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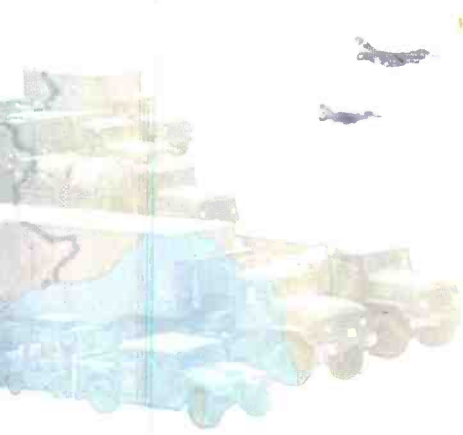
BOSNIA WATCH

Tuning in NATO's Peacekeeping Mission to the Balkans



Also in this issue:

- **Restore Cellular in Your 800 MHz Scanner**
- **GMRS: A Service Under Seige**
- **MT Reviews: PRO-2042 and ICF-SW1000T**

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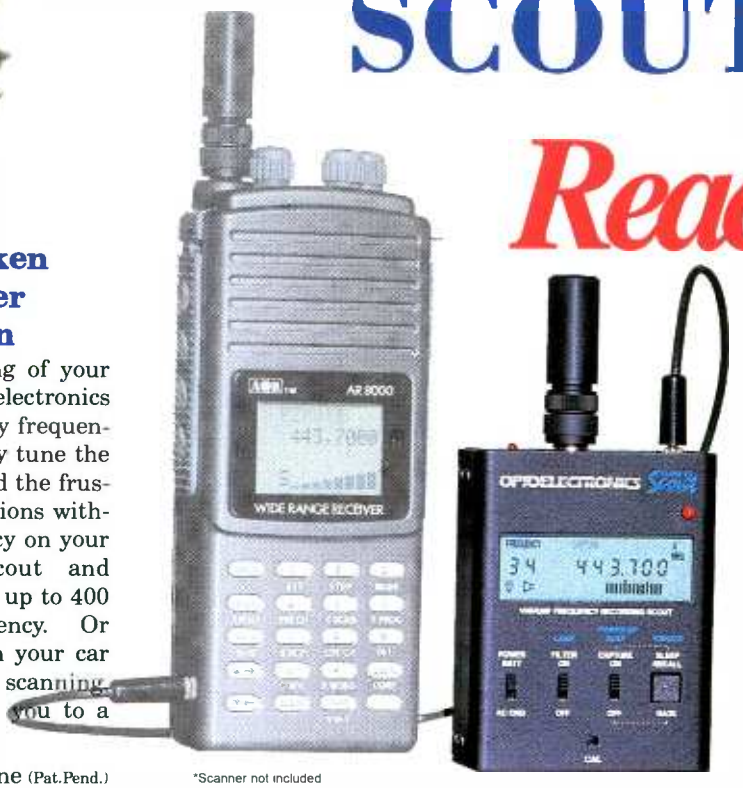

*Scanner not included

Reaction Tune

The SCOUT™ Has Taken Tuning Your Receiver To a New Dimension

Featuring Automatic Tuning of your AR8000 and AR2700 with the Optoelectronics Exclusive, Reaction Tune (Pat.Pend). Any frequency captured by the Scout will instantly tune the receiver. Imagine the possibilities! End the frustration of seeing two-way communications without being able to pick up the frequency on your portable scanner. Attach the Scout and AR8000/2700 to your belt and capture up to 400 frequencies and 255 hits per frequency. Or mount the Scout and AR8000/2700 in your car and cruise your way into the future of scanning. A simple interface cable will connect you to a whole new dimension of scanning.

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The Scout will also Reaction Tune and Memory Tune Icom CI-V receivers: (R7000, R7100, and R9000) and (Pro 2005/6 equipped with OS456, Pro 2035 equipped with OS535). Download the Scout frequencies to a PC with the Scout Utility Disk and CX-12AR (optional), then compare them to the Spectum CD-ROM/PerCon FCC Database (optional).

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Features

- Automatically tunes these receivers with Reaction Tune (Pat.Pend.) CI-V receivers (ICOM's R7000, R7100, and R9000), (Pro 2005/2006 equipped with OS456, Pro 2035 equipped with OS535) or AOR models (AR2700 and AR8000).
- Records and saves 400 unique frequencies
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- AC Adaptor/Charger
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Monitoring Times™

Vol. 15, No.2 February 1996

CONTENTS

Cover Story

Tune in Joint Endeavor

By Gayle and Larry Van Horn

Today's news junkie has available to him a variety of news sources from which to choose: shortwave, mediumwave, and satellite-delivered broadcasts from interested nations and the principal players; sites touting every point of view on the World Wide Web; and troop communications from the peacekeepers themselves.

We hope you enjoy this resource list guaranteed to keep you busy and informed. All the images on our cover and within the article were found on the Internet at DefenseLINK. See page 9 for the story.

DEPARTMENTS

Reviews:

The **Sony ICF-SW1000T** is a nifty portable shortwave receiver/cassette recorder that has a lot of desirable features—"the radio/recorder we've been waiting for," says Magne. However, you don't have to do any diagnostics to discover its weak point: the price! (See page 106.)

Did Radio Shack turn a good scanner into a great one in its follow-on to the PRO-2035? Parnass puts the **Radio Shack PRO-2042** through its paces, and also compares it to Uniden's BC9000XLT competitor. Which one wins? It depends on what you're looking for. (Page 108.)

Propagation author Bob Rose gives the thumbs up to **DXAID**, a simple forecasting program that's inexpensive and hard to beat (p.104). If you'd like to know what's going on behind those raucous ACARS data transmissions from your local airport, Catalano says there is finally a moderately-priced program to decode the aero comms—**Lowe's Airmaster**. (See page 98.)

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Scanners/CB/Weather Stations

New Scanner Products Available

Now it's easy to purchase communications, emergency management supplies, weather forecasting equipment and more directly from Communications Electronics Inc. Your **free fax-on-demand catalog** including unadvertised specials is instantly available by calling 313-663-8888 from your fax machine.

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Bearcat 760XLT-U base/mobile $189.95
Bearcat 700A-U information mobile $144.95
Bearcat 560XLA-U base/mobile $76.95
Bearcat 220XLT-U handheld/SPECIAL $207.95
Bearcat 178XLT-U base with weather alert $124.95
Sportcat 150-U handheld with 800 MHz. $158.95
Bearcat 148XLT-U base with weather alert $83.95
Bearcat 120XLT-U handheld $129.95
Bearcat 80XLT-U handheld with 800 MHz. $144.95
Bearcat BCT7-U information mobile $168.95

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Now you can be your own weather reporter with the Davis Weather Monitor II. Our top-of-the-line weather station combines the most advanced weather monitoring technologies available into one incredible package. Glance at the display, and see wind direction and wind speed on the compass rose. Check the barometric trend arrow to see if the pressure is rising or falling. Push a button, and read indoor and outdoor temperature, wind chill, humidity and barometric pressure. Our package deal includes the new ultra high resolution 1/100 inch rain collector part **#7852-U**, and the external temperature/humidity sensor, part **#7859-U**. The package deal is order **#DAV1-U** for $479.95 plus $15.00 shipping. If you have a personal computer, when you order the optional Weatherlink computer software for $139.95, you'll have a powerful computerized weather station at an incredible price. For the IBM PC or equivalent order part **#7862-U**. Apple Mac Plus or higher including PowerBook, order part number **7866-U**.

The Weather Monitor II (7440) comes complete with anemometer with 40 feet of cable, external temperature sensor with 25 feet of cable, junction box with 8 feet of cable, AC power adapter, detailed instruction booklet and one year limited factory warranty.

Davis Weather Monitor II 7440-U $334.95
Davis Weather Wizard III 7425-U $154.95
Davis Perception II Indoor stand-alone weather monitor 7400-U .. $124.95
Davis Remote Display Unit 7815-U $84.95
Davis Rain Collector II 0.01" 7852-U $59.95
Davis Rain Collector II 0.2 mm 7852METRIC-U $59.95
Davis Rain Gauge Stand-alone 0.01" 7520-U $79.95
External Temperature/Humidity Sensor 7859-U $99.95
Davis Anemometer Mast Mount 7890-U $15.95
Weatherlink Software for IBM PC-Version 3.0 7862-U $139.95
Weatherlink Software for Apple-Version 3.0 7866-U $139.95
4-Conductor 40' (12.2 m) extension cable 7876-U $17.95
6-Conductor 40' (12.2 m) extension cable 7878-U $21.95
8-Conductor 25' (7.6 m) junction box cable 7880-U $14.95
8-Conductor 50' (15.2 m) junction box cable 7881-U $24.95
8-Conductor 100' (30.5 m) junction box cable 7882-U $44.95
Modem Adaptor 25-Uin for communications port 7870-U $9.95
Car/Boat/RV Lighter Power Cord 7873-U $9.95
2400 baud modem for Weatherlink MEXT-U $29.95
Talking weather card - Call 313-994-9000 for demo IT1-U $474.95
Weatherlink language disks: Française, Deutsche, Italiana, Española 7863-U $24.95
Barometer, Indoor Hygrometer & Thermometer, Clock/Calendar BA888-U . $89.95
Indoor/Outdoor Thermometer/Barometer & Hygrometer by OSI BA213-U .. $79.95
Thermometer with transparent calender & clock display by OSI TC188-U .. $19.95
Thermometer with AM/FM clock radio by Oregon Scientific CR388-U $39.95
Indoor/Outdoor Thermometer with Jumbo Display by OSI JB880EX-U $24.95

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Mfg. suggested list price $769.95/**CE Special $369.95**
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The Bearcat 9000XLT gives you pure scanning satisfaction with amazing features like TurboSearch™ to search VHF channels at 300 steps per second. This base and moble scanner is ideal for surveillance professionals because it has a selectable attenuator to help eliminate annoying intermodulation from adjacent frequencies in highly populated areas and selectable AM, Wide FM and Narrow FM modes that allow you to change the default receiving mode of the BC9000XLT. Other features include ***Auto Store*** - Automatically stores all active frequencies within the specified bank(s). ***Auto Recording*** - This feature lets you record channel activity from the scanner onto a tape recorder. Hi-Cut filter to help eliminate unwanted static noise. You can even get an optional ***CTCSS Tone Board*** (Continuous Tone Control Squelch System) which allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning enjoyment, order the following optional accessories: **PS001** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter $14.95; **PS002** DC power cord - enables permanent operation from your vehicle's fuse box $14.95; **MB001** Mobile mounting bracket $14.95; BC005 CTCSS Tone Board $54.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached $19.95. The BC9000XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited warranty from Uniden.

CB/GMRS Radios

The Maxon GMRS 210+3 transceiver is a PLL synthesized 10 channel radio on General Mobile Radio Service frequencies. It's the ideal radio for long range communications. Two repeater channels are programmable and one channel (462.675 MHz.) is set aside for emergency and safety communications. The seven remaining interstitial frequencies 462.5625, 462.5875, 462.6125, 462.6375, 462.6875 & 462.7125 MHz are all-purpose GMRS radio channels. 2 watts of RF power for exceptional transmitting range. Up to 5 watts when used with the supplied 12 volt vehicular DC power cord. CTCSS built-in. Includes 450mAh Ni-cad rechargeable battery pack, AC/DC wall battery charger, owner's manual, FCC license application, belt clip, antenna. Call 1-800-USA-SCAN to order.

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WTA6GN2-U Ni-cad pack gives 2 watts power with 210+3 ..... $29.95
WTA6GA-U Alkaline battery case - requires 6 AA batteries $9.95
WTA8GA-U Carrying case for Maxon GMRS210+3 ..... $29.95
WTA10G-U Speaker/microphone for Maxon GMRS210+3 ..... $18.95
WTA13G-U Push-to-talk mini-VOX headset for GMRS210+3 ..... $47.95
WTA14-U Antenna adaptor/screw-in male to BNC connector $9.95
ANT4GM-U 1/4 wave UHF magnetic mount mobile antenna $29.95
Cobra 2010GTLWX-U SSB base with weather alert $379.95
Cobra 148FGTL-U CB with frequency counter $209.95
Cobra 29LTDWX-U CB with weather alert $114.95
Cobra HH40-U CB 40 channel handheld transceiver $99.95
Ranger RCI2950-U 25 watt 10 meter transceiver $239.95
Uniden GMR100-U GMRS handheld transceiver $144.95
Uniden WASHINGTON-U SSB CB Base (+ $25.00 shipping) $199.95
Uniden GRANTXL-U SSB CB Mobile $139.95
Uniden PRO538W-U CB & Weather $59.95

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RELM® WHS150-U Transceiver/SPECIAL

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Police and fire departments depend on the RELM WHS150 transceiver for direct two-way communications with their police, fire department, civil defense agency or ham radio repeater. The WHS150 is our most popular programmable five watt, 16 channel handheld transceiver that has built-in CTCSS, which may be programmed for any 39 standard EIA tones. Frequency range 148.000 to 174.000 MHz. Will also work 144.000-148.000 with slightly reduced performance. The full function, DTMF compatible keypad also allows for DTMF Encode/Decode and programmable ANI. Weighing only 15.5 oz., it features dealer programmable synthesized frequencies either simplex or half duplex in both 5.0 and 6.25 KHz. increments. Other features include scan list, priority channel, selectable scan delay, selectable 5 watt/1 watt power levels, liquid crystal display, time-out timer and much more. When you order the WHS150 from Communications Electronics Inc., you'll get a complete package deal including antenna, battery, belt clip and user operating instructions. Other accessories are available. A leather carrying case with swivel belt loop part **#LCWHS** is $49.95; rapid charge battery charger, part **#BCWHS** is $69.95; speaker/microphone, part **#SMWHS** is $54.95; extra ni-cad battery pack, part **#BP007** is $59.95. The radio technician maintaining your radio system must order programming instructions part **#PI150** for $18.00 to activate this radio. FCC license required for United States operation.

Other neat stuff

PH5000-U Waber 500VA/340 Watt computer uninterruptable power supply $159.95
WX70-U weather radio with National Weather Service storm alert $29.95
WB-U USA Today The Weather Book, Guide to USA weather by Jack Williams $15.95
PSUN-U Partly Sunny, Weather Junkie's Guide to Weather by Alan Fields $11.95
Grundig Yacht Boy 400-U digital portable shortwave - 40 memory $179.95
Grundig Yacht Boy 230-U portable shortwave receiver $109.95
Sangean ATS800-U portable 20 memory shortwave receiver $69.95
Sangean ATS803A-U portable shortwave w/AC adapter -- 9 memory $129.95
Sangean ATS808-U portable 45 memory shortwave receiver $129.95
Uniden EXP9200-U 900 MHz. 1 or 2 line spread spectrum cordless phone . $289.95
Uniden EXP9100-U 900 MHz. 1 line cordless spread spectrum telephone ... $224.95
Uniden EXP901-U 900 MHz. 1 line cordless analog telephone $149.95
Bogen FR3110-U Digital FAX Friday Fax-on-Demand & answering system ... $399.95
Bogen FR3020-U memory module for Fax Friday/up to 36 minutes $99.95
Bogen FR2000-U Digital two-line voice mail & answering machine $279.95
Bogen FR0018-U memory module, doubles recording time to 36 minutes $79.95
FANS P161P-U 60 name/number caller ID, unwanted call blocker, paging .. $149.95
SNI ID200-U Bouncer name/number caller ID, call reject, forward $89.95
ICOM GP22-U handheld global positioning system (GPS) $489.95
RELM WHS150-U VHF handheld 5 watt, 16 channel transceiver $299.95
RELM RH256NB-U VHF 25 watt, 16 channel synthesized transceiver $289.95
Ranger RCI2950-U 25 watt 10 meter ham radio transceiver $239.95
Cobra RDL712SW-U Safety Alert & Super Wideband Laser/Radar receiver .. $139.95
Uniden LRD6399SW-U Super Wideband Laser/Radar receiver-VG2 protection $99.95
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LETTERS

A Changing of the Guard

Before getting to your letters, I need to acknowledge the considerable contribution to *Monitoring Times* made by a writer who leaves the regular staff with this issue. Bob Kay came on board when we first inaugurated the "Scanning Report" column eight years ago. This month he recounts some of the escapades that have kept him in and out of hot water over the years. Bob has always been willing to experiment to keep the column lively and entertaining. Between the frequency exchange and his treasure hunts (which will be discontinued after the current one runs its course), his column has generated an enormous amount of reader response—and made a lot of work on his part—for which we owe him our sincere thanks. We hope he doesn't get so caught up in "retirement" that he allows his scanner and his pen to cool off!

Probably no aspect of our hobby is changing as rapidly as scanning. Coming to the helm to steer the column in some slightly different directions is Richard Barnett, editor of the well-respected *Scanner Master* frequency directories. He will continue the frequency exchange and keep us current with communications systems, news, and scanning techniques. We are honored to welcome him to the *MT* staff. You can reach him at the Brasstown address with your frequency lists, clippings of scanning in the news, and topic suggestions and questions you'd like to see addressed in the column.

Now on to your letters and comments.

Education in Radio/Radio in Education

Neil Carleton teaches grades four and five and has been developing ways to use shortwave radio in his classroom. In his search for ideas, he started a newsletter to educators and others entitled *The Shortwave Classroom* which, true to the international nature of shortwave radio, contains articles from teachers around the world. A subscription to the newsletter is available for $10 *plus* an accompanying feature article to share. Send to Neil Carleton, Naismith Memorial Public School, P.O. Box 280, Almonte, Ontario, K0A 1A0 Canada or Internet as167@freenet.carleton.ca

The accompanying picture is of the after-school Shortwave Listening Club for 5th and 6th graders at G.L. Comba Public School in Almonte. Neil keeps very busy!

The after-school Shortwave Listening Club for 5th and 6th graders at G.L. Comba Public School in Almonte, California.

Radio Canada International

Stephen Parrish of Spartanburg, South Carolina, was one of several who sent newspaper clippings and expressions of dismay at Radio Canada International's imminent demise (see opening story in this month's "Communications" column). He says, "It's disconcerting to hear that Radio Canada International will cease broadcasting at the end of March. At a minimum, I would hope that the Canadian Broadcasting Corporation could continue shortwave broadcasts to the United States. I realize that Public Radio International broadcasts *As It Happens* on some public broadcasting stations, but not in my area. After March 1996, I hope that arrangements can be made to continue broadcasting *The News at Six* and *As It Happens* so that anyone outside Canada with an interest in hearing those broadcasts can do so.

"Another point to ponder: after March 1996, what happens to the Sackville relay? Will it continue to be used? Or will international shortwave broadcasters have to find another means of broadcasting to North and South America by way of another relay station?"

Excellent suggestions and questions, Stephen. I hope we'll have an in-depth feature by next month with a few more answers; in the interim, we'll post news to *www.grove.net* as time permits.

800 MHz: It's Not All Negative

"Congratulations on your editorship of *Monitoring Times*. Under your guidance, the magazine has not only maintained its status as the flagship 'monitoring monthly,' but continues to evolve along with our ever-changing hobby." These flattering words opened a thoughtful letter from Brian Humphrey, Firefighter/Paramedic and Public Information Officer for the LA City Fire Dept. Brian expressed his enjoyment of articles such as December's "Informed Scanning," which pushed for a greater depth of knowledge of one's local fire department and procedures.

Then he goes on to say, "I must however confess my disappointment in a brief that appeared in the December issue, entitled 'Fire Radio Static' (p.6 col.2). In what appeared to be an editorial comment regarding '800 MHz radio systems,' the piece ended with the quote. 'Same story. Only the city changes.' I was saddened to see such a comment in *Monitoring Times*, and must respectfully disagree.

"While 800 MHz radio equipment is not a panacea to a Fire Department's communication problems, there are many places in North America where 800 MHz radio is working quite well. The City of Los Angeles is one such place. Since its inception in 1988, the Los Angeles City Fire Department's 24-frequency analog 800 MHz conventional (non-trunking) radio system has performed admirably in protecting lives in America's second largest city. On time and on budget, it has performed exceptionally despite firestorms, floods, and earthquakes.

"Let me assure you and your readers that our migration to 800 MHz was no fad. In a crowded metropolis like Los Angeles, radio spectrum has become increasingly scarce.

I entrust my life each shift to a comprehensive 800 MHz radio system. I hope that in the future you will work in earnest to dispel the myths and ru-

(Continued on Page 112)

Can RCI Be Saved from the Axe?

Will Canada become the only major country without an external broadcast service? After five years of limbo, Radio Canada International is to be shut down when the fiscal year ends March 31. Following severe budget cuts of its own, CBC announced in mid-December it would no longer pay half the cost of RCI, nor would External Affairs, which had been sharing the annual C$16.5 million budget. That was already cut to the minimum, but the services RCI provides are comparable to stations costing three or four times as much, such as Switzerland or the Netherlands.

Notices of termination were sent to 125 employees, but within hours, a campaign to reverse the decision was launched, and RCI's loyal listeners responded.

To help save RCI, write directly to the Prime Minister, Jean Chretien, Ottawa, Ont K1A 0A6; fax (63) 957-5556 or 941-6900. For more addresses and how you can help, contact the Coalition to Restore RCI, 1250 de la Visitation, Montreal, Quebec H2L 3B4; phone (514) 844-262; fax (54) 521-3082.

Thanks to Glenn Hauser for this summary report.

High Flying Fun

Whether you thought that being able to make a phone call from an airplane was either real excess or real convenience, you'll probably feel more of the same about GTE Airfone's newest venture. Now you can make phone calls *to* a person on an airplane. The procedure is kind of complicated, though.

Before you get on a plane, you call GTE Airfone (1-800-890-3939) and get a 10-digit "aircall" number. The cost is $2.00 for each leg of your flight. You then call anyone who might be interested in getting in touch with you while you're in the air and tell them your aircall number. When someone decides to call you—and they should after all the trouble you went through—they call 1-800-AIRFONE and your aircall number.

A message indicating that a passenger has a phone call flashes on a screen in the aircraft and then is routed to the proper seat number. The cost for the call is $2.50 per connection plus $2.50 a minute for domestic calls and $5.00 a minute for international flights.

Pair Fake Out OK PD

When Marshal One and Marshal Two—a male and a female—announced their arrival on Oklahoma City police radio, officials assumed that they were federal marshals out serving warrants. Before long, however, all hell broke loose.

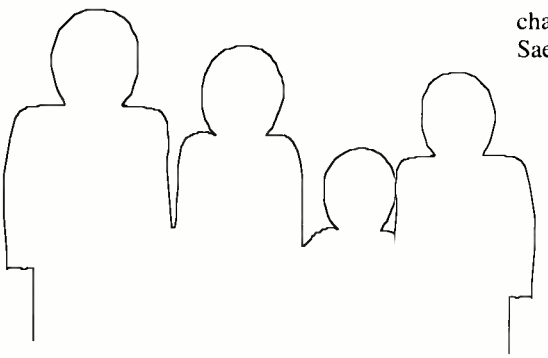
"Officer down," reported the female. Then "step it up," meaning that the injuries were serious. When police took to the streets in search of the injured officer, nothing was ever found. A short time later, police were dispatched, including a helicopter, to assist in a pursuit on Interstate 35. When they arrived on the scene, however, all they found was routine traffic. Marshal One and Two then vanished.

Police have been unable to trace the source of the broadcasts, but warn that the situation is serious. "They need to realize they're putting the safety of the public and the officers in jeopardy," said a spokesman.

In 1992, two people plagued Oklahoma City airwaves by interfering with radio traffic for Santa Fe Railway. Every time a train went by, the two would start singing, "I've been working on the railroad."

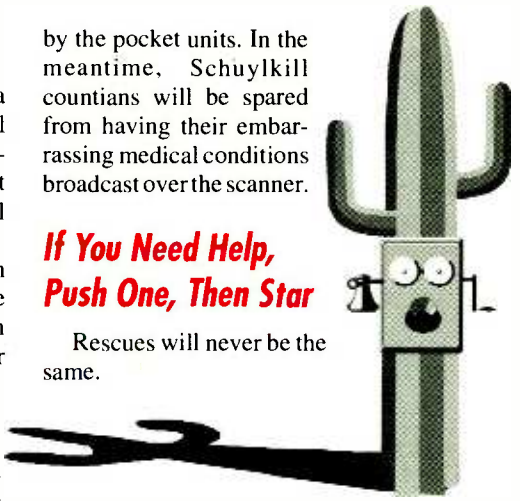
Ooh and Aah Squad

Tamaqua, Pennsylvania, EMT Darren Thomas calls them "The Ooh and Aah Squad." They're the crowd that gathers at every traffic accident after hearing about it on the scanner. "It's a nuisance," says Thomas. Arthur Kaplan, Schuylkill County's emergency management coordinator, sees another problem besides the onlookers: privacy. "When you have someone having a miscarriage, you don't necessarily want that going over the scanner."



To that end, ambulance companies serving the county have changed over to pagers—alphanumeric pagers. Fire calls will probably never go on the pager, says Kaplan, because fire companies need to alert larger memberships. But some police calls may be handled by the pocket units. In the meantime, Schuylkill countians will be spared from having their embarrassing medical conditions broadcast over the scanner.

If You Need Help, Push One, Then Star



Rescues will never be the same.

When bow hunter Tom Hoffman twisted his leg during a blizzard and needed help, there was no need for him to drag himself, wounded, inch-by-inch through the frozen woods. Or build a fire out of twigs and leaves, hoping to signal rescuers. According to police in Colonie, New York, Hoffman flipped out his cellular phone and called 911. While officials agree that the cellular phone helped, rescuers point out that it still took three local fire and rescue companies to carry Hoffman out of the woods and through the slippery darkness.

Taxi

Business was bad for the London, Ontario, cab company. Every time a fare was dispatched, someone would jam the company's frequency. So federal officials were dispatched in a car loaded with direction-finding equipment to locate the source of the mischief. The alleged source: Mahdi Mohammed Saed, a former cab driver who said he jammed the channel because he didn't like the dispatcher. Saed was fined $500.

Churches Dump Bird

Officials of both the Church of England and the Methodist Church say they're bailing out of British Satellite Broadcasting. Together, the two churches had invested over $7 million in the company's BSkyB operation. And then they found out that BSkyB was going to carry the American Playboy Channel. "Pornography degrades and exploits human beings," said the church. A spokeswoman for the satellite company noted that the channels were legal and called the church's decision "regrettable."

Arizona Free Radio

Mike Dougan operates a radio station in Phoenix. It's nothing fancy. Low-power, it has only 10 watts. The studios are not all that impressive, either. They're in a shed in his back yard. And, oh yes, Mike Dougan's KAFR-FM has no license. And that has federal officials upset.

Dougan has been jousting with the FCC since he went on the air in 1991, getting hit with a $17,500 fine just six months after he signed on. Undeterred, Dougan returned to the air—and upped his power. He vows to stay on the air, fighting FCC licensing policies and offering an open forum for people who don't have any other broadcast forum.

"I could sit at home every night and surf the Internet. But what would I get out of that?" he asks. KAFR stands for Arizona Free Radio and operates on 92.7-FM.

Be a Partner

Allan Weiner, well-known pirate radio operator, is reportedly seeking financial backing so that he can go back on the air. "I have a ship," declares Weiner. "I want to build another offshore broadcasting station to travel the world's seas and broadcast wherever a radio voice is needed. It will be safe, it will be legal, and it will be good."

It will also, according to Weiner, be profitable. "There is money to be made and more." If you'd like to join Weiner as a full financial partner, you can contact him at 97 High Street, Kennebunk, ME 04043. "The world needs at least one good fully-operational radio ship—out there, broadcasting its message, bolstering the human spirit."

Pulling Licenses

Radio stations in two midwestern states have been told to prepare for revocation of license hearings. WBOW (AM), WBFX (AM), and WZZQ (FM) in Terre Haute, Indiana; and KFMZ (FM) in Columbia, KAAM (FM) in Huntsville, KBMX in Eldon, and KFXE (FM) in Cuba, Missouri, are all owned by companies of which Michael Rice is president, treasurer, director, and part-owner.

Last year, Rice was convicted of 12 felony counts of sodomy, sexual abuse, and sexual assault of five children ranging in age from 12 to 16. According to reports, the Commission wants to know if Rice's convictions affect the basic qualifications of the companies to hold radio licenses.

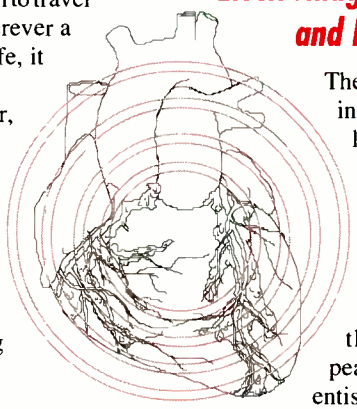
60 Year Old Dog Fetches $25,000

Nipper, the puzzled dog peering into the horn of the RCA gramaphone, is going home. Nipper sat atop the Triangle Sign Company in Baltimore ever since RCA dropped the pooch as its trademark back in 1974. He was then purchased by Jim Wells for $1.00. Now Wells is getting ready to move to Florida and he's selling Nipper to Baltimore's City Life Museum. How much did the statue go for? $25,000—not bad for a 60 year old dog.

No Mo' WOWO

It's official now. This spring clear channel WOWO will celebrate its 70th birthday by dropping 42,000 watts. The Federal Communications Commission formally approved the plan whereby WOWO will drop its signal so that Inner City Broadcasting's WLIB in New York can increase its power to 30,000 watts. According to WOWO Listener's Guild leader Peter George, the FCC received only 300 letters of protest about the power-down.

Electromagnetic Radiation and Illness

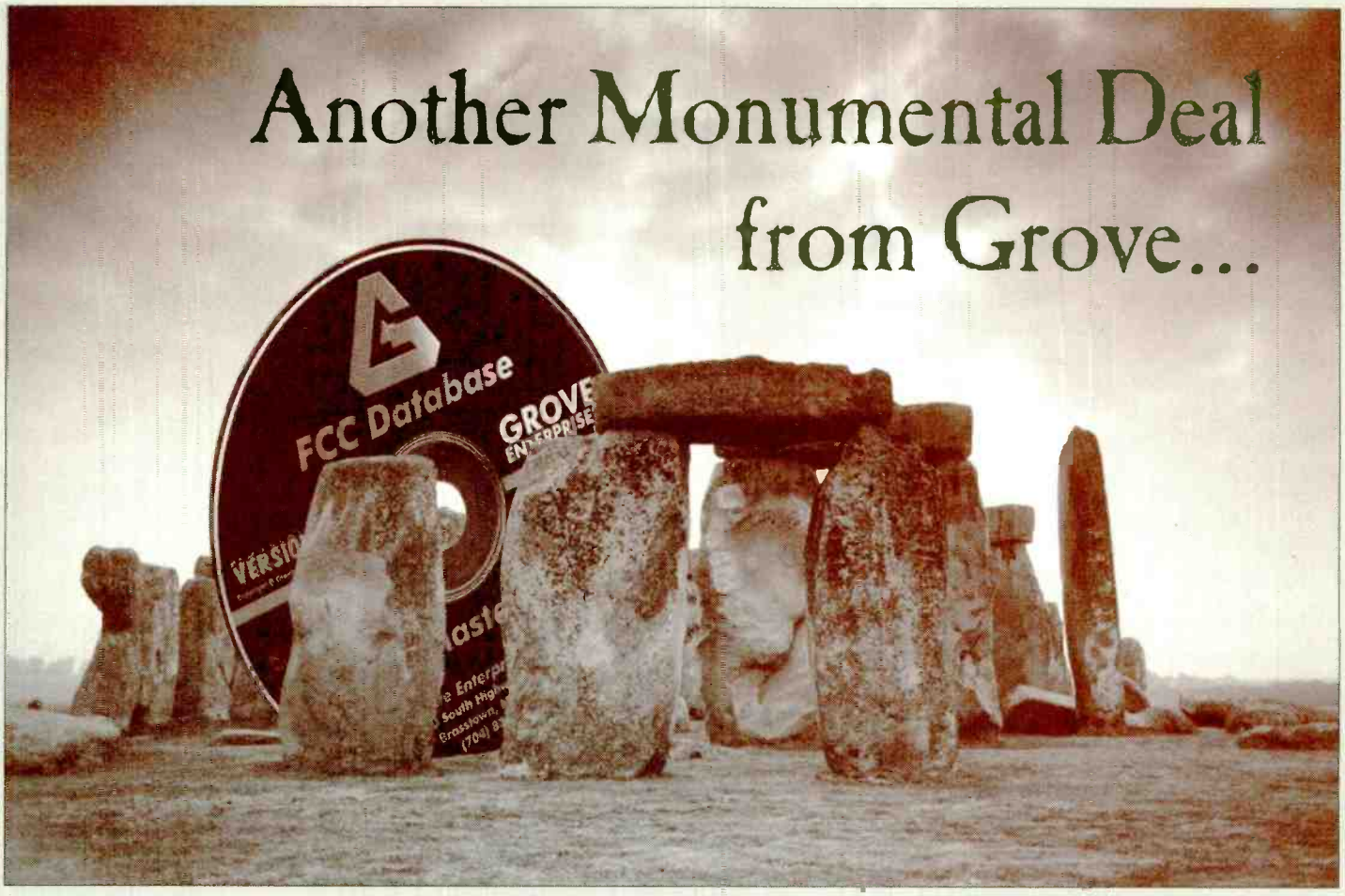


The debate has been going on for years: power lines and electrical appliances can cause cancer and other diseases. Now comes word of a study by the U.S. Council on Radiation Protection that contradicts repeated denials from scientists. According to journalist Steve Newman, the report cites "studies that show these fields can disturb the production of the hormone melatonin, which is linked to sleep patterns and which also helps protect the body from degenerative effects like those seen in heart disease, Parkinson's and Alzheimer's." The report appears in the magazine, *New Scientist*.

"Communications" is written by Larry Miller with help from Rachel Baughn and the following readers who are members of the Communications Media Monitoring Team: Anonymous, Oklahoma City, OK; Dave Chapchuk, Scranton, PA; Bob Fraser, Cohasset, MA; Steve Goldman, Roselle, IL; Bob Grove, Brasstown, NC; Hubert Harris, Macon, MO; Glenn Hauser, Enid, OK; Ron Hughes, Memphis, TN; Bob Jackson, Newton, IA; Howard Klepfler, Salt Lake City, UT; Paul McDonough, Somerville, MA; Larry Metzler, Doug Robertson, Oxnard, CA; Louis Shirley, NJ; Danny Smith, Kingston, TN; Doug Smith, Tennessee; Dennis Taschner, Trenton, NJ; Wes Weathers, Lancaster, CA; and Shaun Willingham, Winnipeg, MB. We also consulted the following publications and organizations and list their names in appreciation: Associated Press, *National Scanning, Radio World* and *W5YI Report*.

Become a member of the MT news monitoring team: send clippings and stories of interest to the hobby to "Communications," P.O. Box 98, Brasstown, NC 28902; fax 704-837-2216; e-mail mteditor@grove.net.

Another Monumental Deal from Grove...



The new 1995 Grove FCC Database (version 4.1) is a spectacular compendium of all the licensees in the FCC Master File! Public safety, railroad, industrial, broadcast, marine and many other categories are listed. You can sort through fields like city, service, state, callsign, antenna height, output power, county and many more! The program can also be custom-tailored to fit your specific searching needs, using any available information you have.

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JOINT ENDEAVOR

Tuning In NATO's Deployment in Bosnia-Herzegovina

The aircraft carrier USS America (CV 66) (top, center) leads the Los Angeles class submarine USS Oklahoma City (SSN 723) (right) north through the Suez Canal on Dec. 9, 1995. The USS America Battle Group is enroute to the Adriatic Sea and will operate off the coast of Croatia to support NATO's Operation Joint Endeavor in Bosnia and Herzegovina. DoD photo by Petty Officer 2nd Class Eric N. Dunn, U.S. Navy. Above, members of the U.S. Army 3rd Corps Support Command and the 30th Medical Brigade board a C-141 Starlifter at Rhein-Main Air Base, Germany, on Dec. 14, 1995. Both units are deploying to Taszar Air Base, Hungary, in support of Operation Joint Endeavor. DoD photo by Senior Airman Ken Bergmann, U.S. Air Force.

A Resource List for the Balkans

By Gayle Van Horn

It's "the most important story we can tell." So says John Stack, NBC News' foreign news editor.

As America's troops prepare for another enforcement operation on foreign ground, shortwave radio listeners and Internet travelers around the world gear up for an influx of news from station correspondents and web sites. In the United States, CNN (*http://www.cnn.com*) has plans to increase its staff in war-torn Yugoslavia and the former republics, as do the networks of ABC, CBS, and NBC.

"It's not like anything we've covered before," said Bob Murphy, ABC's executive vice president for hard news. As with past military coverage, the risk is always there, but Bosnia may pose a threat far greater than in the Persian Gulf, due to lack of facilities or hotels, no real sources of food, the unbearable elements of winter, and spotty, undependable electricity. Snipers and hundreds of thousands of buried land mines increase the danger.

Searching the Internet

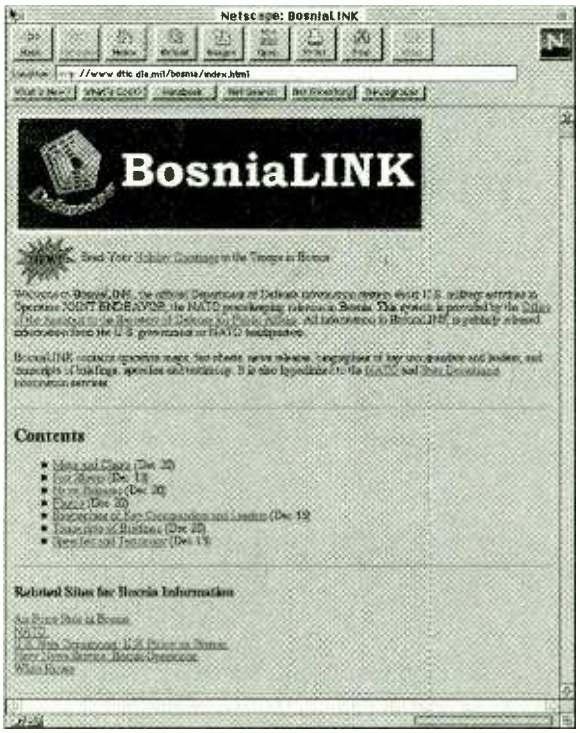
Internet enthusiasts can catch up on the history of Croatia via the World Wide Web, complete with maps, documents, and historical text covering the Balkan conflict.

Ex-Balkan patriots have assembled an assortment of computer sites related to the war, including newsprint articles and maps. Internet travelers also have available ongoing articles, speeches, and arguments. By far, the most popular sites are *misc.news.bosnia* and *soc.culture.bosna-herzgvna*. "Internet Relay Chat" (IRC) offers an ongoing source of news and information via "#serbia" and "#bosnia". Internet search services of Lycos, All in One, Internet Search, Web Crawler, and Yahoo all have numerous sources for Balkan updates.

Internet sites abound for world wide web browsers searching for the latest. Are you hooked on CNN? Check out the CNN Home Page address: *http://www.cnn.com/feedback/sitemap/html.* (or) *http:// www.cnn.com/index.html.* CNN International can be found at; *http://www.cnn.com/WORLD/index.html.*

The U.S. Defense Department has a WWW site called BosniaLINK, for the deployment of U.S. troops in Bosnia, that includes a congressional fact sheet on the mission at: *http://www.dtic.da. mil/bosnia/.* For an explanation of U.S. policy and the Dayton Agreement try: *http://dosfan.lib.uic.edu/boshome.html.* NATO's press releases can be found at: *gopher://marvin.stc.nato.int:70/11/yuoNEWS.*

Netherlands-based *The Daily News-Just the Links*, offers a connection of worldwide news organizations. Address: *http://www.cs.vu.nl/~gerben/news.html.*



The U.S. Defense Department maintains the BosniaLink site on the World Wide Web.

The Bosnia Home Page includes information on culture, NATO, history of the war and interviews. Address: *http://www.cco.caltech.edu/~.* The Home Page for Banja Luka (located in northern Bosnia-Hercegovina), contains links for former residents that include photographs, letters and information about the city.

The Balkan Media and Policy Monitor includes news reports from independent magazines in the Balkans, provided by an organization in Amsterdam at: *http://MediaFilter.org/MFF/MonIdx.html.*

■ Satellite Sources

C-Span (Cable-Satellite Public Affairs Network) offers C-Span Audio I on Satcom C3/F3 (131.0 west) Tr 7 (3.840 MHz.v) 5.20 MHz audio. A complete schedule of C-Span I audio services can be found in the November-December, 1995 issue of *Satellite Times.* C-Span Audio 2 is on Satcom C3/F3 (131.0 west) Tr 7 (3.840 MHz.v) 5.40 MHz audio. The BBC World Service in English is broadcast continuously 24 hours on this audio subcarrier.

For "bird-watchers," keep an eye on the World Radio Network. Two audio channels are available on Galaxy 5, channel 6: WRI is on 6.8 MHz with 24 hour English broadcasts from a variety of shortwave broadcasters; WRN2 is on 6.2 MHz, 24 hours with multilingual broadcasts. Complete schedules of these broadcast can be found in the Jan/Feb. 1996 issue of *Satellite Times*, available on your newsstand the first week of January.

■ Shortwave and Local Broadcasting

English news coverage on Bosnia may also be heard from international shortwave broadcasters. *Monitoring Times*' English Shortwave Guide lists hourly schedules for Radio Australia, BBC, Germany's Deutsche Welle, Radio Canada International, Belgium's Radio Vlaanderen International, Radio Finland, Radio Prague from the Czech Republic, Radio France International, RAI from Rome, Lithuania's Radio Vilnius, Radio Netherlands, Radio Portugal International, Radio Romania International, Voice of Russia from Moscow, Radio Ukraine International, Voice of America, and Boston's Monitor Radio International.

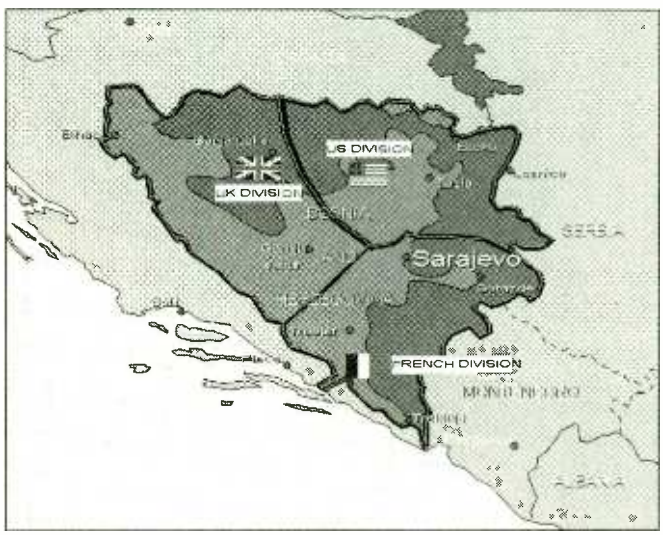
Balkan countries comprise the southeastern corner of Europe and include Albania, Bosnia-Hercegovina, Bulgaria, Croatia, Greece, the European portion of Turkey (Eastern Thrace), and Serbia (former Yugoslavia).

Shortwave broadcasting in Bosnia-Hercegovina is erratic and frequencies are variable. Radio-Television Bosnia-Hercegovina—a domestic station controlled by the Muslim-led government—broadcast only in Serbo-Croat at presstime on 7108.8 USB from 0000-0100, 0700-1940, and 2100-2300 UTC. Previously-used frequencies are 6220, 7059, and 7240 kHz.

Radio Yugoslavia uses two shortwave transmitter stations—one at Stubline in Serbia, and another at Biejelina in a Serb-occupied area of northeast Bosnia-Hercegovina. Because of the unstable situation in the area, particularly in Bosnia-Hercegovina, it has not been possible to confirm the current operational status of either of these stations. The transmitters at Biejeljina also carry external service broadcasts from Serb Republic radio (operated by the Bosnian Serbs), but these have not been heard since January 1995. Many transmissions are also broadcast in the Belgrade area on 100.4 MHz.

Armed Forces Radio is already being set up and tested to broadcast to the arriving troops on 100.1 MHz FM, according to an Associated Press report by Bryan Brumley. Initial programming will be a relay of the Armed Forces Network from Frankfurt, Germany. "Radio Bosnia" will reach a radius of only 12 miles from its studio in Tuzla, but is an important tool for information and morale.

Information spots will reinforce com-



Map derived from the Dayton Peace Agreement shows Serb-held territory, Bosnia Federation-held territory and the regions to be to policed by Britain, the U.S. and France.

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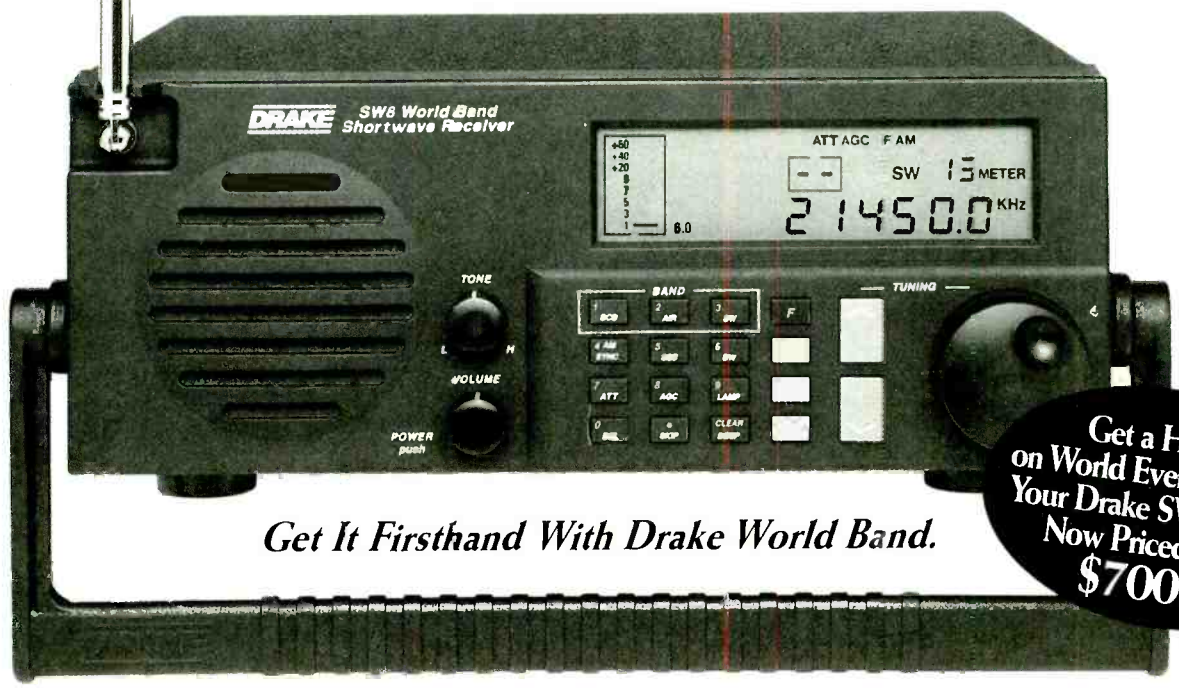

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U.S. Air Force C-17 Globemaster III crew members wave goodbye to the NATO ground crew after unloading a humanitarian cargo of 62 metric tons of kerosene and wood chips at the airport in Sarajevo, Bosnia-Herzegovina, on Dec. 8, 1995. The humanitarian cargo was flown into Sarajevo as part of Operation Provide Promise. The Globemaster III belongs to the 437th Air Lift Wing, Charleston Air Force Base, S.C. DoD photo by Staff Sgt. Efrain Gonzalez, U.S. Air Force.

A Humvee is unloaded from a U.S. Air Force C-130 Hercules at Tuzla Air Base, Bosnia and Herzegovina, on Dec. 13, 1995, as the aircraft keeps its engines running. The C-130 delivered two Humvee's that will be used to support the NATO Enabling Force of Operation Joint Endeavor. Enabling forces are moving into the Croatia, Bosnia and Herzegovina, and Slovenia theaters of operation to prepare entry points for the main Implementation Force. DoD photo by Senior Airman Jeffrey Allen, U.S. Air Force.

manders' messages, such as dressing warmly; morale will be boosted by "loud and crazy" DJ Sgt. Hank Minitrez, who will broadcast a live, Top-40's show from 5-9 a.m. A live evening music show is also planned.

Armed Forces television will follow shortly, to allay the concerns of servicemen afraid they'll miss the Superbowl. An AM, easy-listening format aimed at the adult audience is also in the works. "I'm pretty sure we'll be a hit with the local Bosnians," said Minitrez. "We just like to play music and keep people happy."

News Sources: AP news service, David Alpert; *Atlanta Journal/Atlanta Constitution/Fine Tuning*, John Babbis, Silver Spring, MD; Kevin Hecht, Devon, PA; Loyd Van Horn, Brasstown, NC; NASWA *Journal*, *Satellite Times*; BBCMS; *BBC Worldwide*; *BBC Summary of World Broadcasters*, Internet Shortwave Newsgroup.

Military vehicles are lined up in preparation for air transport at the marshaling yard at Rhein-Main Air Base, Germany, on Dec. 14, 1995. Long known as the "Gateway to Europe", Rhein-Main has become a marshaling point for the NATO Enabling Force of Operation Joint Endeavor. Enabling forces are moving into the Croatia, Bosnia and Herzegovina, and Slovenia theaters of operation to prepare entry points for the main Implementation Force. DoD photo by Airman 1st Class Lee E. Rogers, U.S. Air Force.

TABLE 1: English Language Programming from Balkan Countries

Target Areas:

af: Africa
as: Asia
au: Australia
eu: Europe
na: North America
sa: South America

Albania: Radio Tirana International

Times UTC	EST	Freq kHz
0145-0200	8:45-9:00 pm	6140na/7160na
0230-0300	9:30-10:00 pm	6140na/7160na
1715-1730	12:00-12:30pm	7155eu/9740eu
1930-2000	2:30-3:00pm	7260eu/9740eu

Bulgaria: Radio Bulgaria

Times UTC	EST	Freq kHz
0000-0100	7:00-8:00pm	7480na/9700na
0500-0600	12:00-1:00pm	7480na/9700na
1230-1300	7:30-8:00am	9810as/11605as
1300-1330	8:00-8:30am	9810as/11605as
2000-2100	3:00-4:00pm	7335eu/9700eu
2200-2300	5:00-6:00pm	7105eu/9700eu

Croatia: Croatian Radio

Times UTC	EST	Freq kHz
0000-0008	7:00-7:08pm	5895eu/7370eu/13830eu
0100-0108	8:00-8:08pm	5895eu/7370eu/13830eu
0200-0208	9:00-9:08pm	5985eu/7370eu/13830eu
0300-0308	10:00-10:08pm	5895eu/7370eu/13830eu
0400-0408	11:00-11:08pm	5895eu/7370eu/13830eu
0500-0508	12:00-1208am	5895eu/7370eu/13830eu
0600-0608	1:00-1:08am	5895eu/7370eu/13830eu
2300-2308	6:00-6:08pm	5895eu/7370eu/13830eu

Greece: Voice of Greece

Times UTC	EST	Freq kHz
0130-0150	8:30-8:50pm	6245na/7448na/9420na
0315-0330	10:15-10:30pm	Sun 6245na/7448na 9420na
0340-0350	10:40-10:50pm	6245na/7448na/9420na
0730-0745	2:30-2:45am	Sun 7450eu/9425eu 11645au
0745-0755	2:45-2:55am	7450eu/9425eu/11645eu
1240-1250	7:40-7:50am	9915af/11645af/15650af
1435-1450	9:35-9:50am	9420eu/15650na
1840-1850	1:40-1:50pm	11645af/15150af
1900-1910	2:00-2:10pm	9375eu
2145-2200	4:45-5:00pm	Sun 9425au
2240-2250	5:40-5:50pm	9425au
2335-2345	6:35-6:45pm	9935sa/11595sa/11640sa

Serbia: Radio Yugoslavia

Times UTC	EST	Freq kHz
0100-0130	7:00-7:30pm	Mon-Sat 7115na/6195na
0200-0230	9:00-9:30pm	6100na/7115na
1330-1400	8:30-9:00am	11835au
1930-2000	2:00-3:00pm	6100eu/9720af
2200-2230	5:00-5:30pm	6100eu/6185eu

Turkey: Voice of Turkey

Times UTC	EST	Freq kHz
0400-0500	11:00pm-12:00am	9445na/9560na/9655na/ 9685na/9760na/7190na
1330-1400	8:30-9:00am	9445eu/9630as
1400-1430	9:00-9:30am	9445eu/9630as
1930-2000	2:30-3:00pm	9445eu
2000-2030	4:00-4:30pm	9445eu
2300-0000	6:00-7:00pm	7280eu/9560as/7190na

Additional eastern European countries that may carry news updates in English, can be heard on the following stations.

Armenia: Voice of Armenia

0930-1000	4:30-5:00am	Sun 15270eu
2140-2200	5:40-6:00pm	7480eu/9965eu

Azerbaijan: Voice of Azerbaijan

1900-1930	2:00-2:30pm	4957eu

Belarus: Radiostantsiya Belarus

0030-0100	7:30-8:00pm	5940eu/13640eu/17665eu
1930-2000	2:30-3:00pm	Tues 5940eu/7105eu/7205eu/ 7210eu

Georgia: Georgian Radio

0630-0700	1:00-2:00am	11805eu

Hungary: Radio Budapest-
http://www.eunet.hu/radio

0200-0230	9:00-9:30pm	6190na/9850na/11870na
0330-0400	10:00-11:00pm	5965na/9850na/11870na
2000-2030	3:00-3:30pm	3975eu/5970eu/7250eu 9835eu
2200-2230	5:00-5:30pm	3975eu/5935eu/7250eu/9835eu

Kazakhstan: Radio Alma Ata

0630-0700	1:00-2:00am	5035eu/5915eu/6135eu

Latvia: Radio Latvia

2130-2200	4:30-5:00pm	Sat/Sun 5935eu

Moldova: Radio Dniester International

2130-2200	4:30-5:00pm	Mon/Wed/Thurs 6205eu

Radio Moldova International (via Romania)

0330-0355	10:30-10:55pm	7500na
0430-0455	11:30pm-11:55am	7500na
2200-2225	5:00-5:25pm	Mon-Fri 7500eu
2300-2325	6:00-6:25pm	Mon-Fri 7500eu

Uzbekistan: Radio Tashkent

1200-1230	7:00-7:30am	5060eu/5975eu/6025eu/9715eu
1330-1400	8:30-9:00am	5060eu/6025eu/9715eu

Frequencies and information herin are subject to change. Not all of the listed frequencies for each hour will necessarily be heard, depending on your receiver, location, propagation, and antenna. Any additions or correction are welcomed to gayle@grove.net

Monitoring Joint Endeavor Communications

By Larry Van Horn

As this communications profile is being written, Operation Joint Endeavor—the NATO operation in Bosnia-Herzegovina enforcing the Dayton Balkans Peace Treaty—is just getting under way. While some military communications associated with the operation have been monitored, a full report is not possible at this time until all the NATO forces get into place.

In the light of the peace agreement initialled in Dayton on 21 November 1995, the North Atlantic Council (NAC) authorised on 1 December 1995 the Supreme Allied Commander Europe (SACEUR) to deploy Enabling Forces into Croatia and Bosnia-Herzegovina.

On 5 December 1995, NATO Foreign and Defence Ministers endorsed the military planning for the Implementation Force (IFOR). On the same day the Acting Secretary General announced that fourteen non-NATO countries—which had expressed interest in participating—would be invited to contribute to the IFOR: Austria, Czech Republic, Estonia, Finland, Hungary, Latvia, Lithuania, Pakistan, Poland, Romania, Russia, Slovakia, Sweden and Ukraine. Two more non-NATO nations have since been invited—Egypt and Malaysia—and offers from other countries to contribute troops continue to be assessed.

All the NATO nations with armed forces (Belgium, Canada, Denmark, France, Germany, Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Turkey, United Kingdom and United States) pledged to contribute forces to IFOR.

The Peace Agreement (General Framework Agreement for Peace in Bosnia and Herzegovina) was formally signed in Paris on 14 December 95.

On 16 December 1995, the NAC approved the overall plan for the Implementation Force and directed that NATO commence operation "Joint Endeavor" and begin deploying the main Implementation Force into Bosnia that same day.

The Force has a unified command and is NATO-led, under the political direction and control of the NAC and under the overall military authority of NATO's Supreme Allied Commander Europe, General George Joulwan; the responsibility as Commander-in-Theatre was assigned to Admiral Leighton W. Smith, Commander-in-Chief Allied Forces Southern Europe, who assumed command of IFOR.

Enabling Forces

These forces were deployed in advance of the main body to facilitate the smooth flow of the deployment. They consist primarily of headquarters communications and logistics elements involving around 2,600 NATO personnel.

Elements of the Enabling Forces were from Allied Forces Southern Europe (AFSOUTH) Headquarters in Naples, Italy, and the Allied Command Europe Rapid Reaction Corps (ARRC) in Rheindahlen, Moenchengladbach, Germany. The rest were provided by other NATO commands as well as by NATO nations. They have deployed to a number of locations in Croatia and Bosnia-Herzegovina. Their task has been to establish logistic support and command and control to facilitate the establishment of the IFOR headquarters and the transition into theatre of the large numbers of soldiers, sailors, airmen and marines that will comprise the IFOR.

Thanks to SC-MAC

Material for this special communications profile comes from the finest military HF monitoring group in Europe — SC-MAC. I would like to thank Gerbrand Diebels and the entire SC-MAC team for their assistance and information used in this special *MT* feature. You can find out more about the SC-MAC group by writing: SC-MAC, Postbus 644, 5700 AP Helmond, Netherlands. All frequencies are in kilohertz (kHz).

TABLE 2: Utility Frequencies in the Balkans

Possible Air Warning Frequencies (Used during Deny Flight)

4066.0	6207.0

NATO AWACS HF Communications
(Callsign Magic ##)

Freq	Channel Designator	Freq	Channel Designator
3225.0	NC	4542.0	NE
4720.0	NF	4756.0	NG
4758.0	NH	6695.0	KF
6700.0	AA	6760.0	KD
6762.5	NI	8965.0	NJ
11228.0	AB (Flight crew only)	11270.5	NK
15050.0	NL	17996.5	NM

NATO HF Frequencies

3764.0	10100.0	12165.0	NATO Belguim ONY27-Mons: 5737.5

French Air Force (FAF) AWACS HF Communications
(Callsign Cyrano ##)

4704.0	5701.5	11215.0

HF Link Coordination Frequencies

6723.0	AWACS/CRC/CRP	5131.0	AWACS/CRC/Navy
5464.0	AWACS/CRC/Navy		

HF AWACS Voice-Tell Frequencies (Used during Deny Flight)

3272.5	3303.5 (ch G1)	5343.5 (Backup)	6836.0 (Backup)
8391.5 (ch B0)			

Italian SOC Frequencies

5183.5 (Rupe)	4660.0 (Rupe/Sasso)	6262.0 (Rupe)	6725.0 (Rupe)
6997.0 (Sasso)	8115.5 (Rupe/Sasso)		

Close Air Support Frequencies
ABCCC/AOCC/FAC coordination

3178.0	4789.0	4923.0	5084.0	5788.0	11173.0

Continued on next page

AirCent Close Air Support
4796.0 4830.0 5440.0 5706.0 6230.0 8085.0 11152.0

EC-130 (ABCCC) Dps
(Callsigns: EC-130 Bookshelf/42 ACCS/CAOC Ops-Aviano Bookshelf Ops)
4450.0 5103.5 5110.0 5312.0 6717.0 6932.5 7560.5 8083.0 9118.5 11161.0

Sarajevo Airbridge Frequency
5462.0

Belguim Air Force DNY77-Brussels
4728.0 8989.0 (Ch Y8) 11168.0 (Ch Y11) 11275.0
18002.0 18004.0 (Ch Y18) 18006.0 20320.0 (Ch Y20B)
20620.0 (Ch Y20A) 23275.0 (Ch Y23)

French Air Force
3880.0 5723.0 6742.0 6762.0 8972.0 11223.0
11270.0 11271.0 13245.0 13329.0

German Air Force DHM 91-Munster
3144.0 5687.0 (Ch E) 5688.0 5691.0 6692.0
6718.0 8985.0 10722.0 11179.0 11187.0
11217.0 (Ch M) 11238.0 11266.0 13231.0 13248.0
13342.0 17993.0 18006.0 23341.0

Italian Air Force
31 VIP Squadron-Rome: 8991.0 11356.0 13220.0
46BA Squadron-Pisa: 6748.0 11235.0
IAF Lampedusa: 4000.0 6787.0
IAF Rome: 4082.5 5685.0 9025.0
IAF Sarajevo: 13220

RAF STCICS
4742.0 5713.0 6739.0 9032.0 11204.0 11234.0
13257.0 18018.0

U.S.Air Force GHFS
4724.0 6712.0 6739.0 8968.0 8992.0 11175.0
11244.0 13200.0 15016.0 17976.0
Croughton GHFS Discretes: 4542.0 10648.0 13822.0
Incirlik GHFS Discretes: 11051.0
Ascension GHFS Discretes: 12107.0 13244.0

NATO Naval Blockade Frequencies (Sharp Guard)
3158.0 3182.0 4547.0 4555.0 4711.0 4763.0 (Link Coordination)
4930.5 (Voice-Tell North) 5077.0 5310.0 (Voice-Tell South) 5779.0 7904.0

Italian Naval IDR-Rome
3947.0 4082.5 4547.0 4724.5 4839.0 6747.0
8272.0 8302.5

U.S. Navy tactical frequencies
4702.0 4711.0 6720.0 6770.0 6804.0 8971.0
11205.0 11255.0 11267.0

International Committee of the Red Cross
(Both USB/LSB) 6990.0 6992.0 6994.0 6996.0 6998.0

Acronyms

ABCCC	Airborne Battlefield Command and Control Center (EC-130 aircraft)
ACCS	Air Command and Control Squadron
AOCC	Air Operations and Control Center
AWACS	Airborne Warning and Control System (E-3 aircraft)
CAP	Combat Air Patrol
CRC	Control and Reporting Center
CRP	Control and Reporting Post
FAC	Forward Air Controller
GHFS	Global HF System (USAF)
NATO	North Atlantic Treaty Organization
SOC	Sector Operation Centers
STCICS	Strike Command Intergrated Communications System (RAF)

General Mobile Radio Service

A SERVICE UNDER SIEGE

By Steve Berk KAE9390

When the "breaker, breaker, one niner's" start getting you down, you may want to look at this alternate communications protocol—then hope it doesn't go the way of Citizens Band.

Back in the old days, folks turned to (or tuned to) Citizen's Band radio when it came to personal communications needs. If you needed assistance on the highways, you'd dial up channel 9, and contact one of the local REACT (Radio Emergency Action Citizens Team) monitors. It wasn't a bad way to communicate, somewhat reliable, and still somewhat civilized.

