0700 for western North America.]

VOICE OF RUSSIA
0200 D News; 0211 S/M/H Moscow Mailbag, T/F Science & Engineering, W/A Newsmarket (business); 0230 D News in Brief; 0232 S Songs from Russia, M This is Russia, T Kaleidoscope (Russian events), W Musical Portraits of the 20th Century, H Moscow Yesterday & Today, F Russian by Radio, A Audio Book Club (Russian lit.); 0246 S You Write to Moscow; 0254 W Russia: People & Events.

VOICE OF VIETNAM
0230 D News; 0235 D Current Affairs; 0240 Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; 0245 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0250 S Music, A Literature and Arts.

WBCQ, Maine
7415 kHz.: 0200 S Pocket Calculator, M Radio New York International (from 0000).

WHRI, Indiana
7580 kHz.: 0205 M Music (Christian contemporary/gospel); 0230 S DXing with Cumbre, A World Harvest Country Style.

WRMI, Florida
7385 kHz.: 0230 S Drive In Double Feature, M Wavescan.

WWCR, Tennessee
3210 kHz.: 0205 M Golden Age of Radio Theatre.
5070 kHz.: 0230 S World of Radio.

0300 UTC/ 11pm E/8pm P - Page 44 Freqs

BBC WORLD SERVICE (am) - 5975, 11835
0300 S/M World Briefing, T-A News; 0305 T Jazzmatazz, W Charlie Gillett, H John Peel, F Composer of the Month, A Brain of Britain; 0320 S/M Sports Roundup; 0330 S Reporting Religion, M Westway Omnibus (drama serial), T The Handy Guide to the Gurus of Management, W Write On, H Heart & Soul (religion), F World Learning Feature, A Patterns of Faith; 0345 T-A Off the Shelf (book readings).

BBC WORLD SERVICE (eu) - 6195, 9410
[same as (am) schedule above]

BBC WORLD SERVICE (me) - 12095, 15575
0300 D World Briefing; 0320 D Sports Roundup; 0330 S Reporting Religion, M World Business Review, T-A World Business Report; 0345 M Patterns of Faith, T/W/F/A Analysis, H From Our Own Correspondent.

BBC WORLD SERVICE (af) - 6005, 7120, 7160, 11730, 12035, 15420
0300 D World Briefing; 0320 D Sports Roundup; 0330 S Postmark Africa, M-F Network Africa, A African Quiz or This Week And Africa.

BBC WORLD SERVICE (eas) - 15280, 15360
0300 S World Briefing, M-A News; 0305 M One Planet (ecology), T Science in Action, W Health Matters, H Go Digital, F Discovery, A Wright Around the World (music requests); 0320 S Sports Roundup; 0330 S Reporting Religion, M True Lives, T Documentaries, W Everywoman, H Omnibus (documentary), F Sports International.

CHINA RADIO INT.
0300 D News; 0310 S Report on Developing Countries, M-F Current Affairs, A Biz China; 0320 S In the Spotlight (cultural magazine), A Cutting Edge (sci/tech); 0330 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

DEUTSCHE WELLE
0300 D News; 0305 S Saturday Review, M Sunday Review, T-A Newslink (European current affairs); 0315 S Spectrum (sci/tech), M Arts on the Air; 0330 T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCJB, Ecuador
0300 S Inspirational Classics (liturgical classical music), M The Sower, T-A Stories of Great Christians; 0315 M The Word Today, T-A Rendezvous (inspirational music); 0330 S Did You Hear (news comment), M Unshockled (radio's oldest drama series), T Let My People Think (apologetics), W Words for Women, H Adventures in Odyssey (children), F Book & the Spade (religion & archaeology), A Walkin' in the Sunshine (country music); 0345 S Specialized English, W Wonderful Words of Life (hymns), F Science, Scripture & Salvation.

RADIO AUSTRALIA
0300 D News; 0305 S Feedback (letters/station news), A Rural Reporter; 0310 M-F Regional Sports Report; 0320 M-F Pacific Focus (M business, T health, W environment, H sport, F culture); 0330 S All in the Mind (the brain), A Educational series; 0340 M Oz Music Show (rock), T Music Deli (diverse world/folk),W Blacktracker (contemporary Aboriginal), H Australian Country Style, F Jazz Notes.
[Special service: 0305 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO HABANA CUBA
0300 D International News; 0310 M Weekly Review, T-S National News; 0315 T-S Viewpoint; 0330 M Reports & Music, T-S News Bulletin; 0335 T-A Time Out (sports); 0340 S/W DXers Unlimited, M Mailbag Show, T/H/F Caribbean Outlook, A Weekly Review; 0350 M Breakthrough (science report).

RADIO NEW ZEALAND INT.
0300 S/A RNZ News*, M-F Pacific Regional News; 0305 S Feature program or series*, A The Mix* (rock music); 0308 M Tagata o te Moana (Pacific culture), T Top 5, W Pacific Report, H Mailbox (letters & DX news) or RNZI Talk (meet the RNZI staff), F Dateline Pacific; 0330 T New Releases, W Tradewinds, H The World in Sport, F Pacific Correspondent; 0335 S Band Programme*. [*may be preempted by live sport].

RADIO FOR PEACE INT., Costa Rica
0300 S Far Right Radio Review (from 0230), M Voices of Our World (Maryknoll program), T Honoring Mother Earth: Indigenous Voices (from 0230), W Living Enrichment Center, H Global Community Forum (from 0230), F A Woman's Voice (from 0230), A Earthspan (War & Peace Foundation); 0330 S World Citizens Weekly Commentary, M Perspective (UN program), T In the Moment, W Peace Forum, H Scope (UN program), F Tropical Conservation Newshour (rainforests), A Newsmaier Report; 0345 S/M Hightower Report (commentary), T-A UN Today; 0350 S/M Earthwatch (ecology); 0355 S/M Earth & Sky (astronomy).

RADIO PRAGUE
0300 D News; 0305 S Readings from Czech Literature, M Letter from Prague, T-A Newsview; 0310 S Saturday Music (classical/folk/jazz), M The Arts, W Witness, H ABC of Czech; 0315 M Mailbox, T One on One (interview), W Talking Point or Insight Central Europe, H Czechs in History or Profile, F Economic Report, A Magazine.

RADIO SWEDEN
0330 S Network Europe (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); 0345 T Sports Scan, W Close Up (profiles of Swedes-1st/3rd), H Money Matters, F Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

RADIO TAIPEI INT.
0300 D News; 0315 S Great Wall Forum (discussing the mainland), M Taiwan Economic Journal, T Culture Express, W Taiwan Today, H Discover Taiwan, F Instant Noodles, A Kaleidoscope (life in Taiwan); 0330 S Asia Pacific, M People, T Trends, W Confucius & Inspiration Beyond, H Life Unusual, F People, A Mailbag Time; 0345 M-F Let's Learn Chinese (M/W/F elementary, T/H intermediate), A Best of Naluwan.

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RADIO UKRAINE INT.
0300 D News; 0306 M Hello From Kiev (listener letters/music); 0310 T-S Ukraine Today (magazine); 0318 S Baroque (the arts); 0320 M Music from Ukraine; 0325 T-F Closeup (current issues).

VOICE OF RUSSIA
0300 D News; 0311 M Sunday Panorama, T-S News & Views; 0324 M Russia: People & Events; 0330 D News in Brief; 0332 S Kaleidoscope (Russian events), M Audio Book Club (Russian lit.), T/H/A 20th Century, W/F Russian history/culture.

VOICE OF VIETNAM
0330 D News; 0335 D Current Affairs; 0340 Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; 0345 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0350 S Music, A Literature and Arts.

WBCQ, Maine
7415 kHz.: 0300 S You Are What You Think, M Radio New York International (from 0000), F Veronica/Passaro Music Hour.

WHRI, Indiana
5745 kHz.: 0302 S 20, The Countdown Magazine (Christian rock music charts to 0500); 0305 T-A Music (Christian contemporary/gospel).
7315 kHz.: 0302 S 20, The Countdown Magazine (Christian rock music charts to 0500); 0305 M Music (Christian contemporary/gospel); 0330 M DXing with Cumbre.
7580 kHz.: 0305 T-A Music (Christian contemporary/gospel); 0335 S Music (Christian contemporary/gospel).

WRMI, Florida
7385 kHz.: 0330 S Viva Miami (magazine).

WWCR Tennessee
5070 kHz.: 0300 S Spectrum (communications discussion).

0400 UTC/ 12am E/9pm P - Page 45 Freqs

BBC WORLD SERVICE (am) - 5975, 11835
0400 D The World Today; 0430 S Global Business, A Assignment; 0450 M-F Sports Roundup.

BBC WORLD SERVICE (eu) - 6195, 9410
0400 D The World Today; 0430 S Global Business, A Network Europe; 0450 M-F Sports Roundup.

BBC WORLD SERVICE (me) - 12095, 15575
0400 D The World Today; 0430 S In Praise of God, A Assignment; 0450 M-F Sports Roundup.

BBC WORLD SERVICE (eaf) - 15420, 17640
0400 D The World Today; 0430 S African Perspective, M-F Network Africa, A Talkabout Africa.

BBC WORLD SERVICE (waf) - 6005, 7120, 7160
0400 D The World Today; 0430 S African Perspective, M-F Network Africa, A African Quiz/This Week and Africa.

BBC WORLD SERVICE (eas) - 15280
0400 S The World Today, M-A News; 0430 S Brain of Britain, A Assignment; 0445 M-F Sports Roundup.

CHINA RADIO INT.
0400 D News; 0410 S Report on Developing Countries, M-F Current Affairs, A Biz China; 0420 S In the Spotlight (cultural magazine), A Cutting Edge (sci/tech); 0430 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

HCJB, Ecuador
0400 S DX Partyline, M Musical Mailbag, T-A Latin American & World News; 0410 T-A Studio 9 (Latin American regional report including T Inside HCJB, W/F Did You Hear? (news comment), H Ham Radio Today, A Musica del Ecuador); 0430 S Saludos Amigos, M Mountain Meditations, T-A A New Beginning; 0445 T-A A Time for Truth.

RADIO AUSTRALIA
0400 D News; 0405 S/A Pacific Focus (S arts, A environment); 0410 M-F Margaret Throsby (interviews and music); 0430 S RA Arts, A The Buzz (technology issues).
[Special service: 0405 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO HABANA CUBA
0400 D International News; 0410 M From Habana (Cuban musicians), T-S National News; 0415 T-S Reports and music; 0430 M The Jazz Place or Top Tens, T-S News Bulletin; 0435 S World of Stamps, T-A Reports and music; 0450 S Cuban music.

RADIO NETHERLANDS
0430 S/M News; T-A Newsline; 0435 S Europe Unzipped, As Sincerely Yours; 0455 S Insight, M The Week Ahead.

RADIO NEW ZEALAND INT.
0400 D RNZ News; 0406 S Playhouse (radio theatre)*, M-F In Touch with New Zealand (from 0205), A Home Grown (NZ music to 0600, including Musical Chairs-artist feature 0430*.

RADIO FOR PEACE INT., Costa Rica
0400 S CounterSpin (media analysis), M Music Medicine, T-A Democracy Now! (Pacifica Radio's daily report); 0430 S Freespeech Radio News (repeat of Fri. newscast).

RADIO ROMANIA INT.
0400 D Radio Newsreel; 0410 S The Week, M Focus, T-A Commentary; 0415 S World of Culture, M Sunday Studio, T Pro Memoria (history), W Business Club, H Society Today, F Cards on the Table (debate) or The Romanian Next to You (interview), A Challenge for the Future or Terra 2001; 0420 S RRI Encyclopedia, T Political Flash, W European Horizons; 0425 S Roots (culture/traditions), M Romanian by Radio, T/H/A Business Update, W Tourist News, F Listeners' Letterbox; 0430 S Radio Pictures, M Romanian Itineraries, T Pulse of Transition, W Mother Nature (ecology), H Visit Romania, A Practical Guide; 0435 S Romanian Itineraries, M Listeners' Letterbox, T Performing Arts, W Youth Club, H Partners in a Changing World, A Cultural Survey; 0440 S, Bucharest Along the Centuries, T Pages of Romanian Literature, W/F Skylark (folk music), H Stage and Screen, A Spectator (voice of the people); 0445 S DX Mailbag, T Romanian Hits, H Romanian Musicians, A Romanian Folk Music At Its Best; 0450 M Romanian Folk Music At Its Best, T Sports Roundup, W Athlete of the Week, H Sports Club, F Football Flash, A Sports Weekend.

RVi, Belgium
0400 S Music from Flanders, M Radio World, T-A News; 0404 T-A Belgium Today; 0408 M Tourism in Flanders; 0413 T Focus on Europe, W Green Society (ecology), H/A Around the Arts, F Economics; 0414 M Brussels 1043 (letters); 0418 T Sports, H Around Town, F International Report, A Tourism in Flanders; 0424 M-A Soundbox (Flemish rock).

VOICE OF RUSSIA
0400 D News; 0411 S Russian Musical Highlights, M Musical Portraits of the 20th Century, T/F Moscow Mailbag, W/A Science and Engineering, H Newmarket (business); 0430 D News in Brief; 0432 S/A Timelines, M Jazz Show, T Yours for the Asking, W Moscow Yesterday & Today, H Folk Box, F Audio Book Club (Russian lit.); 0447 T Music At Your Request.

WBCQ, Maine
7415 kHz.: 0400 S Tom & Darryl (electronic media), M-A Ames 'n Andy.

WHRI, Indiana
5745 kHz.: 0400 S 20,The Countdown Magazine (from 0302).
7315 kHz.: 0400 S 20,The Countdown Magazine (from 0302); 0405 M-F Music (Christian contemporary and gospel).
7580 kHz.: 0430 A DXing with Cumbre.

WWCR, Tennessee
3210 kHz.: 0400 S Cyber Line (computers).
5070 kHz.: 0400 S Cyber Line (computers).

0500 UTC/ 1am E/10pm P - Page 45 Freqs

BBC WORLD SERVICE (eu) - 6195, 9410, 12095
0500 D The World Today; 0530 S Pick of the World (BBC's best), A From Our Own Correspondent; 0545 A Letter from America.

BBC WORLD SERVICE (me) - 15565, 15575
0500 D The World Today; 0530 S Global Business, A World Business Review; 0545 A Letter from America.

BBC WORLD SERVICE (eaf) - 11940
0500 D The World Today; 0530 S Artbeat, M-F Network Africa, A African Quiz or This Week And Africa.

BBC WORLD SERVICE (waf) - 6005, 7160, 11765
0500 D The World Today; 0530 S Artbeat, M-F Network Africa, A Talkabout Africa.

BBC WORLD SERVICE (eas) - 15280
0500 D The World Today; 0530 S/H World Learning, M The Handy Guide to the Gurus of Management, T Write On, W Heart & Soul (religion), F What's the Problem?.

DEUTSCHE WELLE
0500 D News; 0505 S Talking Point (journalists), M Religion & Society, T-A Newslink (European current affairs); 0515 S Money Talks, M COOL! (youth magazine); 0530 T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCJB, Ecuador
0500 S Inspirational Classics, M Renewing Your Mind, T-S Family Life Today; 0530 S Did You Hear (news comment), M Unshackled (radio's oldest drama series), T Let My People Think (apologetics), W Words for Women, H Adventures in Odyssey (children), F Book & the Spade (religion & archaeology), A Walkin' in the Sunshine (country music); 0545 S Specialized English, W Wonderful Words of Life (hymns), F Science, Scripture & Salvation.

RADIO AUSTRALIA
0500 D News; 0505 S/A Pacific Focus (S business, A sport); 0510 M-F Pacific Beat (Pacific islands magazine w/regional sports report 0530); 0530 S Fine Music Australia (classical), A Lingua Franca (about language); 0545 A Short Story.
[Special service: 0505 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO HABANA CUBA
0500 D International News; 0510 M Weekly Review, T-S National News; 0515 T-S Viewpoint; 0530 M Reports & Music, T-S News Bulletin; 0535 T-A Time Out (sports); 0540 S/W DXers Unlimited, M Mailbag Show, T/H/F Caribbean Outlook, A Weekly Review; 0550 M Breakthrough (science report).

RADIO JAPAN
0500 D News; 0510 S Pop Joins the World, A Hello from Tokyo (listener contact); 0515 M-F 44 Minutes (feature magazine).

RADIO NETHERLANDS
0500 S Roughly Speaking, M Dutch Horizons, T Research File (science), H Documentary, F Aural Tapestry (cultural magazine), A A Good Life (global development).

RADIO NEW ZEALAND INT.
0500 D RNZ News; 0505 S Spiritual Outlook*, M-F Checkpoint (comprehensive news). A Home Grown (NZ music from 0405].

RADIO FOR PEACE INT., Costa Rica
0500 S TUC Radio, M Neumaier Report, T Between the Lines, W A Woman's Voice, H Alternative Radio, F Making Contact (reports & interviews), A Honoring Mother Earth: Indigenous Voices; 0515 M Living Enrichment Center; 0530 S Continent of Media, T TUC Radio, F Steppin' Out of Babylon.

Voice of Nigeria
0500 S/A News Summary, M-F VON Scope, A African Safari (music); 0505 S VON Link-Up, A African Safari; 0530 D News about Nigeria; 0540 D News About Africa; 0545 D World News; 0555 D Commentary.

WBCQ, Maine
7415 kHz.: 0500 S Tom and Darryl (cont'd. from 0400-1st/3rd wks.), H World of Radio, A The Clone Zone; 0530 H Radio DC.

WHRI, Indiana
5745 kHz.: 0500 A DXing with Cumbre; 0530 A World Harvest Country Style.
7315 kHz.: 0500 M-F Music (Christian contemporary and gospel), A DXing with Cumbre; 0530 A World Harvest Country Style.

WWCR, Tennessee
3210 kHz.: 0500 M World of Radio; 0505 A Rock the Universe (Christian rock music).
5070 kHz.: 0500 S World Wide Country Radio (music), T Ask WWCR (letters); 0505 M A View from Europe.

0600 UTC/ 2am E/11pm P - Page 46 Freqs

BBC WORLD SERVICE (eu) - 9410, 12095, 15485
0600 D World Briefing; 0620 D Sports Roundup; 0630 S Agenda (trends), M-F World Business Report, A People and Politics; 0645 M The New Europe (1st wk) or Letter from America, T/W/F Analysis, H From Our Own Correspondent.

Shortwave Guide

BBC WORLD SERVICE (me) - 15565, 15575
0600 S World Briefing, M-A News; 0605 M Talking Point, T-A Outlook; 0620 S Sports Roundup; 0630 S Agenda (trends); 0645 M-F Off the Shelf (book readings), A Patterns of Faith (belief systems).

BBC WORLD SERVICE (esaf) - 11940
[same as (me) schedule above]

BBC WORLD SERVICE (wcaf) - 6005, 7160, 11765
0600 D World Briefing; 0620 D Sports Roundup; 0630 S Agenda (trends), M-F Network Africa, A African Quiz or This Week And Africa.

BBC WORLD SERVICE (eas) - 15280
0600 S/A World Briefing, M-F News; 0605 M Arts in Action, T Meridian-Masterpiece, W Meridian-Screen, H Meridon-Writing, F The Music Biz; 0620 S/A Sports Roundup; 0630 S Westway Omnibus (drama serial), M Jazzmatazz, T Charlie Gillett (world music), W UK Top 20, H Revolver, F John Peel (eclectic music), A People and Politics.

RADIO AUSTRALIA
0600 D News; 0605 S The Europeans, A Feedback (letters/station news); 0610 M-F Regional Sports Report; 0620 M-F Pacific Focus (M business, T health, W environment, H sport, F culture); 0630 A Oz Sounds (new releases); 0634 S Ockham's Razor (a science issue); 0640 M Oz Music Show (rock), T Music Deli (diverse world/folk),W Blacktracker (contemporary Aboriginal), H Australian Country Style, F Jazz Notes
[Special service: 0605 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO HABANA CUBA
0600 D International News; 0610 M From Habana (Cuban musicians), T-S National News; 0615 T-S Reports and music; 0630 M The Jazz Place or Top Tens, T-S News Bulletin; 0635 S World of Stamps, T-A Reports and music; 0650 S Cuban music.

RADIO JAPAN
0600 D News; 0615 S Weekend Square, M-F Asian Top News, A Pop Joins the World ; 0625 M Japan Music Log, T Let's Learn Japanese, W Japan Musical Treasure Box, H Brush Up Your Japanese, F Music Beat (pop).

RADIO NEW ZEALAND INT.
0600 D RNZ News; 0606 S Whenua (Maori magazine), M-F What's Going On? (arts & entertainment calendar), A Feature; 0630 M Letter from America (BBC), T-H Today in Parliament, F The Pacific Report, A In a Mellow Tone (soft sounds); 0645 M-F Storytime.

RADIO FOR PEACE INT., Costa Rica
0600 S World of Radio, M Spiritual Awakening, T-A Freespeech Radio News; 0630 S RFPI Mailbag, M One World—One Family (Bahai program), T/H/A Hightower Radio (commentary), W Radio Nation ("The Nation"), F This Way Out (gays magazine); 0035 T/H/A Earthwatch (ecology); 0640 T/H/A Earth & Sky (astronomy); 0645 T Tropical Conservation Newsbureau (rainforests), H World Citizen's Weekly Commentary, A Women (UN program).

VOICE OF NIGERIA
0600 S This Week on VON, M-F Moving On, A Weekend Magazine; 0615 S Soul Lift; 0630 S/A Reporter's Diary, M-F African Press; 0645 S From the Rocks, M-F Insight, A Listeners' Letters.

WHRI, Indiana
5745 kHz.: 0630 S DXing with Cumbre.
7315 kHz.: 0604 A Turn Your Radio On; 0630 S World Harvest Country Style.

WWCR, Tennessee
3210 kHz.: 0600 S The Big Backyard (Australian country music), M Spectrum (communications discussion; 0605 T-F World Wide Country Radio (music).
5070 kHz.: 0605 S This Week in Americana (antiques); 0630 S World of Radio.

1000 UTC/6am E/3am P - Page 48 Freqs

BBC WORLD SERVICE (am) - 6195
1000 D World Briefing; 1020 S/A Sports Roundup; 1030 S Agenda (trends), M-F World Business Report, A Reporting Religion; 1045 M-F Sports Roundup.

BBC WORLD SERVICE (eu) - 12095, 15485
1000 D World Briefing; 1020 S/A Sports Roundup; 1030 S Network Europe, M-F World Business Report, A Reporting Religion; 1045 M-F Sports Roundup.

BBC WORLD SERVICE (me) - 15565, 15575
1000 D World Briefing; 1020 S/A Sports Roundup; 1030 S/A World Learning, M-F World Business Report; 1045 M-F Sports Roundup.

BBC WORLD SERVICE (eas) - 9740
1000 S/A News, M-F World Briefing; 1001 S Concert Hall; 1005 A Composer of the Month; 1030 M-F World Business Report, A Music Review; 1045 M-F Sports Roundup.

RADIO AUSTRALIA
1000 D News; 1005 S The Buzz (technology issues), M-F Asia Pacific (regional current affairs), A Pacific Review; 1030 S Rural Reporter, M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor, A In Conversation.

RADIO NETHERLANDS
1030 S/A News, M-F Newsline; 1035 S Wide Angle, A Europe Unzipped (lifestyle magazine); 1055 S The Week Ahead (program guide), A Insight (commentary).

RADIO NEW ZEALAND INT.
1000 D News; 1005 S Mediawatch, M-F Late Edition (the day's news), A Deep Purple (relaxing music/nostalgia); 1035 S Sunday Supplement.

RADIO FOR PEACE INT., Costa Rica
1000 S CounterSpin (media analysis), M Music Medicine, T-A Democracy Now! (Pacifica Radio's daily report); 1030 S Freespeech Radio News (repeat of Fri. newscast).

VOICE OF AMERICA (News Now)
1000 M-F News; 1015 M-F Focus; 1020 M-F Sports; 1030 M-F Headlines; 1033 S/H/A On the Line (US foreign policy), M Press Conference USA, T Encounter (foreign affairs debate), W Our World (science), F Best of 'Talk to America' (interviews).

WHRI, Indiana
6040 kHz.: 1005 A For the People (populist phone-in to 1200).
9495 kHz.: 1005 M-F Music (contemporary Christian/Gospel).

WWCR, Tennessee
5070 kHz.: 1000 A The Old Record Shop (vintage recordings); 1010 S A View from Europe.
15825 kHz.: 1000 M-F World Wide Country Radio (country music); 1015 S Ask WWCR (letters).

1100 UTC/ 7am E/4am P - Page 48 Freqs

BBC WORLD SERVICE (am) - 15190
1100 D World Briefing; 1105 M-F Caribbean Morning Report; 1110 M-F Caribbean Sport; 1115 M-F Caribbean Magazine; 1120 D British News; 1130 S Assignment, M Letter from America, T/W/F/A Analysis, H From Our Own Correspondent; 1145 M-H/A Sports Roundup, F Football Extra.

BBC WORLD SERVICE (eu) - 12095, 15485
1100 D World Briefing; 1120 D British News; 1130 S Assignment, M Letter from America, T/W/F/A Analysis, H From Our Own Correspondent; 1145 M-H/A Sports Roundup, F Football Extra.

BBC WORLD SERVICE (me) - 15565, 15575, 17640
1100 S World Briefing, M-A News; 1105 M Arts in Action, T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Writing, F The Music Biz, A Wright Around the World (music requests); 1120 S British News; 1130 S Assignment, M Jazzmatazz, T Charlie Gillett (world music), W UK Top 20, H Revolver, F John Peel (eclectic music).

BBC WORLD SERVICE (wcaf) - 17830
1100 D World Briefing; 1120 D British News; 1130 S Postmark Africa, M-F World Business Report, A Inside Track (African sport); 1145 M-H Sports Roundup, A Football Extra.

BBC WORLD SERVICE (eas) - 9740
1100 S/A World Briefing, M-F News; 1105 M Health Matters, T Go Digital, W Discovery, H One Planet (ecology), F Science in Action; 1120 S/A British News; 1130 S Play of the Week (radio theatre), M Everywoman, T Omnibus (documentary), W Sports International, H True Lives, F Documentaries, A Analysis; 1145 A Sports Roundup.

HCJB, Ecuador
1100 S Let My People Think, M-F Insight for Living, A We Kids; 1128 M-F Money Minute; 1130 S Encounter, M-F Morning in the Mountains (Christian breakfast show w/News 1130, Overcomers 1133, Listen to the Bible 1140, Beyond the Call 1145), A Down Gilead Lane.

RADIO AUSTRALIA
1100 D News; 1105 S Correspondents' Report, M-A Asia Pacific; 1130 S Business Report, M-F Bush Telegraph (rural magazine), A Fine Music Australia (classical).

RADIO JAPAN
1100 D News; 1110 S Hello from Tokyo (listener contact), A Pop Joins the World; 1115 M-F Asian Top News (headlines from region's radio); 1125 M Japan Music Log, T Let's Learn Japanese, W Japan Music Treasure Box, H Brush Up Your Japanese, F Music Beat.

RADIO KOREA INT.
1130 D News; 1140 S Korean Pop Interactive (requests), M-F News Commentary, A Seoul Report (week in review); 1145 M-F Seoul Calling (magazine).

RADIO NETHERLANDS
1100 S Aurol Topestry (culture), M EuroQuest (Europe in context), T A Good Life (development issues), W Dutch Horizons, H Research File (science), F Documentary, A Roughly Speaking (Euro youth culture); 1130 S Dutch Horizons, M Research File, T/A Music 52-15 (international music), W Documentary, H Aurol Topestry, F A Good Life.

RADIO NEW ZEALAND INT.
1100 D RNZ News; 1105 S/A NZ Forces Programme (to 1300), M-H Nine to Noon (current affairs), F Sports Story; 1130 F Top 5 (music).

RADIO FOR PEACE INT., Costa Rica
1100 S TUC Radio, M Neumaier Report, T Between the Lines, W A Woman's Voice, H Alternative Radio, F Making Contact (reports & interviews), A Honoring Mother Earth: Indigenous Voices; 1115 M Living Enrichment Center; 1130 S Continent of Media, T TUC Radio, F Steppin' Out of Babylon.

RADIO SWEDEN
1130 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report), A Network Europe (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); 1145 M Sports Scan, T Close Up (profiles of Swedes-1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WHRI, Indiana
6040 kHz.: 1105 A For the People (from 1005).
9495 kHz.: 1145 M-F Music (Christian contemporary/gospel).

WWCR, Tennessee
5070 kHz.: 1100 S Ken's Country Classics; 1105 A This Week in Americana (antiques), W America's Greatest Heroes.
15685 kHz.: 1115 A Eco Watch.

1200 UTC/ 8am E/5am P - Page 49 Freqs

BBC WORLD SERVICE (am) - 15190
1200 D Newshour; 1205 M-F Caribbean Business 1210 M-F Caribbean Morning Report 2nd Edition; 1220 M-F Newshour (continued).

BBC WORLD SERVICE (me) - 15565, 15575, 17640
1200 D Newshour.

BBC WORLD SERVICE (wcaf) - 17830
1200 D Newshour.

BBC WORLD SERVICE (eu) - 12095, 15485
1200 D Newshour.

BBC WORLD SERVICE (eas) - 9740
1200 S Play of the Week (cont'd from 1130), M-A News; 1205 M-F Outlook (magazine), A Brain of Britain; 1230 S Assignment, A Agenda (trends); 1245 M Write On, T Heart and Soul, W/F Westway (drama serial), H What's the Problem?

HCJB, Ecuador
1200 S Moody Presents, M-F Morning in the Mountains (cont'd. from 1130 w/ News 1200 & 1230, Insights 1205, Sports 1206, Mission Network News 1220, Guidelines for Living 1233, Did You Hear? 1245), A Adventures in Odyssey; 1230 S The Living Word, A Toonz!.

RADIO AUSTRALIA
1200 D News; 1205 S Nocturne (innovative music to 1400), M-H Late Night Live (discussion and interviews), F Sound Quality (innovative music), A The Spirit of Things (spiritual matters).

Shortwave Guide

RADIO CANADA INT.
1200 M-F News; 1210 M-F This Morning (magazine to 1500).

RADIO KOREA INT.
1200 S Multiwave Feedback (letters/DX news), M Exploring the New Millennium, T Cultural Promenade, W Economic Radar, H Korea & Its Splendors, F Notes of Nostalgia (traditional music), A From Us to You (letters).

RADIO NETHERLANDS
1200 S/A News, M-F News ine; 1205 S Sincerely Yours (listener letters), A Europe Unzipped.

RADIO NEW ZEALAND INT.
1200 D News; 1205 S/A NZ Forces Programme (from 1105), M-F Late Edition (repeat of 1005).

RADIO FOR PEACE INT., Costa Rica
1200 S World of Radio, M Spiritual Awakening, T-A Freespeech Radio News; 1230 S RFPI Mailbag, M One World—One Family (Bahai program), T/H/A Hightower Radio (commentary), W Radio Nation ("The Nation"), F This Way Out (gays magazine); 1235 T/H/A Earthwatch (ecology); 1240 T/H/A Earth & Sky (astronomy); 1245 T Tropical Conservation Newsbureau (rainforests), H World Citizen's Weekly Commentary, A Women (UN program).

RADIO SWEDEN
1230 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report), A Network Europe (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); 1245 M Sports Scan, T Close Up (profiles of Swedes-1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WHRI, Indiana
6040 kHz.: 1200 A DXing with Cumbre; 1230 A World Harvest Country Style.
9495 kHz.: 1230 A DXing with Cumbre.