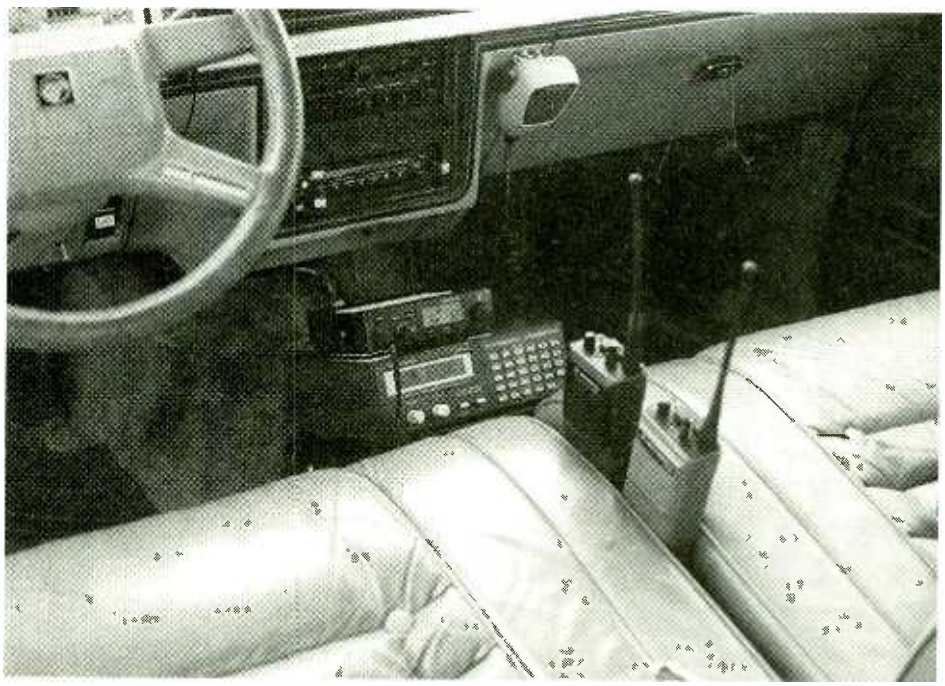
Then, along came the 70's with its truckers, the songs, and the Burt Reynolds movies. Citizen's Band radio became the rage of the country. Everyone had one, including many who shouldn't have. For the next several years CB radio became one of the biggest fads in the country—great for CB radio sales, but not so great for those poor communicators who couldn't get a *break* in edgewise.

It became so popular that the FCC couldn't keep up with the complaints or license applications. So, like the man who read so much about the bad effects of drinking he decided to give up reading, the FCC decided to give up licensing.

Today, any kid can plop down forty bucks at Radio Shack and take to the air with his favorite cuss words. If the forty bucks is too steep, CB radios are plentiful at some of the finer garage sales in any neighborhood starting as low as two bucks.

However, there are still those of us who want a reliable and serious communication vehicle for personal use, without having to compete with the *breaker, breaker, one niner's*. And let's face it, some of us have neither the time nor the aptitude for electronic theory and written tests, so an amateur license is not part of the plan.

Enter GMRS, the General Mobile Radio Service, consisting of 15 frequencies in the



Berk's mobile radio post includes a Kenwood TK803D UHF radio piggybacked on the PRO-2006. The Kenwood contains the GMRS frequencies as well as Shadow Traffic frequency, Galveston Office of Emergency Management frequency, and receive-only for Houston PD and Houston FD. The portables are Motorola: an MTX900 for his company's (Jansen & Co) 900 MHz trunked system, and an HT600 UHF with GMRS and Shadow Traffic frequencies for use at the scene of an incident.

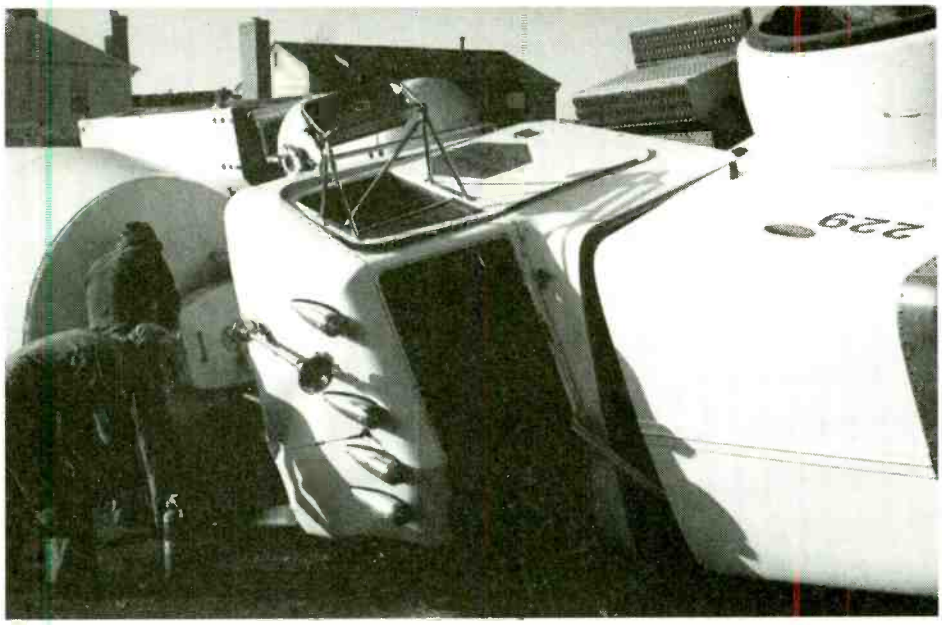


Photo by Joan Heinen

Besides providing reliable personal communications, GMRS channels are widely used by REACT teams to report traffic conditions, accidents, stranded motorists, etc.

UHF band—eight for repeater use and seven for simplex. Formerly Class A of the Citizens Radio Service (CB is Class D), GMRS is used primarily for personal communications between families and friends. Messages to pick up the kids from day care or to stop at the store for a gallon of milk are not uncommon, yet perfectly legal.

REACT teams—under their new acronym, Radio Emergency Associated Communications Teams—still use CB channel 9, but GMRS is becoming the preferred spectrum for REACT. Members enjoy the reliability and increased range of repeaters, and the maturity of its users.

For $60 and a completed FCC form 574, you can get a five year license, no test required. You may apply for two of the repeater frequencies, and you will get all of the simplex frequencies for free. You will also get the motorist assistance frequency (467.675/462.675), so you end up with a total of three repeater frequencies. This assistance channel is monitored by REACT teams across the country.

For an additional form 574 (and another $60), your spouse or offspring (18 or older) can get two different frequencies along with all the freebies, thus licensing your family for five GMRS channels. What a deal!

The *National Repeater Guide*, published by the Personal Radio Steering Group of Ann Arbor, Michigan, is a useful tool for locating REACT and other GMRS repeaters around the country. While most of the REACT teams use CTCSS frequency 141.3 on their repeaters, some of them operate on voice frequencies other than "675." Here in Houston, for example, the Houston Metro Emergency REACT team can be contacted on "725," while our neighbor to the south, Brazoria County REACT, operates on "600."

The frequencies allocated for GMRS are as follows:

Frequency Pairs for Repeater Use	Interstitial (split) Freqs for Low Power Simplex
462.550/467.550	462.5625
462.575/467.575	462.5875
462.600/467.600	462.6125
462.625/467.625	462.6375
462.650/467.650	462.6625
462.675/467.675	462.6875
462.700/467.700	462.7125
462.725/467.725	

In this range of the UHF spectrum, the transmitter input frequency is exactly 5 MHz higher than the repeater output. The radio equipment used on GMRS is the same type used by your local police or fire departments—a higher priced, quality radio, which helps keep the jokesters off of the band.

UHF equipment is readily available from several sources, including the classified ads. As more and more municipalities switch their communications to trunked systems, it might be worthwhile to check into some city or county auctions. Be cautious about getting a "good deal" on a crystal-controlled radio, as the cost of re-crystaling and tuning the unit may be far more expensive than a new or used programmable radio.

Some manufacturers are selling pre-programmed GMRS radios, but watch out: they are usually programmed for simplex use only. Before you buy, listen on your scanner to the GMRS frequencies in your "radio neighborhood" to find out what's already being used and by whom. Many businesses still use GMRS and you may not want to be part of that busy channel.

GMRS Up for Grabs?

That's the good news. Now the bad news. As you may have read in past issues of *Monitoring Times*, there is a move afoot to deregulate GMRS, drop the licensing requirement, and rename it the Family Radio Service. What's wrong with this picture? Please reread the first four paragraphs of this article.

GMRS users, especially REACT team members across the nation, fear that deregulating GMRS would invite the same abuse now cursing 27 megahertz. A secondary concern is that those who decide to use GMRS even in a mature manner would unwittingly interfere with the repeaters on which the REACT teams depend. Reliable access to a repeater is essential to relaying important traffic and other information to team members and to the news media, as well as to public service and emergency agencies.

The scheme to deregulate GMRS is being fueled by radio manufacturers, principally Tandy Corporation, under the guise of doing a great public service for potential radio users. In recent response to an outpouring of written objections to the FCC, the *Consumers Electronics Group* of the *Electronic Industries Association* stated, "FRS will satisfy the sizable demand that exists for a low-cost, sophisticated, two-way radio service capable of providing greater service reliability than citizens band (CB) radio without the regulatory oversight of the GMRS."

In plainer English, the above statement means, "we can sell a lot more radios because they don't need licenses." This issue has already come before the House of Representatives, which decided not to get involved, so the FCC took it upon itself to "fix something that ain't broke." This attempt to deregulate GMRS has about as much to do with public interest, convenience, and necessity as the Electronic Communications Privacy Act (ECPA) of 1986 had to do with privacy. Profit is the motive behind them both.

Well, if you're still interested in GMRS—and who wouldn't be?—look in your phone book under REACT to contact your local team. They'll be more than happy to explain the service to you, show you how to fill out the application, and most likely will try to get you to join the team. Do it. REACT is a valuable assistant to charitable and civic organizations, providing essential communications and other services during scheduled events. Our Houston team works regularly with the local March of Dimes, Special Olympics, and local parades.

Traveling around Texas as often as I do, I have been assisted by fellow REACT members on a number of occasions. Preparations for a trip always include consulting the *National Repeater Guide* for the local area frequencies.

Photo by Harry Baughn

You're 500 miles from home and your car breaks down on the freeway. But because you paid your $60 and a completed FCC form 574, you have a five year GMRS license, which includes the motorist assistance frequency (467.675/462.675). This assistance channel is monitored by REACT teams across the country, so your call for help will be heard!

GMRS is regulated under 47 CFR Part 95.1 - 95.181 Subpart A, but it's really dull reading. For a more coherent explanation contact:

Corwin Moore
Personal Radio Steering Group
P.O. Box 2851
Ann Arbor, MI 48106
313-662-4533 (voice)

GMRS opens up all sorts of interesting opportunities for the serious radio user, and just like CB and amateur radio, you get to meet a lot of interesting people. Next time you're in Houston, Texas, to visit the Johnson Space Center, or to wave goodbye to the Oilers, switch to 467.725 tone 141.3, and give a holler for "Metro 112." That's me.

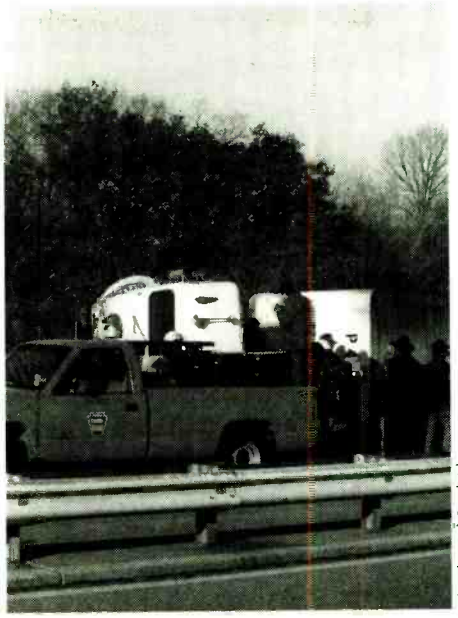


Photo by Mark Swarbrick

Steve Berk is the communications manager for Jansen & Company, a Houston based Public Insurance Adjusting firm, as well as a part time traffic reporter for Shadow Broadcast Services and a member of Houston Metro Emergency REACT. He is also a communications volunteer for the Galveston County Office of Emergency Management. In a former life he worked as a radio/television/newspaper reporter in California and Texas.

Keeping the QSL Fires Burning

By Jerry Berg

Most shortwave listeners enjoy collecting verifications. The emphasis is usually on QSLing new stations and new countries. As one's QSL collection grows, however, obtaining verifications from new stations and new countries becomes more difficult. Keeping an eye out for special shortwave events can produce many interesting opportunities for obtaining attractive new QSLs, sometimes from new stations, but more often from "programs" which may be interesting QSL targets in and of themselves. This may help keep one's QSL juices flowing when new stations are in short supply.

■ One-time or occasional transmissions

Be alert to special transmissions that occur only once, or occasionally, or for only a brief duration. These may produce "once-in-a-lifetime" QSL opportunities.

Among such short-term transmissions that have yielded highly valued QSLs are the usually-annual Radio St. Helena broadcasts (next one: October 1996; see QSL above); the Radio TV Hong Kong yacht race broadcasts usually transmitted only once a year over the station's rarely-used 2 kW shortwave transmitter; the British Forces Broadcasting Service, Australian Armed Forces Radio, and Radio Monte Carlo transmissions during the Gulf War; the September 1994 one-time broadcast from the Russian station, Radio Baltika, over shortwave facilities in St. Petersburg; and Radio Atlantico del Sur, a broadcast that emanated from BBC-Ascension during the Falklands War.

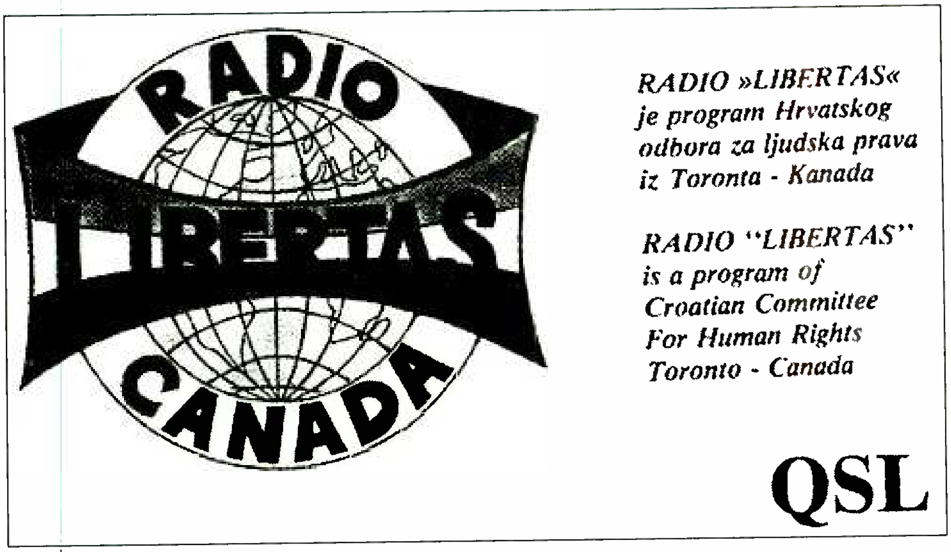
■ New sites

Use of a new transmitter site may be a good reason to send for a new QSL. Sometimes the QSL will be especially designed for the site, such as the Radio Japan broadcasts from Sackville, Canada, and Skelton, England, and the Radio Korea broadcasts from Sackville. Others may just make a note of the new site on the station's regular card, e.g. the AWR transmitter move to Cahuita, Costa Rica. For reports on new transmitter sites, always request that the site be specifically noted on the QSL.

■ Special services

Some broadcasters carry special services that are beamed to particular geographical areas or that carry special programming, and some of these have their own QSLs. Examples include the old CBC Northern Service, the Radio Marti program of the Voice of America, and the former "Radio Free Afghanistan" service of Radio Free Europe.

Some domestic services, such as the South Afri-



can Broadcasting Corporation's Radio Oranje and Radio Orion and the English-language "Capital Radio" program from Abu Dhabi, have also verified on their own letterheads. In such cases, be sure to mention to the station that you would value a reply on their own stationery.

Different languages

Many years ago, IBRA Radio (which used to broadcast via the Voice of Tangier, precursor of Tans World Radio) required reports for its many different language services to be sent to offices in different countries, and each office had its own QSL card.

While no broadcaster has such a policy today, some stations do occasionally issue separate QSLs for different language services. The BBC German service has long issued its own QSL card, as have, at times, the BBC Spanish service and HCJB's Chinese service.

Test transmissions

Special QSLs often accompany special test transmissions. Examples include loggings of WHRI when it first came on the air, the initial Radio Netherlands tests from Russian transmitter sites, the Radio Netherlands SSB tests, the VOA shortwave stereo broadcasts for the European DX Council, the special Northern Ireland Shortwave Relay Service transmission to North America in 1991, the R. Centras (Lithuania) SSB broadcasts over 9400 kHz, and the (apparently now concluded) tests of Radio Ropa in Germany.

New QSLs

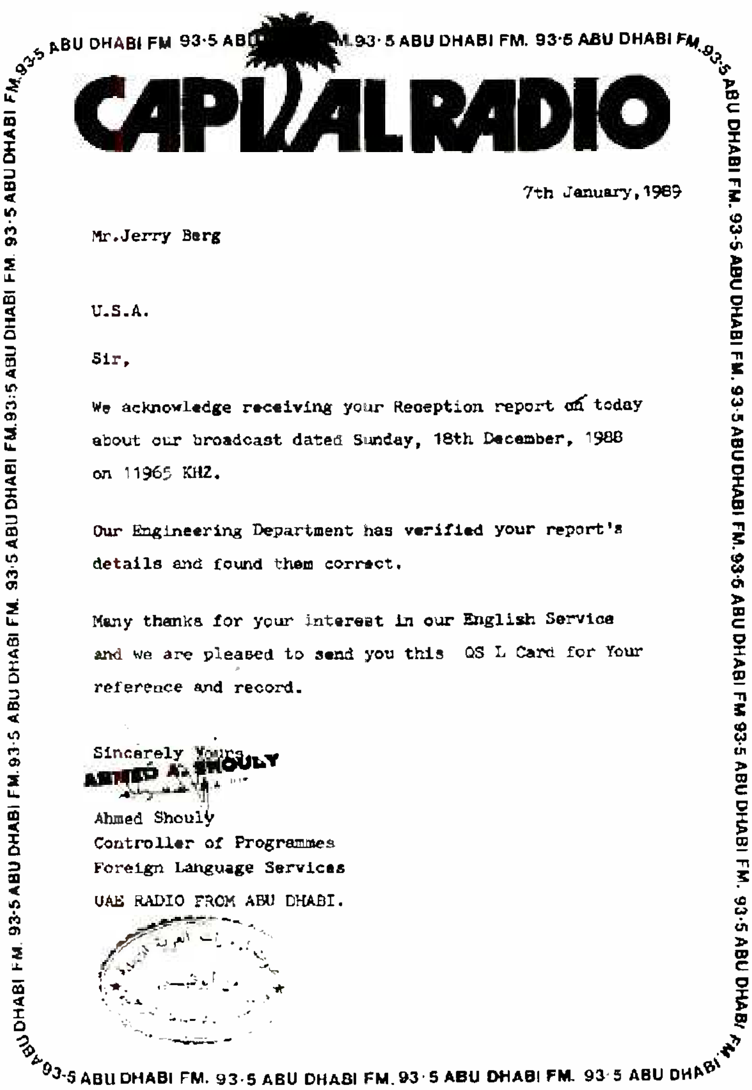
From DX bulletins you will sometimes learn that a station has issued a distinctive new QSL that is especially worth having. For example, prior to its closedown the VOA-Bethany verified directly, with its own card. Radio Australia issued a series of commemorative QSLs in 1988; AWR-Guatemala has several distinctive series of QSLs; Radio France International has issued a card picturing their Guyana transmitter site, as has the VOA with its Greenville site and its Crosley transmitters at Bethany. For years, Radio Canada International issued an attractive new card every year. HCJB is the leader in issuing different QSLs, having issued many, many series of specially-designed cards over the years. Adventist World Radio is not far behind.

Sometimes a new QSL will accompany a fundamental change in the station's service. CFCX in Montreal, Canada, began issuing a special certificate-type QSL when it started carrying the programs of CKOI, and WRNO has offered special QSLs for its Rush Limbaugh and Willie Nelson programs and New Orleans Saints football games.

Occasionally a station upgrades its verification policy and starts issuing more detailed QSLs. Some Eastern European stations, for example, will now indicate transmitter sites, which are often useful for station counting purposes.

Special event broadcasts

Stations sometimes offer special QSLs for special events. Examples have included notable anniversaries of such stations as Radio for Peace International, Radio RSA, KSDA-Guam, AWR, and CFRX. Some of the special programs acknowledged in QSLs include the NORDX-91 programs over Radio Centras and Radio Norway, the 750th *DX Telegramm* program over Radio Austria International (September 1993); a special DX program pro-


ABU DHABI FM 93·5 ABU DHABI FM. 93·5 ABU DHABI FM. 93·5 ABU DHABI FM

CAPITAL RADIO

7th January, 1989

Mr. Jerry Berg

U.S.A.

Sir,

We acknowledge receiving your Reception report on today about our broadcast dated Sunday, 18th December, 1988 on 11965 KHZ.

Our Engineering Department has verified your report's details and found them correct.

Many thanks for your interest in our English Service and we are pleased to send you this QS L Card for Your reference and record.

Sincerely Yours,
AHMED A. SHOULY
Ahmed Shouly
Controller of Programmes
Foreign Language Services
UAE RADIO FROM ABU DHABI.

duced in the Canary Islands and broadcast from the BRT, Belgium, in 1987; the September 1994 Samoa Broadcasting Service special over Radio Korea; and special 1994 Olympic programming from Radio Norway. HCJB has issued many special QSLs for call-in programs, amateur radio specials, and other events.

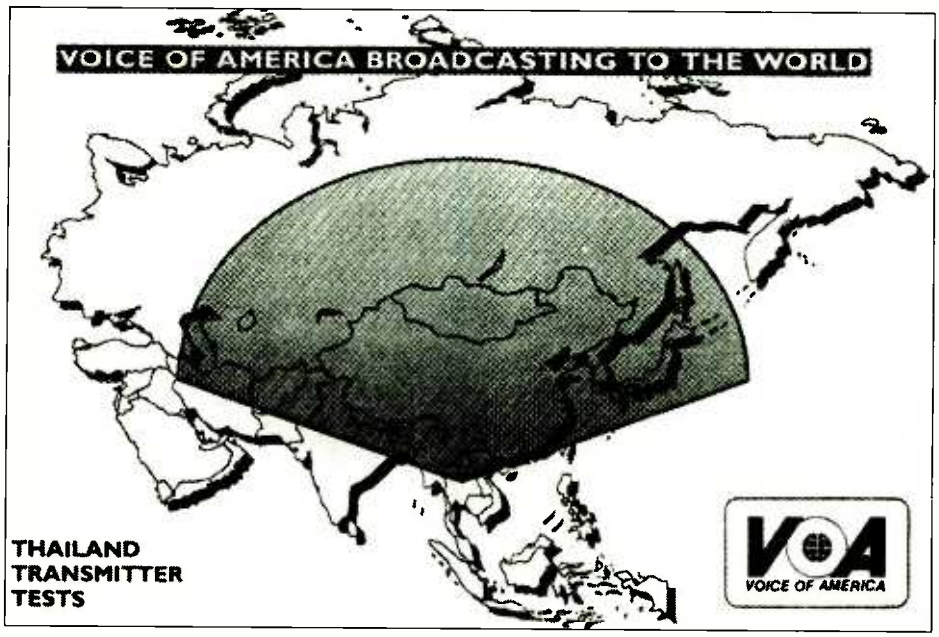
Last day transmissions may also produce special QSLs, as was the case with Radio DDR (absorbed into Deutsche Welle after reunification), TWR-Bonaire, and VOA-Bethany.

Alternative sources of verifications

Different offices of the same station may issue different QSLs, depending on where

you send your report. The UNESCO office in Paris has issued verifications for UNESCO programs over United Nations Radio. The UN in New York will verify these broadcasts as well, but the QSLs are different. In addition to obtaining QSLs through the Darwin headquarters of the Australian Northern Territory Shortwave Service (NTSS), the local ABC offices in Alice Springs, Katherine, and Tennant Creek have been known to issue QSLs for the NTSS shortwave transmitters located in these towns. The Central Australian Aboriginal Media Association (CAAMA), which produces some of the programming for these stations, has also verified some reports.

And, while All India Radio headquarters in New Delhi often issues "site" verifications for reports of their domestic shortwave stations (regardless of whether you write directly to the transmitter location or to New Delhi), you may receive a reply direct from



the transmitter location if that is where you sent your report. You can still write to London for BBC QSLs, but most BBC sites now verify directly with their own QSLs.

Occasionally a special QSL will be issued by a person or organization that has been authorized by the station to verify reports for it. Examples are the Radio Nacional de Chile veries that are issued by Chilean DXer Carlos Toledo Verdugo, and the TWR-Bonaire QSLs that used to be issued by the "Monitor DX" organization in Argentina.

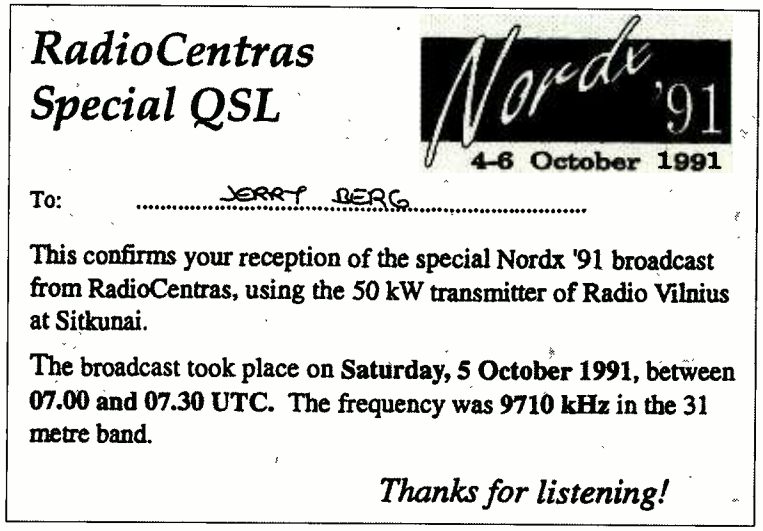
Third-party program QSLs

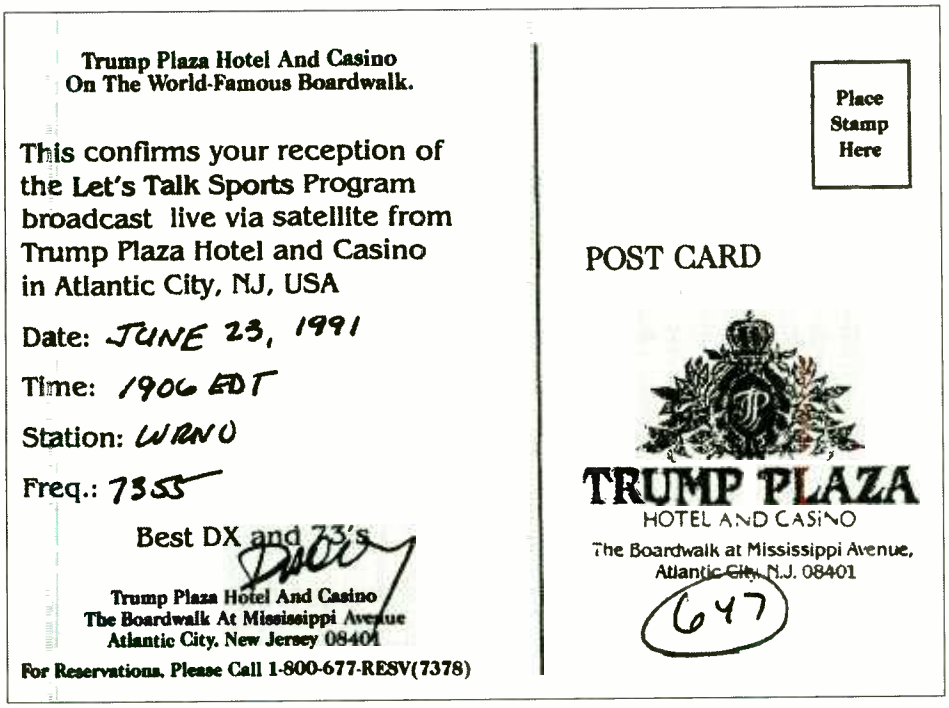
These are verifications issued by organizations that are not stations, but producers who originate programming under their own name for broadcast over one or more stations. Some such "programs" issue their own verifications. A few of the more interesting ones in recent years include the *Die Antwort* program produced in Switzerland for broadcast over Radio Minsk; *Radio Amahoro*, a Rwandan aid station broadcasting over Radio Ethiopia; the *Voice of Orthodoxy* broadcasts over Radio Trans Europe, Portugal; the *Voice of China* and *Voice of June 4th* programs over BBC, Taiwan; *R. Aum Shinrikiyo*, the Japanese cult which used to broadcast via Russia; the *Sounds of Aloha* program offered by KWHR in Hawaii; the *Radio Mitternachsruf* program broadcast via transmitters in Armenia; etc.

Sometimes DX programs offer their own cards, e.g. the now-defunct *Signals* program, and the National Radio Club, American Shortwave Listeners Club, and Australian Radio DX Club programs over various stations. Religious programs and Latin American "freedom" programs which transmit over private United States shortwave stations sometimes issue their own verifications as well.

The return of old stations

Finally, consider sending a report to a station when it returns to shortwave after a





Trump Plaza Hotel And Casino
On The World-Famous Boardwalk.

This confirms your reception of the Let's Talk Sports Program broadcast live via satellite from Trump Plaza Hotel and Casino in Atlantic City, NJ, USA

Date: JUNE 23, 1991

Time: 1906 EDT

Station: WRNO

Freq.: 7355

Best DX and 73's

Trump Plaza Hotel And Casino
The Boardwalk At Mississippi Avenue
Atlantic City, New Jersey 08401

For Reservations, Please Call 1-800-677-RESV(7378)

Place Stamp Here

POST CARD

TRUMP PLAZA
HOTEL AND CASINO
The Boardwalk at Mississippi Avenue,
Atlantic City, N.J. 08401

647

long absence. The station will often welcome the opportunity to reestablish contact with its listeners. Examples of stations in this category are ELWA, Monrovia, Liberia; Radio Renascenca, Portugal; and the Zimbabwe Broadcasting Corp., all of which were off shortwave for a time.

Interesting QSLs are always available if you seek them out. The best sources for information on special QSL opportunities are shortwave club bulletins, radio magazines like *Monitoring Times*, and the major shortwave DX programs. You'll find a list of DX programs on page 47.

Good hunting!

This article was first published in the July-August 1994 issue of ANDEX International, the newsletter of HCJB's ANDEX Club.

Virtual Downconverter

A New Approach to 800 MHz Coverage

By Steven Donnell, WA1KYL

Almost any scanner that can receive 800 MHz can also receive blocked-out cellular frequencies. Here's the theory behind the Virtual Downconverter and how it applies to the PRO- 2035/2042.

Goaded by the unjust prospect of 800 MHz coverage continuing to be curtailed in all new scanners, I was prompted to complete the development of a technique I have named the "Virtual Downconverter." This modification enables a scanner to receive the missing 869 - 894 MHz frequency band on a non-800 MHz frequency band segment—usually with the same, and sometimes even better, receive performance than if the scanner had within its CPU the missing "firmware."

Many people already know that for some models of scanners, you can receive cellular signals from around 880 MHz across the 894 - 916 MHz range. This is a technique called "image reception." In itself, image reception is nothing new; it has been both a boom and a bane for listeners since the advent of scanning. On the plus side, it was used as a way to receive signals from the 138 and 418 MHz areas that were not included in the programming ranges of most early scanner designs. On the minus side, it invites interference from off-frequency signals.

Understanding how image reception works is key to understanding how the "Virtual Downconverter" operates. For ANY one frequency that you have programmed into ANY scanner, you can actually receive signals on two entirely different frequencies. One signal is on the desired receive frequency and the other is on the so-called "image" frequency.

Let's review the basic process of how a scanner receives a signal: For a scanner to receive a signal on any given frequency, the scanner's CPU first instructs the scanner's local oscillator (LO) to generate a radio signal on a frequency that's removed from the desired receive frequency by a value equal to the scanner's Intermediate Frequency (IF). The IF of a given scanner is the "common" frequency that received signals from all other frequencies are converted to for further amplification, filtering, and detection (see Figure 1). Although the exact component and functional configuration of these stages varies between scanner designs, the general architecture remains the same.

One constant of radio physics is that when signals on two separate frequencies are combined or "mixed," signals on two entirely new frequencies are produced. These new frequencies are equal to the sum (Freq.1 plus Freq.2) or the difference (Freq.1 minus Freq.2) of the original two.

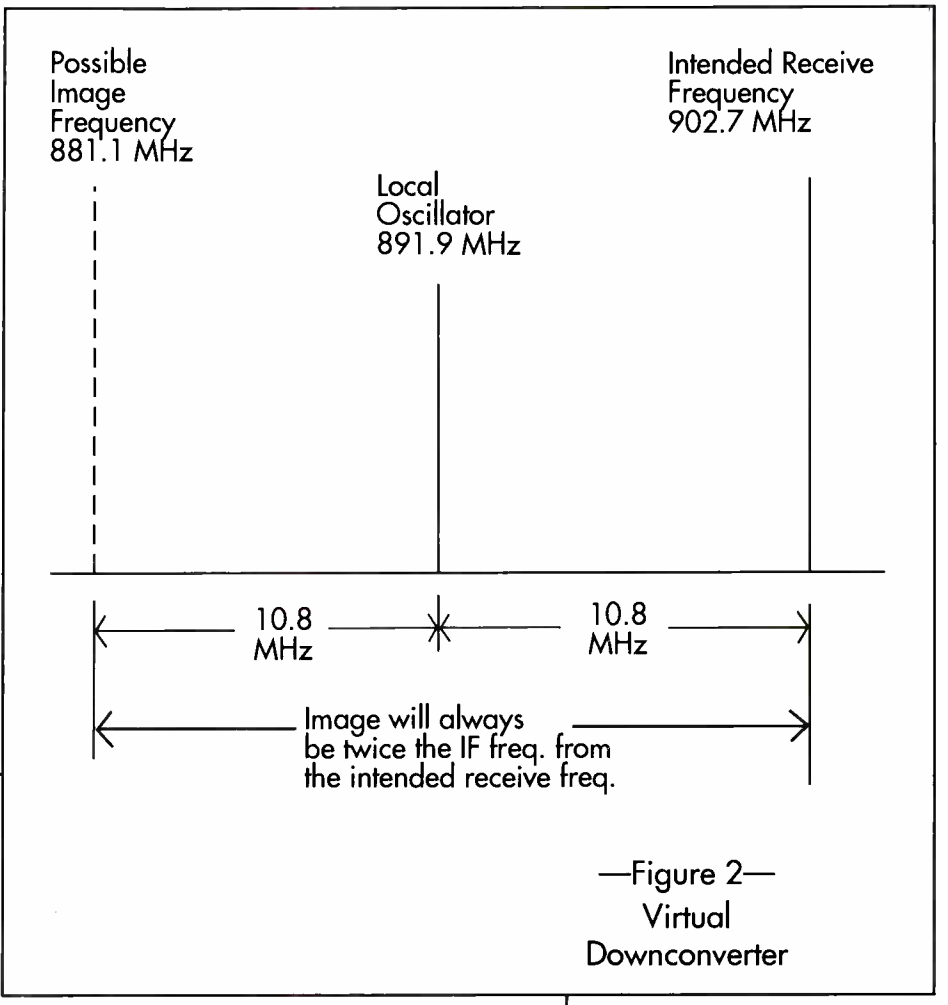
Let's say you want to receive a signal on a frequency of 902.7 MHz and you are using a scanner that has a typical IF frequency of 10.8 MHz (see Figure 2). The scanner's local oscillator will be programmed to produce a signal on a frequency of 891.9 MHz. If a carrier signal on 902.7 MHz is present, it will combine in the scanner's Mixer stage with the 891.9 MHz local oscillator signal, creating a new signal on the scanner's 10.8 MHz IF frequency. The equation is: 902.7 - 891.9 = 10.8 (MHz).

However, as mentioned earlier, there is a secondary frequency that can be received besides the one programmed into the scanner. The reason behind this is that there is more than one way that the 10.8 MHz IF signal can be produced: If, while trying to receive a signal on 902.7 MHz, a separate signal on a frequency of 881.1 MHz is present, that, too, combined with the 891.9 MHz local oscillator signal, will also produce a 10.8 MHz IF carrier and will be heard (891.9 MHz - 881.1 MHz = 10.8 MHz). Image reception takes its name from the fact that the secondary receive signal will always be an exact mirror "image" of the relationship of the primary, desired signal to the local oscillator's frequency.

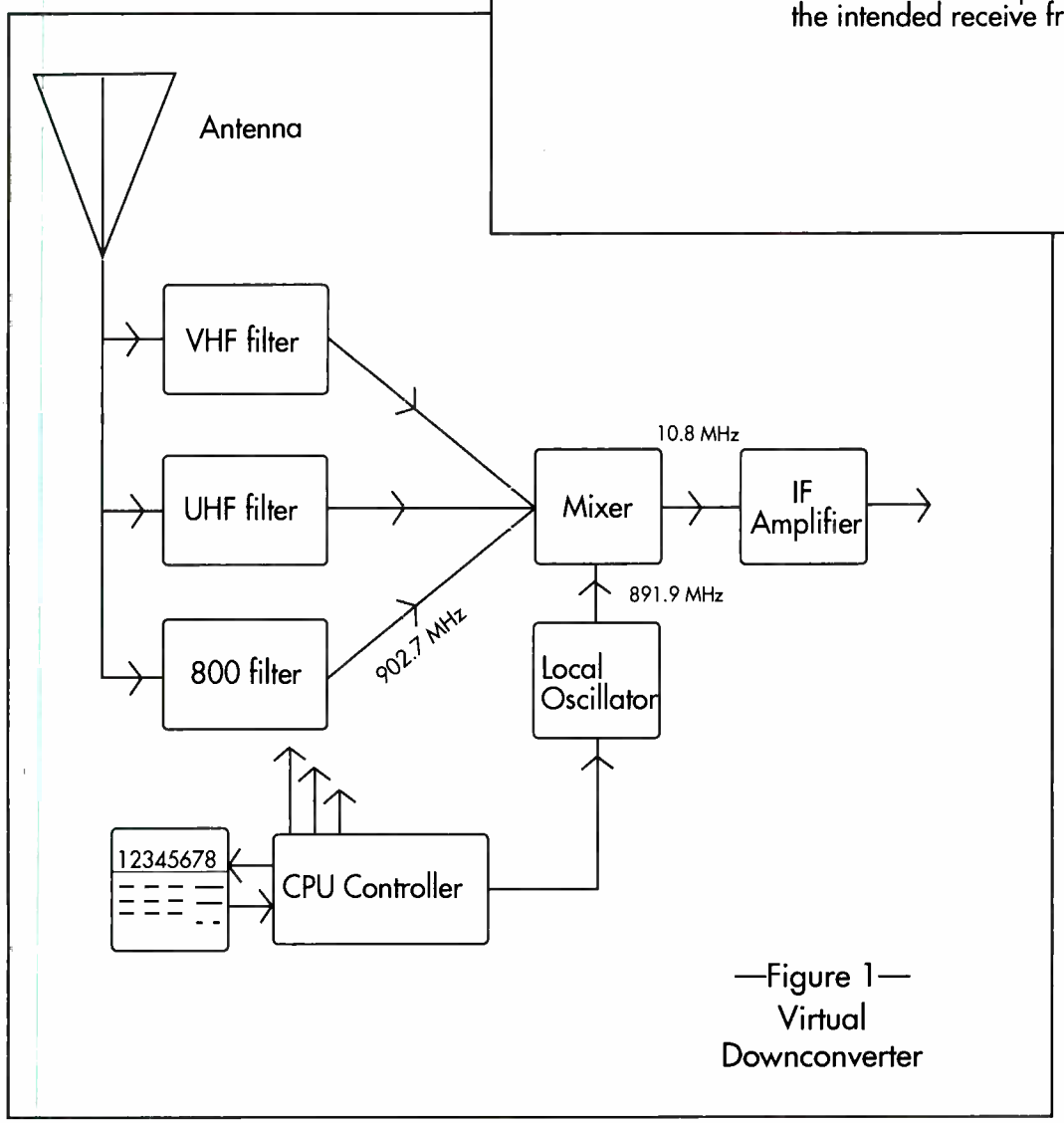
Some people already familiar with image reception may wonder why they should consider the Virtual Downconverter technique as a way to receive "blocked" 800 MHz band frequencies. After all, for most scanners where image reception in the lower part of the 900 MHz band would work, the frequency programming step increments for the 800 - 950 MHz band are limited to 12.5 kHz per step. This results in receiving some signals from the 880 MHz area as much as 2 to 5 kHz off frequency, which can cause them to sound distorted or to be missed entirely.

Additionally, with conventional image reception, the lowest "blocked" frequency that can be received is about 872.4 MHz (894.0125 - 21.6 MHz: 10.8x2), missing about 3 MHz of

The scanner's local oscillator will be programmed to produce a signal on a frequency of 891.9 MHz. If a carrier signal on 902.7 MHz is present, it will combine in the scanner's Mixer stage with the 891.9 MHz local oscillator signal, creating a new signal on the scanner's 10.8 MHz IF frequency.



—Figure 2—
Virtual
Downconverter



—Figure 1—
Virtual
Downconverter

The IF of a given scanner is the "common" frequency that received signals from all other frequencies are converted to for further amplification, filtering, and detection.

the blocked band that extends down to 869 MHz. By using the Virtual Downconverter approach in a scanner like a PRO-51 or BC-860, you get the entire 869 to 894 MHz band, with exact, on-channel tuning, along with normal 800 MHz receive sensitivity.

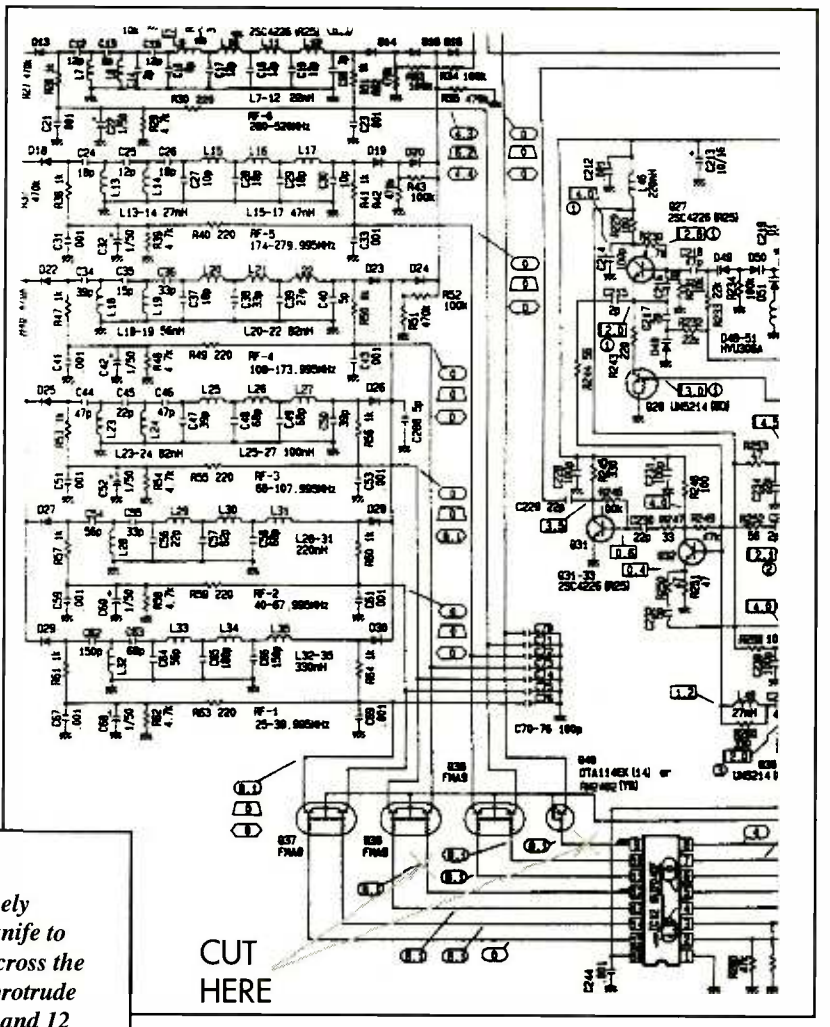
Even in some older scanners like the BC-760, which can be "restored" to full 800 MHz band frequency programming, there are some limitations to be considered: First, in most cases you still have the problem of frequency programming in 12.5 kHz steps to contend with. Secondly, you also have a problem with getting interference from 860 MHz trunked systems when scanning within the 870 MHz area. Neither of these concerns is a problem when using the Virtual Downconverter approach.

Bypass Surgery

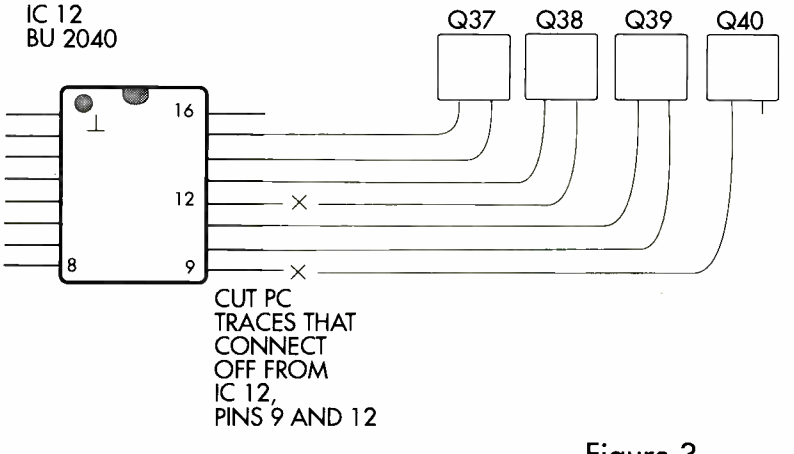
While understanding the process behind normal reception and image reception is key to understanding the Virtual Downconverter approach, it is only part of the story. Another key aspect of scanner design and operation is understanding how a scanner switches between different frequency "bands." In large part, this is done by employing various radio frequency band filters on the scanner's radio signal input stage. These filters help to reduce image and other signal interference but, more importantly, they determine what signals the scanner *does* and *does not* hear. According to the frequency band on which the scanner is operating, the scanner's CPU automatically selects which signal input filter will be used.

This is the heart of the Virtual Downconverter. Normal CPU control of these different input filters is overridden. The receive signal band filter that would normally be selected by the CPU is blocked OFF and the filter needed for 800 MHz band reception is "hot wired" ON. Although this usually involves merely switching or swapping two digital control lines, the specific technique required by different scanners varies considerably. Applying the principle correctly requires you to be somewhat knowledgeable in scanner receiver circuit design.

There are several things you need to do to allow reception of blocked 800 MHz frequencies: Since the scanner can't be directly pro-



Use a sharp, finely pointed hobby knife to make a break across the PC traces that protrude out from pins 9 and 12 on IC-12.



—Figure 3—
PRO 2035/2042
Receive Band Control Switch

grammed for reception of some 800 MHz band frequencies, you need to do some reverse calculating to find out what frequencies the scanner *can* be programmed for will result in generating the same range of local oscillator frequencies by the scanner's frequency synthesizer. You will also need to know what frequency(ies) is(are) used for the scanner's (first) IF.

You should also determine if the tuning frequency progression of the local oscillator steps in a direct sequence or if, as is seen in many cases, the local oscillator is tuned non-sequentially, but in a nevertheless fixed pattern. (The latter is largely only important if you need to develop a calibration table in order to correlate certain non-800 MHz frequencies, shown on the scanner's display, to "real" 800 MHz radio frequencies.)

There are a couple of important programming considerations that you need to take note of as well: Does the scanner permit narrow FM mode to be selected for a given frequency range used in the downconverter mode? This is not a problem with most scanners, but it was an issue when I tried using a BC-8500. In that case, the 800 MHz frequencies were being converted down to the 300 MHz UHF aero band, and it was therefore necessary to add an AM to FM switch feature.

Consider the available frequency steps for which the scanner can be programmed. Ideally, the scanner should do 5 kHz steps within the frequency range you need to use as your local oscillator source range. While 5 kHz may not be the most efficient in terms of frequency step rate, given the ultra-fast scan and search rates of most modern scanners, it's not a big issue. Consider it a small price to pay for permitting on-channel tuning.

There are a few models of scanner like the late-version PRO-43's that cannot be candidates for Virtual Downconverter modification because they do not offer user-selectable frequency programming steps. One exception is the simple BC-860 which, even though it does not offer programmable frequency steps, actually multiplies its 5 kHz frequency steps by 6, resulting in a frequency step rate of 30 kHz, which just happens to be what you most often need for perfect 880 MHz band reception. What a coincidence ...

Understanding the process of how the Virtual Downconverter operates is fairly easy and the principle can be applied to the majority of all scanners that include 800 MHz band coverage. Let's take a look at how to specifically go about this modification in two popular scanners.

Virtual Downconverter for the PRO-2035/2042

The PRO-2035 and its successor, the PRO-2042 (which uses exactly the same receiver design), use what is referred to as "triple conversion." That is, it has a total of three different IF frequency conversions. The only one that's important to the Virtual Downconverter is the First IF, which has an approximate frequency of 612 MHz. The primary effect of this IF is to put a much greater separation between any intended receive frequency and its image frequency.

Many folks already know that the PRO-2035 can receive (some) of the blocked 800 MHz band signals when the radio is tuned across the 1105 - 1115 MHz range. This phenomenon, however, is not due to image reception, at least not in the "classic" sense we described earlier. The mathematical relationship of the frequencies simply do not "add up." 800 MHz reception that does take place near 1100 MHz is a result of a "harmonic"—a multiple of the local oscillator's signal.

For example, when the PRO-2035 is programmed to receive a frequency of 1108 MHz, its local oscillator is set to operate at approximately 496 MHz (1108 MHz - 496 MHz LO = 612 MHz IF). As it happens, the third harmonic of 496 MHz is 1488 MHz (496 x 3). While utilizing the harmonic does permit some reception in the 876 MHz area, there are significant problems with this approach. The 1488 MHz harmonic is allowed by the design of the PRO-2035 to mix with potential signals in the 876 MHz area. This does result in producing the correct receive IF signal on 612 MHz (1488 - 876 = 612), creating what you hear out of the speaker. One problem, however, is that the 1488 MHz harmonic is significantly weaker than the fundamental local oscillator signal, resulting in a significantly

reduced receive sensitivity (3 microvolts or less).

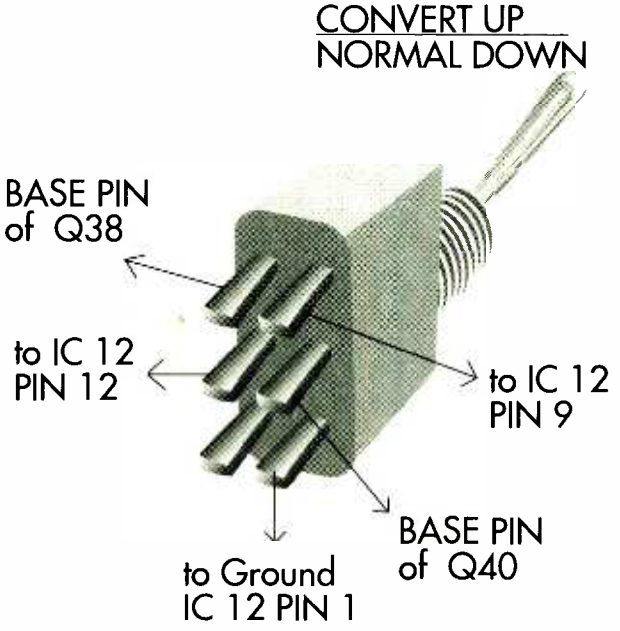
A more significant problem with this approach is from the tuning step rate of the local oscillator. The first local oscillator actually tunes in blocks of about 1.5 MHz, followed by the second local oscillator that provides the finer resolution tuning steps. The problem is that since the 870 MHz reception occurs by way of a third harmonic of the local oscillator, the wide tuning steps of the local oscillator are multiplied even further. This creates a misalignment condition where some 870 MHz frequencies covered in each step of that local oscillator are out of reach for the next frequency conversion by the second local oscillator.

It's a bit complex, but the end result is that in trying to receive "blocked" 800 MHz frequencies by tuning a PRO-2035 across the 1105 MHz area, you can actually receive, at best, approximately one-third of all possible frequencies.

While not entirely perfect, a major improvement can be achieved through the Virtual Downconveter approach. The primary limiting factor here is the frequency conversion design of the PRO-2035 does not permit 800 reception of the blocked 800 MHz frequencies by way of any local oscillator "direct" or fundamental frequency. Reception by way of the LO's third harmonic is due to the fact that the same input filter is used when the PRO-2035 is used over the whole 760 - 1300 MHz operating range.

A somewhat better approach is to use the second harmonic of the local oscillator by tuning the PRO-2035 across the 128.5 - 140.5 MHz range. When the PRO-2035 is programmed for, say, 132.0 MHz, its local oscillator is operating at a frequency of 744 MHz (132 + 744, LO = 612, IF). The second harmonic of 744, is, of course, 1488 MHz (744 x 2), and, since a 612 MHz IF signal will be created if an 876.0 MHz signal mixes with that 1488 MHz carrier (1488 - 876 = 612), the result is reception of an 876.0 MHz signal.

Use of the local oscillator's second harmonic has two principal limitations: There is still a misalignment problem because of the wider-than-normal tuning steps, so you can only receive about half the total possible frequencies, and the second harmonic of the local oscillator is still weaker than the fundamental. But the actual receive sensitivity from this approach has been measured in tests which show it to be about 0.75 microvolts. This is considerably better than that achieved by the previous method, and only slightly worse than the usual 800 MHz sensitivity of about 0.50 microvolts.



—Figure 4—
PRO-2035/2042
switch hookup
VIRTUAL
DOWNCONVERTER

Install two lead wires from the DPDT switch over to the connections on transistors Q38 and Q40 that were previously tied to pins 9 and 12 of IC-12.

It's important to note here that, as applied to other scanners, the Virtual Downconverter permits reception of *all* 800 MHz signals that are otherwise blocked, and at completely "normal" 800 MHz sensitivity. It is not simply a rehashing of image reception. In a scanner such as the BC-860, for example, we are not just swapping around control of the signal input filters.The digital control lines that are being swapped actually control activation of the VHF and 800 MHz receive converter circuits. One entire band converter circuit is being blocked *off* and another is forced *on*. Without this mod, *no* 800 MHz band reception can occur.

It's possible to do a "stealth conversion" on the PRO-26. Even though this requires some tight wiring and the use of a special (but cheap) switch IC, all the work is done on one side of one PC board. In place of the conversion switch, you can elect to use the ATT (RF attenuator) function to provide the switching logic—there's no external switch to mess up the appearance of the radio. Also, when you consider that the attenuation function on the PRO-26 can be set on a per-channel basis, this allows you to easily configure certain channels/banks with locally active conversion frequencies preprogrammed into them.

Performing the necessary circuit modifications for the Virtual Downconverter in the PRO-2035 or PRO-2042 is fairly simple. It merely requires wiring in a small switch to effect manually controlling two of the PRO-2035's signal input filters. The procedure is as follows.

Modifying the PRO-2035/2042

NOTE: This project is intended for the

experienced experminetor and should not be attempted by anyone unfamiliar with microsoldering electronic circuitry.

If you do not already have one, it is highly suggested that you have a copy of a service manual for the PRO-2035 or the PRO-2042. If you want a service manual for the 2042, be sure to order the service manual for the PRO-2035 as well; the portion that covers the receiver circuits in the PRO-2042 is only available in the manual for the PRO-2035! You can order one by calling 1-800-442-2425.

1) Unplug the radio from the AC power source.

2) Unscrew the telescopic whip antenna and remove it.

3) On the rear of the case, along the upper and lower edges, remove the four screws that secure the two halves of the case to the main chassis. Carefully lift up on the back edge of the case and pull it free of the chassis. *Caution*: the internal speaker is attached to the upper half of the case. Be sure to carefully unplug the cable from it that attaches to a connector on the main PC board. Then proceed to remove the lower half of the case.

4) Just to the right of center on the main PC board, locate and identify integrated circuit IC-12. It will be a "flat-pack" or surface-mount case, package style, with the number "BU2040" on it.

5) As shown in Figure 3, use a sharp, finely pointed hobby knife to make a break across the PC traces that protrude out from pins 9 and 12 on IC-12. Over on the left side of the rear panel, you will need to drill out a small hole to accommodate a small DPDT toggle switch. Carefully survey the exact location where you plan to install the switch. Is it up high enough not to interfere with the other components on the PC board? Do not locate the hole up so high that it interferes with the top cover being reinstalled. Be *sure* to completely remove *any* tiny burrs that fall into the interior of the chassis. Don't forget to label the switch.

6) Using Figure 4 as a guide, install three lead wires between the switch and pins 1, 9, and 12 of IC-12. I find the use of "wire wrap" type wire very well-suited for this type of work. With the proper tool, its insulation strips off very easily, there are no stray pieces to worry about, and its small gauge makes for easy hookups to very small solder connections. Also be sure to use a soldering iron with a very fine pointed tip. Use of #22 or smaller gauge solder is helpful here, too.

7) Referring to Figures 3 and 4, install two lead wires from the DPDT switch over to the connections on transistors Q38 and Q40 that were previously tied to pins 9 and 12 of IC-12.

Take a moment to inspect your work. Be sure you have not accidentally bridged solder across any of the pins of IC-12 or transistors Q38 or Q40. Plug the cable from the speaker back into its connector on the main PC board, reattach the top and bottom covers, and reattach the telescopic antenna.

Power up the scanner and proceed to program its search limits for frequencies between 128.5 and 140.5 MHz. Be sure to set the operating mode to narrow FM and program in a tuning step rate of 5 kHz/step. With the Virtual Downconverter OFF, the scanner should receive entirely normally. With the Virtual Downconverter set ON and with the PRO-2035 set in its search mode, you should be able to hear many more signals from the otherwise-blocked portion of the 800 MHz band than you had previously. Remember, though, that monitoring of signals used by the Cellular Mobile Telephone service is illegal.

Out-patient Surgery

If you do not feel comfortable with doing these modifications yourself, please contact the folks at Max Systems/Cellular Security Group.Their phone number is 1-508-281-8892.They are fully prepared to do this type of modifications for these scanners and many others for a nominal fee of $99.00. Some of the other scanners for which Cellular Security currently supports the Virtual Downconverter modification include Uniden's BC-220, BC-300, BC-9000, SC-150, and the Radio Shack PRO-25, PRO-51, PRO-2030, with more scanner models being added all the time.

DX Camps

Mania or Merely Masochism?

By Jacques d'Avignon

Sooner or later in the life of a shortwave listener he or she is offered the opportunity to attend a DX camp. Those who take the challenge may find that the experience serves as a rite of passage from just being an armchair listener to becoming a "real" SWL with the scarred eardrums to prove it. For those of you who are still uncertain what a DX camp is, I will try to explain what it is, when to organize it, how you organize one, and what you can reasonably expect to happen during this experience. (Some would say there's nothing reasonable about it!)

A DX camp is a reunion of SWLs at a very secluded and a noise-free site for the purpose of listening and identifying as many countries as you can, staying up all night and sleeping a few hours during the day. It's for exchanging ideas and tricks with your fellow SWLs on how to enhance your listening enjoyment. It's for discussing in depth the latest gadget, trying to see if it's worth your while to attempt to buy one without arousing the suspicion of the home front treasurer!

A DX camp is also the site of some horse trading and of deep consultation with the resident expert on how to snag that elusive signal from the far away land. Finally, it is a bonding process within the SWL fraternity which will be handy in the future on those occasions when the regular channels fail you and you need to ask the "experts" for some help.

Spice it up with competition

The DX camp can also turn into an interesting challenge, whether between two clubs or between two teams operating at the same site. In November 1995 the Ontario DX Association was holding a camp north of Toronto and the Mohawk Valley Short Wave Listener's Club was also organizing a separate camp in the Adirondack park in northeast New York state. A challenge was issued. Rules were set down, complete with handicaps!

The crew, from back to front: Harry Riddell, Rochester, NY; Roger Chambers, Utica, NY; Chet Dougherty, Whitesboro, NY; Larry Cohen, Utica; Daryl Rocker, Utica. Missing — Jacques d'Avignon, Canada, photographer.

The challenge was to log as many confirmed countries as possible within a specific schedule. One camp had over twenty participants and the other group only had five listeners, which explains why certain handicap rules had to be agreed upon. The smaller group did eventually win with over 110 stations heard and confirmed.

Twice a year, in spring and fall, no matter where you are—northern or southern hemisphere—SWLs feel the urge to get away from the static of the home environment, go to a very radio-frequency-quiet site, string all kinds of antennae (if you can call some of the contraptions "antennae"!), and spend a few nights and even days listening for that elusive signal from the antipode.

Spring camps are normally set up to reassure the SWL that there really are signals out there behind the static caused by the TV, the thermostat, the microwave oven, and all the other electrical gadgets used in winter, including the noisy electrical blanket. It is important to hear those signals before summer arrives and thunderstorm season blots out all signals and fries your ears.

The fall camp is likewise necessary to reassure the SWL that the receiver is still operating properly after the close call with the thunderstorms all summer and to ascertain that signals can be heard from the 5 kW transmitter in the 2 MHz band in the center of Australia. This camp is also the catalyst that keeps the SWL listening all winter to recapture the elusive signals that he heard at the DX camp.

Location, location, location

The location of the DX camp is very important. The first requirement is that no high tension power line is closer than 50 miles from the camp. Well, okay, no closer than 10 miles. The setting should be relaxing, so that the listener can walk out of the listening cell (which is about how he'll feel about the room by then), and be able to hear nature's sounds to rest the bruised eardrums. Mountain settings, deep woods, and secluded seashore beaches are the ideal locations for DX camps. It is extremely important that there be trees around to support the antennas.