WWCR, Tennessee
5070 kHz.: 1205 A Rock the Universe.
12160 kHz.: 1200 S Dialogue.

YLE RADIO FINLAND
1230 M-A News; 1235 M-H Finland This Morning (magazine), F Capital Cafe (interview), A Finland This Week (news review); 1245 A Starting Finnish (language lesson); 1255 A Nuuni Latini (news in classical Latin).

1300 UTC/ 9am E/6am P - Page 49 Freqs

BBC WORLD SERVICE (am) - 15190
1300 D News; 1305 S Composer of the Month, M-F Outlook (magazine), A World Football; 1330 S In Praise of God, A The Music Feature; 1345 M-F Off the Shelf (book readings).

BBC WORLD SERVICE (eu) - 12095, 15485
1300 D News; 1305 S Brain of Britain, M-F Outlook (magazine), A Wright Around the World (music requests); 1330 S Global Business; 1345 M Write On, T Heart & Soul (religion), W/F Westway (drama serial), H What's the Problem? (advice).

BBC WORLD SERVICE (me) - 15565, 15575, 17640
1300 D News; 1305 S Pick of the World (BBC's best), M Science in Action, T Health Matters, W Go Digital, H Discovery, F One Planet (ecology), A Composer of the Month; 1330 S Reporting Religion, M Documentaries, T Everywoman, W Omnibus, H Sports International, F True Lives, A People and Politics

BBC WORLD SERVICE (wcaf) - 17830
1300 D News; 1301 S Concert Hall; 1305 M Arts in Action, T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Writing, F The Music Biz, A Brain of Britain; 1330 M Jazzmatazz, T Charlie Gillett (world music), W UK Top 20, H Revolver, F John Peel (eclectic music), A Music Review.

BBC WORLD SERVICE (esaf) - 21470
1300 D Newshour.

BBC WORLD SERVICE (eas) - 9740
1300 D Newshour; 1350 M-F World Business Report.

CHINA RADIO INT.
1300 D News; 1310 S Report on Developing Countries, M-F Current Affairs, A Biz China; 1320 S In the Spotlight (cultural magazine), A Cutting Edge (sci/tech); 1330 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

HCJB, Ecuador
1300 S Viewpoint, M-F Precept, A Toonz! (from 1230); 1313 M-F Getting the Message; 1315 M-F Proclaim; 1330 S Mountain Meditations, M-F Family Life Today, A Rock Solid.

RADIO AUSTRALIA
1300 D News; 1305 S Nocturne (innovative music from 1205), A The Science Show; 1310 M-F Sports; 1315M-F Dust & Dollars (stock market); 1320 M-F The Planet (diverse music to 1500).

RADIO CANADA INT.
1300 D News; 1305 S The Sunday Edition (arts/ideas magazine to 1600), M-F This Morning (cont'd. from 1210), A The House (Canadian politics).

RADIO FOR PEACE INT., Costa Rica
1300 S Making Contact, M Every Living Thing (nature), T Disability Radio Worldwide, W World of Radio, H A Public Affair, F Far Right Radio Review, A Continent of Media; 1330 S Alternative Radio (political/social analysis), T This Way Out (gays magazine), W RFPI Mailbag, A World of Radio.

RADIO SWEDEN
1330 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report), A Network Europe (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); 1345 M Sports Scan, T Close Up (profiles of Swedes-1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WHRI, Indiana
15105 kHz.: 1300 S World Harvest Country Style. 1345 A Music (Christian contemporary and gospel).

WWCR, Tennessee
15825 kHz.: 1330 S The Old Record Shop (vintage recordings).

1400 UTC/ 10am E/7am P - Page 49 Freqs

BBC WORLD SERVICE (cm) - 15190
1400 D News; 1405 S Talking Point (global phone-in), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Writing, H The Music Biz, F Arts in Action, A Sportsworld (live action to 1700); 1430 M Charlie Gillett, T UK Top 20, W Revolver, H John Peel, F Jazzmatazz.

BBC WORLD SERVICE (eu) - 12095, 15485
1400 D News; 1405 S Talking Point (global phone-in), M Science in Action, T Health Matters, W Go Digital, H Discovery, F One Planet (ecology), A Sportsworld (live action); 1430 M Documentaries, T Everywoman, W Omnibus, H Sports International, F True Lives.

BBC WORLD SERVICE (wcaf) - 17830
[same as (eu) schedule above]

BBC WORLD SERVICE (me) - 15565, 15575, 17640
1400 S/A News, M-F World Briefing; 1405 S Talking Point (global phone-in), A Sportsworld (live action); 1420 M-F World Business Report; 1430 M-F British News; 1445 M-H Sports Roundup, F Football Extra.

BBC WORLD SERVICE (esaf) - 21470, 21660
[same as (me) schedule above]

BBC WORLD SERVICE (eas) - 9740
1400 S/A News, M-F East Asia Today; 1405 S Talking Point (global phone-in), A Sportsworld (live action); 1430 M-F British News; 1445 M-H Sports Roundup, F Football Extra.

CHINA RADIO INT.
1400 D News; 1410 S Report on Developing Countries, M-F Current Affairs, A Biz China; 1420 S In the Spotlight (cultural magazine), A Cutting Edge (sci/tech); 1430 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

HCJB, Ecuador
1400 S Renewing Your Mind, M-F Haven, A Rock Solid (from 1330).

RADIO AUSTRALIA
1400 D News; 1405 S Books and Writing, M-F The Planet (cont'd. from 1315), A New Dimensions ("progressive" ideas).

RADIO CANADA INT.
1400 D News; 1405 S The Sunday Edition (cont'd. from 1310), M-F This Morning (cont'd from 1210), A Vinyl Cafe; 1430 F C'est La Vie (life in French Canada); 1445 M-H Out Front (experimental radio).

RADIO JAPAN
1400 D News; 1410 S Pop Joins the World, A Weekend Square (Japanese life); 1415 M-F 44 Minutes (feature magazine).

RADIO NETHERLANDS
1430 S/A News, M-F Newsline; 1435 S Sincerely Yours (listener letters), A Europe Unzipped (Europe in context); 1455 S The Week Ahead (program guide), A Insight (commentary).

RADIO FOR PEACE INT., Costa Rica
1400 S Alternative Radio (from 1330), M New Dimensions, T University Forum (interviews), W Continent of Media, H WINGS (women's news), F Disability Radio Worldwide, A RFPI Mailbag; 1430 S Far Right Radio Review, T Honoring Mother Earth: Indigenous Voices, W Ecothspan (War & Peace Foundation), H Global Community Forum (interviews), F A Woman's Voice, A University Forum (peace studies).

WHRI, Indiana
15105 kHz.: 1430 M-F Music (Christian contemporary and gospel).

1500 UTC/ 11am E/8am P - Page 50 Freqs

BBC WORLD SERVICE (am) - 15190
1500 D News; 1501 S Concert Hall; 1505 M One Planet (ecology), T Science in Action, W Health Matters, H Go Digital, F Discovery; 1530 M True Lives, T Documentaries, W Everywoman, H Omnibus (documentary), F Sports International.

BBC WORLD SERVICE (eu) - 12095, 15485
1500 S/A News, M-F World Briefing; 1501 S Concert Hall; 1505 A Sportsworld (live action); 1530 M-F British News; 1545 M/T/H/F Analysis, W From Our Own Correspondent.

BBC WORLD SERVICE (me) - 15565
1500 D News; 1501 S Concert Hall; 1505 M-F Outlook (magazine), A Sportsworld (from 1405); 1545 M Write On, T Heart and Soul (religion), W/F Westway (drama serial), H What's the Problem?.

BBC WORLD SERVICE (wcaf) - 15400, 17830
1500 D News; 1501 S Play of the Week; 1505 M-F Focus on Africa, A Sportsworld; 1530 M Write On, T Heart & Soul (religion), W/F Westway (drama serial), H What's the Problem? (advice); 1545 Off the Shelf (serialized readings).

BBC WORLD SERVICE (esaf) - 21470, 21660
1500 D News; 1505 S Composer of the Month, M-F Focus on Africa, A Sportsworld; 1530 S Pick of the World (best of the BBC), M Write On, T Heart & Soul (religion), W/F Westway (drama serial), H What's the Problem? (advice); 1545 M-F Off the Shelf (serialized readings).

BBC WORLD SERVICE (eas) - 9740
1500 D News; 1505 S Composer of the Month, M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Writing, H The Music Biz, F Arts in Action; 1530 S Pick of the World (best of the BBC), M Charlie Gillett, T UK Top 20, W Revolver, H John Peel, F Jazzmatazz.

CHINA RADIO INT.
1500 D News; 1510 S Report on Developing Countries, M-F Current Affairs, A Biz China; 1520 S In the Spotlight (cultural magazine), A Cutting Edge (sci/tech); 1530 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

RADIO AUSTRALIA
1500 D News; 1505 S Encounter (religion in Australia), M-F Asia Pacific (regional current affairs), A Nocturne (innovative music); 1530 M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor.

RADIO AUSTRIA INT.
1530 D Report from Austria (magazine); 1535 S Network Europe, A Insight Central Europe; 1550 A Listener Letters.

RADIO CANADA INT.
1500 S/A News; 1505 S The Sunday Edition (cont'd. from 1310), A Quirks and Quarks (science).

RADIO NETHERLANDS
1500 S Dutch Horizons, M Research File, T/A Music 52-15, W Documentary, H Aural Tapestry, F A Good Life; 1530 S Aural Tapestry, M EuroQuest, T A Good Life, W Dutch Horizons, H Research File, F Documentary, A Roughly Speaking.

RADIO FOR PEACE INT., Costa Rica
1500 S Far Right Radio Review (from 1430), M Voices of Our World (Maryknoll program), T Honoring Mother Earth: Indigenous Voices (from 1430), W Living Enrichment Center, H Global Community Forum (from 1430), F A Woman's Voice (from 1430), A Earthspan (War & Peace Foundation); 1530 S World Citizens Weekly Commentary, M Perspective (UN program), T In the Moment, W Peace Forum, H Scope (UN program), F Tropical Conservation Newsbureau (rainforests), A Newmaier Report; 1545 S/M Hightower Report (commentary), T-A UN Today; 1550 S/M Earthwatch (ecology); 1555 S/M Earth & Sky (astronomy).

WHRI, Indiana
15105 kHz.: 1505 M-F Music (Christian contemporary and gospel).
17650 kHz.: 1505 M-F Music (Christian contemporary and gospel); 1545 A Music (Christian contemporary and gospel).

1600 UTC/ 12pm E/9am P - Page 50 Freqs

BBC WORLD SERVICE (am) - 15190
1600 S/A News, M-F Europe Today; 1605 S/A Sportsworld (live action); 1630 M-F World Business Report; 1645 M-F Sports Roundup.

BBC WORLD SERVICE (eu) - 9410, 12095, 15485
[same as (am) schedule above]

BBC WORLD SERVICE (me) - 15565
1600 D News; 1605 S/A Sportsworld (live action), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Writing, H The Music Biz, F Arts in Action; 1630 M Charlie Gillett (world music), T UK Top 20, W Revolver, H John Peel (eclectic music), F Jazzmatazz.

BBC WORLD SERVICE (of) - 15400, 17830, 21470, 21660
1600 D News; 1605 S/A Sportsworld (live action), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Writing, H The Music Biz, F Omnibus (documentary); 1630 M/F Fast Track (African sport), T African Perspective, W Talkabout Africa, H Artbeat; 1645 F Inside Track.

HCJB, Ecuador
1600 S Message of Truth, M-F Renewing Your Mind, A Words of Hope.

RADIO AUSTRALIA
1600 D News; 1605 S The National Interest, M Margaret Throsby (music & interview), T Comfort Zone (design), W Verbatim (oral histories), H Hindsight (social history), F Awaye! (Aboriginal life); 1630 W Street Stories.

RADIO NETHERLANDS
1600 S/A News, M-F Newsline; 1605 S Wide Angle, A Europe Unzipped.

RADIO FOR PEACE INT., Costa Rica
1600 S Music Medicine, M-F Democracy Now! (Pacifica Radio's daily report), A CounterSpin (media analysis); 1630 A Freespeech Radio News (repeat of Fri. newscast).

WBCQ, Maine
17495 kHz.: 1600 A Allan Weiner Worldwide.

WHRI, Indiana
15105 kHz.: 1600 A Sports Spectrum Live; 1605 S-F Music (Christian contemporary and gospel).

WWCR, Tennessee
15825 kHz.: 1600 M-F World Wide Country Radio (country music).

1700 UTC/ 1pm E/10am P - Page 51 Freqs

BBC WORLD SERVICE (eu) - 9410
1700 D News; 1701 S Play of the Week (radio theatre); 1705 M-F Outlook (magazine), A From Our Own Correspondent; 1730 A Agenda (trends); 1745 M Write On, T Heart & Soul (religion), W/F Westway (drama serial), H What's the Problem? (advice).

BBC WORLD SERVICE (me) - 12095, 15565
1700 S-F News, A World Briefing; 1701 S Play of the Week (radio theatre); 1705 M Health Matters, T Go Digital, W Discovery, H One Planet (ecology), F Science in Action; 1720 A British News; 1730 M Everywoman, T Omnibus (documentary), W Sports International, H True Lives, F Documentaries, A Westway Omnibus (drama serial).

BBC WORLD SERVICE (of) - 15400, 17830, 21470
1700 D News; 1705 D Focus on Africa; 1745 D Sports Roundup.

RADIO FOR PEACE INT., Costa Rica
1700 S Neumaier Report, M Between the Lines, T A Woman's Voice, W Alternative Radio, H Making Contact (reports & interviews), F Honoring Mother Earth: Indigenous Voices, A TUC Radio; 1715 S Living Enrichment Center; 1730 M TUC Radio, H Steppin' Out of Babylon, A Continent of Media.

SWISS RADIO INT.
1730 S/A Swiss Scene, M-F Newsnet; 1735 A Take 2; 1740 S Culture Zone (the arts-1st/3rd wk) or Out and About (Swiss places-2nd/4th wk), A Sounds Good (Swiss music-3rd/5th wk); 1745 F Business Spotlight.

WBCQ, Maine
17495 kHz.: 1700 A Marion's Attic (vintage recordings).

WHRI, Indiana
13760 kHz.: 1730 S Music (Christian contemporary/gospel).

WWCR, Tennessee
15685 kHz.: 1730 T Dialogue.

1800 UTC/ 2pm E/11am P - Page 51 Freqs

BBC WORLD SERVICE (eu) - 9410
1800 S/A World Briefing, M-F News; 1805 M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Writing, H The Music Biz, F Arts in Action; 1820 S/A British News; 1830 S Assignment, M Charlie Gillett (world music), T UK Top 20, W Revolver, H John Peel (eclectic music), F Jazzmatazz, A World Business Review; 1845 A Letter from America.

BBC WORLD SERVICE (me) - 12095
1800 D World Briefing; 1820 D British News; 1830 S Assignment, M-F World Business Report, A World Business Review; 1845 M/T/H/F Analysis, W From Our Own Correspondent, A Letter from America.

BBC WORLD SERVICE (wcaf) - 15400, 17830
[same as (me) schedule above]

BBC WORLD SERVICE (esaf) - 21470
1800 S/A World Briefing, M-F News; 1805 M Health Matters, T Go Digital, W Discovery, H One Planet (ecology), F Science in Action; 1820 S/A British News; 1830 S Assignment, M Everywoman, T Omnibus (documentary), W Sports International, H True Lives, F Documentaries, A World Business Review; 1845 A Letter from America.

RADIO KUWAIT
1800 D Program Review; 1802 D Burning of the Oil Wells; 1815 D The Amir Speaks to the Nation for the Nation; 1830 D News; 1845 S-H Musical Interlude, F Pioneers, A Famous Personalities of Kuwait.

RADIO FOR PEACE INT., Costa Rica
1800 S Spiritual Awakening, M-F Freespeech Radio News, A World of Radio; 1830 S One World—One Family (Bahai program), M/W/F Hightower Radio (commentary), T Radio Nation ("The Nation"), H This Way Out (gays magazine), A RFPI Mailbag; 1835 M/W/F Earthwatch (ecology); 1840 M/W/F Earth & Sky (astronomy); 1845 M Tropical Conservation Newsbureau (rainforests), W World Citizen's Weekly Commentary, F Women (UN program).

WBCQ, Maine
17495 kHz.: 1800 A Zombo's Mondo Record Party.

WHRI, Indiana
13760 kHz.: 1800 A DXing with Cumbre.
15105 kHz.: 1800 A World Harvest Country Style; 1805 S Pat Boone, M-F For the People (populist phone-in); 1830 A Live from Studio 8.

1900 UTC/ 3pm E/12pm P - Page 52 Freqs

BBC WORLD SERVICE (eu) - 9410
1900 S/A World Briefing, M-F News; 1905 M Health Matters, T Go Digital, W Discovery, H One Planet (ecology), F Science in Action; 1920 S/A Sports Roundup; 1930 S Reporting Religion, M Everywoman, T Omnibus (documentary), W Sports International, H True Lives, F Documentories, A Westway Omnibus (drama serial).

BBC WORLD SERVICE (wcaf) - 15400, 17830
1900 D News; 1905 S From Our Own Correspondent, M-F Focus on Africa, A Westway Omnibus (drama serial); 1930 S/A World Learning, M/F Fast Track (African sport), T Artbeat, W Talkabout Africa, H Postmark Africa; 1945 F Inside Track.

BBC WORLD SERVICE (esaf) - 12095
1900 S-F News, A World Briefing; 1905 S Wright Around the World (music requests), M-F Focus on Africa; 1920 A Sports Roundup; 1930 M Charlie Gillett (world music), T UK Top 20, W Revolver, H John Peel (eclectic music), F Jazzmatazz, A Music Review.

RADIO KUWAIT
1900 S-H Sounds of Today, F Home Matters, A Kuwait and the Media; 1915 D Songs; 1930 D Sohih Muslim; 1945 S Pell Mell, M Helter Skelter, T Short Stories of Kuwait, W International Top 20, H Pop Session Special, F Discovering Your Hidden Powers, A Scene & Heard.

RADIO FOR PEACE INT., Costa Rica
1900 S Every Living Thing (nature), M Disability Radio Worldwide, T World of Radio, W A Public Affair, H Far Right Radio Review, F Continent of Media, A Making Contact; 1930 M Earthspan (War & Peace Foundation), T RFPI Mailbag, F World of Radio, A Alternative Radio (political/social analysis).

SWISS RADIO INT.
1930 S/A Swiss Scene, M-F Newsnet; 1935 A Take 2; 1740 S Culture Zone (the arts-1st/3rd wk) or Out and About (Swiss places-2nd/4th wk), A Sounds Good (Swiss music-3rd/5th wk); 1945 F Business Spotlight.

VOICE OF NIGERIA
1900 S Youth Forum, M Our Cities, T Our Environment, W Who Are the Nigerians?, H Listeners' Letters, F Nigerian Scene, A Folktales; 1915 H Wheel of Progress, F Business Weekly, A Nigerian Newsletter; 1930 S Window on Abujo, M Perspectives, T African Monarchy, W Theatre on the Air, H Women and Development, F Weekend Magazine, A Time for Highlife; 1945 S From the Bookshelf, T Listeners' Letters.

WHRI, Indiana
5745 kHz.: 1905 M-F Music (Christian contemporary/gospel).
9495 kHz.: 1905 M-F For the People (from 1805); 1945 A Music (contemporary Christian/gospel).

WWCR, Tennessee
15685 kHz.: 1930 T New Horizons (science).

2000 UTC/ 4pm E/1pm P - Page 52 Freqs

BBC WORLD SERVICE (eu) - 9410
2000 D Newshour.

BBC WORLD SERVICE (of) - 11835, 12095, 15400
2000 D Newshour; 2050 D Sports Roundup.

RADIO KUWAIT
2000 (all cont'd from 1945) S Pell Mell, M Helter Skelter, T Short Stories of Kuwait, W International Top 20, H Pop Session Special, F Discovering Your Hidden Powers, A Scene & Heard. 2015 D Music; 2030 S-H Kuwait: Land of Prosperity; 2050 D News in Brief.

RADIO FOR PEACE INT., Costa Rica
2000 S New Dimensions, M University Forum (interviews), T Continent of Media, W WINGS (women's news), H Radio Nation ("The Nation"), F RFPI Mailbag, A Alternative Radio (from 1930); 2030 S Far Right Radio Review, T Honoring Mother Earth: Indigenous Voices, W/A University of the Air (peace studies), H Global Community Forum (interviews), F A Woman's Voice.

SWISS RADIO INT.
2000 S/A Swiss Scene, M-F Newsnet; 2005 A Take 2; 1740 S Culture Zone (the arts-1st/3rd wk) or Out and About (Swiss places-2nd/4th wk), A Sounds Good (Swiss music-3rd/5th wk); 2015 F Business Spotlight.

VOICE OF NIGERIA
2000 S News Bulletin, M-F Sixty Minutes, A African Hour; 2015 S Sports Roundup; 2030 S In the News.

WBCQ, Maine
7415 kHz.: 2000 H-S Radio Caroline.

WHRI, Indiana
9495 kHz.: 2005 S Music (Christian contemporary/gospel).

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WWCR, Tennessee
9475 kHz.: 2000 F Ask WWCR (letters); 2015 F New Horizons (science); 2030 A Presidential Radio Address/Democratic Response.
15685 kHz.: 2030 H World of Radio.

2100 UTC/ 5pm E/2pm P - Page 53 Freqs

BBC WORLD SERVICE (am) - 5975
2100 D News; 2105 S Global Business, M-F World Business Report, A World Business Review; 2115 M-F Caribbean Report; 2120 A British News; 2130 D Sports Roundup; 2145 S Write On, M/T/H/F Analysis, W From Our Own Correspondent, A Patterns of Faith.
[Caribbean Report also on 11675, 15390 kHz. Special service to the Falklands on 11680 kHz.: 2130 T/F Calling the Falklands.]

BBC WORLD SERVICE (eu) - 9410
2100 D News; 2105 S Pick of the World, M-F World Business Report, A Composer of the Month; 2120 M-F British News; 2130 S Brain of Britain, M-F Sports Roundup, A Assignment; 2145 M-F Off the Shelf (book readings).

BBC WORLD SERVICE (wcaf) - 11835, 15400
2100 D News; 2105 S Wright Around the World (music requests), M Health Matters, T Go Digital, W Discovery, H One Planet (ecology), F Science in Action, A Composer of the Month; 2130 M Everywoman, T Omnibus (documentary), W Sports International, H True Lives, F Documentaries, A People and Politics.

RADIO AUSTRALIA
2100 D News; 2105 F Feedback, A Australia All Over; 2110 S-H AM (morning news magazine), 2130 S Educational series, M Health Report, T Innovations, W Religion Report, H Rural Reporter, F Oz Sounds.

RADIO FOR PEACE INT., Costa Rica
2100 S Voices of Our World (Maryknoll program), M Honoring Mother Earth: Indigenous Voices (from 2030), T Living Enrichment Center, W Global Community Forum (from 2030), H A Woman's Voice (from 0230), F Earthspan (War & Peace Foundation), A Far Right Radio Review (from 2030); 2130 S Perspective (UN program), M In the Moment, T Peace Forum, W Scope (UN program), H Tropical Conservation Newshour (rainforests), F Newmaier Report, A World Citizens Weekly Commentary; 2145 S/A Hightower Report (commentary), M-F UN Today; 2150 S/A Earthwatch (ecology); 2155 S/A Earth & Sky (astronomy).

RADIO JAPAN
2100 D News; 2110 S Weekend Square (Japanese life), M Pop Joins the World; 2115 T-A Asian Top News; 2125 T Japan Music Log, W Let's Learn Japanese, W Japan Musical Treasure Box, H Brush Up Your Japanese, F Music Beat.

VOICE OF NIGERIA
2100 S Time for Highlife, M Musical Heritage, T Soul Lift, W Health Corner, H Perspectives, F Our Environment, A Talking Agriculture; 2115 M World of the Arts, T Beyond the Poverty Line; 2130 S Wheel of Progress, M From the Racks, T Ten Seconds, W VON Link-Up, H Our Cities, F Celebrations, A Theatre on the Air; 2145 S Listeners' Letters, M Issues.

WBCQ, Maine
7415 kHz.: 2100 S Radio Free Euphoria, M Jean Shepherd, W The Clone Zone, F Juliet's Wild Kingdom, A HarvZower; 2130 T International World Beat Music, F Pab Sungenis Project.

WHRI, Indiana
5745 kHz.: 2100 S DXing with Cumbre; 2105 M-H For the People (populist phone-in). 2130 S Music (Christian contemporary/gospel).
17650 kHz.: 2100 F DXing with Cumbre; 2130 M-F Music (Christian contemporary/gospel), A DXing with Cumbre.

2200 UTC/ 6pm E/3pm P - Page 54 Freqs

BBC WORLD SERVICE (am) - 5975
2200 D The World Today; 2230 S Agenda (trends), F People and Politics, A From Our Own Correspondent.

BBC WORLD SERVICE (wcaf) - 11835, 15400
2200 D News; 2205 S Brain of Britain, M-F Outlook (magazine), A Pick of the World (BBC's best); 2230 S Assignment, A From Our Own Correspondent; 2245 M Write On, T Heart and Soul (religion), W/F Westway (drama serial), H What's the Problem? (advice).

RADIO AUSTRALIA
2200 D News; 2205 F Asia Pacific Weekend Edition, A Correspondents Report; 2210 S-H AM (morning news magazine); 2230 A Business Report; 2240 S Australian Music Show (rock), M Music Deli (international), T Blacktracker (Aboriginal contemporary), W Country Style, H Jazz Notes

RADIO CANADA INT.
2200 S/A The World This Weekend, M-F The World at 6; 2230 S Inside Track (sports anthologies) M-F As It Happens (interviews with newsmakers), A Madly Off in All Directions (comedy).

RADIO FOR PEACE INT., Costa Rica
2200 S Music Medicine, M-F Democracy Now! (Pacifica Radio's daily report), A CounterSpin (media analysis); 2230 A Freespeech Radio News.

RADIO PRAGUE
2230 D News; 2235 S Letter from Prague, M-F Newsview, A Readings from Czech Literature; 2240 S The Arts, T Witness, W ABC of Czech, A Saturday Music (classical/folk/jazz); 2245 S Mailbox, M One on One (interview), T Talking Point or Insight Central Europe, W Czechs in History or Profile, H Economic Report, F Magazine.

RVi, Belgium
2230 S Radio World, M-F News, A Music from Flanders; 2234 M-F Belgium Today; 2238 S Tourism in Flanders; 2243 M Focus on Europe, T Green Society (ecology), W/F Around the Arts, H Economics; 2244 S Brussels 1043 (letters); 2248 M Sports, W Around Town, H International Report, F Tourism in Flanders; 2254 S-F Soundbox (Flemish rock).

WBCQ, Maine
7415 kHz.: 2200 M The RMF Show; 2230 H Uncle Ed's Musical Memories, F Wanton Display of Control & Disruption, A Radio Timtron Worldwide.

WHRI, Indiana
5745 kHz.: 2200 S/A Turn Your Radio On.
9495 kHz.: 2205 M-F Music (Christian contemporary/gospel); 2230 S Music (Christian contemporary/Gospel), A DXing with Cumbre.
17650 kHz.: 2205 M-F For the People; 2230 S Music (Christian contemporary/gospel).

WRMI, Florida
15725 kHz.: 2200 S Wavescan.

2300 UTC/ 7pm E/4pm P - Page 54 Freqs

BBC WORLD SERVICE (am) - 5975
2300 S The World Today, M-A News; 2301 A Play of the Week (radio theatre); 2305 M-F Outlook (magazine); 2330 S Pick of the World; 2345 M Write On, T Heart & Soul (religion), W/F Westway H What's the Problem?

CHINA RADIO INT.
2300 D News; 2310 S Report on Developing Countries, M-F Current Affairs, A Biz China; 2320 S In the Spotlight (cultural magazine), A Cutting Edge (sci/tech); 2330 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Gorden.

RADIO AUSTRALIA
2300 D News; 2305 F Lingua Franca (about language, A All in the Mind (the brain); 2310 S-H Asia Pacific (regional current affairs); 2320 F Short Story; 2330 S Earthbeat (ecology), M The Buzz (technology issues), T RA Arts, W Rural Reporter, H Media Report, F In Conversation, A Innovations (new products).

RADIO BULGARIA
2300 D News; 2310 S Folk Studio (Bulgarian folk music), M-F Events and Developments (current affairs review), A Views Behind the News; 2320 M Sports; 2325 M-F Timeout for Music; 2330 F Bulgarian Plaza (cultural magazine) or Walks and Talks (interesting places); 2335 M-W, F-A Keyword Bulgaria (Bulgaria and things Bulgarian), H Answering Your Letters; 2345 M Magazine Economy, T Arts and Artists; W History Club, H The Way We Live, F RADIO BULGARIA Calling (for radio hobbyists).

RADIO CANADA INT.
2300 D CBC News; 2305 S Global Village (world music), M-F As It Happens (interviews with newsmakers)[began at 2230], A Quirks & Quarks (science); 2330 W Dispatches (world events through Canadian eyes).

RADIO NETHERLANDS
2330 S/A News; M-F Newsline; 2335 S Sincerely Yours (letters), A Europe Unzipped (lifestyle magazine); 2355 S The Week Ahead (program guide), A Insight (commentary).

RADIO NEW ZEALAND INT.
2300 S-H World and Pacific News, F/A RNZ News; 2310 S-H Sports News, F Saturday Night with John Campbell, A Feature or series; 2315 S-H Pacific Weather; 2317 Kim Hill (interviews/current affairs).

RADIO FOR PEACE INT., Costa Rica
2300 S Neumaier Report, M Between the Lines, T A Woman's Voice, W Alternative Radio, H Making Contact (reports & interviews), F Honoring Mother Earth: Indigenous Voices, A TUC Radio; 2315 S Living Enrichment Center; 2330 M TUC Radio, H Steppin' Out of Babylon, A Continent of Media.

RADIO ROMANIA INT.
2300 D Radio Newsreel; 2310 S Focus, M-F Commentary, A The Week; 2315 S Sunday Studio, M Pro Memoria (history), T Business Club, W Society Today, H Cards on the Table (debate) or The Romanian Next to You (interview), F Challenge for the Future or Terra 2001, A World of Culture; 2320 M Political Flash, T European Horizons, A RRI Encyclopedia; 2325 S Romanian by Radio, M/W/F Business Update, T Tourist News, H Listeners' Letterbox, A Roots (culture/traditions); 2330 S Romanian Itineraries, M Pulse of Transition, T Mother Nature (ecology), W Visit Romania, F Practical Guide, A Radio Pictures; 2335 S Listeners' Letterbox, M Performing Arts, T Youth Club, W Partners in a Changing World, F Cultural Survey, A Romanian Itineraries; 2340 M Pages of Romanian Literature, T/H Skylark (folk music), W Stage and Screen, F Spectator (voice of the people), A Bucharest Along the Centuries; 2345 M Romanian Hits, W Romanian Musicians, F Romanian Folk Music At Its Best, A DX Mailbag; 2350 S Romanian Folk Music At Its Best, M Sports Roundup, T Athlete of the Week, W Sports Club, H Football Flash, F Sports Weekend.

SWISS RADIO INT.
2330 S/A Swiss Scene, M-F Newsnet; 2335 A Take 2; 2340 S Culture Zone (the arts-1st/3rd wk) or Out and About (Swiss places-2nd/4th wk), A Sounds Good (Swiss music-3rd/5th wk); 2345 F Business Spotlight.