Ensure that there are as few cottagers as possible in the vicinity. They can cause major problems by using electrical equipment such as electrical drills to repair their home or car, and they can be relied upon to turn on their TV during the prime time of your listening. If you intend to locate in deep wood or on high mountain territory, do not wait too late in the fall: heavy snow has a nasty habit of falling in those locations before it does in the surrounding towns. With today's budget cuts, the snowplows may not clear the roads as early after the storm as you would wish.

A view of the listening cabin at Camp Aldersgate, a United Methodist camp just inside the Adirondack Park. Looks inviting now, maybe—but then it snowed (see far left)!

Preferably, there should be a separate building for sleeping or catnapping; at the very least, the area reserved for sleeping should be quiet so that you can recharge yourself before your stint at the receiver controls. Food is important, but that can easily be taken care by stocking up on fruits, candy bars, sandwiches, salami, and an assortment of soft drinks. The most important items are COFFEE and TEA! During the last camp I attended it was calculated that each listener drank the equivalent of 1 gallon of coffee/tea per day, so make sure that this commodity is not overlooked in the planning. The coffee maker should be within 25 feet of the listening positions. If you can find a site that offers cafeteria service, fine, go for it, but advise the kitchen staff that the microwave oven is not to be used between 17:00 hours local time and 10:00 hours the next morning, local time.

Personal preparations

If you decide to attend a DX camp, make sure that you arrive early and choose a good spot to set up your equipment. And remember: you have to install your antenna. Normally DX camps are organized in areas where the trees will offer good support for all the wires being strung out. I pity the poor deer that decides to scout out the activities in the area. It would be a copper "jungle" around a DX camp. The immediate vicinity of a DX camp with all the antennae, the lead-ins, and coaxial wires looks like a very sophisticated monitoring station. As you will normally spend most of your time doing some active listening, it is not really necessary to stake out a good sleeping arrangement—you won't be using it much.

What should you bring? The list will vary with each attender, but there are some basic items that should be packed. A good receiver, a set of comfortable headphones, some antenna wire, an extension cord, a surge/power bar, tools, duct tape (to secure the various wires on the floor), and reference books.

Of secondary importance are a few changes of clothes, a sleeping bag is necessary in some camps, and anything you think you will need. Some candies, fruits, and possibly dry salami or beef jerky should also be part of the list of essentials. If you decide to bring a reading lamp to illuminate your listening area, *do not* bring a fluorescent lamp or a small desk lamp with a dimmer; these are major sources of radio frequency interference, and remember you are at this camp to run away from RFI!

Getting with the program

The listening routine establishes itself fairly early after the monitoring starts; everyone looks for their pet countries and keeps a log of what is heard. Normally someone keeps a master log to ensure that duplication logging is avoided and "assigns" targets to snag. It is interesting that monitors often forget to log Canada, the USA, BBC, and other "easy" countries and stations!

During the lulls in monitoring, the exchange of information starts in earnest and discussion groups get going. Much excellent information is shared during these very informal sessions.

When an unusual station is heard, it is normal for many, if not all, listeners to tune in to that same elusive station to help obtain a confirmation. This happened during the Mohawk Short Wave Listener's Club camp in November when we snagged the Australian stations on 2.310 and 2.325 MHz in the very early morning hours. Very shortly afterwards a few Papua New Guinea were heard. Everyone in the room was tuned to the same frequency and got to experience it first hand.

Very important tools during DX camps are the many information sources that are found in listening posts around the country. Books, magazines, and private lists found on Internet are all sources that can be consulted when you are searching for a specific country or are trying to confirm what station you are hearing. It is interesting to see the various sources that surface during DX camps and change hands.

How to organize a DX camp

If you want to set up a DX camp in your area, look at the possibility of using church camps. Early in the spring and late in the fall there are usually some weekends available to accommodate your groups. Try a motel closed for the winter. It is quite possible that the owners could accommodate you. Look for resorts that normally cater to business meetings and training sessions; very often the weekends are open for small groups. If you own a summer cottage, and your group is small, that is also a possibility.

A well-organized camp is an asset to club members or simply to a dedicated group of SWL's that wish to get away from the high level of noise present in a city environment. It is also an excellent site for exchange of ideas and for "training" new recruits in the finer points of our hobby.

No, SWL's are not masochists, and they're maybe only a little crazy. But at least once a year they simply need to be reassured that their receivers are still operational, and to exchange notes with others who are just as passionate as they in their pursuit of those elusive radio waves.

DXing *a la* Hatteras: An Alternate Style

Though by their nature the hours are grueling, DX camps are not necessarily a survival course. While Jacques d'Avignon braved the snow in up-state New York, George Zeller and eight others spent the weekend sharing a luxury condominium on Hatteras Island, North Carolina. The DXing is the thing, though. "We ran plenty of antennas, and had a nice quiet spot. Most of our logs were SWBC stuff, although European MW and LW came in nicely around sunset. I also heard about 15 pirates. All in all, a good time was had by all."

Skip Arey, WB2GHA
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Used Receivers — What a Deal!

We stand at an odd crossroads in modern electronics. The digitalization of all aspects of consumer electronics, including the radios and, of course, computers we hold so dear to our hobby, has turned many folks into rabid seekers of the latest "bleeding edge" technology. This led to a personal awakening, originally involving computers but coming around to radios as well.

I was about three-quarters done with the first draft of a new beginner's radio book. I returned home from my Alaskan holiday (the basis of my November *MT* column), to discover that my nearly state-of-the-art Pentium PC had sent a couple of components to computer heaven. The system is under service contract but I was forced to wait a few weeks for parts.

Having been burned a few times in the past, I had my priceless prose backed up. I was able to keep the project going (and write my columns) on a used SX386 laptop that I picked up for $250 last winter. In other words, I was able to accomplish what I needed using a system that cost me less than the price of a new hard drive for my main computer. Hmmm . . . what does this say about where technology might be taking us?

Sure, we all covet the latest and greatest technology, and those who have the disposable income fall over one another to get it. Fortunately, this results in the disposing of yesterday's latest and greatest hardware. It wasn't that long ago that some folks were desperate to buy that SX386 that kept me on my deadlines. The same goes for radio equipment. The rush of some folks to get the newest receivers that the manufacturers have to offer has created a great number of "nearly new" bargains for the shrewd hobbyist.

I've always had a soft spot for used equipment, but my tastes always ran to older tube gear. Now, on the premise that deals like my SX386 might just apply to the radio world, I did enough hunting around to prove it's true. You can find some great, reasonably priced, used receivers without needing to return to the world of vacuum tube technology. As a matter of fact, you can get a receiver that does almost the same job for a lot less money if you can forego a few new features in favor of an often substantially lower price.

How about a few cases in point? The ICOM R-71A has a current street price in the neighborhood of one thousand dollars for a new unit. That's a pretty expensive neighborhood for most beginning shortwave monitors. But used units of this receiver can be found for half that amount, making this a good choice for that first "big league" receiver for many folks. Drop back another couple of years and you can find the R-71A's predecessor, the R-70, for even less cash. Both of these receivers earned a well-deserved reputation over the last ten years or so. Their solid state construction could keep somebody happy for another ten years so long as he or she remembered to replace the memory backup battery.

Here's another example: The Kenwood R-5000 also has a new street price in the same range as the ICOM R-71A unit and similar used pricing, as well. If $500 is too steep a price for modern technology, you can consider the R-5000's baby brother. The Kenwood's R-2000 receiver appears on the used block for less than $350. At this price you are still getting a full featured, solid state receiver that will bring you the whole world.

Want to know what Uncle Skip uses for much of his listening these days? When I don't feel the need to warm up one of my grand old R-390A's (giving those rare tubes a rest), I spend a lot of time tuning around on a well-used solid state Yaesu FRG-7700 that I picked up for around $200—and you can bet I'm not missing anything worth hearing! The FRG-7700's predecessor, the FRG-7000, shows up on the used market for under $150 today: one quarter of its original price.

Just about every receiver manufacturer came up with a few portable units during the late 70's and early 80's. The early Sangean digital portables such as the ATS-801 and ATS-803 make great beginners' rigs that can be found for well under $150. If you are willing to give up such luxuries as digital tuning, you can find dozens of great, used, solid state receivers for under $100. Keep an eye out for the Panasonic RF-2200. People still talk about the incredible performance of this mid-1970's portable.

Preliminary Considerations

A couple of resources that any used shortwave receiver hunter needs to have are Fred Osterman's two short books: *Shortwave Receivers, Past and Present*, $8.95 and *Buying a Used Shortwave Receiver*, $3.95. These books are available directly from Fred at Universal Radio Inc., 6830 Americana Parkway, Reynoldsburg, Ohio 43068-4113, 1-800-431-3939. The books will give you information on specifications and pricing so you can make intelligent decisions when it comes to putting down your cash. Also, if you have access to back issues of *MT* or other radio magazines, look for equipment reviews of the receivers you are interested in. Check the

logging lists in older club publications for an idea of what was "hot" gear 5 or 10 years back.

But let's talk a bit more about money! As with most hobby activities, one must start by taking a hard look into one's pocketbook. I don't think your family will appreciate you spending several mortgage payments on radio monitoring. Start by looking at what you really have to spend without risking family bliss. A good point of departure would be to plan to spend 75% of your allowable funds on your receiver and then utilize the remaining 25% to acquire your antenna and accessories. This little exercise in personal economics makes the quest for used gear that much more practical.

The decision to purchase a used receiver is very difficult to make, especially for someone new to the shortwave hobby. As I said earlier, it is possible to essentially double the buying power of your budget when purchasing a comparably-featured used receiver. However, the same warnings apply to the purchase of used radios that apply to used cars, with one notable exception. Used receivers tend to hold their resale value through several owners.

This means that, if you are someone who wants to try shortwave listening but are unsure of your interest, you could purchase a modestly-priced used receiver. Then, when you are ready to leave this aspect of the radio monitoring hobby or move up to a new or newer receiver, you can sell it for almost what you paid for it. Some folks have gone their whole radio hobby careers without ever once buying a piece of new equipment. Their loggings are just as valid as those brought in by today's latest technology.

A little research goes a long way in making a purchase that can last for many years. Don't get too rattled when you see the wide range in prices between used and new equipment. While the advanced features of some higher priced receivers are most certainly desirable, they are by no means necessary for full enjoyment of the shortwave hobby.

If you choose the used receiver route you must add on a few additional considerations. Once again, think about the kind of things you will look for in the purchase of a used car. Does the receiver show signs of abuse or excessive wear? Do all the dials, knobs, and meters perform their tasks properly? Is the person you are making the purchase from trustworthy? What kind of guarantee is being provided, if any? If at all possible, use the receiver for about an hour to get the feel for anything that might represent a problem due to overheating. During the hour trial, make it a point to leave the receiver tuned to one frequency for about fifteen minutes and check for any drift off frequency. Ideally, you should try to get the use of the receiver for a few days before making your final decision.

■ Where to Look

Okay, you've decided to dip your toe in the waters of used receiver ownership. Where should you start looking? If you are in the market for a used receiver, you will do well to examine the classified sections of your local newspaper or similar sections that can be found in many radio and electronics publications. Don't scoff at the local newspaper idea. I acquired my first R-390A through this resource. I found this listed in a general "sales" column, not under any radio or electronic heading.

Radio hobby magazines will also clue you in to the location of flea markets, swap meets, and amateur radio "hamfests" that represent the best source of used equipment. Also, some of the radio hobby specialty stores that advertise in magazines such as *MT* deal in used gear as well as new equipment—including Grove Enterprises.

Don't be afraid to wander around the more traditional, non-radio oriented flea markets and swap meets with your significant other. I once surfaced a classic Radio Shack Model 655 TRF Long Distance AM portable for five bucks! This is still the receiver of choice for many mediumwave DXers. I've also added substantially to my collection of early pocket transistor radios for what amounts to pocket change. You'll never know what is going to turn up until you look.

A resource I recently used to locate a piece of used gear was *The Amateur Radio Trader*, P.O. Box 3729, Crossville, TN 38557. 1-800-774-2623. This twice-monthly, radio classified magazine will not only give you a few hundred resources for that equipment you are looking for, you will also get a good notion of the most current pricing for most used gear. The magazine contains ads both from people selling and people looking for equipment. My years' long search for a Kenwood VFO-520 unit to go with my low band rig was solved with one ad.

Okay, we've followed the shortwave route on this excursion through the used radio world. How does this information shake out for hams and scannists? The answer is, great. Used ham gear can save an operator a small fortune. Old Uncle Skip does all his low band work using a fine old Kenwood TS-520 (which now has a VFO-520 to work DX splits). Older ham gear also has the advantage of being fairly easy to maintain and repair without needing to resort to sending the rig out for servicing.

Likewise, scanning receivers can be found for substantial savings. Bearcat 200 XLT's will never die, but will always show up on the used market. Right now the market for nearly-new scanning receivers is a bit more volatile due to the fact that many of these fine used rigs can be modified to give full coverage on 800 MHz. This means that some of this equipment will demand higher prices for a while.

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

Staying in Hot Water

Someone once said, "If you keep your feet in hot water, you'll stay clean." As I look back over the past eight or nine years as the Scanning Report Editor, I've probably got the cleanest feet of anyone on the *MT* staff. Since this is my final column, I thought I'd indulge in a little "nostalgia" and share a few of the times that I found myself in "hot water."

When an inmate from Augusta State Prison wrote to me and said that he wasn't allowed to read *Monitoring Times*, I immediately went to his aid. I provided him with the Augusta State Prison frequencies and suggested that he scratch them into his prison wall (January 1990 *MT*). A short time later, the inmate was placed in solitary confinement and I received a complaint from the American Civil Liberties Union. The ACLU requested that I stop poking fun at the inmate and to refrain from mentioning the incident in future columns.

My column on eavesdropping from within the Soviet embassy in Washington, DC, stirred a great deal of interest (March 1989 *MT*). Mail came in from a variety of sources, including a letter from my congressman. The Honorable Curt Weldon had been part of a congressional committee that was investigating electronic eavesdropping from within the Soviet embassy. At my request, Congressman Weldon tried to schedule a tour of the embassy for me, but the request was denied.

A heavy frown wrinkled the forehead of the New York FBI when I provided a list of FBI antenna repeater locations for the New England area (April 1990 *MT*). The FBI apparently contacted publisher Bob Grove, and advised him that providing repeater locations jeopardized their communications security. Bob asked me to stop mailing the list—but not until I sent Grove Enterprises a copy!

When I printed two incorrect shopping mall frequencies in my October 1992 column, an Ohio scanning club featured my mistake on the first page of their club bulletin and followed it up the next month with remarks from club readers who had also noticed the discrepancy. It was testimony to how closely my column was read and also to the expertise that readers continue to demand of *MT* writers.

Bob Kay on the loose in the public library, looking to get into "hot water."

Another club newsletter became very upset when former editor Larry Miller and I offered the "Scanning Test" (January 1991 *MT*). To sabotage the "Scanning Test," this particular club bulletin actually printed the answers to one of the tests. *MT* readers, however, loved the idea. The certificates are still hanging in listening posts throughout the United States, Canada, and overseas.

Shortly after the *Wall Street Journal* published a front page article on the hobby of scanning in October 1990, NBC news called me to discuss cellular phone monitoring. NBC wanted to interview me on camera, but they quickly dismissed the idea when I refused to link cellular monitoring with scanning. I simply told them that anyone with a cable-ready television could connect a UHF bow tie antenna to the back of their set and then tune across TV channels 80 through 90. As you probably guessed, NBC didn't want to feature me listening to cellular phone calls on a television. For further information, check out the March 1991 *MT*.

In the July 1990 issue of *MT*, I used my column to write an open letter to all cordless phone owners. In that letter, I explained in layman's terms how easy it was for anyone to monitor a cordless phone. That column was reprinted by newspapers such as the North Dakota *Daily Herald* throughout the country. As you may imagine, reader responses to that column kept me in hot water for a long time.

At this point, I'd like to dip my feet into hot water for one last time. For your information, here is a list of frequency ranges that are illegal to monitor: 459.700 to 459.975 MHz for private plane airphone communications, 894.00 to 896.00 MHz (AM mode) for commercial plane airphone communications, 46.61 to 46.97 MHz for traditional cordless phones, and 824 to 849 and 869 to 894 MHz for cellular phones.

As I dry my feet and pull on my socks and shoes, I realize that it's time to say good-bye. It's time to move on and to look for new scanning adventures. Where am I bound? Dunno. You'll probably see me around in the feature pages. I can only tell you this: If my feet get dirty, I won't hesitate to put them in hot water. Keep on Scanning!

■ Treasure Hunt

This is also the last Treasure Hunt for the Scanning Report. Appropriately, our last prize give-a-away is from Grove Enterprises. To kick-start your new year, Grove Enterprises is providing their new FCC Database on both CD-ROM and High Density Diskette. You'll get public safety, railroad, business, industrial, broadcast, maritime, and many others. Here are the clues:

1) Briefly describe the Radio Shack #25-0202.
2) Briefly describe the Grove #ACC 143.
3) What is the U.S. one year subscription price to MT?
4) Caller ID provides the call signs for radio transmissions. True or False?
5) The Grove SDU-100 is compatible with the ICOM R-7000. True or False?

You can sort through fields like city, service, state, callsign, antenna height, and output power, or you can custom tailor the program to fit your personal search needs. The Grove CD-ROM Database also offers a unique mapping program. The program displays a map of major roadways in your area, and it actually shows you where the transmitter site is located. To win the CD-ROM Database, send your answers via post card or letter to Treasure Hunt, P.O. Box 98, Brasstown, NC 28902. Sorry, no bulk mailings or faxed entries will be accepted.

Frequency Exchange

Living in **Hanna City, Illinois,** Bob Sloan listens to the following frequencies.

37.16	Youth center	37.22	Hill prison
37.36	Cloyton work camp	42.62	Police
42.66	Radio repair--police	154.905	Police
154.935	Prison	453.15	Police
458.90	Police	458.95	State university
851.6125	State university		

Jake Nesby of **Hickory Grove, Mississippi**, wants to share the following:

42.18	Stote Police	42.20	Stote Police
45.00	Stote Parks	45.22	Sheriff
151.45	Forestry	151.415	Forestry
154.16	Fire	154.19	Fire
154.695	Truck wt. enfrcmt.	155.46	Truck wt. enfrcmt.
155.655	Police	453.425	Trash pick-up

Lou Richards is a railroad fan and he listens to the Burlington Northern railroad from **Wilkes-Barre, Pennsylvania.**

160.260	160.320	160.380	160.455	160.500
160.590	160.620	160.650	160.665	160.695
160.920	161.100	161.160	161.250	161.280
161.385	161.415			

Another railroad fan, Hank Farewell, wanted to share his **Philadelphia, Pennsylvania**, Amtrack frequencies.

160.440	160.455	160.215	160.905	161.280
161.520				

Working as an emergency medical technician, Bobby Brown, sent in the following frequencies for **Jackson County, Georgia**.

45.560	Emergency medical	47.300	Road crews
47.320	Road crews	47.340	Road crews
47.400	Road crews	153.845	State college
153.860	Augusto college	154.905	Sheriff
465.3625	Police		

Fran Branson lives in **Breckenridge, Colorado**, and wanted to share the following:

151.145	Game protectors	151.280	State porks
154.280	Fire	154.695	State Police
154.755	Stote Police	154.875	Police
154.935	Stote Police	155.475	Stote Police
155.565	Sheriff	155.950	Police
453.035	Boulder College	463.175	Game protectors

In **Sun Prairie, Montana,** an anonymous reader sent in the following:

39.50	Hospitol	153.74	Highway dept.
153.905	Police	154.68	Police
154.815	Stote Police	155.16	Ski potrol
155.28	Board of Heolth	155.475	Stote Police

Another anonymous reader sent in the fire cache frequencies for **Seattle, Washington.** Readers living in forested areas throughout the nation will also find these frequencies to be active.

166.675	169.175	169.20	170.00	168.70
168.10	166.6125	167.10	168.47	414.65
415.40	415.50	417.30	417.35	417.50
417.80	168.05	168.20	168.60	168.35
168.55				

Our final stop is with Lou Perkins. Lou lives near **Philadelphia, Pennsylvania**, and he has provided the Federal Building frequencies that may be active nationwide.

406.35	406.55	406.75	406.95	407.15
407.35	407.55	407.75	407.95	408.15
408.35	408.55	408.75	408.95	409.15
409.35	409.5	409.75	409.95	410.15

The Frequency Exchange wants to visit with you! Send your favorite frequencies to the Frequency Exchange, P.O. Box 98, Brasstown, NC 28902.

Wash & Wear Radio

Comments about wash and wear radio started when someone wrote in and explained how they salvaged a wet scanner radio by drying it in an oven. Things got wacky when more readers wrote in with additional ideas. Here are a few examples: 1) Washing electronic parts in a dishwasher; 2) drying electronic gear in a microwave oven; 3) hanging electronic gear on the clothes line; 3) suspending electronic parts in a clothes dryer.

I was afraid to continue with the idea after one reader complained that his scanner radio failed to work after he had washed it in the family dishwasher!

Stupid Questions

Most folks will tell you that the only stupid question is a question not asked. During my years at the helm of the Treasure Hunt, I started to make people think twice about that statement. Here are a couple of the "stupid" questions I asked:

1. How much does the average cloud weigh?

Responses to this Treasure Hunt Question arrived from around the globe. One reader sent a three-page essay that explained how clouds are formed. The correct answer is, approximately two and a half tons. The information came from the Franklin Institute Science Museum in Philadelphia, Pennsylvania.

2. Can computer viruses can be transmitted by airborne dust?

Hey, don't laugh! Most of the answers that I received would lead one to believe that computers should come equipped with surgical dust masks. The correct answer is, "false." A computer virus is nothing more than a program that has been written to damage other files.

Finally, there's one last secret that I'll let you in on: I never discarded a Treasure Hunt entry because of a wrong answer. Right or wrong, they all went into a pile. We shook them up, closed our eyes, and pulled out a lucky winner.

■ Speeding, Radar, and Scanning

Whenever I mentioned radar guns and speeding in the Scanning Report, my editor would usually say something like this, "Radar guns and speeding have nothing to do with scanning." Now that's just not true: I know for a fact that you guys are rolling down the highway with vehicles that resemble the inside of a Radio Shack store. You have radar detectors, a scanner radio, a global positioning system, a cellular phone, and at least three antennas on the outside of your vehicle. In fact, you're probably considering adding a fourth antenna and a laptop computer.

Maybe I'm wrong: maybe it is time for me to write my last line. But, if speeding, radar, and scanning don't mix, why do I see advertisements in scanning magazines for the "Zapper?" As most of you know, it's a device that triggers radar detectors. Scanner buffs are mounting them in their vehicles and are having a hilarious time falsely triggering the radar detectors used by speeding motorists. One last helpful hint: Your best protection against the new laser guns *doesn't* involve radio—just keep your lights on.

■ Mall Frequencies

Here's my last stab at providing shopping mall frequencies. Check 'em closely: I may have slipped in a "mistake"! 151.745, 464.975, 464.775, 464.9125, 154.5700, 154.5150.

■ Legal Listening

Although you can't listen to cellular phone calls, you can legally monitor land line repair crews. Here are a few of the frequencies to check: 35.16, 151.985, 451.225, 451.275, 451.30, 451.325, 451.35, 451.375, 451.40, 451.525, 451.575, 451.625, 451.575, 462.475.

■ Movie Scanning

Is there a motion picture film crew in your neck of the woods? If so, here are the "channels" to watch. 152.87, 152.90, 152.96, 153.02, 173.225, 173.275, 173,325, 173.375.

■ Scanning Alaska

If you're looking for a free home, Alaska may be in your future. In specified areas, you can claim a wild woods cabin by simply staying in it for three months. Here's the catch. The polar bears in these areas don't take kindly to human visitors. If you can keep the bears at bay, you get to keep the cabin.

What does this have to do with scanning? Well, if you're a scanner buff, you might want to listen to 31.04 MHz. That's the frequency for the tracking collars that have been attached to some of the bears—the same bears that may be coming to scratch down your back door.

■ Cordless Monitoring

In Denver, Colorado, a Jewish family used a scanner radio to monitor their neighbor's (for clarity, I'll name the neighbors "Smith") cordless phone conversations. As most of you already know, monitoring cordless phone conversations has been an illegal act since October 25, 1994. The District Attorney in Denver, however, didn't know that. On the basis of the taped cordless conversations, which included ethnic slurs about Jews, the D.A. filed charges against the Smiths.

Now here's where it gets interesting. When the D.A. realized that it was illegal to monitor cordless phones, the DA volunteered to pay the Smiths $75,000. Why? Because the D.A. was afraid that the Smiths would countersue, alleging invasion of privacy.

At this writing the Smiths have indeed countersued the Jewish family, and the Colorado Anti-Defamation League is accusing the Jewish family of conspiring to ruin the Smith's reputation.

The moral of the story? I'll take you back to the Communications Act of 1934. Basically, the Act says that you can listen, but don't repeat what you hear. And that's the best advice that anyone can give. (News clipping from the *Morning Call*, Allentown, PA).

■ Next Month

Your new Scanning Report editor, Richard Barnett, will take the helm to steer you into new waters. But you're all invited to write. The address is 134 Miller Road, Bechtelsville, PA 19505. If you're in the area, I'm on the dirt road that's two corn fields away from the pig farm. You're all invited to stop in and talk about the good monitoring times.

AOR AR8000 Accessories

ScannerWEAR

- Memory banks include 100 channels per bank with frequency, description and mode.
- NEW database scan by service code, create memory banks from service codes.
- NEW memory bank up and downloads.
- NEW config window with support for com ports 1-8, IRQ call on all ports.
- NEW slave-master scanning with CIV protocol, scan on your receiver and all hits are transferred to the slave receiver for monitoring.
- NEW minimize window allows viewing of frequency status while in any other WINDOWS or DOS application.

SSE BHA3

Universal base stand for handheld scanners and transceivers

- Heavy chrome base for extra stability, even with heavy handhelds.
- Adjustable front support stop which adjusts to fit all popular handheld scanners and transceivers.
- Convenient rear panel ENC connector for external antenna attachment- Use a short jumper to your radio and remove stress of large external antenna cable from your handheld's connector.
- Deluxe felt-lined radio tray that won't hurt your handheld's finish.

PSU101

This quality, custom-designed combination desk charger and regulated power supply unit is perfect for convenient 'Base Station' use of your handheld scanner at home or office!

- Securely holds scanner in proper position
- Charges radio's internal NiCad w/out overcharging
- Powers radio for standard 117VAC house current

MA-500

The MA-500 is a magnet mount antenna designed for the AR8000. It is designed for mobile installation as well as outdoor installation. For mobile installation, mount the MA-500 on the trunk lip. Since the MA-500 is exclusively designed for a reception purpose, no transmission features are available.

AOR

Remote Computer Scanning System

The RCSS, Windows '95 compatible Software significantly enhances the AOR AR8000 receiver's capabilities by providing automate Personal Computer control over the receiver's scanning, logging and memory functions! These features and many more make this software a great choice for Windows use.

ScanCat Gold

Can be used to restore full coverage of the AR8000.

Our software allows complete control of all functions supported by these radios through the standard manufacturer's interface.

SCANCAT allows you to:

1. Enter any one frequency and increment up-down from that point.
2. Enter any two frequencies and scan between them with ANY increment, time delay or pause.
3. Scan a file of frequencies, search by description or wildcards.
4. Create Databases of frequency files. Sort by any field, and save to disk and/or send to printer.
5. Create 30 personal "Preset" frequency BANDS for SW, aircraft etc. including increment and mode. The most popular presets are included in the program.

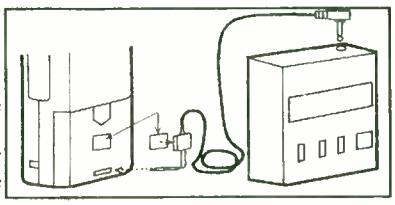
• Multiple Scanning Banks • Multiple Scanning Diskfile Banks
• Unlimited Files Sizes • Dual Radio Simultaneous Scanning
• Comma Delimited Conversion • D-Base Support. Scanport- Gold
• Direct Import of TRS • Macro Control per Record
• Command Line Control • Automatic Birdie Lockout
•Top Hits Table

Computer interface for the AR8000

Unlike some of the European devices sold today, this unit is smaller, lighter, and makes no power demands on your receiver. With the extra shielding and smaller size there is less chance of additional interference leaking into your radio. The AR8000INF is also the only interface that is upgradeable for use with the optional Tape recorder controller.

AOR SAC8000

The SAC8000 is a connection kit for the AR8000 Scanner. Once the SAC8000 is installed, the AR8000 can easily be connected to the OptoElectronics Scout™. Any frequency captured by the Scout™ instantly tunes the AR8000 receiver.



Other Available Accessories:

CR8000 - Tape Recorder Interface
SC8000 - Soft Case
DS8000 - Speech inversion descrambling chip

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USAF MARS Stations Closing

A lot of rumors have been circulating in the past year that the various military service MARS (Military Affiliate Radio System) branches would be consolidating into one combined service sometime in the near future. From conversations that I have had with the various services this appears to be nothing more than a proposal at this point. However, budget cuts have started to have an affect on the various services MARS programs as illustrated in the following information sent to us by Paul Swietek.

"Headquarters Air Mobility Command has officially directed U.S. Air Force MARS stations at Andrews, Scott, and Travis Air Force Base (AIR, AGA3HQ, and AGA6TR respectively) be downgraded to unfunded (standby) stations effective October 1, 1995. The exact structure and operations of each individual MARS stations at these locations will be determined by installation disaster preparedness planning and operation requirements as outlined in applicable Air Force and local base directives. This means that there will no longer be a military MARS facility operating on a daily basis at the above installations. Net control duties will be assumed by qualified affiliates appointed by the appropriate regional and national officials.

"Kelly Air Force Base (AGA4KE) will be the sole remaining active MARS station in CONUS (continental United States). Under the recent round of the base realignment and closing (BRAC) hearings, Kelly Air Force Base, Texas, is designated to be closed. A MARS station is expected to remain operational until the base is deactivated. -- Chief USAF MARS."

Paul says that as of October 1st all the CONUS stations were downgraded to Class B military MARS stations. "They still have the equipment at the stations, but they have it turned off and they do not have the operators to man the stations fulltime," Paul said. He further notes that as of now, amateur affiliate members have no way of getting TRANSCON (trans-continental) traffic from overseas. In the past they had to rely on Travis and Hickam Air Force Base to contact stations in Korea like AGA8OS. Due to this situation they have been trying to find ways to route traffic using Army MARS stations.

Many thanks to Paul for the information on USAF MARS. I suggest *MT* readers needing to log the various MARS service outlets for their logbooks should get cracking now before it is too late. Separate MARS services with their distinctive callsigns could go the way of the dinosaur.

■ ARIA has Moved

ST columnist Keith Stein checks in with some information on the ARIA (Advanced Range Instrumentation Aircraft) missions that are normally heard on HF in connection with civilian and military space launches. The 452nd Flight Test squadron now operates these aircraft out of Edwards AFB, CA. These aircraft used to be part of the 4950th Test Wing stationed at Wright Patterson AFB in Ohio. Tail numbers for the aircraft based out of Edwards are as follows:

ARIA Aircraft Tail Numbers

EC-135E	EC-18B	EC-135E	EC-18B
60-0374	81-0891	61-0326	81-0892
61-0329	81-0894	61-0330	81-0896

During the recent launch of Galaxy 3R from Cape Canaveral on an Atlas Centaur 2AS booster, two ARIA aircraft were heard during the launch (callsigns ARIA 1 and 2) supporting the mission. The ARIA 1 aircraft appeared to cover the western portion of the Eastern Test Range (ETR) and provided telemetry data during the first phases of the Galaxy 3R launch. During the Centaur rocket 2nd main engine firing, the ARIA 2 aircraft took over duties of tracking the mission. According to the launch commentators covering the launch live on Brazilsat A1, C-band transponder 4, ARIA 2 was forward based out of Ascension Island.

ARIA aircraft are used as flexible airborne telemetry data recording and relay stations. These aircraft were designed and developed to supplement land and marine telemetry stations in support of DoD and NASA space and missile programs. These ARIA aircraft have the capability to acquire, track, record, and retransmit telemetry signals, primarily from the S-band (2200-2300 MHz) frequency range.

The ARIA deploy throughout the world to obtain telemetry data from orbital and reentry vehicles as well as air-to-air and cruise missile tests. This includes support of tests conducted at Cape Canaveral AFS, Vandenberg AFB, Hill AFB, Eglin AFB, Edwards AFB, and from submarines. Normally, the telemetry data is obtained in locations such as broad ocean areas and remote land areas which are outside the coverage of ground stations. Selected portions of the data may be retransmitted in real time, via UHF military satellite, to enable the launching agency to monitor system performance. All data is recorded on magnetic tape for post-test analysis.

The communications subsystem on these aircraft provides voice communications through three 1,000 watt single sideband HF transmitters and receivers, and data transmission through a 1,000 watt AN/ARC-146 UHF satellite terminal. The HF radios are tunable over 280,000 discrete frequencies in the 2 MHz to 30 MHz frequency range and are capable of simplex or full duplex operation. Voice communications provide a link between the deployed aircraft and the 452nd Aircraft Operations Control Center (AOCC), also known as ARIA Control, at Edwards AFB, CA. AOCC provides flight-following and mission update information during aircraft deployments. Data retransmission to the launch agency via satellite allows instantaneous analysis of critical events aboard the spacecraft. The ARIA mission uses the AFSATCOM and Navy LEASAT and UHF Follow-On communications satellites.

According to Keith, he first heard the ARIA support aircraft on 10780 kHz, but they quickly settled in on 11414 kHz as the launch operation proceeded. Listeners can also check other NASA voice

frequencies for ARIA communications during future launch operations. ARIA UHF military satellite operations have been monitored on a downlink frequency of 260.600 MHz (narrowband FM).

These aircraft offer some very interesting listening up to three hours before and during spacecraft launches. You can get an idea of when the aircraft are going to be operational by watching the *Launch Schedules* column in *Satellite Times* edited by Keith Stein. Thanks, Keith, for the info.

■ Address Updates

Mike Hardester passes along an address update for the Rescue Coordination Center (RCC) in Edinburgh, commonly heard here in the U.S. during the evening hours on 6757 kHz. According to the verification signer at the station a lot of ute hobbyists are sending their reports to England instead of *Scotland* where the station is actually located. The complete address for station MKL is as follows:

HF SAR Comms
RCC Edinburgh
RAF Pitreavie Castle
Dunfermline
Fife
SCOTLAND KY11 5QF

Speaking of QSL addresses, Mark Burns passes along the following address for WLC-Rogers City Radio in Michigan. According to Mark, we had the location in the Grove *Shortwave Directory* printed as Rodgers City. He said this caused him some trouble in his search. Many thanks to Mark for the update on this popular maritime station. The correct address is:

Central Radio and Telegraph Company
Port of Caleite
Rogers City, MI 49779

Charlene Vickers passes on another interesting tidbit in the world of geography. She has noticed over the past year that the town that was formerly called Frobisher Bay in the Canadian Northwest Territories is always spelled *Iqualuit*. According to Charlene this is wrong.

Charlene explains, "Only in European languages does there always have to be a *u* after an *aq*. In Inuktitut, there are two sounds which are similiar to our *k* sound. Inuktitut is the language of the Inuit of the Arctic. One *k* sound is represented by the letter *k* and one by the letter *q*. Therefore, Iqaluit is pronounced roughly — *IgkhallooEET* and *Iqualuit* would be as wrong *Nuew Yuork* — and look as odd to an inhabitant."

■ Spanish Stations in the Ute Bands

Ute World regular Brian Webb has discovered the location of at least one of the many Spanish speaking voices commonly heard in the utility bands during the evening hours here in North America. During a recent visit to Baja California, Brian discovered an ICOM IC-745 HF transceiver in the La Quinta Hotel in San Quintin (see photo above).

According to Brian, much of Mexico has no telephone service. In these areas, businesses use HF single sideband radio. The radio at the La Quinta is used to pass reservations and other information. The frequency Brian observed dialed in on the ICOM transceiver was 4850 kHz. Thanks, Brian, and *Ute World* readers remember that we do welcome reports on stations broadcasting in languages other than English found in the utility bands. So you linguists get cracking.

Ever wonder who all of those Spanish language stations in the utility bands are that are heard during the evening hours here in North America? Ute World regular Brian Webb has found at least one of them.

■ MOSSAD! (By Robert Hall, Capetown, South Africa)

Many people have heard something about the MOSSAD, the foreign intelligence service of Israel. Less well-known is their common usage of shortwave radio with USB traffic which can be easily heard, but seldom understood. This traffic usually takes the form of a female voice repeating alpha numeric groups or station callsigns. Each transmission lasts for about five minutes and the last schedule I compiled is as follows:

CIO2: transmits every H+45			
0700-1400 UTC	13291	17966	23195
1500-2100 UTC	10125	13921	17966
2200-2300 UTC	6745	10125	13921
KPA2: transmits H+15			
0700-1500 UTC	10820		
1900-2300 UTC	3270	4780	7445
MIW2: transmits H+15			
0700-1500 UTC	12747	17170	20740
1600-2300 UTC	8641	12747	17170
SYN2: transmits H+30			
0700-1500 UTC	8465	12950	
1600-2300 UTC	5629	8465	
VLB2: transmit H+45			
0700-2345 UTC	12950	14750	18178

The schedule above represents the most common frequencies in my database, but I have heard most of the following, usually on the hour and half hour at various times of the day:

ART:	3417	5437			
EZI:	6840	9130	11565	13533	15980
		17410	19715		
JSR:	2270	5091			
PCD:	3150	4270			
ULX:	2743	4880			
YHF:	3840	4560	5820	7919	10648

As I write this, I can hear a YL on 10125 kHz (CIO2) transmitting five letter groups at 1810 UTC, which is not in accord with the above schedule and therefore probably has some special significance. MOSSAD broadcasts are all thought to emanate from within Israel and should not be confused with the "Numbers" voice transmissions originating from the Caribbean, North America, and Europe.

Utility Loggings

UTILITY WORLD

Larry Van Horn

Abbreviations used in this column

AFB	Air Force Base	FEC-A	One-way traffic FEC teleprinter system
AM	Amplitude Modulation	FEMA	Federal Emergency Management Agency
ANDVT	Advanced Narrowband Digital Voice Terminal	FF	French Forces
ASECNA	Agence pour la Securite de la Navigation Aerienne en Afrique et a Madagascar	GHFS	Global HF System (USAF)
		HF	High Frequency
ARG	Air Refueling Group	Hicom	High Command Net (USN)
ARQ	Synchronous transmission and automatic repetition teleprinter system	KPL	Khaosan Pathet Lao
		Lant	Atlantic
		LSB	Lower Sideband
ARQ-E	Single-channel ARQ teleprinter system	MARS	Military Affiliate Radio System
		Meteo	Meteorology
ARQ-E3	Single-channel ARQ teleprinter system	MFA	Ministry of Foreign Affairs
		MOD	Ministry of Defense
ARQ-M2	Multiplex ARQ teleprinter system with two data channels	MTC	Missile Test Center
		NECN	National Emergency Coordination Net
AW	Air Wing		
BuNo	Bureau Number	NG	National Guard
CAMSLANT	Communications Area Master Station Atlantic	Ops	Operations
		Packet	Teleprinter system used by hams for computer to computer comms
CAMSPAC	Communications Area Master Station Pacific		
CanForce	Canadian Forces	PIAB	Presse- und Informationsamt der Bundesregierung
CCG	Canadian Coast Guard		
CG	Coast Guard	RAF	Royal Air Force
CQ	General call for any station	RTTY	Radioteletype
CW	Continuous Wave (Morse Code)	SAM	Special Air Mission (89th Air Wing aircraft)
DEA	Drug Enforcement Administration	SAR	Search and Rescue
		SITOR	Simplex teleprinting over radio system
DGPS	Differential Global Positioning System	SITOR-A	Simplex teleprinting over radio system, mode A
DLA	Defense Logistics Agency		
DoD	Department of Defense	SITOR-B	Simplex teleprinting over radio system, mode B
DoE	Department of Energy		
EAm	Emergency Action Message	Unid	Unidentified
EPA	Environmental Protection Agency	U.S.	United States
		USAF	U.S. Air Force
FAF	French Air Force	USB	Upper Sideband
FAX	Facsimile	USCG	U.S. Coast Guard
FCC	Federal Communications Commission	USMC	U.S. Marine Corps
		USN	U.S. Navy
FEC	Forward Error Correction	XINHUA	New China News Agency

All times are in UTC, all frequencies in kHz, and all transmissions are in USB unless otherwise indicated

100.0 Loran Station in Sylt, Germany, with navigation pulses. (Ary Boender-Netherlands)

111.8 OLT21-Prague Meteo, Czech Republic, with FAX charts at 0030 (Boender-Neth)

129.1 SOA212-Warsaw Meteo, Poland, with 50-baud RTTY weather at 0021. Also noted DCF49-BMPT Bonn, Germany, with 200-baud data burst at 0020, mode unknown. (Boender-Neth)

287.5 HH-Dutch CG Hoek van Holland, Netherlands, with DGPS data at 0047. (Boender-Neth)

299.5 AD-Dutch CG Ameland, Netherlands, with DGPS data at 0048. (Boender-Neth)

310.0 Trinity House, North Foreland, England, with DGPS data at 0050. (Boender-Neth)

1612.5 GKR-Norwick Radio, England, with CW marker at 0119. (Boender-Neth)

1655.0 Pt de la Coubre, France, with DGPS data at 0107. (Boender-Neth)

2359.0 ESA-Tallinn Radio, Estonia, with CW marker at 2359. (Boender-Neth)

2533.0 FDG-FAF Orleans, France, with CW marker at 2339. (Boender-Neth)

2618.0 GFE25-Bracknell Meteo, England, with FAX charts at 0006. (Boender-Neth)

2683.0 Tokyo Volmet, Japan, with weather for Tokyo, Kansai, Fukuoka and Seoul at 1110. (Takashi Yamaguchi-Nagasaki, Japan) *Thanks for the logs, Takashi. Feel free to check in often. We don't see much from your part of the world-Larry.*

2716.0 SAB-Goteborg Radio, Sweden, calling QTUC in SITOR-A at 2347. (Boender-Neth)

2780.7 GND-Stonehaven Radio, England, with CW marker at 2348. (Boender-Neth)

2789.0 FUE-French Navy Brest, France, with 75-baud RTTY traffic at 2353. (Boender-Neth)

3328.8 Pt de la Coubre, France, with DGPS data at 0109. (Boender-Neth)

3413.0 Shannon Volmet, Irleand, with aviation weather at 0845. (Bill McClintock-Minneapolis, MN, via Internet)

3439.0 2CR8 repeating "V8L6S DE 2CR8" in CW at 1410. (Yamaguchi-Japan)

3486.0 VKLN-Russian Army with endless call only CW marker at 2250. (Boender-Neth)

3542.7 GKE1-Portishead Radio, England, with SITOR-A, signing CW at 0130. (Fred Hetherington-Ormond Beach, FL)

3959.0 SUU7-Cairo Meteo, Egypt, with 100/850n RTTY coded traffic at 0200. (Hetherington-FL)

4016.5 USN MARS NNN0AEC and NNN0GAD (*Arkansas Area Coordinator-Larry*) using 300-baud packet at 2340. Message was a "ship active list." (J.L. Metcalfe-KY)

4018.8 RFLIG-FF Cayenne, French Guiana, with ARQ-E (IGA) to RFLIGA-Kourou at 1045. (Hetherington-FL)

4210.5 A9M-Bahrain Radio with CW/SITOR marker at 1842. (Robin Hood-UK)

4226.0 XFM-Manzanillo Radio, Mexico, with CQ CW marker at 0140. (McClintock-MN)

4228.5 VIM-Melbourne Radio, Australia, with V CW marker at 1116. (Jack Dix-Yonkers, NY)

4245.0 UFN-Novorossiysk Radio, Russia, with 50-baud RTTY traffic at 1845. (Hood-UK)

4268.6 SAB-Goteborg Radio, Sweden, calling KKZF in SITOR-A at 2332. (Boender-Neth)

4276.0 JNA-Tokyo Radio, Japan, with V CW marker at 1120. (Dix-NY)

4316.0 JJC-Kyodo News Tokyo, Japan, with weak FAX (60/576) newspaper transmission at 0710. (McClintock-MN)

4318.0 VIT-Townsville Radio, Australia, with V CW marker at 1200. (Dix-NY)

4442.0 SAM 682 working Andrews in clear voice and ANDVT at 0240. (Jeff Haverlah-Houston, TX)

4489.0 GFL26-Bracknell meteo, England, at 0313 using 75-baud RTTY with AAXX weather reports. (Rick Baker-Austintown, OH)

4524.0 USN tracking net with American, French, Canadian and British units at 2145. Probably part of Joint Task Force Exercise 96-1 off the East Coast of the U.S. (Larry Fowler-Falmouth, MA)

4583.0 DDK2-Hamburg Meteo, Germany, at 0230 with 50-baud ship reports. (Baker-OH)

4637.0 Station KORQ here working other stations including WQZN and PP344 passing on different traffic (including weather and various geographic coordinates). (Milan Prokes-Rexburg, ID) *U.S. Army traffic has been noted here in the past-Larry.*

4703.5 USN Link 11A transmission with 12/13 pulses at 0534. (Haverlah-TX)

4707.17 RFFVAY-FF Sarajevo, Bosnia-Herzegovina, with ARQ-M2 transmission at 0330. (Hetherington-FL)

4715.0 RAF Volmet with coded weather at 0536. (Haverlah-TX)

4724.0 Andrews calling Mainsail with EF series EAM (26 characters) at 0522. (Prokes-ID)

4739.0 Super 22 (KC-135 Barksdale) working Navy P6Z at 0519. (Prokes-ID)

4742.0 Station Decorator on X-209 here from 8968, entered net after authentication procedure with station Grapevine at 0913. (Prokes-ID)

4783.0 U4Q working W9O requesting current Alligator Playground at 0853. All British voices noted. (TV-UK)

4855.0 NPM-USN Pearl Harbor, HI, at 1240 with FAX weather charts. (Baker-OH)

5026.0 Nightwatch 01 working WAR46 on self ID'ed S-305 at 0504. (Haverlah-TX) *Thanks for the new designator, Jeff-Larry.*

5044.0 Blacklist working Stallion 1 and 2 at 0153. (Haverlah-TX) *The U.S. Army has been reported on 5045 in the past-Larry.*

5062.0 U.S. military calls I77 working P47 at 1346. (Metcalfe-KY) *The U.S. Army has been reported here in the past-Larry.*

5063.5 Two faintly heard U.S. military tactical calls, F3A and S3H with test counts at 1646. (Metcalfe-KY) *Again, probably the U.S. Army-Larry.*

5080.0 Atlantic Superior calling Plead Control (MTC Point Mugu) about hot areas at 1722. (Jim DeWitt-Sacramento, CA)

5211.0 DLA309-DLA Battle Creek, MI, checking into FEMA's NECN exercise at 1302. Other check-ins included: KJN950-Dept of Veteran Affairs, Martinsburg, WV, at 1343; KA80661-WV Dept. of Emergency Services at 1501; and BF741C-Director of Military Support, Washington, DC, at 1605. (Metcalfe-KY)

5221.4 TYE41-ASECNA Cotonou, Benin, with ARQ-M2 (UNA) meteo messages on both channels at 2200. Last logged on 5222.5. (Hetherington-FL)

5400.0 YOG37-Bucharest Meteo, Romania, with coded weather using 50-baud RTTY at 1705. (Hood-UK)

5474.5 CSY-Santa Maria Air, Azores, with 50-baud RTTY on circuit MSA at 0910. (Baker-OH)

5696.0 K2P-T working CAMSPAC at 0129. (Gordon Levine-Anaheim, CA)

5717.0 Vancouver military (CanForce) working Rescue 452 at 0749. (Haverlah-TX)

5724.0 Spanish speaking male passing long messages, phonetic alphabet was in Spanish and very long character count 60+ noted. Possibly a vessel since he mentioned "Capitan." (Prokes-ID)

6316.0 LSD836-Argentina Radio with CW marker at 2133. (Hood-UK)

6376.0 WCC-Chatham Radio, MA, with V CW marker at 0314. (Bill McLean-Ann Arbor, MI)

6683.0 Navy 50511 (VP-3A BuNo 150511) working Andrews at 1729. This aircraft is assigned to USMC headquarters. (Baker-OH)

6691.0 Boomtown working Appraisal on self ID'ed charlie alpha at 1844. (Haverlah-TX) *Great, just what we need, more designators. Readers be on the lookout for the E-6 TACAMOs and their charlie-letter designators-Larry.*

6728.0 Air Force One working Andrews on Mystic Star F-400 at 0247. (Baker-OH)

6730.0 Station Neonsign, Nightwatch 01 and Stopsign noted here on X-903. Also heard on S-310 (11220) and S-312 (13211) at 2133. (Prokes-ID)

6830.0 SAM 683 working Andrews here on F-867 at 1610. (Prokes-ID)

6835.0 Foxtrot Tango Net/USN Link 11A voice coordination at 0412. (Baker-OH)

6918.44 ECA7-Madrid Meteo, Spain, with FAX transmission at 2200. (Hetherington, FL)

6982.0 RFFXL-FF Beirut, Lebanon, ARQ-E (XZL) message to Versailles, but addresses to RFFXCC-Favieres. Versailles uses circuit ID of XXL in messages to Beirut. (Hetherington-FL)

7321.5 FDY-FAF Orleans, France, with 50-baud RTTY RY parallel to 7362.5. (Hetherington-FL)

7470.5 English female 3/2-digit number station in AM at 1440. (Yamaguchi-Japan)

7540.0 English female 5-digit number station in AM at 1455. (Yamaguchi-Japan)

7605.0 ELB2-Mossad number station at 1420. (Yamaguchi-Japan)

7606.7 RFFA-MOD Paris, France, with idling ARQ-E3 at 1012. (Yamaguchi-Japan)

7620.0 English female 5-digit number station in AM at 0600. (McClintock-MN)

7682.0 AFA1WP-USAF MARS Wright Patterson at 1928 using 300-baud packet BBS system. Also logged beacons for AFA3FP-MSYS Shoreview, AFA1QW-MSYS Greenwood, IN, and AFA1NW-MSYS Wilmington, DE. (Baker-OH)

7710.0 VFR-CCG Resolute, NWT, Canada, at 2251 with FAX weather chart. (Baker-OH)

7755.0 English female 5-digit number station in USB at 1506. (Yamaguchi-Japan)

7831.0 Nightwatch 01 at 0546 working Terceary and Deckboat on W-105. (Baker-OH)

7834.5 5ST-ASECNA Antananarivo, Madagascar, with idling ARQ-E3 at 1410. (Yamaguchi-Japan) FDC-FAF Metz-Frascaty Air, France, with V CW marker at 1204. (Dix-NY)

7840.0 Stallion working Blacklist in LSB asking about battery situation at 1505. Who is this? (Mark Redfox-Seattle, WA) *Mark, this has been reported in the past as a DoE frequency-Larry.*

7865.0 Spanish female 5-digit number station in AM at 0305. (McLean-MI)

7916.0 DDJ-PIAB Bonn, Germany, with 96-baud FEC-A German news at 1350. (Yamaguchi-Japan)

8014.1 U2K (?) with "RYRY U2K U2K" then 5-figure groups at 1902 using 75 baud RTTY. (Metcalfe-KY) *This is a known DoE frequency-Larry.*

8053.0 SAM 26000 at 0044 working Andrews on F-649. (Baker-OH)

8164.5 5YD-Nairobi Air, Kenya, with 50-baud RTTY RY test tape at 2114. (Dix-NY)

8452.0 VIT-Townsville Radio, Australia, with V CW marker at 2009. (Dix-NY)

8470.0 XFL-Mazatlan Radio, Mexico, with slow CQ CW marker at 0108. (McClintock-MN)

8484.0 HLF-Seoul Radio, South Korea, with CQ CW marker at 1059. (Dix-NY)

8527.0 OBY2-Paita Radio, Peru, with CQ CW marker at 1143. (Dix-NY)

8584.0 VRX36-Hong Kong Radio with CW marker at 1122. (Hood-UK)

8604.5 DZJ-Bulacan Radio, Philippines, with CQ CW marker at 1059. (Dix-NY)

8607.0 VIM-Melbourne Radio, Australia, with V CW marker at 2150. (Dix-NY)

8642.0 KPH-San Francisco Radio, CA, with V CW marker at 0118. (McClintock-MN)

8683.0 UFJ-Rostov on Don Radio with CW traffic list at 1130. (Hood-UK)

8686.0 PKB-Belawan Radio, Indonesia, with CQ CW marker at 1232. (Dix-NY)

8694.0 PJC-Curacao Radio, Netherland Antilles, with CQ CW marker at 0219. (McClintock-MN)

8968.0 Copper 4 (KC-135) working Offutt with phone patch to Phoenix Sky Harbor at 1641. (DeWitt-CA) *Probably a 161st ARG KC-135E on a USAF Headdancer mission-Larry.*

8980.0 USCG CAMSLANT Chesapeake, VA, calling 1709 (*Probably a CG HC-130H aircraft-Larry*) and requested them to shift to 3E7 for better reception. (Prokes-ID)

8983.0 USCG CAMSLANT Chesapeake, VA, working GT5I and moved station to 3E7 at 0036. (Prokes-ID) *Try 5932.5 the next time you hear 3E7 mentioned and let me know if that works-Larry.*

8985.0 USCG CAMSLANT Chesapeake, VA, calling CG 2126 on 5 and 8 MHz at 0019. (Prokes-ID) *2126 is a USCG HU-25A aircraft-Larry.*

8990.0 Navy 321 calling USCG Port Angeles, WA, for a radio check at 1717. (DeWitt-CA) *Interesting out-of-bandplan frequency-Larry.*

9002.0 Unid stations with active phone patches about using a cell phone for comms and setting up a data circuit for sending RTTY at 2200 in LSB. Listed as USN Hicom. (Prokes-ID) *Not any more Milan. Hicom is no more and has been absorbed into the GHFS. Probably being used as a USN tactical channel now-Larry.*

9020.0 Wrigley 01 working unid station at 2122 about a couple of approaches before they land, and asked if they should remain on the air. (Prokes-ID) *This is a USAF frequency-Larry.*

9057.0 Facecard 1 working Facecard 2 at 2051. Facecard 1 working Appraisal at 2105. Facecard 1 working Nightwatch 01 at 2111. (Levine-CA)

9259.5 C7O (U.S. military) calling 5TE and 7ND at 1549. (Metcalfe-KY) *This is a U.S. Marine Corps tactical, training, and coordination frequency-Larry.*

10000.0 Spanish language communication under time station WWV-Ft. Collins. Heard Chile mentioned at 0115. (Brian Webb-CA)

10320.0 BABJ-Beijing Meteo, China, with 50-baud RTTY weather at 0335. (Yamaguchi-Japan)

10493.0 Bell Hawk-USAF tactical callsign, requesting a list of participating NECN agencies at 1616. Additional stations heard include: KTQ311-EPA Montgomery, AL; KC2XKG-DEA Cedar Rapids, IA; KCI615-American Red Cross, Falls Church, VA; AAB1IA-NG Johnston, IA; and AAB1ME-NG Augusta, ME. WGY912-FEMA Berryville, VA, and WGY 910-FEMA Bothell, WA, were net control stations. (Metcalfe-KY)

10650.0 BJZ23-Wuhan Meteo, China, with 75-baud RTTY weather code at 0716. (Yamaguchi-Japan)

10928.0 BAP40-XINHUA Beijing, China, with 75-baud RTTY English news at 0740. (Yamaguchi-Japan)

11202.0 Lant Area Command working USCG Rescue 1500 on SAR mission at 1632. (Fowler-MA) *1500 is a HC-130H aircraft-Larry.*

11217.0 Offutt calling Mainsail with LY series EAM at 1947. (Prokes-ID)

11232.0 Oiler 41 (CanForce KC-130) requesting Goose Bay weather from Trenton military at 2022. (TV-UK) *Probably a CC-130H from the 435th Squadron in Edmonton-Larry.*

11244.0 Toll Road and MacDill AFB, FL, coordinating a move to 11181.0 for HF data at 1744. (Metcalfe-KY)

11247.0 RAFAIR 2C15 working Architect approaching Nice for refuel, requested this relayed to Lifter Ops at 1017. (TV-UK) *2C Puma aircraft are from the 7th Squadron-Larry.*

11253.0 Navy C3T repeatedly calling Habitat at 2023. Magic Carpet Sierra answered their call. Requested to pass on to Habitat Ops. (Prokes-ID)

11548.0 Unid station transmitting 5-figure CW groups at 1850. (Dix-NY)

11627.0 Lightning 02, 03, 04, 07, and 08 heard over several days passing KL traffic intermittently. (Metcalfe-KY)

12070.0 Split Ends here on W-108 working Nightwatch at 0323. Station Humprey had a hard time with his new callsign as he keep trying to answer as Spit Ends after callsign change. (Prokes-ID)

12585.0 VIP44-Perth Radio, Australia, with CW/SITOR marker at 1356. (Hood-UK)

12601.1 ZSC-Capetown Radio, South Africa, with SITOR-A message at 0845. (Robert Hall-Capetown, RSA)

12692.0 RIW-Russian Naval calling RMMW in CW at 1252. (Hood-UK)

12695.5 UWS3-Kiev Radio working UYBY-T/H *Orel 3* in CW at 1258. (Hood-UK)

12711.0 USU-Mariupol Radio with traffic to URJO-T/H *Kiliya* in 50-baud RTTY at 1348. (Hood-UK)

12728.0 J2A9-Djibouti Radio, Djibouti, with V CW marker at 1246. (Dxi-NY) *Nice catch, Jack. I don't see this one reported very often-Larry.*

12774.0 TCR-Istanbul Radio, Turkey, with CQ CW marker at 1458. (Dix-NY)

12781.5 OST-Oostende Radio, Belguim, with V CW marker then this message, "Permanently closed for commercial traffic. OST thanks you for your trust and cooperation. Pse call telephony or TOR or 500+" at 1508. (Dix-NY) *Looks like another maritime station has abandoned CW-Larry.*

12976.0 MFA Rome with 5-letter groups to Tehran Embassy using ARQ-E at 1358. Ended at 1415 with voice link on this frequency. Heard before, but couldn't ID them. (Hood-UK)

13211.0 Nightwatch 01 and 02 on S-312 with frequency checks at 1710. Also checked S-311 11494 and X-908 17992. (Fowler-MA)

13248.0 Andrews (Mystic Star) working SAM 049 requesting weather for Bangor at 1750. (Fowler-MA) *C-20C tail 85-0049 from the 89th AW at Andrews-Larry.*

13410.4 FUX-French Navy Le Port, Reunion, with 75 baud RTTY at 1037. (Hall-RSA)

13498.6 ZOE-Tristan da Cunha Radio working Capetown Radio at 0848 in SITOR-A. (Hall-RSA)

14406.5 LN2A-CW beacon heard at 1541. (Dix-NY) Beacon is located in Sveio, Norway-Larry.

14606.7 RFHI-FF Noumea, New Caledonia, with 100-baud ARQ-E3 idler at 0708. (Yamaguchi-Japan)

14639.0 KPL Vientiane, Laos, with 50 baud RTTY English news at 1020. (Yamaguchi-Japan)

15012.2 4XZ-Haifa Naval Radio, Israel, with V CW marker at 1500. (Roger Parmenter-Hyannis, MA)

15708.0 WGY918-FEMA Denver, CO, using voice and 2400-baud data with WGY912-FEMA Berryville, VA, at 1912. FEMA channel F-50. (Metcalfe-KY)

16101.1 HBD61-Swiss Embassy Cairo, Egypt, with SITOR-A 5-letter groups to MFA Berne. (Hall-RSA)

16120.0 HBD20-MFA Berne, Switzerland, with SITOR-A 5-letter groups at 1116. (Hall-RSA)

16136.2 BZR66-XINHUA Beijing, China, with 75-baud RTTY English news bulletins at 1125. (Hall-RSA)

16815.5 9MG17-Georgetown Radio, Pinang Island, Malaysia, with SITOR-B idler at 0730. (Yamaguchi-Japan)

16938.0 VTG-Bombay Naval Radio, India, with V CW marker at 1252. (Dix-NY)

18498.8 PCW6-Dutch Embassy Jeddah, Saudi Arabia, with SITOR-A synch tones at 1337. (Hall-RSA)

18553.9 RFTJ-FF Dakar, Senegal, with idling ARQ-E3 at 1350. (Hall-RSA)

19390.1 German Embassy Brasilia, Brazil, with ARQ-E traffic in German to MFA Bonn at 1159. (Hall-RSA)

20450.7 CLP1-MFA Havana, Cuba, at 1604 using 50-baud RTTY with Embacuba circular traffic, news in Spanish/English then into CW traffic. (Baker-OH)

22382.5 KPH-San Francisco Radio, CA, at 1703 with SITOR-B traffic list. (Baker-OH)

22387.6 SVA-Athens Radio, Greece, with SITOR-B traffic list at 1425. (Hall-RSA)

23135.0 English female 3/2-digit number station in AM at 0312. (Yamaguchi-Japan)

26890.0 English female 3/2-digit number station in AM at 0315. (Yamaguchi-Japan)

SHORTWAVE BROADCASTING

The Global Forum

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ALBANIA With only two people on English staff and no more Correspondence Section, R. Tirana is very difficult to coax a reply or QSL out of. After three tries, finally sent me flag, and QSL signed by Altin Kurdari. Requires at least $1 and patience. English is at 0145-0200 & 0230-0300 on 6140 & 7160, 1930-2000 on 7270 & 9740; also announced 1715-1730 on 7155 & 9740 (Kevin Hecht, PA) Mystery regional on 9043.8 around 1400-1800 Sunday sports, other SW freqs not //; maybe spur from Gjirokaster MW? Later, news at 1500-1510 points to Kosovo or Macedonia source (Wolfgang Büschel, Germany via HCJB *Latest Catch*)

ANGOLA Black Cockerel, English Service, clandestine, Tue & Thu 1835-1857 heard on 7090 (Edwin Southwell, England, *World of Radio*) VORGAN on new 9755 from 0515 Afro music, 0600 gongs and Portuguese talk to 0620 fade (Ernie Behr, Ont.)

ANGUILLA Dr Gene Scott is still planning to move his international HQ from LA to Anguilla; also took seven Playmates to a horse show with Hef's blessing (Diane Mauer, WI, *W.O.R.*)

AUSTRALIA VL8T, Tennant Creek on 4910 ex-2325 kHz until 1200* and //Alice on 2310 (Dave Valko, PA, *Cumbre-DX*) CAAMA program from 0930 or 1000 IDing as KIN-FM (David Martin, Australia, *ibid.*)

BANGLADESH Dhaka, English from *1230 on 9546v ex-9650, poor audio level (John Wright & Brian Anderson, *Australian DX News*)

BELGIUM RVI's four QSL designs for 1996: *Brussels Calling* team, Wavre transmitter, office, and broadcast building (RVI *Mailbag*) Announced new webpage: **http://www.brtn.be/rvi/** (Steven Cline, and BBC Monitoring)

BHUTAN BBS closing an hour earlier on 5030 at 1400* (Jose Jacob, India, RKI *SW Feedback*) English moved up to 1315-1345, mid-news ID at 1321; transmission also now daily. Don't confuse with Costa Rica or Sarawak. (Hans Johnson, CO, *Cumbre-DX*)

BULGARIA R. Bulgaria on new 9445 ex-9810 //11605 at 1230-1330 (Edwin Southwell, England) Best reception of DX program, tho iffy, is Sun 2245 on 9700, mostly ham items (John Norfolk, OK, *W.O.R.*)

CANADA Letterman's *Top Ten List* is on CFRX, 6070, Mon-Sat around 2055 (Joe Hanlon, PA, *W.O.R.*) CFCX, 6005, switched from English to French with CKOI-FM simulcast, plus English, French, and Spanish IDs on the hour (Kevin Hecht, PA, *ibid.*)

RCI's morning hours in English now both on 9640 & 11855, daily 1300, Su-F 1400 (Jim Frimmel, TX) One-time-only frequency mistakes at Sackville: BBC at 1210 blocking VOA on 6110, instead of 5965; RCI at 2315 on 5965 instead of 5960; probably forgot to retune transmitter from earlier in the day (gh) Record year for reception reports at RCI, expected to surpass 2500 QSLs issued in 1995 (Bill Westenhaver, RCI volunteer QSL manager) For the big story see p. 6!

CHINA CRI curtailed *Letterbox* UT Mon 0440 for *World of Wine*, 5-minute commercial spot with a quiz, on 9730 (gh, OK)

COLOMBIA R. Mira, Tumaco, 6015.3 put spur on 5878.57 at 1154 for 25th anniversary; unable to hear matching 6152 due to AWR strength, but at 1430 more wideband FM spurs on 5901, 5786 (Rich McVicar, Ecuador, HCJB *TLC*)

COSTA RICA RFPI first-quarter sked shows little change, same as in Dec *MT*, p. 56, except no *This Way Out* Sun at 15; *Alternative Radio* Tue 11, Fri 10. *World of Radio* tapes now expedited so first airing normally Tue 1900 only 5 days after production (gh) TIAWR resumed *Wavescan* Sun around 2300 on 9725, 5030, but running 11 or 12 weeks (!) behind WRMI (Diane Mauer, gh)

CUBA One day at 2100, RHC swapped English and Spanish on 11705, 11760; I phoned the studio where they were unaware; can't monitor own off-air signals (George Thurman, TX) 11760 often has horrible buzz on channel in mornings and spreading at least +/- 15 kHz. SSB in English at 2200 on 11960 mis-aligned so audible only at modulation peaks (gh) 0530-0730 new time to West Coast on new 6000 ex-9820 (Arnie Coro, *DXers Unlimited*) R. Rebelde on new 6205 at 0000-0035 and 2215, weak //5025 (Brian Alexander, PA, *W.O.R.*) One shot?

CYBERSPACE World Radio Network, including *World of Radio* Sat 2000 is now available live on the Internet Multicasting Service using Xing Technology's Streamworks. Download free Windows or Macintosh software for this from http://www.xingtech.com (Joel Rubin, CA)

CZECH REPUBLIC R. Prague should be on till end of March, but future beyond that very uncertain; needs listeners to write in (Andy Sennitt, PA, via Kevin Hecht, *ibid.*, *W.O.R.*) R. Prague announced it had been renewed for a year by powers that be in parliament (John Wells, rec.radio.sw via Marie Lamb, HCJB *TLC*)

ECUADOR HCJB English to Europe 1700-2000 moved 15490 to 15540 for Dec (Jim Moats, OH) Not propagating, so Jan trying 11960 at 1900-2200 (Rich McVicar, *DX Partyline*) HCJB's 5900 and 6050 transmitters put spurs on 5750, 6200 at 0710; 6200 with the 5900 program and 5750 with the 6050 program (Brian Alexander, PA)

La Voz de Chinchipe is new station in the deep, deep south on 3570.17 at Zumba, only active SW station in Zamora Chinchipe province, closing at 2350*; next week heard at 1150, 0030 (McVicar, HCJB, *TLC*)

EQUATORIAL GUINEA R. East Africa nearly back to nominal on 15189.90 at 0748 (Piet Conradie, RSA, *Cumbre-DX*)

ESTONIA Ran across fledgling WWW site for Estonian Radio: **http://www.online.ee/er/** (Kevin Hecht, PA) English on 5925, missing from *SW Guide*, is *Estonia Today*, M-F 1620-1630, Mon & Thu 2000-2030 (Patrick Travers, World DX Club *Contact*)

ETHIOPIA R. Fana, P.O. Box 30702, Addis Ababa, verie letter in one month for taped report, signed by Mulugeta Gessese, G.M.—says previously owned by EPRDF, now autonomous, supported by NGOs. In heart of A.A., near Black Lion Hospital in front of Swedish embassy; looking for sister station to support it. Girma Lema, Head of Planning & Research Dept. enclosed postcard of Commercial Bank saying station is 400m behind it. Sked on 6210 in Oromic and Amharic is 0330-0530, 0900-1030, 1530-1730 (Jerry Berg, MA, *Fine Tuning*) Tentatively this on late to 2030* (Bob Hill, MA, *FT*)

FRANCE RFI has new chairman and director-general, Jean-Paul Cluzel, ex-André Larquie (TF-1 via BBCM)

GUATEMALA LV de Nahualá heard on 5040 at 1226 //3360, so is this a sesqui-harmonic? Also has been heard on 2nd harmonic 6720 (Don Moore, IA, HCJB *DXPL*) Perhaps 3360 is doubled from 1680 within the transmitter, so its multiples escape (gh)

HONG KONG BBC transmitters will be dismantled before China takes over in 1997, and equipment returned to Britain so China can not use it, maybe for jamming; replaced by new Thailand station from mid-1996 (R. Netherlands *Media Network*)

HUNGARY R. Budapest best here at 2200 on 7250, with *DX Show* Sun 2205, not 2215 as announced (John Norfolk, OK, *W.O.R.*)

INDONESIA RRI Ujung Pandang irregularly tests new 250 KW on 6165, 7110, 9565, 11855, 13685, 15165, 17730, 21660 (Subagyo, Indonesian DX Club via *Wavescan* via WRMI, *Cumbre-DX*)

IRAN VOIRI on new 6015 at 0030-0127* English, error or ex-6150, //9022, 6175 both weak (Brian Alexander, PA)

IRAQ [non] V. of Rebellious Iraq at 1300-

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; W-95 = Winter season

1530 announced on 6350-6650, heard one date on 6065; also on MW frequencies from Ahwaz, Iran. Palestinian newspaper *Al-Hayat al-Jadidah* says Gen. Husayn Kamil, who defected to Jordan in August, signed an agreement with General Electric to set up a radio station beamed to Iraq at a cost of $25 million, across the Iraqi border in Syria. Sources close to the Iraqi opposition in Amman said Washington has promised Kamil it would try to finance the station from Iraqi assets frozen in the U.S. (BBCM) Close enough for AM, FM?

IRELAND [non] RTE's 1000/1100 broadcast via WWCR 5065 is in fact a repeat of the 1930/2000/2100 originally aired at 1830 via WRN. RTE also did another sports special via BBC on short notice Dec 13 (gh) WWCR deal is a 6-month experiment (VOA *Communications World*) Includes a couple of commercials in the middle (gh) May run a 7-8 hour special via BBC St. Patrick's Day, Mar 17 (Sean O'Donnell, Ireland, WDXC)

Radio Teilifís Éireann, Donnybrook, Dublin 4, Ireland

ISRAEL Israel Radio was to add an English broadcast from Jan. 1 at 1500-1530; overseas programming reorganized under same management as immigrants' network (Daniel Rosenzweig via George Thurman) Reshet Bet on new 9988 at 1818 (Kevin Hecht, PA)

JAPAN R. Japan announced skeds and programs now on Web: **http://www.nhk.or.jp/rjnet/** (Pete Costello, *Cumbre-DX*)

KOREA NORTH after using off-channel 6576 and 9977 for 20+ years, R. Pyongyang standardized them in November to 6575 and 9975 (BBCM)

KURDISTAN [non] Soundtrack of Kurdistan People's TV (*Arabic: Tilivizyun Sha'b Kurdistan*), operated by PUK is being relayed on SW by transmitter used at other times to carry V. of the People of Kurdistan, 4015-4035v, at 1700-1900v, in Kurdish, with rare Arabic ID. R. Denge Medya [see Jan. *MT* p. 47] gone in mid-Nov from 9855 at 0800-1100, 1300-1600, replaced by Mayak on Russian transmitter (BBCM) Back in early Dec on 11985, another frequency it had previously announced but not used, same times (Chris Greenway, *Cumbre-DX*)

LIBYA R. Jamahiriya back on 17725 after several years, ex-15435, // 15235, 15415 until 1630 (Tony Jones, Paraguay, *NU* via NASWA via *Cumbre DX*)

LITHUANIA [non] R. Vilnius was to quit Krasnodar, Russia relay, for new deal via DW, Jülich, Germany, which is 30% cheaper, and better reception likely, expanding to 60-minute format from Jan. 1, 0000-0030 Lithuanian, 0030-0100 English, provisionally on 5910 (Sigitas Zelainis, HCJB *TLC*) Great except for frequency choice, home of RTTY monster (gh) Badly in need of fq advice (Joe Hanlon, PA)

MALAYSIA On 15295, V. of Islam heard via V. of Malaysia, long religious talk in English, 0655 ID and closing, 0658 VOM sign-on, 0700 news (John Kecskes, Australia, *Cumbre-DX*) *V. of Islam* is a program via VOM including 0620, started 17th April 1995 (Chris Greenway, *Cumbre DX*)

MALDIVE ISLANDS [non] VOM logging last month on 11815 was most likely R. Pilipinas (Wolfgang Büschel, Germany, and Piet Conradie, RSA, *Cumbre DX*)

MAURITIUS Financial accord with Luxembourg for SW station here to cover Indian Ocean, Africa, Australia (*Radiopanorama*, Amitié Radio via Jose Jacob, *Wavescan* via *DX Ontario* via *Cumbre DX*)

MÉXICO XERMX DX program manager Dr. Julián Santiago Diez de Bonilla advised that both reactivated 5985 and 9705 are using 10 kW transmitters at less than rated output. R. México installed a 100 kW several years ago, but never used. Sked is 1300-1700, 2000-0430 (Mon 0500) and reports wanted for QSL: P O Box 21-300, 04021 México DF. Manager is Lic. Juan Mort Martín del Campo (Miguel Ángel Rocha Games, *DX Ontario* via *Cumbre DX*) *Encuentro DX* with Diez de Bonilla is Sat 1630, Sun 2030, Wed 0200 (Lester Flores López, Cuba, *Radio-Enlace*) He used to do the DX program on R. Educación, 6185 (gh)


TNx DXER M.A. ROCHA GAMEZ, MEXICO

NALQSL XERMX RADIO MEXICO INTERNACIONAL QSL XERMX RADIO MEXICO INTER

FRECUENCIAS: BANDA 49 MTS. FRECUENCIA 5985 KHZ. BANDA 25 MTS. FRECUENCIA 11770 KHZ. 7:00 A 11:00 (HL) 13:00 A 17:00 (UTC) BANDA 31 MTS. FRECUENCIA 9705 KHZ. 14:00 A 23:00 (HL) 20:00 A 05:00 (UTC)

Gracias por su informe de recepción. Tenemos el gusto de confirmar su control de nuestra emisión en 5985 Khz. de fecha 18 Oct. 95 a las 00:25 A 00:55 horas de UTC con 16-090 vatios de potencia.

Atentamente
Cordially
RADIO MÉXICO INTERNACIONAL

QSL

NAL QSL XERMX RADIO MEXICO INTERNACIO

NACIONAL QSL XERMX RADIO MEXICO INTE

MOZAMBIQUE R. Mozambique, 15291.65, music in domestic service at 0717, still at 1553 in vernacular; sigs vary poor-good due to skip (Piet Conradie, RSA, *Cumbre-DX*) Only six of R. Moz' 19 SW transmitters are operational. Several were shut down for lack of wiring, especially from Inhambane northwards. Thieves have stolen 14.8 km of cabling connecting transmitters to antennas, costing more than 493 kilocontos; copper is in great demand (R. Moz via BBCM)

MYANMAR Contrary to the item in Jan *MT*, p. 47, the station on 6355.5 is not a KNU station but a government outlet *against* the KNU, Thabye Radio, referring to aromatic leaves of the eugenia tree denoting victory. Varies 6355-6357 at 0030-0130, 0530-0630, 1030-1230; first hour has repeat of news from government's R. Myanmar, Yangon. Also, jamming of BBC Burmese service is no longer heard (BBCM)

NETHERLANDS RN documentaries starting on Weds: Feb 14, China's social security system breaks up; Feb 21, why people collect things; Feb 28, hemp; Mar 6, The Wannabees of New York—schools of the arts; Mar 13, American vs British English (via Steven Cline, Bob Thomas) RN has dropped American jingles in favor of a Dutch accent; also starting to play Dutch music (*Sincerely Yours* on RN) About time

NEW ZEALAND RNZI *Mailbox* skipped a week for summer holiday, so look for it Jan. 29 and then fortnightly, Mon 0430 on 15115, Thu 0830 on 9700 (gh) 4502 USB heard relaying Wellington and other FM stations, perhaps for Antarctica? (John Wilkins, Hans Johnson, CO, *Cumbre DX*)

NIGERIA Lagos on 3326.05 at 2140 American pops, 2245 ID, 2300 News, 2306* all in English (Tom Sundstrom, NJ, HCJB *Latest Catch*)

PAKISTAN R. Pak at 0800-0850 has tried both 15470 and 15475 along with 17895 (Edwin Southwell, England, *W.O.R.*)

PERÚ **R. Qollasuyo**, Juliaca, resumed SW 3250.1 with tests Oct. 1 after 10 years off; power to be 1.5 kW, irregular but MW sked is *1000-0200* (Sun 0100*) **R. Ayaviri**, 4606.5, is relaying FM station called just **Radio A**, *1000-1500* & *2100-0300*. New on 5053.6 is **R. Acobamba** at *1100-0300* (Takayuki Inoue N., Perú, DSWCI *SW News*) **La Voz de San Antonio**, 5645.9, ex-6627 until 0347* (John Wilkins, CO, *Cumbre DX*) Carries program also on other SW stations, *La Voz del Exportador* (Harald Kuhl, Ecuador, *ibid.*) **R. Arequipa** at 1025 on 5145 (Ed Rausch, NJ, HCJB *TLC*) **R. San Ignacio**, 6747.22 at *1204. **R. Oriente**, 6188.08 also puts spurs on 6201.43, 6214.75, 6228.1 (Rich McVicar, Ecuador, HCJB *DX Partyline*) **R. Altura**, Huarmaca, on new 7143.04 x-5956.7 ex-7559, Sun at 1418 (McVicar, *TLC*)

PHILIPPINES R. Pilipinas, 0230-0329 English on 17840 ex-17865 (Wright & Anderson, *ADXN*) // 17760v, strong and clear on 21580 with *V. of Democracy* program, 0250 news (Richard Jary, Qsld. *ADXN*)

POLAND R. Maryja [pronounced Maria], on 9670 at 1600-1625 with bad hum; then Warsaw via different transmitter on 9670 at *1630 (Bob Hill, MA, *Fine Tuning*)

RUSSIA **R. Pacific Ocean**, Vladivostok, has 3-minute English news, Sat 0850 on 17570, 10344-USB, 9850, 9600, 9530, 7230, 7210, 7175, 5940, 4810. Christian **R. Stn. Alpha & Omega** in Russian daily 1500-1600 on 7230 (BBCM) **R. Nadezhda**, women's station, back on SW 0830-0930 on 5925, also at *0300 (BBCM via HCJB *DXPL*) unID in Arabic at 2000-2030 on 5935, 7420 and 7425 with address P O Box 7420, 3315 Limassol, Cyprus, is **IBRA Radio**, via Russia for first time, says letter from Rashid Saleem. **R. Palana**, in remote Kamchatka, has 2 kW on 4520 at 0720-0800 M-F, 2000-2030 Su-Th (Nikolai Rudnev, *Newsplus* via *Cumbre DX*)

SÃO TOMÉ Daytime test frequencies for new VOA SW relay: 13770, 13740, 13710, 13680, 4985, 4950, 4860, 4785 (Dan Ferguson, IBB, *Cumbre DX*) Probably this on 13740 one day only from *2130 huge open carrier, 2135 old jazz to 2140*, no ID (Ernie Behr, Ont.) 60 mb will stay on 4950 (Fred Haney, VOA, *Communications World*)

SÉNÉGAL RTVS on 7170.05v +/- 70 Hz, *0658-0845+, French after 0800, and 2215-2235* (Brian Alexander, PA, *W.O.R.*)

SIERRA LEONE SLBS, presumed on 3316 at 0035 until wiped out by WWCR at 0058 in late Nov (Ed Rausch, NJ, *Cumbre DX*) SLBS confirmed reactivated after a year off, heard mornings and evenings (Chris Greenway, BBCM, *ibid.*) ¿Prompted by WWCR appearance?

SLOVAKIA AWR at 2200 on 9440 ex-9465 (*Wavescan*, WRMI via Diane Mauer)

SOMALIA R. Mogadishu, pro-Uthman Ato, 6711 ex-6722 to 1900* a.k.a. V. of Somali Pacification includes English news 1830-1845 (BBCM via *Cumbre DX*) Other R. Mogadishu, 6870-USB heard to 2015* with English ID at 1959 (Dave Valko, PA, *ibid.*)

SPAIN R. Liberty, VOA Pals site frequencies still heard after reported closedown, switched to another site? (Bob Padula, *ADXN*) Playa de Pals closed briefly Oct 31, reopened a few days later (Dan Ferguson, VOA via *Wavescan* via Büschel via *Cumbre-DX*)

SRI LANKA VOA continues installing 4 x 500 kW SW transmitters; should test in Jan, go into full use by end of summer, covering Far East to East Africa (Fred Haney, AC4IC, VOA *Communications World* via Mauer) The three Bethany ABB transmitters are not going to SL after all, "unfriendly country," but to Philippines (John Vodenik, OH) SLBC, 9719.97, 1513-1734* including English religion 1515, DW-produced classical music program with RDW IDs at 1530-1630, SLBC ID at 1630 then jazz/big band music, on a Sat (Brian Alexander, PA) SLBC Mideast service *1745-1945 on 11800, joined by 300 kW R. Japan Ekala transmitter at 1905-1945 on 11930, in Sinhala and Tamil except 1930-1940 English news (Victor Goonetilleke, RN*MN*)

SUDAN R. Omdurman uses 9025v or 9000v in French 1700-1800, English 1800-1900. V. of Sudan, clandestine, claimed to broadcast from inside Sudan, but other sources say Eritrea, at 0330-0600 & 1300-1500, on 9025v or 9000v, jammed by Omdurman (BBCM) Heard English at 1800 on 9026 (Arthur Cushen, *NZ DX Times*)

UKOGBANI BBC's budget cut 5.5 megapounds this year, more than that in 1997. Private financing initiative may compensate in 1996. Trying to get 1997 cuts reversed, lest 10 languages be cut (Caroline Thompson, Foreign Office, RN *Media Network*) Affects mostly transmitters and satellite distribution; 1997 figure is 8.6 megapounds (VOA *CW*) 1400 BBC transmitters being sold off for 100 megapounds with BBC getting 80%; mostly domestic TV and radio; proceeds from government-owned World Service transmitters go to Treasury (Andrew Culf, *Guardian Weekly* via Bill Westenhaver) Also privatising relays abroad?

UKRAINE RUI spur situation: 9735 and 9870 at 1200-1800 put very strong spur on 10005; 6020 & 6130 at 1830?-0000 or 0100 put weak one on 6240 including English 2200; 5915 & 6020 around 0100-0600 put weak spur on 6125 with English 0100 & 0400 (Kevin Hecht, PA, *W.O.R.*) English at 2235-2300 on 6020 & 6130 also spurious on 5800, 5910, 6350! Brian Alexander, PA)

USA Tho it may slip, target date for WWCR-4 to go on air was Jan. 29; committed to include weekly live airing of *Ham Radio & More*, Sun 2305, and additional times for *World of Radio*; listen for announcements. As of Dec, *W.O.R.* sked: Fri 2215 on 9475, Sat 1128 on 5065, 1400 on 15685, Sun 0130 & 0800 on 3315, Mon 1230 & Tue 1330 on 15685. Slot for gh's Spanish report produced monthly keeps changing; try Wed 2200 on 9475. Planned schedule shifts for Feb & Mar: 13845 to 5935 at 0100; 9475 at 2200-0100; 12160 to 5065 at 0000. *A View from Europe* with Harvey Thomas retimed to Sun 2305 on 9475. (Adam Lock, WWCR) see also IRELAND

WRNO was off for 3 weeks due to lightning strike. We are committed to help get a new transmitter by paying $100,000 in advance for air time; may take three months (Brother Stair, *The Overcomer*) WRNO causing problems again, often distorted, overmodulated on 7355 & 7395 when Bro. Stair is on. After 0400 splattering over 30 kHz, mixing with RFPI 7385. They have ignored numerous complaints; demand action from FCC at (616) 673-3055 (Ernie Behr, Ont.)

WGTG, 9475, carrying non-Stair programs on Sat, 1705 *You Are There*, 1730 *Unshackled* (John Norfolk, OK) Also Sun 1708 Spanish *Desencadenado*, 1738 *Unshackled*. Needs SASE or SAE and 2 IRC for QSL (Diane Mauer, WI) Both sidebands but stronger on upper, 1400-2100* Sat with various religious programs in English & Spanish, only 2 hours of Bro. Stair (Ernie Behr, Ont.) Improved signal with antenna work; plans to add 2nd transmitter in 1996 with 50 kW on yagi northwest (George Thurman, TX)

KAIJ gave me this schedule: 2000-2400 on 13815, 0000-0800 on 5810 (Jim Frimmel, TX) Checked at 0453, 5810 had severe interference from 160-per-minute siren pulses on 5809.00 (gh, OK)

KTBN may be in trouble; judge found that TBN created "sham" corporations for some TV station licenses to take advantage of minority preference. All TBN licenses are potentially at risk (Doug Smith, *VHF-UHF Digest*)

Probably changed again, but as of Dec, WRMI, 9955 had *Viva Miami*: Fri-Mon 2130, Sun 1430, 2230, Mon 0130; and *Wavescan* Sun shifted to 1415 (Diane Mauer, WI)

VOA budget cuts less severe than expected: House & Senate decided on $360 million in 1996 for VOA, Worldnet TV, and another $30 million for transmitter construction (VOA *CW* via Mauer)

DXing with Cumbre was to start Dec. 29, hosted by Marie Lamb, on WHRI: Fri 2330 5745, Sat 0600 7315, 5760, 2330 9495, Sun 0430 5760, KWHR Sat 0500, 1200, Sun 1300 on 9930, Mon 0330 17510; not just loggings but teaching the art of DXing (HCJB *DXPL*) 5760 after 0300 killed by ute, not RTTY (Kevin Hecht, PA) 5760 barely audible due to extremely weak mod, jamming, and numbers station on 5762 at *0530-0645* (Ernie Behr, Ont)

WTJZ, Norfolk, VA, relayed on 5438-USB at 0440-0405+, very strong, announcing 1270 AM which was not heard here (Brian Alexander, PA) FCC online database, explained here last month, is huge file, difficult to download but handy for reference, of worldwide SWBC regitrations, not just U.S. (Kevin Hecht, PA)

[non?] AFRTS with live football 0345-0410 on 4903 (Anker Petersen, Germany, DSWCI *SW News*)

VANUATU RV using 7260 until 0800, 3945 at 0800-1100+, but once kept 7260 on to 1100 (Arthur Cushen, NZ, RN*MN*)

VIETNAM [non] Surprised to hear Vietnamese closing at 0459* on 7345 (gh, OK) It's Voice of Vietnam relay via Russia at new earlier time 0400 probably via Petropavlovsk-Kamchatsky (Kevin Hecht, PA) [non non] VOV, 9727.70 at 1135 in Viet, 1200 Lao? (John Kecskes, Australia, *Cumbre DX*)

YEMEN RTC, 9780, announced different address for R. Sanaa: P O Box 2371 (Willi Passmann, *Cumbre DX*)

ZAMBIA André Flynn, engineer for Christian Voice, 4965, says they will start signing on at 0400 as soon as staff available, suspect on same freq (Hans Johnson, *Cumbre DX*)

ZANZIBAR RTZ reactivated on 11734.11, 1615-2000*, best after 1900 (Brian Alexander, PA, *W.O.R.*)

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

Broadcast Loggings

SHORTWAVE BROADCASTING

Gayle Van Horn

0000 UTC on 5940
LITHUANIA: Radio Vilnius. Interval signal to station ID. National news and European headlines. Interesting item on Lithuania's dispute of sea boundaries with Latvia over oil exploration. (John Hanz, Old Bridge, NJ)

0000 UTC on 4499.95
CHINA: Xinjiang People's BC Station. Chinese. Station ID from announcer duo. Newscast to Chinese music pauses. Possible commentary from lady. Station monitored to 0115. (Giovanni Serra, Rome, Italy)

0030 UTC on 9540
SPAIN: Radio Exterior de Espana. *Sports Spotlight* show. (Bob Fraser, Cohasset, MA) Interval signal 2300 on 11945. World news on //9620. (Hanz, NJ; Sue Wilden, Columbus, IN; Lee Silvi, Mentor, OH)

0032 UTC on 7105
RUSSIA: Voice of Russia. Folk music from Siberia. News 1930 on 5940; classical music program on 5940 at 2157. (Wilden, IN) *Music & Musicians* heard on 17880 at 1320. Report on Soviet space probes heard on 5940 at 2240. (Fraser, MA)

0244 UTC on 11655
NETHERLANDS: Radio Netherlands. *Letters From Listeners*, with great signal, // 9860 only fair quality. (Brookman, AK).

0050 UTC on 9590
UNITED KINGDOM: BBC. World news with good signal. Additional BBC noted as; 0435 on 5975 with talk of soccer in Brazil; 0456 on 6175 with *Off the Shelf* show // 9740. News at 1359 on 6195; talk on political scandals on 15260 at 1407; *Quiz Show* on 9410 at 1957; Bosnia news update on 9580 at 2307. (Gerald Brookman, Kenai, AK)

0417 UTC on 5810
UNITED STATES: KAIJ. Religious teachings from Dr. Gene Scott, including an "expletive" expressed toward a listener! (Wilden, IN) For more wit and wisdom check out "Doc" 24 hours on C-Band/Transponder G6/19. -Gayle VH

0300 UTC on 4820
HONDURAS: **La Voz Evangelica**. Spanish. Catholic Mass to religious choral music. Religious format also noted on Honduran **Radio Luz y Vida** at 0350 on 3249. (Silvi, OH)

0454 UTC on 4890
GABON: **Radio France International**. Female ID to frequency/target area quote. Pop musical pause to La Marseillaise interval signal. Time pips at 0500 to world newscast, heard on // 7135, 9790, 6175. (Serra, Italy) **Afrique Numero Un** heard on 15475 at 1700. (Silvi, OH)

0456 UTC on 5995
NETHERLANDS ANTILLES: Radio Netherlands **Bonaire relay**. *Media Network* program on the road reporting from Quito, Ecuador. (Hanz, NJ) **Madagascar** relay heard on 9605 at 1855, *Siren Song* show interviewing lute player Stephen Stubbs and author Giles Smith. (Fraser, MA)

0510 UTC on 5985
UNITED STATES: **WYFR**. Religious programming of Bible text and hymns. (Frank Hillton, Charleston, SC) Religious programming heard on **WWCR** at 0510 on 3315; **WGTG** at 0202-0302 on 9475. (Silvi, OH)

0530 UTC on 6100
GERMANY: Deutsche Welle. German/English. Station ID/frequency quotes to national newscast. (Hanz, NJ) DW heard at 0111 in English on 6040 with letters; 1956 on 11760, interval signal/ID into German. (Wilden, IN)

0620 UTC on 9860
AUSTRALIA: Radio Australia. Program *Feedback* including address/fax, followed by *Correspondent Report* at 0630. Classical music pause to jazz tunes, ID/frequency quote and program lineup. Time tips 0700 into international newscast. //11880, 15530, 17715. (Serra, Italy)

0702 UTC on 7385
COSTA RICA: Radio For Peace International. Relay of *Vietnam Veterans Network*. Program included the music of Jimi Hendrix and other 60's artist. (Wilden, IN)

0715 UTC on 7230
UNITED KINGDOM: Radio Japan Skelton relay. Japanese cultural program on role-playing and psycho-drama on the Japanese lifestyle. (Hanz, NJ)

0743 UTC on 9425
GREECE: Voice of Greece. Greek/English. "Edo Athina, Y Foni Tis Helladas...". into English ID and newscast (0743-0753). Greek folk songs to ID and Greek announcements with frequencies quote and ID, 0800* heard on //11645 to 0759. (Serra, Italy) Monitored in Greek on 9935 at 0253. (Brookman, AK)

0828 UTC on 9460
TURKEY: Voice of Turkey. Turkish. Male/female duo chat to Turkish vocals. German speech segments translated into Turkish. Parallel 11925, 15145, 15385. (Serra, Italy)

1030 UTC on 6195
ANTIGUA: BBC World Service relay. *Composer of the Month* featuring Paul Hindemith. (Fraser, MA)

1050 UTC on 9700
NEW ZEALAND: Radio New Zealand International. *Sounds of the South Pacific* music show. (Fraser, MA) RNZI heard on 15115 at 0128-0215. (Silvi, OH)

1130 UTC on 3255
BRAZIL: Radio 6 De Agosto. Portuguese. Station ID to newscast. Chat to Portuguese pops and instrumental. Good signal to 1214 fade-out. (John T. Wagner, Pickerington, OH)

1150 UTC on 3300
GUATEMALA: Radio Cultural. Spanish. Male/female news team to ID. Final fade-out by 1220. (Wagner, OH)

1220 UTC on 13625
FRANCE: Radio France International. Updated report on December's Russian elections. (Fraser, MA); Additional RFI programming noted as; 1346 on 21580 //21685; 1433 on 15405; 1554 on 21580, 1944 on 21765; 2048 on 21765 (Brookman, AK)

1242 UTC on 13605
IRAN: VOIRI. Italian. *Notiziario* newscast to musical pauses. Announcements into Islamic historical portrait program. Station ID/frequency schedule for Italian programming. Heard on // 15084. (Serra, Italy)

1254 UTC on 11605
BULGARIA: Radio Bulgaria. Environment program to musical pause. Bulgarian economic review to IDs. *Cultural Review* program to Bulgarian pop tune, heard on // 9810. (Serra, Italy; Brookman, AK)

1300 UTC on 11735
FINLAND: YLE/Radio Finland. Time pips signal at tune-in. ID/frequencies quote to Finnish newscast. Weather forecast to North American service information, heard on 15400. (Robert Atkins, Birmingham, AL; Brookman, AK)

1353 UTC on 17745
ROMANIA: Radio Romania International. Sports show talking about international competitution. (Brookman, AK)

1400 UTC on 12005
ECUADOR: HCJB. Visit to Ecuador's Galapagos Islands. WEWN is on 15115 until 1405. (Fraser, MA) *Saludos Amigos* heard on 15540 at 1715. (Hanz, NJ; Brookman, AK)

1435 UTC on 15415
LIBYA: Radio Jamahiriya. Arabic announcements, music and special feature programs. (Brookman, AK)

1558 UTC on 21490
ASCENSION ISLANDS: BBC relay. Swahili. Female current affairs show, *Focus On Africa*. Telephone interviews discussing Burundi to AfroAmerican news from Washington, D.C. Sign-off 1629, heard on // 15420 till 1615 and / / 11860. (Serra, Italy; Brookman, AK).

1615 UTC on 9515
CANADA: BBC World Service relay. *Meridian* program on the bios of Picasso and Alfred Hitchcock. (Fraser, MA)

1630 UTC on 9705
MEXICO: Radio Mexico International. Spanish/English. DX program with English announcements and request of listener's reception reports (station address: P.O. Box 21-300, 04021 Mexico City, Mexico). Multilingual ID at 1655, national anthem to 1700*. Good signal. (Darren White, Hattiesburg, MS)

1715 UTC on 7155
ALBANIA: Radio Tirana. Regional folk music to ID. National news update to sports. Fair signal quality. (Hillton, SC)

1759 UTC on 13750
INDIA: All India Radio-Bangladore. Male ID with time check at 1800 into world newscast. *Today Commentary* program heard on // 11620 (**AIR-Bangladore**), 9950 (**AIR-Delhi**), 9650 (**AIR-Bangladore**). (Serra, Italy)

1825 UTC on 4945
TAJIKISTAN: Radio Netherlands relay. Light music to interval signal. Frequencies/address to world news. Netherlands weather and sports update. *Newsline* show featring topics on Estonia. Programming heard on //9860, 9895, 15315, 6015, 17605. (Serra, Italy)

1929 UTC on 7530
MONGOLIA: Radio Ulan Bator. Interval signal to lady's ID. Frequency quote and program preview. Newscast, musical pause and clear "this is Radio Ulan Bator" ID. (Serra, Italy...This is my first catch of Mongolia!) *Congrats!- GVH*

1945 UTC on 7235
ITALY: RAI. News item on Italy's hopes in the upcoming Academy Awards for Foreign Films. (Fraser, MA)

2000 UTC on 7465
ISRAEL: **Kol Israel**. Developments in the Rabin assassination. (Fraser, MA) Monitored on // 9845 at 2015. **Heshet Bet** in Hebrew heard on 7497 at 0020. (Hanz, NJ)

2037 UTC on 9510
SOUTH AFRICA: Trans World Radio-Swaziland. Local children's chant to English ID. Pop music to prayer and sermon to chants. Ghana address quote to Afro pop music. Station ID, interval signal and 2107*. (Serra, Italy)

2045 UTC on 9760
MOROCCO: Voice of America relay. *Jazz House* program featuring the music of Frank Sinatra. (Wilden, IN)

2115 UTC on 4850
UZBEKISTAN: Uzbek Radio. Unid lang. Local instrumental chorus to interval signal repeated twice. ID format to musical bridge and newscast. Station heard 1108 on 15165 with music, newscast (1130-1135). (Serra, Italy)

2200 UTC on 6165
CHAD: Radiodiffusion Nationale. French. Interval signal to ID including N' Djamena mention. (Hanz, NJ)

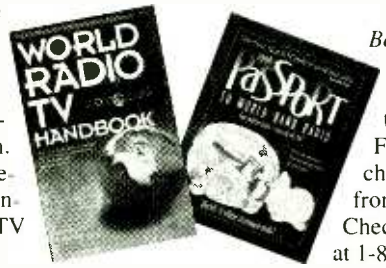
Thanks to our contributors — Have you sent in YOUR logs?
Send to ***Gayle Van Horn,*** *c/o Monitoring Times (or e-mail gayle@grove.net)*
English broadcast unless otherwise noted.

Gayle Van Horn, gayle@grove.net

Necessary DXing Publications

From the casual program listener to the serious "country-chasing" DXer, every hobbyist needs two annual publications to keep up with the ever-changing radio scene.

The 1996 *World Radio TV Handbook* celebrates 50 years with this year's publication. *WRTH* covers domestic and international medium and shortwave frequency assignments, English by-hour broadcasts, VHF/UHF FM and TV frequencies, and much more!



Want even more? The 1996 *Passport To World Band Radio* gives you over 500 pages of feature articles, receiver reviews, *What's On Tonight?* (an hour-by-hour guide to world band shows), and the *Addresses Plus*—a guide for QSLing stations. Finally, don't forget the *Blue Pages*—a channel-by-channel guide by frequency to world band schedules from 2310-21850 kHz. Have I convinced you yet? Check out *PTWBR* and *WRTH* from Grove Enterprises at 1-800-437-8155.

ARGENTINA

RAE, 11710 kHz. Full data QSL card signed by Rodrigo Calderon-English Programming. Personal letter enclosed from veri signer.Received in 23 days for an English report, souvenir postcard and one U.S. dollar. Station address: C.C. 555 Correo Central, 1000 Buenos Aires, Republic of Argentina. (Eric M. Walton, Vancouver, BC Canada)

CHILE

CBA-Antofagasta Radio, 8461 kHz USB. Full data prepared QSL card signed by Sr. Francisco Jimenez Gonzalez. Two-page personal letter received from veri signer. Received in 92 days after Spanish follow-up report (total time 364 days), mint stamps, address label (not used on reply). Station address: Gobernacion Maritime de Antofagasta, Casilla #481, Antofagasta, Chile. (Mike Hardester, Jacksonville, NC) received via Internet, gayle@grove.net.

CLANDESTINE

Voice of Human Rights & Freedom for Iran, 11470, 9380, 9270 kHz. Full data QSL on letterhead of Organization For Human Rights & Fundamental Freedoms For Iran, signed by Laila Amir. Organization brochure and color Iranian adhesive flag. Received in 26 days for an English report and one U.S. dollar. QSL address: 18 Bis.Rue Violet 75015 Paris, France. (Gayle VH, Brasstown, NC)

CZECH REPUBLIC

Radio Praha, 5930 kHz. Full data flora & fauna QSL card, signed with initials. Received in 23 days for an English taped report and one IRC. Station address: Vinohradska 12, 120 99 Prague 2, Czech Republic. (Walter Szczepaniak, PA)

W. Szczepaniak's attractive QSL from Radio Praha

ECUADOR

Radio Bahai, 4950 kHz. Full data card and letter signed by William Rodriguez, plus station pennant. Received in 24 days for a Spanish report, cassette tape, mint stamps and souvenir postcard. Station address: Apartado 14, Otavalo, Imbabura, Ecuador. (John C. Mello, North Scituate, RI)

Radio Oriental, 4870 kHz. Full data prepared QSL card returned and signed by Enrique Espin Espinoza. Souvenir tourist map of Ecuador enclosed. Received in 21 days for a Spanish report, cassette tape, mint stamps and souvenir postcard. Station address: Casilla 260, Tena, Ecuador. (Mello, RI)

DOMINICAN REPUBLIC

Onda Musical, 4870 kHz. Full data prepared QSL card returned and signed by Mario Baez Asuncion-Director. Received in 21 days for a Spanish report, cassette tape, and one U.S. dollar. Station address: Apartado 860, Santo Domingo, Dominican Republic. (Mello, RI)

FRANCE

Radio France International. Full data QSL card, unsigned. Station stickers and schedule enclosed. Received in 93 days for an English report. Station address: 116, Avenue du Presidente' Kennedy, Boite Postal 9516, 75016 Paris, France. (Jennifer Hull, New York, NY)

FRENCH POLYNESIA

RFO-Tahiti, 15168 kHz. Full data blue and white station logo card, stamped with station's seal, unsigned. Received in 90 days for an English report and one U.S. dollar. Station address: Boite Postal 125, Papeete, French Polynesia. (Patrick M. Griffith, Federal Heights, CO)

HONDURAS

Radio Internacional, 4930 kHz. Full data logo card stamped with station's seal. Honduran bank note enclosed. Received in 38 days for a Spanish report and one U.S. dollar. Station address: Apartado 1473, San Pedro Sula, Honduras. (Darren White, Hattiesburg, MS)

MEDIUMWAVE

KLZ, 560 AM kHz. Full data QSL card for DX Test, signed by K.C. O'Brien. Coverage map enclosed. Received in 12 days for an English AM report and one U.S. dollar. Station address: 2150 West 29th Avenue, Denver, CO 80211. (Griffith, CO)

KUSA, 1660 AM kHz. Partial data QSL card unsigned, for DX Test during the NAB convention in Las Vegas, NV. Received in 190 days for an English AM report and one U.S. dollar (returned). Station address: USA Digital Radio, 332 South Michigan Avenue-Suite 605, Chicago. IL 60604. (Griffith, CO)

WCKL. 560 AM kHz. Full data QSL on station letterhead, signed by Paul Edwards-Program Director. Received in 76 days for an English AM report. Station address: 5620 Route 9G, Hudson, NY 12534. (George Knight, Garfield, NJ)

POLAND

Polish Radio Warsaw, 11815 kHz. Full data QSL card, schedule, and souvenir postcard. Personal letter signed by Rafal Kiepusezewski-Editor English Service. Received in 37 days for an English taped report and one U.S. dollar. Station address: P.O. Box 46, 00-977 Warsaw, Poland. (Szczepaniak, PA)

PORTUGAL

Deutsche Welle, Sines, Portugal relay, 6175 kHz. No data, unsigned QSL card. Received in 92 days for an English report. Station address: Postfach 10 04 44, D-50588 Cologne, Germany. (Hull, NY)

ROMANIA

Radio Romania, 9510 kHz. Full data QSL card unsigned. Station newsletter and listener's certificate info enclosed. Received in 136 days for an English report, souvenir postcard and one U.S. dollar. Station address: P.O. Box 111, 70756 Bucharest, Romania. (Hull, NY)

SHIP TRAFFIC

Concho KCZC, 600 kHz (Tanker). Full data prepared QSL card verified. Received in 14 days for an English utility report and mint stamps. Ship address: Sabine Towing & Transportation Co., Inc., P.O. Box 1528, Groves, TX 77619. (Hank Holbrook, Dunkirk, MD)

Konkar Victory SYSG, 500 kHz (Cargo/Bulk Carrier). Terrific QSL letter! Received in 41 days for an English utility report and one U.S. dollar. Ship address: c/o Konkar Ship Agency, 12 Skouze Street, Piraeus 18536 Greece. (Holbrook, MD)

Nosac Ranger WRYG, 500 kHz (RO/RO Carrier)Verification letter and photo of vessel. Received for an English utility report and mint stamps. Ship address: c/o Pacific Gulf Marine, P.O. Box 6479, New Orleans, LA 70174-6479 (Holbrook, MD)

Carolina WYBI, 500 kHz (Cargo/Container) Full data prepared QSL card verified. Received for an English utility report. Ship address: c/o Puerto Rico Marine Management, Inc., P.O. Box 71306, San Juan, Puerto Rico 00936-1306. (Holbrook, MD)

SPAIN

Radio Exterior De Espana, 9540 kHz. Full data QSL card unsigned. Schedule and stickers enclosed. Received in 82 days for an English taped report and one IRC. Station address: Apartado 156.202, 28080 Madrid, Spain. (Szczepaniak, PA)

TADZHIKSTAN

Radio Netherlands via Dushanbe, Tadzhikstan relay, 9860 kHz. Full data station card unsigned, and *On Target* newsletter.Received in 47 days for an English report and one IRC. Station address: P.O. Box 222, 1200 JG Hilversum, The Netherlands. (Gayle VH, NC)

How to Use the Shortwave Guide

1: Convert your time to UTC.

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

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

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

Some selected programs appear on the lower half of the page for prime listening hours—space does not permit 24-hour listings except for the "Newsline" listing, which begins on the next page.

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

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

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

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

The frequency listing uses the same day codes as the program listings; if a broadcast is not daily, those day codes will appear before the station name. Irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

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

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

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

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

Radio Programs

Compiled by Jim Frimmel

Sundays
0025 REE: "Distance Unknown"
0030 VOA (ca): "Communications World"
0109 HCJB (am): "DX Partyline"
0124 REE: "Distance Unknown"
0130 WWCR #1 (Tennessee): "World of Radio"
0200 Radio For Peace Intl: "World of Radio"
0234 Radio Havana Cuba: "DXers Unlimited"
0258 Vatican Radio: "On-the-Air"
0300 WWCR #3 (Tennessee): "Spectrum"
0350 BBC (eu): "Waveguide"
0410 Australia, Radio: "Feedback"
0430 WHRI (Angel 2): "Cumbre DX"
0434 Radio Havana Cuba: "DXers Unlimited"
0509 HCJB (am): "DX Partyline"
0524 Radio Exterior de Espana: "Distance Unknown"
0525 Radio Japan: "Media Roundup"
0608 Vatican Radio: "On-the-Air"
0610 Australia, Radio: "Feedback"
0634 Radio Havana Cuba: "DXers Unlimited"
0725 Radio Japan: "Media Roundup"
0735 Radio Vlaanderen Intl: "Radio World"
0800 WWCR #1 (Tennessee): "World of Radio"
0810 Australia, Radio: "Feedback"
0900 Radio For Peace Intl: "World of Radio"
1100 AWR Latin America: "Wavescan"
1138 Radio Korea: "Shortwave Feedback"
1245 WRMI (Florida): "Wavescan"
1300 KWHR (Hawaii): "Cumbre DX"
1336 Radio Vlaanderen Intl: "Radio World"
1352 Vatican Radio: "On-the-Air"
1425 Radio Japan: "Media Roundup"
1445 WRMI (Florida): "Wavescan"
1645 BBC (af): "Waveguide"
1725 Radio Japan: "Media Roundup"
2125 Radio Japan: "Media Roundup"
2205 Radio Vlaanderen Intl: "Radio World"
2215 Budapest Intl: "Budapest DX Show"
2245 Radio Bulgaria: "Radio Bulgaria Calling"
2252 Vatican Radio: "On-the-Air"
2300 AWR Latin America: "Wavescan"
2300 KSDA (Guam): "Wavescan"
2300 Radio For Peace Intl: "World of Radio"
2320 BBC (am): "Waveguide"
2330 Radio Canada Intl: "Now the Details"

Mondays
0035 Radio Vlaanderen Intl: "Radio World"
0100 WRMI (Florida): "Wavescan"
0125 Radio Japan: "Media Roundup"
0215 WRMI (Florida): "Wavescan"
0331 Radio Canada Intl: "Now the Details"
0345 Budapest Intl: "Budapest DX Show"
0430 Radio New Zealand Intl: "Mailbox (biweekly)"
0545 Radio Bulgaria: "Radio Bulgaria Calling"
0635 Radio Korea: "Shortwave Feedback"
0700 Radio For Peace Intl: "World of Radio"
0745 BBC (am): "Waveguide"
0900 WWCR #1 (Tennessee): "Spectrum"
1005 WWCR #1: "Ham Radio and More"
1040 All India Radio: "DX-ers Corner (2/4)"
1230 WWCR #1 (Tennessee): "World of Radio"
1355 Romania Intl: "For Radio Amateurs"
1435 All India Radio: "DX-ers Corner (2/4)"
2345 BBC (as pac): "Waveguide"

Tuesdays
1247 Radio Sweden: "Media Scan (1/3)"
1330 WWCR #1 (Tennessee): "World of Radio"
1349 Radio Sweden: "Media Scan (1/3)"
1449 Radio Sweden: "Media Scan (1/3)"
1900 Radio For Peace Intl: "World of Radio"
2139 Radio Havana Cuba: "DXers Unlimited"
2239 Radio Havana Cuba: "DXers Unlimited"
2249 Radio Sweden: "Media Scan (1/3)"

Wednesdays
0049 Radio Sweden: "Media Scan (1/3)"
0135 Radio Havana Cuba: "DXers Unlimited"
0249 Radio Sweden: "Media Scan (1/3)"
0300 Radio For Peace Intl: "World of Radio"
0335 Radio Havana Cuba: "DXers Unlimited"
0349 Radio Sweden: "Media Scan (1/3)"
0535 Radio Havana Cuba: "DXers Unlimited"
0700 HCJB (eu): "The Latest Catch"
0800 HCJB (eu): "Ham Radio Today"
0930 HCJB (pac): "Ham Radio Today"
1000 Radio For Peace Intl: "World of Radio"
1030 HCJB (pac): "The Latest Catch"
1530 BBC (south as): "Waveguide"
1730 HCJB (eu): "Ham Radio Today"
1800 HCJB (eu): "The Latest Catch"

Thursdays
0130 HCJB (am): "Ham Radio Today"
0200 HCJB (am): "The Latest Catch"
0215 Budapest Intl: "Budapest DX Show"
0235 Argentina, RAE: "DX'ers Special"
0530 HCJB (am): "Ham Radio Today"
0600 HCJB (am): "The Latest Catch"
0752 Radio Netherlands Intl: "Media Network"
0830 Radio New Zealand Intl: "Mailbox (biweekly)"
0953 Radio Netherlands Intl: "Media Network"
1352 Radio Netherlands Intl: "Media Network"
1553 Radio Netherlands Intl: "Media Network"
1952 Radio Netherlands Intl: "Media Network"

Fridays
0053 Radio Netherlands Intl: "Media Network"
0253 Radio Netherlands Intl: "Media Network"
0453 Radio Netherlands Intl: "Media Network"
0814 Radio Prague: "Calling All Listeners"
1114 Radio Prague: "Calling All Listeners"
1235 BBC (am): "Waveguide"
1414 Radio Prague: "Calling All Listeners"
2000 Radio For Peace Intl: "World of Radio"
2045 Radio Bulgaria: "Radio Bulgaria Calling"
2114 Radio Prague: "Calling All Listeners"
2210 Australia, Radio: "Feedback"
2215 WWCR #1 (Tennessee): "World of Radio"
2244 Radio Prague: "Calling All Listeners"
2330 WHRI (Angel 2): "Cumbre DX"

Saturdays
0014 Radio Prague: "Calling All Listeners"
0045 Radio Bulgaria: "Radio Bulgaria Calling"
0114 Radio Prague: "Calling All Listeners"
0210 Australia, Radio: "Feedback"
0246 Radio Portugal Intl: "Radio Portugal DX (triweekly)"
0314 Radio Prague: "Calling All Listeners"
0344 Radio Prague: "Calling All Listeners"
0400 Radio For Peace Intl: "World of Radio"
0600 WHRI (Angel 1): "Cumbre DX"
0600 WHRI (Angel 2): "Cumbre DX"
0739 HCJB (eu): "DX Partyline"
0909 HCJB (pac): "DX Partyline"
1030 VOA (as pac): "Communications World"
1100 Radio For Peace Intl: "World of Radio"
1128 WWCR #3 (Tennessee): "World of Radio"
1200 KWHR (Hawaii): "Cumbre DX"
1230 VOA (as pac): "Communications World"
1349 Radio Romania Intl: "DX Mailbag"
1400 WWCR #1 (Tennessee): "World of Radio"
1707 WWCR #3: "Ham Radio and More"
1709 HCJB (eu): "DX Partyline"
1730 VOA (af): "Communications World"
1730 VOA (me): "Communications World"
1730 VOA (south as): "Communications World"
1800 Radio For Peace Intl: "World of Radio"
2058 Vatican Radio: "On-the-Air"
2130 VOA (me): "Communications World"
2137 Radio Havana Cuba: "DXers Unlimited"
2215 WRMI (Florida): "Wavescan"
2236 Radio Havana Cuba: "DXers Unlimited"
2300 KSDA (Guam): "Wavescan"

MT MONITORING TEAM

Gayle Van Horn, Frequency Manager
North Carolina

Dave Datko
California

Jeff Demers
New Hampshire

Next Reporting Deadline
February 20, 1995

Jim Frimmel, Program Manager
Texas

Jacques d'Avignon
Propagation Forecasts
Ontario, Canada

NEWSLINE

"Newsline" is your guide to news broadcasts on the air. • All broadcasts are world news reports unless followed by an asterisk, which means the broadcast is primarily national news. • All broadcasts are daily unless otherwise noted by the day codes.

0000 UTC
(7:00 PM EST, 4:00 PM PST)
AWR Latin America [T-F]*
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (south as)
Canada (North-Quebec) [S]
China Radio Intl
Croatian Radio
KWHR (Hawaii) [H]
Monitor Radio Intl [T-A]
Radio Australia
Radio Bulgaria
Radio Canada Intl
Radio Exterior de Espana
Radio New Zealand Intl
Radio Prague
Radio Thailand
Radio Vilnius
Voice of America (am)
Voice of America (as)
Voice of America (ca)
Voice of Russia
WHRI (Indiana) [T-A]
0003
Radio Pyongyang
0010
China Radio Intl*
Voice of America (ca) [T-A]*
0015
Radio Cairo
0030
All India Radio
Radio Netherlands Intl
Radio New Zealand Intl [M-F]
Radio Sweden [T-A]
Radio Thailand [T-S]
Radio Vlaanderen Intl
Voice of America (am) [T-S] (Special English)
Voice of America (as) (Special English)
Voice of Russia
0035
Voice of Iran
0045
BBC (am)*
BBC (as pac)*
BBC (south as)*
0050
RAI Italy

0100 UTC
(8:00 PM EST, 5:00 PM PST)
BBC (am) (Newsdesk)
BBC (as pac)
BBC (south as) (Newsdesk)
Canada (North-Quebec)
Croatian Radio
Deutsche Welle
HCJB (am)
Monitor Radio Intl [T-A]
R Slovakia Intl [A]*
R Slovakia Intl [S/T-F]
Radio Australia
Radio Exterior de Espana
Radio Havana Cuba [T-S]
Radio Japan
Radio New Zealand Intl
Radio Norway Intl [M]
Radio Prague
Radio Ukraine Intl
Radio Yugoslavia [M-A]
Swiss Radio Intl
Voice of America (am)
Voice of America (as)
Voice of America (ca)
Voice of Indonesia [F]
Voice of Russia
Voice of Vietnam
WWCR #1 (Tennessee) [T-A]
0110
Radio Australia [M-F]*
0113
Radio Havana Cuba [T-S]*
0130
Radio Austria Intl
Radio Havana Cuba [T-S]
Radio Netherlands Intl
Radio Sweden [T-A]
Voice of Greece
Voice of Russia
Voice of Vietnam
0145
Radio Tirana
0152
Vatican Radio
0155
Voice of Indonesia [F]

0200 UTC
(9:00 PM EST, 6:00 PM PST)
BBC (af) (Newsday)
BBC (am) (Newsday)
BBC (as pac) (Newsday)
BBC (eu) (Newsday)
BBC (south as) (Newsday)
Canada (North-Quebec) [S]
Croatian Radio
Deutsche Welle
Monitor Radio Intl [T-A]
Radio Australia
Radio Budapest
Radio Canada Intl
Radio Havana Cuba [T-S]
Radio Korea
Radio New Zealand Intl [M-A]
Radio Romania Intl
Radio Yugoslavia
RAE Argentina [T-A]
Voice of America (as)
Voice of Myanmar (Burma)
Voice of Russia
Voice of Vietnam
0203
Voice of Free China
0212
Radio Havana Cuba [T-S]*
0215
Radio Cairo
Radio Nepal
0230
Radio Austria Intl
Radio Havana Cuba [T-S]
Radio Netherlands Intl
Radio Pakistan
Radio Portugal Intl [T-A]
Radio Sweden [T-A]
Radio Tirana
Voice of Russia [T-A]
Voice of Vietnam
0255
Radio Canada Intl [T-A]

0300 UTC
(10:00 PM EST, 7:00 PM PST)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu) [S-F]
BBC (south as)
Canada (North-Quebec)
Channel Africa
China Radio Intl
Croatian Radio
Deutsche Welle
Monitor Radio Intl [T-A]
Radio Australia
Radio Canada Intl
Radio Havana Cuba [T-S]
Radio Japan
Radio New Zealand Intl [M-A]
Radio Norway Intl [M]
Radio Prague
Radio Thailand
Voice of America (af) [A-S]
Voice of Russia
WHRI (Indiana) [T-A]
WWCR #3 (Tennessee) [T-A]
0301
Voice of America (af) [M-F]*
0303
Voice of Free China
0310
China Radio Intl*
0313
Radio Havana Cuba [T-S]*
0315
Radio Cairo
0320
Radio Philipinas [M-A]
Vatican Radio
0330
BBC (eu) [A]
Radio Budapest
Radio Dubai
Radio Havana Cuba [T-S]
Radio Prague
Radio Sweden [T-A]
Voice of America (af) [M-F] (Special English)
Voice of Russia
0340
BBC (af) [S]*
Voice of Greece
0355
Radio Japan [W-M]

0400 UTC
(11:00 PM EST, 8:00 PM PST)
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac)
BBC (eu) [S-F] (Newsdesk)
BBC (south as) (Newsdesk)
Canada (North-Quebec)
Channel Africa
China Radio Intl
Croatian Radio
Deutsche Welle
Monitor Radio Intl [T-A]
Radio Australia
Radio Canada Intl
Radio Havana Cuba [T-S]
Radio New Zealand Intl [A]
Radio New Zealand Intl [M-F]*
Radio Romania Intl
Radio Tanzania
Radio Ukraine Intl
Swiss Radio Intl
Voice of America (af)
Voice of America (me)
Voice of Russia
Voice of Turkey
WHRI (Indiana) [T-A]
WWCR #3 (Tennessee) [T-A]
ZBC Zimbabwe
0403
Radio Pyongyang
0410
China Radio Intl*
0412
Radio Havana Cuba [T-S]*
0425
RAI Italy
0430
BBC (af) [A-S]*
BBC (eu) [A] (Newsdesk)
Radio Havana Cuba [T-A]
Radio Netherlands Intl
Voice of Russia
0431
Voice of America (af) [M-F]*

0500 UTC
(12:00 AM EST, 9:00 PM PST)
AWR Latin America [T-F]*
BBC (af) (Newsday)
BBC (am) (Newsday)
BBC (as pac) (Newsday)
BBC (eu) (Newsday)
BBC (south as)
Canada (North-Quebec)
Channel Africa
China Radio Intl
Deutsche Welle
HCJB (am)
Monitor Radio Intl [T-F]
Radio Australia
Radio Bulgaria
Radio Cameroon
Radio Exterior de Espana
Radio Havana Cuba [T-S]
Radio Japan
Radio New Zealand Intl [S-F]
Vatican Radio [T/F]
Voice of America (af)
Voice of America (me)
Voice of Israel
Voice of Russia
WWCR #1 (Tennessee) [T-A]
WYFR (Satellite Network) [A]
0510
China Radio Intl*
Radio Australia [M-F]*
0513
Radio Havana Cuba [T-S]*
0530
BBC (af) [A-S]*
Radio Austria Intl
Radio Havana Cuba [T-A]
Radio Romania Intl
Voice of Nigeria
Voice of Russia
0555
Radio Japan [A]

0600 UTC
(1:00 AM EST, 10:00 PM PST)
BBC (af)
BBC (am) (Newsday)
BBC (as pac)
BBC (eu) (Newsday)
BBC (south as)
Canada (North-Quebec)
Deutsche Welle
Monitor Radio Intl [T-F]
Radio Australia
Radio Canada Intl [M-F]
Radio Havana Cuba [T-S]
Radio Japan
Radio Korea
Radio New Zealand Intl [M-A]
Swiss Radio Intl
Voice of America (af) [A-S]
Voice of America (me)
Voice of Kenya
Voice of Malaysia
Voice of Russia
WWCR #1 (Tennessee) [T-A]
0601
Voice of America (af) [M-F]*
0603
Croatian Radio
Radio Pyongyang

0612
Radio Havana Cuba [T-S]*
0615
Swiss Radio Intl (eu)
0630
BBC (af) [A-S]*
Radio Austria Intl
Radio Havana Cuba [T-S]
Vatican Radio [H]
Voice of Nigeria [M-F]
Voice of Russia
0631
Radio Romania Intl
0645
Radio Romania Intl
Voice of Nigeria [T-F]*
0655
Radio Japan [W-M]
Voice of Med. (Malta) [M-F]

0700 UTC
(2:00 AM EST, 11:00 PM PST)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
KWHR (Hawaii) [M-F]
Monitor Radio Intl [T-F]
Papua New Guinea
Radio Australia
Radio Japan
Radio New Zealand Intl [A]
Radio New Zealand Intl [M-F]*
Radio Norway Intl [S]
Voice of Myanmar (Burma)
Voice of Russia
WWCR #1 (Tennessee) [S]
0703
Radio Pyongyang
Voice of Free China
0710
Radio Australia [M-F]*
0715
Swiss Radio Intl (eu)
0730
HCJB (eu)
Radio Netherlands Intl
Radio Vlaanderen Intl
Voice of Greece
Voice of Russia
0750
Radio New Zealand Intl [M-F]*
0755
Radio Japan

0800 UTC
(3:00 AM EST, 12:00 AM PST)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
KNLS (Alaska)
Monitor Radio Intl [M-A]
Radio Australia
Radio Korea
Radio New Zealand Intl
Radio Pakistan
Radio Prague
Voice of Indonesia [A-H]
Voice of Malaysia
Voice of Russia
WWCR #3 (Tennessee) [M-F]
0803
Croatian Radio
Radio Pyongyang
0810
Radio New Zealand Intl [M-F]*
0830
R Slovakia Intl
Radio Austria Intl
Radio Netherlands Intl
Voice of Russia [T-A]
0855
Voice of Indonesia [A-H]

0900 UTC
(4:00 AM EST, 1:00 AM PST)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
China Radio Intl
Deutsche Welle
HCJB (pac)
Monitor Radio Intl [M-A]
Papua New Guinea [M]*
Radio Australia
Radio Japan
Radio New Zealand Intl [M-A]
Swiss Radio Intl
Voice of Russia
0910
China Radio Intl*
Radio Australia [M-F]*
0930
FEBC (Philippines) [M-A]
Radio Netherlands Intl
Voice of Armenia [S]
Voice of Russia
0945
Deutsche Welle [M-F]*
0950
Russia (Radio Pacific Ocean) [A]
0955
Radio Japan

1000 UTC
(5:00 AM EST, 2:00 AM PST)
All India Radio
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
China Radio Intl
Monitor Radio Intl
Papua New Guinea
Radio Australia
Radio New Zealand Intl [S-F]
Radio Prague
Radio Tanzania
Radio Vlaanderen Intl [M-A]
Voice of America (as)
Voice of America (ca)
Voice of Kenya
Voice of Russia
Voice of Vietnam
WWCR #1 (Tennessee) [M-F]
WYFR (Satellite Network) [M-A]
1010
China Radio Intl*
Radio New Zealand Intl [M-F]*
1020
Radio New Zealand Intl [H]*
1030
FEBC (Philippines) [M-F]*
Radio Austria Intl [M-A]
Radio Dubai
Radio Netherlands Intl
Voice of Nigeria
Voice of Russia
1045
Voice of Nigeria [A-S]*

1100 UTC
(6:00 AM EST, 3:00 AM PST)
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
BBC (south as) (Newsdesk)
Deutsche Welle
Monitor Radio Intl [M-A]
Papua New Guinea
Radio Australia
Radio Ghana [A-S]
Radio Japan
Radio New Zealand Intl (Newsdesk)
Radio Pakistan
Radio Singapore Intl
Swiss Radio Intl
Swiss Radio Intl (eu)
Voice of America (as)
Voice of America (ca)
Voice of Israel
Voice of Russia
WYFR (Satellite Network) [M-A]
1102
Radio Mozambique
1103
Radio Pyongyang
1110
Radio Australia*
1120
Vatican Radio [M-A]
1130
Radio Austria Intl
Radio Korea
Radio Netherlands Intl
Radio Prague
Radio Singapore Intl
Voice of Asia
Voice of Russia
1135
Voice of Iran
1145
Deutsche Welle [M-F]*
1155
Radio Japan [S-F]