WBCQ, Maine
7415 kHz.: 2300 S Le Show (humor/entertainment), H Goddess Irina 1 Music Show, F Lost Discs Radio Show, A The Real Amateur Radio Show; 2330 W World of Radio, H Steppin' Out of Babylon, A Fred Flintstone Music Show.
9335 kHz.: 2330 A Bluegrass Gospel.

WHRI, Indiana
7580 kHz.: 2302 A 20 The Countdown Magazine (to 0010); 2305 M-F For the People (populist phone-in), A Music (Christian contemporary/gospel).
9495 kHz.: 2305 A Music (Christian contemporary/gospel).

WWCR, Tennessee
5070 kHz.: 2305 W/F Golden Age of Radio Theatre.

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Harold Frodge, Midland, MI; Alokesh Gupta, New Delhi, India; Glenn Hauser, Enid, OK; Adrian Sainsbury, RZ Intl; Harold Sellers, *BBC On Air; BCL News; BCDXC; Cumbre DX; DXA; DX Listening Digest; DX Ontario; Fineware; Hard Core DX ; HFCC; ILG; NASWA; RFPI; World of Radio; Worldwide DX Club.*

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Speak Up for Hobby Monitoring

I have wanted to visit Florida for 20 years – in part because a person based there vanished with my life savings, but now there is a better reason for going: the NOAA Satellite Direct Readout Conference, scheduled for December 9-13.

The Remote Imaging Group (RIG – a club for WXSAT hobbyists) is based in Britain but has a worldwide membership and will be attending the conference. They expect to have an exhibition table there. RIG has around 2,400 members worldwide, and most receive both polar and geostationary WXSAT images for their own use. Members use low cost, often home-built equipment. In Europe there are an estimated 10,000 private individual users of Meteosat-7 – the European geostationary WXSAT. Figures for the US appear to be uncertain, and currently one estimate is just under 3,000, but RIG suspects it could be over 5,000.

There are many changes planned for the future, and hobbyists need all the help they can get from NOAA, EUMETSAT and the other satellite operators. European hobbyists, in particular, suffer from the policy of EUMETSAT data encryption – the selective encryption of almost all high resolution images from Meteosat-7. The ministers responsible for this policy, sadly, do not support the "free-to-air" policies of America and China, and are planning to encrypt much of their future high resolution image transmissions.

Substantial changes are planned for the NOAA WXSAT constellation of polar orbiting and geostationary satellites during this decade. The changes are planned to take advantage of new technologies, the requirements for more and different data, and the need to achieve a cost effective United States environmental satellite program.

The change that will occur the soonest is the replacement of the GOES analog WEFAX transmission service with the digital Low Rate Information Transmission (LRIT) from now to 2004. By early 2004, it is expected that NOAA will have completed this transition and WEFAX will no longer be transmitted from the GOES satellites.

While LRIT will continue to be transmitted on the 1691.0 MHz frequency, users will need to upgrade or replace both receiving hardware and processing software to utilize LRIT. LRIT becomes the worldwide standard for the low data rate image transmission service from geostationary satellites by all meteorological/environmental satellite operators during the next several years.

If you plan to visit the conference, you can find further details at **http://noaasis.noaa.gov/miami02/**. RIG details are at **http://www.rig.org.uk/** Membership in RIG will help the cause. My thanks to Dave Cawley of the Remote Imaging Group for this information. P.S. – Unfortunately, I cannot go.

❖ NOAA-14 Failure Mode

Beginning on 27 July, the scan mirror motor for the AVHRR instrument (the telescope's radiometer system that produces the image data streams) has been operating erratically. This causes both APT (the low resolution data) and HRPT (high resolution) imagery to be unusable. This condition is a familiar one, and it has been well documented in the past. The satellite is now eight years old and operating beyond its design life. NOAA is monitoring the situation with NOAA-14, but is unable to do much to correct the problem. The AVHRR rephase commanding is performed every morning at 07.30 UTC. In the past, the scan motor has returned to operating limits and substantially corrected itself.

Coinciding with this failure, the NOAA-12 APT transmitter, normally operating on 137.50 MHz, was turned off at 1015 UTC on 6 July 2002. This was because the NOAA-12 spacecraft entered the period where it was in close proximity to NOAA-15 which was using an APT transmitter also operating on 137.50 MHz. NOAA-15 is the operational spacecraft; hence the routine decision to switch off NOAA-12's APT to prevent possible interference.

The APT transmitter was turned back on around 16 August. Due to the different reception systems used for HRPT (requiring a high gain antenna), the switch-off does not affect HRPT transmissions from either spacecraft. If NOAA-14's failure is permanent, this may offer an opportunity for frequency adjustment of one of the other APT WXSATs that currently experience periods of VHF conflict requiring occasional switch-off. Time will tell!

APT
- NOAA-12 and NOAA-15 transmit APT on 137.50 MHz (except during VHF conflict)
- NOAA-14 and NOAA-17 transmit APT on 137.62 MHz
- NOAAs transmit non-APT data on 137.77 or 136.77 MHz
- Meteor 3-5 usually transmits on 137.30 MHz when in sunlight.
- Meteor 2-21 may transmit on 137.40 MHz when Meteor 3-5 is switched off.

HRPT
- NOAA-12 and NOAA-16 transmit on 1698.0 MHz
- NOAA-14 and NOAA-17 transmit on 1707 MHz
- NOAA-15 transmits on 1702.5 MHz
- Fengyun-1C and –1D transmit on 1700.4 MHz

WEFAX
- GOES-8 and GOES-10 transmit on 1691 MHz

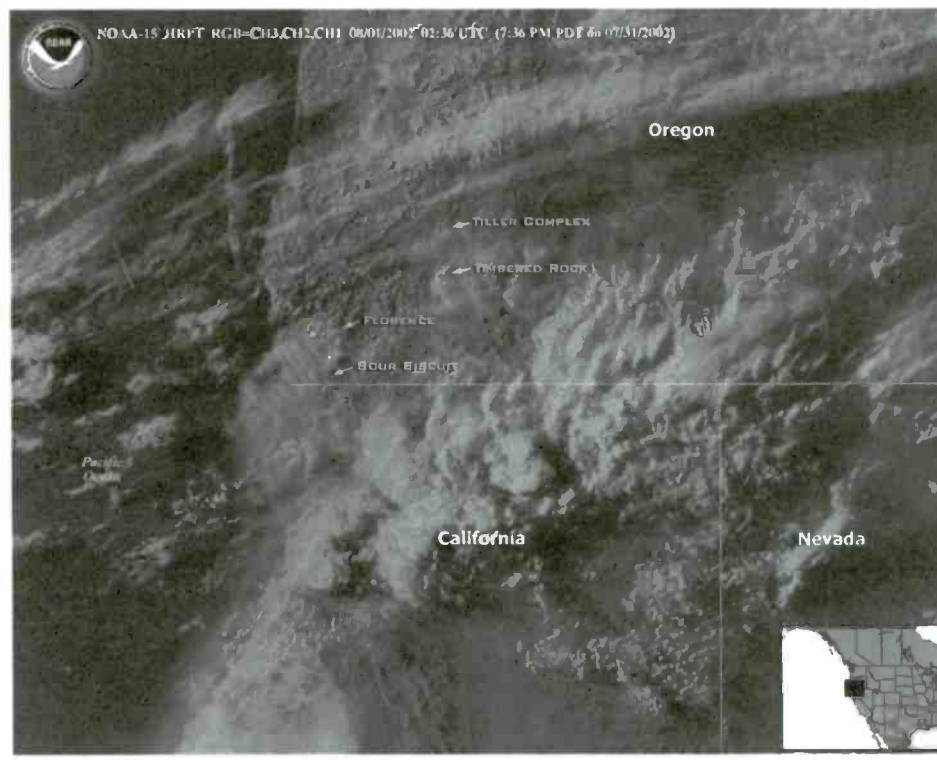

Fig 1: Heat signatures (red dots in MT Express and Anthology, light gray in print edition) and smoke (light colored haze) are visible from fires burning in Oregon and California.

Satellite Service Guide

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All Frequencies MHz

Loral Skynet Telstar 5

Ku-Band - 97 degrees West longitude

1(V)	11728.5	Data Transmissions / Bob Jones University Homesat (digital)
2(H)	11735.0	Data Transmissions
3(V)	11789.5	Occasional video (analog and digital)
4(H)	11796.0	Data Transmissions
5(V)	11836.0	**Pittsburgh International Telecommunications (digital)**
		IRIB2 - Iranian
		Al-Alam News Channel
		GCGI (Chinese)
		Tamil TV
		Haitian Satellite TV
		Asia After Dark - adult
		Rang-a-Rang Channel
		Iran TV Network
		Arabic Radio
		Quran Radio
6(H)	11842.5	Data Transmissions
7(V)	11867.0	Occasional video
8(H)	11873.5	**Globecast World Television (digital)**
		Arab Network of America (ANA) / MBC TV
		Arab Network of America (ANA) radio
		Radio Dimensione Suono (RDS) - Italian
		SPT - Portuguese
		Al Jamahirya Satellite Channel
		Iraq TV
		RTV 21 - Albanian
		Radio 21 - Albanian
		Futbol de Primera
9(V)	11898.0	**"Sky Vista" (digital)**
		Nile TV International
		Palestine Satellite Channel
		EDTV (Dubai Television)
		Dubai Sports Channel
		Saudi Channel One
		Beste Van Nederland (Dubai Business Channel)
		Arabic radio
10(H)	11904.5	Data Transmissions
11(V)	11929.0	**Globecast World Television (digital)**
		Euronews (languages: English, French, German, Italian, Spanish, Portuguese, Russian)
		Fashion TV
		Syria Satellite Channel
		Syria Radio
		Al Manar TV
		Radio Al Nour
		MTV (Lebanon)
		German TV
		Deutsche Welle Radio
		TV Polonia
		Polskie Radio 1
		Polskie Radio 3
		TV Romania International
12(H)	11935.5	Occasional video
13(V)	11960.0	Data Transmissions
14(H)	11966.5	Data Transmissions
15(V)	11991.0	Data Transmissions
16(H)	11997.5	Data Transmissions
17(V)	12022.0	Data Transmissions
18(H)	12028.5	Data Transmissions
19(V)	12053.0	Occasional video
20(H)	12059.5	Data Transmissions
21(V)	12084.0	**Taipei International Satellite Television (digital)**
		CTV - Taiwan
		TTV - Taiwan
		CTS - Taiwan
		Taipei International Channel
		Super Value Channel
		Hunan TV
		BCC-News
		BCC-Pop
		BCC-Taiwan
		The Asian Network (TAN)
		Korean Radio
		AFN Iran Radio
		Macroview TV
		UCN TV
22(H)	12090.5	**ABS-CBN International (digital)**
		The Filipino Channel
		ABS-CBN News Channel
		Pinoy Blockbuster Channel
		DZMM Radio
		DWRR Radio
		National Iranian TV
		Zhong-CTN Channel North America
		Tzu Chi Da'I
		Appadana International
23(V)	12175.0	**C Sky Net (digital)**
		ETTV International
		TSI Radio
		USA-INFO Radio
		Buddhism Light TV
		Sanlih Entertainment TV
		MAC-TV
		Unique Satellite TV
		Japanese Entertainment TV
		Tzu Chi Da'I
		NATV
24(H)	12121.5	**Globecast World Television (digital)**
		Assyria Satellite Channel
		HRT
		HIC TV - Croatian
		HIC Radio - Croatian
		OFH-1: ATV and TBRT networks - Turkey
		OFH-2: Star Network - Turkey
		OFH-3: NTV, Kanal D, Teleon networks - Turkey
		DFH-FM 1 radio - Turkey
		DFH-FM 2 radio - Turkey
		KISB-1 - Korean
		KISB-2 - Korean
		KISB-3 - Korean
		Radio Korea
25(V)	12146.0	Data Transmissions
26(H)	12152.5	Globecast World Television (digital)
		Abu Dhabi TV
		Emirate FM 1 - radio
		Emirate FM 2 - radio
		Iran TV Network
		PARS TV - Iranian
		Tapesh TV - Iranian
		Ajara - Georgian
		Radio Sedaye Iran radio
		Radio Seoul
		Thai TV 5
		SBC-TV
		JJI TV
		Persian TV Channel One
		Armenian Public Channel
		Radio Afgan
		Bahai Radio
		WVGN Radio
27(V)	12177.0	**Pittsburgh International Telecommunications (digital)**
		KurdSat
		Kurd TV
		Radio Sedaye Melli Iran radio
		Maharishi Open University
		AFN Farsi Radio
		Samanyolu TV World
		World Radio Network - English
		World Radio Network - Multilingual
		World Radio Network - French
		Kuwait Radio Network
		Kuwait Space Channel
		Israeli TV
		Pro TV International
		TRT - Turkey
28(H)	12193.5	Spacecom Systems FM2 Services
		Data Transmissions .046, .08, .15, .23, .30, .35, .38 .50, .65, .89, .93, .96, 1.05, 1.12, 1.22, and 1.35 MHz

Panamsat Galaxy 4R

C-Band - 99 degrees West longitude

1(H)	3720		Data Transmissions / SCPC Services
	1443.80	56.20	Chinese-language audio service
	1431.00	69.00	Occasional Audio
2(V)	3740		Occasional video (digital)
3(H)	3760		The Reformation Channel (digital) / SCPC Services
	1403.10	56.90	Michigan News Network
	1402.90	57.10	Agrinet/USA Radio Network
	1402.00	58.00	Andy Thomas Radio Network
	1401.50	58.50	Occasional Audio
	1399.00	61.00	Sports Byline USA/Sports Byline Weekend
	1398.20	61.80	Performance Racing Network
	1397.10	62.90	Wisconsin Radio Network
	1396.00	64.00	Kansas Audio Reader Network
	1395.80	64.20	WTMJ-AM, Milwaukee, WI - news/talk/Packers NFL radio network/Bucks NBA radio network/University of Wisconsin sports
	1395.00	65.00	Occasional Audio
	1394.70	65.30	WJR-AM, Detroit, MI - talk radio/Michigan News Network
	1390.95	69.05	Occasional Audio
	1383.10	76.90	KIRO-AM Seattle, WA - news/talk/Seahawks NFL radio network
	1382.80	77.20	Michigan News Network
	1382.60	77.40	Soldiers Radio Network
	1382.30	77.70	Motor Racing Network (occasional)
	1382.00	78.00	Occasional Audio
	1381.60	78.40	Radio Northwest Network
	1381.20	78.80	KJR-AM Seattle, WA - ESPN Radio/Supersonics NBA radio network/University of Washington sports
4(V)	3780		WB Network / WB Domestic Television Distribution (digital)
5(H)	3800		KCHF-TV Albucuerque (digital) / KDAZ-AM Albuquerque (digital) / WLPG-TV Detroit, MI (digital)
6(V)	3820		WB Network / WB Domestic Television Distribution (digital)
7(H)	3840		Data Transmissions
8(V)	3860		Data Transmissions
9(H)	3880		XEW-TV 2 / XHGC-TV 5 / XEQ-TV 9 (digital)
10(V)	3900		Occasional video
11(H)	3920		Mexican feeds (digital)
12(V)	3940		Occasional video
13(H)	3960		(none)
14(V)	3980		Occasional video (digital)
15(H)	4000		World Harvest Television
	6.48, 7.30		WHPZ-FM, Bremen, IN - contemporary Christian radio
	7.46		WHRI Americas - World Harvest Radio
	7.55		WHRI Europe - World Harvest Radio
	7.64		KWHR Asia - World Harvest Radio
	7.73		KWHR South Pacific - World Harvest Radio
	7.82		WHRA Africa/Middle East - World Harvest Radio
16(V)	4020		Shepherd's Chapel Network (Pastor Murray)
	7.30		KNEA-AM, Jonesboro, AR - ESPN Radio
17(H)	4040		Occasional video
18(V)	4060		Occasional video
19(H)	4080		Occasional video
20(V)	4100		Occasional video
21(H)	4120		Occasional video
22(V)	4140		Occasional video
23(H)	4160		Occasional video
24(V)	4180		Occasional video

Panamsat Galaxy 4R

Ku-Band - 99 degrees West longitude

1(H)	11720	Occasional video
2(V)	11740	Data Transmissions
3(H)	11760	Occasional video
4(V)	11780	Headend in the Sky - HITS (digital)
5(H)	11800	Headend in the Sky - HITS (digital)
6(V)	11820	Headend in the Sky - HITS (digital)
7(H)	11840	Headend in the Sky - HITS (digital)
8(V)	11860	Data Transmissions
9(H)	11880	Headend in the Sky - HITS (digital)
10(V)	11900	Headend in the Sky - HITS (digital)
11(H)	11920	Headend in the Sky - HITS (digital)
12(V)	11940	Headend in the Sky - HITS (digital)
13(H)	11960	Data Transmissions
14(V)	11980	Occasional video
15(H)	12000	Data Transmissions
16(V)	12020	Occasional video
17(H)	12040	Headend in the Sky - HITS (digital)
18(V)	12060	Headend in the Sky - HITS (digital)
19(H)	12080	Data Transmissions
20(V)	12100	Data Transmissions
21(H)	12120	Occasional video
22(V)	12140	Headend in the Sky - HITS (digital)
23(H)	12160	Headend in the Sky - HITS (digital)
24(V)	12180	Spacecom Systems Data Transmissions

SES Americom Americom-4

C-Band - 101 degrees West longitude

1(V)	3720	Cornerstone Television (digital) / TBN Superchannel (digital) / Data Transmissions
2(H)	3740	(none)
3(V)	3760	Data Transmissions / Daystar Television (digital)
4(H)	3780	(none)
5(V)	3800	(none)
6(H)	3820	(none)
7(V)	3840	Data Transmissions
8(H)	3860	(none)
9(V)	3880	Golden Eagle Broadcasting
	5.80	KMUS-AM, Muskogee, OK - religious
10(H)	3900	(none)
11(V)	3920	(none)
12(H)	3940	(none)
13(V)	3960	Data Transmissions
14(H)	3980	Fox Sports Net regionals (digital)
15(V)	4000	Data Transmissions
16(H)	4020	Fox Sports Net regionals (digital)
17(V)	4040	(none)
18(H)	4060	(none)
19(V)	4080	(none)
20(H)	4100	Data Transmissions
21(V)	4120	Safe TV (digital) / God's Learning Channel (digital) / Familyland (digital) / Data Transmissions
22(H)	4140	(none)
23(V)	4160	Data Transmissions / La Familia Television Network (digital)
24(H)	4180	(none)

SES Americom Americom-4

Ku-Band - 101 degrees West longitude

1(V)	11720	Data Transmissions
2(H)	11740	Data Transmissions
3(V)	11760	Data Transmissions
4(H)	11780	(none)
5(V)	11800	Data Transmissions
6(H)	11820	3 Angels Broadcasting Network (digital) / Data Transmissions
7(V)	11840	Data Transmissions
8(H)	11860	**Jade Entertainment (digital)**
		TVB Jade Channel
		Jade World Movie
		TVB Xing He
		TVBS-News
		TVB8
		CCTV4
		MAC-TV
9(V)	11880	Data Transmissions
10(H)	11900	Data Transmissions
11(V)	11920	Data Transmissions
12(H)	11940	Data Transmissions
13(V)	11960	Data Transmissions
14(H)	11980	Data Transmissions
15(V)	12000	Data Transmissions
16(H)	12020	Data Transmissions
17(V)	12040	Data Transmissions
18(H)	12060	Data Transmissions
19(V)	12080	Data Transmissions
20(H)	12100	Data Transmissions
21(V)	12120	**German Channel D (digital)**
		German Channel D Television
		Vietnamese Public Radio
		Schlager Radio
		Heimat Radio
22(H)	12140	(none)
23(V)	12160	Data Transmissions
24(H)	12180	Data Transmissions
25(V)	11535	South-American beamed
26(H)	11535	South-American beamed
27(V)	11655	South American beamed
28(H)	11655	South American beamed

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Feds in the Longwave Band

While most of the United States government activity monitored in the longwave spectrum is military in nature, there are a group of frequencies used by a wide variety of government agencies that are fun to DX and useful to monitor when you are on the road. The two primary frequencies used by these stations are 530 and 1610 kHz (technically not in the longwave band, but included in order to provide the full picture). These are the domain of the Traveler Information Service (TIS).

TIS stations, also known as Highway Advisory Radios (HAR), are systems that can be used to provide motorists with pertinent and up-to-the-minute travel information through their AM car radios. A wide variety of agencies, both government (federal, state and local) and private, use these frequencies to keep in touch with the motoring public.

Prerecorded messages are transmitted from low-power AM roadside transmitters. Messages are typically less than a minute; however, longer messages are heard when there is a lot of information to broadcast.

Usually drivers approaching a TIS/HAR site are advised of its existence by advance highway signs which tell the motorists where to set the tuning dial to receive the station's message. These messages are generally recorded for continuous repetition. The transmitted message length is adjusted to permit the driver to receive the messages at least twice while passing through the stations' coverage zone.

Some specific examples of current TIS/HAR applications include:

Airport arrivals/departures
Maintenance/construction zones (speed limits, hazards, etc.)
Route diversion (local traffic only, alternative route, etc.)
Special events (hours, ticket availability and parking control, etc.)
Tourist information (recreational facilities, parking, camping, gas, food, lodging, exhibit and educational areas)
Traffic advisories (accidents, lane blockage, etc.)
Weather advisory (heavy rains, flash floods, snow/ice, etc.)

Information on government TIS/HAR stations has been hard to obtain over the last few years. We have managed to put together a pretty extensive list in Table One of these government stations. As always we can use updates, additions and corrections. You can send them to the email address in the masthead.

In addition to monitoring these stations while traveling, there is a group of radio hobbyists who DX (listen for distant stations) on these frequencies. While power levels for these stations are limited to 10 watts, some of these stations can be heard at quite a distance from the transmitter under favorable conditions. It is fun to occasionally tune to 530 and 1610 kHz and see what you can hear in your local area.

And that does it for this month's edition of *The Fed Files*. Until next month, 73 and good hunting.

Table One: U.S. Government TIS/HAR Stations

530 kHz Stations

AR	Eureka Springs	Army		Corps of Engineers
AR	Heber Springs	Army		Corps of Engineers
AZ	Globe	BRec	KOJ879	Roosevelt Dam
AZ	Goldfield	BRec	KOJ878	Roosevelt Dam
AZ	Jakes Corner	BRec	KOJ877	Roosevelt Dam
AZ	Sholow	USFS	KIF794	Apache Sitgreaves National Forest
AZ	Sunset Point	USFS	KGR402	Prescott National Forest
AZ	Tucson	USFS	KGO48	Coronado National Forest
CA	June Lake	USFS	KMG849	Inyo National Forest
CO	Fall River Pass	NPS	KAF712	Rocky Mountain National Park
CO	Grand Lake	NPS	KAF711	Rocky Mountain National Park
DC	Washington	USCG		Potomac River TIS
FL	Convoy Point	NPS	KID772	Biscayne National Park, Homestead-Inactive
FL	Eglin AFB	AF		[Note: Used for public affairs info, severe weather warnings and military recalls]
FL	Loxahatchee	USFW	KIE640	Loxahatchee National Wildlife Refuge
FL	Sanibel Island	USFW	KIE663	J N "Ding" Darling National Wildlife Refuge-Inactive
FL	W Summerland Key	USFW	KIE616	Key Deer National Wildlife Refuge [reportedly inactive]
GA	Buford	Army		Corps of Engineers
ID	Idaho Falls	DOE	KOC913	Idaho National Engineering Labs
IL	Benton	Army		Corps of Engineers
IN	Ogden Dunes	NPS	KQC717	Indiana Dunes National Lakeshore
MO	Branson	Army		Corps of Engineers
MO	Monroe City	Army		Corps of Engineers
MT	Fort Peck	Army		Corps of Engineers
MT	St. Mary	NPS	KOE732	Glacier National Park
NC	Deep Creek	NPS	KID771	Great Smoky National Park
NC	Frying Pan Mountain	USFS	KG8526	Pisgah National Forest
NC	Fort Bragg	Army		
ND	Riverdale	Army		Corps of Engineers
NM	Whites City	NPS	KKF721	Carlsbad Caverns National Park
NV	Hoover Dam	BRec	KOJ876	
OH	Deerfield	Army		Carps of Engineers
OR	Knox Hill	USFS	KHA550	Umpqua National Forest
OR	Timberline	USFS	KMB741	Mt. Hood National Forest/Timberline Rec Area
SD	Chamberlain	Army		Carps of Engineers
SD	Ft Thompson	Army		Corps of Engineers
SD	Pickstown	Army		Corps of Engineers
SD	Pierre	Army		Corps of Engineers
TN	Norris Dam	TVA	KID845	Land Between the Lakes
UT	Vernal Annex	USFS	KCP271	Ashely National Forest
VA	Great Falls	NPS	KID719	George Washington National Parkway
VA	Langley AFB	AF		
VA	Marion	USFS	KDZ272	Jefferson National Forest
VA	National Airport	FAA		Washington National Airport
WA	Cle Elum	USFS	KOD87	Wenatche National Forest
WA	Enumclaw	USFS	KID338	Mt. Baker-Snoqualmie National Forest
WA	Pitcher Mountain	USFS	KAC203	Okanogan National Forest
WA	Port Angeles	NPS	KOD773	Olympic National Park
WA	Randle	USFS	KOD88	Gifford Pinchot National Forest
WA	Yale	USFS	KOQ206	Gifford Pinchot National Forest
WY	Rock Springs	USFS	KCP272	Ashley National Forest

1610 kHz Stations

AK	Riley Creek	NPS	KOE700	Denali National Park
AK	Tetlin	USFW	KOJ611	Tetlin National Wildlife Refuge
AR	Turrell	USFW	KKF633	Waponocca National Wildlife Refuge
AZ	Canyon Point	USFS	KIF782	Apache Sitgreaves National Forest
AZ	Desert View	NPS	KOP738	Grand Canyon National Park
AZ	Eldon	USFS	KGD49	Coconino National Forest
AZ	Glen Canyon	NPS	KOJ778	Glen Canyon National Rec Area
AZ	Jacob Lake	USFS	KGD50	Kaibab National Forest
AZ	Katherine Landing	NPS	KOJ737	Lake Mead National Rec Area
AZ	Painted Desert	NPS	KOC734	Petrified Forest National Park
AZ	Rainbow Forest	NPS	KOC733	Petrified Forest National Park
AZ	South Rim	NPS	KOP737	Grand Canyon National Park
CA	Ash Mountain	NPS	KPB748	Sequoia and Lins Canyon National Parks
CA	Bakersfield	USFS	KMB745	Sequoia National Forest
CA	Barstow	BLM	KMC490	California Desert District
CA	Big Sycamore Canyon	NPS	KPB799	Santa Monica Mountains National Rec Area
CA	Chapel	NPS	KOP739	Yosemite National Park
CA	Chester	USFS	KOG793	Lassen National Forest
CA	Fremont	USFW	KMC613	San Francisco Bay National Wildlife Refuge
CA	Hiouchi	NPS	KPB794	Redwood National Park
CA	Kernville	USFS	KHA523	Sequoia National Forest
CA	Laguna	USFS	KG8528	Cleveland National Forest
CA	Las Virgenes Creek	NPS	KPB797	Santa Monica Mountains National Rec Area
CA	Malibu Creek	NPS	KPB793	Santa Monica Mountains National Rec Area
CA	Old Station	USFS	KOG794	Lassen National Forest
CA	Orick	NPS	KPB796	Redwood National Park
CA	Prairie Creek	NPS	KPB795	Redwood National Park
CA	Point Reyes	NPS	KPB749	Point Reyes National Seashore
CA	Saddle Rock	NPS	KPB798	Santa Monica Mountains National Rec Area
CA	Sequoia	NPS	KMC797	Sequoia National Park
CA	Shasta Dam	BRec	KMC815	Central Valley Project
CA	Susanville	USFS	KOG790	Lassen National Forest
CA	Whitewater Hill	BLM	KMC410	California Desert District

CO	Beaver Meadows	NPS	KAF713	Rocky Mountain National Park
CO	Dolores	BLM	KAC401	Escalante Ruins Archaeological Site
CO	East Portal	NPS	KAF721	Curecanti National Rec Area
CO	Elk Creek	NPS	KAF720	Curecanti National Rec Area
CO	Mancos Valley	NPS	KAF727	Mesa Verde National Park
FL	Crystal River	USFW	KIE653	Chassahowitzka National Wildlife Refuge
FL	Parachute Key	NPS	KPC749	Everglades National Park
FL	Pine Island	NPS	KIE780	Everglades National Park
FL	Sanibel Island	USFW	KIE665	Darling National Wildlife Refuge
FL	Santa Rosa	NPS	KID751	Guld Islands National Seashore
FL	Turtle Mound	NPS	KIE710	Canaveral National Seashore
FL	Wilson	NPS	KIE711	Canaveral National Seashore
GA	Buford	Army		Corps of Engineers
HI	Kilauea	NPS	KWA712	Hawaii Volcano National Park
IA	Des Moines	Army		Corps of Engineers
ID	Idaho City	USFS	KSB834	Boise National Forest
ID	Orofino	Army		Corps of Engineers
ID	Sunset Cone	NPS	KOE780	Craters of the Moon National Monument
IL	Carterville	USFW	KQC608	Crab Orchard National Wildlife Refuge
IS	Clinton	Army		Corps of Engineers
KY	Golden Pond	TVA	KID968	Land Between the Lakes
KY	Grand Rivers	TVA	KID966	Land Between the Lakes
KY	Kentucky Dam	TVA	KID965	Land Between the Lakes
KY	Twin Knobs	USFS	KCP267	Daniel Boone National Forest
MD	Kent Island	USCG		Kent Island TIS
MD	Sandy Point	NPS	KPC756	Assateague Island National Seashore
ME	Hulls Cove	NPS	KFB759	Acadia National Park
ME	Thompson Island	NPS	KFB760	Acadia National Park
MI	Bass Lake	NPS	KIE769	Sleeping Bear Dunes National Seashore
MI	Dune Climb	NPS	KIE770	Sleeping Bear Dunes National Seashore
MI	Platte River	NPS	KIE778	Sleeping Bear Dunes National Seashore
MI	Rapid River	USFS	KHA552	Hiawatha National Forest
MI	Watersmeet	USFS	KQC32	Ottawa National Forest
MN	Deer River	USFS	KOQ547	Chippewa National Forest
MN	Ely	USFS		Superior National Forest
MO	Buck Hollow	NPS	KAC779	Ozark National Scenic Riverway
MO	Country Store	NPS	KAC776	Ozark National Scenic Riverway
MO	Mark Twain	USFS	KOQ213	Mark Twain National Forest
MO	Mound City	USFW	KAC630	Squaw Creek National Wildlife Refuge
MO	Salem	NPS	KAC775	Ozark National Scenic Riverway
MO	Van Buren	NPS	KAC778	Ozark National Scenic Riverway
MS	Brooksville	USFW	KKF652	Noxubee National Wildlife Refuge
MT	Boulder River	USFS	KQC33	Gallatin National Forest
MT	Bozeman	USFS	KAC2DO	Gallatin National Forest
MT	Crow Agency	NPS	KID776	Custer Battlefield National Monument
MT	Deer Lodge	NPS	KOP796	Grant-Kohrs Ranch National Historic Site
MT	Emigrant	USFS	KHA526	Gallatin National Forest
MT	Fort Peck	Army		Corps of Engineers
MT	Gallatin Canyon	USFS	KIN222	Gallatin National Forest
MT	Gardiner	NPS	KOP708	Yellowstone National Park
MT	Hyalite Canyon	USFS	KMG845	Gallatin National Forest
MT	Libby Dam	Army		Corps of Engineers
MT	Livingston	USFS	KHA518	Gallatin National Forest
MT	Moiese	USFW	KOC631	National Bison Park
MT	Silver Gate	NPS	KOP709	Yellowstone National Park
MT	Tom Minor Campground	USFS	KHA515	Gallatin National Forest
MT	West Glacier	NPS	KOE731	Glacier National Park
MT	West Yellowstone	NPS	KOP710	Yellowstone National Park
MT	Yellowstone Valley	USFS	KHA527	Gallatin National Forest
NC	Bodie Island	NPS	KPC711	Cape Hatteras National Seashore
NC	Buxton	NPS	KPC713	Cape Hatteras National Seashore
NC	Cataloochee	NPS	KPC744	Great Smoky Mountains National Park
NC	Clingmans Dome	NPS	KIE730	Great Smoky Mountains National Park
NC	Oconaluftee	NPS	KIE718	Great Smoky Mountains National Park
NC	Ocracoke	NPS	KPC755	Cape Hatteras National Seashore
NC	Smokemont	NPS	KPC742	Great Smoky Mountains National Park
NC	Troy	USFS	KOQ545	Uwharrie National Forest
NE	Fort Niobrara	USFW	KAC619	Fort Niobrara National Wildlife Refuge
NE	Gavins Point Dam	Army		Corps of Engineers
NH	Conway	USFS	KHA525	White Mountain National Forest
NM	Albuquerque	DOE	KOP20	Sandia National Labs/Kirtland AFB
NM	Cloud Croft	USFS	KIF780	Lincoln National Forest
NM	Green Bose	USFS	KID325	Lincoln National Forest
NM	Los Alamos	DOE	WGA70	Los Alamos Science Labs
NM	Mayhill	USFS	KID326	Lincoln National Forest
NM	Ruidoso	USFS	KGR403	Lincoln National Forest
NM	Weed	USFS	KGR405	Lincoln National Forest
NM	White Sands	NPS	KOP743	White Sands National Monument
NM	Whites City	NPS	KOP741	Carlsbad Caverns National Park
NV	Boulder Beach	NPS	KOJ751	Lake Mead National Rec Area
NV	Las Vegas Wash	NPS	KOJ742	Lake Mead National Rec Area
NV	Las Vegas Wash	NPS	KOJ711	Lake Mead National Rec Area
NY	Seneca Falls	USFW	KEC669	Montezuma National Wildlife Refuge
NY	Sparrow Bush	NPS	KPC712	Upper Delaware Scenic and Rec River
OR	Annie Spring	NPS	KOC736	Crater Lake National Park
OR	Cave Junction	NPS	KOC741	Oregon Caves National Monument
OR	Fort Klamath	NPS	KOC713	Crater Lake National Park
OR	Glenada	USFS	KOQ226	Siuslaw National Forest
OR	Lazy Bend	USFS	KOQ291	Mt. Hood National Forest
OR	McKenzie Bridge	USFS	KOE699	Willamette National Forest
OR	Narrows	USFW	KAC616	Malheur Wildlife Refuge
OR	North Bend	USFW	KOQ227	Siuslaw National Forest
OR	Reedsport	USFW	KOQ228	Siuslaw National Forest
OR	Rim Village	NPS	KOC735	Crater Lake National Park
OR	Union	USFS	KOD89	Wallowa-Whitman National Forest
OR	Unity	USFS	KMB663	Wallowa-Whitman National Forest
OR	Winchester Hill	USFS	KOQ229	Siuslaw National Forest
OR	Zig Zag	USFS	KMB7371	Mt. Hood National Forest
PA	Cresson	NPS	KID737	Allegheny Portage Railroad National Historic Park
PA	Fort Necessity	NPS	KPC731	Fort Necessity National Battlefield
PA	Gettysburg	NPS	KID774	Gettysburg National Military Park
PA	Johnstown	NPS	KID726	Allegheny Portage Railroad National Historic Park
PA	Kinzua Point	NPS	KSG225	Allegheny National Forest
PA	Valley Forge	NPS	KFB733	Valley Forge National Historic Park
SD	Pactola	USFS	KCI702	Black Hills National Forest
TN	Cades Cove	NPS	KIE722	Great Smoky Mountains National Park
TN	Cosby	NPS	KIE732	Great Smoky Mountains National Park
TN	Dover	NPS	KID746	Fort Donaldson National Battlefield
TN	Elkmont	NPS	KIE731	Great Smoky Mountains National Park
TN	Greenbrier	NPS	KPB747	Great Smoky Mountains National Park
TN	Newfound Gap	NPS	KPC745	Great Smoky Mountains National Park
TN	Ocoee	USFS	KCP286	Cherokee National Forest
TN	Sugarlands	NPS	KIE723	Great Smoky Mountains National Park
TN	Tremont	NPS	KIE724	Great Smoky Mountains National Park
TN	Twin Creek	NPS	KIE793	Great Smoky Mountains National Park
TX	Gulf Coast	NPS	KOP736	Padre Island National Seashore
TX	Persimmon Gap	NPS	KOP740	Big Bend National Park
TX	Pine Spring	NPS	KOP742	Guadalupe Mountains National Park
UT	Bryce Canyon	NPS	KOP798	Bryce Canyon National Park
UT	Cedar Breaks	NPS	KOE719	Cedar Breaks National Monument
UT	Clear Creek	NPS	KOJ786	Zion National Park
UT	Colton	USFS	KCP284	Manti La Sal National Forest
UT	Crescent Junction	NPS	KOP728	Canyonlands National Monument
UT	Farley Canyon	NPS	KOJ777	Glen Canyon National Rec Area
UT	Fruita	NPS	KOJ738	Capitol Reef National Park
UT	Ivie Creek	USFS	KCP260	Fishlake National Forest
UT	Mackinaw	USFS	KOQ516	Fishlake National Forest
UT	Moab Valley	NPS	KOP795	Arches National Park
UT	Vernal Office	USFS	KCP270	Ashley National Forest
UT	Watchman	NPS	KOJ761	Zion National Park
VA	Appomattox	NPS	KID702	Appomattox Court House National Historic Park
VA	Assateague Island	USFW	KIE634	Chincoteague National Wildlife Refuge
VA	Cape Charles	USFW	KIE651	Eastern Shore National Wildlife Refuge
VA	Damascus	USFS	KDZ275	Jefferson National Forest
VA	Fredericksburg	NPS	KID783	Fredericksburg and Spotsylvania County Battlefields Memorial Nat'l Military Park
VA	Front Royal	NPS	KIE741	Shenandoah National Park
VA	Jamestown	NPS	KPC747	Colonial National Historical Park
VA	Mabry Mill	NPS	KID773	Blue Ridge Parkway
VA	Rockfish Gap	NPS	KID711	Shenandoah National Park
VA	Skyland	NPS	KIE737	Shenandoah National Park
VA	Thornton Gap	NPS	KIE736	Shenandoah National Park
VA	Wytheville	USFS	KOQ544	Jefferson National Forest
WA	Lake Crescent	NPS	KOD771	Olympic National Park
WA	Longmire	NPS	KOD767	Mount Rainer National Park
WA	Marblemount	NPS	KOF788	North Cascades National Park
WA	Naches	USFS	KHA519	Wenatchee National Forest
WA	Neilton	NPS	KOD772	Olympic National Park
WA	Nisqually	NPS	KOD769	Mount Rainer National Park
WA	Ohanapecash	NPS	KOD762	Mount Rainer National Park
WA	Tahoma Woods	NPS	KOD762	Mount Rainer National Park
WI	Basswood Island	NPS	KAC794	Apostle Island National Lakeshore
WI	Bayfield	NPS	KAC734	Apostle Island National Lakeshore
WI	Lakewood	USFS	KHA520	Nicolet National Forest
WI	Mayville	USFW	KAC629	Horicon National Wildlife Refuge
WI	Stockton Island	NPS	KAC791	Apostle Island National Lakeshore
WV	Harpers Ferry	NPS	KQC714	Harpers Ferry National Historic Park
WV	Oak Hill	NPS	KPC795	New River National River Park
WV	Seneca Rocks	USFS	KID324	Monongahela National Forest
WY	Artist Point	NPS	KOD713	Yellowstone National Park
WY	Bridge Bay	NPS	KOP722	Yellowstone National Park
WY	Canyon	NPS	KOP720	Yellowstone National Park
WY	Devils Tower	NPS	KOP735	Devil's Tower National Monument
WY	Firehole Lake	NPS	KOD712	Yellowstone National Park
WY	Fishing Bridge	NPS	KOP718	Yellowstone National Park
WY	Fountain Flats	NPS	KOP719	Yellowstone National Park
WY	Fort Laramie	NPS	KOC744	Fort Laramie National Historic Park
WY	Grant Village	NPS	KOP721	Yellowstone National Park
WY	Green River	USFS	KCP270	Ashley National Forest
WY	Hayden Valley	NPS	KOP729	Yellowstone National Park
WY	Indian Creek	NPS	KOD710	Yellowstone National Park
WY	Lamar Valley	NPS	KOP725	Yellowstone National Park
WY	Madison Junction	NPS	KOP714	Yellowstone National Park
WY	Mammoth	NPS	KOP724	Yellowstone National Park
WY	Middle Creek	NPS	KOP707	Yellowstone National Park
WY	Midway Geyser Basin	NPS	KOP715	Yellowstone National Park
WY	Mount Washburn	NPS	KOD711	Yellowstone National Park
WY	Mud Volcano	NPS	KOD709	Yellowstone National Park
WY	Norris Geyser	NPS	KOP726	Yellowstone National Park
WY	Old Faithful	NPS	KOP713	Yellowstone National Park
WY	Snake River	NPS	KOP711	Yellowstone National Park
WY	Steamboat Point	NPS	KOP717	Yellowstone National Park
WY	Tower Junction	NPS	KOP712	Yellowstone National Park
WY	Willow Creek	NPS	KOP727	Yellowstone National Park

Legend:

AF	Air Force	NPS	National Park Service
BLM	Bureau of Land Management	TVA	Tennessee Valley Authority
Brec	Bureau of Reclamation	USCG	U.S. Coast Guard
DOE	Department of Energy	USFS	U.S. Forest Service
FAA	Federal Aviation Administration	USFW	U.S. Fish and Wildlife Service

TRACKING THE TRUNKS

TECHNOLOGY, EQUIPMENT, FREQUENCIES AND NEWS

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Recommendations from our Readers

Autumn is here and it's time to cover some letters that have come in the mailbag. We have some Missouri frequencies, several recommendations on computer control software and antennas, and we round up with a quick tutorial on getting type acceptance equipment information from the Federal Communications Commission (FCC) website.

❖ Green County/Springfield, Missouri

Hello Dan,

My name is Gary and I am a subscriber from Springfield, Missouri. Here in the Greene County area, we are in the final stages of installing a new 800 MHz trunking communication system for all public service agencies. I would like to ascertain if you have, have heard about, or can obtain any information regarding this new trunking system. I have the frequencies they are to operate on, but I don't have any information about groupings etc. Some of the agencies are simulcasting on the new trunking and the old UHF system. Any assistance and/or information you have would be appreciated.

Thanks much, Gary.

The Greene County Sheriff's Department historically has used a couple of frequencies in the VHF band, namely 155.145 and 155.730 MHz. The Springfield Police Department has several frequencies in VHF and UHF: 154.860, 154.890, 154.490, 458.800, 458.850, 460.020, 460.100, 460.225, 465.400, 465.500, 465.025, 465.100 and 465.225 MHz. The Springfield Fire Department uses 458.250, 458.600, 458.950 and 458.6250 MHz.

It's not clear how long these frequencies will remain in use, since the new trunked radio system is currently being brought on-line for the county sheriff and highway department as well as the Springfield police, fire and public works. Another seven agencies and a dozen fire departments are expected to join the system in the near future.

The new Motorola Type II system is configured to support both analog and digital radios, with the majority of traffic expected to be analog. Officials claim that digital communications will also be encrypted. The initial radio fleet includes about 120 digital radios and more than 1,600 analog units.

Seven sites will simulcast on eighteen assigned frequencies: 854.9875, 855.4625, 855.7375, 856.2125, 856.4375, 856.7125, 856.9625, 857.2125, 857.4375, 857.7125, 857.9625, 858.2125, 858.4375, 858.7125, 858.9625, 859.2125, 859.4375 and 859.7125 MHz.

Released talkgroups are as follows:

Decimal	Hex	Description
848	350	Springfield PD South Side Dispatch
912	390	Springfield PD North Side Dispatch
1648	670	Springfield Fire Dispatch
16592	40D0	Greene County Sheriff Patrol 1
16624	40F0	Greene County Sheriff Patrol 2
16656	4110	Greene County Sheriff Countywide Patrol
17264	4370	Greene County Rural Fire
24592	6010	Republic Fire
24624	6030	Republic Common
24752	6060	Republic PD

❖ Comments on Computer Control

First, a positive report about BlackBag's control programs for Uniden's 780XLT base/mobile scanner and the 245XLT handheld.

Dan,

I wanted to take a few moments to tell you that your June article in Monitoring Times encouraged me to go out and find a PC control program for my Uniden BC780XLT scanner. I have owned this fine scanner for several months, and had considered getting a control program for it. Your article spurred me on.

After going to the StrongSignals web site to check out what my options were, I decided on the program from BlackBag Software. I don't know if this is an indication of the overall quality of the company, but I placed my order via their website on Saturday morning, and my order arrived at my house the very next Monday afternoon. Talk about service!

I purchased two software control programs from BlackBag: the 780 control program and the BC245XLT control program. I should note that the 780 control program I purchased was less than half the cost of some of the major programs on the market today, and it even comes with a control cable included in the price. The software loaded right up without any problems, and runs quite well on my Windows XP Pro system, so I presume it will work equally well with earlier versions of Windows, including Windows 2000. I was able to get the program configured in a matter of minutes, and was doing Service Searches and Trunktracking almost immediately. The user interface is clean and functional and very intuitive.

Also, for the same price of $28.50 ($25 + $3.50 for priority mail), I got BlackBag's Frequency Logger program, which is a nice addition to operating my 780.

If there is a weak point in the package that I bought, it is that no documentation comes with the program. You are prompted to take action through pop-up dialogue boxes, but I can't find a documentation file on the CD or on the company's website. Also, there does not seem to be any help available through the program. Maybe I've missed something, but I've looked several times without success. Though using the program was easy for me, it might not be as easy for someone who is still fairly new to working with Windows.

The website address I went to, to get this program was http://www.bc780xlt.net/. They also carry a Palm OS control version of the program.

That's it. I just wanted to let you know that this program is well worth the money for anyone looking for a good, fairly priced for what you get, control program for their BC780XLT.

– Jeff in Denver, Colorado

Also in the mailbag, some positive words about ScanCat Gold SE control software for several radios.

Hello,

I just read your column in the August 2002 issue of MT and thought I would throw my two cents in.

I've had computer controlled radios and software for sometime now, beginning with the Icom PCR1000 and leading up to the 780XLT. I own the PRO-2052, the 245XLT, the 895, as well as computer-capable amateur gear such as my Icom 706, Kenwood D700A and now my Yaesu VX-7R. I mention all that to reinforce the point of the need to have a computer control program capable of controlling many different types of radios - receivers and transceivers alike. That program is Computer Aided Technology's Scancat Gold SE.

Obviously, the multi-radio capabilities are its number one asset, but the program's ability to use several different database formats, the logging choices, and its trunk tracking ability make the software even more alluring. I can download a database from the several frequency CD-ROMs I own into a DBase format and scan that database with Scancat without any further manipulation required. I can do complete logging of these frequencies, not to mention graphical plots of frequency hits vs. time or decibel - there are several possibilities. The software also has a built-

in spectrum analyzer which works well with all the radios I've controlled with the software. Heck, the software even has a subprogram for changing, copying and editing a wide range of files and databases including it's own SCN and FRQ formats.

I think anyone who has invested in a computer controllable receiver has the right to expect the best in control software especially if there are large databases to be sifted through or a lot of programming. For my money, ScanCat cannot be beat.

That's my two cents worth. I look forward to reading your column in the future. Till then, 73.

– Mark in Tucson, Arizona

◆ Antennas

I have also received a number of comments regarding various antennas that people are using. Here Brian makes some good points and offers several recommendations.

Hi Dan,

In reference your column in the July MT, I have the following comments. Firstly you have to differentiate between base and handheld units. For base stations you can use a rotatable antenna like the Grove Scanner Beam, with good quality coax as a must. In my case I have good success with the Grove Scantenna mounted in my attic.

For handhelds it's a different story. I think it was Bob Grove who said, "You don't need antennas but attenuators." In a lot of cases putting a good antenna on your scanner creates more problems (front-end overload, cross modulation, etc.). I agree that the "rubber duckies" leave a lot to be desired. Personally I use a Watson W-889, but there are similar units available such as the Grove Universal Telescoping Whip and the MFJ 1812. Also good are the MFJ 1710 or the AEA Hot Rod, which you can also use for transmitting on 2 meters.

– Brian in Seabrook, Texas

Another reader has found a good 800 MHz performer for handhelds.

I agree the Max antennas are great for 800 MHz but are a little difficult to live with on a handheld strapped to your belt. I found a very effective 800 MHz "ducky" on the web at Durham Radio in Canada. I'm very impressed with the reception that their "800 BNC" gives me on our countywide 800 MHz trunked and non-trunked towers. It even performs very well inside the car.

– Bob in New Philadelphia, Ohio

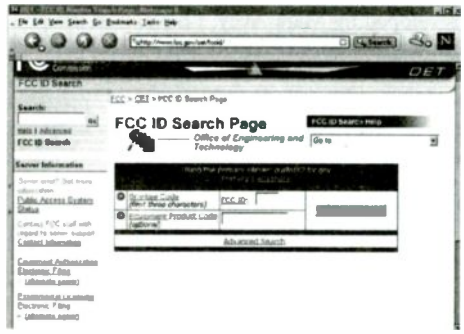
◆ Uniden Bearcat 785D

In August the Federal Communications Commission (FCC) granted type acceptance to the soon-to-be-released Uniden BC785D, the mobile/base version of their APCO Project 25 scanner.

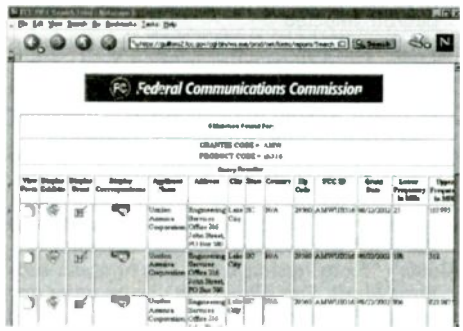
The FCC's Office of Engineering and Technology (OET) maintains an "FCC ID Number Search" on their website that allows anyone to look up filing information related to a certified or type accepted product. Every FCC identification number, usually found on the back or bottom of a piece of equipment, is made up of two parts. The first part is the *Grantee Code*, which is made up of three characters assigned by the FCC to a company to identify all of their products. The remainder of the ID number, anywhere from one to 14 characters, is called an *Equipment Product Code* and is assigned by the company submitting the application

The 785D has an FCC ID Number of AMWUB316, where AMW is the Grantee Code and UB316 is the Equipment Product Code. We can use this information on the FCC's website to find the filing information Uniden submitted related to this receiver.

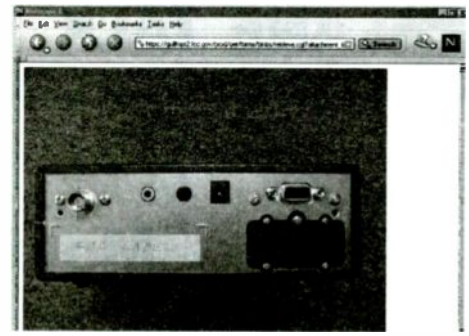
Using your favorite web browser go to **http://www.fcc.gov/oet/fccid/** and you should see the search form. Put in AMW in the Grantee Code box and UB316 in the Equipment Product Code box, then click on the "Start Search" box.



You should get back six records of information. Click on the first icon under "Display Exhibits" and you'll get a dozen records that Uniden submitted.



You can then click on any icon in the "View Attachment" column. The third selection, for instance, brings up a picture of the rear view of the receiver, showing the connectors and the probable slot for the digital decoder card.



You can look up information on nearly any piece of approved equipment. The FCC ID for the PRO-92 scanner, now on sale at Radio Shack for less than $200, is AAO2000522. My Radio Shack wireless thermometer is AAO6301026R. I've even looked up the filing records for the SpeedPass receivers you see at many of the Mobil gas stations.

That's all for this month. Enjoy the fading days of autumn, if you can, and let me know what you're monitoring via electronic mail at *danveeneman@monitoringtimes.com*. My website at **http://www.signalharbor.com** has updated information and additional links. Until next month, happy monitoring!

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.

PLANE TALK

Jean Baker
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Monitoring the Northwest

Welcome aboard, everyone! Today we have two more new products to show you and some good frequencies to share.

❖ DX Atlas

While this program was written with amateur radio operators in mind, it is also an excellent tool for utility monitors, shortwave broadcast listeners, and others. I became familiar with this program when Charles Brain included it in his High Frequency Data Link ACARS Decoder program. When utilized in the HFDL program, you can see approximately where the aircraft are that are using HFDL. However, I've found that there are other aspects of the program that are equally useful.

DX Atlas is produced by Afreet Software. Don't forget to visit their website at **http://www.dxatlas.com/**. This program is shareware: however, you can download a completely functional copy and use it at no charge for 30 days. When this trial period ends, you must either register or uninstall it from your computer. The registration fee for *DX Atlas* is only $29.95 – and the features that this program offers are really worth a lot more than that. For instance, check out this list of goodies (thanks to the folks at DX Atlas):

Prefixes (Click on a prefix to find it in the Prefix Database)
Zones (CQ & ITU)
Azmuthal Map (both Rectangular and Azimuthal are available)
Navigation (Including antenna bearing and distance for the point under the mouse cursor.) *Very handy! (jb)*
Gray Line (Can be turned off and on, or shown for any specific length of time.)
Prefix Database (This database includes current and old prefixes of countries and provinces, prefix blocks allocated to club stations and reserved for special events.)
Gazetteers (includes a detailed City and Island Index) *One of my favorite features (jb).*
Local Time (This is displayed for all territories, provinces and cities, for the current date/time and past or future.) *Another indispensable feature! (jb)*
Automation (Third party programs can control *DX Atlas* and even plot their own data on the map via COM or OLE Automation. See the "Compatible Software" page on their website for further explanation of this.)

Minimum requirements for DX Atlas: CPU – Pentium 166 MHz; RAM – 32 Mb; OS (Operation System) – Win95/Win98/WinME/Win2000; Video Card 640x480 (256 colors) or better; Disk Space – 9 Mb (+55 Mb for optional hi-resolution relief data).

Try it for yourself – you'll be pleasantly surprised at all this program has to offer.

❖ ACARS Log Analyzer

Our next product is *ACARS Log Analyzer*, developed by Mark Avey. I have used the program with both PC-HFDL and AirNav Aircraft Communication and Reporting System Decoder, and it's really great. Let's see what this program can do for you: Here are the primary program functions:

Log Importing - (*Where it all begins.*) "The current release will import WACARS (Airmaster Mode), PC-HFDL (Airmaster mode), SkySpy, AirNav ACARS decoder, ZCARS, and Airmaster 3/2000 logs.
DDE Link - "Log Analyser allows you to establish a DDE link with SkySpy, Airmaster 2000, AirNav's ACARS decoder, and PC-HFDL. This means live data is passed to Log Analyser in real-time."
Photo Lookup - "If you have an Internet connection, you can right-click on any aircraft in the list views and view a photograph of the currently selected aircraft."
Display Log Data - "The main interface of the program comprises four main views on your log data (see screen shots on their website at **http://www.acarsonline.co.uk/loganaly.htm**). All Log Records show all of the data imported, and can be filtered by Registration, Flight Number, or Date. Unique Aircraft/Flight Number and Unique Aircraft show filtered views of your data, providing details about when the aircraft was first/last heard and the number of times it *has* been heard. Also, double-clicking an entry in the log view pops up detailed information relating to the aircraft selected."
Reports - "Version 1.3 onwards can export a file in Aviation Databases 2002 TripLog format which allows the user to transfer their list of 'heard' aircraft without having to manually type the data into Aviation Databases."
Data Base - "The data base includes lookup tables for Aircraft and Carriers (*companies, jb*). These are used for the Aircraft Detail popup window and can be added to and edited by the user" (so you can add new aircraft).
Alerts - "From version 1.3.0, Log Analyser supports Alerts. This allows the user to enter any text (i.e. a registration number), which Log Analyser will look for in any messages in DDE mode."
Statistics - "New in version 1.0.15 is the Statistics screen. From here, you can see detailed statistics about the database and can also see how many aircraft from a particular carrier you have heard." (*This is something that you have to see to appreciate! jb*)

The Log Analyser Version 2 will shortly be available at the current price. Users who registered ACARS Log Analyser after July 1st, 2002, qualify for a free upgrade to version 2. As the program author states, "It will be a constant evolving project, being improved over time using feedback provided by users. You can follow development work by watching our WebLog." Well, folks, I don't know how much better the program can get, because right now it is a mega-asset for all of us who keep logs of our ACARS decodes.

Bottom line: The program costs $45 in US dollars – and I believe it's worth every cent. They accept PayPal, and all major credit cards. By the way, I didn't go into all of the details and goodies that this program contains; why spoil your fun? Go to their website and download the program. The proof is in the pudding. Don't forget to check out the Online Forum and Mailing List details on their website. Both of these are great assets for ACARS decode fans.

❖ Frequencies

I've received quite a few emails from folks around the Portland, Seattle, and Vancouver area who were wondering why I didn't list frequencies in their area very often. Well, thanks to Rich Williamson (KA7IEN) of Intercept Northwest Radio at **http://www.northwestradio.com/interceptnw** here they are. We hope our subscribers from that area enjoy them, and thanks, Rich, for the use of this material.

108.0 - 117.975	VOR/DME/= navigation
110.6	PAE Paine Field VOR/DME
111.5	IAWO unknown - probably Arlington airport
113.7	YYJ Saltspring Island VOR
116.8	Sea-Tac VOR/DME
118.0 - 121.4	ATC & ATIS
118.0	Sea-Tac ATIS
118.1	Portland Appr
118.2	Whidbey Appr
118.3	BFI Tower
118.5	Tacoma Tower (Rwy 17)
118.55	Seattle Center (Yakima)
118.9	BFI Clearance Delivery
119.1	? Possibly Victoria Tower
119.2	Sea-Tac Departure
119.5	Seattle Appr
119.65	Seattle Center (The Dalles)
119.7	Victoria Tower
119.9	Sea-Tac Tower
120.1	Seattle Appr
120.2	Paine Tower
120.3	Seattle Center (Beacon Hill)
120.4	Seattle Appr
120.6	BFI Tower
120.7	Whidbey Appr