1200 UTC
(7:00 AM EST, 4:00 AM PST)
BBC (af) [M-A]
BBC (am)
BBC (as pac) [M-A]
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
China Radio Intl
Croatian Radio
Monitor Radio Intl [M-A]
Papua New Guinea
Radio Australia
Radio France Intl
Radio Jordan
Radio Korea
Radio New Zealand Intl [H-T]
Radio Singapore Intl
Radio Tashkent
Voice of America (as)
Voice of Russia
WHRI (Indiana) [A]
WWCR #1 (Tennessee) [A]
WYFR (Satellite Network) [M-F]
1203
Voice of Free China
1204
HCJB (am) [M-F]
1210
China Radio Intl*
1215
BBC (af) [M-A]*
BBC (as pac) [M-F]*
BBC (eu)*
BBC (south as) [M-A]*
1230
HCJB (am) [M-F]*
Radio Bangladesh [S-M]
Radio Bulgaria
Radio Cairo
Radio Canada Intl
Radio Finland [M-F]
Radio Korea [S-W/A]
Radio Netherlands Intl
Radio Singapore Intl
Radio Sweden [M-F]
Voice of Russia
Voice of Vietnam
WYFR (Satellite Network) [M-F]
1231
Radio France Intl [T]*
1240
Voice of Greece

1300 UTC
(8:00 AM EST, 5:00 AM PST)
BBC (af) (Newshour)
BBC (am) (Newshour)
BBC (as pac) (Newshour)
BBC (eu) (Newshour)
BBC (south as) (Newshour)
Canada (North-Quebec) [A-S]
China Radio Intl
KNLS (Alaska)
Monitor Radio Intl [M-A]
Papua New Guinea
Polish Radio [A]
Polish Radio [M-F]*
Radio Australia
Radio Canada Intl
Radio Ghana
Radio Norway Intl [S]
Radio Romania Intl
Radio Singapore Intl
Radio Tanzania [A-S]
Swiss Radio Intl
Swiss Radio Intl (eu)
Voice of America (as)
Voice of Kenya
Voice of Russia
WYFR (Satellite Network) [M-F]
1303
Radio Pyongyang
1310
China Radio Intl*
Radiobras [M-F]*
1324
HCJB (am) [M-F]
1328
Radio Cairo
1330
All India Radio
FEBC (Philippines) [M-A]
Radio Austria Intl
Radio Canada Intl
Radio Dubai
Radio Finland
Radio Netherlands Intl
Radio Singapore Intl
Radio Sweden [M-F]
Radio Tashkent
Radio Vlaanderen Intl [S]
Radio Yugoslavia
Voice of America (as) (Special English)
Voice of Russia [M-A]
Voice of Turkey
Voice of Vietnam
WYFR (Satellite Network) [M-F]
1335
FEBC (Philippines) [M-F]*
1355
Radio Singapore Intl

1400 UTC
(9:00 AM EST, 6:00 AM PST)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
China Radio Intl
Monitor Radio Intl [M-A]
Radio Australia
Radio Cameroon
Radio Canada Intl [S-F]
Radio France Intl
Radio Ghana
Radio Japan
Radio Norway Intl [S]
Radio Pakistan
Radio Prague
Radio Vlaanderen Intl [M-A]
Voice of America (as)
Voice of America (me)
Voice of Russia
WYFR (Satellite Network) [M-F]
1410
China Radio Intl*
1415
Radio Nepal
1424
HCJB (am) [M-F]
1430
FEBC (Philippines) [M-A]
Radio Austria Intl
Radio Canada Intl
Radio Netherlands Intl
Radio Romania Intl
Radio Sweden [M-F]
RTM Morocco [S]
Voice of Myanmar (Burma)
Voice of Russia
1431
Radio France Intl [T]*
1435
Voice of Greece
1445
All India Radio
Voice of Myanmar (Burma)
1455
Radio Japan [A]
Voice of Med. (Malta) [M-F]

1500 UTC
(10:00 AM EST, 7:00 AM PST)
BBC (af)
BBC (am)
BBC (as pac) [A-S]
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
Channel Africa
China Radio Intl
Monitor Radio Intl [M-A]
Radio Australia
Radio Canada Intl [S]
Radio Japan
Radio Norway Intl [S]
Swiss Radio Intl
Voice of America (as)
Voice of America (me)
Voice of Israel

Voice of Russia
WWCR #1 (Tennessee) [M-F]
1503
Radio Pyongyang
1510
China Radio Intl*
1530
All India Radio*
FEBA (Seychelles)
FEBC (Philippines) [M-A]
Radio Netherlands Intl
Radio Portugal Intl [M-F]
Voice of Nigeria [M-F]
Voice of Russia
WYFR (Satellite Network) [M-F]
1535
Voice of Iran
1555
Radio Japan [A]

1600 UTC
(11:00 AM EST, 8:00 AM PST)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
BBC (south as)
Canada (North-Quebec) [A-S]
Channel Africa
China Radio Intl
Deutsche Welle
Estonian Radio [M-F]
Monitor Radio Intl [M-A]
Radio Australia
Radio Canada Intl [S]
Radio France Intl
Radio Jordan
Radio Korea
Radio Pakistan
Radio Tanzania
Voice of America (af) [A-S]
Voice of America (as)
Voice of America (me)
Voice of Ethiopia
Voice of Kenya
Voice of Russia
Voice of Vietnam
WWCR #1 (Tennessee) [M-F]
WYFR (Satellite Network) [A]
1610
China Radio Intl*
1612
Vatican Radio [S-F]
1630
Channel Africa [F]*
Radio Austria Intl
Radio Canada Intl
Radio Dubai
Voice of America (af) [M-F]*
Voice of America (as) (Special English)
Voice of America (me) (Special English)
Voice of Ethiopia
Voice of Russia
1633
Deutsche Welle [M]*
1638
Deutsche Welle [T-F]*
1645
BBC (am) [S-F]*
BBC (as pac) [M-F]*
BBC (eu) [S-F]*

1700 UTC
(12:00 PM EST, 9:00 AM PST)
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu) [A]
BBC (south as)
Canada (North-Quebec) [A]
Channel Africa
China Radio Intl
HCJB (eu)
Monitor Radio Intl [M-A]
Radio Australia
Radio France Intl
Radio Japan
Radio Jordan
Radio New Zealand Intl [M-F]*
Radio Pakistan
Radio Prague
Swiss Radio Intl
Swiss Radio Intl (eu)
Voice of America (af)
Voice of America (as)
Voice of America (me)
Voice of Russia
WRNO (Louisiana) [M-F]
WWCR #3 (Tennessee) [A]
1703
Radio Pyongyang
1710
China Radio Intl*
Radio Australia*
1715
Radio Sweden [S-F]
Radio Tirana
Vatican Radio
1725
Radio New Zealand Intl [F]*
1730
Radio Netherlands Intl
Radio Romania Intl
Vatican Radio [F]
Voice of Russia [S-F]
1740
BBC (af)*
1745
Radio Canada Intl [M-F]
1755
Radio New Zealand Intl [M-W]*

1800 UTC
(1:00 PM EST, 10:00 AM PST)
All India Radio
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (eu) (Newsdesk)
BBC (south as) (Newsdesk)
Canada (North-Quebec) [A]
Monitor Radio Intl [M-A]
Polish Radio [A]
Polish Radio [M-F]*
Radio Australia
Radio Cameroon
Radio New Zealand Intl [M-F]*
Radio Omdurman
Radio Prague
Radio Tanzania
Radio Yemen
Voice of America (af) [A-S]
Voice of America (af) [M-F]*
Voice of America (me)
Voice of Kenya
Voice of Russia
Voice of Vietnam
WRNO (Louisiana) [M-F]
1802
Radio Mozambique
1830
BBC (af) [A-S]*
Radio Bangladesh
Radio Korea [S-W/A]
Radio Kuwait
Radio Netherlands Intl
Radio Sweden [M-F]
Radio Yemen
Voice of America (af) [A-S] (Special English)
Voice of America (me) (Special English)
Voice of Russia
1840
Voice of Greece [M-A]
1845
Voice of Armenia [M-F]
1855
Radio New Zealand Intl [M-H]*

1900 UTC
(2:00 PM EST, 11:00 AM PST)
All India Radio
BBC (af)
BBC (as pac) [M-A]
BBC (eu) [M-A]
China Radio Intl
Deutsche Welle
Monitor Radio Intl [M-A]
Radio Australia
Radio Japan
Radio Korea
Radio New Zealand Intl
Radio Norway Intl [S]
Radio Portugal Intl [M-F]
Radio Romania Intl
Radio Vlaanderen Intl
Voice of America (af)
Voice of America (as)
Voice of America (me)
Voice of Greece [M-A]
Voice of Russia
Voice of Vietnam
WHRI (Indiana) [M-F]
WWCR #1 (Tennessee) [M-F]
1910
China Radio Intl*
Radio Australia [M-F]*
Radiobras [M-F]*
1930
Deutsche Welle [M-F]*
R Slovakia Intl
Radio Austria Intl
Radio Netherlands Intl
Radio Tirana
Radio Yugoslavia
Voice of Russia
Voice of Turkey
1935
RAI Italy
Voice of Iran

2000 UTC
(3:00 PM EST, 12:00 PM PST)
BBC (af) (Newshour)
BBC (am) (Newshour)
BBC (as pac) [M-A] (Newshour)
BBC (eu) (Newshour)
China Radio Intl
Deutsche Welle
Estonian Radio [M/H]
Monitor Radio Intl [M-A]
Radio Australia
Radio Budapest
Radio Bulgaria
Radio Korea
Radio New Zealand Intl
Radio Vilnius
Swiss Radio Intl
Swiss Radio Intl (eu)
Voice of America (af) [A-S]
Voice of America (af) [M-F]*
Voice of America (me)
Voice of Indonesia
Voice of Israel
Voice of Nigeria [M-F]
Voice of Russia
WHRI (Indiana) [M-F]
WWCR #3 (Tennessee) [M-F]
2003
Radio Pyongyang
2007
Radio Damascus [M-F]
2010
China Radio Intl*
Radio New Zealand Intl [S-H]*
2025
RAI Italy
2030
Polish Radio [A-S]
Polish Radio [M-F]*
Radio Netherlands Intl
Radio Thailand
Voice of Vietnam
2055
Voice of Indonesia [M]
2057
Radio Kuwait

2100 UTC
(4:00 PM EST, 1:00 PM PST)
All India Radio
BBC (af)
BBC (am)
BBC (as pac)
BBC (eu)
China Radio Intl
Deutsche Welle
Monitor Radio Intl [M-A]
Radio Australia
Radio Cameroon
Radio Canada Intl
Radio Damascus [F]
Radio Exterior de Espana
Radio Havana Cuba [M-A]
Radio Japan
Radio New Zealand Intl [A-H]
Radio Prague
Radio Romania Intl
Voice of America (af)
Voice of America (as)
Voice of America (me)
Voice of Russia
WHRI (Indiana) [M-F]
2110
China Radio Intl*
Radio Damascus [S-M]
Radio New Zealand Intl [M-H]*
2112
Radio Damascus [F]
2115
BBC (af)*
BBC (eu)*
Radio Damascus [T]
2120
Radio Cairo
2130
Radio Cairo
Radio Dnestr (Moldova) [M/W-H/A]
Radio Havana Cuba [M-A]*
Radio Riga Intl [M-F]
Radio Sweden [M-F]
Voice of Armenia
Voice of Russia
2135
Voice of Iran
2145
Radio Damascus [W]
2155
Radio Canada Intl [M-F]

2200 UTC
(5:00 PM EST, 2:00 PM PST)
All India Radio
BBC (af) (Newsdesk)
BBC (am) (Newsdesk)
BBC (as pac) (Newsdesk)
BBC (eu) (Newsdesk)
Canada (North-Quebec) [A-S]
China Radio Intl
Croatian Radio
Monitor Radio Intl [M-A]
Radio Australia
Radio Budapest
Radio Bulgaria
Radio Canada Intl
Radio Exterior de Espana
Radio Havana Cuba [M-A]
Radio Korea
Radio New Zealand Intl [A-H]
Radio Norway Intl [S]
Radio Ukraine Intl
Radio Vilnius
Radio Vlaanderen Intl [S-F]
Radio Yugoslavia
RAI Italy
Voice of America (as)
Voice of Russia
WWCR #1 (Tennessee) [M-F]
2203
Voice of Free China
2210
China Radio Intl*
2215
Radio Cairo
2230
Radio Austria Intl
Radio Finland
Radio Prague
Radio Sweden [M-F]
Voice of America (as) (Special English)
Voice of Russia [M-F]
2240
Radio Cairo
Voice of Greece [S-F]

2300 UTC
(6:00 PM EST, 3:00 PM PST)
All India Radio
BBC (af) [S-F]
BBC (am) [S-F]
BBC (as pac)
BBC (eu) [S-F]
Canada (North-Quebec) [S]
Croatian Radio
Deutsche Welle
KWHR (Hawaii) [M-F]
Monitor Radio Intl [M-A]
Radio Australia
Radio Canada Intl
Radio Japan
Radio New Zealand Intl [A-H]
Voice of America (as)
Voice of Russia
Voice of Turkey
WHRI (Indiana) [M-F]
2303
Radio Pyongyang
2315
Radio Cairo
2330
Radio Canada Intl [A]
Radio Netherlands Intl
Voice of Russia
Voice of Vietnam
2335
Voice of Greece [S-F]

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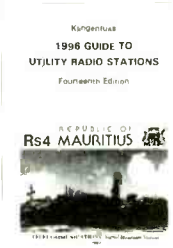

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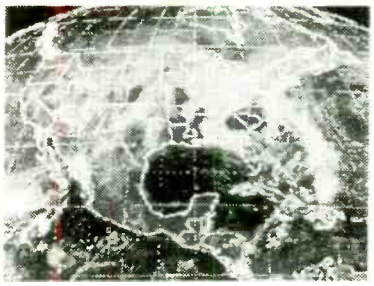

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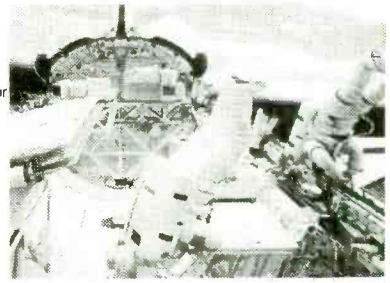

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Frequencies

0000-0030	Australia, Radio	9610as	13605pa	13745as	17750as
0000-0100 vl	Australia, VL8A Alice Spg	2310do			
0000-0100 vl	Australia, VL8K Katherine	5025do			
0000-0100 vl	Australia, VL8T Tent Crk	4910do			
0000-0100	Bulgaria, Radio	7480na	9700na		
0000-0015	Cambodia, Natl Voice of	11940as			
0000-0100	Canada, CBC N Quebec Svc	9625do			
0000-0100	Canada, CFCX Montreal	6005do			
0000-0100	Canada, CFRX Toronto	6070do			
0000-0100	Canada, CFVP Calgary	6030do			
0000-0100	Canada, CHNX Halifax	6130do			
0000-0100	Canada, CKZN St John's	6160do			
0000-0100	Canada, CKZU Vancouver	6160do			
0000-0030 mtwhfa	Canada, RCI Montreal	6040am	9535am	11940am	
0000-0100	Canada, RCI Montreal	5960na	9755na		
0000-0100	China, China Radio Intl	9710na	11715na		
0000-0100	Costa Rica, AWR Alajuela	5030am	6150am	7375am	9725am
		13750am	15460am		
0000-0005	Croatia, Croatian Radio	5895eu	7370eu	13830eu	
0000-0027	Czech Rep, Radio Prague	5930na	7345na		
0000-0030	Egypt, Radio Cairo	9900na			
0000-0015	Ghana, Ghana Broadc Corp	3366do	4915do		
0000-0045	India, All India Radio	9705as	9950as	11620as	13700as
		15145as			
0000-0100	Lebanon, Voice of Hope	6280va			
0000-0100	Lebanon, Wings of Hope	9960va			
0000-0030 sm	Lithuania, Radio Vilnius	5940na			
0000-0100	Malaysia, Radio	7295do			
0000-0100	Malaysia, RTM Kuching	7160do			
0000-0100	Netherlands, Radio	6020na	6165na		
0000-0100	New Zealand, R NZ Intl	15115pa			
0000-0050	North Korea, R Pyongyang	11335na	13760na	15130na	
0000-0100	Palau, KHBN/Voice of Hope	9965as			
0000-0100	Philippines, FEBC/R Intl	15450as			
0000-0100	Russia, Voice of	7105na	7125na	7180na	
0000-0100	Spain, R Exterior Espana	9540na			
0000-0030	Thailand, Radio	9655as	11905af		
0000-0100	United Kingdom,BBC London	5965as	5970sa	5975va	6175na
		6195as	7110as	7265as	7325va
		9590va	9915sa	11750sa	11955as
		15280as	15360as		
0000-0030	United Kingdom,BBC London	9580as	11945as		
0000-0100	USA, KAIJ Dallas TX	5810am			
0000-0100	USA, KTBN Salt Lk City UT	7510am			
0000-0100	USA, KWHR Naalehu HI	17510au			
0000-0100	USA, Monitor Radio Intl	7535am	9430ca		
0000-0100	USA, VOA Washington DC	5995na	6130am	7215va	7405na
		9455am	9775na	9890as	11695am
		11760va	13740na	15185va	15290va
		17735va	17820va		
0000-0100	USA, WEWN Birmingham AL	5825eu	7425na	7520sa	
0000-0100	USA, WHRI Noblesville IN	5745am	7315am		
0000-0100	USA, WJCR Upton KY	7490na	13595na		
0000-0025	USA, WRMI/R Miami Intl	9955am			
0000-0100	USA, WRNO New Orleans LA	7355am			
0000-0100	USA, WWCR Nashville TN	3315am	5065am	5935am	
0000-0044	USA, WYFR Okeechobee FL	6085na			
0001-0005 twhfa	Lithuania, Radio Vilnius	5940na			
0030-0100	Australia, Radio	9580pa	9660pa	11795as	13605pa
		13755as	15240pa	15365pa	15415as
		15510as	17795pa	17860pa	
0030-0100 irreg	Belarus, Radiosta Belarus	5940eu	13640eu	17665eu	
0030-0055	Belgium, R Vlaanderen Int	6030na	9925sa		
0030-0100	Ecuador, HCJB Quito	9745am			
0030-0100	Iran, VOIRI Tehran	6015na	6175na	9022na	
0030-0100	Netherlands, Radio	5905as	7305as	9860as	11655as
0030-0100	Sri Lanka, SLBC Colombo	15425as			
0030-0100	Sweden, Radio	6065am	9850am		
0030-0100	Thailand, Radio	9680as	11905na	15370as	
0045-0100	USA, WYFR Okeechobee FL	6065na			
0050-0100	Italy, RAI Rome	6005na	9645na	11800na	

Selected Programs

Sundays

0000 WHRI (Angel 2): Prophecy Countdown Radio Broadcast. The program that charts the end of the world.
0005 Canada, RCI Montreal: Quirks and Quarks. Updating what's new and what's next in science.
0010 USA, VOA Washington DC (ca): Agriculture Today. Basic farming, biotechnology, food marketing, and related issues.
0030 USA, VOA Washington DC (ca): Communications World. A look at the people, technologies, economics, and politics involved in modern telecommunications.
0030 WHRI (Angel 2): Biblical Studies Institute. Bob Tref evangelizes from Rapid City, South Dakota.
0040 USA, VOA Washington DC (am): Words and Their Stories (Special English). The origin and use of common words and phrases in American English.
0045 USA, VOA Washington DC (am): People in America (Special English). Stories about famous Americans.

Mondays

0000 KWHR (Hawaii): Ever Increasing Faith. Fredrick "K.C." Price evangelizes from Los Angeles.
0000 WHRI (Angel 2): Best Country Countdown. Tom Carter.
0005 Canada, RCI Montreal: Tapestry. A look at the broad range of spiritual and human issues facing people of various cultures and religions.
0005 UK, BBC London (south as): Cue for a Song (5th,12th,19th). Showing off the great range of voices singing in a variety of styles, from opera to pop, folk to jazz.
0010 USA, VOA Washington DC (am): Encounter. Two experts debate their contrasting views on a subject of current importance.
0010 USA, VOA Washington DC (ca): VOA Business Report. A weekday review of business and financial matters.
0030 UK, BBC London (af/as pac/eu): Popular Music. The World in Your Ear (5th,12th). See S 0445.
0030 USA, VOA Washington DC (am/ca): Spotlight. Extensive reports and interviews on people, places, and events of interest to listeners in the Caribbean and Latin America.

Tuesdays

0000 Canada, RCI Montreal: As It Happens. See M 2330.
0000 Canada, RCI Montreal: The World at Six. See M 2300.
0005 KWHR (Hawaii): People to People (live). A program offering practical scriptural insights with Bob George.
0005 WHRI (Angel 2): People to People (live). See T 0005.
0010 USA, VOA Washington DC (am): VOA Business Report. See M 0010.
0030 USA, VOA Washington DC (ca): Music USA (Standards). Classics of American popular music.
0040 USA, VOA Washington DC (am): Agriculture Report (Special English). Developments and reports on farming and agriculture.
0045 USA, VOA Washington DC (am): Science in the News (Special English). Recent scientific developments.

Wednesdays

0000 Canada, RCI Montreal: As It Happens. See M 2330.
0000 Canada, RCI Montreal: The World at Six. See M 2300.
0005 KWHR (Hawaii): People to People (live). See T 0005.
0005 UK, BBC London (south as): Food Plants. Nick Rankin's series about the plants that feed us and keep us alive continues.
0005 WHRI (Angel 2): People to People (live). See T 0005.
0010 USA, VOA Washington DC (am): VOA Business Report. See M 0010.
0015 UK, BBC London (south as): Science. Fron Pins to Paperclips (7th,14th). See S 0330.
0030 UK, BBC London (af/eu): What's News? See T 1630.
0030 UK, BBC London (am): Classical Music. How to Listen (7th,14th,21st). See M 0430.
0030 UK, BBC London (south as): Science. Bluffers Guide to Science (7th,14th). See S 0345.
0030 USA, VOA Washington DC (ca): Now Music USA. Rock and soul hits of today and yesterday.
0035 UK, BBC London (south as): Science. A Guide to Biotechnology (7th,14th). See S 0350.
0040 USA, VOA Washington DC (am): Science Report (Special English). Developments in the world of science and technology.
0045 USA, VOA Washington DC (am): Space and Man (Special English). Reports about outer space or about the human body.

Thursdays

0000 Canada, RCI Montreal: As It Happens. See M 2330.
0000 Canada, RCI Montreal: The World at Six. See M 2300.
0005 KWHR (Hawaii): People to People (live). See T 0005.
0005 WHRI (Angel 2): People to People (live). See T 0005.
0010 USA, VOA Washington DC (am): VOA Business Report. See M 0010.
0030 UK, BBC London (af/eu/as pac): Classical Music. How to Listen (1st,8th,15th,22nd). See M 0430.
0030 USA, VOA Washington DC (ca): Now Music USA. See W 0030.
0040 USA, VOA Washington DC (am): Science Report (Special English). See W 0040.
0045 USA, VOA Washington DC (am): The Making of a Nation (Special English). Chapters from U.S. history in special English.
0054 Radio Netherlands: Documentary. Collectors (22nd). See W 1154.
0054 Radio Netherlands: Documentary. Crossing the River by Feeling the Stones (14th). See A 2354.
0054 Radio Netherlands: Documentary. Greenland II: Reviving the Inuit Culture (8th). See W 1154.
0054 Radio Netherlands: Documentary. Hemp (29th). See W 1554.

Fridays

0000 Canada, RCI Montreal: As It Happens. See M 2330.
0000 Canada, RCI Montreal: The World at Six. See M 2300.
0005 KWHR (Hawaii): People to People (live). See T 0005.
0005 WHRI (Angel 2): People to People (live). See T 0005.
0010 USA, VOA Washington DC (am): VOA Business Report. See M 0010.
0030 USA, VOA Washington DC (ca): Now Music USA (Top Ten). Top ten pop music hits of the week in the USA.
0040 USA, VOA Washington DC (am): Environment Report (Special English). A five-minute report on a specific environmental subject.
0045 USA, VOA Washington DC (am): American Mosaic (Special English). Reports about music, books, movies, and student life in the USA.

Saturdays

0000 Canada, RCI Montreal: As It Happens. See M 2330.
0000 Canada, RCI Montreal: The World at Six. See M 2300.
0005 KWHR (Hawaii): People to People (live). See T 0005.
0005 WHRI (Angel 2): People to People (live). See T 0005.
0010 USA, VOA Washington DC (am): Newsline. Background and insight on the news from experienced VOA correspondents and journalists.
0030 USA, VOA Washington DC (ca): Country Music USA. Country, bluegrass, and western swing, plus conversations with country performers.
0040 USA, VOA Washington DC (am): In the News (Special English). Focus on a person, organization, or issue in news reports.
0045 USA, VOA Washington DC (am): American Stories (Special English). Readings of short stories by American authors in slow English.

FREQUENCIES

0100-0200 twhfa	Argentina, RAE	11710am			
0100-0200	Australia, Radio	9580pa	9660pa	13605pa	13745as
		13755as	15240pa	15245as	15365pa
		15415as	15510as	17715as	17750as
		17795pa	17860pa	17880as	
0100-0200 vl	Australia, VL8A Alice Spg	2310do			
0100-0200 vl	Australia, VL8K Katherine	5025do			
0100-0200 vl	Australia, VL8T Tent Crk	4910do			
0100-0200	Australia,DefenseForces R	13525as			
0100-0200 vl	Canada, CBC N Quebec Svc	9625do			
0100-0200	Canada, CFCX Montreal	6005do			
0100-0200	Canada, CFRX Toronto	6070do			
0100-0200	Canada, CFVP Calgary	6030do			
0100-0200	Canada, CHNX Halifax	6130do			
0100-0200	Canada, CKZN St John's	6160do			
0100-0200	Canada, CKZU Vancouver	6160do			
0100-0200	Costa Rica,RF Peace Intl	7385am	9400am	15050am	
0100-0105	Croatia, Croatian Radio	5895eu	7370eu	13830eu	
0100-0200	Cuba, Radio Havana Cuba	6000na	9820na	9830na	
0100-0127	Czech Rep, Radio Prague	6200na	7345na		
0100-0200	Ecuador, HCJB Quito	9745am			
0100-0150	Germany, Deutsche Welle	6040na	6085na	6145na	9555na
		9640na	9670na		
0100-0115	Ghana, Ghana Broadc Corp	3366do	4915do		
0100-0200	Guatemala, Radio Cultural	3300do			
0100-0200	Indonesia, Voice of	9525na			
0100-0127	Iran, VOIRI Tehran	6015na	6175na	9022na	
0100-0110	Italy, RAI Rome	6005na	9645na	11800na	
0100-0200	Japan, NHK/Radio	9605as	11840as	11860as	11890as
		11910as	17810as	17845as	
0100-0200	Lebanon, Wings of Hope	9960va			
0100-0200 smtwh	Malaysia, Radio	7295do			
0100-0200	Netherlands, Radio	5905as	7305as		
0100-0125	Netherlands, Radio	6020na	6165na		
0100-0200	New Zealand, R NZ Intl	15115pa			
0100-0130 m	Norway, Radio Norway Intl	6010na			
0100-0200	Philippines, FEBC/R Intl	15450as			
0100-0200	Russia, Voice of	7105na	7125na		
0100-0127	Slovakia, R Slovakia Intl	5930na	7300na	9440sa	
0100-0200	South Korea, R Korea Intl	7550eu	11810na	15575na	
0100-0200	Spain, R Exterior Espana	9540na			
0100-0200	Sri Lanka, SLBC Colombo	15425as			
0100-0130	Switzerland, Swiss R Intl	6135na	9885na	9905na	
0100-0200	Ukraine, R Ukraine Intl	5905na	5915na	6010na	6020na
		6055na	7205na		
0100-0200	United Kingdom,BBC London	5970sa	5975va	6175na	6195as
		7325va	9590va	9915sa	11750sa
		11955as	15360as		
0100-0200	USA, KAIJ Dallas TX	5810am			
0100-0200	USA, KTBN Salt Lk City UT	7510am			
0100-0200	USA, KVOH Los Angeles CA	9975am			
0100-0200	USA, KWHR Naalehu HI	17510au			
0100-0200	USA, Monitor Radio Intl	7535na	9430am		
0100-0200	USA, VOA Washington DC	5995na	6130na	7405na	9455na
		9775na	13740na	15205as	15250as
		15370as	17740as	21550as	
0100-0200	USA, WEWN Birmingham AL	5825eu	7425na	7520na	
0100-0200	USA, WHRI Noblesville IN	5745am			
0100-0200	USA, WJCR Upton KY	7490na	13595na		
0100-0200	USA, WRNO New Orleans LA	7355am			
0100-0200	USA, WWCR Nashville TN	3315am	5065am	5935am	
0100-0200	USA, WYFR Okeechobee FL	6065na	9505na		
0100-0130	Uzbekistan, R Tashkent	5955as	5975as	7285as	
0100-0200	Vietnam, Voice of	5940na	9840na	15010na	
0100-0130 mtwhfa	Yugoslavia, Radio	6195af	7115na		
0130-0200	Austria, R Austria Intl	9655na			
0130-0150	Greece, Voice of	6245na	7448na	9420na	
0130-0200	Netherlands, Radio	9860as			
0130-0200	Sweden, Radio	7120as			
0140-0200	Vatican State, Vatican R	5980as	7335as		
0145-0200	Albania, R Tirana Intl	6140na	7160na		

SELECTED PROGRAMS

Sundays

0100 KWHR (Hawaii): The Water of Life Broadcast. Doyle Davidson preaches from Plano, Texas.
0100 WHRI (Angel 2): Truth House. Evangelistic teachings by E.C. Fultcher plus his global shortwave club.
0108 Germany, Deutsche Welle: Inside Europe. A radio magazine offering a European perspective on events of the week.
0110 USA, VOA Washington DC (am): On the Line. A discussion of U.S. policies and contemporary issues.
0110 USA, VOA Washington DC (ca): On the Line. See S 0110.
0130 UK, BBC London (am): Popular Music. The World in Your Ear (4th,11th). See S 0445.
0130 USA, VOA Washington DC (am/ca): Press Conference USA. Newsmakers are questioned by Washington journalists in the VOA studios.
0138 Germany, Deutsche Welle: Religion and Society. News and developments concerning the world's major religions.
0154 Radio Netherlands: Documentary. Collectors (25th). See W 1154.
0154 Radio Netherlands: Documentary. Crossing the River by Feeling the Stones (18th). See A 2354.
0154 Radio Netherlands: Documentary. Greenland II: Reviving the Inuit Culture (11th). See W 1154.
0154 Radio Netherlands: Documentary. Hemp (Mar 3). See W 1554.

Mondays

0100 KWHR (Hawaii): Remnant Church of God. Ruth Tetzlaff evangelizes from Wisconsin.
0100 Norway, Radio Norway Intl: Norway Now. See S 1300.
0108 Germany, Deutsche Welle: Mailbag. Listener mail from the Americas is answered.
0110 USA, VOA Washington DC (amca): New Horizons. A twenty-minute documentary on a scientific, technological, or medical subject.
0115 UK, BBC London (af/as pac/eu): Red Dwarf. A sci-fi comedy first commissioned for BBC-TV is a space odyssey adventure series.
0118 Germany, Deutsche Welle: Living in Germany. A weekly look at the social and political issues in the 1990s.
0130 KWHR (Hawaii): Church of the Risen Christ. See S 2300.
0130 USA, VOA Washington DC (am/ca): Issues in the News. Members of the Washington press corps discuss current topics.
0133 Germany, Deutsche Welle: German by Radio. See S 1133.
0145 KWHR (Hawaii): Music. See S 0200.

Tuesdays

0100 KWHR (Hawaii): Music. See S 0200.
0100 WHRI (Angel 2): Jack McLamb Show (live). Jack McLamb.
0109 Germany, Deutsche Welle: European Journal. See S 2324.
0110 USA, VOA Washington DC (am/ca): Report to the Americas. The latest news affecting the region, as well as a roundup of sports, financial news, and the weather forecast.
0132 Germany, Deutsche Welle: German Tribune. News and views from the Federal Republic.
0155 USA, VOA Washington DC (am/ca): VOA Editorial. Comments expressing the official position of the U.S. Government on various subjects.

Wednesdays

0100 KWHR (Hawaii): Music. See S 0200.
0100 WHRI (Angel 2): Jack McLamb Show (live). See T 0100.
0109 Germany, Deutsche Welle: European Journal. See S 2324.
0110 USA, VOA Washington DC (am/ca): Report to the Americas. See T 0110.
0130 UK, BBC London (af/as pac/eu): Classical Music. The Story of Western Music. See S 1615.
0133 Germany, Deutsche Welle: Come to Germany. Focus on a seasonal event, festival, or attraction.
0155 USA, VOA Washington DC (am/ca): VOA Editorial. See T 0155.

Thursdays

0100 KWHR (Hawaii): Music. See S 0200.
0100 WHRI (Angel 2): Jack McLamb Show (live). See T 0100.
0109 Germany, Deutsche Welle: European Journal. See S 2324.
0110 USA, VOA Washington DC (am/ca): Report to the Americas. See T 0110.
0133 Germany, Deutsche Welle: German Tribune. See T 0132.
0155 USA, VOA Washington DC (am/ca): VOA Editorial. See T 0155.

Fridays

0100 KWHR (Hawaii): Music. See S 0200.
0100 WHRI (Angel 2): Jack McLamb Show (live). See T 0100.
0109 Germany, Deutsche Welle: European Journal. See S 2324.
0110 USA, VOA Washington DC (am/ca): Report to the Americas. See T 0110.
0115 UK, BBC London (af/as pac/eu/south as): Surviving the 20th Century (2nd,9th). A human interest program in which ordinary people tell the extraordinary stories of their lives.
0133 Germany, Deutsche Welle: Arts on the Air. See S 1109.
0155 USA, VOA Washington DC (am/ca): VOA Editorial. See T 0155.

Saturdays

0100 KWHR (Hawaii): Home Schooling. Terry and Vicki Brady of the Home Education network take calls about schooling.
0100 WHRI (Angel 2): Jack McLamb Show (live). See T 0100.
0108 Germany, Deutsche Welle: European Journal. See S 2324.
0110 USA, VOA Washington DC (am/ca): Report to the Americas. See T 0110.
0130 USA, VOA Washington DC (am/ca): Press Conference USA. See S 0130.
0131 Germany, Deutsche Welle: Through German Eyes. See S 1629.

Frequencies

0200-0300	Australia, Radio	9580pa	9660pa	13605pa	15240pa
		15365pa	15415as	15510as	17715as
		17750as	17795pa	17860pa	
0200-0300 vl	Australia, VL8A Alice Spg	2310do			
0200-0300 vl	Australia, VL8K Katherine	5025do			
0200-0300 vl	Australia, VL8T Tent Crk	4910do			
0200-0300	Australia,DefenseForces R	13525as			
0200-0300 vl	Canada, CBC N Quebec Svc	9625do			
0200-0300	Canada, CFCX Montreal	6005do			
0200-0300	Canada, CFRX Toronto	6070do			
0200-0300	Canada, CFVP Calgary	6030do			
0200-0300	Canada, CHNX Halifax	6130do			
0200-0300	Canada, CKZN St John's	6160do			
0200-0300	Canada, CKZU Vancouver	6160do			
0200-0300	Canada, RCI Montreal	5905na	9535am	9755na	11725am
0200-0300	Costa Rica,RF Peace Intl	7385am	9400am	15050am	
0200-0205	Croatia, Croatian Radio	5895eu	7370eu	13830eu	
0200-0300	Cuba, Radio Havana Cuba	6000na	9820na	9830na	
0200-0300	Ecuador, HCJB Quito	9745am			
0200-0300	Egypt, Radio Cairo	9475na			
0200-0250	Germany, Deutsche Welle	6035as	6130na	7265as	7285as
		7355as	9515as		
0200-0230	Hungary, Radio Budapest	6190na	9850na	11870na	
0200-0300 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0200-0300	Lebanon, Wings of Hope	9960va			
0200-0300 smtwh	Malaysia, Radio	7295do			
0200-0230	Netherlands, Radio	5905as	7305as	9860as	11655as
0200-0300	New Zealand, R NZ Intl	15115pa			
0200-0300	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		11940na			
0200-0300	Russia, Voice of	5950na	7105na	7270na	7345na
		9580na	12030na	13640na	
0200-0300	South Korea, R Korea Intl	7275sa	11725sa	11810sa	
0200-0230	Sri Lanka, SLBC Colombo	15425as			
0200-0300	Taiwan, VO Free China	5950na	7130as	9680na	11740ca
		11825as	15345as		
0200-0300	United Kingdom,BBC London	5970sa	5975va	6135af	6175na
		7235va	7325va	9590va	9605as
		9915sa	11955as	15360as	
0200-0300	USA, KAIJ Dallas TX	5810am			
0200-0300	USA, KTBN Salt Lk City UT	7510am			
0200-0300	USA, KVOH Los Angeles CA	9975am			
0200-0300	USA, KWHR Naalehu HI	17510au			
0200-0300	USA, Monitor Radio Intl	5850na	9430am		
0200-0300	USA, VOA Washington DC	7115as	7205as	7215as	7651as
		9740as	11705as	15205as	17740as
		17820as			
0200-0300	USA, WEWN Birmingham AL	5825eu	7425na		
0200-0300	USA, WHRI Noblesville IN	5745am			
0200-0300	USA, WJCR Upton KY	7490na	13595na		
0200-0300	USA, WRNO New Orleans LA	7355am			
0200-0300	USA, WWCR Nashville TN	3315am	5065am	5935am	
0200-0300	USA, WYFR Okeechobee FL	6065na	9505na		
0200-0300	Vietnam, Voice of	5940na	9840na	15010na	
0200-0230	Yugoslavia, Radio	6195na	7115na		
0230-0300	Albania, R Tirana Intl	6140na	7160na		
0230-0300	Austria, R Austria Intl	9655na	9870ca	13730sa	
0230-0245	Pakistan, Radio	7290as	15190as	17705as	17725as
		21730as			
0230-0300	Philippines, R Pilipinas	17760me	17865me	21580me	
0230-0300 mtwhf	Portugal, R Portugal Intl	6175sa	9570na		
0230-0300	Sweden, Radio	7115na			
0250-0300	Vatican State, Vatican R	6095na	7305na		

Selected Programs

Sundays

0200 KWHR (Hawaii): Grace In Action. Paul Kamanu evangelizes.
0200 WHRI (Angel 1): Music. Contemporary christian music and inspiration.
0200 WHRI (Angel 2): The Hour of Courage. Ron Wilson talks politics and the precious metals market.
0207 Canada, RCI Montreal: Innovation Canada. Canadian entrepreneurs, inventors, and researchers and their ideas and discoveries.
0208 Germany, Deutsche Welle: Commentary. Guest commentary about a current event.
0212 Germany, Deutsche Welle: Sports Report. The latest news from the world of sports.
0216 Germany, Deutsche Welle: Mailbag Asia. Listener mail from Asia is answered.
0230 KWHR (Hawaii): Living Faith Ministries. Bill Perg.
0231 Canada, RCI Montreal: Earth Watch. Environment and ecology matters.
0245 KWHR (Hawaii): Israel Prayer Chain. B. Honeysucker.

Mondays

0200 KWHR (Hawaii): Methodist Hour. Music, interviews, and timely messages.
0200 WHRI (Angel 2): Open Bible Dialog. Joseph Chambers takes listeners' phone calls.
0206 Canada, RCI Montreal: The Arts in Canada. A look at the Canadian arts scene.
0208 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
0224 Germany, Deutsche Welle: European Journal. See S 2324.
0230 Canada, RCI Montreal: The Mailbag. See S 1437.
0230 KWHR (Hawaii): A Study in God's Word. See S 0615.
0230 WHRI (Angel 1): New Life Fellowship. Bob Bailey.
0245 KWHR (Hawaii): Battle Line. A production of Indiana Christian University.

Tuesdays

0200 KWHR (Hawaii): Music. See S 0200.
0200 WHRI (Angel 1): Music. See S 0200.
0200 WHRI (Angel 2): The Prophecy Club. A discussion of Bible prophecy from Topeka, Kansas.
0208 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
0211 Canada, RCI Montreal: Spectrum. See M 1440.
0224 Germany, Deutsche Welle: European Journal. See S 2324.
0230 WHRI (Angel 2): The Hour of Courage. See S 0200.

Wednesdays

0200 KWHR (Hawaii): Music. See S 0200.
0200 WHRI (Angel 1): Music. See S 0200.
0200 WHRI (Angel 2): The Prophecy Club. See T 0200.
0208 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
0211 Canada, RCI Montreal: Spectrum. See M 1440.
0224 Germany, Deutsche Welle: European Journal. See S 2324.
0230 WHRI (Angel 2): The Hour of Courage. See S 0200.

Thursdays

0200 KWHR (Hawaii): Music. See S 0200.
0200 WHRI (Angel 1): Music. See S 0200.
0200 WHRI (Angel 2): The Prophecy Club. See T 0200.
0208 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
0211 Canada, RCI Montreal: Spectrum. See M 1440.
0224 Germany, Deutsche Welle: European Journal. See S 2324.
0230 WHRI (Angel 2): The Hour of Courage. See S 0200.
0254 Radio Netherlands: Documentary. Collectors (22nd). See W 1154.
0254 Radio Netherlands: Documentary. Crossing the River by Feeling the Stones (15th). See A 2354.
0254 Radio Netherlands: Documentary. Greenland II: Reviving the Inuit Culture (8th). See W 1154.
0254 Radio Netherlands: Documentary. Hemp (29th). See W 1554.

Fridays

0200 KWHR (Hawaii): Music. See S 0200.
0200 WHRI (Angel 1): Music. See S 0200.
0200 WHRI (Angel 2): The Prophecy Club. See T 0200.
0208 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
0211 Canada, RCI Montreal: Spectrum. See M 1440.
0224 Germany, Deutsche Welle: European Journal. See S 2324.
0230 WHRI (Angel 2): The Hour of Courage. See S 0200.

Saturdays

0200 KWHR (Hawaii): Home Schooling. See A 0100.
0200 WHRI (Angel 1): Music. See S 0200.
0200 WHRI (Angel 2): The Prophecy Club. See T 0200.
0208 Germany, Deutsche Welle: Commentary. See S 0208.
0211 Canada, RCI Montreal: Spectrum. See M 1440.
0212 Germany, Deutsche Welle: The Week in Germany. See S 1609.
0222 Germany, Deutsche Welle: Economic Notebook. See T 0333.
0230 WHRI (Angel 2): The Hour of Courage. See S 0200.
0237 Germany, Deutsche Welle: The Jazz Corner. See F 2333.

Radio Havana QSL sent to MT by Donald M. Choleva

Frequencies

0300-0400	Australia, Radio	9580pa	9660pa	13605pa	15240pa
		15245as	15365pa	15510as	17750pa
		17795pa	17860pa		
0300-0400 vl	Australia, VL8A Alice Spg	2310do			
0300-0400 vl	Australia, VL8K Katherine	5025do			
0300-0400 vl	Australia, VL8T Tent Crk	4910do			
0300-0400 vl	Canada, CBC N Quebec Svc	9625do			
0300-0400	Canada, CFCX Montreal	6005do			
0300-0400	Canada, CFRX Toronto	6070do			
0300-0400	Canada, CFVP Calgary	6030do			
0300-0400	Canada, CHNX Halifax	6130do			
0300-0400	Canada, CKZN St John's	6160do			
0300-0400	Canada, CKZU Vancouver	6160do			
0300-0330 twhfa	Canada, RCI Montreal	6010na	9755na		
0300-0400 sm	Canada, RCI Montreal	6010na	9755na		
0300-0400	China, China Radio Intl	9690na	9710na	11715na	
0300-0400 vl	Costa Rica,Faro del Carib	5055do			
0300-0400	Costa Rica,RF Peace Intl	7385am	9400am		
0300-0305	Croatia, Croatian Radio	5895eu	7370eu	13830eu	
0300-0400	Cuba, Radio Havana Cuba	6000na	9820na	9830na	
0300-0327	Czech Rep, Radio Prague	5930na	7345na		
0300-0400	Ecuador, HCJB Quito	9745am			
0300-0330	Egypt, Radio Cairo	9475na			
0300-0350	Germany, Deutsche Welle	6045na	6085na	6120na	9535na
		9650na			
0300-0400	Guatemala, Radio Cultural	3300do			
0300-0400	Japan, NHK/Radio	5960na	9605na	11840as	
0300-0330	Japan, NHK/Radio	11885na	11895ca	11960na	
0300-0400 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0300-0400	Lebanon, Wings of Hope	9960va			
0300-0330	Mongolia, R Ulan Bator	9960na	12000na		
0300-0325	Netherlands, Radio	5905as	7305as	9860as	11655as
0300-0400	New Zealand, R NZ Intl	15115pa			
0300-0330 m	Norway, Radio Norway Intl	6030na			
0300-0330	Philippines, R Pilipinas	17760me	17865me	21580me	
0300-0400	Russia, Voice of	5930na	5940na	7105na	7175na
		7270na	7330na	7345na	9580na
0300-0400	S Africa, Channel Africa	5955af	9585af		
0300-0400	Taiwan, VO Free China	5950na	9680na	11745as	11825as
		15345as			
0300-0330	Thailand, Radio	9655na	11890na		
0300-0315	Uganda, Radio	4976do			
0300-0330	United Kingdom,BBC London	5970sa	6135af	7235va	7325sa
		15360as	15380as		
0300-0400	United Kingdom,BBC London	3255af	3955eu	5975va	6005af
		6175na	9410va	9590va	9600af
		9605as	11760va	12095af	15310as
0300-0400	USA, KAIJ Dallas TX	5810am			
0300-0400	USA, KTBN Salt Lk City UT	7510am			
0300-0400	USA, KVOH Los Angeles CA	9975am			
0300-0400	USA, KWHR Naalehu HI	17510au			
0300-0400	USA, Monitor Radio Intl	5850na	7535af		
0300-0400	USA, VOA Washington DC	6035af	7105af	7280af	7340af
		7405af	7415af	9575af	9885af
0300-0400	USA, WEWN Birmingham AL	5825eu	7425na	7520na	
0300-0400	USA, WHRI Noblesville IN	5760am	7315am		
0300-0400	USA, WJCR Upton KY	7490na	13595na		
0300-0400	USA, WRNO New Orleans LA	7395am			
0300-0400	USA, WWCR Nashville TN	3315am	5065am	5935am	
0300-0400	USA, WYFR Okeechobee FL	6065na	7355eu	9505na	
0300-0315	Vatican State, Vatican R	6095na	7305na		
0300-0400	Zimbabwe, ZBC/Radio 3	3306do	3396do	4828do	
0315-0330 s	Greece, Voice of	6245na	7448na	9420na	
0320-0350	Vatican State, Vatican R	7360af			
0330-0357	Czech Rep, Radio Prague	6200as			
0330-0400	Hungary, Radio Budapest	5965na	9850na	11870na	
0330-0355	Moldova, R Moldova Intl	7500na			
0330-0400	Sweden, Radio	7115na			
0330-0400 vl	Tanzania, Radio	5050af			
0330-0400	UAE, Radio Dubai	13675na	15395eu	21605na	
0330-0400	United Kingdom,BBC London	9610af	11730af	11955as	15280as
0340-0350	Greece, Voice of	6245na	7448na	9420na	
0345-0400 irreg	Burundi, Radio Nationale	6140do			

Selected Programs

Sundays

0300 KWHR (Hawaii): Truth House. See S 0100.
0300 WHRI (Angel 1): Music. See S 0200.
0300 WHRI (Angel 2): World of Prophecy. Texe Marrs and a guest discuss the evils and pitfalls of today and the outlook for tomorrow.
0305 Canada, RCI Montreal: Double Exposure. The comedy team of Bob Robertson and Linda Cullen present their award-winning brand of political satire and mimicry.
0308 Germany, Deutsche Welle: Inside Europe. See S 0108.
0330 UK, BBC London (am): Classical Music. The Story of Western Music. See S 1615.
0330 UK, BBC London (as pac): Science. Fron Pins to Paperclips (4th,11th). An examination of everyday objects that have unusual histories.
0332 Canada, RCI Montreal: The Royal Canadian Air Farce. The traveling comedy show that was brought back by popular demand.
0335 UK, BBC London (af): Education Express. This new 12-part series looks at all aspects of the educational scene in Africa with a mixture of news, views and analysis.
0337 Germany, Deutsche Welle: Religion and Society. See S 0138.
0345 UK, BBC London (as pac): Science. Bluffers Guide to Science (4th,11th). Taking the lid off scientific jarçon.
0350 UK, BBC London (as pac): Science, A Guide to Biotechnology (4th,11th). A look at gene-shifting and the effects of genetic engineering.

Mondays

0300 KWHR (Hawaii): The Sword of the Spirit. Mike Keyes evangelizes.
0300 Norway, Radio Norway Intl: Norway Now. See S 1300.
0300 WHRI (Angel 1): The Water of Life Broadcast. See S 0100.
0300 WHRI (Angel 2): The America's Promise Broadcast. Dave Farley preaches from Idaho.
0304 Canada, RCI Montreal: The Inside Track. An award-winning program of sports journalism, examining the impact of sports on the lives of Canadians.
0308 Germany, Deutsche Welle: Mailbag. See M 0108.
0318 Germany, Deutsche Welle: Living in Germany. See M 0118.
0330 KWHR (Hawaii): Cumbre DX. See S 0430.
0330 WHRI (Angel 2): Truth for the World. Churches of Christ spokesman Jim Dearman examines Scripture.
0331 Canada, RCI Montreal: Now the Details. See S 2330.
0333 Germany, Deutsche Welle: German by Radio. See S 1133.

Tuesdays

0300 KWHR (Hawaii): The Hour of Courage. See S 0200.
0300 WHRI (Angel 1): Music. See S 0200.
0306 WHRI (Angel 2): For the People (repeat). Chuck Harder talk radio.
0309 Germany, Deutsche Welle: European Journal. See S 2324.
0315 Canada, RCI Montreal: Report to the Peacekeepers. See M 0612.
0330 KWHR (Hawaii): Music. See S 0200.
0333 Germany, Deutsche Welle: Economic Notebook. The economic scene in Germany and around the world.

Wednesdays

0300 KWHR (Hawaii): The Hour of Courage. See S 0200.
0300 WHRI (Angel 1): Music. See S 0200.
0306 WHRI (Angel 2): For the People (repeat). See T 0306.
0309 Germany, Deutsche Welle: European Journal. See S 2324.
0315 Canada, RCI Montreal: Report to the Peacekeepers. See M 0612.
0330 KWHR (Hawaii): Music. See S 0200.
0333 Germany, Deutsche Welle (am): Insight. Greenpeace Turns 25 (7th). Reporting on the environmental pressure group which is suddenly all at sea.
0333 Germany, Deutsche Welle: Insight. A weekly analysis of major developments on the international scene.

Thursdays

0300 KWHR (Hawaii): The Hour of Courage. See S 0200.
0300 WHRI (Angel 1): Music. See S 0200.
0306 WHRI (Angel 2): For the People (repeat). See T 0306.
0309 Germany, Deutsche Welle: European Journal. See S 2324.
0315 Canada, RCI Montreal: Report to the Peacekeepers. See M 0612.
0330 KWHR (Hawaii): Music. See S 0200.
0333 Germany, Deutsche Welle: German by Radio. See S 1133.

Fridays

0300 KWHR (Hawaii): The Hour of Courage. See S 0200.
0300 WHRI (Angel 1): Music. See S 0200.
0306 WHRI (Angel 2): For the People (repeat). See T 0306.
0309 Germany, Deutsche Welle: European Journal. See S 2324.
0315 Canada, RCI Montreal: Report to the Peacekeepers. See M 0612.
0330 KWHR (Hawaii): Music. See S 0200.
0330 UK, BBC London (am): Surviving the 20th Century (2nd,9th). See F 0115.
0333 Germany, Deutsche Welle: Science and Technology. See M 1633.

Saturdays

0300 KWHR (Hawaii): The Hour of Courage. See S 0200.
0300 WHRI (Angel 1): Music. See S 0200.
0306 WHRI (Angel 2): For the People (repeat). See T 0306.
0308 Germany, Deutsche Welle: European Journal. See S 2324.
0315 Canada, RCI Montreal: Report to the Peacekeepers. See M 0612.
0330 KWHR (Hawaii): Music. See S 0200.
0332 Germany, Deutsche Welle: Through German Eyes. See S 1629.

Frimmel's Program Pointers
Israel to the Americas

The voice of Israel plans to transmit in a new time slot effective April 1st. This is a 30-minute morning broadcast to the Americas at 1500-1530 UTC on 9300 and 11685. The 2000-2030 broadcast on 7420, 7465, 9435, 9845 and 13750 remains in effect.

FREQUENCIES

0400-0500	Australia, Radio	9580pa	9660pa	11880pa	13605as
		15240pa	15365pa	15415pa	15510pa
		17715pa	17750as	17795pa	
0400-0500 vl	Australia, VL8A Alice Spg	2310do			
0400-0500 vl	Australia, VL8K Katherine	5025do			
0400-0500 vl	Australia, VL8T Tent Crk	4910do			
0400-0500 vl	Canada, CBC N Quebec Svc	9625do			
0400-0500	Canada, CFCX Montreal	6005do			
0400-0500	Canada, CFRX Toronto	6070do			
0400-0500	Canada, CFVP Calgary	6030do			
0400-0500	Canada, CHNX Halifax	6130do			
0400-0500	Canada, CKZN St John's	6160do			
0400-0500	Canada, CKZU Vancouver	6160do			
0400-0430	Canada, RCI Montreal	6150me	9505me	9645me	
0400-0500	China, China Radio Intl	9730na			
0400-0500	Costa Rica,RF Peace Intl	7385am	9400am	15050am	
0400-0405	Croatia, Croatian Radio	5895eu	7370eu	13830eu	
0400-0500	Cuba, Radio Havana Cuba	6000na	6180na	9820na	9830na
0400-0500	Ecuador, HCJB Quito	9745am			
0400-0450	Germany, Deutsche Welle	6015af	6045af	6065af	7225af
		7265af	9565af		
0400-0500 twtfa	Guatemala, Radio Cultural	3300do			
0400-0500 vl	Italy, IRRS Milan	7100va			
0400-0500 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0400-0500	Lebanon, Wings of Hope	9960va			
0400-0458	New Zealand, R NZ Intl	15115pa			
0400-0450	North Korea, R Pyongyang	15180as	15230as	17765as	
0400-0430	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		11940na			
0400-0500	Russia, Voice of	5920na	5930na	7105na	7175na
		7180na	7270na	7330na	
0400-0500	S Africa, Channel Africa	5955af	9585af		
0400-0427	S Africa, Trans World R	7165af			
0400-0500	Slovakia, AWR	9450af	9465af		
0400-0430	Switzerland, Swiss R Intl	6135na	9885na	9905na	
0400-0500	Switzerland, Swiss R Intl	9905na			
0400-0430	Tanzania, Radio	5050af			
0400-0500	Turkey, Voice of	9445na	9560as	9655na	9685eu
		9760au			
0400-0415	Uganda, Radio	4976do			
0400-0500	Ukraine, R Ukraine Intl	5905na	5915na	6010na	6020na
		6055na	7205na		
0400-0500	United Kingdom,BBC London	3255af	5975va	6005af	6175na
		7160af	9410va	9600af	11730af
		11760af	11955as	12095af	15280as
		15310as	15575va		
0400-0430	United Kingdom,BBC London	3955eu	6180eu	6195eu	9610af
0400-0500	USA, KAIJ Dallas TX	5810am			
0400-0500	USA, KTBN Salt Lk City UT	7510am			
0400-0500	USA, KVOH Los Angeles CA	9975am			
0400-0500	USA, KWHR Naalehu HI	17510as			
0400-0500	USA, Monitor Radio Intl	7535eu	9840af		
0400-0500	USA, VOA Washington DC	6035af	6110af	6873va	7170va
		7280af	7340af	7405af	7415af
		9575af	9630af	9885af	15300af
0400-0500	USA, WHRI Noblesville IN	5760am			
0400-0500	USA, WJCR Upton KY	7490na	13595na		
0400-0500 smtwhf	USA, WMLK Bethel PA	9465eu			
0400-0500	USA, WRNO New Orleans LA	7395am			
0400-0500	USA, WWCR Nashville TN	3315am	5065am	5935am	
0400-0500	USA, WYFR Okeechobee FL	6065na	9505na		
0400-0500	USA, WYFR Okeechobee FL	9355eu			
0400-0430	Vietnam, Voice of	7360na	9840na	12020na	
0400-0500	Zimbabwe, ZBC/Radio 3	3306do	3396do		
0425-0440	Italy, RAI Rome	5990eu	7275eu		
0425-0500	Nigeria, FRCN/Radio	3326do	4990do		
0430-0500	Australia,DefenseForces R	13525as			
0430-0455	Moldova, R Moldova Intl	7500na			
0430-0500	Netherlands, Radio	5995na	6165na		
0430-0500	Swaziland, Trans World R	3200af	5055af	6070af	
0430-0500	United Kingdom,BBC London	7150eu			
0445-0500	Tajikistan, Tajik Radio	7245as			
0455-0500	Nigeria, Voice of	7255af			
0459-0500 mtwhf	New Zealand, R NZ Intl	11900pa			

SELECTED PROGRAMS

Sundays

0400 KWHR (Hawaii): Gospel Crusade Ministries. Scripture teachings by Roger Hedrick and free bible correspondence courses.
0400 WHRI (Angel 1): Music. See S 0200.
0400 WHRI (Angel 2): Biblical Studies Institute. See S 0030.
0407 Canada, RCI Montreal: Innovation Canada. See S 0207.
0408 Germany, Deutsche Welle: Commentary. See S 0208.
0412 Germany, Deutsche Welle: Sports Report. See S 0212.
0416 Germany, Deutsche Welle: International Talking Point. Journalists discuss major trends and events.
0430 KWHR (Hawaii): Prophetic Voice Broadcast. A program from Gospel Truth Ministries of Cincinnati.
0430 WHRI (Angel 2): Cumbre DX. NEW! A what's-on-the-air program hosted by Marie Lamb.
0436 Germany, Deutsche Welle: Feature of the Month (1). A special feature on important developmental issues of our time.
0436 Germany, Deutsche Welle: People and Places. Interviews, stories and music for Africa listeners.
0445 UK, BBC London (as pac/south as): Popular Music. The World in Your Ear (4th,11th). Bizarre stories from around the world in comic sketches, off-beat characters and lots of fun music.

Mondays

0400 KWHR (Hawaii): Best Country Countdown. See M 0000.
0407 Canada, RCI Montreal: The Mailbag. See S 1437.
0408 Germany, Deutsche Welle: Africa Highlight. A weekly feature on an important topic concerning Africa.
0424 Germany, Deutsche Welle: European Journal. See S 2324.
0430 UK, BBC London (south as): Classical Music. How to Listen (5th,12th,19th). Mark Lowther looks at a different popular classic in each program and explains what to listen for when hearing it.
0445 UK, BBC London (eu/south as): Red Dwarf. See T 0115.

Tuesdays

0400 KWHR (Hawaii): Music. See S 0200.
0400 WHRI (Angel 1): Music. See S 0200.
0407 WHRI (Angel 2): For the People (repeat). See T 0306.
0408 Germany, Deutsche Welle: Africa Report. Reports and background to the news from Africa by Deutsche Welle correspondents.
0411 Canada, RCI Montreal: Spectrum. See M 1440.
0424 Germany, Deutsche Welle: European Journal. See S 2324.

Wednesdays

0400 KWHR (Hawaii): Music. See S 0200.
0400 WHRI (Angel 1): Music. See S 0200.
0407 WHRI (Angel 2): For the People (repeat). See T 0306.
0408 Germany, Deutsche Welle: Africa Report. See T 0408.
0411 Canada, RCI Montreal: Spectrum. See M 1440.
0424 Germany, Deutsche Welle: European Journal. See S 2324.

Thursdays

0400 KWHR (Hawaii): Music. See S 0200.
0400 WHRI (Angel 1): Music. See S 0200.
0407 WHRI (Angel 2): For the People (repeat). See T 0306.
0408 Germany, Deutsche Welle: Africa Report. See T 0408.
0411 Canada, RCI Montreal: Spectrum. See M 1440.
0424 Germany, Deutsche Welle: European Journal. See S 2324.
0430 UK, BBC London (south as): What's News? See T 1630.
0454 Radio Netherlands: Documentary. Collectors (22nd). See W 1154.
0454 Radio Netherlands: Documentary. Crossing the River by Feeling the Stones (15th). See A 2354.
0454 Radio Netherlands: Documentary. Greenland II: Reviving the Inuit Culture (8th). See W 1154.
0454 Radio Netherlands: Documentary. Hemp (29th). See W 1554.

Fridays

0400 KWHR (Hawaii): Music. See S 0200.
0400 WHRI (Angel 1): Music. See S 0200.
0407 WHRI (Angel 2): For the People (repeat). See T 0306.
0408 Germany, Deutsche Welle: Africa Report. See T 0408.
0411 Canada, RCI Montreal: Spectrum. See M 1440.
0424 Germany, Deutsche Welle: European Journal. See S 2324.

Saturdays

0400 KWHR (Hawaii): Music. See S 0200.
0400 WHRI (Angel 1): Music. See S 0200.
0407 WHRI (Angel 2): For the People (repeat). See T 0306.
0408 Germany, Deutsche Welle: Commentary. See S 0208.
0411 Canada, RCI Montreal: Spectrum. See M 1440.
0412 Germany, Deutsche Welle: Africa This Week. A weekly review of trends and events on the African continent.
0424 Germany, Deutsche Welle: Man and Environment. See T 1633.