121.1	Seattle Center Appr/Dep
121.125	Skagit Regional (AWOS)
121.2	Bremerton ATIS
121.35	Seattle Center (Oregon area?)
121.5	**Emergency & ELT**
121.6 - 121.9	Ground Control
121.7	Sea-Tac Ground Control
121.75	? Ground Control - unknown airport
121.8	? Possibly Paine Field ground control
121.95 - 122.675	FSS & misc.
122.1	Nanaimo FSS
122.55	Seattle FSS
122.7- 123.2	**Unicom & misc.**
122.7	Unicom for uncontrolled airports Arlington, Bremerton, Sequim, Hoquiam, Kenmore (seaplanes)
122.775	Traffic Helicopters (primary)
122.8	Unicom for uncontrolled airports Anacortes, Friday Harbor, Oak Harbor, Blaine, Chehalis-Centralia, Auburn,Thun Field (Puyallup), Sky Harbor (Sultan), Sanderson Field (Shelton)
123.0	Unicom for uncontrolled airports Kent, Snohomish (Harvey Field), Burlington, Pt. Townsend
123.025	Unicom - Helicopters (local Traffic Helicopters secondary)
123.2 - 123.675	**Misc.**
123.275	Boeing test flights
123.3	Gliders
123.5	Gliders
123.7 -128.8	**ATC & ATIS**
123.7	Comox Terminal
123.8	Chinook Appr
123.9	Seattle Appr
124.05	Tacoma Narrows ATIS
124.2	Seattle Center (Scappoose)
124.4	Olympia Tower
124.65	Gray AAF (Ft. Lewis) ATIS
124.7	Renton Tower
124.8	McChord Tower (Rwy 34)
124.9	Bellingham Tower
125.1	Seattle Center (Neah Bay) - Olympic Peninsula
125.6	Seattle Center (approaching aircraft 16k-9k)
125.8	Seattle Center (Hartan)
125.9	Seattle Appr
125.95	Vancouver Center
126.1	Seattle Center (Wenatchee)
126.125	Vancouver Terminal
126.2	Gray Tower (Rwy 15)
126.5	Seattle Appr
126.6	Seattle Center (Larch Mtn) - areas South and East of Tacoma
126.95	Renton ATIS
127.1	Advisory Freq - not sure what area it covers
127.75	Boeing Field ATIS
127.8	Victoria Terminal VFR (simulcast on 133.85)
128.0	Sea-Tac Clearance Delivery
128.15	Seattle Center (Redmond, OR / Scappoose)
128.25	San Juan Advisory
128.3	Seattle Center (Larch Mtn) - Olympia and Elma area
128.45	Seattle Center (Mullan Pass)
128.5	Seattle Center (Ft. Lawton) - airspace under 6000 ft
128.6	Vancouver Appr
128.65	Paine Field ATIS
128.75	?
128.825 - 132.05	**Corporate enroute & ACARS**
128.825	Sea-Tac -Sun Country Airlines
128.825	Sea-Tac -Aeroflot
128.825	Sea-Tac - Omni Air Int'l (handled by Premier Avai l ground services)
128.825	Sea-Tac -Martinair (outbound) (handled by Slatterly ground services)
128.825	Portland -Aero Air (FBO) Learjet maintenance
128.9	BFI - Airpac Airlines
128.9	Vancouver - Cathay Pacific (inbound)
128.925	Sea-Tac - Signature (FBO) fueling & ground transportation
128.95	Vancouver - Kelowna Flightcraft (Purolator)
128.975	? - unknown airline (outbound) to Penticton/ Cranbrook
129.0	Sea-Tac - Air Canada (handled by United)
129.0	Vancouver Canada 3000 Airlines ('Elite xxx')
129.025	BFI - Galvin Flight Services (FBO)
129.1	? - Light aircraft operating in the Vancouver area
129.2	? - Canadian planes - some flights going to Calgary
129.2	? - "Timber 1" and "Timber 2" - possibly Timberline Air or Kwatna Timber
129.2	? - inbound to sea-tac
129.225	Sea-Tac - American Airlines
129.325	Sea-Tac - Horizon Airlines
129.375	Sea-Tac - Casino Express
129.4	Sea-Tac - ARINC - San Francisco Radio
129.425	BFI - UPS (also Vancouver, Victoria, Pt. Angeles)
129.45	Vancouver - America West Airlines (handled by United)
129.45	Vancouver - United Airlines and United Express (Skywest)
129.5	Sea-Tac - United Airlines
129.5	Sea-Tac - Shuttle by United ('Air Coach xxx)
129.5	Portland - Delta Airlines
129.5	Canadian Airlines (outbound)
129.575	Vancouver - Canadian Airlines
129.6	Sea-Tac - American Trans Air ('Amtran xxx)
129.6	Sea-Tac - Omni Air (inbound) calling Slattery Ground Services no response
129.7	Vancouver - Canadian Airlines
129.725	Sea-Tac - Cargolux Air Freight
129.775	Vancouver - Air Canada (outbound ops)
129.825	Seattle - Airlift NW (helicopters), also Lear 359EF doing patient transport
129.85	ARINC - San Francisco Radio
129.9	Vancouver - Canadian Airlines (maintenance)
129.925	Sea-Tac - Continental Airlines
130.0	Air Canada - possibly inbound for Penticton ACARS data
130.025	Sea-Tac - British Airways
130.05	Sea-Tac - Delta Airlines
130.1	Sea-Tac - Vanguard Airlines
130.1	? - Light aircraft operating in the San Juans
130.125	Portland - American Airlines
130.15	Vancouver/Victoria - Air Canada
130.175	Vancouver - British Airways
130.200	Sea-Tac - old TWA freq. Unknown if used now.
130.225	Sea-Tac - Kitty Hawk (Air freight)
130.25	? Kenmore Air Harbor & Lake Union Air
130.275	Vancouver - Air Canada
130.3	? - (Canada - inbound to Richmond)
130.35	Sea-Tac - Scandinavian Airlines
130.375	Sea-Tac - China Airlines ('Dynasty xxx')
130.45	Vancouver - Air Canada ? (maintenance)
130.45	Portland - Alaska Airlines
130.475	Bellingham - United Express
130.5	Vancouver - West Jet
130.525	? San Juans - West Isle Air
130.575	Sea-Tac - National Airlines ('Red Rock xxx)
130.6	? - unknown airline '125' calling operations
130.625	Vancouver - Continental Airlines
130.65	? - small commercial passenger planes going to Vancouver and Victoria - probably Harbour Air Seaplanes, might be Baxter Air...
130.65	Sea-Tac - Scandinavian Airlines (inbound)
130.675	Sea-Tac - Horizon Airlines/Big Sky Airlines (inbound), NorthwestAirlines
130.7	ACARS data
130.7	Vancouver - Canadian Airlines
130.725	Sea-Tac - Frontier Airlines
130.75	Sea-Tac - Southwest Airlines
130.8	Sea-Tac - Alaska Airlines (outbound)
130.825	Vancouver - Canadian Airlines/Air Canada (outbound)
130.85	Sea-Tac - America West Airlines Mactus xxx')
130.875	? - unknown airline (outbound) '1240'
130.9	BFI - Airborne Express ('ABEX xxx') maintenance
130.925	? - light aircraft or helicopter w/fuel requests
130.95	Sea-Tac - United Express (Skywest)
131.0	Sea-Tac - US Air
131.025	Sea-Tac - Alaska Airlines (inbound)
131.05	Vancouver - Helijet Airways
131.15	? - unknown commercial airliners - Vancouver
131.2	Portland - Horizon Airlines
131.25	?
131.275	Sea-Tac - EVA Air
131.35	? - Canada)
131.4	ACARS data – Air Canada
131.425	? - unknown airline - San Juans, BFI, Pt. Townsend, Harbor; scenic flights possibly Vashon Island Air
131.45	ACARS data (primary)
131.475	Sea-Tac - old Harbor Airlines freq. Unknown if used now.
131.525	San Juans - Harbor Airlines
131.55	Sea-Tac - DHL ('Reliant xxx')
131.6	? (Canada - outbound)11031 calling operations
131.6	Sea-Tac - Northwest Airlines (inbound)
131.625	Sea-Tac - Hawaiian Airlines (inbound) - handled by Northwest
131.675	Sea-Tac - Evergreen Air Freight
131.7	BFI - Aeroflight
131.7	Bonanza 82159 calling unknown base station
131.725	? - ?
131.75	Paine Field - FedEx (secondary when they can't contact on 131.925)
131.75	? - ? (maintenance)
131.8	? - ?
131.825	Vancouver - West Jet
131.825	Vancouver - Canadian Airlines (maintenance)
131.85	FedEx (Sea-Tac, Portland, Paine Field)
131.875	Sea-Tac - Empire Airlines (outbound)
131.9	? - ?
131.925	Vancouver - Alaska Airlines
131.925	Bellingham - Horizon (inbound)
131.95	BFI - Flight Center (FBO)
132.0	
132.0	
132.025	
132.075 - 136.475	**ATC & ATIS**
132.075	Seattle Center (Hartan)
132.2	Vancouver Center
132.3	Vancouver Center
132.4	?
132.6	Seattle Center (Yakima)
132.7	Vancouver Center
132.95	Paine Tower
133.0	Portland Appr
133.1	?
133.5	Vancouver Center
133.65	Sea-Tac Appr
133.7	Vancouver Center
133.85	Victoria Appr (Victoria Terminal main VFR freq) simulcast on 127.8
133.95	Victoria Terminal (north - Nanaimo)
134.15	Ault Field (Whidbey Island) ATIS
134.4	Vancouver Center
134.55	Vancouver Center
134.8	Vancouver Center
134.95	Seattle Center (Whidbey Island) - Mt. Vernon/ Bellingham area
135.05	Vancouver Center
135.1	Whidbey Island NAS Clearance Delivery
135.45	Seattle Center (The Dalles)
135.5	Vancouver Center
135.525	Seattle Center (Beacon Hill)
135.625	Arlington AWOS
136.5 - 136.975	**Corporate on-route & ACARS**
136.525	Sea-Tac Emery Air Freight
136.850	ACARS data

AMERICAN BANDSCAN

THE WORLD OF DOMESTIC BROADCASTING

Doug Smith, W9WI
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Tower Battle

Once upon a time, if you wanted to build a new tower for your broadcast station, the FCC was the only agency you had to deal with. As I'm sure the hams in the audience can tell you, those days are long gone. One New York City FM station has learned this lesson the hard way...

Robert Thomas forwarded a number of news items about Fordham University's WFUV-90.7's battle to construct a new 480-foot tower on the University campus. After obtaining FCC and city permission, construction began. This didn't sit well with the University's next-door neighbor, the New York Botanical Garden. After the Garden complained, the city reversed its approval – unfortunately, after the tower was half-complete. That was in 1994. The situation is still unresolved.

WFUV's original tower site was atop Keating Hall. Structural problems with the building forced removal of the tower, and RF exposure regulations made it inadvisable to rebuild atop a building. (WFUV is a 50,000-watt station; it needs to be a fair distance from any location normally occupied by people.) The location of any new tower is restricted by the need to be a minimum distance from other stations on the same frequency. In particular, the presence of stations on 90.5 in New Jersey makes it impossible for WFUV to move to the Empire State Building or any of the other Manhattan skyscrapers. Flight paths for La Guardia Airport also limit available tower sites. Failing to act at all (and staying on the current 215-foot tower) would allow other stations to expand coverage and limit WFUV's coverage area.

The Garden, on the other hand, presents an aesthetic argument. The Garden is just across Kazimiroff Boulevard from the University; the tower would be plainly visible. A number of conservation and preservation agencies including the National Trust for Historic Preservation, the Smithsonian Institution, the NYC Landmarks Preservation Commission, and the National Park Service have weighed in on the issue.

In an unusual action, FCC staff held two open June meetings in New York to discuss the situation. Various alternative sites and mitigation measures were discussed. A second consultation session was held in New York on August 14 – results are not yet available. Stay tuned...

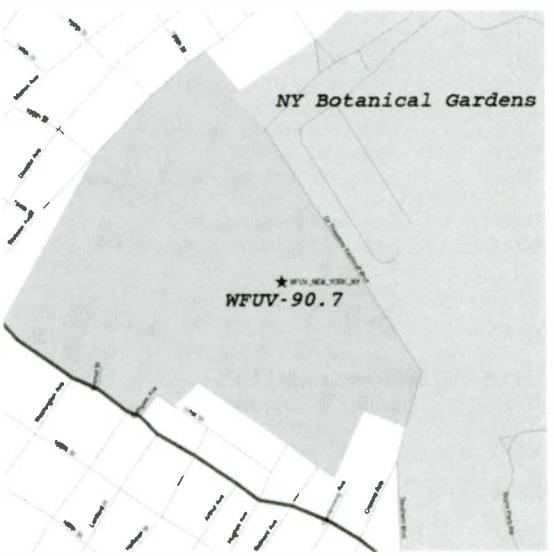
This kind of problem is commonly faced by other broadcasters. More than one station has returned its license for cancellation after being unable to find a transmitter site acceptable to the locals. The American Radio Relay League has asked for legislation preventing local governments from blocking radio hams from erecting antennas – now broadcast interests are asking for similar legislation for commercial operations.

❖ Bits and Pieces

* Brian Rogers reports in Detroit, that a pair of Kisses most certainly does not lead to love! 2-1/2 years ago, WDMK-102.7 reclaimed the name "Kiss 102.7," a name the station had previously used in the 1980s. However, it would appear they never bothered to register the "Kiss" trademark. Clear Channel Communications, hoping to establish a consistent image for all their popular-music stations, has. They plan to use the "Kiss" slogan for their WKQI-95.5. The situation is not yet resolved. In Bakersfield, Clear Channel did succeed in forcing KISV-FM to rename itself, freeing the "Kiss FM" name for Clear Channel's KKXX-FM.
* David Lomady WD8CKK saw the picture of my FM DX antenna in the September 2001 issue of *MT*. He wanted to know what kind of antenna it was. The antenna in question is a Channel Master Stereo Probe 9. ...Unfortunately, you can't get one. Channel Master has discontinued this popular and effective antenna. If you *really* want one, you might check with a local TV-repair or electronic-parts store. Often, these stores have unsold antennas in the back room.

  Many FM DXers have switched to the APS line of antennas. The APS-13 is probably the ultimate FM DX antenna these days, while the APS-9 is a more reasonably-sized choice! Check out http://www.antennaperformance.com or write P.O. Box 9597, Bolton, CT 06043-9597 for more information on these antennas.
* In April, I mentioned the National Radio Club's *Night Pattern Book*, showing the nighttime directional antenna patterns of AM stations. George Hamer of Brooklyn wants to know if there are any books (or websites) showing *daytime* directional patterns. I'm afraid I'm not aware of any. There are two programs out there that will display this information on your own computer, however. Check out Neil Adams' *FCC Database Reader* on http://home.earthlink.net/~nsadams/, and Robert Carpenters' *AMSTNS* on http://www.qsl.net/w3otc/.
* George also wonders how wideband scanners like the AOR AR8200II and Alinco DJ-X10T compare to regular TVs and radios for DXing. I have not tried either receiver – if you have, please write. I did buy a Kenwood TH-F6 ham rig with wideband receive coverage at this year's Dayton Hamvention. I'm afraid I'm not impressed with its ability as a broadcast DX receiver. It is, however, handy to be able to listen to *All Things Considered* on WPLN-1430 while monitoring the 145.37 repeater on the same radio! I should mention too, that the TH-F6 can be quite effective for DXing TV audio if you select narrow FM, not the WFM recommended in the manual.
* On Staten Island, James Hannah has heard the 1710 kHz Jewish ethnic pirate station from Brooklyn. Programming included an English discussion of the Second Coming and uninterrupted singing in presumed Yiddish. The station can be heard on a car radio in the northern part of Staten Island, but it disappears at his home at the southern tip of the island. James is using a Sangean 818 with a 75' wire and a homebrew 2' tuned loop. He's logged 184 stations from 24 states, with the best DX WOKV-690 Jacksonville, Florida.

DX should be picking up as we enter fall. Hearing anything interesting? Write me at Box 98, Brasstown NC 28902-0098, or by email to w9wi@w9wi.com. Good DX!



WFUV-90.7's half-completed tower is across the street from the New York Botanical Gardens.

OUTER LIMITS

THE CLANDESTINE, THE UNUSUAL, THE UNLICENSED

George Zeller
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Russian "Names" Station Heard

Virtually every DXer has heard a "numbers" station, where coded messages are transmitted on shortwave to spies and other secret recipients. In *DXplorer*, Walter Salmaniw reports hearing a Russian "names" station around 1400 on 5080 kHz, in which the numbers messages were replaced by a long list of Russian names. Given the frequency and time of day, Walter presumes that this one probably came from a far east transmitter. Has anybody else been hearing odd transmissions like this one? The ordinary numbers stations appear on virtually any frequency in the shortwave spectrum.

Occasionally pirate broadcasters enter the "spy numbers" business with a variety of hilarious parodies, including one that replaces the numbers with names of Mexican foods, and another where risqué sexual terms supplement the numbers.

In a slightly related matter, well-known DXer Gerry Dexter points out that those of you in Wisconsin might want to visit "Secret Passages," a local restaurant in Milwaukee that has a "spy" theme. This eatery was recently profiled in a show telecast on the cable television History Channel.

❖ William Pierce Dies

William Pierce of Hillsboro, WV, the founder of the far-right National Alliance and a frequent focus of the programming on the classic USA clandestine station **Voice of To-Morrow** as well as a major influence on the quasi-clandestine **American Dissident Voices** program, passed away in late July from cancer at the age of 68. His best known book, *The Turner Diaries*, was cited by Oklahoma City bomber Timothy McVeigh as a major influence. This book had a similar influence on some of the most prominent right wing clandestine broadcasters in United States history. According to coverage by the Associated Press that was carried in a variety of newspapers, Pierce left detailed instructions to ensure the survival of the National Alliance prior to his death.

❖ What We Are Hearing

Our readers heard all of these North American pirate broadcasters this month. Most stations still transmit in the vicinity of 6955 kHz, although frequencies can vary up and down a little bit. Pirate broadcasting increases noticeably on weekends, and around major holidays such as Labor Day this month.

All-Pirate Radio- This apparently new operation has not been widely heard, despite the chipmunks that are announcers on their shows. (Unknown)

Captain Morgan- The format is evolving on this relatively new station, which has been featuring more rock music during recent productions. (None)

KIPM- Alan Maxwell's elaborate psychological dramas continue to divide the pirate listening community. Even though the themes are bizarre, they are among the best produced and most widely heard pirate shows on shortwave today. (Elkhorn)

KMUD- This veteran pirate, on the air for a decade and a half, is best heard on the west coast of North America, and is excellent DX elsewhere. Lately their new age music has been supplemented by IDs in Morse Code. (Belfast)

KRMI- Radio Michigan International remains active with genuine rock music and parody tunes. (Uses *KRMI6955@hotmail.com* e-mail)

Laser Hot Hits- This historic Europirate was featured in a special broadcast from Latvia on 5935 kHz, but it appears that this was a series of special broadcasts in mid-July only. You can check their web site at **http://www.radiolink.net/hothits** on the internet. (Might use *loserradio@yahoogroups.com* e-mail)

Mary Ann Calling- This new one, with host Uncle Schleckstein is part of an unfortunate trend of pirates who make malicious fun of various DXers. It is possible that this was an Oxycontin Radio clone, given the announcer's name. (None)

Mystery Science Radio- Comedy and drama are their staple, with emphasis on commercially available material. (Elkhorn)

Oxycontin Radio- Uncle Fleckstein and Mr. Ed alternate host duties on this rock music station. (None)

Psyco Radio- This mysterious station remains active on shortwave with rock and pirate radio jingles, but it still avoids contact with its listeners. (None)

Radio Bingo- John T. Arthur still wins the radio bingo game every time, and people are starting to conclude that it might be fixed. (Merlin)

Radio Cochiquaz- All pirates are not from North America and Europe, as this South American operation proves from time to time. Their recent operations have been during weekend darkness hours on 11440 kHz. You can also check out their **http://www.geocities.com/rcochiguaz** web site. (Santiago)

Radio Free Speech- Bill O. Rights has been more active lately, with his trademark "O Francis Scott Key" national anthem at signoff. (Belfast)

Radio Time Machine- The purpose of this new pirate is apparently to memorialize historic pirate stations from history. (Elkhorn)

Sensation AM- This europirate has occasionally been making it to North America with a format of techno dance music on 15785 kHz. The frequency range is worth a check, since e-mails from the station promise future activity. (Uses *sensationom@hotmail.com* e-mail)

United Patriot Militia Bingo- Steve Anderson of the defunct KSMR remains on the lam, but his pirate parody remains active with parodies of all kinds. (Merlin)

Voice of Captain Ron Shortwave- Captain Ron's adventures are woven into dramas that are becoming a larger proportion of the programming on his station. (Uses *captainron6955@hotmail.com* e-mail)

Voice of the Abnormal- Among the tunes played on this pirate recently was, "The Pope Smokes Dope." What else would you expect from a station with a name like this? (Elkhorn)

Voice of the Angry Bastard- Using a common pirate format of rock music mixed with political commentary, this one is much milder than its name indicates. (Belfast)

Voice of the New World Order- This well produced station always uses a political theme of the New World Order, perhaps as a parody or perhaps as a warning. (Uses *vonwoun@yahoo.com* e-mail)

Voice of the Tiki- Although still somewhat mysterious, word is getting around that their Hawaiian shows are starting to produce QSLs. (None, sometimes verifies logs in bulletins)

WANP- This new one is yet another example in the genre of pirates who make fun of certain DXers. (Unknown)

WBNY- This station, the voice of the Rodent Revolution, is normally a seasonal Easter station. But, either this one or a close clone were recently back with Commander Bunny reading "spy" numbers to his comrades in the revolution. (None, Washington, DC, maildrop defunct)

WHYP- The James Brownyard memorial station, allegedly from North East, PA, remains the most active North American pirate. His temperature readings for Lake Erie cities are supplemented by pirate radio news and parodies. (Providence)

WMFQ- Although their main theme is the promotion of pirate radio QSLs, most of their programming consists of rock music with the promos between songs. (Providence)

WMPR- As we see here this month, this veteran "Dance Party" station has begun to send out QSLs to their listeners. (None, occasionally verifies loggings in bulletins)

❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or $2 US to foreign locations. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14711; PO Box 28413, Providence, RI 02908; PO Box 69, Elkhorn, NE 68022; and PO Box 293, Merlin, Ontario N0P 1W0, Canada; and PO Box 159, Santiago 14, Chile. Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletins for sending pirate loggings with a hope that pirates might QSL them remain *The ACE* ($2 US for sample copies via Belfast) and the e-mailed *Free Radio Weekly* newsletter, still free to contributors via **yukon@tm.net**.

❖ Thanks

Your loggings and news are always welcome via 7540 Hwy 64 West, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: Jerry Berg, Lexington, MA; Rich D'Angelo, Wyomissing, PA; Jerry Coatsworth, Merlin, Ontario; Ross Comeau, Andover, MA; Gerry Dexter, Lake Geneva, WI; Harold Frodge, Midland, MI; Captain Ganja, Belfast, NY; Ted Gurley, Dallas, TX; William Hassig, Mount Prospect, IL; John Herkimer, Caledonia, NY; Roger Dale Huff, Norfolk, VA; Ben Loveless, Bloomfield, MI; Larry Magne, Penn's Park, PA; Greg Majewski, Oakdale, CT; Bill McClintock, Avon Lake, OH; Craig M. Pradarelli, Necedah, WI; Adrian Peterson, Indianapolis, IN; Lee Reynolds, Leppster, NH; Walter Salmaniw, Victoria, British Columbia; Martin Schoech, Merseburg, Germany; Chris Smolinski, MD; Bud Stacey, Setsuma, AL; Gayle Van Horn, Brasstown, NC; Niel Wolfish, Toronto, Ontario, and Joe Kenneth Wood, Gray, TN.

BELOW 500 kHz

DXING THE BASEMENT BAND

Kevin Carey, WB2QMY
kevincarey@monitoringtimes.com

Reader Questions & Comments

❖ WWVB Puzzler

MT reader William Tobin writes to ask why the small receivers and antennas used in 60 kHz WWVB-synchronized clocks work so well. He notes that he has difficulty hearing WWVB with a tabletop receiver and large outdoor antenna, so *"what is the trick that enables these small clocks to reliably pick up the WWVB time signal for time keeping?"*

This is an excellent question, and one that I've heard others ask from time to time. One factor that comes to mind is WWVB's massive power increase and antenna upgrade that took place a few years ago. The signal is now stronger than ever, and even in my Upstate NY location, I have little trouble picking up the Colorado-based station at any time of the day. Also, the clocks that I'm aware of are programmed to synchronize to the radio signal once per day. This typically occurs well after dark, when LF propagation is most favorable. Finally, a radio clock need only intercept a short timing sequence from WWVB's data stream to recalibrate itself. Therefore, even if signals are weak, chances are that enough data can be "heard" by the clock to maintain its synchronization. Thoughts and comments from other readers are most welcome.

❖ Power Line Carriers

Another question that comes up from time to time relates to Power Line Carriers (PLCs) that operate on the LF band. Electric utilities are the prime users of these license-free systems, and they provide a means to convey telemetry and control data over the power lines. Not all of these systems are restricted to sending data. Reports have also been received of voice transmissions being heard over high voltage transmission lines.

These systems provide an alternative to installing microwave links, leased circuits or fiber optics for utility communications. PLC transmitters typically operate in the 30-535 kHz band at 10 watts of power or less, although higher-powered units (up to 100 watts) are available. PLCs can be a nuisance to Lowfer experimental operators, because the devices often operate in or near the 160-190 kHz Part 15 band.

During the recent attempt to secure a ham band at 160-190 kHz, PLC operators were quite vocal in their concerns about interference that might result from widespread amateur operations. Readers interested in learning more about PLCs may want to visit the web site of Pulsar Technologies, Inc., a Florida-based firm that specializes in manufacturing such equipment (**http://www.pulsartech.com**). The Downloads area of their site includes many informative resources, including a whitepaper on PLC applications.

❖ High Power Lowfer

Bill Bowers (TX) writes to express his concern over an FCC decision to issue a 2-year experimental permit to a Carmel, NY, amateur who plans to operate at 200 watts of power in the 160-190 kHz band. Bill is an avid low frequency experimenter and believes that allowing such operation would severely affect low frequency experimental radio (Lowfer) 1-watt operations in this band.

I do understand this concern and feel that far more educational value comes from working with 1-watt transmitters and carefully tuned antenna systems, than will come from running "brute force" power levels. It was for this reason that I applauded the recent FCC decision *not* to grant the ARRL request for a ham band at 160-190 kHz.

On the other hand, I recall several years ago when the Lowfer band was inundated with Ground Wave Emergency Network (GWEN) stations using 5,000 watts and 300-foot "hot tower" antennas. These signals presented a significant challenge to Lowfer operators, but progress on the band did not stop. On the contrary, it was a time of great advances in weak signal receiving techniques.

With this in mind, I do not believe the presence of one 200-watt experimental station will ruin the band for all Lowfers. As it is, Lowfers are afforded no legal protection whatsoever from interference, and they do quite well operating under this handicap. I believe that most experimental operations will see a minimal impact from this new experimental station. It would be another story entirely if the FCC allowed high power to be used on a wide scale. I invite other readers to comment on this situation. What do you think about allowing high power stations onto the Lowfer band?

❖ VLF Intercepts

It's been quite a while since we've included any loggings from the world below 150 kHz. This can be a difficult area to explore for two main reasons: First, many of today's receivers don't tune that low, and second, many of the signals consist of heavily encrypted data, making it difficult to obtain a positive ID. Mike Silvers, KB6WFC (CA) is one listener who enjoys overcoming the challenges of radio's sub-basement. A brief sampling of his log is shown in Table 1.

Mike cautions that he cannot be 100% certain of the IDs listed in his log. He arrived at them by carefully checking the frequency of transmission, and then consulting various online resources to determine the likely user. The list is offered as a sampling of the types of signals that can be heard in this spectrum.

Table 1. Selected LF/VLF Loggings

Freq.	Tentative ID
11.9	Russian Alpha Sys.
12.64	Russian Alpha Sys.
14.89	Russian Alpha Sys.
19.8	NWC, Australia
22.2	NDT, Japan
24	NAA, Maine
24.8	NLK, Wash. State
40.75	NAU, Puerto Rico
55.5	NPG, California
60	WWVB, Colorado
76.2	CKN, British Columbia
100	LORAN C, Various loc.
124	CKN, British Columbia

❖ ID Changes in Canada

For many years Canada has operated a large number of single-letter aviation beacons in the LF/MF band. In keeping with ICAO (International Civil Aviation Organization) standards, these single-letter IDs will soon be phased out and redesignated with three-letter IDs all beginning with the letter "Z." The changes are expected to be complete by the end of 2002.

The new IDs are the result of a deadly air crash that occurred in South America, where a plane may have been following the wrong single-letter beacon. It is hoped that by phasing out single-letter IDs worldwide, the chances of confusion will be greatly reduced, and such disasters can be avoided. Stay tuned here for a complete list of the redesignated beacons. For now, if you hear a new "Z" call sign, there's a good chance it's coming from a Canadian beacon.

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The frequency range is 150 kHz to 1.5 GHz (cellular frequencies 825-849 and 869-894 MHz are excluded).

The hardware/software package consists of the receiver card {11.25"L x 4.5"H x 0.9" thick}, Windows-based software, a start-up antenna and a user's manual.

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No cables or power supplies needed - no clutter on your desk. Just plug in and scan! Every computer can be converted into an inconspicuous monitoring station with minimum operator training required. (***Requirements:*** *Windows 3.1 requires 386 or higher, 1 Meg RAM, 1 Meg hard disk space VGA monitor: Windows 95 requires 486 or higher, 4 Megs RAM, and SVGA monitor.)*

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ON THE HAM BANDS

THE FUNDAMENTALS OF AMATEUR RADIO

T.J. "Skip" Arey, N2EI
tjarey@monitoringtimes.com

Classic Home Brewing

October is when we begin to get a bit of a chill in the air. The atmospheric noise begins to quiet down. For me, outdoor activities begin to turn into indoor pursuits. This usually means spending more time down in my basement workshop rooting through my junk boxes and turning the odd schematic into a working radio of one sort or another.

Old Uncle Skip is a devoted home-brewer and it has always been my desire to get other folks to give a try at melting a bit of solder from time to time. I thought I might share some ideas that might just get even the most dedicated "appliance operator" to try to get on the air with something home built.

Many of you are familiar with the late great Doug DeMaw W1FB. Doug was a columnist here at *MT* but he was also widely known for his work at and for The American Radio Relay League. He designed dozens of low cost transmitters, receivers and even transceivers that had great performance and relatively low parts count. When most folks first ventured into home building a ham rig it was usually done with a Doug DeMaw schematic in hand.

One of Doug's most beloved designs was a diminutive 40 meter crystal controlled transmitter known as the Tuna Tin II. I've written about this rig many times and have also dealt with its companion "Herring Aid" receiver. For less than 20 dollars each it was easy to get a simple station built and on the air by almost any ham. Doug has left us but his spirit lives on, largely through the efforts of the QRP community. Many clubs and individuals continue to keep novice and even serious home brewers' workbenches full of fine projects. This month I'd like to let you know about a couple of projects that reflect the spirit of Doug's wonderful designs.

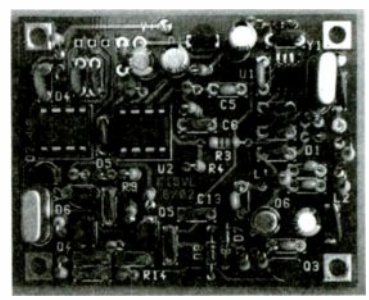
THE SMALL WONDER LABS ROCK-MITE

$25.00 postpaid in US and Canada
$28.00 elsewhere
http://www.smallwonderlabs.com/
Small Wonder Labs
32 Mountain Road
Colchester, CT 06415

Dave Benson, K1SWL, may be more familiar to many folks by his previous callsign NN1G. Dave became the talk of the home brew ham world back in 1994 when he developed the 40-40 transceiver: the rig that put any ham with basic soldering skills on 40 meters for 40 bucks (hence the name 40-40). The project was initially developed for the New England QRP Club, but once the design was published in the pages of *QST* that same year, ham radio home brewers beat a path to Dave's door. He formed his company Small Wonder Labs and the rest, as they say, is history. Dave has gone on to provide some of the most exciting low cost kits ever produced. His updated 40-40 design is still available from his company as the popular SW+ series of single board transceivers. I've built any number of Dave's kits over the years and I've always found them excellent, enjoyable projects.

This glowing introduction of Dave and Small Wonder Labs is to let you in on the latest kit to come out of Dave's production line, the Rock-Mite.

To put it as succinctly as possible: How would you like to get on the air for about $25.00? The Rock-Mite is a fully functional, crystal-controlled, 40 meter CW transceiver that can be assembled in one evening with basic tools and no special skills. The entire rig is small enough to fit in any of those small mint tins that can be found at any candy counter in the country. Truly a project in the spirit of W1FB.



The Rock-Mite is a low cost rig in the tradition of the 'Tuna Tin II'

Word of the Rock-Mite came out of "Lobstercon," a New England QRP gathering held last July. The QRP e-mail reflector QRP-L **http://qrp.lehigh.edu/lists/qrp-l/** was abuzz, and it wasn't long until folks (Old Uncle Skip included) began bugging Dave to add the design to his line of kits.

The Rock-Mite, as its name suggests, is a crystal-controlled transceiver. It comes "tuned" for 7040 kHz, the popular North American CW QRP operating/calling frequency. There have been dozens of basic designs in this class, but as usual, Dave takes things a few steps further.

The Rock-Mite has a PIC microcontroller that manages T/R offset and also functions as a built-in lambic keyer. By manipulating the transmitter offset you can actually get the rig to operate on a second frequency of 7039 kHz. Unlike other simple designs, Dave's diminutive rig includes crystal filtering to reduce shortwave broadcast station interference, a major problem on the 40 meter band.

The whole shootin' match lives on a 2 x 2-1/2 inch double-sided printed circuit board that includes plated-thru-holes, solder masking and silk screening. The Rock-Mite will operate from a supply voltage between 8 and 15 volts and it yields an honest 1/2 watt output with a common 12 volt supply.

The built-in keyer operates in the range of 5 through 40 WPM and the built-in side tone is set at an easy to listen to 700 Hz. All onboard parts are supplied, leaving the end user to supply desired connectors with a quick trip to his junk box, the local Radio Shack or other parts store.

As with all of Dave's designs, the Rock-Mite comes with complete instructions and even some operating tips and ideas for modifications. Even before the Rock-Mite went into general production, a Web page sprouted up as a resource for modifications and ideas for Rock-Mite users. Rod Cerkoney N0RC set up the site at: **http://www.radioactivehams.com/~n0rc/rm/**

If the sub-QRP power output of one half watt makes you a bit skittish, I can attest to a box full of QSL cards from all over the United States and dozens of countries operated at that power level. With the Rock-Mite, you get the double reward of working other stations with a rig you build yourself at a power level that demonstrates real operating skill. Ham radio doesn't get any more basic than this. For less than the cost of two tickets to a movie and a large buttered popcorn, you can be on the HF bands with tons of style. And don't forget... You get to eat all those mints to get the tin to use as a case!

The Rock-Mite makes an excellent first kit, even though it does include one larger format surface mount component (Hey, we all gotta start somewhere, right?). Once you build it, don't be too surprised if you find yourself returning to the Small Wonder Labs Web site in search of other, more challenging projects.

THE MRX-40 MINI RECEIVER

Designed by Steve Bornstein K8IDN
http://www.arrl.org/tis/info/pdf/99759.pdf

The next step up in the home brew world is to grab a good schematic and have at it by whatever means necessary. A good start is the K8IDN MRX-40 Mini Receiver. This is a very basic but fine-performing 40 meter receiver. The receiver is a single stage direct conversion design using a 7.048 MHz (or thereabouts) crystal, NE612 oscillator/mixer, and LM380 audio amplifier. The design has a very low parts count, and all components are common "parts house" pieces. You may have

a bit of difficulty tracking down the NE-612 or its equivalent, but they can be found in a number of places on the Web. One place to look is Dan's Small Parts (**http://www.fix.net/dans.html**) or the below mentioned (**http://kitsandparts.com**). You can find a printed circuit board for this design at Far Radio Circuits (**http://www.farcircuits.net**).

I built mine up "ugly" style, just assembling the parts on a small section of PC board. I also wound my own RF chokes but only because I had the right toroids lying around in the junk box. The essence of this kind of home building is trying to make whatever you have in your junk box work as a way of saving money. It is both challenging and fun.

THE MultiPIG+ ALL BAND CW TRANSCEIVER

Dieter Gentzow W8DIZ
197 Timber Trail
Loveland, OH 45140
http://www.kitsandparts.com/index.html

At the other end of the home brew spectrum are a number of advanced designs. If you want to try something a bit more complicated and challenging than the Rock-Mite, Diz Gentzow W8DIZ has hooked a number of us more rabid home builders on an adventure called the MultiPIG+. Diz is producing a series of separate "sub-kits" that, when all put together, will result in a high performance, all ham band, CW transceiver (including the proposed 60 meter band). This modular approach allows a builder to spread the building, debugging, and (not insignificantly) the cost of building this design over time.

The first installment, the PLL VFO Signal Generator, was released in August. By the time you read this, further modules will be available, including a Frequency Counter/Display/QSK/Control Board and Keyer, the Main Radio section, the RF Filter deck, the Low Pass Filter deck, and the RF Amplifier. The goal of the project is to have everything together by the end of December. For Old Uncle Skip this is sort of something that started around my Birthday and should finish up around Christmas, so it's like one long present I'm purchasing for myself.

As mentioned above, the multiPIG+ is a high performance, all HF band, CW transceiver kit. It is based on the original multiPIG, which was a "Flying Pig QRP Club" project. The original multiPIG was built "ugly" style – essentially built on raw, unetched PC boards from schematics. The new multiPIG+ version will have the luxury of PC boards.

The multiPIG+ design features continuous transceive from 1.8 MHz through 29.7 MHz in 5 to 30 kHz steps depending upon base frequency. The rig is designed with dual VFOs, using two 10 turn potentiometers. The design utilizes the K1EL K10 Keyer chip. The custom frequency counter has a 10Hz IF offset resolution; built on same PCB as the Keyer and the QSK circuit. The design includes full QSK using a 1N5767 pin diode at the Band Pass Filters. The RF Amplifier operates at 5 Watts output with 7 pole bandpass filters. The design utilizes a Ring Diode front-end balanced mixer. To maintain overall simplicity the design uses no microprocessors. Total cost of all modules will be in the neighborhood of $250 when completed.

This design is most assuredly NOT a first time builder's kit. However, if you are interested in trying to build your own optimized CW rig and know your way around a soldering iron, Diz' work has a great reputation.

Home building is a fun way to spend those cooler fall and winter evenings. You can warm yourself up by the heat of your soldering iron. Have fun! See you on the lower end of 40 meters.

UNCLE SKIP'S OCTOBER CONTEST CORNER

California QSO Party
Oct 5 1600UTC – Oct 6 2200UTC
QCWA QSO Party
Oct 5 1800UTC - Oct 6 1800UTC
YLRL Anniversary Party(CW)
Oct 9 1400UTC – Oct 11 0200UTC
10-10 Day Sprint
Oct 10 0001UTC- 2400UTC
Pennsylvania QSO Party
Oct 12 1600UTC - Oct 13 0500UTC
and Oct 13 1300UTC- 2200UTC
FISTS Fall Sprint
Oct 12 1700UTC- 2100UTC
YLRL Anniversary Party (SSB)
Oct 16 1400UTC - Oct 18 0200UTC
ARCI Fall QSO Party
Oct 19 1200UTC - Oct 20 2400UTC
Illinois QSO Party
Oct 20 1800UTC - Oct 21 0200UTC
CQ Worldwide DX Contest (SSB)
Oct 26 0000UTC- Oct 26 2400UTC
10-10 Int. Fall Contest (CW)
Oct 26 0001UTC- Oct 27 2400UTC

Marc Ellis
marcellis@monitoringtimes.com

Wrapping up the Voltohmist Project

In the July, August and September columns, we've been discussing and rehabbing two different VTVMs, both by RCA: the Junior Voltohmist and Senior Voltohmist. By September we had completed the work on the Junior Voltohmist, but a problem turned up with the Senior model. The a.c. measurement function was inoperative on all ranges, and the reason wasn't too hard to find.

❖ Critical Resistor Found Open

Take a look at the detail I've included from the instrument's schematic and find R28. It's at the top of the network of range resistors located under the 6AL5 tube. An open resistor at this location would definitely result in no meter indication on any of the a.c. ranges. And that's exactly what happened; R28 was checked and found to be open.

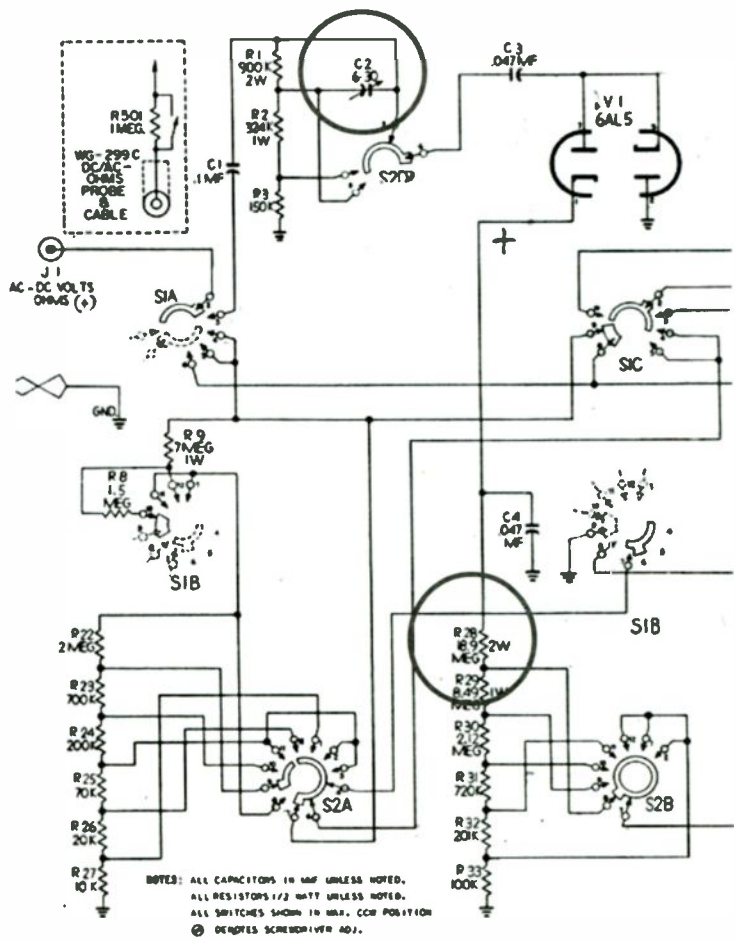
This resistor accomplishes the bulk of the voltage drop required to reduce the a.c. input voltage to a value suitable for the vacuum-tube indicating circuit. Because of its unusually high value it is specified as a 2-watt resistor. (Keep in mind that the power dissipated in a resistor is the square of the current being passed, times the resistance value.) Perhaps during some measurement made by a previous owner, the input voltage was too high for the range switch, overloading this vulnerable resistor.

R28 happens to be an 18.9-megohm carbon film precision (1%) resistor. Unfortunately, there is no way to order a replacement from RCA. Even if that company still existed in its original form, the Voltohmist is a long-obsolete product. Generic precision resistors might be available from a major electronics parts supplier. But even if one were willing to pay the high prices and fulfill the probably even higher minimum order requirements, it's doubtful that the oddball 18.9-megohm value could be purchased off the shelf.

❖ Jury-Rigging a Replacement

My junkbox came to the rescue here. I happened to have an assortment of resistors that looked like carbon film rather than ordinary composition units. (I say this because they were painted an overall solid color and marked with their resistance value in plain English rather than as a color code.) Furthermore, even though I've had them a long time, they had not drifted seriously in value as older composition resistors are wont to do. Each one I checked was within a percent or two of its marked value.

Playing around with various arrangements of these resistors, I found two 5-megohm, two 4-megohm, and one 500-k unit that, when series-connected, gave a resistance of 18.86 megohms on my digital ohmmeter. Well within the 1% rating of the original 18.9-megohm resistor. I wired these onto a terminal strip and connected the assembly in place of the original resistor.



Detail from schematic of RCA Senior Voltohmist. Circles indicate locations of resistor R28 and capacitor C2 (see text).

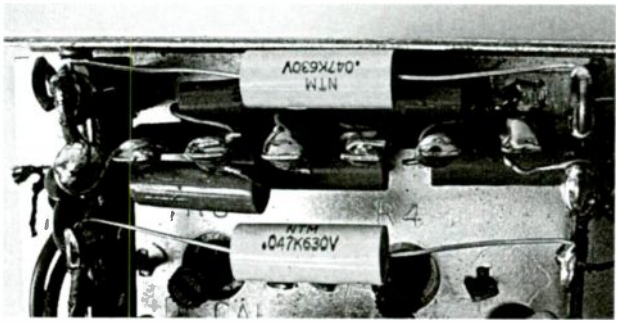
Now the a.c. calibration process that had become stalled at the end of last month's column could be completed without incident, though of course I don't really know if my junkbox resistors are suitable carbon film units and good for the long haul.

The final procedure in the calibration protocol, the "a.c. compensation adjustment" could not be undertaken. That procedure calls for the adjustment of a trimmer capacitor (C2 on the schematic) using a test signal of 150 volts at 100 kHz. The ordinary r.f. generator found in a radio service shop has an output of a couple of volts max. What RCA is calling for here is more like a small radio transmitter. I have no idea how ordinary folk could produce such a signal. If any readers can suggest a method, let me know.

I suspect that this adjustment only affects the response of the instrument when measuring higher frequencies. I tried rocking the trimmer very gingerly while measuring a.c. at 60 cycles and found that it had no effect. In our restoration work, we will rarely need to measure a.c. at higher than power line frequencies.

Now that I've finished working on the Voltohmist Senior, I want to recommend caution about acquiring one for restoration. You'll recall that in the first article in this series I advised you to look for service-grade rather than laboratory-grade test instruments as candidates for rehab. One major reason was that the latter frequently call for calibration procedures difficult to duplicate in the amateur's workshop. It looks like the Senior Voltohmist, while certainly not out of place in a service shop, begins to edge into the laboratory category. There is no such difficulty with the Junior Voltohmist.

Through discussing this project with others, I've also found that resistor R28 has been found open in other examples of the Senior Voltohmist. For one person, this was a good enough reason to scrap the unit on the spot. So if you *are* tempted to purchase one of these instruments, do not do so unless you are given



Five resistors wired in series on terminal strip (between the two light-colored capacitors) substitute for burned-out R28 (see text).

permission to plug it in and try it on various ranges – especially the a.c. ones.

I hope you will forgive me if I don't go through the exercise of cleaning up this meter and refinishing the case as originally planned. Because of the jury-rigged resistor fix and inability to complete the adjustment procedure, I'm just not that excited about the instrument. The rehabbed Junior Voltohmist, however, now has a permanent spot on my test gear shelf.

❖ Replacing Missing Probes

In a recent e-mail, Reader Martin Petherbridge writes that he purchased a Senior Voltohmist at a yard sale for five bucks. It appears to be in great shape, and we'll keep our fingers crossed in the hope that it does not have an open R28! In any case, Martin's instrument came without a probe and he wondered how to obtain one.

Though I've answered Martin personally, this looks like a good topic to discuss in the column because test instruments found at sales and flea markets are frequently without their probes. Almost all small VTVMs use probes of the same design. When measuring a.c. or resistance, the probe is connected directly to the input of the instrument by a shielded cable. When measuring d.c., a 1-megohm resistor must be inserted between the probe and the instrument input. Most commercial probes have a small slide switch, enabling this resistor to be cut in or out depending on the type of measurement being made.

Chances are you won't be able to buy a probe like this from commercial sources because VTVMs are no longer being made. If you are lucky, you may be able to find such a probe in a surplus catalogue or by keeping your eyes peeled at hamfests, antique radio meets, or other electronic flea markets. However, if you don't mind the inconvenience of working with two separate probes, you can make your own. Most parts are readily available at your local Radio Shack.

❖ Needed Parts

Select a pair of test leads with probe tips similar to Radio Shack 278-704, 705, 712 or 713. Just make sure that the probe tips can be unscrewed from their plastic handles. Unscrew the tips and disconnect the wires. Put the wires, with their plug or pin terminations, into your junk box for some future use. You now have two disassembled test prods, one red and one black, ready to be rewired for VTVM use.

You'll need about six feet of single-conductor shielded audio cable and a 1-megohm, 1/2 or 1/4-watt resistor. Radio Shack can supply a 20-foot spool of cable (278-512) and 5-packs of the resistor (271-1356 for the 1/4-watt; 271-1134 for the 1/2-watt).

Finally, you'll require two connectors that mate with the input of your VTVM. In the case of the RCA instruments, these are screw-on mic connectors of the type we used to call "Amphenol connectors." To my knowledge, they are no longer manufactured, but they were made and used by the thousands in years gone by. Cruise the tables at any electronic flea market, keeping your eyes on the tangles of wire in boxes under the tables. You should eventually be able to find a couple of lengths with such connectors attached.

If you are impatient to proceed and don't mind bastardizing your equipment, you might consider removing the Amphenol input connector and substituting a standard 1/4-inch phone jack (Radio Shack 274-252 or equivalent). Then you can use standard 1/4-inch phone plugs (Radio Shack 274-1536 or equivalent) on your test leads. The old Heathkit VTVMs, and probably others as well, were equipped with 1/4-inch phone jack input connectors.

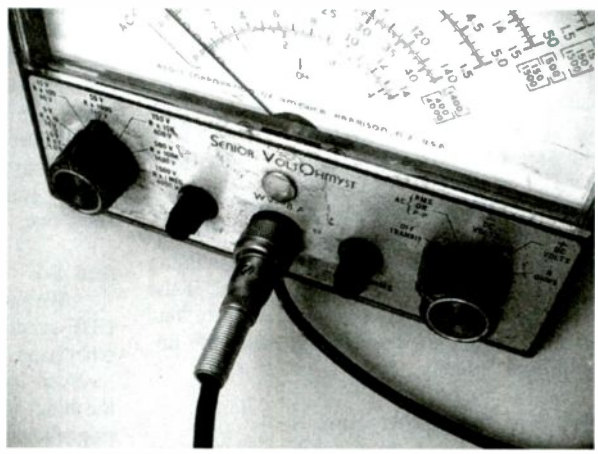
❖ Putting the Probes Together

Cut yourself two lengths of mic cable about 3-feet long each. Skin back one end of each, allowing about an inch of the insulated center wire to extend past the shield braid. Cut the insulation of each wire back about 1/4 inch. Remove all but 1/4-inch or so of wire from each end of a 1-megohm resistor. Solder one end of the resistor to the back of one of the test prods. Solder the center wire of one of your mic cables to the other end. Do not connect anything to the cable's shield braid. Slide one of the plastic handles, or barrels, up the wire and over the resistor, screwing it in place over the probe. Now solder the exposed center wire of the other cable directly to the back of the other test prod, slide the other plastic barrel up the wire and screw it in place over the probe.

Skin back the insulation of the other ends of both cables in similar fashion to the ends you've just connected. However, this time you will be making connections to the shield braids as well as the center conductors, so be sure some of each braid is exposed. If working with "Amphenol" connectors, loosen the set screws holding the strain relief springs in place, then remove the springs and slide them over the ends of your cables.

Solder the braids to the ends of the springs that will be inserted into the connectors. Cut the insulated center conductors long enough so that an exposed quarter-inch of wire at the end just passes through the solder eyelet in the center of the connectors when the springs are inserted all the way into the bodies of the connectors. Tighten the spring-retaining set screws and solder the center conductors. If working with quarter-inch phone plugs, connect the cables to them as you would any shielded cable, with the shield braid going to the ground (sleeve) of the plug and the center conductor going to the tip.

Use the probe without the series resistor for measuring resistance and a.c. voltage; use the probe with the resistor for measuring d.c. voltage.



To make your own probes for a Junior or Senior Voltohmist, you'll need to find screw-on Amphenol mic connectors like the one shown (center of picture). Electronic swap meets are a good source.

Clem Small, KR6A
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Scanner Antennas

There are many antenna designs from which to choose for our scanning activity. For example, there are non-directional antennas for all-around coverage; higher-gain and beams for directional, or weak-signal work; and multiband and wideband antennas for work on more than one band. So let's take a look at some of these antenna designs, and what they offer us. This discussion will consider primarily VHF-UHF scanning, but be sure to note the closing comments concerning HF, or lower-frequency scanning.

Antennas for Handheld Scanners

Starting Small:

When an ordinary, telescoping, whip antenna is extended vertically, it is essentially non-directional such that it gives all-around reception. In many areas the signals you may want to monitor will be of sufficient strength that a whip gives you satisfactory reception. Actually, even the smaller stubby, baby duck; full-sized, rubber-duck; or the extra-long, rubber-goose antennas can give you the signals you want in situations where signal strength is adequate for their performance. So, before you spend the bucks for a more expensive antenna, check out the performance of these simpler types. And, believe it or not, some folks get satisfactory reception with only a short piece of wire for their scanner antenna.

For the Weaker Signals:

If the smaller antennas don't give you the kind of reception you want then you may profit from some of the extended whips such as the 1/4 wave, 1/2 wave or 5/8 wave models. Often these antennas will give a beneficial increase in received signal strength as compared to smaller antennas. But the longer the antenna the more unwieldy it is. The 1/2 wave, and especially the 5/8 wave, can be very inconvenient to use, especially if you want to walk around while using the receiver.

Another option for improving signal strength with whips or the shorter antennas is the addition of a ground plane wire. Just about any light wire will work. Cut it to be about 1/4 wavelength at the center frequency of the band you are using:
1/4 wavelength L(feet)=234/frequency(MHz), or
L(meters)=71.3/frequency(MHz)

Clip the wire to the metal outer part of the antenna connector. Or, if the wire is thin enough, just slip the wire against the connector on the receiver before you put the antenna on, and let the antenna connecter hold the wire in place. At times these wires will significantly improve reception.

A more expensive option for increasing antenna performance is the antenna-mounted preamplifier. For some weak-signal work these amps can improve reception.

Mobile Scanner Antennas

Antennas can be permanently mounted on a vehicle, but it is most common to use antennas with removable mounts such as magnetic bases, or clamp-on bases. Common mounting positions include the vehicle's roof for magnetic mounts, and rain gutter, top luggage rack, or trunk lid for clamp-on mounts.

Some mobile antennas mount on the windshield or rear window outside the vehicle, and feed the signal directly through the glass (capacity coupled) with no hole in the glass needed. A different design has its elements glued flat against the windshield inside the vehicle in an inconspicuous manner.

Yet a different approach is to use the vehicle's existing AM-FM, broadcast, whip antenna as the scanner antenna also. This is done by adding a signal splitter to the antenna's feedline. Outputs on the splitter then feed signals to both the AM-FM receiver, and to the scanner.

Most vehicular or marine mobile antennas are some variant of the ground plane antenna. As the table shows, increasing gain over the quarterwave ground plane antenna can be had from the halfwave, 5/8 wave, and collinear ground plane antennas.

Scanner Fixed-Station Antennas

As you probably know, the VHF and UHF bands where scanners typically operate are known for "line of sight" reception. For this reason raising your antenna so that it can "see" farther toward the horizon will often result in a useful improvement in reception. Usually this means mounting the antenna outside on a mast, or building. But moving to a higher floor inside a building can sometimes help. On the other hand, if the antenna isn't raised high enough to clear its "line of sight" to the station scanned, then little improvement is likely.

Non-Directional Antennas:

Whereas handheld and mobile antennas are almost always non-directional, both directional and non-directional designs are popular for fixed-station operation. The most popular non-directional, base-station antenna is the vertical, 1/4-wave, ground plane antenna. This old workhorse provides good non-directional support for many scanner installations.

The discone antenna provides a non-directional, very wide-band coverage. Some discones have a vertical ground plane element atop their disc, giving the antenna even wider frequency coverage. If you are dealing with weak signals then the gain provided by the halfwave, 5/8 wave, or especially the collinear may be desirable.

Directional Antennas:

Often more important than gain level itself, is the fact that increased gain means more directivity, and that usually means less noise and interference. For use on a specific band we would usually select a Yagi-Uda, or perhaps a cubical quad beam. For multi-band operation there are some multi-band versions of these designs. If we want to cover a very-wide portion of RF spectrum with one beam then a log-periodic dipole array (LPDA) may be just the thing we are looking for.

There are some models of active antennas which cover the common scanning frequencies, and these are useful in a fixed-location station when it is not possible or practical to mount antennas outdoors. If there are very strong signals at your location, however, active antennas may have problems with intermodulation, or desensitization.

Scanner Antenna Polarization

You have no doubt noticed that it is common practice to mount scanner antennas with their elements oriented vertically. This is because most VHF-UHF communications utilize vertical polarization. If you mount your antenna with its elements oriented horizontally it will probably reduce the strength of many VHF-UHF signals. But, since polarization doesn't always remain vertical, an antenna tilted at about 45 degrees from vertical sometimes outperforms a vertically-oriented one.

And So:

We have dealt with the more common VHF-UHF scanner antennas in this column. On the other hand, a number of today's all-band and HF receivers include a scanning function. In general the things true of VHF-UHF scanner antennas are true of lower-frequency antennas also. The differences are primarily due to the fact that lower-frequency signals are not limited to line-of-sight propagation as are VHF-UHF signals, and to the larger size of the lower frequency antennas.

For example, HF 1/4 wave handheld anten-

This Month's Interesting Antenna-Related Web site:

This site compares 1/4 and 1/2 wave vertical antenna patterns:
http://www.williamson-labs.com/antenna.htm

Here is an antenna tutorial with an on-line calculator for antenna-element length:
http://www.qsl.net/kd4sai/antenn.html

nas are quite impractical, and at MF or lower they would be absurdly longer. Similarly, HF mobile whip antennas are essentially limited to 1/4 wave. If 1/2-wave and 5/8-wave designs are used on HF they must be shortened by inductive and/or capacitive loading. Below HF, significant loading is always needed if resonant antennas are to be used. And lower-frequency antennas are typically mounted on the vehicle's bumper rather than its roof.

RADIO RIDDLES

Last Month:

I said: "Actually there were "antennas" in existence before Henry's or Franklin's use of antennas. These "antennas" were naturally occurring phenomena, and they received the EM (electromagnetic) waves emitted by lightning over the eons of pre-historic time. And the lightning must have utilized some kind of transmitting antenna from which the waves were propagated – right? What were these natural antennas which co-existed with the dinosaurs, and even earlier?"

Well, as lightning bolts occur, they conduct in a column of ionized air which can be called a "plasma." The use of such conductive plasma as an antenna for spacecraft has actually been demonstrated, and studied experimentally by utilizing the ionized exhaust gasses of space rockets as an antenna.

Living vegetation, although not a really-good conductor, will conduct electrical current. And so this vegetation acts as an antenna when encountered by EM waves. In fact there are a number of reports, including one by this author, of utilizing living trees as vertical antennas (they sometimes work quite well). This is accomplished by connecting feedlines to the tree's conductive layers beneath its bark. And so, although mankind was not involved in producing or receiving the ancient EM waves involved, obviously there was natural radio transmission and reception occurring in the age of the dinosaurs and before.

COMPARISON OF TYPICAL VALUES OF ANTENNA GAIN

REMEMBER:
1. THESE GAIN VALUES ARE IN dBd WHICH USES A HALF-WAVE DIPOLE FOR THE ZERO REFERENCE POINT
2. RADIATION AND RECEPTION PATTERNS WHICH SUPPORT REJECTION OF NOISE AND INTERFERENCE CAN BE MORE IMPORTANT FOR GOOD RECEPTION THAN LEVEL OF GAIN.
3. SURPRISINGLY LOW GAIN IS SUFFICIENT FOR MANY APPLICATIONS

HANDHELD/MOBILE		FIXED STATION	
TYPE	APPROX. GAIN	TYPE	APPROX. GAIN
STUBBY DUCK	VERY, VERY LOW	1/4 WAVE GROUND PLANE	-1.8 dB
RUBBER DUCK	VERY LOW	DISCONE	COMPARABLE TO GROUND PLANE
RUBBER GOOSE	LOW	1/2 WAVE GROUND PLANE	0 dB
1/4 WAVE	-1.8 dB	1/2 WAVE DIPOLE	0 dB
1/2 WAVE	0 dB	5/8 WAVE GROUND PLANE	1.2 dB
5/8 WAVE	1.2 dB	8-ELEMENT COLLINEAR	6 dB
ADDING A GROUND PLANE WIRE	SOMETIMES ADDS USEFUL GAIN	2-ELEMENT CUBICAL QUAD	7 dB
ADDING AN ANTENNA PREAMPLIFIER	SOMETIMES ADDS USEFUL GAIN	LPDA	7 dB
		3-ELEMENT YAGI-UDA	8 dB
		3-ELEMENT CUBICAL QUAD	10 dB
		7-ELEMENT YAGI-UDA	14 dB
		ACTIVE ANTENNA	GOOD GAIN LEVEL DEPENDING ON MODEL AND ANTENNA ELEMENT

This Month:

We've just talked about "scanner antennas." Now what is a "scanning antenna"? Hint: This is not just another name for a "scanner antenna."

You'll find an answer for this month's riddle, another interesting, antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then, Peace, DX, and 73.

Bob Parnass, AJ9S
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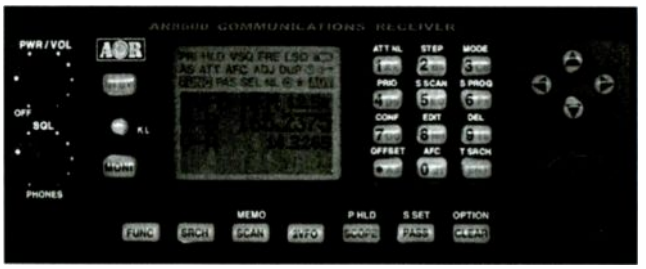
http://www.parnass.org

AOR AR8600 Mark 2 Receiver

The AOR AR8600 Mark 2 is a wide coverage, multimode receiver built in Japan. It is an improved version of the AR8600 we reviewed in April 2001 *MT*. Except for a "Mark 2" gummed label affixed to the cabinet top, the AR8600 Mark 2 looks identical to the original AR8600. Both models are furnished with the same manual, though the Mark 2 comes with a two-page update sheet.



The AR8600 is both a shortwave and VHF/UHF receiver, and frequency coverage has been expanded to 0.1 to 3000 MHz versus the earlier model's 0.53 to 2040 MHz limits. Three AM bandwidths, three FM bandwidths, CW, USB, and LSB are supported.

The AR8600 is powered by 12 - 14 VDC or from the AC mains using the provided wall wart power supply. A telescoping antenna and a tiny, removable AM broadcast antenna are included.

Extra cost options include a dealer installed eight AA 700 mAH NiCd battery pack and "slot" cards which can be plugged into edge connectors on the rear panel. Cards available are: TE8200 tone eliminator, CT8200 CTCSS squelch, VI8200 inversion descrambler, RU8200 20 second audio recorder, and EM8200 secondary memory. An optional mobile mounting bracket (MM8600) is available, as well. We tested AR8600 serial number 551213, but have none of the options to evaluate.

VFOs, Memory, Scanning, and Searching

The AR8600 has two VFOs and displays the frequency of both simultaneously. The tuning step size is more flexible than found in most receivers. It is adjustable, regardless of emission mode, in 50 Hz increments up to 999.95 kHz, with an additional choice of an exact 8-1/3 kHz. Though the procedure requires some effort, you can offset the AR8600 tuning if you want to tune only the interstitial channels, e.g., use a 25 kHz step size to tune 470.0125, 470.0375, 470.0625, etc.

The VFOs are handy for general band tuning or searching, using both VFOs to designate upper and lower limits. Our AR8600 often stops a few kHz away from a signal's center frequency. Up to 50 frequencies may be skipped. The AR8600 will not stop on signals within 10 kHz of designated skip frequency.

In addition to searching between the VFO limits, there are 40 pairs of search limits available. They can be linked together, though the step, mode, and attenuator settings can differ for each one. Each search bank also supports up to 50 "pass" (skip) frequencies.

An Auto Store facility stores active frequencies into a memory bank. The AR8600 stops on the active frequency during an Auto Store and you can hear the audio. It will not resume searching until end of transmission, depending on the search settings.

The 1000 memory channels are divided into 20 banks, designated A, a, B, b, etc. Initially, each bank has 50 channels, but you can reapportion 100 channels between bank pairs. For instance, bank A can contain 15 channels and bank a can hold the remaining 85 channels.

An alphanumeric label can be programmed for each memory channel, memory bank, and search bank. Banks can be scanned individually or in combination.

A Solid Build

The AR8600 Mark 2 is ruggedly built in a clamshell metal cabinet with cast metal front and rear panels. It "feels" like an expensive radio and won't walk off the desk when keys are pressed. One can easily envision a Mark 2 installed inside a police surveillance van or emergency communications truck.

The tuning, volume, and squelch knobs are rubbery and easy to grasp.

The green LCD display and keypad are brightly lit, and you can adjust the LCD contrast to suit. The Mark 2 has a new option to turn on backlighting for a few seconds after the squelch opens or a key is pressed. We would have preferred that the light remain on for the duration of a transmission instead of timing out.

A standard DB9 connector is fitted on the rear panel so a computer may control the AR8600 Mark 2. AOR wisely documents the computer commands in the radio's operating manual. The manual update sheet mentions the AOR Workshop PC software (for Windows) available for free download (**http://www.aoruk.com**), but we haven't used it.

A 10.7 MHz IF output jack is provided and enabled in WFM mode. Enabling it for other modes is an operation which "should be carried out in a workshop," but the user manual doesn't tell how. An odd, 8-pin jack on the rear provides unfiltered detector output, high and low level audio outputs, but the Mark 2 no longer provides the same tape recorder switching connections as the original AR8600. AOR doesn't include the mating connector with this kilobuck radio.

Performance

Our AR8600 Mark 2 performs fairly well on VHF/UHF, though we confined testing to frequencies below 1300 MHz. The image rejection, audio, intermod immunity, and sensitivity are on par with good scanners. The Mark 2 hears intermodulation products in the VHF high band from a NWR 162.4 MHz transmitter, as do our Radio Shack PRO-2006 and Uniden BC9000XLT. The "old faithful" ICOM IC-R8500 is unaffected.

Audio output power is usually specified as some number of watts or milliwatts at 10% distortion. Our Mark 2's audio distortion was less than 2%, even with the volume control at full rotation. We connected the receiver to a noninductive 8-ohm resistive load

instead of a speaker while making this measurement.