Radio Maya QSL sent to MT by Donald M. Choleva

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Frequencies

0500-0600	Australia, Radio	9580pa	9660pa	11880pa	13605as
		15240pa	15245as	15365pa	15415as
		17715pa	17795pa		
0500-0600 vl	Australia, VL8A Alice Spg	2310do			
0500-0600 vl	Australia, VL8K Katherine	5025do			
0500-0600 vl	Australia, VL8T Tent Crk	4910do			
0500-0600	Australia,DefenseForces R	13525as			
0500-0600	Bulgaria, Radio	7480na	9700na		
0500-0600	Canada, CFCX Montreal	6005do			
0500-0600	Canada, CFRX Toronto	6070do			
0500-0600	Canada, CFVP Calgary	6030do			
0500-0600	Canada, CHNX Halifax	6130do			
0500-0600	Canada, CKZU Vancouver	6160do			
0500-0600	China, China Radio Intl	9560na			
0500-0600	Costa Rica, AWR Alajuela	9725ca			
0500-0600	Costa Rica,RF Peace Intl	7385am	9400am	15050am	
0500-0505	Croatia, Croatian Radio	5895eu	7370eu	13830eu	
0500-0600	Cuba, Radio Havana Cuba	9820na			
0500-0600	Ecuador, HCJB Quito	9745am			
0500-0550	Germany, Deutsche Welle	5960na	6045na	6120na	6185na
0500-0515	Israel, Kol Israel	5885na	7465na	17545na	
0500-0600 vl	Italy, IRRS Milan	7100va			
0500-0600	Japan, NHK/Radio	5975eu	6110na	6150eu	9605na
		11725as	11740as	11885na	17810as
0500-0600 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0500-0600	Lebanon, Wings of Hope	9960va			
0500-0525	Netherlands, Radio	5995na	6165na		
0500-0600 mtwhf	New Zealand, R NZ Intl	11900pa			
0500-0505	Nigeria, FRCN/Radio	3326do	4990do		
0500-0600	Nigeria, Voice of	7255af			
0500-0600	Russia, AWR	9895me			
0500-0600	Russia, Voice of	5905na	5930na	7105na	7175na
		7180na	7270na	7330na	
0500-0600	S Africa, Channel Africa	7185af	11900af		
0500-0556	Spain, R Exterior Espana	9540na			
0500-0600	United Kingdom,BBC London	3255af	3955eu	5975va	6005af
		6175va	6195af	7150eu	7160af
		9410va	9600af	9640sa	9740as
		11760va	11955va	12095af	15280as
		15310as	15360va	15420af	15575va
	17640af	17885af			
0500-0600	USA, KAIJ Dallas TX	5810am			
0500-0600	USA, KTBN Salt Lk City UT	7510am			
0500-0600	USA, KVOH Los Angeles CA	9975am			
0500-0600	USA, KWHR Naalehu HI	9930as			
0500-0600	USA, Monitor Radio Intl	7535eu			
0500-0600	USA, VOA Washington DC	6035af	6873va	7170va	7295af
		9630af	9700va	9885af	11825va
		11965va	15205va		
0500-0600	USA, WEWN Birmingham AL	5825eu	7425na		
0500-0600	USA, WHRI Noblesville IN	5745am	9495am		
0500-0600	USA, WJCR Upton KY	7490na	13595na		
0500-0600 mtwhfa	USA, WMLK Bethel PA	9465eu			
0500-0600	USA, WRNO New Orleans LA	7395am			
0500-0600	USA, WWCR Nashville TN	3315am	5065am	5935am	
0500-0600	USA, WYFR Okeechobee FL	5985na	9885af		
0500-0530	Vatican State, Vatican R	7360af	9660af	11625af	
0500-0530	Vietnam, Voice of	7360na	9840na	12030na	
0500-0600	Zimbabwe, ZBC/Radio 3	3306do	3396do		
0505-0600	Swaziland, Trans World R	3200af	5055af	6070af	9500af
0525-0600	Ghana, Ghana Broadc Corp	3366do	4915do		
0530-0600	Australia, Radio	15510as	15565as	17880as	
0530-0600	Austria, R Austria Intl	6015na	6155eu	13730eu	
0530-0600	Romania, R Romania Intl	11940af	15250af	15365af	17745af
		17790af			

Selected Programs

Sundays

0500 KWHR (Hawaii): Breakthrough. Rod Parsley conducts services from the World Harvest Church in Columbus, OH.
0500 WHRI (Angel 1): Bob Enyart (live). Bob takes listener phone calls about everyday Christian topics.
0500 WHRI (Angel 2): Bob Enyart (live). See S 0500.
0508 Germany, Deutsche Welle: Inside Europe. See S 0108.
0510 UK, BBC London (south as): International Question Time. See S 1515.
0510 USA, VOA Washington DC (af): VOA Sunday. Interviews and features about science, sports, agriculture, and business, plus the latest American music.
0535 UK, BBC London (af): Education Express. See S 0335.
0537 Germany, Deutsche Welle: Religion and Society. See S 0138.

Mondays

0500 KWHR (Hawaii): Music. See S 0200.
0500 WHRI (Angel 1): Turn Your Radio On. Bill Brasier plays southern gospel music.
0500 WHRI (Angel 2): New Life Fellowship. See M 0230.
0508 Germany, Deutsche Welle: Mailbag. See M 0108.
0510 USA, VOA Washington DC (af): VOA Today. Up-to-the-minute news summaries, hourly business and sports updates, interviews on world news events, plus features on topics from movies to medicine.
0518 Germany, Deutsche Welle: Living in Germany. See M 0118.
0530 WHRI (Angel 2): Music. See S 0200.
0533 Germany, Deutsche Welle: German by Radio. See S 1133.

Tuesdays

0500 KWHR (Hawaii): Music. See S 0200.
0500 WHRI (Angel 2): The Prophecy Club. See T 0200.
0509 Germany, Deutsche Welle: European Journal. See S 2324.
0510 USA, VOA Washington DC (af): VOA Today. See M 0510.
0530 UK, BBC London (eu): What's News? See T 1630.
0530 WHRI (Angel 2): John Hagee Today. Evangelizing by John Hagee of the Cornerstone Church in San Antonio, TX.
0532 Germany, Deutsche Welle: German Tribune. See T 0132.

Wednesdays

0500 KWHR (Hawaii): Music. See S 0200.
0500 WHRI (Angel 1): Bob Enyart (live). See S 0500.
0500 WHRI (Angel 2): The Prophecy Club. See T 0200.
0509 Germany, Deutsche Welle: European Journal. See S 2324.
0510 USA, VOA Washington DC (af): VOA Today. See M 0510.
0530 WHRI (Angel 2): John Hagee Today. See T 0530.
0533 Germany, Deutsche Welle: Backdrop. A program of culture and the arts in Germany.
0539 Germany, Deutsche Welle: Come to Germany. See W 0133.

Thursdays

0500 KWHR (Hawaii): Music. See S 0200.
0500 WHRI (Angel 1): Bob Enyart (live). See S 0500.
0500 WHRI (Angel 2): The Prophecy Club. See T 0200.
0509 Germany, Deutsche Welle: European Journal. See S 2324.
0510 USA, VOA Washington DC (af): VOA Today. See M 0510.
0530 WHRI (Angel 2): John Hagee Today. See T 0530.
0533 Germany, Deutsche Welle: German Tribune. See T 0132.
0545 UK, BBC London (eu): Classical Music. The High-C Hero (4th,11th,18th). See W 0030.

Fridays

0500 KWHR (Hawaii): Music. See S 0200.
0500 WHRI (Angel 1): Bob Enyart (live). See S 0500.
0500 WHRI (Angel 2): The Prophecy Club. See T 0200.
0509 Germany, Deutsche Welle: European Journal. See S 2324.
0510 USA, VOA Washington DC (af): VOA Today. See M 0510.
0530 WHRI (Angel 2): John Hagee Today. See T 0530.
0533 Germany, Deutsche Welle: Arts on the Air. See S 1109.

Saturdays

0500 KWHR (Hawaii): Cumbre DX. See S 0430.
0500 WHRI (Angel 1): Bob Enyart (live). See S 0500.
0500 WHRI (Angel 2): The Prophecy Club. See T 0200.
0509 Germany, Deutsche Welle: European Journal. See S 2324.
0510 USA, VOA Washington DC (af): VOA Saturday. See S 0510.
0530 KWHR (Hawaii): Remnant Church of God. See M 0100.
0530 WHRI (Angel 2): John Hagee Today. See T 0530.
0533 Germany, Deutsche Welle: Through German Eyes. See S 1629.

Radio Nacional do Brasil

Frequencies

0600-0700	Australia, Radio	9860pa	11910pa	13605as	13755pa
		15240pa	15365pa	15510as	17715as
		17795pa			
0600-0630	Australia, Radio	9580pa	9660pa	15415pa	
0600-0700 vl	Australia, VL8A ALice Spg	2310do			
0600-0700 vl	Australia, VL8K Katherine	5025do			
0600-0700 vl	Australia, VL8T Tent Crk	4910do			
0600-0630	Australia,DefenseForces R	13525as			
0600-0700 vl	Canada, CBC N Quebec Svc	9625do			
0600-0700 vl	Canada, CBC N Quebec Svc	9625do			
0600-0700	Canada, CFCX Montreal	6005do			
0600-0700	Canada, CFRX Toronto	6070do			
0600-0700	Canada, CFVP Calgary	6030do			
0600-0700	Canada, CHNX Halifax	6130do			
0600-0700	Canada, CKZU Vancouver	6160do			
0600-0630	Canada, RCI Montreal	6050eu	6150eu	9740eu	9760eu
		11905eu			
0600-0700	Costa Rica,RF Peace Intl	7385am	9400am		
0600-0605	Croatia, Croatian Radio	5895eu	7370eu	13830eu	
0600-0700	Cuba, Radio Havana Cuba	9820na			
0600-0700	Ecuador, HCJB Quito	9745am			
0600-0650	Germany, Deutsche Welle	6100af	9565af	11765af	13790af
		15185af	17820af	21705me	
0600-0615	Ghana, Ghana Broadc Corp	3316do	4915do		
0600-0700 vl	Italy, IRRS Milan	3985va			
0600-0630 vl	Italy, IRRS Milan	7125va			
0600-0700	Japan, NHK/Radio	11725as	17810as		
0600-0700 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0600-0700 vl	Kiribati, Radio	9825do			
0600-0700	Lebanon, Wings of Hope	9960va			
0600-0700 vl	Liberia, Radio ELBC	7275do			
0600-0700	Liberia, Radio ELWA	4760do			
0600-0700 mtwhfa	Malta, V of Mediterranean	9765me			
0600-0700 mtwhf	New Zealand, R NZ Intl	11900pa			
0600-0630	Nigeria, FRCN/Radio	3326do	4990do		
0600-0700	Nigeria, Voice of	7255af			
0600-0700	North Korea, R Pyongyang	15180as	15230as		
0600-0700	Russia, Voice of	5905na	5920na	5930na	7175na
		7270na	7330na	12025na	
0600-0700	S Africa, Trans World R	11730af			
0600-0700	Slovakia, AWR	5905eu	11655af		
0600-0630 vl	Solomon Islands, SIBC	5020do	9545do		
0600-0700	South Korea, R Korea Intl	7205na			
0600-0630	Switzerland, Swiss R Intl	9885af	12070af	13635af	
0600-0700	United Kingdom,BBC London	3955eu	5975va	6005af	6175va
		6195af	7145pa	7150eu	9410va
		9600af	9640sa	11760va	11780af
		11940af	11955as	12095af	15070va
		15280as	15310as	15360va	15420af
	15575va	17640af	17790as	17885af	
0600-0615	United Kingdom,BBC London	6155af			
0600-0700	USA, KAIJ Dallas TX	5810am			
0600-0700	USA, KTBN Salt Lk City UT	7510am			
0600-0700	USA, KVOH Los Angeles CA	9975am			
0600-0700	USA, KWHR Naalehu HI	9930as			
0600-0700	USA, Monitor Radio Intl	7535eu			
0600-0700	USA, VOA Washington DC	6035af	6873va	7170va	7285af
		9435af	11805va	11950af	12080af
		15205va	15600af		
0600-0700	USA, WEWN Birmingham AL	5825eu	7425na	7465eu	
0600-0700	USA, WHRI Noblesville IN	5760am	7315am		
0600-0700	USA, WJCR Upton KY	7490na	13595na		
0600-0700 smtwhf	USA, WMLK Bethel PA	9465eu			
0600-0700	USA, WWCR Nashville TN	3315am	5065am	5935am	
0600-0700	USA, WYFR Ochokebee FL	5985na	7355eu		
0600-0620	Vatican State, Vatican R	4005eu	5860eu	5882eu	
0600-0700	Yemen, Yemeni Rep Radio	9780as			
0600-0700	Zimbabwe, ZBC/Radio 3	5975do	6045do		
0605-0700	Swaziland, Trans World R	5055af	6070af	9500af	9650af
		11730af			
0615-0630	Switzerland, Swiss R Intl	6165eu	7410eu		
0630-0700	Australia, Radio	5995pa	6020pa	6080pa	9860pa
		15245as			
0630-0700	Austria, R Austria Intl	6015na			
0630-0700	Georgia, Georgian Radio	11805eu			
0630-0700	Kazakhstan, R Almaty	7235eu	7280eu	9560eu	9690eu
		9705eu			
0630-0700	Vatican State, Vatican R	7360af	9660af		
0645-0700	Romania, R Romania Intl	15250pa	15405pa	17720pa	17805pa

Selected Programs

Sundays

0600 KWHR (Hawaii): New Testament Studies. Joseph Sorrell.
0600 WHRI (Angel 1&2): The Joy of Living Broadcast. Hurst-Smith Evangelists, Inc.
0608 Germany, Deutsche Welle: Commentary. See S 0208.
0612 Germany, Deutsche Welle: Sports Report. See S 0212.
0615 KWHR (Hawaii): A Study in God's Word. Hezakiah Smith reads Scripture from North Carolina.
0615 WHRI (Angel 1&2): A Study in God's Word. See S 0615.
0616 Germany, Deutsche Welle: Feature of the Month (1). See S 0436.
0616 Germany, Deutsche Welle: International Talking Point. See S 0416.
0630 KWHR (Hawaii): Eternal Good News. Germaine Lockwood teaches from the Old Testament.
0630 WHRI (Angel 1&2): The Mercies of God Radio Broadcast. Pastor Peter from Michigan preaches mercy for lost sinners.
0636 Germany, Deutsche Welle: People and Places. See S 0436.

Mondays

0600 KWHR (Hawaii): World Harvest. Steve Sumrall.
0600 WHRI (Angel 1&2): Music. See S 0200.
0608 Germany, Deutsche Welle: Africa Highlight. See M 0408.
0612 Canada, RCI Montreal: Report to the Peacekeepers. Information about Canada for Canadian Forces overseas.
0624 Germany, Deutsche Welle: European Journal. See S 2324.
0630 UK, BBC London (am): Science. Fron Pins to Paperclips (5th,12th). See S 0330.
0630 WHRI (Angel 1&2): In Touch. See S 1300.
0645 UK, BBC London (am): Science. Bluffers Guide to Science (5th,12th). See S 0345.
0650 UK, BBC London (am): Science. A Guide to Biotechnology (5th,12th). See S 0350.
0655 WHRI (Angel 1&2): In Search of Messiah. Teaching and commentary by Don Victor Bovey.

Tuesdays

0600 KWHR (Hawaii): World Harvest. See M 0600.
0600 WHRI (Angel 1&2): Music. See S 0200.
0608 Germany, Deutsche Welle: Africa Report. See T 0408.
0612 Canada, RCI Montreal: Report to the Peacekeepers. See M 0612.
0624 Germany, Deutsche Welle: European Journal. See S 2324.
0630 WHRI (Angel 1&2): In Touch. See S 1300.
0655 WHRI (Angel 1&2): In Search of Messiah. See M 0655.

Wednesdays

0600 KWHR (Hawaii): World Harvest. See M 0600.
0600 WHRI (Angel 1&2): Music. See S 0200.
0608 Germany, Deutsche Welle: Africa Report. See T 0408.
0612 Canada, RCI Montreal: Report to the Peacekeepers. See M 0612.
0615 UK, BBC London (as pac): What's News? See T 1630.
0624 Germany, Deutsche Welle: European Journal. See S 2324.
0630 WHRI (Angel 1&2): In Touch. See S 1300.
0655 WHRI (Angel 1&2): In Search of Messiah. See M 0655.

Thursdays

0600 KWHR (Hawaii): World Harvest. See M 0600.
0600 WHRI (Angel 1&2): Music. See S 0200.
0608 Germany, Deutsche Welle: Africa Report. See T 0408.
0612 Canada, RCI Montreal: Report to the Peacekeepers. See M 0612.
0615 UK, BBC London (as pac): Red Dwarf. See T 0115.
0624 Germany, Deutsche Welle: European Journal. See S 2324.
0630 WHRI (Angel 1&2): In Touch. See S 1300.
0655 WHRI (Angel 1&2): In Search of Messiah. See M 0655.

Fridays

0600 KWHR (Hawaii): World Harvest. See M 0600.
0600 WHRI (Angel 1&2): Music. See S 0200.
0608 Germany, Deutsche Welle: Africa Report. See T 0408.
0612 Canada, RCI Montreal: Report to the Peacekeepers. See M 0612.
0624 Germany, Deutsche Welle: European Journal. See S 2324.
0630 WHRI (Angel 1&2): In Touch. See S 1300.
0655 WHRI (Angel 1&2): In Search of Messiah. See M 0655.

Saturdays

0600 KWHR (Hawaii): Faith Christian Church. Paul Shirek.
0600 WHRI (Angel 1&2): Cumbre DX. See S 0430.
0608 Germany, Deutsche Welle: Commentary. See S 0208.
0612 Germany, Deutsche Welle: Africa This Week. See A 0412.
0615 KWHR (Hawaii): Music. See S 0200.
0630 Germany, Deutsche Welle: Man and Environment. See T 1633.
0630 KWHR (Hawaii): The Word of God Broadcast. Sister Polly preaches from the Knoxville House of Faith in Tennessee.
0630 WHRI (Angel 1&2): Music. See S 0200.

THANK YOU ...

Additional contributors to this month's Shortwave Guide:

John Babbis, Silver Spring, MD; Capt. K.J. Barry, Blackpool, England; Carl T. Craig, Shelbyville, TN; Bob Fraser, Cohasset, MA; Kevin Hecht, Devon, PA; Frank Hillton, Charleston, SC; Jerry D. Plummer, Nashville, TN; Lee Silvi, Mentor, OH; Loyd Van Horn, Brasstown, NC; BBCMS; BBC *Worldwide*; BBC *Summary of World Broadcasts*; Grove Enterprises BBS; Internet Shortwave Newsgroup via Larry Van Horn.

FREQUENCIES

0700-0800	Australia, Radio	5995pa	6020pa	6080pa	9580pa
		9710pa	9860pa	15240pa	15565as
		17695as			
0700-0730	Australia, Radio	13605as	15415as	17795as	
0700-0800 vl	Australia, VL8A Alice Spg	4835do			
0700-0800 vl	Australia, VL8K KAtherine	5025do			
0700-0800 vl	Australia, VL8T Tent Crk	4910do			
0700-0800	Canada, CFCX Montreal	6005do			
0700-0800	Canada, CFRX Toronto	6070do			
0700-0800	Canada, CFVP Calgary	6030do			
0700-0800	Canada, CHNX Halifax	6130do			
0700-0800	Canada, CKZU Vancouver	6160do			
0700-0800	Costa Rica,RF Peace Intl	7385am	9400am		
0700-0800	Ecuador, HCJB Quito	5900pa	6050eu		
0700-0800 as	Eqt Guinea, R East Africa	15190af			
0700-0800 mtwhf	Eqt Guinea, Radio Africa	15190af			
0700-0715	Ghana, Ghana Broadc Corp	3366do	4915do		
0700-0800 vl	Italy, IRRS Milan	3985va			
0700-0800	Japan, NHK/Radio	5975eu	7230eu	11725as	11740as
		11850pa	15165me	17810va	17815af
		21610as			
0700-0800 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0700-0800 vl	Kiribati, Radio	9825do			
0700-0800	Lebanon, Wings of Hope	9960va			
0700-0800 vl	Liberia, Radio ELBC	7275do			
0700-0800	Liberia, Radio ELWA	4760do			
0700-0800 asmtwh	Malaysia, Radio	7295do			
0700-0800	Malaysia, Voice of	15295as			
0700-0800 s	Malta, V of Mediterranean	9765me			
0700-0716 mtwhf	New Zealand, R NZ Intl	11900pa			
0700-0757 as	New Zealand, R NZ Intl	11900pa			
0700-0750	North Korea, R Pyongyang	15340af	17765me		
0700-0730 s	Norway, Radio Norway Intl	7180au			
0700-0800	Russia, Voice of	5905na	5920na	5930na	7175na
		7270na	7330na	12025na	
0700-0800 vl	Solomon Islands, SIBC	5020do	9545do		
0700-0800	Taiwan, VO Free China	5950na			
0700-0800	United Kingdom,BBC London	3955eu	5975va	6175na	6195va
		7145pa	7325va	9410va	9600af
		9640sa	11760va	11940af	11955va
		12095va	15070va	15280as	15310as
		15360va	15575va	17640af	17790as
		17830af			
0700-0730	United Kingdom,BBC London	6180eu	11780va		
0700-0715	United Kingdom,BBC London	6005af	7160af	11860af	
0700-0800	USA, KAIJ Dallas TX	5810am			
0700-0800	USA, KTBN Salt Lk City UT	7510am			
0700-0800	USA, KWHR Naalehu HI	9930as			
0700-0800	USA, Monitor Radio Intl	7535eu			
0700-0800	USA, WEWN Birmingham AL	5825eu	7425na	7465na	
0700-0800	USA, WHRI Noblesville IN	5760am	7315am		
0700-0800	USA, WJCR Upton KY	7490na	13595na		
0700-0800 smtwhf	USA, WMLK Bethel PA	9465eu			
0700-0800	USA, WWCR Nashville TN	3315am	5065am	5935am	
0700-0745	USA, WYFR Okeechobee FL	7355eu	9680eu		
0700-0745 mtwhf	Vatican State, Vatican R	4005va			
0700-0800	Zimbabwe, ZBC/Radio 3	5975do	6045do		
0705-0800	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0715-0730	Switzerland, Swiss R Intl	6165eu	7410eu		
0717-0800	New Zealand, R NZ Intl	9700pa			
0730-0800	Australia, Radio	9660pa	17880as		
0730-0800	Belgium, R Vlaanderen Int	5985eu	9925va		
0730-0745 s	Greece, Voice of	7450eu	9425eu	11645au	
0730-0800	Netherlands, Radio	9720au	11895pa		
0740-0800	Monaco, Trans World Radio	7115eu			
0745-0800 s	Ghana, Ghana Broadc Corp	3366do	4915do		
0745-0755	Greece, Voice of	7450eu	9425eu	11645au	
0745-0800	USA, WRMI/R Miami Intl	9955am			
0755-0800	Guam, AWR/KTWR	15200as			

0800 UTC

0800-0900	Australia, Radio	5995pa	6020pa	6080pa	9580pa
		9710pa	9860pa	17715as	21725as
0800-0900 vl	Australia, VL8A Alice Spg	2310do			
0800-0830 vl	Australia, VL8K Katherine	5025do			
0800-0900 vl	Australia, VL8T Tent Crk	4910do			
0800-0900	Australia,DefenseForces R	15607af	18194af		
0800-0900 vl	Canada, CBC N Quebec Svc	9625do			
0800-0900 vl	Canada, CBC N Quebec Svc	9625do			
0800-0900	Canada, CFCX Montreal	6005do			
0800-0900	Canada, CFRX Toronto	6070do			
0800-0900	Canada, CFVP Calgary	6030do			
0800-0900	Canada, CHNX Halifax	6130do			
0800-0900	Canada, CKZU Vancouver	6160do			
0800-0900	Costa Rica,RF Peace Intl	7385am	9400am		
0800-0827	Czech Rep, Radio Prague	5930eu	7345eu		
0800-0830	Ecuador, HCJB Quito	6050eu			
0800-0900	Ecuador, HCJB Quito	5900pa			
0800-0900 as	Eqt Guinea, R East Africa	15190af			
0800-0900 mtwhf	Eqt Guinea, Radio Africa	15190af			
0800-0830	Georgia, Georgian Radio	11910eu			
0800-0805 s	Ghana, Ghana Broadc Corp	3366do			
0800-0900	Guam, TWR/KTWR	15200as			
0800-0900	Indonesia, Voice of	9525as			
0800-0830 vl	Italy, IRRS Milan	3985va			
0800-0900 vl	Kiribati, Radio	9825do			
0800-0900	Lebanon, Wings of Hope	9960va			
0800-0830	Liberia, Radio ELWA	4760do			
0800-0900	Malaysia, Radio	7295do			
0800-0825	Malaysia, Voice of	15295as			
0800-0830 s	Malta, V of Mediterranean	9765me			
0800-0900	Monaco, Trans World Radio	7115eu			
0800-0825	Netherlands, Radio	9720au	11895pa		
0800-0900	New Zealand, R NZ Intl	9700pa			
0800-0850	North Korea, R Pyongyang	15180as	15230as		
0800-0850	Pakistan, Radio	15470eu	15475eu	17895eu	
0800-0900 vl	Papua New Guinea, NBC	4890do	9675do		
0800-0900	Russia, Voice of	9685as	12005va	12025va	15160va
		17860va			
0800-0815	Sierra Leone, SLBS	3316do			
0800-0900 vl	Solomon Islands, SIBC	5020do	9545do		
0800-0900	South Korea, R Korea Intl	7550eu	13670me		
0800-0900	United Kingdom,BBC London	3955eu	6190af	6195va	7325as
		9410va	11760va	11940af	11955va
		12095va	15070va	15280as	15310as
		15400va	15575va	17640va	17790as
		17830af			
0800-0815	United Kingdom,BBC London	7145pa			
0800-0830	United Kingdom,BBC London	3955eu	9640sa		
0800-0900	USA, KNLS Anchor Point AK	6150as			
0800-0900	USA, KTBN Salt Lk City UT	7510am			
0800-0900	USA, KWHR Naalehu HI	9930as			
0800-0900	USA, Monitor Radio Intl	7535eu	13615pa	15665eu	
0800-0900	USA, WEWN Birmingham AL	5825eu	5975na	7425na	
0800-0900	USA, WHRI Noblesville IN	5745am	7315am		
0800-0900	USA, WJCR Upton KY	7490na	13595na		
0800-0900 smtwhf	USA, WMLK Bethel PA	9465eu			
0800-0900	USA, WRMI/R Miami Intl	9955am			
0800-0900	USA, WWCR Nashville TN	3315am	5065am	5935am	
0800-0900	Zimbabwe, ZBC/Radio 4	5975do	6045do	7285do	
0805-0835	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0815-0900 mtwtf	Nigeria, FRCN/Radio	3326do	4990do		
0830-0900 vl	Australia, VL8K Katherine	2485do			
0830-0900	Austria, R Austria Intl	6155eu	13730eu	17870pa	
0830-0900 vl	Italy, IRRS Milan	7125va			
0830-0900	Netherlands, Radio	9720au	11895pa	13700pa	
0830-0857	Slovakia, R Slovakia Intl	11990au	15640au	17485au	
0855-0900	Guam, TWR/KTWR	11830pa			

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FREQUENCIES

0900-1000	Australia, Radio	5995as	7240as	9510as	9580pa
		9860pa	13605as	15170as	21725as
0900-1000 vl	Australia, VL8A Alice Spg	2310do			
0900-1000 vl	Australia, VL8K Katherine	2485do			
0900-1000 vl	Australia, VL8T Tent Crk	4910do			
0900-1000	Australia,DefenseForces R	15607af	18194af		
0900-1000	Canada, CFCX Montreal	6005do			
0900-1000	Canada, CFRX Toronto	6070do			
0900-1000	Canada, CFVP Calgary	6030do			
0900-1000	Canada, CHNX Halifax	6130do			
0900-1000	Canada, CKZU Vancouver	6160do			
0900-1000	China, China Radio Intl	11755pa	15440pa		
0900-1000	Costa Rica,RF Peace Intl	7385am	9400am		
0900-1000	Ecuador, HCJB Quito	5900pa			
0900-1000 as	Eqt Guinea, R East Africa	15190af			
0900-1000 mtwhf	Eqt Guinea, Radio Africa	15190af			
0900-0950	Germany, Deutsche Welle	6160pa	7380as	11725af	15145af
		15410af	17780pa	17820as	21600af
		21680as			
0900-0915 mtwtf	Ghana, Ghana Broadc Corp	3366do	4915do		
0900-1000	Guam, AWR/KSDA	9530as			
0900-0915	Guam, TWR/KTWR	15200as			
0900-1000	Guam, TWR/KTWR	11830pa			
0900-1000 vl	Italy, IRRS Milan	7125va			
0900-1000	Japan, NHK/Radio	6090as	11850au	15190as	
0900-0948 vl	Kiribati, Radio	9825do			
0900-1000	Lebanon, Voice of Hope	6280va			
0900-1000	Lebanon, Wings of Hope	9960va			
0900-1000	Malaysia, Radio	7295do			
0900-0905 a	Monaco, Trans World Radio	7115eu			
0900-0930	Netherlands, Radio	9720au	13700pa		
0900-1000	New Zealand, R NZ Intl	9700pa			

FRIMMEL'S PROGRAM POINTERS
NEW DX PROGRAM

WHRI and KWHR had been without a DX program since last July. Glenn Hauser discovered that World Harvest Radio had been editing his *World of Radio* programs for content and pulled the plug on them. The action left WHRI in serious need for a program which would entice defecting listeners to return. After all, there wasn't much else to keep those fickle fans around, considering all the religious programs in the lineup. (See the selected programs in the centerfold for WHRI and KWHR listings.)

All this should change on December 29th, thanks to the development efforts of Joseph Brashier of WHRI, host of *Christian Country Music* and *World Harvest Country Style*, and the help of friends Euliss Flemming and Hans Johnson. Together, they cooked up a 30-minute show to be called *Cumbre DX*. All they needed was a presenter with the right credentials.

To the rescue came Marie Lamb of *Passport to World Band Radio*. Known for her monthly *NASWA Report* heard on HCJB's DX Partyline, and as the spokesperson for *PWBR*'s editor Larry Magne on the Internet, Marie seemed to be a great choice to fill the slot as host of *Cumbre DX*.

In case you've been wondering about the name, the word *cumbre* translates to summit or peak. The new program was not heard as of this writing; nevertheless, we hope that it turns out to be tops.

See the complete schedule of *Cumbre DX* and all the DX/Media programs in this issue.

0900-1000 vl	Papua New Guinea, NBC	4890do	9675do		
0900-1000	Russia, Voice of	7305as	9450as	9685as	12005va
		12025va	17860va		
0900-1000	Slovakia, AWR	15620af			
0900-0930	Switzerland, Swiss R Intl	9885au	11640au	13685au	
0900-1000	United Kingdom,BBC London	6190af	6195va	9410va	9740as
		11750as	11940af	12095va	15070va
		15190sa	15280va	15380as	15400va
		15575va	17640va	17705eu	17830va
		17885af			
0900-0915	United Kingdom,BBC London	7180as	7325af	9580as	11760va
		11955va	15310as	15310as	15360va
		17790as			
0900-1000	USA, KTBN Salt Lk City UT	7510am			
0900-1000	USA, Monitor Radio Intl	7395sa	7535eu	9430as	13615au
0900-1000	USA, WEWN Birmingham AL	5825eu	7425na	7465na	
0900-1000	USA, WHRI Noblesville IN	5760am	7315am		
0900-1000	USA, WJCR Upton KY	7490na	13595na		
0900-1000 smtwhf	USA, WMLK Bethel PA	9465eu			
0900-1000	USA, WRMI/R Miami Intl	9955am			
0900-1000	USA, WWCR Nashville TN	5065am	5935am	7435am	
0900-1000	Zambia, Christian Voice	6065af			
0900-1000	Zimbabwe, ZBC/Radio 4	5975do	6045do	7285do	
0905-0920 smtwhf	Monaco, Trans World Radio	7115eu			
0910-0940	Mongolia, R Ulan Bator	9960au	12000au		
0915-1000	Ghana, Ghana Broadc Corp	6130do	7295do		
0930-1000 s	Armenia, Voice of	15270va			
0930-1000	Canada, CKZN St John's	6160do			
0930-1000	Netherlands, Radio	7260pa	9720au	9810pa	11895pa
		13700pa			
0930-1000	Philippines, FEBC/R Intl	11635as			
1000-1100	Australia, Radio	5995as	7240as	9580pa	9860pa
		13605as	15170as	21725as	
1000-1100 vl	Australia, VL8A Alice Spg	2310do			
1000-1100 vl	Australia, VL8K Katherine	2485do			
1000-1100 vl	Australia, VL8T Tent Crk	4910do			
1000-1100	Australia,DefenseForces R	13525as			
1000-1025 mtwhfa	Belgium, R Vlaanderen Int	6035eu	15510af	17595af	
1000-1100 vl	Canada, CBC N Quebec Svc	9625do			
1000-1100	Canada, CFCX Montreal	6005do			
1000-1100	Canada, CFRX Toronto	6070do			
1000-1100	Canada, CFVP Calgary	6030do			
1000-1100	Canada, CHNX Halifax	6130do			
1000-1100	Canada, CKZN St John's	6160do			
1000-1100	Canada, CKZU Vancouver	6160do			
1000-1100	China, China Radio Intl	11755pa	15440pa		
1000-1100	Costa Rica,RF Peace Intl	7385am	9400am		
1000-1030	Czech Rep, Radio Prague	15640as	17845af		
1000-1100	Ecuador, HCJB Quito	5900pa			
1000-1100 as	Eqt Guinea, R East Africa	15190af			
1000-1100 mtwhf	Eqt Guinea, Radio Africa	15190af			
1000-1100	India, All India Radio	13700as	15050as	17387au	17890as
1000-1100	Iraq, Radio Iraq Intl	13680eu			
1000-1100 vl	Italy, IRRS Milan	7125va			
1000-1100	Lebanon, Voice of Hope	6280va			
1000-1100	Lebanon, Wings of Hope	9960va			
1000-1100	Malaysia, Radio	7295do			
1000-1100 vl	Malaysia, RTM Kuching	7160do			
1000-1100 vl	Malaysia,RTM KotaKinabalu	5980do			
1000-1100	Netherlands, Radio	7260as	9720pa	9810pa	
1000-1100	New Zealand, R NZ Intl	9700pa			
1000-1100	Nigeria, Voice of	7255af			
1000-1100 vl	Papua New Guinea, NBC	4890do	9675do		
1000-1100	Philippines, FEBC/R Intl	11635as			
1000-1100	Russia, Voice of	7305as	9685as	13785as	15490va
		15560va	17755as	17860va	
1000-1100	Singapore, SBC Radio One	6155do			
1000-1100	United Kingdom,BBC London	6190af	6195va	9410va	9740as
		11750as	11760va	11940af	12095va
		15070va	15190sa	15310as	15400af
		15575va	17640va	17705va	17790as
		17830va	17885af		
1000-1030	United Kingdom,BBC London	15280as	15280va		
1000-1100	USA, KTBN Salt Lk City UT	7510am			
1000-1100	USA, Monitor Radio Intl	6095ca	7395sa	9430as	13625as
1000-1100	USA, VOA Washington DC	5985va	6165am	7405am	9590am
		11720va	15425va		
1000-1100	USA, WEWN Birmingham AL	7425na	7465eu		
1000-1100	USA, WHRI Noblesville IN	6040am	6185am		
1000-1100	USA, WJCR Upton KY	7490na	13595na		
1000-1100	USA, WWCR Nashville TN	5065am	5935am	7435am	
1000-1100	USA, WYFR Okeechobee FL	5950na			
1000-1030	Vietnam, Voice of	7360na	9840as	12020as	15010as
1030-1100 mtwhfa	Austria, R Austria Intl	6155eu	13730pa	17870pa	
1030-1055	UAE, Radio Dubai	13675eu	15395eu	17825eu	21605me

FREQUENCIES

1100-1200	Australia, Radio	5995as	7240as	9510pa	9580pa
		9710pa	9860pa	13605as	15170as
		15530as	15565as		
1100-1200 vl	Australia, VL8A Alice Spg	2310do			
1100-1200 vl	Australia, VL8K Katherine	2485do			
1100-1200 vl	Australia, VL8T Tent Crk	4910do			
1100-1200	Australia,DefenseForces R	13525as			
1100-1200	Canada, CFCX Montreal	6005do			
1100-1200	Canada, CFRX Toronto	6070do			
1100-1200	Canada, CFVP Calgary	6030do			
1100-1200	Canada, CHNX Halifax	6130do			
1100-1200	Canada, CKZN St John's	6160do			
1100-1200	Canada, CKZU Vancouver	6160do			
1100-1200	Costa Rica, AWR Alajuela	5030am	7375am	9725am	13750am
1100-1200	Costa Rica,RF Peace Intl	9400am			
1100-1130	Ecuador, HCJB Quito	5900pa			
1100-1200	Ecuador, HCJB Quito	12005am	15115am		
1100-1200 as	Eqt Guinea, R East Africa	15190af			
1100-1200	Eqt Guinea, Radio Africa	9530as			
1100-1150	Germany, Deutsche Welle	15370af	15410af	17765af	17800af
1100-1200	Iraq, Radio Iraq Intl	13680eu			
1100-1105	Israel, Kol Israel	11605eu			
1100-1200 vl	Italy, IRRS Milan	7125va			
1100-1200	Japan, NHK/Radio	6090as	6120na	15350as	
1100-1200	Malaysia, Radio	7295do			
1100-1200 vl	Malaysia, RTM Kuching	7160do			
1100-1200 vl	Malaysia,RTM KotaKinabalu	5980do			
1100-1200	Nepal, Radio	3230do	5005do		
1100-1200	New Zealand, R NZ Intl	9700pa			
1100-1150	North Korea, R Pyongyang	6575na	9975na	11335na	
1100-1115	Pakistan, Radio	15470as	17895as		
1100-1200 vl	Papua New Guinea, NBC	4890do	9675do		
1100-1200	Russia, Voice of	12055va	13785as	15490va	15560va
		17755va	17860va		
1100-1200	Singapore, SBC Radio One	6155do			
1100-1200	Singapore,R Singapore Int	9530as			
1100-1130	Sri Lanka, SLBC Colombo	11835as	15120as	17850au	
1100-1130	Switzerland, Swiss R Intl	6165eu	9535eu	9885as	11640as
		13635as			
1100-1200	Taiwan, Voice of Asia	7445as			
1100-1200	United Kingdom,BBC London	5965na	6190af	6195va	7180as
		9410va	9580as	11760va	11940af
		11955as	12095va	15070va	15220am
		15310as	15575va	17640va	17750va
		17830af	17885af	21660af	
1100-1130	United Kingdom,BBC London	15190sa	15400eu	17790as	
1100-1200	USA, KTBN Salt Lk City UT	7510am			
1100-1200	USA, KWHR Naalehu HI	9930as			
1100-1200	USA, Monitor Radio Intl	6095na	7395ca	9355as	9430au
1100-1200	USA, VOA Washington DC	5985va	6110va	6165am	7405am
		9590am	9645va	9760va	11720va
		15160va	15425va		
1100-1200	USA, WEWN Birmingham AL	7425na	7465na		
1100-1200	USA, WHRI Noblesville IN	6040am	6185am		
1100-1200	USA, WJCR Upton KY	7490na	13595na		
1100-1200	USA, WWCR Nashville TN	5065am	5935am	7435am	
1100-1200	USA, WYFR Okeechobee FL	5950na	7355na		
1130-1200	Austria, R Austria Intl	13730eu			
1130-1200 vl	China, China Radio Intl	8660as	11445as	11700as	
1130-1157	Czech Rep, Radio Prague	7345eu	9505eu		
1130-1200	Ecuador, HCJB Quito	15115am			
1130-1200	Iran, VOIRI Tehran	11745as	11790as	11875me	11930me
		15260af	17750me		
1130-1200	Myanmar, Voice of	5990do			
1130-1200	Netherlands, Radio	6045eu	7190eu		
1130-1200	South Korea, R Korea Intl	9650na			
1135-1140	India, All India Radio	9595as			
1145-1200	USA, WRMI/R Miami Intl	9955am			

SELECTED PROGRAMS

Sundays

1100 KWHR (Hawaii): The Water of Life Broadcast. See S 0100.
1100 WHRI (Angel 1&2): The Water of Life Broadcast. See S 0100.
1109 Germany, Deutsche Welle: Arts on the Air. Reports and interviews on major cultural events and developments.
1110 USA, VOA-Washington DC (ca): Critic's Choice. The performing arts in America.
1130 USA, VOA Washington DC (ca): Studio One. Dramatizations and documentaries on significant events and personalities.
1133 Germany, Deutsche Welle: German by Radio. An advanced German language course for English speakers.

Mondays

1100 KWHR (Hawaii): Biblical Studies Institute. See S 0030.
1100 WHRI (Angel 1&2): Music. See S 0200.
1109 Germany, Deutsche Welle: Newsline Cologne. Worldwide current affairs program with a review of the German or European press.
1110 USA, VOA Washington DC (ca): Stateside. Issues and personalities, science and politics, sports and entertainment inside America.
1130 KWHR (Hawaii): Faith Seminar of the Air. Kenneth Hagin evangelizes.
1133 Germany, Deutsche Welle: Hallo Africa. A program with musical requests and greetings to friends.
1145 KWHR (Hawaii): Listen to Jesus. Clinton and Sarah Outerbach from The Redeeming Love Christian Center of Nanuet, NY.

Tuesdays

1100 KWHR (Hawaii): Modern Manna. Danny Vierra tells you how to evaluate your life and make changes for better health.
1100 WHRI (Angel 1&2): Music. See S 0200.
1109 Germany, Deutsche Welle: Newsline Cologne. See M 1109.
1110 USA, VOA Washington DC (ca): Stateside. See M 1110.
1130 KWHR (Hawaii): Faith Seminar of the Air. See M 1130.
1133 Germany, Deutsche Welle: Hallo Africa. See M 1133.
1145 KWHR (Hawaii): Listen to Jesus. See M 1145.

Wednesdays

1100 KWHR (Hawaii): Biblical Studies Institute. See S 0030.
1100 WHRI (Angel 1&2): Music. See S 0200.
1109 Germany, Deutsche Welle: Newsline Cologne. See M 1109.
1110 USA, VOA Washington DC (ca): Stateside. See M 1110.
1130 KWHR (Hawaii): Faith Seminar of the Air. See M 1130.
1133 Germany, Deutsche Welle: Hallo Africa. See M 1133.
1145 KWHR (Hawaii): Listen to Jesus. See M 1145.
1154 Radio Netherlands: Documentary. Collectors (21st). Mindy Ran explores why people collect things and what they collect.
1154 Radio Netherlands: Documentary. Greenland II: Reviving the Inuit Culture (7th). Michele Ernsting looks at the choices facing young people in Greenland.
1154 Radio Netherlands: Documentary. Hemp (28th). See W 1554.
1154 Radio Netherlands: Documentary. Japanese Youth (10th). See S 2354.

Thursdays

1100 KWHR (Hawaii): Modern Manna. See T 1100.
1100 WHRI (Angel 1&2): Music. See S 0200.
1109 Germany, Deutsche Welle: Newsline Cologne. See M 1109.
1110 USA, VOA Washington DC (ca): Stateside. See M 1110.
1130 KWHR (Hawaii): Faith Seminar of the Air. See M 1130.
1130 UK, BBC London (south as): Science. Fron Pins to Paperclips (8th,15th). See S 0330.
1133 Germany, Deutsche Welle: Hallo Africa. See M 1133.
1145 KWHR (Hawaii): Listen to Jesus. See M 1145.
1145 UK, BBC London (south as): Science. Bluffers Guide to Science (8th,15th). See S 0345.
1150 UK, BBC London (south as): Science. A Guide to Biotechnology (8th,15th). See S 0350.

Fridays

1100 KWHR (Hawaii): Biblical Studies Institute. See S 0030.
1100 WHRI (Angel 1&2): Music. See S 0200.
1109 Germany, Deutsche Welle: Newsline Cologne. See M 1109.
1110 USA, VOA Washington DC (ca): Stateside. See M 1110.
1130 KWHR (Hawaii): Faith Seminar of the Air. See M 1130.
1133 Germany, Deutsche Welle: Hallo Africa. See M 1133.
1145 KWHR (Hawaii): Music. See S 0200.

Saturdays

1100 WHRI (Angel 1): Turn Your Radio On. See M 0500.
1106 WHRI (Angel 2): For the People (repeat). See T 0306.
1109 Germany, Deutsche Welle: The Week in Germany. See S 1609.
1110 USA, VOA Washington DC (ca): Agriculture Today. See S 0010.
1120 Germany, Deutsche Welle: Mailbag Africa. Listener mail from Africa is answered.
1130 USA, VOA Washington DC (ca): Music USA (Standards). See T 0030.
1134 Germany, Deutsche Welle: Saturday Special. Information unavailable.

Frequencies

1200-1300	Australia, Radio	5995pa	6060pa	6080pa	7260as
		9580pa	9610as	9860pa	11800pa
		15565as			
1200-1300	Brazil, Radiobras	15445na			
1200-1215	Cambodia, Natl Voice of	11940as			
1200-1300 vl	Canada, CBC N Quebec Svc	9625do			
1200-1300 vl	Canada, CBC N Quebec Svc	9625do			
1200-1300	Canada, CFCX Montreal	6005do			
1200-1300	Canada, CFRX Toronto	6070do			
1200-1300	Canada, CFVP Calgary	6030do			
1200-1300	Canada, CHNX Halifax	6130do			
1200-1300	Canada, CKZN St John's	6160do			
1200-1300	Canada, CKZU Vancouver	6160do			
1200-1300	China, China Radio Intl	7385na	7410as	9715as	11660as
		11795pa			
1200-1230 vl	China, China Radio Intl	8660as	11445as	11700as	12110as
1200-1300	Costa Rica, AWR Alajuela	5030am	7375am	9725am	13750am
1200-1300	Costa Rica,RF Peace Intl	6200am	9400am	15050am	
1200-1300	Ecuador, HCJB Quito	12005am	15115am		
1200-1300 as	Eqt Guinea, R East Africa	15190af			
1200-1300	Eqt Guinea, Radio Africa	9530as			
1200-1300	Finland, YLE/R Finland	11735na	15400na		
1200-1300	France, Radio France Intl	9805eu	11615na	13625na	15155eu
		15195eu	15325af	15530na	17575ca
1200-1230	Iran, VOIRI Tehran	11745as	11790as	11875me	11930me
		15260af	17750me		
1200-1300	Iraq, Radio Iraq Intl	13680eu			
1200-1300 vl	Italy, IRRS Milan	7125va			
1200-1300	Jordan, Radio	11910na	11940na		
1200-1300	Malaysia, Radio	7295do			
1200-1300 vl	Malaysia,RTM KotaKinabalu	5980do			
1200-1250	Myanmar, Voice of	5990do			
1200-1300	Netherlands, Radio	6045eu	7190eu		
1200-1206	New Zealand, R NZ Intl	9700pa			
1200-1300 vl	Palau, KHBN/Voice of Hope	9965as			
1200-1300 vl	Papua New Guinea, NBC	4890do	9675do		
1200-1300	Russia, Voice of	4740as	9725as	9820as	13785va
		17755as	17860as		
1200-1300	Singapore, SBC Radio One	6155do			
1200-1300	Singapore,R Singapore Int	9530as			
1200-1300	South Korea, R Korea Intl	7285as			
1200-1300	Taiwan, VO Free China	7130au	9610as		
1200-1300	United Kingdom,BBC London	5965na	6190af	6195va	7180as
		9410va	9580as	9740as	11750as
		11760va	11940af	11955as	12095va
		15070va	15220va	15310as	15575va
		17640va	17705va	17830af	17885af
		21660af			
1200-1300	USA, KTBN Salt Lk City UT	7510am			
1200-1300	USA, KWHR Naalehu HI	9930as			
1200-1300	USA, Monitor Radio Intl	6095na	9355as	9430au	9455sa
1200-1300	USA, VOA Washington DC	6110va	9645va	9760va	11715va
		15160va	15425va		
1200-1300	USA, WEWN Birmingham AL	7425na	15115na		
1200-1300	USA, WHRI Noblesville IN	6040am	6185am		
1200-1300	USA, WJCR Upton KY	7490na	13595na		
1200-1300	USA, WRMI/R Miami Intl	9955am			
1200-1300	USA, WWCR Nashville TN	5935am	7435am	15685am	
1200-1300	USA, WYFR Okeechobee FL	5950na	7355na	11830na	11970na
1200-1230	Uzbekistan, R Tashkent	5060as	5975as	6025as	9715as
1215-1300	Egypt, Radio Cairo	17595as			
1230-1300	Bangladesh, Radio	7185as	9648as	13615as	
1230-1300	Bulgaria, Radio	9810as	11605as		
1230-1300	Canada, RCI Montreal	6150as	11730as		
1230-1300 w	Indonesia, RRI Sorong	4875do			
1230-1300 a	Monaco, Trans World Radio	7115eu			
1230-1255 s	Monaco, Trans World Radio	7115eu			
1230-1300	Russia, Voice of	9755as	9875as		
1230-1300	South Korea, R Korea Intl	9570as	9640as	13670va	
1230-1300	Sweden, Radio	9835as	13740pa	15240pa	
1230-1300	Vietnam, Voice of	7360as	9840as	12030as	
1240-1250	Greece, Voice of	9915af	11645af	15650af	

Selected Programs

Sundays

1200 WHRI (Angel 1&2): Breakthrough. See S 0500.
1215 UK, BBC London (south as): Science. Fron Pins to Paperclips (4th,11th). See S 0330.
1216 France, R France Intl: African Analysis (biweekly). An in-depth analysis of African current affairs.
1216 France, R France Intl: Asian Analysis (biweekly). An in-depth analysis of Asian current affairs.
1223 France, R France Intl: Paris Promenade. Spotlight on a city bistro or restaurant.
1228 France, R France Intl: Counterpoint (biweekly). A specific human rights issue is examined.
1228 France, R France Intl: Everywoman (biweekly). A program for and about women.
1230 UK, BBC London (South as): Science. Bluffers Guide to Science (4th,11th). See S 0345.
1234 France, R France Intl: Club 9516. Listener letters are read in this mailbag program.
1235 UK, BBC London (South as): Science. A Guide to Biotechnology (4th,11th). See S 0350.

Mondays

1200 WHRI (Angel 1&2): Music. See S 0200.
1230 UK, BBC London (eu): Classical Music. The Story of Western Music. See S 1615.
1230 WHRI (Angel 2): The Hour of Courage. See S 0200.
1231 France, R France Intl: RFI Europe. European press review focuses on current affairs in other countries of the region.
1241 France, R France Intl: Sports. A summary of the seasonal matches from around the continent.
1247 France, R France Intl: Arts in France. Profile on the work of a French artist or a cultural activity such as music.

Tuesdays

1200 WHRI (Angel 1&2): Music. See S 0200.
1230 WHRI (Angel 2): The Hour of Courage. See S 0200.
1231 France, R France Intl: France Today. Current happenings in France.
1233 France, R France Intl: RFI Europe. See M 1231.
1243 France, R France Intl: Books. New books, publishing trends, and authors.
1250 France, R France Intl: Science Probe. Developments in the world of science, technology, and health.

Wednesdays

1200 WHRI (Angel 1&2): Music. See S 0200.
1230 UK, BBC London (af): What's News? See T 1630.
1230 WHRI (Angel 2): The Hour of Courage. See S 0200.
1231 France, R France Intl: RFI Europe. See M 1231.
1242 France, R France Intl: The Bottom Line. Focus on financial matters.
1247 France, R France Intl: Land of France. A feature on life and times in France.

Thursdays

1200 WHRI (Angel 1&2): Music. See S 0200.
1215 UK, BBC London (am): Classical Music. The Story of Western Music. See S 1615.
1230 WHRI (Angel 2): The Hour of Courage. See S 0200.
1231 France, R France Intl: Sports. See M 1241.
1234 France, R France Intl: RFI Europe. See M 1231.
1244 France, R France Intl: The Americas Magazine. Focus on a subject relating to a country of the western hemisphere.
1249 France, R France Intl: North/South (biweekly). Focus on a public activity in France.
1249 France, R France Intl: Planet Earth (biweekly). An interview with an expert on ecological matters.

Fridays

1200 WHRI (Angel 1&2): Music. See S 0200.
1230 WHRI (Angel 2): The Hour of Courage. See S 0200.
1231 France, R France Intl: RFI Europe. See M 1231.
1241 France, R France Intl: Film Reel. Interview with an performer or film maker.
1248 France, R France Intl: Made in France. See H 1448.

Saturdays

1200 KWHR (Hawaii): Cumbre DX. See S 0430.
1206 WHRI (Angel 1&2): For the People (repeat). See T 0306.
1228 France, R France Intl: Spotlight on Africa. Correspondent reports and interviews on African affairs.
1230 KWHR (Hawaii): Day of Decision. See S 1430.
1247 France, R France Intl: French Lesson. Learn French by radio.
1254 Radio Netherlands: Documentary. Collectors (24th). See W 1154.
1254 Radio Netherlands: Documentary. Crossing the River by Feeling the Stones (17th). See A 2354.
1254 Radio Netherlands: Documentary. Greenland II: Reviving the Inuit Culture (10th). See W 1154.
1254 Radio Netherlands: Documentary. Hemp (Mar 2). See W 1554.

Radio Budapest news editor Sándor Köröspataki and senior editor Vera Sárkány.

Frimmel's Program Pointers New Call-In Program

The BBC inaugurated *International Question Time* on January 13th, a new listener phone-in program similar to the VOA's *Talk to America*. The program will run for eight weeks and is heard live at 1915 Saturdays. Another listening time for North America is the repeat at 1515 Mondays on the Americas stream.

Frequencies

1300-1400	Australia, Radio	5995pa	7240as	9560pa	9580pa
		9610as	11800pa		
1300-1330	Australia, Radio	6060pa	6080as	9510pa	
1300-1320	Brazil, Radiobras	15445na			
1300-1330	Bulgaria, Radio	9810as	11605as		
1300-1400 vl	Canada, CBC N Quebec Svc	9625do			
1300-1400	Canada, CFCX Montreal	6005do			
1300-1400	Canada, CFRX Toronto	6070do			
1300-1400	Canada, CFVP Calgary	6030do			
1300-1400	Canada, CHNX Halifax	6130do			
1300-1400	Canada, CKZN St John's	6160do			
1300-1400	Canada, CKZU Vancouver	6160do			
1300-1400	Canada, RCI Montreal	9640na	11855na		
1300-1400	China, China Radio Intl	7385na	9715as	11660pa	
1300-1330	China, China Radio Intl	7410as			
1300-1400	Costa Rica,RF Peace Intl	6200am	9400am	15050am	
1300-1400	Ecuador, HCJB Quito	12005am	15115am		
1300-1330	Egypt, Radio Cairo	17595as			
1300-1400 as	Eqt Guinea, R East Africa	15190af			
1300-1400	Eqt Guinea, Radio Africa	9530as			
1300-1400	Iraq, Radio Iraq Intl	13680as			
1300-1400 vl	Italy, IRRS Milan	7125va			
1300-1400	Lebanon, Wings of Hope	9960va			
1300-1400	Malaysia, Radio	7295do			
1300-1400 vl	Malaysia, RTM Kuching	7160do			
1300-1400 vl	Malaysia,RTM KotaKinabalu	5980do			
1300-1325	Netherlands, Radio	6045eu	7190eu		
1300-1350	North Korea, R Pyongyang	9345as	9640eu	11740as	15230as
		15430as			
1300-1330 s	Norway, Radio Norway Intl	7315as	9590eu	15605as	
1300-1400 vl	Palau, KHBN/Voice of Hope	9965as			
1300-1400 vl	Papua New Guinea, NBC	4890do	9675do		
1300-1400	Philippines, FEBC/R Intl	11995as			
1300-1355	Poland, Polish R Warsaw	6095eu	7145eu	7270eu	9525eu
		11815eu			
1300-1400	Romania, R Romania Intl	11940eu	15390eu	17745eu	
1300-1400	Russia, Voice of	4740va	4975va	12055as	15470va
		17880as			
1300-1400	Singapore, SBC Radio One	6155do			
1300-1400	Singapore,R Singapore Irt	9530as			
1300-1330	Switzerland, Swiss R Intl	7230as	7480as	11640as	13625as
1300-1400	Switzerland, Swiss R Intl	6165eu	9535eu		
1300-1400	United Kingdom,BBC Lordon	5965na	5990as	6190af	6195va
		9410va	9515na	9740as	11750as
		11760va	11940af	12095va	15070va
		15220va	15310as	15420af	15575va
		17640va	17705va	17830af	17885af
		21470af	21660af		
1300-1400	USA, KJES Mesquite NM	11715na			
1300-1400	USA, KNLS Anchor Point AK	7365as			
1300-1400	USA, KTBN Salt Lk City UT	7510am			
1300-1400	USA,KWHR Naalchu HI	9930as			
1300-1400	USA, Monitor Radio Intl	6095na	9355as	9455na	13625au
1300-1400	USA, VOA Washington DC	6110va	9645va	9760va	11715va
		15160va	15425va		
1300-1400	USA, WEWN Birmingham AL	7425na	11875na	15115na	15375na
1300-1400	USA, WHRI Noblesville IN	6040am	15105am		
1300-1400	USA, WJCR Upton KY	7490na	13595na		
1300-1400	USA, WRMI/R Miami Intl	9955am			
1300-1400	USA, WWCR Nashville TN	5935am	7435am	15685am	
1300-1400	USA, WYFR Okeechobee FL	5950na	9705na	11830na	11970na
		13695na			
1307-1400 occsnal	New Zealand, R NZ Intl	9655pa			
1330-1400	Austria, R Austria Intl	15450as			
1330-1355 s	Belgium, R Vlaanderen Int	13670na			
1330-1357	Canada, RCI Montreal	6150as	9535as		
1330-1345	India, All India Radio	11620as	13750as		
1330-1400	Netherlands, Radio	9895as	13700as	15150as	
1330-1400	Sweden, Radio	11650na	15240na		
1330-1400	Turkey, Voice of	9445eu	9630as	9675as	
1330-1355	UAE, Radio Dubai	13675eu	15395eu	17825eu	21605me
1330-1400	Uzbekistan, R Tashkent	5060as	5975as	6025as	9715as
1330-1400	Vietnam, Voice of	7360as	9840as	12030as	
1330-1400	Yugoslavia, Radio	11835au			
1345-1400	Vatican State, Vatican R	9500as	11625as	15585as	

Selected Programs

Sundays

1300 KWHR (Hawaii): Cumbre DX. See S 0430.
1300 Norway, Radio Norway Intl: Norway Now. A weekly magazine of news from Norway and special features about politics, economy, foreign relations, culture, and everyday life.
1300 WHRI (Angel 1): Music. See S 0200.
1300 WHRI (Angel 2): In Touch. The teaching ministry of Charles Stanley.
1305 Canada, RCI Montreal: Quirks and Quarks. See S 0005.
1330 KWHR (Hawaii): Cornerstone Ministries. Dwight Hammond.
1345 WHRI (Angel 1): Called to Conquer. Bill Knight

Mondays

1300 KWHR (Hawaii): Music. See S 0200.
1300 UK, BBC London (af): Science. Fron Pins to Paperclips (5th,12th). See S 0330.
1300 WHRI (Angel 1): Truth, Life and Light Broadcast. Daniel Rhodes preaches the Bible.
1300 WHRI (Angel 2): The Voice of Praise. Pastor Kenneth Ivy teaches from the word of God.
1307 Canada, RCI Montreal: Double Exposure. See S 0305.
1315 UK, BBC London (af): Science. Bluffers Guide to Science (5th,12th). See S 0345.
1315 WHRI (Angel 1): Reach Out. Pastor Jerry Lynn reaches out with Bible teaching.
1315 WHRI (Angel 2): Reach Out. See M 1315.
1320 UK, BBC London (af): Science. A Guide to Biotechnology (5th,12th). See S 0350.
1330 WHRI (Angel 1&2): Faith Seminar of the Air. See M 1130.
1334 Canada, RCI Montreal: The Royal Canadian Air Farce. See S 0332.
1345 WHRI (Angel 1): The Jesus Time Network. Walter Bail evangelizes from Tennessee.
1345 WHRI (Angel 2): Life in the Word. Joyce Meyer offers help by example for everyday living.

Tuesdays

1300 KWHR (Hawaii): Music. See S 0200.
1300 WHRI (Angel 1): Truth, Life and Light Broadcast. See M 1300.
1300 WHRI (Angel 2): The Voice of Praise. See M 1300.
1310 Canada, RCI Montreal: As It Happens. See M 2330.
1315 WHRI (Angel 1&2): Reach Out. See M 1315.
1330 WHRI (Angel 1&2): Faith Seminar of the Air. See M 1130.
1345 WHRI (Angel 1): The Jesus Time Network. See M 1345.
1345 WHRI (Angel 2): Life in the Word. See M 1345.

Wednesdays

1300 KWHR (Hawaii): Music. See S 0200.
1300 WHRI (Angel 1): Truth, Life and Light Broadcast. See M 1300.
1300 WHRI (Angel 2): The Voice of Praise. See M 1300.
1310 Canada, RCI Montreal: As It Happens. See M 2330.
1315 WHRI (Angel 1&2): Reach Out. See M 1315.
1330 WHRI (Angel 1&2): Faith Seminar of the Air. See M 1130.
1345 WHRI (Angel 1): The Jesus Time Network. See M 1345.
1345 WHRI (Angel 2): Life in the Word. See M 1345.
1354 Radio Netherlands: Documentary. Collectors (21st). See W 1154.
1354 Radio Netherlands: Documentary. Crossing the River by Feeling the Stones (14th). See A 2354.
1354 Radio Netherlands: Documentary. Greenland II: Reviving the Inuit Culture (7th). See W 1154.
1354 Radio Netherlands: Documentary. Hemp (28th). See W 1554.

Thursdays

1300 KWHR (Hawaii): Music. See S 0200.
1300 WHRI (Angel 1): Truth, Life and Light Broadcast. See M 1300.
1300 WHRI (Angel 2): The Voice of Praise. See M 1300.
1310 Canada, RCI Montreal: As It Happens. See M 2330.
1315 WHRI (Angel 1&2): Reach Out. See M 1315.
1330 WHRI (Angel 1&2): Faith Seminar of the Air. See M 1130.
1345 WHRI (Angel 1): The Jesus Time Network. See M 1345.
1345 WHRI (Angel 2): Life in the Word. See M 1345.

Fridays

1300 KWHR (Hawaii): Music. See S 0200.
1300 WHRI (Angel 1): Truth, Life and Light Broadcast. See M 1300.
1300 WHRI (Angel 2): The Voice of Praise. See M 1300.
1310 Canada, RCI Montreal: As It Happens. See M 2330.
1315 WHRI (Angel 1&2): Reach Out. See M 1315.
1330 WHRI (Angel 1&2): Faith Seminar of the Air. See M 1130.
1345 WHRI (Angel 1): The Jesus Time Network. See M 1345.
1345 WHRI (Angel 2): Life in the Word. See M 1345.