With a 12 channel/sec scan rate and 24 step/sec search rate, our Mark 2 is not a fast scanner.

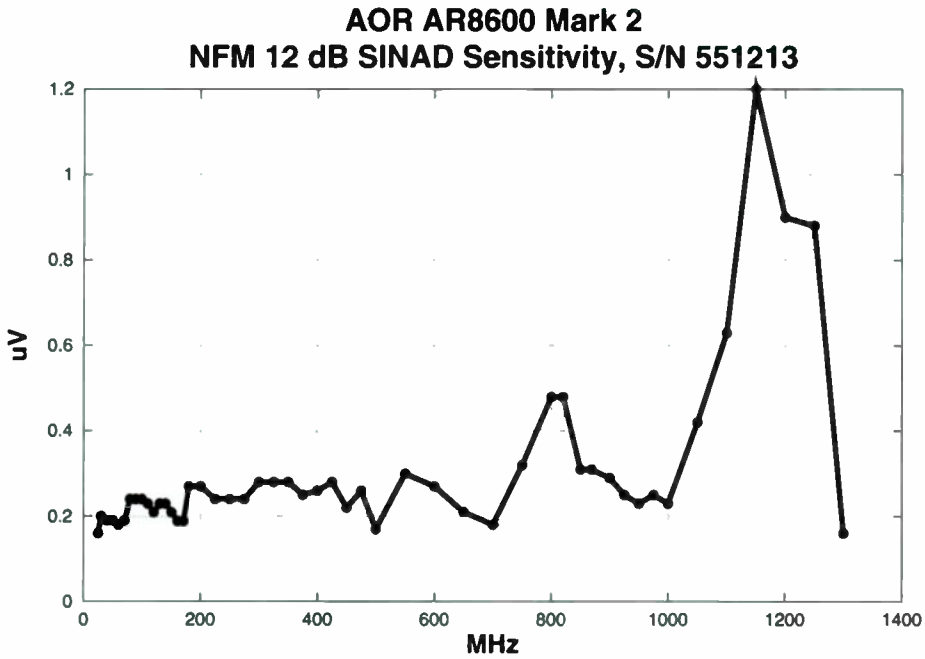
AM BCB reception using the small plug-in "dorsal fin" antenna is disappointing. Our minimalist AM/FM portable radios are more sensitive.

We used the AR8600 Mark 2 on shortwave side by side with a Japan Radio NRD545 (s/n RG05179) and ICOM IC-R8500 (S/N 01075). They shared the same 132-foot center fed Zepp antenna.

Our AR8600 Mark 2 overloads below 30 MHz without attenuation and is severely stricken with AM broadcast intermod. The Mark 2's built-in attenuator does not completely eliminate the problem, but reduces it better than in the original AR8600. The more expensive NRD545 and IC-R8500 are nearly intermod free under the same conditions.

Finicky Squelch

The squelch has three modes: carrier operated, voice operated, and signal strength. The squelch tail is slightly longer than our AR8600 during FM reception in normal operation. Our Mark 2's squelch threshold varies by mode and that means that scanning channels with a variety of modes (e.g., NFM, SFM, AM, NAM) requires a compromise squelch setting. The squelch doesn't close consistently in SSB when using it in the carrier operated mode, regardless of the squelch knob position. Luckily, the voice activated squelch mode works well during SSB reception unless it becomes confused by a high noise level, e.g., 4 MHz band conditions on a summer night.



Measurements

AOR AR-8600 Receiver S/N 551213

List price $999
AOR U.S.A., INC.
20655 S. Western Ave., Suite 112
Torrance, CA 90501
Phone: 310-787-8615
Fax: 310-787-8619
http://www.aorusa.com

Frequency coverage (MHz):
0.1 - 3000

Steps: 0.05 kHz - 999.95 kHz
in 0.05 kHz increments

NFM modulation acceptance: 7.7 kHz

Attenuator:
15 dB @ 14 MHz
15 dB @ 40 MHz
15 dB @ 155 MHz
14 dB @ 460 MHz
14 dB @ 860 MHz

Intermediate Frequencies (MHz):
1) 243.85 or 754.85
2) 10.7 or 45.05
3) 0.455

Audio output power, measured at speaker jack:
400 mW @ 2% distortion

Squelch tail near threshhold (1 uV @ 155 MHz): 40 ms.

Practical memory scan speed: 12 channels/sec.
Search speed: 26 steps/sec.

Wrapup

The AR8600 is solidly built. The wide spectrum coverage, front panel illumination, flexible step sizes, and adjustable memory banks are assets we'd like to see in more receivers. It oozes with features and options, but the multiple keypad sequences make the AR8600 Mark 2 difficult to use and program. Changing the mode and step size requires several key presses. The 143-page AR8600 manual is much more comprehensive than the Yaesu VR5000 manual, despite a few omissions.

The most important improvement in the Mark 2 over the original AR8600 is in reception below 30 MHz. Our Mark 2 is quite usable for shortwave reception when teamed with an external, adjustable attenuator and an outdoor antenna. The original AR8600 was more easily overloaded, and we could not find the right balance of attenuation and antenna.

The Mark 2's VHF and UHF performance is on par with other scanners. Listeners with more space should consider an ICOM IC-R75/Uniden BC780XLT combination alternative.

The AR-8600 Mark 2 receiver is available for $889.95 from Grove Enterprises, 7540 Hwy 64 West, Brasstown, NC 28902; 800-438-8155 or email order@grove-ent.com.

John Catalano, PhD
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Do Unicorns Exist? Another Look at OCR

A few days ago I was rambling through Wal-Mart's electronics department when I came upon a Canon Inkjet printer and scanner combo for $88! I reflected on my first image scanner, which I purchased after much negotiating for $250. "Boy," I mused, "the printing and imaging side of personal computers have really come down in price."

I thought back to a few years ago when we looked at optical character recognition programs (OCRs) in this column. The idea was that using OCRs we could take written frequency lists and load them directly into receiver control programs. This avoided the boring, time-consuming reading and typing of hundreds of lines of frequencies and their associated descriptions. That was the idea.

But back then we found that the theory had not caught up with practice. The resulting OCR processed files had so many mistakes it required lots of manual correction, almost to the point of uselessness. So what is the state of OCR development in 2002? Today's answer was quite a surprise to me.

Some Things Never Change: Some Do

When searching for OCRs programs a few years ago I considered cost a major factor. (No surprise there.) For most of us $100 is the absolute maximum that we would consider paying for such a program. Cheaper is better. And free, of course, is best. I used this same approach in choosing the two OCR programs we will try out in real world tests, using pages from *Monitoring Times*.

When I started the *Computers & Radio* column, dinosaurs ruled the earth, there was no mention of the use of computers in the radio shack by any other *MT* or *PopCom* columnist; the main source of frequency information was paper magazines such as *Monitoring Times* or *Popular Communications*.

Today, although *MT* still publishes timely shortwave broadcast, utility and scanner frequencies, many frequency files are also available over the Internet. *Monitoring Times* is now available in a downloadable software form. (See **http://www.groveenterprises.com/mtexpress.html**). These downloads are in a PDF format so require some manipulation to be imported into most radio control database programs.

However, for those of us that still gather frequencies from the printed page, a highly accurate OCR would be worth its weight in gold. Does such an animal exist, or is it the fictitious unicorn of the programming world?

How OCRs Work

An OCR is a program which starts with scanned optical *image* of letters and numbers. In this form the file is a picture image, not text. The OCR, using its own pattern recognition engine "smarts," attempts to break the single image down into many hundreds/thousands of text characters. Finally, it converts the resulting characters into a standard text or word processing data format.

The common problem we encountered a few years ago, that disqualified OCRs was their inaccuracy. By inaccuracy we mean, how well does its brain recognize and convert the image into text? Does an image of the word "NORAD" result in the text "NOMAD"? Or does the image of "287.801" get converted into numbers "207.001? This has occurred numerous times in past OCR program tests.

A few years ago we found the best accuracy that could be repeatable achieved was about 75%. That means that you may lose up to one-quarter of the original frequency file data. Or, it requires careful reading to catch and correct the mistakes manually. That was just not acceptable. And what about now, you may ask? In 2002, spending less than $100, what kind of accuracy can we expect routinely?

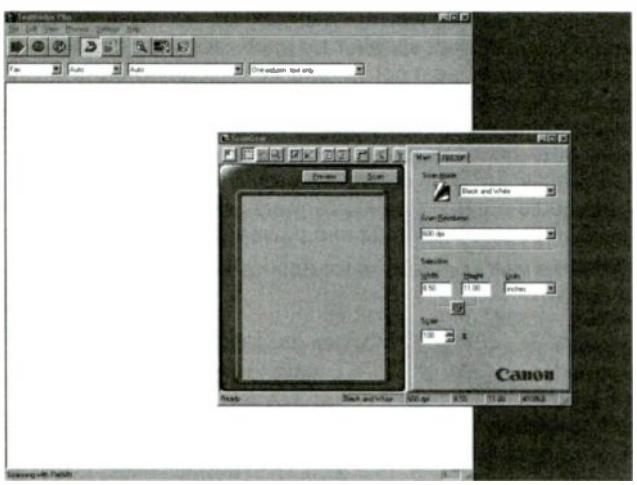


Figure 1 - The Start Scan Screen Which TextBridge Had Problems Finding

Hunting Unicorns in 2002

After searching magazines and surfing the web I decided to try two OCRs. The first one, TextBridge Plus, came free with my Canon optical scanner. "Free" being the key factor in its choice. A commercial program by Cognitive that touted an accuracy of 99% – Cuneiform 99 OCR – was chosen as the "best under $100" program.

Using a very inexpensive Canon FB 620P optical scanner, attached to the printer port of a Pentium II laptop, I skeptically began the tests. For all tests I used page 20 of August 2002 **Monitoring Times**. This page, from Larry van Horn's column, is an extensive list of UHF military frequencies currently in use and their associated descriptions.

This page was chosen for a number of reasons, including its multi-columns, use of a font that's close to the smallest that one might encounter in a magazine, and finally, because I'm interested in UHF military monitoring (one of the best reasons).

Free is Good

A Xerox program, TextBridge Plus, version 1.0C, came bundled with the Canon scanner and is on a CD-ROM. A search on the Internet for TextBridge indicated that Scansoft now owns it. Although I emailed Scansoft (**http://www.scansoft.com**) concerning an update, I have not received any further info from them.

A Bridge Too Far?

The TextBridge loaded quickly from the CD, but it seemed to have a bit of trouble communicating with the scanner. After a few tries, the "Start Scanning" screen did not come up. After a number of tries I realized that the problem was that it was displayed behind TextBridge's screen. See Figure 1.

Therefore, in order to actually proceed with the process I had to minimize the TextBridge screen to reveal the Start Scanning screen. Knowing this little trick was key in using TextBridge.

Under the pulldown menu at the top of the page "Preview" is clicked. Then the "Go" button at the top left is clicked to start the OCR process. The scan was started at 300 DPI (dots per inch) and the result was displayed on

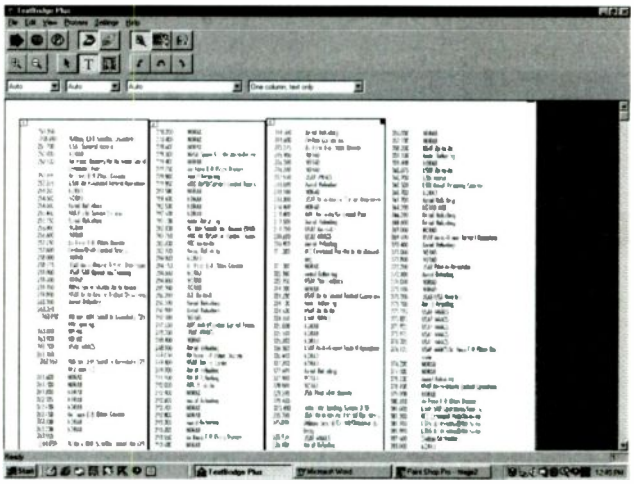


Figure 2 - TextBridge's Preview Screen with Three of the Four Columns Manually Formatted by the User

the TextBridge screen as an image of the page. The result is displayed on the main section of the TextBridge screen.

Figure 2 is the TextBridge Preview screen displaying the scanned image. The last phase of operation is to set up the format of the end product text file. In this case I wanted the four frequency-description columns to be displayed in a single column. This allows easier importing of the file into a receiver control program.

Using the cursor the columns were cut up into four sections. See Figure 2. Then the OCR process was begun.

Oops!

Upon investigation of the OCR processed image using the magnification function on the toolbar, a problem surfaced. The frequency listed after 279 was 200 instead of 280. And all the 280s had been changed to 200s! Many other similar mistakes were noted.

Clearly, the recognition process was picking up the image of the eight and mis-recognizing it as a zero. The problem was fixed by re-scanning at 600 DPI and then re-processing the image. Comparing the result to the original showed an almost perfect match.

Paying for an OCR

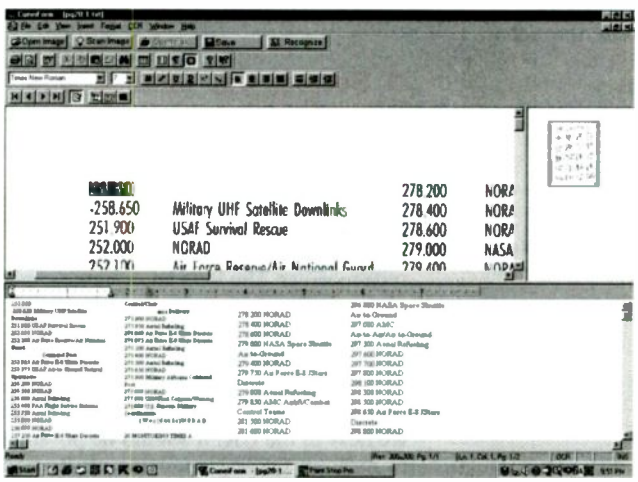


Figure 3- Cuneiform 99 OCR version 5.0 Screen. The Top Section Displays the Scanned Image. The Bottom Section Display the OCR Processed Text File.

Figure 3 is the business screen of Cuneiform 99 OCR version 5.0. A free limited-time-use trial version of the program can be downloaded from Cognitive's website at **http://www.OCR.com**. The 5 MEG self-extracting file took a while to download. Installation was fast and went without a hitch.

The program was very well behaved and had no problems accessing the Canon scanner Start Scan screen. The scan of the now famous page 20 was performed at 300 DPI to judge the difference in the recognition engine relative to TextBridge.

Once scanned, the image is displayed in the top section of the screen. See Figure 3. Clicking on the "Recognize" tab at the top right of the screen starts the OCR process. The next screen that is displayed gives the user a number of choices. Manual Layout was chosen so the number of columns in the final file could be defined.

Cuneiform gives many more user defined features and functions. But we are just trying to get by with the bare minimum to get our first importable file.

How Did It Work?

In an answer – Great! Even at the 300 DPI scan Cuneiform performed perfectly! The OCR engine was not only accurate, but very fast. I tried over 25 scans and every one operated without a problem and produced perfect results.

Comparing the Two

Both TextBridge Plus and Cuneiform were sensitive to skew. By skew we mean how far off from perfectly vertical and horizontal of the initial page is aligned. TextBridge appeared to stop performing at a smaller skew angle than Cuneiform.

Cuneiform's recognition engine's ability to deliver perfect results at a 300 DPI scan, as compared to TextBridge's required 600 DPI scan, speaks for itself. This may account for Cuneiform's high accuracy.

TextBridge Plus had a difficult time in consistently handling the scanner driver interface. Cuneiform had no operational problems.

In my opinion as a new user, TextBridge allowed easier custom composition of the resulting file.

Where Can I Try/ Buy Them?

A trial version of OCR 99 is available for downloading at **http://www.OCR.com**. Cognitive has reduced the price of Cuneiform OCR 99 to $69 for a limited time. As a paying customer you will receive by email a registration code which will take away the 14-day operating limitation of the trial version. Tell them you saw it in Catalano's *MT* column and they will honor the sale price at least till the end of October 2002.

Cuneiform OCR 99 comes capable of English recognition plus eight additional languages and spell checkers. An eastern European language version is also available.

TextBridge is now a product of Scansoft. Their website is **http://www.scansoft.com/textbridge** and offers the new version of TextBridge, Pro 11, for $79.99. They claim that this version is "50% better" than their previous version. As I previously said, I emailed Scansoft concerning TextBridge but have yet to receive a reply.

The Unicorn IS Real

One thing is for certain. OCR technology is now quite real and useful. OCR programs have come along way in the past few years. They warrant another look for applications in radio monitoring as well as business and other personal applications. Their accuracy and easy of use make them a real gateway to the paperless radio shack or office.

Now, using OCR, we have the printed data converted into an electronic file which we must import it into our radio control databases, such as ScanCat. Next month we'll try importing into to a few different radio control database programs. I expect to be having a few frustrating and keyboard pounding sessions before next we meet. Till then, I hope the Great Pumpkin is good to you!

A Longwave Band Ferrite Antenna

By Richard Q Marris G2BZQ

This project involves building a sensitive, directional, longwave ferrite loop antenna covering 150 kHz to 300 kHz. Using this loop indoors with a good receiver (from my location in Central Southern England), it has been possible to receive just about all the longwave AM broadcast stations, which are located throughout Europe, N. Africa and the Middle East; and a good distance into greater Russia. (*See this month's feature article.*) In addition, of course, various beacons have been heard at the HF end of the frequency range (those in N. America being blanketed out by the high power AM broadcast stations).

North American listeners should have good luck picking up beacons with this antenna. Those on the East Coast may be able to tune in some European broadcasters as well, when conditions are favorable. For potential US longwave targets, regularly check Kevin Carey's *Below 500 kHz* column.

General description

This ferrite loop uses a 15" long x 3/8" diameter (61 mix), ferrite rod. It is simple to construct. The schematic (Figure 1) shows the ferrite rod, passed through the core of L1 and L2. L1 is the tuning coil resonated by a variable capacitor (VC), which, on the prototype, was a metal frame 250 pf unit . L1 + VC are coupled to the antenna input socket of the receiver by a length of RG58 coaxial feedline connected to coupling coil L2.

The tuning capacitor and coaxial socket are fitted into a convenient size plastic box, which also serves as the base of the loop antenna.

Construction

The ferrite rod, which is 15" long x 3/8" diameter, is constructed from two 7-1/2" long x 3/8" diameter 61 mix rods, which were obtained from Amidon Associates. Other sources of supply are no doubt available, and at least one supplier – Antique Electronic Supply – offers such rods, with and without winding on them. (The windings can be removed.)

The two rods are adhered, end to end, by thoroughly cleaning one end of each rod, using glass paper. Then the rods are glued, end to end, with Super Glue. This glue sets in a few seconds, and you do not get a second chance if the result is not absolutely straight. Therefore, it is suggested that a few practice "dry runs" are tried out, before actually applying the adhesive.

The coil bobbin (figure 3) is a standard reel used to supply small quantities of enamel and tinned copper wire. These bobbins are made of a plastic material, with two 1-5/8" diameter cheeks, with the inner surfaces 1" apart. The actual body of the bobbin is a tube with 7/16" inside diameter, so that the ferrite rod conveniently slides through it.

The two windings, L1 and L2, are wound onto this bobbin. It is essential that the correct wire be used. This is 1/0.6 mm (1.2 mm o/d) PVC covered wire. The use of PVC covered wire is a convenient way of spacing the wire turns and providing the correct gap between wire and ferrite rod.

First, wind on L1, which consists of 10 layers of 20 turns, per layer, closewound, giving a total of 200 turns. The inner end of the winding should be brought out, through a small hole, in the side of the bobbin cheek. Over this winding, wind on four layers of PVC insulating tape. Over this, wind on 11 turns, closewound, of the same wire; and over the whole assembly, wind more PVC tape. The winding detail can quite clearly be seen in Figure 3, with the turns details alongside Figure 4.

The Variable Capacitor used was a salvaged 250 pf air spaced affair, with solid metal frame. However, any capacitor up to 500 pf can be used, with the effect of extending the frequency down, a few kHz. A simple slow motion drive, fitted to the variable capacitor, would be an advantage. The variable capacitor is fitted in the front side of a convenient-sized plastic box, along with the slow motion drive. A coaxial socket should be inserted into the left hand end of the box.

The ferrite rod/coil assembly is mounted on a timber frame as shown in Figure 4. This frame consists of a length of timber 15" x 3/4" thick. Onto this are glued two pieces of timber, 7-1/4" x 3/4", leaving a gap between the inner ends (as Figure 4). Into the gap between these ends is fitted the bobbin of the coil/rod assembly. The ferrite rod should then be secured to the wood base assembly using a strong tape, spaced a few inches apart.

The whole assembly is then fastened to the top of the plastic box, with a couple of wood screws (Figure 2).

The ends of the two windings should be threaded through small holes drilled through the plastic box, and connected as shown in Schematic Figure 1. The device is now ready for testing.

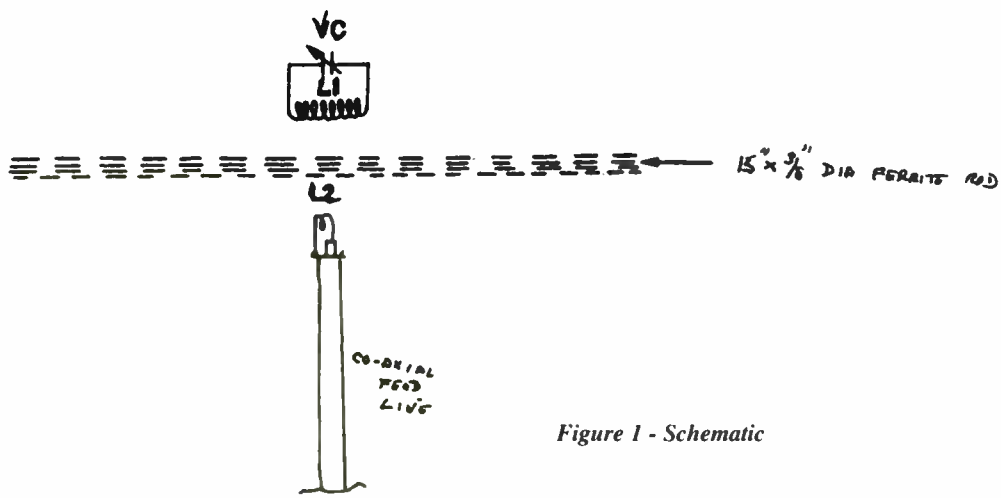


Figure 1 - Schematic

Setting Up, Testing, and Operation

The use of an extra long ferrite rod gives the benefit of increased sensitivity and directivity. A preamplifier between the loop and the receiver should not be necessary with a good communications-type receiver. The loop has a figure-eight pattern, with the minimum signal being received at the rod ends, and the maximum signal on the long sides. With all but the strongest signals, such as the multi-kilowatt AM broadcast stations we hear in the UK, it should be possible to null-out QRM (manmade noise) and much of the QRN (atmospheric noise).

The loop should be located on a non-metal table near the receiver, so that

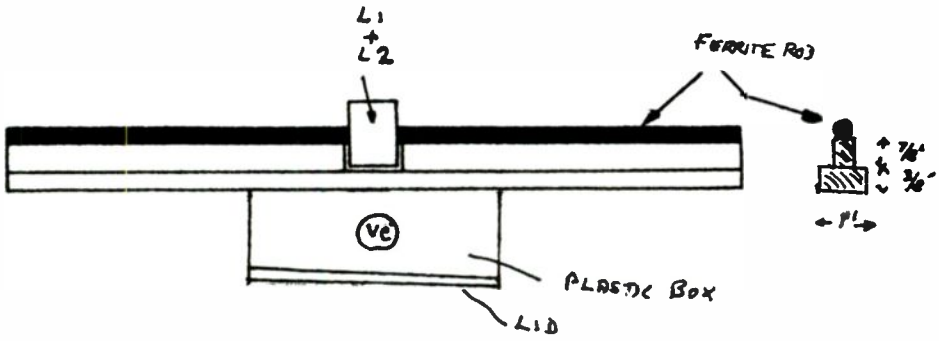


Figure 2 - Perspective of unit

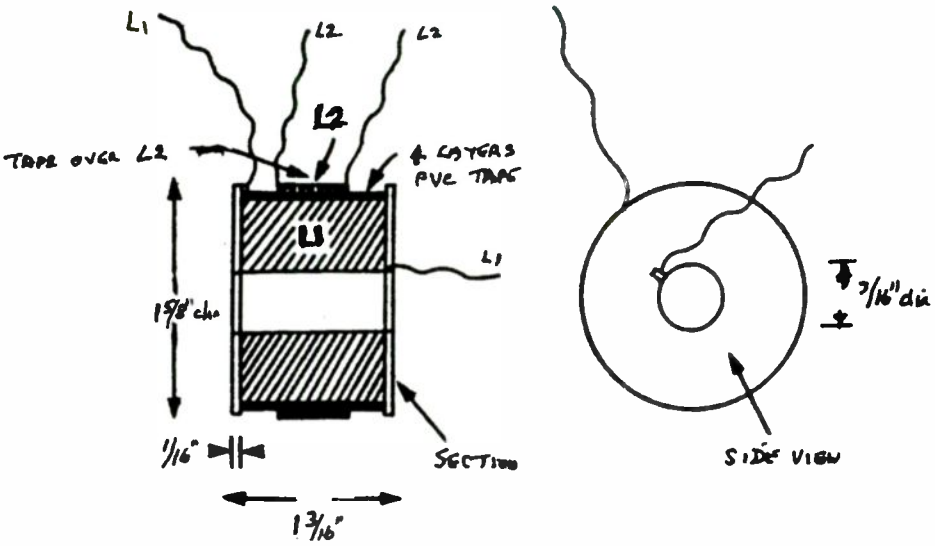


Figure 3 - Bobbin and winding details

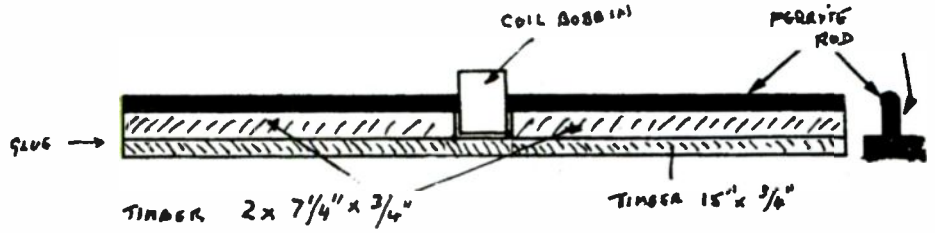


Figure 4 - Mounting and assembly of coil/rod unit

it can be rotated to improve the signal of the station being received. Here about 48" of RG58 50 ohm impedance feedline is used. Keep the loop well away from any house wiring, where it may be hidden in the walls.

Connect the loop to the receiver with a length of feedline. Tune the receiver to a station around 300 kHz, and bring the loop tuning control to resonance, which is indicated by a substantial increase in signal strength. Next, rotate the loop slowly for maximum signal, again indicated by an increase in signal strength. Next rotate the loop 90 degrees, at which point the signal should be around zero, except in the case of very high power stations, or a station located just down the road.

If the loop tuning capacitor is, say, 350 or 500 pf (in lieu of the 250 pf specified), then a slightly lower frequency can be expected below 2150 kHz.

The form of construction adopted is somewhat unusual, and, since it's low-cost and uses readily available bits and pieces, may well form the basis of further experiment by readers.

Sources:

Amidon Inc.
240 Briggs Ave.
Costa Mesa, California 92626
800-898-1883; Fax 714-850-1163
sales@amidon-inductive.com

Antique Electronic Supply
6221 S Maple Ave
Tempe, AZ 85283 USA
480-820-5411;
Fax 480-820-4643 or 800-706-6789 (US & Canada).
sales@tubesandmore.com

Digital Digest, continues from page 35

VCT Tors Cove, Newfoundland, Canada
4566.4/5289.4, 5893.0/5843.0, 6499.5/6241.5, 6523.4/6222.4, 7570.0/7389.0, 8615.0/8361.0, 8690.5/8332.5, 8723.4/8199.4, 8774.4/8250.4, 10166.4/10253.4, 13162.4/12315.4, 13914.0/13488.0, 13934.0/13514.0, 13940.0/13520 0, 13946.0/13543.0, 13983.0/13567.0, 14945.0/14658 0, 14948.0/14666.0, 16912.0/16620.5, 17237.5/16627 5, 17402.4/16520.4, 18602.0/18233.0, 18614.0/18244 5, 19786.4/18811.4, 19798.4/18823.4, 22660.5/22256 5, 22679.5/22265.5, 22694.5/22268.5, 26164.4/25089 4

VIE Darwin, Australia
6411.0/6239.0, 6464.0/6286.5, 8657.0/8358.0, 8680.5/8361.0, 8699.5/8352.0, 10455.5/10319.5, 13045.0/12466.0, 13053.5/12412.5, 13063.5/12448.0, 13066.5/12451.0, 17214.0/16627.5, 17217.0/16636.0, 17220.0/16669 5, 17240.5/16663.5, 19724.0/18865.5, 22682.5/22274 5, 22691.5/22253.5, 26124.0/25166.5

VIP Perth, Australia
4213.0/4175.0, 8419.0/8379.0, 12582.0/12479.5, 12584.0/12481 5, 16809.5/16686.0, 22383.0/22291.0

WNU Slidell, LA, USA
4210.5/4172.5, 4225.0/4185.8, 4336.4/4200.5, 4424.5/4132.4, 5077.5/4845.0, 5121.5/4848.0, 5367.0/5245.9, 6327.0/6281.0, 6334.0/6297.0, 6431.4/6256.5, 7753.0/7718.0, 7793.3/7827.0, 8672.4/8329.5, 12624.5/12522.5, 12670.4/12406.5, 12963.5/12394.5, 12966.5/12415.5, 13027.5/12391.5, 16942.0/16666.5, 17375.4/16493.4, 22451 8/22220.5, 26143.0/25169.5

XSV Tionjin, China
6484.5/6235.5, 8617.0/8346.0, 12822.0/12433.0, 17132.0/16675 5, 22688.0/22243.5

ZLA Awanui, New Zealand
4385.4/4093.4, 6456.0/6244.5, 8668.0/8643.0, 8753.4/8229.4, 12740.0/12430.0, 13147.4/12300.4, 17170.4/16651.5, 17351.4/16469.4, 19736.4/18859.5, 22469.4/22211 5, 26132.8/25138.5

ZSC Cape Town, South Africa
4214.0/4176.0, 6322.0/6271.0, 8431 5/8391.5, 12601.0/12498.5, 12644.0/12542.0, 16816.0/16692.5, 16895.0/16777.0, 18306.0/18169.5, 19689.5/18879.0, 19692.5/18882.0, 22540.0/22277.5, 26132.5/25129.5

Globe is also planning stations in Shangzou (China), Valetta (Malta), Shanghai (China), Istanbul (Turkey) and Varna (Bulgaria).

That's it for now. See you next month.

Resources

BushMail - http://www.bushmail.co.za
Globe Wireless - http://www.globewireless.com
Google Search Engine - http://www.google.com
GlobeData Modem - http://rover.vistecprivat.de/~signals/WAV/GW_single-tone.WAV

Jock Elliott KB2GQM
jockelliott@monitoringtimes.com

Cobra's Worthy GMRS/FRS Handi-Talkie

If you don't like what's going on in the world of two-way radio, just wait a minute: Cobra Electronics is bound to come out with something new and exciting before very long. A case in point is the MicroTalk PR 950-DX handi-talkie. This worthy piece of gear features 22 channels – seven FRS/GMRS, eight GMRS, and seven FRS.