Saturdays

1300 KWHR (Hawaii): Spirit of Truth. Don Young offers words of encouragement and joy.
1300 WHRI (Angel 1): Music. See S 0200.
1310 Canada, RCI Montreal: As It Happens. See M 2330.
1315 KWHR (Hawaii): River of Life. Paul Roberts evangelizes.
1315 WHRI (Angel 2): Music. See S 0200.
1325 KWHR (Hawaii): Faith in Action. Betty Potterbaum of Hawaii interprets the Bible.
1330 KWHR (Hawaii): The Showers of Blessings Broadcast. Ed McAbee sermonizes before a live congregation.
1330 WHRI (Angel 1): Walking in Light. John Pietzonka
1345 KWHR (Hawaii): The Bread of Life Victory Hour. Brother Jack Meeks with music and teaching.

Frequencies

1400-1430	Australia, Radio	7240pa	9560as	9610pa	11695pa
1400-1500	Australia, Radio	5995pa	9580pa	11800pa	
1400-1500	Australia,DefenseForces R	8743af	10623af		
1400-1430 mtwhfa	Belgium, R Vlaanderen Int	13670na			
1400-1500 vl	Canada, CBC N Quebec Svc	9625do			
1400-1500	Canada, CFCX Montreal	6005do			
1400-1500	Canada, CFRX Toronto	6070do			
1400-1500	Canada, CFVP Calgary	6030do			
1400-1500	Canada, CHNX Halifax	6130do			
1400-1500	Canada, CKZN St John's	6160do			
1400-1500	Canada, CKZU Vancouver	6160do			
1400-1500	Canada, RCI Montreal	9640na	11855na		
1400-1500	China, China Radio Intl	7405na	9530as	9785as	
1400-1500	Costa Rica,RF Peace Intl	6200am	9400am	15050am	
1400-1430	Czech Rep, Radio Prague	13580na	17845af		
1400-1500	Ecuador, HCJB Quito	12005am	15115am		
1400-1500 as	Eqt Guinea, R East Africa	15190af			
1400-1500	France, Radio France Intl	7110as	12030as	15405as	17560me
1400-1500	India, All India Radio	11620as	13750as		
1400-1430 vl	Italy, IRRS Milan	7125va			
1400-1500	Japan, NHK/Radio	6090as	9535na	9695as	11705na
		11895as			
1400-1500	Lebanon, Wings of Hope	9960va			
1400-1500	Malaysia, Radio	7295do			
1400-1500 vl	Malaysia, RTM Kuching	7160do			
1400-1500 vl	Malaysia,RTM KotaKinabalu	5980do			
1400-1500	Malta, V of Mediterranean	11925me			
1400-1500	Netherlands, Radio	9895as	13700as	15150as	
1400-1500 occsnal	New Zealand, R NZ Intl	6100pa			
1400-1430 s	Norway, Radio Norway Intl	11840na			
1400-1500 vl	Palau, KHBN/Voice of Hope	9965as			
1400-1500	Philippines, FEBC/R Intl	11995as			
1400-1500	Russia, Voice of	7130as	7165as	9470va	12065me
		17880as			
1400-1500	Singapore, SBC Radio One	6155do			
1400-1430	Turkey, Voice of	9445eu	9630as		
1400-1500	United Kingdom,BBC London	5965as	5990as	6190af	6195as
		9410va	9515na	9740as	11750as
		11940af	12095va	15070va	15260na
		15310as	15575va	17640va	17705va
		17830af	17840va	21470af	21660af
1400-1500	USA, KJES Mesquite NM	11715na			
1400-1500	USA, KTBN Salt Lk City UT	7510am			
1400-1500	USA, Monitor Radio Intl	9355as			
1400-1500	USA, VOA Washington DC	6110va	7125va	7215va	9645va
		9760va	15160va	15205as	15395as
		15425va			
1400-1500	USA, WEWN Birmingham AL	9455na	11875na	15235sa	
1400-1500 irreg	USA, WGTG McCaysville GA	9475am			
1400-1500	USA, WHRI Noblesville IN	6040am	15105am		
1400-1500	USA, WJCR Upton KY	7490na	13595na		
1400-1500	USA, WRNO New Orleans LA	15420am			
1400-1500 a	USA, WVHA Greenbush ME	15745eu			
1400-1500	USA, WWCR Nashville TN	7435am	13845am	15685am	
1400-1500	USA, WYFR Okeechobee FL	9705na	11830na	17760eu	
1400-1415	Vatican State, Vatican R	9500as	11625as	15585au	
1415-1500 mtwtfa	Bhutan, Bhutan BC Service	5025do			
1415-1425	Nepal, Radio	3230do	5005do		
1430-1500	Australia, Radio	6060pa	6080pa	7260as	9710pa
		11660as	11695pa		
1430-1500	Austria, R Austria Intl	6155eu	11780as	13730eu	
1430-1500	Canada, RCI Montreal	9555eu	11915eu	11935eu	15325eu
1430-1500 vl	China, China Radio Intl	8660as	9880as	11445as	15135as
1430-1440 mtwhf	Indonesia, RRI Uj Pandang	4753do			
1430-1500 vl	Italy, IRRS Milan	3985va			
1430-1500	Romania, R Romania Intl	11740as	11810as	15335as	
1430-1500	Sweden, Radio	11650na	15240na		
1430-1500	United Kingdom,BBC London	15400af			
1435-1445	Greece, Voice of	9420eu	15650na		
1440-1500	Myanmar, Voice of	5990do			
1445-1500	Mongolia, R Ulan Bator	7530as	9950as		
1458-1500 mtwhfa	Seychelles, FEBA Radio	9810as			
1458-1500 s	Seychelles, FEBA Radio	11870as			

Selected Programs

Sundays

1400 Norway, Radio Norway Intl: Norway Now. See S 1300.
1400 WHRI (Angel 1&2): Gospel Crusade Ministries. See S 0400.
1411 Canada, RCI Montreal: Sunday Morning (1st hour). CBC Radio's powerful and critically acclaimed three-hour current affairs program examines the events and ideas that shape our world.
1416 France, R France Intl: African Analysis (biweekly). See S 1216.
1416 France, R France Intl: Asian Analysis (biweekly). See S 1216.
1422 France, R France Intl: Paris Promenade. See S 1223.
1427 France, R France Intl: Everywoman. See S 1228.
1430 KWHR (Hawaii): Day of Decision. Bob Roman evangelizes from Texas.
1430 WHRI (Angel 1): The Gospel Blessings Broadcast. Glenn McHatten evangelizes.
1430 WHRI (Angel 2): The Banner of Truth Broadcast. Sponsored by the Free Reformed Churches of North America.
1433 France, R France Intl: Club 9516. See S 1234.
1437 Canada, RCI Montreal: The Mailbag. Listener letters, musical selections, and happenings in Canada.
1445 WHRI (Angel 1&2): Bible Pathway. Rick Hash with five minutes of Bible readings.

Mondays

1400 WHRI (Angel 1&2): World Harvest (live). An hour of Christian music and information for WHRI supporters.
1407 Canada, RCI Montreal: The Best of Morningside. Repeats of the CBC's morning program.
1430 UK, BBC London (af): Science. Fron Pins to Paperclips (5th,12th). See S 0330.
1431 France, R France Intl: RFI Europe. See M 1231.
1440 Canada, RCI Montreal: Spectrum. A weekday magazine program of current affairs, features, and a business report.
1440 France, R France Intl: Sports. See M 1241.
1445 UK, BBC London (af): Science. Bluffers Guide to Science (5th,12th). See S 0345.
1445 UK, BBC London (am): Popular Music. The World in Your Ear (6th,13th). See S 0445.
1447 France, R France Intl: Arts in France. See M 1247.
1450 UK, BBC London (af): Science. A Guide to Biotechnology (5th,12th). See S 0350.

Tuesdays

1400 WHRI (Angel 1&2): World Harvest (live). See M 1400.
1407 Canada, RCI Montreal: The Best of Morningside. See M 1407.
1430 UK, BBC London (south as): Red Dwarf. See T 0115.
1431 France, R France Intl: France Today. See T 1231.
1433 France, R France Intl: RFI Europe. See M 1231.
1440 Canada, RCI Montreal: Spectrum. See M 1440.
1442 France, R France Intl: Books. See T 1243.
1449 France, R France Intl: Science Probe. See T 1250.

Wednesdays

1400 WHRI (Angel 1&2): World Harvest (live). See M 1400.
1407 Canada, RCI Montreal: The Best of Morningside. See M 1407.
1430 UK, BBC London (south as): What's News? See T 1630.
1431 France, R France Intl: RFI Europe. See M 1231.
1440 Canada, RCI Montreal: Spectrum. See M 1440.
1443 France, R France Intl: The Bottom Line. See W 1242.
1446 France, R France Intl: Land of France. See W 1247.

Thursdays

1400 WHRI (Angel 1&2): World Harvest (live). See M 1400.
1407 Canada, RCI Montreal: The Best of Morningside. See M 1407.
1415 UK, BBC London (af): Classical Music. How to Listen (1st,8th,15th,22nd). See M 0430.
1431 France, R France Intl: Sports. See M 1241.
1435 France, R France Intl: RFI Europe. See M 1231.
1440 Canada, RCI Montreal: Spectrum. See M 1440.
1443 France, R France Intl: North/South (biweekly). See H 1249.
1443 France, R France Intl: Planet Earth (biweekly). See H 1249.
1443 France, R France Intl: The Americas Magazine (5). See H 1244.
1445 UK, BBC London (af): Popular Music. The World in Your Ear (1st,8th,15th). See S 0445.
1448 France, R France Intl: Made in France. A review of something very French.

Fridays

1400 WHRI (Angel 1&2): World Harvest (live). See M 1400.
1407 Canada, RCI Montreal: The Best of Morningside. See M 1407.
1431 France, R France Intl: RFI Europe. See M 1231.
1440 Canada, RCI Montreal: Spectrum. See M 1440.
1441 France, R France Intl: Film Reel. See F 1241.
1446 France, R France Intl: Counterpoint (biweekly). See S 1228.
1446 France, R France Intl: Silk Roads (biweekly). Focus on South Asia.

Saturdays

1400 WHRI (Angel 1): Listen to Jesus. See M 1145.
1400 WHRI (Angel 2): Modern Manna. See T 1100.
1425 France, R France Intl: Focus on France. Zooming in on a French news item.
1430 WHRI (Angel 1): Eternal Good News. See S 0630.
1430 WHRI (Angel 2): Biblical Studies Institute. See S 0030.
1434 France, R France Intl: Asia File. Correspondent reports and interviews on Asian affairs.
1436 Canada, RCI Montreal: Innovation Canada. See S 0207.
1440 France, R France Intl: French Lesson. See A 1247.
1445 WHRI (Angel 1): Word of Faith. Aaron Collins preaches from Racine, Wisconsin.
1454 Radio Netherlands: Documentary. Collectors (24th). See W 1154.
1454 Radio Netherlands: Documentary. Crossing the River by Feeling the Stones (17th). See A 2354.
1454 Radio Netherlands: Documentary. Greenland II: Reviving the Inuit Culture (10th). See W 1154.
1454 Radio Netherlands: Documentary. Hemp (Mar 2). See W 1554.

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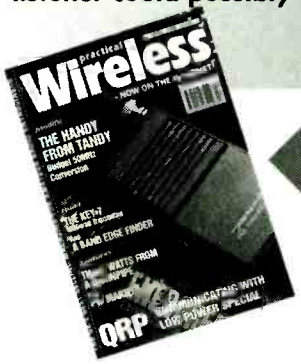

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Frequencies

1500-1600	Australia, Radio	5995pa	6060pa	6080pa	6090as
		7260as	9580pa	9615as	9710pa
		11660as	11695pa	11800pa	
1500-1600	Australia,DefenseForces R	8743af	10623af		
1500-1600 vl	Canada, CBC N Quebec Svc	9625do			
1500-1600	Canada, CFCX Montreal	6005do			
1500-1600	Canada, CFRX Toronto	6070do			
1500-1600	Canada, CFVP Calgary	6030do			
1500-1600	Canada, CHNX Halifax	6130do			
1500-1600	Canada, CKZN St John's	6160do			
1500-1600	Canada, CKZU Vancouver	6160do			
1500-1600 s	Canada. RCI Montreal	9640na	11855na		
1500-1600	China, China Radio Intl	7405na	9535as	9785as	
1500-1600	Costa Rica,RF Peace Intl	6200am	9400am	15050am	
1500-1600	Ecuador, HCJB Quito	12005am	15115sa		
1500-1600 as	Eqt Guinea, R East Africa	15190af			
1500-1600	Guam, TWR/KTWR	11580as			
1500-1600 vl	Italy, IRRS Milan	3985va			
1500-1600	Japan, NHK/Radio	7240as	9535na	9695as	15355af
1500-1600	Jordan, Radio	11910na	11940na		
1500-1600	Lebanon, Wings of Hope	9960va			
1500-1600	Malaysia, Radio	7295do			
1500-1600 vl	Malaysia, RTM Kuching	7160do			
1500-1600 vl	Malaysia,RTM KotaKinabalu	5980do			
1500-1515	Mongolia, R Ulan Bator	7530as	9950as		
1500-1515 s	Myanmar, Voice of	5990do			
1500-1525	Netherlands, Radio	9895as	13700as	15150as	
1500-1600 occsnal	New Zealand, R NZ Intl	6100pa			
1500-1600	Nigeria, Voice of	7255af			
1500-1550	North Korea, R Pyongyang	9325eu	9640eu	9975na	13785me
1500-1530 s	Norway, Radio Norway Intl	9520me	11730me		
1500-1600 vl	Palau, KHBN/Voice of Hope	9965as			
1500-1600	Philippines, FEBC/R Intl	11995as			
1500-1530	Romania, R Romania Intl	11740as	11810as	15335as	
1500-1600	Russia, Voice of	4740as	4940as	4975as	7115va
		7130va	7165va	9470va	9635va
		9905as	11765va	11945as	12065me
1500-1600	S Africa, Channel Africa	7240af	9545af		
1500-1600 mtwhfa	Seychelles, FEBA Radio	9810as			
1500-1530 s	Seychelles, FEBA Radio	11870as			
1500-1600	Singapore, SBC Radio One	6155do			
1500-1600	Sri Lanka, SLBC Colombo	9720as	15425as		
1500-1530	Switzerland, Swiss R Intl	9885as	12075as	13625as	
1500-1600	United Kingdom,BBC London	5965as	5990as	6190af	6195va
		7205as	9410va	9515na	9740as
		11750as	12095va	15070va	15260na
		15400va	17705va	17830af	17840va
		21470af	21660af		
1500-1530	United Kingdom,BBC London	11860af	11940af	15400eu	15420af
		17880af	21490af		
1500-1600	USA, KTBN Salt Lk City UT	7510am			
1500-1600	USA, KWHR Naalehu HI	9930as			
1500-1600	USA, Monitor Radio Intl	9355as			
1500-1600	USA, VOA Washington DC	6110as	7125as	7215as	9575as
		9645as	9700as	9760va	15205as
		15255as	15395as		
1500-1600	USA, WEWN Birmingham AL	9455na	11875na	15235na	
1500-1600 irreg	USA, WGTG McCaysville GA	9475am			
1500-1600	USA, WHRI Noblesville IN	13760am	15105am		
1500-1600	USA, WJCR Upton KY	7490na	13595na		
1500-1600	USA, WRNO New Orleans LA	15420am			
1500-1600	USA, WWCR Nashville TN	12160am	13845am	15685am	
1500-1600	USA. WYFR Okeechobee FL	11830na	15215na	17760eu	
1515-1600 a	USA, WVHA Greenbush ME	15745eu			
1530-1545	India, All India Radio	7410as			
1530-1600	Iran, VOIRI Tehran	11875as	15260as	17750as	
1530-1600	Netherlands, Radio	9895as	15150as		
1530-1600 mtwhf	Portugal, R Portugal Intl	21515me			
1530-1600	United Kingdom,BBC London	7180as			

Selected Programs

Sundays

1500 Israel, Kol Israel: Israel News Magazine. The latest world and Israel and regional news.
1500 KWHR (Hawaii): Christian Center Church (live). Dr. Lester Sumrall preaches.
1500 Norway, Radio Norway Intl: Norway Now. See S 1300.
1500 USA, Monitor Radio Intl: Bible Lesson. Lesson-sermons from the King James Version of the Bible and Mary Baker Eddy's textbook.
1500 WHRI (Angel 1&2): Christian Center Church (live). See S 1500.
1505 Canada, RCI Montreal: Sunday Morning (2nd hour). See S 1411.
1515 UK, BBC London (am/as pac/eu/south as): International Question Time. Listeners phone in with questions to the studio in London on a variety of topics (repeat of A 1915 live broadcast).
1529 USA, Monitor Radio Intl: Christian Science Sentinel Radio Edition. Discussions on how the Bible addresses the trends of thought of today.

Mondays

1500 Israel, Kol Israel: Israel News Magazine. See S 1500.
1500 KWHR (Hawaii): Reach Out. See M 1315.
1500 USA, Monitor Radio Intl: Monitor Radio News. Five minutes of the latest world news at the beginning of the hour.
1500 WHRI (Angel 1&2): Music. See S 0200.
1505 UK, BBC London (am): Cue for a Song (5th,12th,19th). See M 0005.
1506 USA, Monitor Radio Intl: Monitor Radio International. News, analysis, commentary, interviews and features in a magazine format.
1515 KWHR (Hawaii): Life in the Word. See M 1345.
1549 USA, Monitor Radio Intl: Letterbox. Listeners make their views known by telephone or letter to host Lisa Dale.
1552 USA, Monitor Radio Intl: Religious Article from the CSM. As published in the christian Science Monitor.

Tuesdays

1500 Israel, Kol Israel: Israel News Magazine. See S 1500.
1500 KWHR (Hawaii): Reach Out. See M 1315.
1500 USA, Monitor Radio Intl: Monitor Radio News. See M 1500.
1500 WHRI (Angel 1&2): Music. See S 0200.
1505 UK, BBC London (am): Food Plants. See W 0005.
1506 USA, Monitor Radio Intl: Monitor Radio International. See M 1506.
1515 KWHR (Hawaii): Life in the Word. See M 1345.
1549 USA, Monitor Radio Intl: Letterbox. See M 1549.
1552 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1552.

Wednesdays

1500 Israel, Kol Israel: Israel News Magazine. See S 1500.
1500 KWHR (Hawaii): Reach Out. See M 1315.
1500 USA, Monitor Radio Intl: Monitor Radio News. See M 1500.
1500 WHRI (Angel 1&2): Music. See S 0200.
1506 USA, Monitor Radio Intl: Monitor Radio International. See M 1506.
1515 KWHR (Hawaii): Life in the Word. See M 1345.
1515 UK, BBC London (am): Red Dwarf. See T 0115.
1549 USA, Monitor Radio Intl: Letterbox. See M 1549.
1552 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1552.
1554 Radio Netherlands: Documentary. Collectors (21st). See W 1154.
1554 Radio Netherlands: Documentary. Crossing the River by Feeling the Stones (14th). See A 2354.
1554 Radio Netherlands: Documentary. Greenland II: Reviving the Inuit Culture (7th). See W 1154.
1554 Radio Netherlands: Documentary. Hemp (28th). Helen Barrington takes a look at the history of this extraordinarily versatile fiber.

Thursdays

1500 Israel, Kol Israel: Israel News Magazine. See S 1500.
1500 KWHR (Hawaii): Reach Out. See M 1315.
1500 USA, Monitor Radio Intl: Monitor Radio News. See M 1500.
1500 WHRI (Angel 1&2): Music. See S 0200.
1506 USA, Monitor Radio Intl: Monitor Radio International. See M 1506.
1515 KWHR (Hawaii): Life in the Word. See M 1345.
1549 USA, Monitor Radio Intl: Letterbox. See M 1549.
1552 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1552.

Fridays

1500 Israel, Kol Israel: Israel News Magazine. See S 1500.
1500 KWHR (Hawaii): Reach Out. See M 1315.
1500 USA, Monitor Radio Intl: Monitor Radio News. See M 1500.
1500 WHRI (Angel 1&2): Music. See S 0200.
1506 USA, Monitor Radio Intl: Monitor Radio International. See M 1506.
1515 KWHR (Hawaii): Life in the Word. See M 1345.
1515 UK, BBC London (south as): Surviving the 20th Century (2nd,9th). See F 0115.
1549 USA, Monitor Radio Intl: Letterbox. See M 1549.
1552 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1552.

Saturdays

1500 KWHR (Hawaii): Eternal Good News. See S 0630.
1500 USA, Monitor Radio Intl: Monitor Radio News. See M 1500.
1500 WHRI (Angel 1): Home Schooling (live). See A 0100.
1500 WHRI (Angel 2): Bible Pathway. See S 1445.
1505 WHRI (Angel 2): CCM Radio Magazine. The top contemporary christian music hits and the stories behind them.
1506 USA, Monitor Radio Intl: Christian Science Sentinel Radio Edition. See S 1529.
1509 Israel, Kol Israel: Weekly Interview. A discussion of current events with a prominent individual.
1530 KWHR (Hawaii): Rhema Radio Church. Kenneth Hagin, Jr. preaches from Tulsa, Oklahoma.

Hauser's Highlights
CHINA: CPBS Taiwan Service
in Standard Chinese, Hakka, Amoy

First Program;

0955-2405	7620, 6015, 5125,3815
0055-0615	15710, 11935, 11100

Second Program:

2055-2314	6790
2314-2400	9170, 6790
0000-0105	11000, 9170
0355-0655	15880, 11000
0605-0900	15880, 11000 exc Tues
0955-1805	6790, 6095, 5090

(BBC Monitoring)

Frequencies

1600-1700	Australia, Radio	5995pa	6060pa	6080pa	6090pa
		7260as	9580pa	9710pa	9770as
		11660pa	11695pa	11800pa	
1600-1613	Bangladesh, Radio	15520as			
1600-1700 vl	Canada, CBC N Quebec Svc	9625do			
1600-1700	Canada, CFCX Montreal	6005do			
1600-1700	Canada, CFRX Toronto	6070do			
1600-1700	Canada, CFVP Calgary	6030do			
1600-1700	Canada, CHNX Halifax	6130do			
1600-1700	Canada, CKZN St John's	6160do			
1600-1700	Canada, CKZU Vancouver	6160do			
1600-1700 s	Canada, RCI Montreal	9640na	11955na		
1600-1700	China, China Radio Intl	11575as	15110af	15130af	
1600-1700	Costa Rica,RF Peace Intl	6200am	9400am	15050am	
1600-1630	Ethiopia, Radio	7165af			
1600-1700	France, Radio France Intl	6175eu	9485eu	11615af	11700af
		12015af	15210af	15460af	15530af
1600-1650	Germany, Deutsche Welle	6170as	7225as	7305as	9585as
1600-1700	Germany, Deutsche Welle	7195af	9735af	11965af	
1600-1700	Guam, AWR/KSDA	9370as			
1600-1615 mt	Guam, TWR/KTWR	11580as			
1600-1630 whfas	Guam, TWR/KTWR	11580as			
1600 1630	Iran, VOIRI Tehran	11875as	15260as	17750as	
1600-1700	Italy, AWR Europe	7230eu			
1600-1700 vl	Italy, IRRS Milan	3985va			
1600-1700	Jordan, Radio	11910na	11940na		
1600-1700	Lebanon, Voice of Hope	6280va			
1600-1700	Malaysia, Radio	7295do			
1600-1625	Netherlands, Radio	9895as	13700as	15150as	
1600-1649 occsnal	New Zealand, R NZ Intl	9655pa			
1600-1700	Nigeria, Voice of	7255af			
1600-1700	Pakistan, Radio	9485af	9785af	11570af	11745af
		13590af	15555af		
1600-1700 vl	Palau, KHBN/Voice of Hope	9965as			
1600-1700	Russia, Voice of	4740va	4940va	7115va	7180as
		7210va	7275va	7330eu	9470va
		9490va	9635as	9905as	11945as
		13670as			
1600-1700	S Africa, Channel Africa	7240af	9545af	15240af	
1600-1700	S Africa, Trans World R	9500af			
1600-1700	Singapore, SBC Radio One	6155do			
1600-1700	South Korea, R Korea Intl	5975as	9515va	9870va	15575eu
1600-1630	Sri Lanka, SLBC Colombo	9720as	15425as		
1600-1700	Swaziland, Trans World R	9500af			
1600-1640	UAE, Radio Dubai	13675eu	15395me	17825me	21605me
1600-1700	United Kingdom,BBC London	3915as	5965as	6190af	6195va
		7135as	7205af	9410va	9515na
		9740va	11750as	11780eu	12095va
		15070va	15400va	17830af	17840va
		21470va	21660af		
1600-1615	United Kingdom,BBC London	5990as	7180as	17705va	
1600-1700	USA, KTBN Salt Lk City UT	15590am			
1600-1700	USA, KWHR Naalehu HI	6120as			
1600-1700	USA, Monitor Radio Intl	9355af	21640af		
1600-1700	USA, VOA Washington DC	3970af	6110as	7125as	7215as
		9645as	9700as	9760as	11920af
		12040af	13710af	15205as	15225af
		15395as	15445af	17895af	
1600-1700	USA, WEWN Birmingham AL	11580na	13615na	15340na	
1600-1700 irreg	USA, WGTG McCaysville GA	9475am			
1600-1700	USA, WHRI Noblesville IN	13760am	15105am		
1600-1700	USA, WJCR Upton KY	7490na	13595na		
1600-1700	USA, WRNO New Orleans LA	15420am			
1600-1700 a	USA, WVHA Greenbush ME	15745eu			
1600-1700	USA, WWCR Nashville TN	12160am	13845am	15685am	
1600-1700	USA, WYFR Okeechobee FL	11580na	11830na	15215na	15566eu
		17760eu	21525af	21745eu	
1600-1630 a	Vatican State, Vatican R	9940va	11640va		
1600-1620 smtwhf	Vatican State, Vatican R	9940va	11640va		
1600-1630	Vietnam, Voice of	7360na	9840eu	12030as	
1615-1625	Egypt, Radio Cairo	11874af			
1615-1700	United Kingdom,BBC London	9630af	11860af	15420af	
1630-1700	Austria, R Austria Intl	11780as			
1630-1657	Canada, RCI Montreal	7150as	9550as		
1630-1700	Egypt, Radio Cairo	15255af			
1630-1700 mtwhfa	USA, WRMI/R Miami Intl	9955am			
1645-1700 mtwhf	Canada, RCI Montreal	9555eu	11935eu	15325eu	17820eu
1650-1700	Eqt Guinea, Radio Africa	15190af			
1650-1700 mtwhf	New Zealand, R NZ Intl	5960pa			

Selected Programs

Sundays

1600 Canada, RCI Montreal: Sunday Morning (3rd hour). See S 1411.
1600 Germany, Deutsche Welle: Arts on the Air. See S 1109.
1600 Germany, Deutsche Welle: The Week in Germany. A summary of the week's events in Germany by Deutsche Welle's Bonn correspondents.
1615 UK, BBC London (af): Classical Music. The Story of Western Music. Anthony Burton introduces 20th century music from Elgar and Debussy to the present day.
1619 France, R France Intl: Everywoman (biweekly). See S 1228.
1629 France, R France Intl: Health Concerns (biweekly). Reports on medicine, fitness, and ecology.
1629 Germany, Deutsche Welle: Religion and Society. See S 0138.
1632 France, R France Intl: Paris Promenade. See S 1223.
1636 France, R France Intl: African Analysis (biweekly). See S 1216.
1636 France, R France Intl: Echoes from Africa (biweekly). An African music program.
1629 Germany, Deutsche Welle: Through German Eyes. In-depth interviews with prominent German journalists.
1630 UK, BBC London (south as): Science. From Pins to Paperclips (4th,11th). See S 0330.
1632 France, R France Intl: Club 9516. See S 1234.
1633 Germany, Deutsche Welle: German by Radio. See S 1133.
1634 Germany, Deutsche Welle: Hits in Germany. The German pop scene for listeners in Africa.
1645 UK, BBC London (south as): Science. Bluffers Guide to Science (4th,11th). See S 0345.
1650 UK, BBC London (south as): Science. A Guide to Biotechnology (4th,11th). See S 0350.

Mondays

1609 Germany, Deutsche Welle: Newsline Cologne. See M 1109.
1631 France, R France Intl: RFI Europe. See M 1231.
1633 Germany, Deutsche Welle: Science and Technology. Magazine program presenting new developments in science and technology.
1640 France, R France Intl: Sports. See M 1241.
1643 Germany, Deutsche Welle: Science and Technology. See M 1633.
1645 WHRI (Angel 2): Reach Out. See M 1315.
1647 France, R France Intl: Arts in France. See M 1247.

Tuesdays

1600 WHRI (Angel 1&2): Music. See S 0200.
1609 Germany, Deutsche Welle: Newsline Cologne. See M 1109.
1630 UK, BBC London (am): What's News? A look at the news stories that interest the young people who write the BBC with questions about particular issues.
1633 France, R France Intl: RFI Europe. See M 1231.
1633 Germany, Deutsche Welle: Man and Environment. Various topics relating to the environment in industrial and developing countries.
1642 France, R France Intl: Books. See T 1243.
1644 Germany, Deutsche Welle: Man and Environment. See T 1633.
1647 France, R France Intl: Drumbeat. African feature.

Wednesdays

1609 Germany, Deutsche Welle: Newsline Cologne. See M 1109.
1615 UK, BBC London (south as): Sexwise. A sex education program destined only to listeners in South Asia.
1631 France, R France Intl: RFI Europe. See M 1231.
1633 Germany, Deutsche Welle (south as): Insight. Greenpeace Turns 25 (7th). See W 0333.
1641 France, R France Intl: The Bottom Line. See W 1242.
1643 Germany, Deutsche Welle (af): Insight. Greenpeace Turns 25 (7th). See W 0333.
1646 France, R France Intl: Land of France. See W 1247.

Thursdays

1609 Germany, Deutsche Welle: Newsline Cologne. See M 1109.
1630 France, R France Intl: Sports. See M 1241.
1632 France, R France Intl: RFI Europe. See M 1231.
1633 Germany, Deutsche Welle: Living in Germany. See M 0118.
1641 France, R France Intl: North/South (biweekly). See H 1249.
1641 France, R France Intl: Planet Earth (biweekly). See H 1249.
1643 Germany, Deutsche Welle: Living in Germany. See M 0118.
1646 France, R France Intl: Science Probe. See T 1250.

Fridays

1609 Germany, Deutsche Welle: Newsline Cologne. See M 1109.
1631 France, R France Intl: RFI Europe. See M 1231.
1633 Germany, Deutsche Welle: Spotlight on Sport. Weekly magazine program with background stories and coverage of important events.
1641 France, R France Intl: Film Reel. See F 1241.
1643 Germany, Deutsche Welle: Spotlight on Sport. See F 1633.
1646 France, R France Intl: Made in France. See H 1448.

Saturdays

1609 Germany, Deutsche Welle: Africa in the German Press. What the German newspapers and weeklies have to say about Africa.
1609 Germany, Deutsche Welle: Feature of the Month (1). See S 0436.
1609 Germany, Deutsche Welle: International Talking Point. See S 0416.
1614 France, R France Intl: Focus on France. See A 1425.
1618 Germany, Deutsche Welle: Focus on Development (biweekly). Reports and interviews on projects and progress in Africa and Asia.
1618 Germany, Deutsche Welle: Women on the Move (biweekly). A magazine promoting intercultural understanding and portraying the role of women in society.
1623 Germany, Deutsche Welle: Development Forum. Reports and interviews on projects and progress in Africa and Asia.
1631 France, R France Intl: Spotlight on Africa. See A 1228.
1633 Germany, Deutsche Welle: Economic Notebook. See T 0333.
1640 Germany, Deutsche Welle: Religion and Society. See S 0138.
1645 France, R France Intl: French Lesson. See A 1247.
1648 Germany, Deutsche Welle: The Jazz Corner. See F 2333.

FREQUENCIES

1700-1800	Australia, Radio	6060pa	6080pa	6090pa	7260as
		9580pa	9615as	9710pa	9860pa
		11660pa	11695pa	11880pa	
1700-1800 vl	Canada, CBC N Quebec Svc	9625do			
1700-1800	Canada, CFCX Montreal	6005do			
1700-1800	Canada, CFRX Toronto	6070do			
1700-1800	Canada, CFVP Calgary	6030do			
1700-1800	Canada, CHNX Halifax	6130do			
1700-1800	Canada, CKZN St John's	6160do			
1700-1800	Canada, CKZU Vancouver	6160do			
1700-1800	China, China Radio Intl	5220af	7150af	7405af	9535as
		11575af			
1700-1800 as	Costa Rica, AWR Alajuela	13750am			
1700-1800	Costa Rica,RF Peace Intl	6200am	9400am	15050am	
1700-1727	Czech Rep, Radio Prague	5930eu	9430eu		
1700-1800	Ecuador, HCJB Quito	15540eu			
1700-1800	Egypt, Radio Cairo	15255af			
1700-1800	Eqt Guinea, Radio Africa	15190af			
1700-1730	France, Radio France Intl	9485af	11615af	15210af	15460af
1700-1730	Georgia, Georgian Radio	11910eu			
1700-1800 vl	Italy, IRRS Milan	3985va			
1700-1800	Japan, NHK/Radio	6150as	7280as	9535na	9580as
		11930me			
1700-1730	Jordan, Radio	11910na	11940na		
1700-1800	Lebanon, Voice of Hope	6280va			
1700-1730	Lebanon, Wings of Hope	9960va			
1700-1800 mtwhf	New Zealand, R NZ Intl	5960pa			
1700-1750	North Korea, R Pyongyang	9325eu	9640af	9975af	13785me
1700-1750	Pakistan, Radio	5825eu	11570eu		
1700-1800 vl	Palau, KHBN/Voice of Hope	9965as			
1700-1800	Russia, Voice of	5940va	5995va	6055va	7115va
		7130va	7205va	7210va	7255va
		7330eu	9470va	9490va	9890va
		13670af			
1700-1800	S Africa, Channel Africa	7240af	9545af		
1700-1800	Slovakia, AWR	9465af	9475af		
1700-1800	Swaziland, Trans World R	9500af			
1700-1730	Switzerland, Swiss R Intl	5850va	9885va	13635va	
1700-1800	United Kingdom,BBC London	3955eu	6180eu	6190af	6195va
		7135as	7160me	7205as	9410va
		9515na	9740va	11750as	11780eu
		12095va	15070va	15400af	15420af
		17830af	17840va		
1700-1745	United Kingdom,BBC London	3915as	9630af	11860af	
1700-1800	USA, KTBN Salt Lk City UT	15590am			
1700-1800	USA, KWHR Naalehu HI	6120as			
1700-1800	USA, Monitor Radio Intl	9355af	21640af		
1700-1800	USA, VOA Washington DC	6040va	6110as	7215as	9760va
		11920af	11945va	12005va	12040af
		13710af	15205va	15255as	15410af
		15445af	17895af	19379me	
1700-1800 mtwhf	USA, VOA Washington DC	5990va	6045va	9525as	9670as
		9770as			
1700-1800	USA, WEWN Birmingham AL	11580na	13615na	15340sa	
1700-1800 irreg	USA, WGTG McCaysville GA	9475am			
1700-1800	USA, WHRI Noblesville IN	13760am	15105ca		
1700-1800	USA, WJCR Upton KY	7490na	13595na		
1700-1800 smtwhf	USA, WMLK Bethel PA	9465eu			
1700-1800	USA, WRMI/R Miami Intl	9955am			
1700-1800	USA, WRNO New Orleans LA	15420am			
1700-1800 a	USA, WVHA Greenbush ME	15745eu			
1700-1800	USA, WWCR Nashville TN	12160am	13845am	15685am	
1700-1800	USA, WYFR Okeechobee FL	15566eu	17760eu		
1700-1800	Zambia, Christian Voice	4965af			
1715-1730	Albania, R Tirana Intl	7155eu	9740eu		
1715-1730	Vatican State, Vatican R	4005eu	6245eu	7250eu	11810eu
1730-1800	Romania, R Romania Intl	9750af	11740af	11940af	
1730-1800	Russia, Voice of	9585eu			
1730-1745	Sweden, Radio	6065eu			
1730-1800	Vatican State, Vatican R	9660af	11625af	11635af	
1745-1800 mtwhf	Canada, RCI Montreal	5995eu	9555eu	11915eu	11935eu
		15325eu	17820eu		
1745-1800	India, All India Radio	7410eu	9650eu	9950af	11620af
		11935af	13750as	15075me	
1745-1800	Swaziland, Trans World R	3200af			

1800 UTC

1800-1900	Algeria, R Algiers Intl	11715me	15160eu		
1800-1900	Australia, Radio	6060pa	6080pa	6090pa	9580pa
		9860pa	11660as	11695pa	11880pa
1800-1900	Brazil, Radiobras	15265eu			
1800-1900	Canada, CFCX Montreal	6005do			
1800-1900	Canada, CFRX Toronto	6070do			
1800-1900	Canada, CFVP Calgary	6030do			
1800-1900	Canada, CHNX Halifax	6130do			
1800-1900	Canada, CKZN St John's	6160do			
1800-1900	Canada, CKZU Vancouver	6160do			
1800-1900	Costa Rica,RF Peace Intl	6200am	9400am	15050am	
1800-1827	Czech Rep, Radio Prague	5835eu	9430eu		
1800-1900	Ecuador, HCJB Quito	15540eu			
1800-1830	Egypt, Radio Cairo	15255af			
1800-1900	Eqt Guinea, Radio Africa	15190af			
1800-1845	India, All India Radio	7410eu	9650eu	9950af	11620af
		11935me	13750as	15075as	
1800-1900 vl	Italy, IRRS Milan	3985va			
1800-1900	Kuwait, Radio	11990na			
1800-1900	Lebanon, Voice of Hope	6280va			
1800-1825	Netherlands, Radio	6020af	9605af	11655af	17605af
1800-1849 mtwhf	New Zealand, R NZ Intl	5960pa			
1800-1900 vl	Palau, KHBN/Voice of Hope	9965as			
1800-1855	Poland, Polish R Warsaw	6095eu	7270eu	7285eu	
1800-1900	Russia, Voice of	7180eu	7205va	7210va	9490va
		9830va	9890eu	13670af	
1800-1900	Sudan, Radio Omdurman	9000af	9025af		
1800-1830	Swaziland, Trans World R	9500af			
1800-1900	United Kingdom,BBC London	3255af	3955eu	6180eu	6190af
		6195eu	9410va	9740as	11860af
		11955au	12095va	15070va	15400va
		17830af	17840am		
1800-1830	United Kingdom,BBC London	7160me	7205as	11750as	
1800-1900	USA, KJES Mesquite NM	15385na			
1800-1900	USA, KTBN Salt Lk City UT	15590am			
1800-1900	USA, KWHR Naalehu HI	13625au			
1800-1900	USA, Monitor Radio Intl	9355va	9370eu	21640af	
1800-1900	USA, VOA Washington DC	6040va	9760va	11920af	12040af
		13710af	15410af	15580af	19379va
1800-1900 mtwhf	USA, VOA Washington DC	4875af			
1800-1900	USA, WEWN Birmingham AL	11580eu	13615na	13695na	
1800-1900 irreg	USA, WGTG McCaysville GA	9475am			
1800-1900	USA, WHRI Noblesville IN	9495am	13760eu		
1800-1900	USA, WJCR Upton KY	7490na	13595na		
1800-1900	USA, WMLK Bethel PA	9465eu			
1800-1900	USA, WRMI/R Miami Intl	9955am			
1800-1900	USA, WRNO New Orleans LA	15420am			
1800-1900 th	USA, WVHA Greenbush ME	15745af			
1800-1830 s	USA, WVHA Greenbush ME	9930eu			
1800-1900 mwf	USA, WVHA Greenbush ME	9930eu			
1800-1900	USA, WWCR Nashville TN	12160am	13845am	15685am	
1800-1900	USA, WYFR Okeechobee FL	15566eu	17760ca		
1800-1830	Vietnam, Voice of	7360na	9840eu	12030as	
1800-1900	Yemen, Yemeni Rep Radio	9780as			
1802-1500 s	Morocco, RTVM Marocaine	17815af			
1815-1900	Bangladesh, Radio	7185eu	9648as	15520as	
1830-1900	Netherlands, Radio	4945af	6015af	6020af	9605af
		9860af	9895af	11655af	15315af
		17605af			
1830-1857	S Africa, Trans World R	9525af			
1830-1855 irreg	Somalia, Radio Mogadishu	6710af			
1830-1900	South Korea, R Korea Intl	6480eu			
1830-1900	Sweden, Radio	6065eu	7240af	9655me	
1830-1900	United Kingdom,BBC London	6005af	9630af		
1833-1900	Cote D' Ivoire, RDTV	11920do			
1840-1850	Greece, Voice of	11645af	15150af		
1845-1900 irreg s	Mali, RDTV Malienne	4783do	4835do	5995do	
1850-1900	New Zealand, R NZ Intl	11735pa			

Radio Austria QSL sent to MT by Donald M. Choleva.

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- **Top quality speaker**
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Audio selectivity: Peak/notch 30 dB or greater, 0.3-6 kHz
Squelch hold: 0-10 seconds
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FREQUENCIES

1900-2000 mtwhf	Argentina, RAE	15335eu			
1900-2000	Australia, Radio	6060pa	6080pa	6150as	7240pa
		7260as	9560as	9580pa	9860pa
		11660pa	11695pa	11880pa	
1900-1930	Azerbaijan, Voice of	4957eu			
1900-1945	Bangladesh, Radio	7185eu	9648as	15520as	
1900-1930	Belgium, R Vlaanderen Int	5910eu	9925af		
1900-1920	Brazil, Radiobras	15265eu			
1900-2000	Canada, CFCX Montreal	6005do			
1900-2000	Canada, CFRX Toronto	6070do			
1900-2000	Canada, CFVP Calgary	6030do			
1900-2000	Canada, CHNX Halifax	6130do			
1900-2000	Canada, CKZN St John's	6160do			
1900-2000	Canada, CKZU Vancouver	6160do			
1900-2000	China, China Radio Intl	6955me	9440af		
1900-2000	Costa Rica, AWR Alajuela	13750am	15460am		
1900-2000	Costa Rica,RF Peace Intl	6200am	9400am	15050am	
1900-1930	Cote D' Ivoire, RDTV	11920do			
1900-2000	Ecuador, HCJB Quito	11960eu			
1900-2000	Eqt Guinea, Radio Africa	15190af			
1900-1950	Germany, Deutsche Welle	9670af	9765af	11785af	11810af
		11865af	13790as	15145af	15425af
1900-1910	Greece, Voice of	9375eu			
1900-2000	Guatemala, AWR	5980am			
1900-1945	India, All India Radio	7410eu	9650eu	9950me	11620eu
		11935af	13750as	15075me	
1900-2000 vl	Italy, IRRS Milan	3985va			
1900-2000	Japan, NHK/Radio	6150as	7140pa	9535na	9580as
		11850pa			
1900-2000 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
1900-2000	Kuwait, Radio	11990eu			
1900-2000	Lebanon, Wings of Hope	9960va			
1900-2000	Liberia, Radio ELBC	7275do			
1900-2000	Liberia, Radio ELWA	4760do			
1900-2000	Netherlands, Radio	4945af	6015af	6020af	9605af
		9860af	9895af	11655af	15315af
		17605af			
1900-2000	New Zealand, R NZ Intl	11735pa			
1900-2000	Nigeria, Voice of	7255af			
1900-1930 s	Norway, Radio Norway Intl	5960eu	6195eu	7485af	9590af
1900-2000	Romania, R Romania Intl	6105eu	7195eu	9510eu	
1900-2000	Russia, Voice of	5940eu	5995eu	7105eu	7180eu
		7205eu	7210va	7255va	7325va
		9470va	9490va	9585eu	9830eu
		9890eu	11895va	13670af	
1900-2000	South Korea, R Korea Intl	5975eu	7275as		
1900-2000	Swaziland, Trans World R	3200af			
1900-2000	Thailand, Radio	9655eu	11805eu		
1900-2000	United Kingdom,BBC London	3255af	3955eu	5975va	6005af
		6180eu	6190af	6195va	7325af
		9410va	9630af	9740as	11780eu
		12095eu	15070eu	15400af	17830af
1900-1915	United Kingdom,BBC London	15105af			
1900-2000	USA, KTBN Salt Lk City UT	15590am			
1900-2000	USA, KWHR Naalehu HI	13625au			
1900-2000	USA, Monitor Radio Intl	9355eu	9370eu	17510af	
1900-2000	USA, VOA Washington DC	7415af	9525va	9760va	11870va
		11920af	12040af	13710af	15180va
		15410af	15580af	19379va	
1900-2000	USA, WEWN Birmingham AL	11580na	13615na	13695af	
1900-2000 irreg	USA, WGTG McCaysville GA	9475am			
1900-2000	USA, WHRI Noblesville IN	9495am	13760eu		
1900-2000	USA, WJCR Upton KY	7490na	13595na		
1900-2000	USA, WMLK Bethel PA	9465eu			
1900-2000	USA, WRMI/R Miami Intl	9955am			
1900-2000	USA, WRNO New Orleans LA	15420am			
1900-2000 th	USA, WVHA Greenbush ME	15745af			
1900-2000 s	USA, WVHA Greenbush ME	15745af			
1900-2000 mwf	USA, WVHA Greenbush ME	9930eu			
1900-2000	USA, WWCR Nashville TN	12160am	13845am	15685am	
1900-2000	USA, WYFR Okeechobee FL	17760eu			
1900-1930	Vietnam, Voice of	7360na	9840eu	12030as	
1900-2000	Zambia, Christian Voice	4965af			
1900-2000	Zimbabwe, ZBC/Radio 4	3306do	3396do	4828do	
1930-2000	Albania, R Tirana Intl	7270eu	9740eu		
1930-2000	Austria, R Austria Intl	5945eu	6155eu	9655me	13730af
1930-2000 irreg t	Belarus, Radiosta Relarus	5940eu	7105eu	7205eu	7210eu
1930-2000	Iran, VOIRI Tehran	7260af	9022eu		
1930-2000	Mongolia, R Ulan Bator	4080as	7530as		
1930-2000	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu	
1930-2000	Turkey, Voice of	9445eu			
1930-2000	Yugoslavia, Radio	6100eu	9720eu		
1935-1955	Italy, RAI Rome	6030eu	7235eu		
1945-2000	Togo, Radio	5047do			
2000-2100	Algeria, R Algiers Intl	11715me	15160eu		
2000-2100 as	Angola, Radio Nacional	9534do			
2000-2100	Australia, Radio	6060pa	6080pa	6150pa	7260as
		9580pa	9860pa	11660pa	11695pa
		11855as	11880pa		
2000-2100	Bulgaria, Radio	7335eu	9700eu		
2000-2100	Canada, CFCX Montreal	6005do			
2000-2100	Canada, CFRX Toronto	6070do			
2000-2100	Canada, CFVP Calgary	6030do			
2000-2100	Canada, CHNX Halifax	6130do			
2000-2100	Canada, CKZN St John's	6160do			
2000-2100	Canada, CKZU Vancouver	6160do			
2000-2100	China, China Radio Intl	6950eu	9440af	9920eu	11715af
		15110af			
2000-2100	Costa Rica,RF Peace Intl	6200am	9400am	15050am	
2000-2100	Ecuador, HCJB Quito	11960eu			
2000-2100	Eqt Guinea, Radio Africa	15190af			
2000-2050	Germany, Deutsche Welle	5960eu	7285eu		
2000-2030	Ghana, Ghana Broadc Corp	3366do	4915do		
2000-2100	Guatemala, AWR	5980am			
2000-2030	Hungary, Radio Budapest	3975eu	5970eu	7250eu	9835eu
2000-2100	Indonesia, Voice of	9525as			
2000-2030	Iran, VOIRI Tehran	7260af	9022eu		
2000-2030	Israel, Kol Israel	7415na	9435eu	9845ca	13750sa
2000-2100 vl	Italy, IRRS Milan	3985va			
2000-2100 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
2000-2100	Kuwait, Radio	11990eu			
2000-2100	Lebanon, Wings of Hope	9960va			
2000-2100	Liberia, Radio ELBC	7275do			
2000-2100	Liberia, Radio ELWA	4760do			
2000-2025	Netherlands, Radio	4945af	6020af	9605af	9860af
		9895af	11655af	15315af	17605af
2000-2100	New Zealand, R NZ Intl	11735pa			
2000-2005	Nigeria, FRCN/Radio	3326do	4990do		
2000-2100	Nigeria, Voice of	7255af			
2000-2050	North Korea, R Pyongyang	6575eu	9345as	9640af	9975as
2000-2100	Russia, Voice of	5940eu	5995eu	6055eu	7180eu
		7205eu	9470va	9490va	9585af
		9890eu	13670af		
2000-2030	South Korea, R Korea Intl	3970eu			
2000-2015	Swaziland, Trans World R	3200af			
2000-2030	Switzerland, Swiss R Intl	6165eu	9770af	9885af	11640af
2000-2030	Turkey, Voice of	9445eu			
2000-2015	Uganda, Radio	4976do			
2000-2100	United Kingdom,BBC London	3255af	3955eu	6005af	6180eu
		6195va	9630af	9740as	11750sa
		11780eu	11835va	11955va	15400af
		17830af			
2000-2100	USA, KAIJ Dallas TX	13815am			
2000-2100	USA, KTBN Salt Lk City UT	15590am			
2000-2100	USA, KWHR Naalehu HI	11980as			
2000-2100	USA, Monitor Radio Intl	7510eu	9355eu		
2000-2100	USA, VOA Washington DC	7415af	9760va	9770va	11855af
		13710af	15205va	15410af	15580af
		17725af	17755af	19379va	
2000-2100	USA, WEWN Birmingham AL	7425na	13615na	13615na	13695na
2000-2100 irreg	USA, WGTG McCaysville GA	9475am			
2000-2100	USA, WHRI Noblesville IN	9495am	13760eu		
2000-2100	USA, WJCR Upton KY	7490na	13595na		
2000-2100	USA, WMLK Bethel PA	9465eu			
2000-2100	USA, WRMI/R Miami Intl	9955am			
2000-2100	USA, WRNO New Orleans LA	15420am			
2000-2100 th	USA, WVHA Greenbush ME	15745af			
2000-2100 s	USA, WVHA Greenbush ME	15745af			
2000-2100 mwfa	USA, WVHA Greenbush ME	9930eu			
2000-2100	USA, WWCR Nashville TN	12160am	13845am	15685am	
2000-2100	USA, WYFR Okeechobee FL	7355eu	15566eu	21525af	
2000-2030	Vatican State, Vatican R	7365af	9645af		
2000-2030	Zambia, Christian Voice	4965af			
2000-2100	Zimbabwe, ZBC/Radio 3	3306do	3396do	4828do	
2005-2100	Syria, Radio Damascus	15095na			
2015-2045 s	Swaziland, Trans World R	3200af			
2025-2045	Italy, RAI Rome	5990af	7110af	9710af	
2030-2100	Egypt, Radio Cairo	15375af			
2030-2100	Lithuania, Radio Vilnius	9710eu			
2030-2100	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
2030-2045	Thailand, Radio	9655eu	11805eu		
2030-2100	Vietnam, Voice of	7360as	9840eu	12020eu	
2045-2100	India, All India Radio	7410eu	9910au	9950eu	11620eu
		11715pa	15225pa		
2050-2100	Vatican State, Vatican R	4055eu	5882eu	7250eu	

Frequencies

2100-2200	Australia, Radio	6060pa	6080pa	7240pa	7260as
		9580pa	9660pa	11660pa	11855as
		11880pa	11955pa		
2100-2110	Bahrain, Radio	6010do			
2100-2200 vl	Canada, CBC N Quebec Svc	9625do			
2100-2200	Canada, CFCX Montreal	6005do			
2100-2200	Canada, CFRX Toronto	6070do			
2100-2200	Canada, CFVP Calgary	6030do			
2100-2200	Canada, CHNX Halifax	6130do			
2100-2200	Canada, CKZN St John's	6160do			
2100-2200	Canada, CKZU Vancouver	6160do			
2100-2200	Canada, RCI Montreal	5925eu	5995eu	7260eu	9755eu
		9805eu	11945eu	13650eu	13690eu
		15150eu	17820eu		
2100-2200	China, China Radio Intl	5220eu	6950eu	9920eu	
2100-2130	China, China Radio Intl	11715af	15110af		
2100-2200	Costa Rica,RF Peace Intl	6200am	9400am	15050am	
2100-2200	Cuba, Radio Havana Cuba	11705eu			
2100-2127	Czech Rep, Radio Prague	5930na	7345na		
2100-2200	Ecuador, HCJB Quito	11960eu			
2100-2200	Egypt, Radio Cairo	15375af			
2100-2200	Eqt Guinea, Radio Africa	15190af			
2100-2150	Germany, Deutsche Welle	6185as	7225af	9670as	9690af
		9765as	11785as	11810af	11905af
		15270af			
2100-2200	Guatemala, AWR	5980am			
2100-2200	India, All India Radio	7410eu	9910eu	9950eu	11620au
		11715au	15225au		
2100-2200 vl	Italy, IRRS Milan	3980va			
2100-2200	Japan, NHK/Radio	6035as	7125as	7140as	11850pa
		11865eu			
2100-2115	Japan, NHK/Radio	7190as	7280as		
2100-2105 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
2100-2200	Lebanon, Voice of Hope	6280va			
2100-2200	Lebanon, Wings of Hope	9960va			
2100-2200 mtwhfa	Liberia, Radio ELWA	4760do			
2100-2200	New Zealand, R NZ Intl	11735pa			
2100-2200	Nigeria, FRCN/Radio	3326do	4990do		
2100-2125	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
2100-2130 mtwhf	Portugal, R Portugal Intl	6130eu	9780eu	9815eu	15515af
2100-2200	Romania, R Romania Intl	5955eu	5990eu	7105eu	7195eu
2100-2200	Russia, Voice of	5940eu	5995eu	6055eu	7180eu
		7205eu	9890eu		
2100-2115	Sierra Leone, SLBS	3316do			
2100-2200	Slovakia, AWR	9465af			
2100-2200	South Korea, R Korea Intl	6480eu	15575eu		
2100-2200	Spain, R Exterior Espana	6125eu			
2100-2200	Turkey, Voice of	9445eu			
2100-2110	Uganda, Radio	4976do			
2100-2200	United Kingdom,BBC London	3255af	3915as	3955eu	5975am
		6005af	6120as	6180eu	6190as
		6195va	7325va	9410va	9740as
		11750sa	11780eu	11835va	11955va
2100-2130	United Kingdom,BBC London	9630af			
2100-2200	USA, KAIJ Dallas TX	13815am			
2100-2200	USA, KTBN Salt Lk City UT	15590am			
2100-2200 s	USA, KVOH Los Angeles CA	17775am			
2100-2200	USA, Monitor Radio Intl	7510na	9355na		
2100-2200	USA, VOA Washington DC	6070va	7415af	9595va	9760va
		11870va	13710af	15185va	15205va
		15375sa	15410af	15580af	17725af
		18275va	19379va		
2100-2200	USA, WEWN Birmingham AL	5825am	7425na	13615na	15375sa
2100-2200	USA, WHRI Noblesville IN	9495am	13760am		
2100-2200	USA, WJCR Upton KY	7490na	13595na		
2100-2200	USA, WMLK Bethel PA	9465eu			
2100-2200	USA, WRMI/R Miami Intl	9955am			
2100-2200	USA, WRNO New Orleans LA	15420am			
2100-2200 th	USA, WVHA Greenbush ME	15745af			
2100-2200 s	USA, WVHA Greenbush ME	15745af			
2100-2200 mwfa	USA, WVHA Greenbush ME	5850eu			
2100-2200	USA, WWCR Nashville TN	9475am	12160am	13845am	
2100-2200	USA, WYFR Okeechobee FL	7355eu	11580af	15566af	
2100-2200	Zimbabwe, ZBC/Radio 3	3306do	3396do	4828do	
2105-2200	Syria, Radio Damascus	12085na	15095na		
2115-2200	Egypt, Radio Cairo	9900eu			
2115-2130	United Kingdom,BBC London	15390ca	17715ca		
2120-2130 mh	Estonia, Estonian Radio	5925eu			
2130-2200	Armenia, Voice of	7480na	9965na		
2130-2200	Australia, Radio	9610as	9645as	15365pa	17860pa
2130-2200	Iran, VOIRI Tehran	6175au			
2130-2200 as	Latvia, Radio	5935eu			
2130-2200	Liberia, Radio ELWA	4760do			
2130-2200 mwh	Moldova, R Dniester Intl	6205na			
2130-2200	Russia, Voice of	7170eu	7400eu		
2130-2200	Sweden, Radio	6065eu	7230af		
2145-2200 s	Greece, Voice of	9425au			
2145-2200	United Kingdom,BBC London	5990as	7160as	9580as	

2200-2300	Australia, Radio	9580pa	9610as	9645as	9660pa
		11660pa	11695pa	11855as	11880pa
		11955pa	13755as	15365pa	17795pa
		17860pa			
2200-2230	Belgium, R Vlaanderen Int	5910eu	7250eu		
2200-2300	Bulgaria, Radio	7105eu	9700eu		
2200-2300	Canada, CBC N Quebec Svc	9625do			
2200-2300	Canada, CFCX Montreal	6005do			
2200-2300	Canada, CFRX Toronto	6070do			
2200-2300	Canada, CFVP Calgary	6030do			
2200-2300	Canada, CHNX Halifax	6130do			
2200-2300	Canada, CKZN St John's	6160do			
2200-2300	Canada, CKZU Vancouver	6160do			
2200-2230	Canada, RCI Montreal	5960am	5995eu	7260eu	9755am
		9805eu	11705as	11945eu	13690eu
2200-2230	China, China Radio Intl	3985eu			
2200-2300	China, China Radio Intl	7170eu			
2200-2300	Costa Rica,RF Peace Intl	7385am	9400am	15050am	
2200-2300	Cuba, Radio Havana Cuba	6180na	11950na		
2200-2245	Egypt, Radio Cairo	9900eu			
2200-2300	Eqt Guinea, Radio Africa	15190af			
2200-2215	Ghana, Ghana Broadc Corp	4915do			
2200-2300	Guatemala, AWR	5980am			
2200-2230	Hungary, Radio Budapest	3975eu	5935eu	7250eu	9835eu
2200-2230	India, All India Radio	7410eu	9910eu	9950eu	11620au
		11715au	15225au		
2200-2230	Iran, VOIRI Tehran	6175au			
2200-2300 vl	Italy, IRRS Milan	3980va			
2200-2225	Italy, RAI Rome	5990as	9710as	11815as	
2200-2300	Lebanon, Voice of Hope	6280va			
2200-2300	Lebanon, Wings of Hope	9960va			
2200-2300	Malaysia, Radio	7295do			
2200-2225 mtwhf	Moldova, R Moldova Intl	7500eu			
2200-2205	New Zealand, R NZ Intl	11735pa			
2200-2215	Nigeria, FRCN/Radio	3326do	4990do		
2200-2230 s	Norway, Radio Norway Intl	6170as	6200na		
2200-2300	Russia, Voice of	5940eu	6055eu	7105eu	7140eu
		7180eu	7205eu	7360eu	7400eu
		9890eu			
2200-2215	Sierra Leone, SLBS	3316do			
2200-2300	Slovakia, AWR	9440eu			
2200-2230	South Korea, R Korea Intl	5965eu			
2200-2300	Spain, R Exterior Espana	11775af			
2200-2205	Syria, Radio Damascus	12085na	15095na		
2200-2300	Taiwan, VO Free China	5810eu	9850eu		
2200-2300	UAE, Radio Abu Dhabi	11855na	11970na	13605na	
2200-2300	Ukraine, R Ukraine Intl	4795eu	4820eu	5905eu	5940eu
		6010eu	6020eu	6055eu	6080eu
		6130eu	7135eu	7205eu	7240eu
		9620eu			
2200-2300	United Kingdom,BBC London	3955eu	5975am	6175na	6195va
		7110as	9410va	9590na	9915sa
		11750sa	11835va	11955va	11965pa
2200-2230	United Kingdom,BBC London	11780eu			
2200-2300	USA, KAIJ Dallas TX	13815am			
2200-2300	USA, KTBN Salt Lk City UT	15590am			
2200-2300	USA, Monitor Radio Intl	7510eu	9430as	13770sa	
2200-2300	USA, VOA Washington DC	7215va	9770va	9890af	11760va
		15185va	15290va	15305va	17735va
		17820va	18275va		
2200-2230 mtwhf	USA, VOA Washington DC	7415af	12080af	13710af	
2200-2300	USA, WEWN Birmingham AL	5825am	7425na	13615na	15375sa
2200-2300	USA, WHRI Noblesville IN	9495am			
2200-2300	USA, WJCR Upton KY	7490na	13595na		
2200-2300	USA, WRMI/R Miami Intl	9955am			
2200-2300	USA, WRNO New Orleans LA	15420am			
2200-2300 w	USA, WVHA Greenbush ME	9852eu			
2200-2300 s	USA, WVHA Greenbush ME	15745af			
2200-2300	USA, WWCR Nashville TN	9475am	12160am	13845am	
2200-2245	USA, WYFR Okeechobee FL	9985eu	11580eu	15566af	
2200-2230	Yugoslavia, Radio	6100eu	6185eu		
2206-2300	New Zealand, R NZ Intl	15115pa			
2230-2300	Austria, R Austria Intl	5945eu	6155eu	9870ca	
2230-2257	Czech Rep, Radio Prague	5930na	7345na		
2230-2300	Lithuania, Radio Vilnius	9710eu			
2230-2300	Russia, Voice of	7105eu			
2230-2300	Sweden, Radio	6065eu			
2240-2250	Greece, Voice of	9425au			
2245-2300	Ghana, Ghana Broadc Corp	3366do	4915do		
2245-2300	India, All India Radio	9705as	9950as	11620as	13750as
		15145as			
2245-2300	Vatican State, Vatican R	6065as	9600au	11830au	

Frequencies

2300-0000	Australia, Radio	9610as	9660pa	11645as	11660pa
		11695as	11855as	13755as	15365pa
		17795pa	17860pa		
2300-0000	Canada, CBC N Quebec Svc	9625do			
2300-0000	Canada, CFCX Montreal	6005do			
2300-0000	Canada, CFRX Toronto	6070do			
2300-0000	Canada, CFVP Calgary	6030do			
2300-0000	Canada, CHNX Halifax	6130do			
2300-0000	Canada, CKZN St John's	6160do			
2300-0000	Canada, CKZU Vancouver	6160do			
2300-0000	Canada, RCI Montreal	5965am	6040am	9535am	9755am
		11940am			
2300-0000	Costa Rica, AWR Alajuela	5030am	6150am	7375am	9725am
		13750am	15460am		
2300-0000	Costa Rica,RF Peace Intl	7385am	9400am	15050am	
2300-2305	Croatia, Croatian Radio	5895eu	7370eu	11635eu	13830eu
2300-0000	Egypt, Radio Cairo	9900na			
2300-2350	Germany, Deutsche Welle	6000as	6160as	7250as	
2300-0000	Guam, AWR/KSDA	11980as			
2300-0000	Guatemala, AWR	5980am			
2300-0000	India, All India Radio	9705as	9950as	13700as	15145as
2300-0000	Japan, NHK/Radio	6055eu	6155eu	7125as	7140as
		11850pa			
2300-0000	Lebanon, Voice of Hope	6280va			
2300-0000	Lebanon, Wings of Hope	9960va			
2300-0000	Malaysia, Radio	7295do			
2300-2325 mtwhf	Moldova, R Moldova Intl	7500eu			
2300-0000	New Zealand, R NZ Intl	15115pa			
2300-2315	Nigeria, FRCN/Radio	3326do	4990do		
2300-2350	North Korea, R Pyongyang	11700na	13650na		
2300-0000	Russia, Voice of	5940na	7105na	7125na	7170na
		7180na	7205na	7330na	9550na
2300-2317	Sierra Leone, SLBS	3316do			
2300-0000	Turkey, Voice of	7280eu	9560as	9655na	
2300-0000	UAE, Radio Abu Dhabi	11885na	11970na	13605na	
2300-0000	United Kingdom,BBC London	5975am	6175na	6195va	7110as
		7180as	7250as	7325va	9580as
		9590na	11750sa	11945as	11955va
2300-2330	United Kingdom,BBC London	9915sa			
2300-2315	United Kingdom,BBC London	9410af	11835va		
2300-0000	USA, KAIJ Dallas TX	13815am			
2300-0000	USA, KTBN Salt Lk City UT	15590am			
2300-0000	USA, KWHR Naalehu HI	17510as			
2300-0000	USA, Monitor Radio Intl	7510eu	9430as	13625pa	13770sa
2300-0000	USA, VOA Washington DC	7215va	9705va	9770va	9890af
		11760va	15185va	15290va	15305va
		17735va	17820va	18275va	
2300-0000	USA, WEWN Birmingham AL	5825eu	7425na	13615na	
2300-0000	USA, WHRI Noblesville IN	5745am			
2300-0000	USA, WJCR Upton KY	7490na	13595na		
2300-0000	USA, WRNO New Orleans LA	7355am			
2300-0000 w	USA, WVHA Greenbush ME	9852eu			
2300-0000	USA, WWCR Nashville TN	5065am	9475am	13845am	
2330-0000	Australia, Radio	9645as	9850as	13605as	15240pa
2330-0000	Netherlands, Radio	6020na	6165na		
2330-0000	Palau, KHBN/Voice of Hope	15140as			
2335-2345	Greece, Voice of	7450sa	9935sa	11640sa	

Selected Programs

Sundays

2300 Canada, RCI Montreal: The World This Weekend. Half-hour of up-to-the-minute news and business reports, a feature documentary, arts and entertainment stories with Michael Crabb, sports with Dzintars Cers, and a news quiz.
2300 WHRI (Angel 1): Church of the Risen Christ. C. Larry Hill.
2300 WHRI (Angel 2): Music. See S 0200.
2309 Germany, Deutsche Welle: Asia-Pacific Report. Correspondent reports, interviews and background news from the Asia-Pacific region.
2324 Germany, Deutsche Welle: European Journal. A review of major events in Europe and Germany through interviews, analyses and background reports.
2330 Canada, RCI Montreal: Now the Details. A program about the media.
2330 WHRI (Angel 1&2): Music. See S 0200.