In case you're not sure what all the "alphabet soup" is about, here's the skinny. Family Radio Service is an unlicensed radio service that is limited by FCC regulation to one-half watt transmitter power. As a rule, FRS handi-talkies tend to be somewhat wimpy on range, averaging about a half-mile, even though manufacturers generally claim "up to two miles." While sometimes FRS range stretches almost to a mile, sometimes it is considerably less (a third of a mile), so a half mile is probably a good rule of thumb.

General Mobile Radio Service (GMRS), however, is a licensed radio service. FCC rules require paying a fee to get a license to use GMRS frequencies. There are GMRS repeaters across the country, but most manufacturers' new GMRS offerings are simplex-only and are not capable of accessing the GMRS repeaters. Since GMRS handitalkies can have two watts of power, they generally can talk farther than FRS radios under the same condition.

The new Cobra PR-950 combines both FRS and GMRS frequencies and power levels in one radio. Here are the frequencies, the services, and the power levels:

	Frequency	Service	Power (watts)
1.	462.5625	FRS/GMRS	2 or .5 selectable
2.	462.5875	FRS/GMRS	2 or .5 selectable
3.	462.6125	FRS/GMRS	2 or .5 selectable
4.	462.6375	FRS/GMRS	2 or .5 selectable
5.	462.6625	FRS/GMRS	2 or .5 selectable
6.	462.6875	FRS/GMRS	2 or .5 selectable
7.	462.7125	FRS/GMRS	2 or .5 selectable
8.	467.5625	FRS	.5
9.	467.5825	FRS	.5
10.	467.6125	FRS	.5
11.	467.6375	FRS	.5
12.	467.6625	FRS	.5
13.	467.6875	FRS	.5
14.	467.7125	FRS	.5
15.	462.5500	GMRS	2 or .5 selectable
16.	462.5750	GMRS	2 or .5 selectable
17.	462.6000	GMRS	2 or .5 selectable
18.	462.6250	GMRS	2 or .5 selectable
19.	462.6500	GMRS	2 or .5 selectable
20.	462.6750	GMRS	2 or .5 selectable
21.	462.7000	GMRS	2 or .5 selectable
22.	462.7250	GMRS	2 or .5 selectable

You'll notice that the first seven channels are shared by the Family Radio Service and the General Mobile Radio Service, the next seven channels are FRS-only, but the last eight channels are General Mobile Radio Service only. As a result, on the very first page of the manual, Cobra clearly states that a license is required and then, on page 15 of the manual, gives more information about GMRS licensing, including the number to call to get the proper licensing forms.

❖ Physical Features

The PR-950 measures roughly 4.5 inches H x 2.5 inches W x 1.25 inches D, excluding belt clip and antenna. The case has a nicely sculpted "round" look that seems to nestle nicely in the hand. Despite the round design, there is a flat spot on the bottom of the case so that the PR-950 can be stood upright on a table if desired.

The PR-950 delivers solid performance at a reasonable price.

On the front of the PR-950 is a liquid crystal display that displays a wealth of information about what's going on with the unit. Below the LCD are four buttons: CALL, HI/LO/LOCK, MODE, and ENTER. Below the four buttons are the speaker and the microphone. Just to the right of the LCD is a Channel select button.

On top of the handi-talkie is a stout 2.5 inch flexible antenna (I call it a fat duckie), a jack for a speaker microphone (covered by a removable rubber plug), and the ON/OFF/VOLUME knob. On the back of the unit is a removable plastic belt clip and a hatch for inserting four AAA alkaline batteries or an optional rechargeable battery pack.

On the left side of the case are a push-to-talk button and the "MON" button. Press the MON button once briefly, and the liquid crystal display is illuminated for 10 seconds. Press it and hold it, the auto-squelch is turned off for monitoring faint transmissions. On the right side of the case is a jack, covered by a rubber plug, for plugging in an optional battery charger.

The PR-950 bristles with features: selectable high-low power on GMRS and GMRS/FRS frequencies, voice-operated transmission (VOX), VibrAlert, continuous-tone-coded squelch system for blocking unwanted transmissions (with 38 CTCSS codes), 10 memory locations, scan function (for channel, privacy code, and memory), battery saver circuit, 10 call button codes, and selectable roger beep.

With the PR-950, Cobra continues its praiseworthy operating scheme. The power and volume are controlled by the knob on top where it can be easily accessed even when clipped to a belt. Changing channels is a snap, thanks to the UP/DOWN buttons. Getting to the advanced functions requires pressing the MODE button and then using the UP/DOWN buttons. In all, it's an operating setup that makes doing the most common functions – changing volume or channel – really easy, yet you don't need a Ph.D. in electrical engineering to make use of the more sophisticated functions.

The PR-950 delivers crisp, clear audio on transmit and receive, and the range on high power on my test course was nearly twice what you would typically expect from an FRS unit. The suggested retail price of a PAIR of these radios (in a blister pack) is only $139.95. This is an excellent radio that delivers solid performance at a reasonable price.

MT REVIEW

Grundig's FR-200: Crank-up SWL on the Cheap!

By Ken Reitz

Last winter Grundig® entered the crank-up radio fray with its FR-200 Emergency Radio. Adding its own features such as a built-in flashlight, two bands of shortwave and a cheaper-than-anything-else price tag, the FR-200 is Grundig's biggest hit in years. And it's everywhere. From the pages of exclusive catalogs to the shelves of your local Radio Shack® store, the ubiquitous FR-200 has enjoyed strong sales throughout its first year.

The Details

The FR-200 features an analog tuner with a slide-rule dial which is operated by rotating the knurled tuning knob just to the right of the dial. A knurled fine-tuning knob is set inside the main tuning knob and really smooths out the typically jumpy analog tuning. A slot in the radio's case allows easy tuning by just sliding your thumb up and down the exposed knob.

The front panel layout is simple: There is a volume control done in the style of the tuning control, a flat round band switch which sets the tuning and two flat plastic switches which control the flashlight and power source selection. The flashlight itself is a very small bulb in a highly reflective case with a clear lens cover measuring about 1" x 5/8".

The back panel features a 25" telescoping whip antenna for FM and SW; an access door to the battery compartment in which four optional AA batteries may be placed and where the cell phone type Ni-MH power pack is neatly stowed away. Follow the wires and you'll find a plug which allows easy replacement of the pack. There is a 3.5 mm stereo earphone jack for private listening and a 4.5 volt DC power socket for an external power supply which is optional. The hand crank for the built-in generator is on the left and folds neatly away into a slot in the back of the case and sticks out about 2-1/2 inches from the case when in service.

Operating the FR-200

When I first took the FR-200 out of the box I turned it on and started tuning around. An hour later it was running strong. Two, three, four hours later it was still going. It ran, in fact, for 18 hours on that little power pack! After that it was about as dead as my chances of winning a Pulitzer prize, so I reached for the hand crank and, per instructions, cranked away for 90 seconds. A small, red LED on top of the radio lit up as I cranked. The radio, as advertised, played for 60 minutes on that small effort.

But, why did it run so long out of the box? According to Grundig Tech Support, the radios are electronically charged before they leave the factory. I found that I could expect about one hour listening for each minute of enthusiastic cranking: 5 minutes on the crank yielded about 5 hours listening. But, 5 minutes on the crank is more than many will want to do. It definitely stops being fun after 90 seconds. The light will stay on about five minutes on a 90 second crank.

So, just how was the listening? About what you'd expect from an analog tuned radio where the bandspread is tight, the antenna short and the audio is, well, audible. I found that reception on all bands was greatly improved by the addition of an external antenna. The AM band in particular benefited when the Radio Shack AM loop antenna was placed beside the FR-200 (the little FR-200 almost fits inside the loop!). Reception on that band went from poor to reasonably good. The SW bands were similarly improved when I attached an external antenna to the radio's whip.

An external antenna connection, while understandably adding to the cost, would equally improve reception on those bands and add to the radio's versatility. The FR-200 would also be improved by adding the capability to tune the NOAA Weatheradio frequencies. I realize this would cause the price to go up substantially, but, it would be a welcome and extremely useful addition.

A Fun Little Radio

The FR-200 is marketed as an emergency radio, the kind of thing you'd like to have with you when the power goes out and you find you're out of batteries, or if you're camping and need to take a look at the map and your flashlight is dead. Ok, there are plenty of reasons for this to be your emergency back-up radio, but, if you have other radios for an emergency consider this: the FR-200 is a fun little radio which might help introduce a new generation to shortwave listening and the mysteries of electricity in general. It's ruggedly built and should be able to take the kind of use a youngster might give it. I could see a couple of kids using the flashlight feature to signal each other in code from across the street. There's room to experiment without fretting, unlike with an expensive Yachtboy 400, for example.

I like the hand-powered generator feature which delivers power to the light and radio even when the internal battery pack is taken out. But, one word of caution: the pack acts like a voltage regulator in preventing too much current being sent through the unit when attempting to power it on the generator alone. I found this out by blowing out the bulb as I cranked away with the battery pack unattached. Luckily, replacement bulbs are cheap and by slipping a coin in the slot so labeled next to the light you'll be able to pop the light out and swap out the bulb.

How many charges can you get from the little Ni-MH pack? Grundig Tech Support says they have no engineering data on it, but they believe it should be able to take several hundred charges. In the event that you should need the pack replaced, it'll cost just $6.95 including postage.

As mentioned, the FR-200 is widely available but I have not seen it listed under the SMRP of $39.95. But wait, you get more! Grundig ships this radio with an operating manual in English and French, the Grundig official *Shortwave Listening Guide*, a one year limited warranty, and a rugged little camouflage canvas carrying bag with nylon liner, complete with shoulder strap, pencil side pockets, map pocket and magnetic closers. This product is made in China.

Grundig's greatest hit? The FR-200 Emergency Radio: It's cute, it's little, it's inexpensive and it comes with a darling little camo carrying bag with shoulder strap! (Courtesy Grundig Radio)

Grundig FR-200 Specifications

Size:	6-3/4" W x 5-3/4" H x 2-3/4" D
Weight:	10 oz
Tunes:	AM (530-1710 kHz)
	FM (88-108 MHz)
	SW1 (3.2-7.6 MHz)
	SW2 (9.2-22.0 MHz)
Power:	Built-in Ni-MH battery pack charged by hand crank
	4.5 V DC jack for external power adaptor (not included)
	3 AA batteries (not included)
Antenna:	25" Pivoting, telescoping whip for FM & SW
	Built-in ferrite rod for AM

What's NEW

Tell them you saw it in Monitoring Times

Grove Scanner Beam II

In the first major redesign in 20 years, the long-respected Grove Scanner Beam has been improved to provide better directivity! The Scanner Beam provides reception for 30-50 MHz low band, 54-800 MHz FM Broadcast and TV, 108-137 MHz aircraft, 137-174 MHz high band, 225-400 MHz military aircraft and satellites, 406-512 MHz UHF, and 698-960 MHz extended microwave mobile.

Boom length is 60 inches, with the rearmost element measuring 96 inches. The major lobe pattern is directional from 100-900 MHz, nondirectional outside of that range. It may be used with an inexpensive TV antenna rotator or fixed in the favored direction; local signals will still be heard from all directions.

The Scanner Beam may also be used for amateur radio transmissions up to 25 watts on VHF/UHF with 50 to 72 ohms nominal impedance.

A balun transformer, offset pipe and all mounting hardware are included (requires TV type F connector on your coax). For more information, visit the Grove Enterprises web page at **http://www.grove-ent.com,** or to order call 800-438-8155 or write Grove Enterprises, 7540 Hwy 64 West, Brasstown, NC 28902. The Grove Scanner Beam II is $74.95 plus shipping.

Radio Shack PRO-95

The newest Radio Shack scanner – due out by the end of the year – is the handheld PRO-95 dual-trunking scanner, capable of scanning trunking and conventional channels at the same time. Trunking modes able to be followed by the PRO-95 are Motorola I, II, VII, GE/Ericsson (EDACS), and analog trunked radio systems.

With 1,000 memory channels, arranged in 10 banks of 100, it has room to store several large trunked systems, as well as 1,000 ID memories to store text entries such as trunk IDs, service, etc. The backlit 4-line alphanumeric display allows text entry for easier identification of frequencies. Extended coverage includes CB, which displays the channel as well as frequency, and the 220 MHz and 1260 MHz ham radio bands. Frequency ranges are 25-54, 108-174, 216-225, 406-512, 806-960 (excluding cellular) and 1240-1300MHz.

The user can also search preset conventional police/fire, marine, CB, Ham and VHF-air frequencies for activity. The radio is equipped for SAME encoded weather alerts, which indicate the type of alert.

Triple conversion circuitry plus a switchable 20dB attenuator cut down on images. A PC interface allows cloning, not only of another Pro-95 but also with the Radio Shack Pro-2067 mobile, Pro-62 handheld, or Pro-2053 base scanner (cable and software extra).

The Pro-95 is powered by two AA batteries or AC adapter (not provided). Included are a flexible antenna, belt clip, and two battery holders. Radio Shack has priced the Pro-95 at $249.99.

APCO Scanner FCC accepted

The excitement mounts as late August brought word that the much-anticipated Uniden BC785D base/mobile scanner has passed the FCC's standards and is type accepted. Delivery is expected in the November/December time frame.

The scanner is virtually identical to the current BC780XLT base/mobile scanner, but it will be equipped to accept an optional card to activate the decoding of unencrypted APCO-25 digital communications – the first scanner to do so, though other manufacturers are close behind in their development.

Both the mobile unit and the yet-to-be-released handheld model cover the 25-512 and 806-1300 MHz spectrum (less cellular) and offer 1000 memory channels (10 banks of 100 channels each). Purchase of the BC125 digital board also provides an additional 600 memory channels. Trunking protocols supported by the basic scanner include Motorola, Ericsson (EDACS) and Johnson (LTR) systems. Pre-programmed memory includes frequencies for weather, police, fire/emergency, aircraft, marine, railroad, news crews, FRS, amateur radio, plus one user-defined bank for custom entries. A signal-watch function provides a beep alert for activity on any number of channels.

The base model includes a record-control line. Both models have CTCSS and DCS squelch readout and decoding. Computer control and/or cloning are enabled through a standard DB-9 RS232 port.

MT advertisers and equipment dealers will be offering the new BC785D scanner as soon as it is available. Grove Enterprises has priced the BC785D at $369.95 and the BC125 digital decoding board at $309.95, plus $12.95 shipping when purchase together.

Domestic Broadcasting Survey

Edited by Anker Petersen

Since my early days as an active DXer, I have relied on the excellent publication *Domestic Broadcasting Survey*. This year's expanded Fourth Edition far exceeds earlier editions, if that is possible.

In my opinion, the *DBS*, published by the Danish Shortwave Club International, is the best frequency guide for stations logged on the 120, 90, and the 60 meter tropical bands. Data includes programming information, hours, relays, IDs, language services, and transmitter information if known. Although the tropical bands remain a popular aspect of DXing, the 4th edition has also added hundreds of higher band frequencies, plus active clandestine stations.

The listings, based on hobby reports from the previous year, are current and accurate. Each station has a code classification to give you an idea how often the station has been logged. This includes frequency, power, ITU county code, and program or network details.

Parallel frequencies (a great tool for identifying a station) are given. Stale frequencies (those not heard in the past year) are gone but not forgotten – they've been transferred to a separate page.

As printing costs have risen, DSWCI has opted to publish the survey exclusively for email delivery in digital format. DXers may chose either PDF format or MS Works database.

Admittedly, much of the information is available through *WRTH* or *PTWBR*; however, the format of the *DBS* listings makes them particularly useful for bandscanning.

To order *Domestic Broadcasting Survey (DBS) 4th edition*, send seven IRCs or $5.00 currency for US orders to: DSWCI, c/o Bent Nielsen, Egekrogen 14, DK 3500 Vaertoese, Denmark. For additional information on the survey and DSWCI, consult their website at **http://www.dswci. org**.

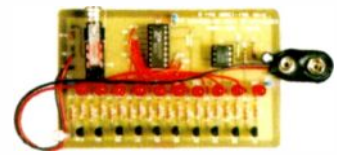
I can't imagine any serious DXer (especially us "trop heads") not having a copy of *DBS* next to his or her receiver ... I certainly do!

- Review by Gayle Van Horn

Solve Those Soldering Jitters

If you're like me, you've been reading columns by Ken Reitz and Skip Arey and Marc Ellis about nifty construction or restoration projects, but you get stopped at the mention of soldering. Vectronics, Inc. may have the solution for nervous Nellies like me: an inexpensive soldering course. For only $29.95 you can develop skills that will leave you ready to tackle a wide range of jobs – and in the end you'll have a fun blinking LED project.

The professional-grade soldering course includes theory, quizzes, PC board and components for soldering practice. It covers all of the latest tools, techniques and materials you'll need for "through-hole" style PC board assembly and repair. Short, concise lessons cover topics like solders and fluxes, product safety, soldering irons, circuit boards, and more. It does



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calls for a few basic tools – a soldering iron, cutters, pliers, wire-strippers and a small screwdriver.

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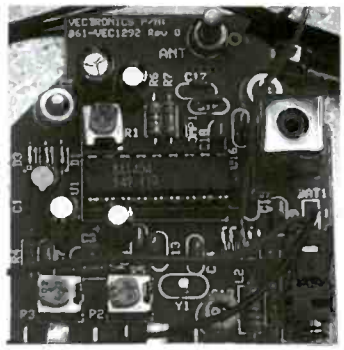
Vectronics FM Transmitter

While you're ordering the soldering course, why not order one of Vectronic's many kits so you have a project to work toward? For example, we've been reminded lately of the many ways to retransmit audio from 'most any source to your home stereo. Vectronics has an FM transmitter kit of moderate difficulty, which costs only $34.95. You can connect your scanner, CD player, tape deck, or even a microphone to the transmitter and get improved audio quality



by rebroadcasting it on a clear FM channel from 88 to 108 MHz. Uses a 9 volt battery or 5-15 vdc power source. Metal cabinet is optional. Contact Vectronics at the address above.

Southwest Frequency Guide

We haven't seen this edition in person, but the testimonials make it clear that for scanner listeners in Arizona this seventh edition of the *Southwest Frequency Guide* is a worthwhile investment. Printed on 200 8-1/2"x11" pages, the information provided by local monitors is well-presented and easy to use. The directory is set up by county and includes police, fire, government, aircraft, recreation, public utilities, and more. A shaded background highlights new or updated information.

Frequencies, radio codes, unit designators, trunked system talk groups, PL tones, maps and special agency information are included. Terminology, scanner tips, and aeronautical and fire department listener guides help you understand what you are hearing.

A travel section contains basic information and frequencies for 16 of the largest US cities.

The SWFD-7 is $34.99 plus $3.99 shipping. It's published by Scannerstuff and is available for purchase on the Internet or from local stores such as Ham Radio Outlet. The 6th edition carried the following info which may still be current (Dan Rollman, Editor, 903 S Rural Road, #101-261, Tempe, AZ 85281; 888-589-0496; fax 978-383-8950). Check out http://www.scannerstuff.com or email *info@scannerstuff.com* to check out this directory and other directories for the Pacific Northwest and Phoenix areas.

Books and equipment for announcement or review should be sent to " What's New?" c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to Rachel Baughn, editor@monitoringtimes.com

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Keaau, Hawaii

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- Don Nauer

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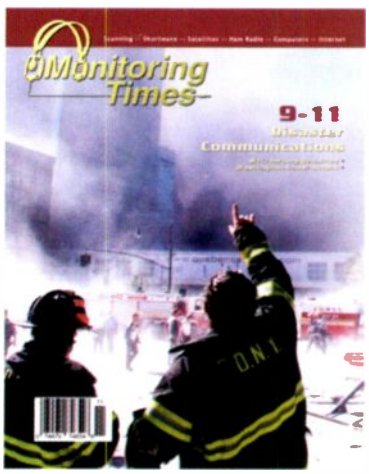

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Closing Comments

Inspector General Audit: Army MARS Not "Operationally Ready"

by Fred Maia

"Army MARS provides communications support for federal agencies in responding to emergency situations on an international, national, and local basis as an addition to normal military communications." Mission: Army Military Affiliate Radio System

The Military Affiliate Radio System (MARS) is a U.S. Department of Defense sponsored program, established as a separately managed and operated program by the Army, Navy, and Air Force.

MARS got its start in 1925 when an Army Signal Corps Captain decided to enlist the talents of volunteer Amateur Radio operators to train soldiers in the new technology of radio. The Army Amateur Radio System (AARS) continued as a Signal Corp extra-curricular activity until World War II when all amateur radio operation was suspended. There were approximately 60,000 FCC licensed Amateurs at the time and some 5600 of those Amateurs were members of the AARS.

After the war, the AARS was reactivated and two years later became the Military Amateur Radio System when the Air Force was created as a separate service. It was later renamed the Military Affiliate Radio System (MARS) in 1948. In early 1963, Army MARS and Air Force MARS were joined by the Navy-Marine Corps MARS. Each of the three MARS Chiefs is responsible for the day-to-day management and operation of their respective programs.

Army MARS Headquarters is located in southern Arizona at Fort Huachuca near the Mexican border. It is the largest of the three programs supposedly overseeing approximately 5,000 members. Air Force MARS, located at Scott AFB, Illinois, and Navy-Marine Corps MARS (which also includes the U.S. Coast Guard), located in Washington, D.C. each have an affiliate volunteer population of approximately 2,000 members.

The mission of MARS

According to the Department of Defense, the mission of U.S. Army Military Affiliate Radio System is "...to provide emergency communications on a local, national, or international basis as an alternative communications capability." Operating on military frequencies, the program relies on both civilian licensed amateur radio operators and military MARS members to provide communications support in times of crisis.

The Army MARS website located at **http://www.asc.army.mil/mars** says their mission is to "*...provide auxiliary communications for military, civil, and/or disaster officials during periods of emergency.*" Their home page claims a "volunteer force of over 5,000 dedicated and skilled amateur radio operators" that keep Army MARS ready to handle vital emergency communications."

MARS member files Freedom of Information request

One Army MARS member took issue with the publicized emergency communications readiness and reported activity of the MARS program and filed a Freedom of Information Act (FOIA) request for a copy of a recent investigation into Army MARS by the Department of the Army's Inspector General (DAIG). The multi-page released excerpt from the audit report was very interesting, to say the least, and it was extremely critical of MARS' value as an emergency communications medium in times of crisis.

The DAIG investigation began in the spring of 2001 but its findings were not made public until June 2002. It has been reported that the full version of the actual audit report was many times the 41-pages that were released under the FOIA. Much of the full report could not be released due to Privacy Act and Law Enforcement concerns.

MARS support to state and local agencies

According to the investigative account, the MARS mission is somewhat different from that stated on their Home Page. The IG said, "The focus of this mission is federal support and not support to state and local agencies. There are other organizations already in place to support state and local agencies (Radio Amateur Civil Emergency Service, RACES, American Radio Relay League ARRL, etc.) Without the authority of the Stafford Act, direct support of state and local agencies by agencies of the federal government is prohibited."

"Without a Presidential declaration of an emergency, MARS has no authority to provide support at the local and state level." The Governor of the state involved must request the declaration of emergency.

MARS fails to plan for disaster communications

According to the audit, MARS stations "participate in periodic exercises to maintain operator proficiency...." A DOD directive states that MARS "provides direct support" to the government in the event of a national disaster. But apparently they are doing a very poor job of it.

The Army Inspector General found that "MARS does not plan or train for this contingency mission nor does NMCS (the National Military Command System) include MARS in its planning, training, or exercise plan."

The findings confirm that Army MARS planning and exercise typically operate in a "closed loop system" that result in MARS participants talking to each other rather than providing point-to-point connectivity for supported customers. "These issues all point to a lack of appropriate planning and performance in providing actual emergency communications support to other agencies, particularly first responders."

The report also mention that Army MARS may be "...focused more on socializing between operators than mission accomplishments." Another MARS member told us that "The entire program lacks any significant value in its current configuration and direction..." and that its current "organizational structure accomplishes little beyond recreational pursuit."

The audit report concludes that MARS fails to support military wartime communications and recommends that MARS include training to support NMCS.

MARS fails to participate in NCS training, meetings

The National Communications System (NCS) was formed in 1962 after the Cuban missile crisis. The goal of NCS is to provide communications support to critical Government functions during emergencies. The system links the communications systems of some 22 Federal agencies and departments, focusing on interconnectivity and survivability ...especially during a disaster.

The National Communications System has a program developed through its member organizations called the SHAred RESources (SHARES) High Frequency (HF) Radio Program. The purpose of SHARES is to provide a single, interagency emergency message handling system by bringing together existing HF radio resources of Federal, state and industry organizations when normal communications are destroyed or unavailable for the transmission of national security and emergency preparedness information.

The DAIG audit said that "MARS is also a member of the NCS SHARES HF Interoperability Working Group which assists, helps identify, records, and tracks issues affecting HF interoperability in the Federal government." But the Inspector General found that "There is no indication that MARS has participated in the planning, training, or participated in actual incidents with [NCS emergency management systems] or has actually attended or participated in any of the [Working Group] sessions." The DAIG said that MARS should assign someone to represent the program and participate as an active member.

MARS fails miserably on September 11

Another issue that the DAIG investigated is the accusation that MARS fails to support military, civil and/or disaster officials during declared emergencies with needed radio communications. Specifically mentioned is the terrorist attack of September 11, 2001, when the city of New York experienced a massive communications failure.

"MARS has the capability of establishing communications in this type of environment, but without planning and training, this capability cannot be realized. Simply stated, no one knew that MARS was there."

"The potential for Army MARS to provide support in the aftermath of 11 September 2001 was phenomenal. Phone links from New York to Washington alone would have relayed critical information to the decision makers and would have helped make up for the loss of key communication links lost in the disaster. The MARS VHF capabilities could have assisted in clarifying the federal emergency response. Computer centers could have been linked via MARS HF links; and phone patches could have placed key individuals in contact with their organizations."

Although Army MARS established a radio net and remained on the air for several days the DAIG found that MARS were not prepared to handle needed communications and did very little in the way of emergency assistance "...except conduct radio checks."

The Inspector General concluded that Army MARS is not prepared to execute its primary mission of providing emergency communications support. "In every presidentially declared emergency where Army MARS claimed participation, the same pattern was demonstrated."

The audit report said MARS needed to implement a training program, participate with FEMA and NCS as a full participant and develop a program to inform the military and Federal emergency operations organizations of its capabilities.

MARS fails to provide timely communications

Historically, the most visible feature of Army MARS has traditionally been morale and welfare communications. The DAIG report mentions "MARSgrams," radioed morale-boosting messages that were handled for military service personnel during the Korean, Vietnam and Desert Storm conflicts.

"According to numbers provided by the Chief, Army MARS, 180,000 MARSgrams and 60,000 radiophone patches were made for service members deployed during Desert Shield/Storm alone." The DAIG agreed that evidence amply demonstrates that MARS continues to have the capability to make phone patches and send MARSgrams supporting soldiers around the world.

It said one of the problems identified was that MARSgrams were not handled in a timely manner. "Procedures need to be established which will eliminate MARSgrams remaining in collection boxes for weeks on end."

The DAIG recommended that procedures be developed to reduce time required to process MARSgrams and to expand phone patch capabilities for use in supporting other Federal agencies. A public relations program should be established since "Many soldiers simply do not know about MARSgrams or phone patches."

MARS membership decreases, equipment poor

The Inspector General agreed with the accusation that Army MARS does not furnish adequate training in military communications equipment, techniques and procedures. It said that although it attempts to increase MARS participants "...the Army MARS program has lost 55% of its membership in the last 20 months. ...to less than 2,200 volunteer members." The number of active duty military personnel and paid staff associated with the Army MARS program is minimal. The Chief, Army MARS is a GS civilian position.

"The fact that recruitment is an extremely high priority, especially with the current budget constraints, is not the question. The actual issue is the question of whether Army MARS furnishes appropriate training...." MARS is not able to train in military communications equipment, which must be remedied.

"Even though the Army does allow Army MARS members to participate in an equipment 'reutilization' program, radio equipment in this program is notoriously out of date and has very limited use to the individual members."

Current funding for Army MARS does not include acquisition of new equipment or even maintenance of the older equipment.

MARS is "misleading"

According to the MARS website, "MARS has a long and proud history of providing world-wide auxiliary emergency communications during times of need. Our volunteer force of over 5,000 dedicated and skilled amateur radio operators is the back bone of our program. The benefit of MARS membership is enjoying an amateur radio hobby through the ever-expanding horizon of MARS. Our affiliate members' continued unselfish support of our mission keeps Army MARS Proud, Professional, and Ready."

The Army's Inspector General took issue with MARS publicized outward appearance versus reality and asserted that "The presentation of information to the chain-of-command, to the Army MARS membership, and to the public by the Army MARS staff was misleading and deceptive." It recommended that the MARS Web Page be reviewed and that the membership numbers be revised to reflect current affiliate numbers. Even some of the 2,200 members may no longer be active.

The report also said that Major Disaster Support (Success Stories) should be deleted since "MARS was not mentioned as a participant by FEMA during any presidentially declared emergency during the past ten years," nor have they participated in any development or planning sessions of FEMA. "There is not a single mention of Army MARS or Army MARS support by either FEMA or NCS during any of the 460 Presidentially Declared Major Disasters," the DAIG remarked.

In short, the Army Inspector General's investigative audit found very little that Army MARS is doing ...or doing right, to support the emergency or disaster communications needs of the U.S. Federal or civil government.

A response by the US Army Public Affairs Office to *Monitoring Times* regarding the audit will appear in *MT* next month.

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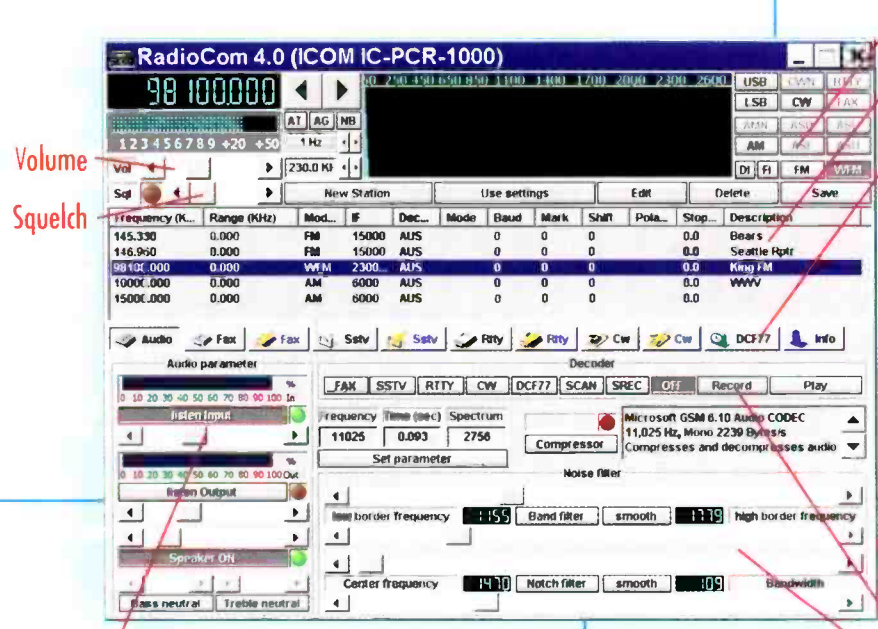

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