Mondays

2300 Canada, RCI Montreal: The World at Six. CBC radio's major newscast of the day, presenting the important stories in depth and in context.
2309 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
2324 Germany, Deutsche Welle: European Journal. See S 2324.
2330 Canada, RCI Montreal: As It Happens. A daily phone-in show introducing listeners to the newsmakers of the day and people whose stories might otherwise not be told.
2330 KWHR (Hawaii): Moments in Bible Prophecy. Raymond Shockley teaches from the Book of Revelations.
2330 WHRI (Angel 2): Music. See S 0200.
2345 KWHR (Hawaii): Reach Out. See M 1315.

Tuesdays

2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 KWHR (Hawaii): Music. See S 0200.
2309 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
2315 UK, BBC London (am): What's News? See T 1630.
2324 Germany, Deutsche Welle: European Journal. See S 2324.
2330 Canada, RCI Montreal: As It Happens. See M 2330.
2330 KWHR (Hawaii): Moments in Bible Prophecy. See M 2330.
2330 WHRI (Angel 2): Music. See S 0200.
2345 KWHR (Hawaii): Reach Out. See M 1315.

Wednesdays

2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 KWHR (Hawaii): Music. See S 0200.
2309 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
2324 Germany, Deutsche Welle: European Journal. See S 2324.
2330 Canada, RCI Montreal: As It Happens. See M 2330.
2330 KWHR (Hawaii): Moments in Bible Prophecy. See M 2330.
2330 WHRI (Angel 2): Music. See S 0200.
2345 KWHR (Hawaii): Reach Out. See M 1315.

Thursdays

2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 KWHR (Hawaii): Music. See S 0200.
2309 Germany, Deutsche Welle: Asia-Pacific Report. See S 2309.
2315 UK, BBC London (am): Red Dwarf. See T 0115.
2324 Germany, Deutsche Welle: European Journal. See S 2324.
2330 Canada, RCI Montreal: As It Happens. See M 2330.
2330 KWHR (Hawaii): Moments in Bible Prophecy. See M 2330.
2330 UK, BBC London (am): Surviving the 20th Century (1st,8th). See F 0115.
2330 WHRI (Angel 2): Music. See S 0200.
2345 KWHR (Hawaii): Reach Out. See M 1315.

Fridays

2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 KWHR (Hawaii): Music. See S 0200.
2309 Germany, Deutsche Welle: Commentary. See S 0208.
2312 Germany, Deutsche Welle: The Week in Germany. See S 1609.
2315 UK, BBC London (af/eu): Surviving the 20th Century (2nd,9th). See F 0115.
2323 Germany, Deutsche Welle: Economic Notebook. See T 0333.
2330 Canada, RCI Montreal: As It Happens. See M 2330.
2330 KWHR (Hawaii): Moments in Bible Prophecy. See M 2330.
2330 WHRI (Angel 2): Cumbre DX. See S 0430.
2333 Germany, Deutsche Welle: The Jazz Corner. A musical change-of-pace from the world of jazz.
2345 KWHR (Hawaii): Reach Out. See M 1315.

Saturdays

2300 Canada, RCI Montreal: The World This Weekend. See S 2300.
2300 WHRI (Angel 2): The Call to Worship. Services from Holland, Michigan.
2309 Germany, Deutsche Welle: Commentary. See S 0208.
2312 Germany, Deutsche Welle: Sports Report. See S 0212.
2323 Germany, Deutsche Welle: Mailbag Asia. See S 0216.
2330 WHRI (Angel 1): Cumbre DX. See S 0430.
2330 WHRI (Angel 2): Prophetic Voice Broadcast. See S 0430.
2354 Radio Netherlands: Documentary. Collectors (24th). See W 1154.
2354 Radio Netherlands: Documentary. Crossing the River by Feeling the Stones (17th). China's transformation from socialism to capitalism is examined.
2354 Radio Netherlands: Documentary. Greenland II: Reviving the Inuit Culture (10th). See W 1154.
2354 Radio Netherlands: Documentary. Hemp (Mar 2). See W 1554.

Hauser's Highlights
China: V. Of the Strait
in Standard Chinese, Amoy

First Program:

2155-0200	6115, 5050, 4940
0855-0959	7280, 6765, 6115, 4940
0959-1059	7280, 6765, 6115, 4940, 4130, 2755
1059-1230	7280, 6166, 5508, 4940, 4130, 2755
1230-1700	6115, 5508, 5050, 4940, 4130, 2755

Second Program:

0255-0700	9505, 6000
Tue 0600	
0955-1600	6000, 4900

(BBC Monitoring)

New England Scanning Club

New England has been noted for some strong indivdual clubs and monitors, but there's never been a club newsletter specifically for New England. That's all changed. We just received a copy of the first newsletter from the New England Scanner Group.

This is not a run-of-the-mill club publication. While it's certainly not slick, it is jam-packed with scanninng and public safety news, and it's pure, 100% New England. Membership is $29.95 a year and includes the club newsletter. To join, or for more information, contact the club at P.O. Box 1024, Derry, NH 03038.

DecalcoMania: Paul Richards, P.O. Box 126, Lincroft, NJ 07738, (908)591-2522. Worldwide AM, FM and collecting radio related items. *DecalcoMania*. $10 US, $11 Can/Mex, $16 Eur, $17.50 Asia/Pac.

DX Audio Service (National Radio Club): Ken Chatterton, P.O. Box 164, Mannsville, NY 13661-0164, (315) 387-3583; http://wcoil.com/~gnbc. Worldwide. North American Broadcasters. *DX-Audio Service* (90-min.tape). Sample $3.

Fire Net: Tom Kravitz, Box 1307, Culver City, CA 90232, 310-838-1436, internet mpage@netcom.com. All of California; fire, EMS, tied in with nationwide notification net.

Houston Area Scanners & Monitoring Club: Glen Dingley, 909 Michael, Alvin, TX 77511, (713) 388-1941. 75 mile radius of Houston, TX; scanning & SW. Paging network. *HASMC Newsletter*. Meets Jan & June.

Monitoring Clubs Outside North America

Associazione Italiana Radioascioto (AIR): C.P. 873, 34100 Trieste, Italy. Broadcasting all bands, utilities, pirates. *Radiorama* (Italian) 70,000 lira. April 25 annual mtg.

Australian Radio DX Club Inc: P.O. Box 227, Box Hill, Victoria 3128, Australia. SW, MW, Utilities. *Australian DX News*. Sample 2 IRCs or $2US cash.

British DX Club: Colin Wright, 126 Bargery Road, Catford, London, SE6 2LR, United Kingdom. UK and international. SW, MW, AM, FM DXing, pirate and clandestine. *Communication*. L10 UK, L12 Eur, L16 ww. Sample 3 IRCs or $2 US cash. Meets monthly in Twickenham (London).

Club d'ondes courtes du Quebec: Denis Pronovost, C.P. 61, Anjou, Quebec, Canada H1K 4G5. E-mail: papineau@msn.com. Annual $40 Canadian. *L'Onde*, monthly (French). Sample US$2.

DX Australia: P.O. Box 422, Moonee Ponds, Victoria 3039, Australia. MW, SW. *DXers Calling*.

DX Club of India: Navin Patel, 1-Dutt Niwas, 309 - M.G. Road, Mulund, Bombay-400 080, India. India; MW/SW/Ham. DX World (quarterly) Rs 50/-, 30 IRCs outside India. 3 IRCs sample.

DX Club Paulista: Marcelo Toniolo Dos Anjos, C. Postal 592, Sao Carlos - SP (Brasil), 13560-970. South America. Shortwave, including utilities. *Actividade DX* (in Portuguese).

Finnish DX Association: Mr. Heikki Aarrevaara, Suomen DX-Liitto, P.O. Box 454, FIN-00101 Helsinki, Finland; +358-0-6949017 fax. Finland and worldwide. SW and BCB. *Radiomaailma*.

Friendship DXers Club: Ing. Santiago San Gil Gonzalez, C.DX.A - International, P.O. Box 202, Barinas 5201-a, Estado Barinas, Venezuela. Venezuela and Caribbean. DXing all bands. Cadena DX, YV-2-FSW, Sunday 1130-1330 UTC on 7113 kHz. Venezuelan membership free.

International DX Association: Bedanta Das, 1 - No. Galiahati, Near Night School, Barpeta - 781301, Assam, India.

International DX Organization: Radio Juel Club, c/o Ranjit Kr. Nath, G.C. Lana Galiahati, Barpeta, India. Ham/DX/SWL. Annual 60/-rs or 22 IRCs. *DX Around* (quarterly) sample plus club info 14 IRCs.

International Listeners Organization: Kalab Abbas, St. No. 1, H, No.231 Waris Rd, Sheikhupura, Pakistan 39350 South Asia. Broadcasting. *Listener Times*.

International Radio Youth Club: G.M. Mostafa Kamal, Amla Wapda Colony-1, Kushtia-7032, Bangladesh

National Society of Pakistani DXers: Mr. Liaqat Ali, E-161/1, Iqbal Park, Opposite Adil Hospital Defence Housing Society Road, Lahore Cantt., Pakistan. Worldwide. All wave. Has library, meets fortnightly 1400-1800 UTC at library. 4 IRCs for more info.

New Zealand Radio DX League: P.O. Box 3011, Auckland, New Zealand. MW, SW, FM, TV. *New Zealand DX Times*.

New Zealand DX Radio Association: Mr. R. Dickson, 88 Cockerell St., Brookville, Dunedin, New Zealand. MW, SW, amateur and utilities. *Tune-In*.

North Ontago Radio Listener's Club: P.O. Box 179, Oamaru, New Zealand.

Pakistan SW Listeners Club: Mrs. Fatima Naseem, Sultanpura, Sheikhupura , 39350 Pakistan; Pakistan; SWBC.

QSL Club de France: Patrick Frigerio, 40 Rue de Haguenau, 67700 Saverne, France. SWBC, pirates, CB-DX, hams, etc. Courrier (in French). 6 bulletins, 72 FF, EEC=16 IRCs, elsewhere 20 IRCs.

Shortwave Radio Communications Club: Atiqur Rehman, Dawood Street, Khalid Road, Sheikhupura, P.C. 39350 Pakistan. South Asia; MW/SW. *The Amateur* (Urdu language). Meets 1st Fri on SW Complex, S.K.P.

South African DX Club (SADXC): P.O. Box 18008, Hillbrow 2038, South Africa; MW, SW, utilities. $60 annual airmail to US; *The South African Shortwave Listener*.

Southern Cross DX Club Inc.: Stephen Newlyn, G.P.O. Box 1487, Adelaide, SA 5001, Australia. Worldwide and Pacific. All bands. *DX Post*. $25 annual in Australia. Meets last Fridays, 8pm, Thebarton.

Swedish DX Federation (SDXF): Box 3108, S-103 62 Stockholm, Sweden. 10 issues *Eter-Aktuellt*. Membership in Sweden 160 SC annual. SweDX BBS +46-(0)8-53034727; Fidonet 2:201/339; Internet sysop@swedx.ct.se

Stichting ScanSearch Military Aircraft Communications (SC-MAC): Gerbrand Diebels, Roer 29, 5751 TJ Deurne, Netherlands. Military aviation NW Eur (VHF/UHF) and worldwide (HF). *Airlift* (Dutch) bi-monthly. FL 35, up to FL 45 outside Netherlands.

Universal DX League: Mr. Kanwarjit Sandhu, 408, Krishna nagar, Ludhiana 141 001. India. India and Int'l; SW/MW/AM/FM/TV DXing/Pirate and Clandestine. *DX Post* bi-monthly, sample 4 IRCs. Annual 24 IRCs or US$10. SWL net: Sun 0300 UTC on 7080 / 1600 on 14150 SSB, VU3SIO net control.

Viamão DX-Club: Alencar Aldo Fossá, P.O. Box 101, Cunhas Road 1286, Jaguaribe Residential Park, 94400-970 Viamão, Rio Grande Do Sul, Brazil, South America. SWBC. Meets occasionally; multi-lingual.

Wonderful World of Shortwave: Baber Shehzad, 43 - Habib Colony, Bahawalpur, 63108 Pakistan. Asia and worldwide. SW listening; mail forwarding service. Annual 5 IRCs Asia & Middle East, 10 IRCs elsewhere. *WAVES* (quarterly).

Hudson Valley Monitors Association (HVMA): Patrick Libretti, P.O. Box 706, Highland, NY 12528. Mid-Hudson valley and surrounding counties; VHF/UHF, public safety. *The Hudson Valley Monitor*.

International 11 Meter Alliance: Allen Newton, Rt. 1 Box 187-A, Whitney, TX 76692, (817) 694-4047. Public safety, traffic handling, all bands, esp. 11 meters.

Int'l Radio Club of America (IRCA): Ralph Sanserino, P.O. Box 1831, Perris, CA 92572-1831. Worldwide; BCB/AM DX. *DX Monitor (34 x)* $25 US, $27 Can/Mex, $28.50 ww. First-class stamp or 2 IRCs for sample.

Longwave Club of America: Bill Oliver, 45 Wildflower Rd., Levittown, PA 19057, (215) 945-0543. Worldwide; Longwave only. *The Lowdown*. $18 US, $19 Can/Mex, $26 ww.

Memphis Area Shortwave Hobbyists (MASH): P.O. Box 3888, Memphis, TN 38173, Jim Pogue (901)873-4291 or Brandon Jordan 373-8046. Memphis area; SW, MW, FM, TV, utilities, pirates, etc.

Metro Radio System: Julian Olansky, P.O. Box 26, Newton Highlands, MA 02161, (617) 969-3000. New England states; Public Safety. *M.R.S. Newsletter*.

Michigan Area Radio Enthusiasts: P.O. Box 530933, Livonia, MI 48153-0933. E-mail xx024@detroit.freenet.org. Great Lakes Region. All bands. *Great Lakes Monitor*. $9.50 annual US & Canada. $1 sample.

Minnesota DX Club: Greg Renner, P.O. Box 10703, White Bear Lake, MN 55110, 612-822-1186 for meeting info. Minnesota. All bands. *MDXC Newsletter*. $10 annual.

Monitoring the Long Island Sounds: Ed, 2134 Decker Ave, North Merrick, NY 11566. Primarily scanner, some SWL. 50 mi. radius of LI. Net Tues 8pm 146.805. *Monitoring the Long Island Sounds*.

MONIX (Cincinnati/Dayton Area Monitoring Exchange): Mark Meece, 7917 Third St., West Chester, OH 45069-2212, (513)777-2909. SW Ohio, SE Ind., N Ken; All bands. Meets 2nd Sats 7pm. Net Thurs 9:30 145.210/4.610. No dues.

Mountain NewsNet: James Richardson, P.O. Box 4488, Estes Park, CO 80517-4488, (970) 586-4325vx; 4357fax. Colorado statewide. Public Safety notification group. *Mile High Pages*.

National Radio Club: Paul Swearingen, Publisher, P.O. Box 5711, Topeka, KS 66605-0711, (913)266-5707; http://wcoil.com/~gnbc. Worldwide; AM DXing. *DX News* 30 times yearly, sample for a first class stamp. Annual Labor Day convention.

New England Scanner Group: P.O. Box 1024, Derry, NH 03038. CT, ME, MA, NH, RI, VT. $29.95 annual.

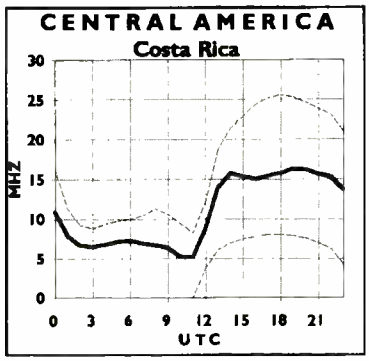
North American SW Assoc: Bob Brown, 45 Wildflower Lane, Levittown, PA 19057, (215) 945-0543. Worldwide; Shortwave broadcast only. *The NASWA Journal*. Regional meetings.

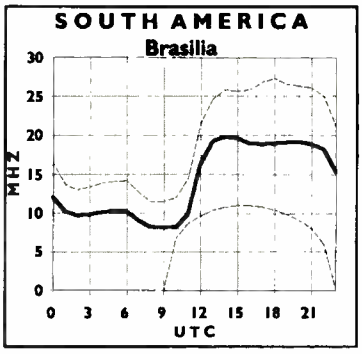
North Central Texas SWL Club: Alton Coffey, 1830 Wildwood Drive, Grand Prairie, TX 75050. North Central TX area; All bands.

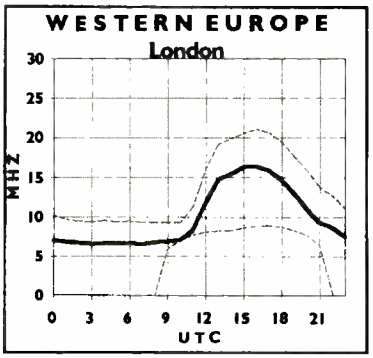
Northeast Ohio SWL/DXers: Donald J. Weber, P.O. Box 652, Westlake, OH 44145-0652. NE Ohio; SWBC and utilities. Check for new meeting sked.

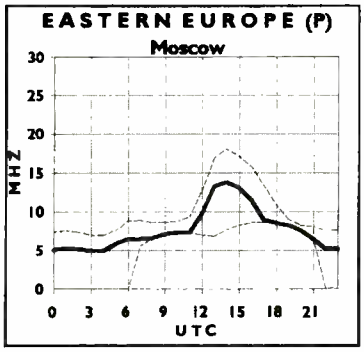
Propagation Conditions: Eastern United States

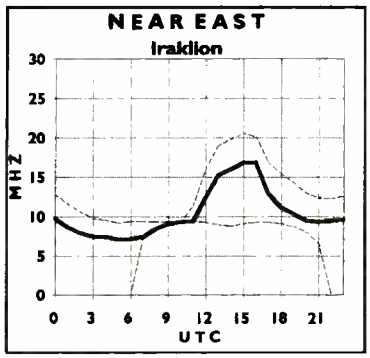
How to use the propagation charts: Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location. Then look for the one most closely describing the geographic location of the station you want to hear. The Sun Spot Number used this month for forecasting purposes is 6.

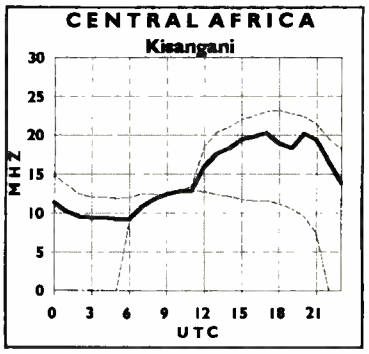


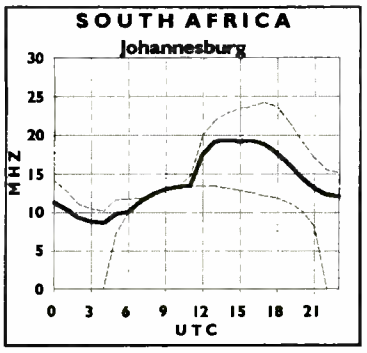


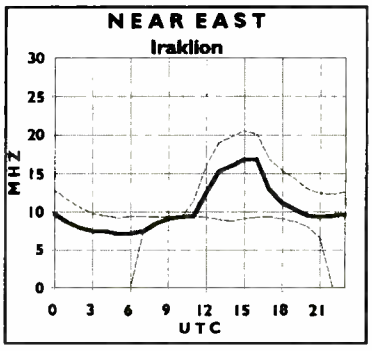


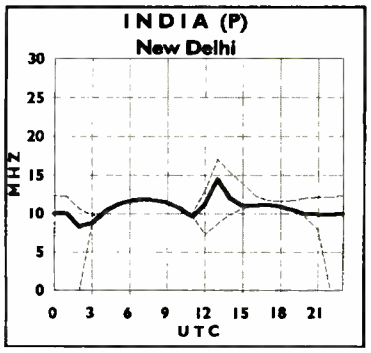


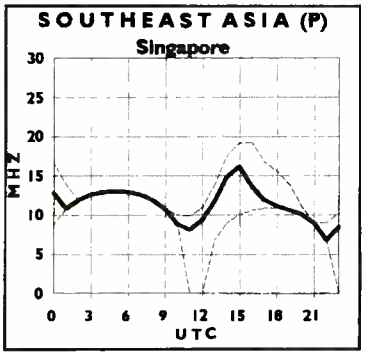


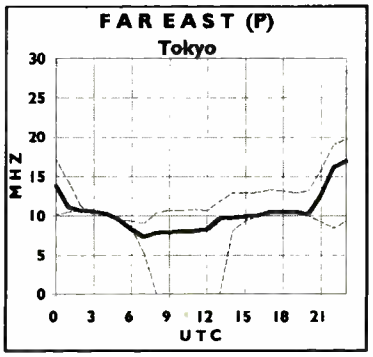


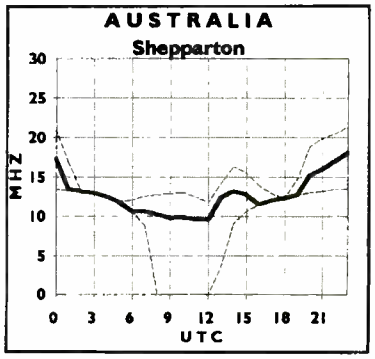






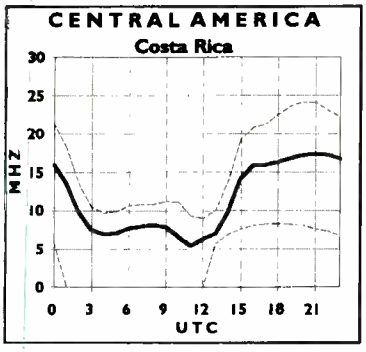


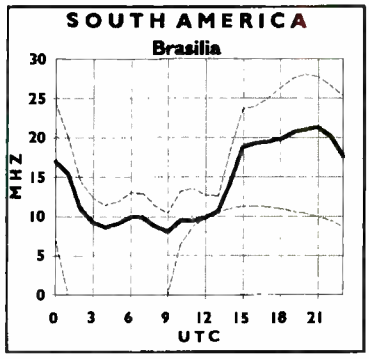


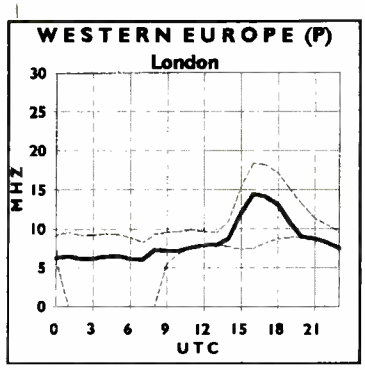


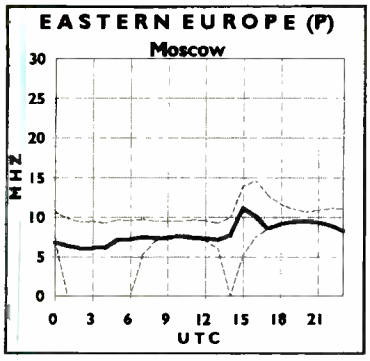
Propagation Conditions: Western United States

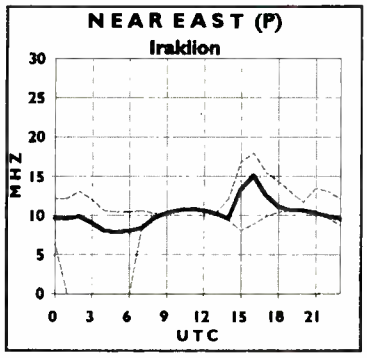
Once you've located the correct charts, look along the horizontal axis of the graph for the time you are listening. The top line of the graph shows the maximum usable frequency (MUF), the heavy middle line is the frequency for best reception, or optimum working frequency (OWF), and finally, the bottom line is the lowest usable frequency (LUF). You will find the best reception along the heavy middle line. Circuits labeled (P) cross the polar auroral zone. Expect poor reception on these circuits during ionospheric disturbances.

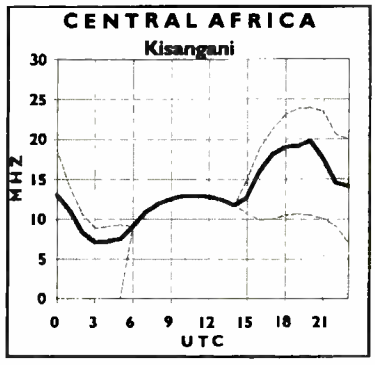


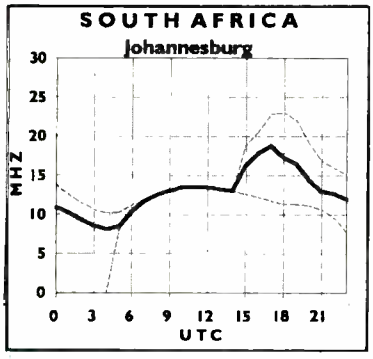


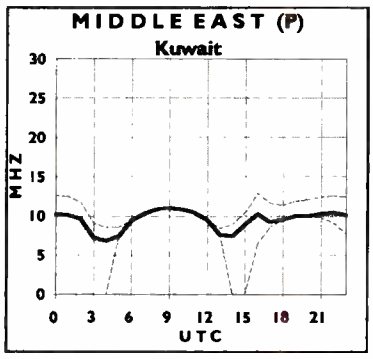


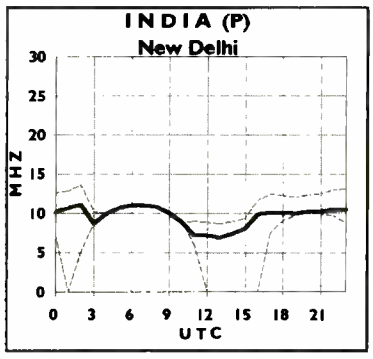


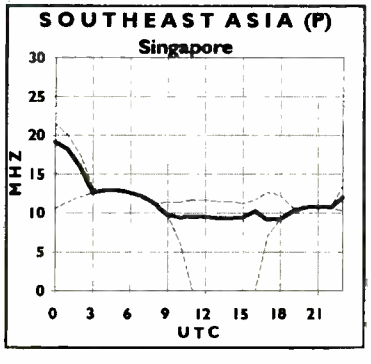


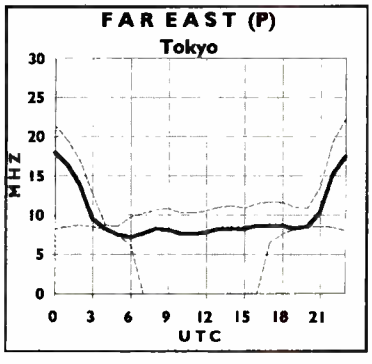


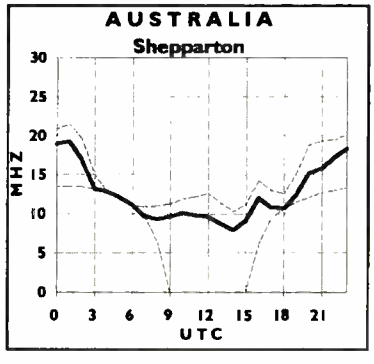












Kevin Carey, WB2QMY
koc@mdsroc.com

You're up, Europe!

Longwaves have always held a special attraction for Europeans. It was on longwave, in fact, that the first trans-Atlantic radio signals were sent from Europe at the beginning of this century. Europe is also the home of longwave domestic broadcasting which continues today, especially in Eastern Europe. And let's not forget beacons—many countries in Europe rely heavily on them for maritime navigation.

This European rental car came equipped with LW receiving capability. Photo by Charles Dowdell (NY).

This month we'll take a look at some of the longwave stations and services that are active in Europe. For North American listeners, it will give a glimpse into how the longwave scene differs between the two continents. For beginning listeners in Europe, it will provide an outline of the band along with some currently active signals to try for.

Music to your ears

An "LW" band is a common sight on European radios—even on car radios. That's because in ITU Region 1, which includes Europe, the frequencies from 148.5 to 283.5 kHz are reserved for domestic broadcasting.

Several of these broadcasters operate in the megawatt power range, making reception quite possible in North America, particularly on the East Coast. The best time to try for them is from local sunset until about 1 am. (The approximate time that a path of darkness exists between the two continents.)

Longwave broadcasts are not intended for worldwide reception, so you should not expect extremely strong signals. They will, however, be quite readable when conditions are favorable. I'm sure that many U.S. listeners have dismissed these signals as local AM broadcast interference, when in fact they were tuning into some pretty good DX!

TABLE 1

Selected Longwave Broadcasters

Freq	Station Name/Country
153	Deutschlandfunk/Germany
162	Alluois/France
171	Medi-1/Morocco
183	Europa-1/France
198	BBC-4/England
198	Radio Moscow/Russia
207	Radio Ukraine/Ukraine
216	Radio Monte Carlo/Monaco
252	Atlantic 252/Ireland
261	Radio Sofia/Bulgaria

You'll find extensive listings for longwave broadcasters in the *World Radio TV Handbook*. Club bulletins are another good source of information. To get you started, Table 1 includes some of the major European stations that are active at this writing. Catch them while you can, though; there are indications that longwave broadcasting is on the decline in many parts of the world.

Things that go beep

Beacons also play an important part in the European longwave scene. The station profiles are similar to those used in North America, except that you will not find European beacons operating below 284 kHz (the start of the broadcast band). Another difference is that European beacons sometimes transmit on "incremental" frequencies such as 291.9 kHz, 291.5 kHz, 304.5 kHz, etc. instead of the whole 1 kHz steps of North American beacons.

One problem with DXing Euro-beacons is that there is no up-to-date directory that lists stations and frequencies. If you can still find a copy, the *Radio Beacon Handbook* is a good source, but the current edition is now five years old, and I've heard of no plans to publish a new edition. Perhaps your best bet is to stay abreast of the loggings in the various club bulletins and magazines in order to build your own list of active beacons.

TABLE 2

Some currently active European beacons.

Freq	ID	Location
284.5	BUS	Brussels, Belgium
286.5	BY	Baily Light, Ireland
288.5	FI*	Cabo Finisterre Light, Spain
291.9	LT*	La Isleta (Canary Islands), Spain
294	PH*	Alprech, France
294.5	PA	Pakrineem Light, Estonia
298.5	RR	Round Island, England
303.5	VL	Vlieland, Holland
308.0	RC	Cabo Roca, Portugal
319	LEC	Stavanger, Norway
326	LLS	Lelystadt, Holland
326	LM	Le Mans, France
328	OLS	Paris, France
348	TRT	Trent, Germany
354	FIN	Finno, Finland
359	LK	Lidkping, Sweden
366	UTH	Uthaug, Norway
371.5	NH	Norwich, England
375	OO	Oostende, Belgium
394	NB	Stockholm, Sweden
403	LW	Luxembourg, Lux.
405	TR	Zielena Gora, Poland
425	ORU	Orust, Sweden
440	PIA	Piacenza, Italy
480	VIB	Viterbo, Italy
510	ST	St. Truiden, Belgium

* Differential Omega Station; Similar in concept to DGPS—See Sept. '95 MT.

TABLE 3

The Omega System

Freq	Station	Location
10-13.6	Omega & Alpha	Numerous, worldwide
23.4	DHO38	German Navy- W. Rhauderfehn
50	OMA	Liblice, Czechoslovakia
60	MSF	Rugby, England
75	HBG	Prangins, Sweden
77.5	DCF77	Mainflingen, Germany
93.9	FUO	French Navy-Toulon, France

I don't know of any North American DXer who has heard a European beacon on longwave, but I could be wrong. If anyone out there has snagged such an intercept, be sure to drop me a line at *MT* along with the appropriate documentation. We'll be sure to report on your success in *Below 500 kHz*.

The Sub-basement

In Europe, as well as other parts of the world, the longwave band starts to noticeably thin out when you drop below 100 kHz. The signals you'll hear include data pulses, Morse Code (CW), RTTY and time signal stations. Table 2 lists some selected services currently operating below 100 kHz.

A major player down here is the worldwide Omega system shown in Table 3. It operates between 10 and 14 kHz with short, unmodulated carrier pulses. There are eight stations in the network, one of which is in Norway (Station A). The other stations are: Liberia (B), Hawaii (C), North Dakota-USA (D), La Reunion (E), Argentina (F), Australia (G) and Japan (H). Signals very similar to Omega may also be heard from the Russian Alpha system that operates between 12 and 15 kHz.

End Notes

My special thanks to DXer Ary Boender (The Netherlands) for providing helpful information used to compile this article. That wraps it up for another month. Be sure to send your loggings, questions and comments to *Below 500 kHz*, P.O. Box 98, Brasstown, NC 28902 USA.

Note on advertisement below: As of 4/26/95 it became unlawful to market cellular-capable receivers in the US. Atlantic Ham Radio assures us that it will give a full refund and hold customers harmless from shipping expenses if a purchased unit is returned to the vendor by US Customs.

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Doug Smith, W9WI
72777.3143@compuserve.com

The World above 1600 kHz

Most domestic-band DXers know the limits of the broadcast band—540 to 1600 kHz: there's nothing below this but Morse code and noise, and nothing above it but hams and ships. But if you limit your DXing to 540-1600 kHz, you're missing out on some exotic loggings! In two or three years, the FCC is expected to begin authorizing regular AM broadcasters to move into the 1610-1700 kHz band. In the meantime, this band is home to some interesting signals.

Let's start with the TISs. TIS stands for "Traveler's Information Station." These stations are licensed to local or state governments and (as their name suggests) provide information for commuters and tourists. Most TISs operate on 530 or 1610 kHz, though a growing number operate within the regular band or on 1620. Powers are limited to 50 watts and often less, and the antennas used are much smaller than those at regular broadcasters.

Of course, this means the normal coverage area of a TIS is minimal. But their use of relatively clear channels makes up for the low power. During the day, I've heard TISs as far as 40 miles distant. At night, I (and many other DXers throughout the eastern USA) have heard a 1620 kHz TIS at Galveston, Texas; other eastern DXers frequently report two suburban Chicago stations.

Because of the nature of their programming, TISs are relatively easy to identify. These stations usually air a continuous loop tape which repeats every 2-3 minutes. Often, a full legal ID including callsign is aired. And the programming itself usually contains many references to the community served by the station. In the worst cases, only highways will be mentioned—in these cases you'll need to break out your road atlas and do a little detective work.

Getting a callsign may be more difficult. Many TISs don't bother with legal IDs. I don't believe IDs are required of these stations. When you do hear a callsign, it will be different from the 3- or 4-letter combinations you're used to from regular broadcasters. TIS callsigns start with a regular four-letter combination, but this is followed by a 3- or 4-digit number. For example, one of the frequently-heard Chicago-area TISs is WNYD-218. Most DXers will simply log TISs by frequency, city, and state.

Channel 2 is the TV affiliate of frequent Alberta DX catch CFAC-960. The TV station, now CICT-2, is well-known to TV DXers. 7 refers to a relay station in Lethbridge.

By the way, there are also TISs in Canada. Most operate on 530 or in the regular band, and regular four-letter callsigns are assigned.

Experimental stations are another source of loggings in the world above 1600 kHz. The FCC will issue temporary licenses for testing or demonstration of new technical developments. Such licenses will also be issued for testing antenna sites for new stations, or antenna tuning equipment for these stations.

One such station operated from Las Vegas last summer, demonstrating digital broadcasting on the AM band. Due to its clear frequency, the station was widely heard in the eastern USA, and provided the first Nevada entry in many DXer's logs (including mine!). Another experimental station is operating on 1680 kHz in Bluff City, Tennessee. So far, only test tones have been heard on this station, but it's an easy addition to your log if you're in the Southeast and can listen on weekdays.

A few easy foreign loggings reside in the 1610-1700 kHz band. Probably the easiest is the Caribbean Beacon on 1610 kHz on Anguilla, British West Indies. This 50 kW religious station can be heard throughout the east most nights. It's probably the fourth easiest foreign country to hear, after Canada and Cuba.

Another easy logging is MER-1685 in Colombia—but you have to know Morse Code. MER is an aircraft navigation beacon and continuously sends its callsign in Morse. If you have a quiet location, a good antenna, and good conditions, you may hear other Morse Code signals in the 1610-1700 kHz band. These are fishing beacons—my understanding is the transmitters are fastened to nets at sea, allowing the fishermen to locate and retrieve their catch.

Again, I don't expect to hear any regular expanded-band broadcasts from the USA in the next two years. But there's one exception. A special law requires the FCC to grant an expanded-band frequency to WJDM-1530 Elizabeth, New Jersey. As I write, WJDM is now testing on 1660 kHz and has been heard throughout the East (unfortunately, not by me!). I expect regular broadcasts on 1660 will begin by the time you read this. New Jersey is a tough state for DXers west of the Appalachians; WJDM should correct this situation quickly!

Finally, don't forget the pirates! 1610-1700 kHz is a favorite hangout for unlicensed stations—many radios cover the band, and the old 160-meter ham transmitters favored by pirates are easily tuned to these frequencies. These stations have some of the most interesting programming on the dial, but catch them fast before the FCC does!

Bits and Pieces

- An East Coast powerhouse has changed callsigns. WPTR-1540 Albany, New York, suspended operations for about a week in mid-October. They've now returned to the air as religious station WDCD, simulcasting the programming of three other religious stations in New York State. Ron Clark forwards news of another callsign change. WWMO-830 Eden, NC, has switched from religion to North Carolina beach music and talk, and changed calls to WETR.
- Two other callsign changes are in the news. In St. Louis, it's reported that KRAM-1380 has changed its callsign after the St. Louis Rams moved their broadcasts to KSD-550. I don't know the new calls. And in Naples, Florida, a confusing change: WEVU-TV, channel 26, has changed its call to WZVN. This station's ID mentions only channel 7—their position on cable.
- In my December column, I asked how KDKA could change the base insulator on their tower without dismantling the entire tower. Propagation forecaster Jacques d'Avignon has the answer. He says: "You weld horizontal crosspieces to the bottom of the tower, above the insulator, and install hydraulic jacks under these crossmembers. When time comes, you choose a time where there is no wind, normally at night. You remove the nuts and bolts... Slowly jack up the

tower and slide out the old insulator and put in the new one."

Jacques saw a manual describing the procedure for a tower in Montreal. According to the manual, the tower doesn't need to be jacked up very far; less than an inch is often enough, and it may not even be necessary to loosen the guy wires. This procedure certainly makes sense—but I sure wouldn't want to be around when it happened!

- Jacques also has a tower-hunting tip. If the station in question is operating below 800 kHz, (850, if your radio covers the expanded band) your radio may stop not only on the station's own frequency, but its second harmonic. The second harmonic is simply twice the station's own frequency. In most cases, the second harmonic is too weak to be heard unless you're within a few hundred feet of the station's antenna. If you carry a shortwave receiver, you can apply this tip to AM stations anywhere in the band.
- Allan Dunn in Holbrook, Massachusetts, has another tip. He carries a portable frequency counter and a magnetic-base scanner or ham antenna. While driving past the tower site in question, he gets a quick and positive indication of the frequency, both for AM and FM stations. Of course, this only works if there's only one station on the site—otherwise, erratic readings can result.
- Steve Carter has found an excellent Internet DXer resource that didn't make my January column. Connect your WWW browser to http://radio.aiss.uiuc.edu/~rrb/fccdb.html. You can search the FCC database for AM or FM broadcast stations by call, frequency, city, geographic coordinates, and other criteria.
- Two stations in rare locations have been widely heard in the East in December. KQFN-1550 West Fargo, North Dakota, has had technical problems with their antenna and have been operating non-directional at night. Their all-sports programming has provided the first North Dakota logging for many DXers, myself included. Alberta is also a difficult logging, but CFAC-960 Calgary has been heard by many DXers.

We're at the peak of the DX season. Keep those DX reports coming! Write me at Box 98, Brasstown NC 28902-0098, or by the Internet at 72777.3143@compuserve.com. If you write by Internet, please include your city and state. Good luck!

Skipping In

Robert Pote of Indiana heard some of the recent DX Tests:

1000	WDJL, Huntsville, Alabama
1190	WKBO, Cobleskill, New York
1430	WVAM, Altoona, Pennsylvania
1560	WSEZ, Paoli, Indiana

Robert comments that several people called WOWO during the WKBO test to ask about "Morse code interference." Robert also reports hearing both CFAC-960 and KQFN-1550 on their regular schedules.

Steve Carter wrote by Internet, so I'm afraid I don't know his location. His log includes the following catches:

680	KFEQ, St. Joseph, Missouri
710	WHB, Kansas City, Missouri
1130	KWKH, Shreveport, Louisiana
1380	KRAM, St. Louis, Missouri

Dx Test Bulletin

Sun, Feb 4 - HCJB-690, Casilla 17-17-691, Quito, Ecuador. 1-1:15am EST. Morse code IDs and "other unique items." Correct reception reports will be verified with a special QSL card. According to the station, *if you hear code, you must report exactly when you heard it and what characters you heard.* Tape recordings are welcome, but cannot be returned. Please include one international reply coupon or first class postage in U.S. or Canadian stamps for a reply to your reception reports. Send to: Mr. Rich McVicar (HC1JMN) - Frequency Manager, Attn: 690 DX Test, c/o English Service, HCJB. (Arranged by Rich McVicar of HCJB for the benefit of all DXers.)

Mon, Feb 5 - WPWA-1590, 12 Kent Road, Aston, PA 19014. 12-12:30am EST. Morse code. Send reception reports to Mr. lloyd B. Road (K3QNT) - President.

Mon, Feb 5 - WABB-1480, 1551 Springhill Avenue, Mobile, AL 36604. 3-4am EST. Voice IDs and Morse code IDs. Send reception reports to Mr. Ed Jurich (N0PVC) - Chief Operator.

Sat, Feb 10 - WTCY-144, 3400 North 6th Street, Harrisburg, PA 17110. 2-2:30am EST. Test tones, voice IDs, and Morse code IDs. Send reception reports to Mr. Thomas L. Walker (WA3MBF) - Chief Engineer.

Mon, Feb 12 - WNNC-1230, Box 940, Newton, NC 28658. 12-12:30am EST. Test tones, voice ID's, and Morse code IDs. Send reception reports to Mr. Dave Lingafelt - President and General Manager.

Sat, Feb 17 - WBSR-1450, P.O. Box 8057, Pensacola, FL 32505. 1-2am EST. Oldies music and Morse code IDs. Send reception reprts to: Mr. Geoff Elkins - Asst Program Director.

Mon, Feb 19 - WIRC-630, Hickory, NC. 12-12:30 EST. Test tones, voice IDs, and Morse code IDs. Send reeption report to Mr. Dave Lingafelt -Pres & Gen Manager, c/o WNNC-AM Radio (see address above)

Unless otherwise noted, these tests were arranged by J.D. Stephens for the International Radio Club of America Courtesy Program Committee (P.O. Box 1831 , Perris, CA 92572-1831, USA); 32 cent stamp (US $1 or 1 IRC overseas for sample bulletin.

OUTER LIMITS

THE CLANDESTINE, THE UNUSUAL, THE UNLICENSED

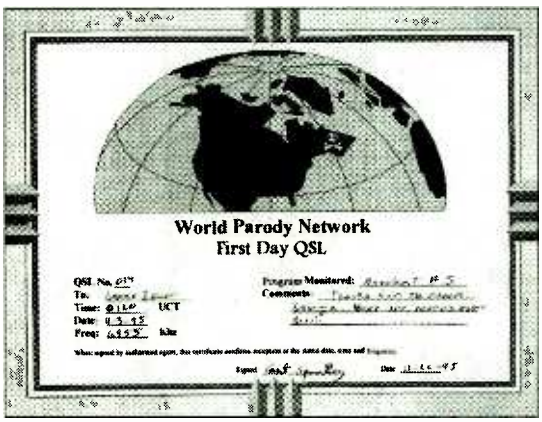
George Zeller
ew088@cleveland.freenet.edu

Hear a Pirate Without a Radio!

North American pirate activity surged toward record levels during the second half of 1995, and plenty of stations have already taken to the air during 1996. The Outer Limits listing of pirate loggings has been bursting at the seams! Nevertheless, just about every month we receive puzzled inquiries from listeners who have not yet managed to tune in a pirate broadcast.

Andrew Yoder, veteran pirate author and DXer, has provided a new solution for radio monitors whose luck with pirates has been poor. High Text Publications Editorial Director Harry Helms announces the publication of *Pirate Radio: The incredible saga of America's underground, illegal broadcasters.* This illustrated, full-length 326 page book—the latest in a long series of pirate publications by Yoder—is an extremely well-done history and profile of North American pirate broadcasting.

As a bonus, every copy of Yoder's book comes with a CD containing actual broadcast programming from 22 different pirates. The interesting selection ranges from historic New York City medium wave pirates to a classic track from the neo-nazi pirate/clandestine **Voice of Tomorrow.** You'll definitely want to get one of these book/CD combinations. It lists at $29.95, and is widely available from *Monitoring Times* advertisers.



WRN issues a nice QSL certificate.

■ Fundación Home Page

MT reader Ulis Fleming of Glen Burnie, MD has discovered that **La Voz de la Fundación,** the quasi-clandestine voice of Jorge Mas Canosa's anti-Castro Cuban American National Foundation, has a site on the internet World Wide Web. Web contents describe the station, its programming, its philosophies, and its schedule. An address of **htpp://www.icanect.net/~canfet/english/prgvoz.html** should get you to this web site.

■ KIWI Still There

Longtime *MT* supporter Gigi Lytle of Lubbock, TX, continues her excellent luck at receiving New Zealand pirate **KIWI.** She bagged Graham Barclay's operation around Thanksgiving at 0640 UTC on 7445 kHz. Gigi has heard this one on a DX-440 and on a Lowe 225, so you don't need a Watkins Johnson HF-1000 to try for this excellent DX. Graham usually operates on UTC Sundays.

■ FCC Downsizing

This month we received a huge volume of reports on more than three and a half dozen different shortwave pirates, which is a record for this column. During the brief late November period when the Federal Government closed because of a budget squabble between Congress and the White House, many stations correctly assumed that the FCC was closed. This beefed up pirate activity.

As Pat Murphy of Chesapeake, VA, points out in an article from the *Virginian Pilot* newspaper, the scheduled closedown of the Norfolk FCC Field Office (and several others) may cause other pirates to be bold. But, the *Pilot* article points out that even after the Field Offices close, many FCC agents will operate as "resident agents" from their homes throughout the country.

■ What We Are Hearing

Your pirate loggings are always welcome for this column via PO Box 98, Brasstown, NC 28902.If you have internet access you can use **ew088@cleveland.freenet.edu.**

Addresses used by pirate stations reported this month include PO Box 452, Wellsville, NY 14895; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 28413, Providence, RI 02908; PO Box 146, Stoneham, MA 02180; PO Box 17534, Atlanta, GA 30316; Ostra Porten 29, S-44254 Ytterby, Sweden; and Postfach 220342, D-42373 Wuppertal, Germany. For return postage, enclose three 32¢ stamps in the envelope to USA addresses; $2 US or two International Reply Coupons go to foreign drops.

Big Johnson Radio- 6955 at 2315. The "premier broadcast" from E. Normous Johnson was very widely heard. It featured risque comedy and holiday music. Addr: Providence. (William Hossig, Mt. Prospect, IL; Barry Williams, Enterprise, AL; Murphy)
Black Rider Radio- 6955 at 0130. This station announced that you must send o picture of your cot in order to receive a station QSL. But, don't take this porody advice too seriously. Addr: Wellsville. (Isaac Kelly, Houston, TX; Williams)
Cell Block 13- 6955 at 2315. The news here is that the Warden has established a maildrop address. He's increasingly involved in program production featuring rock and electronic music. Addr: Stoneham. (Kelly)
Computer Radio- 6955 at 2030. Despite their station name, this one primarily features rock music fare. The computer announcer has a digitized voice. Addr: Providence. (Willioms; Rose; Murphy)
East Coast Music Radio- 6956 at 2330. Although he's a veteran pirate who produces many shows, Dr. Lobotomy has repeatedly transmitted a show of Hawaiian music lately. He's also prepared a station newsletter. Addr: Wellsville. (Don Kidder, Ashland, ME; Dick Pearce, Brottleboro, VT; and direct from the station)
Free Hope Experience- 6955 at 0415. Major Spook weaves vorious music styles into his eloborotely produced mix of sketches ond oudio colloges. They say thot they will verify logs of their interesting shows in *The ACE,* but we're still waiting. Addr: None. (Dovid Chapchuk, Scronton, PA; Bosil Shelley, Blythe, CA; Dennis Myhand, Mercedes, TX; Rondy Ruger, North Hollywood, CA; Kelly; Rose; Williams; Prindle; Murphy)
KCRO- 6855 ot 0400. The female announcer on this new station ploys vintage rock oldies. Borry's log proves thot some stations are on ot late hours, even with the currently low sunspots. Addr: Providence. (Williams)
KDED- 6955 at 0230. Jerry Garcia's death led to the breakup of the Groteful Dead. This has cut down on the volume of broadcasts from the Voice of the Groteful Dead, but they ore still occosionolly heard. Addr: Wellsville. (Lytle; Williams; Rose; Murphy; Hossig; Ruger)
Key West Radio- 6955 ot 0015. Porodise Joe has now aired multiple programs, although he's on the oir irregularly. He was among the pirates who took advantage of the FCC's lote November vacotion. Addr: None, but says will verify logs in *The ACE.* (Rose; Williams)
KFAT- 6955 at 0400. The surprising return of this veteran slick country music station was good news

for DXers. They've been around since 1983. Addr: Wellsville. (Williams)

KMCR- 6955 at 0100. Magic Mike at Magic Carpet Radio has been heard again outside the West Coast by ACE Publisher Yolanda, and on the West Coast by our reader Basil. Addr: Blue Ridge Summit. (Yolanda Lewis, Elgin, IL; Shelley)

KNBS- 7435 at 1845. Phil Muzik has been around since 1985 with his mix of comedy, commentary, and marijuana advocacy. His voice is also heard regularly during promotional announcements by other pirates. Addr: Wellsville. (Michael Prindle, New Suffolk, NY; Murphy; Pearce)

KTLA- 6955 at 2315. This oldies rocker has become a relatively regular inhabitant of the pirate bands. Addr: Providence. (Murphy; Williams; Pearce)

KOLD- 6955 at 0045. QSL's, such as the one we see this month, are rolling in from this relatively new big band music station. Dennis had some interference on this one from a numbers station in Spanish. This one was James' first pirate QSL, and Bill got their #1 verie. Congratulations! Addr: Stoneham. (James Oakley Jr., Oceanside, CA; Cliff Watts, Dickinson, TX; Bill McClintock, Minneapolis, MN; Myhand; Hassig; Shelley; Rose; Ross)

Aldo Batista brings back 1940's swing music.

Northern Music Radio- 6955 at 2000. This Europirate not only has a North American relay for its rock music shows, but it also now has a North American maildrop address. Addr: Providence. (Prindle)

Outlaw Radio- 6955 at 1815. The sexy female announcer on this one programs rock music and sketches, which is a staple pirate format. Addr: Providence. (Williams; Murphy)

POLKA- 6955 at 0015. The call letters on this one are an accurate description of the station's music format. It is among the currently active ethnic pirates on shortwave. Addr: Stoneham. (Kelly; Williams; Shelley; Kelly; Rose)

Radio Amazonia- 6955 at 1700. It would be impossible to hear this Europirate direct from Europe at high noon local time on 39 meters, but stations such as the **North American Pirate Relay Service** extend the coverage area of the Euros. Rob's QSL arrived from Mr. Tequila in 2 months. Addr: Ytterby. (Williams; Ross; Myhand; Murphy)

Radio Azteca- 6055 at 2200. Bram Stoker produces entertaining DX parody programs, with jokes about shortwave broadcasting, shortwave DXers, shortwave personalities, and even *Monitoring Times*. Addr: Wellsville. (Ross; Williams; Prindle; Murphy)

Radio Cyclops- 6955 at 2000. David had a relatively rare log of this one, noting some Cheech and Chong comedy. Addr: Wellsville. (Chapchuk)

Radio Dung- 6955 at 2000. This new comedy pirate is not a reference to the leader of China. They instead feature recorded comedy sketches with an echo effect during identifications. Addr: None. (Ross)

Radio Freedom International- 6955 at 1500. Somebody has been recycling old tapes of this 1980's Europirate station, but the broadcast source for this is unknown at press time. Addr: None. (Prindle; Rose; Murphy; Ross)

Radio Free Speech- 6955 at 0430. Bill O. Rights always signs on with a parody of the USA National Anthem, but he signs off with the real thing by a brass band. The station's AM signal sometimes relays other pirates. Addr: Wellsville. (Williams; Ross; Prindle; Murphy)

Radio Marabu- 6955 at 2100. This Europirate now has a relay relationship with licensed station **WRMI** in Miami. It airs on the fourth Friday of every month, preempting Viva Miami. Addr: Wellsville. (Jeff White, Miami, FL)

Radio Mirage- 6274 at 0800. It's hard to tell if Jesse's log was from a North American relay, or if he heard this Europirate direct. If you're trying for European transmitters, Sunday mornings at this time are a good time to check on 49 meters. Addr: Wuppertal. (Rose)

Radio Titanic International- 6957 at 2215. Captain Smith says that his m/v Titanic memorial rock station has been on the European pirate bands since 1975. It's heard fairly regularly via North American relay transmitters. Addr: Wuppertal. (Pearce; Ross; Williams)

Radio USA- 6955 at 1315. An old Mr. Blue Sky program was part of a mysterious two hour loop of five pirate stations that ran for hours while the FCC was closed by the Federal Government shutdown. Addr: Wellsville. (Murphy; Rose)

RBCN- 6955 at 1515. Radio Bob's Communications Network recently produced an O. J. Simpson trial parody show. Interestingly, Pat heard them with an experimental transmission in FM mode, which produced a fine signal in Virginia. Addr: Atlanta. (Jerry Coatsworth, Merlin, Ontario; Pearce; Williams; Murphy)

Revolutionary Voice of Plainville- 6955 at 0130. Yet another old veteran returned in late 1995 after a long absence. Obviously the revolution is still in progress in Plainville. Addr: Blue Ridge Summit. (Shelley)

RFM- 6950 at 0230. H. V. (as in Victor) Short moved his mellow music program down a few kHz to avoid an intermittent RTTY signal that sometimes inhabits 6955. Addr: Wellsville. (Max Syko, Gaylord, MI)

R-O-C-K- 7435 at 1730. Guess what kind of music dominates the format on this new one? If you guessed classical, jazz, or Irish jigs, guess again. Addr: None. (Murphy)

The Asylum- 6955 at 2130. If you find this strange one, you'll hear a mix of rock music, space music, and random ravings. Addr: Blue Ridge Summit. (Murphy; Syko; Rose; Williams)

The Fox- 6955 at 2330. The Fox Broadcasting System is back, typically with a mix of classic rock music, comedy, and barbs at the FCC. Addr: Blue Ridge Summit. (Syko; Ross)

The Radio Barnyard- 6955 at 0115. This very funny operation has won kudos from DXers for its hilarious and well produced comedy, but it so far has failed to contact its listeners in writing. Addr: None. (Gayle Van Horn, Brasstown, NC; Chapchuk; Lytle; Rose; Murphy; Kelly; McClintock; Williams)

Up Against the Wall Radio- 6955 at 2015. Still using a distinctive klaxon "oogah" horn as an interval signal, they recreate late 60's and early 70's nostalgia with music of the period. Addr: Providence. (Syko; Murphy; Williams)

Voice of Revolutionary Vinco- 6955 at 1400. The two-hour marathon pirate loop (see Radio USA above) contained a nostalgic treat. This well produced 15 year old parody of Eastern European communist radio broadcasters resurfaced. Addr: None current. (Murphy)

WAOJ- 6955 at 2130. With a slogan of "We're the anti-OJ station," they program song cuts as answers to questions from Marcia Clark. "If you have the slightest bit of sympathy for OJ, you won't want (our) QSL. Addr: None, but said would verify logs in *The ACE*. (Murphy; Williams)

WJFK- 6955 at 2230. This holiday station usually broadcasts in association with the anniversary of the assassination of John F. Kennedy on November 22, but it has been heard at other times this year. Addr: None, sometimes verifies logs in *The ACE*. (Van Horn; Chapchuk)

WKES- 1630 at 0345. J. D., Barry, and other DXers have been hearing this micropirate relay of Bay Area Florida licensed stations. Is anybody else picking this up? Addr: None. (J. D. Stephens, Huntsville, AL; Williams)

WPN, World Parody Network- 6955 at 0115. Captain Squirtlong says that his station supports freedom of speech with his comedy program, using a 190 watt transmitter acquired at a hamfest. As we see here, QSL's are materializing. Addr: Huntsville. (direct from the station; Prindle; Shelley; Williams; Rose; Pearce; Kelly; Murphy)

WQSO- 6960 at 0145. Their purpose was announced as ridicule for bootleg "QSO" two-way pirate conversations and one way brief transmissions. In particular, they criticize the "Beavis and Butthead" imitators that frequently show up on the pirate bands. Addr: None. (Murphy)

WREC- 6956 at 2115. P. J. Sparx has been consistently using AM transmitters for his rock music programs. He also relays other pirate broadcasts from time to time. Addr: Wellsville. (Chapchuk; Ross; Shelley)

WRV- 6955 at 0415. Pete the Pirate spins rock music selections, but he's most distinctive for his slogan: "The Radio Virus, The Station that Nobody Wants to Catch." Addr: Wellsville. (Murphy; Syko; Williams; Rose)

YVES- 6955 at 2015. This station was new to your editor. Pat says that a European sounding announcer played a mix of oldies rock. Addr: Wuppertal. (Murphy)

Ike Kerschner, N3IK

The Surplus Saga Continues

Last month we discussed using commercial FM gear on the ham bands; and I gave you a brief rundown on some of the various units available for modification. Here are some closing bits of advice.

Motorola HT-220 and Midland 70-043

■ All That Glitters is not Gold!

One factor you must keep in mind when looking for a decent piece of used commercial gear is that not every piece will lend itself to modification. For example, radio phone (telephone) gear often is too far removed in frequency from any ham band to be of use. Older gear using tubes and vibrator power or dynamotors should not be bothered with unless you are very experienced and want to use the rig for fixed station use. The normal cost of repairing and updating such gear is generally uneconomical.

Another potential difficulty with commercial gear that you must watch for (especially if you are purchasing low band gear for ten or six meters) is frequency split. Many low band rigs have three splits, and getting the wrong one can prove a real pain. Basically the splits are low (30 to 35 MHz is good for ten meters), mid (36 to 42 MHz is normally too difficult to modify), and high (42 to 50 MHz is for six meters).

■ Where to Buy

The best place to purchase commercial surplus is from a two-way radio shop. Normally their prices will be a bit higher, but chances are that you will be getting a workable or repairable set and the dealer usually has service manuals available. You may find some dealers unwilling to sell equipment because they are very busy and do not want to work on a unit which will not bring them much income. Your best approach in this instance is to look around for a local ham who has a good relationship with the dealer and can assure him that you will not be a problem to him. In other words, you are looking for an Elmer who will assist you in getting the rig going.

Photo one is a shot of my two-meter HT—a Motorola HT-220, which is a two-channel crystal rig with two watts of power. It is set up for the local repeater and a popular simplex frequency (unit on left). On the right side is a Midland 70-043 low band unit that is modified for six meters; it runs five watts and is four-channel, crystal controlled. Photo two is a Midland 70-055c which runs fifty watts, 32 channels, and is programmable via an Eprom. It, too, is on six meters.

Midland 70-055c

■ Expectations

Don't expect a low-priced surplus rig to give you all the bells and whistles. Some can have tone boards installed and be modified for more channels. For more money CTSS and fairly easy frequency reprogramming is available. For example, the two HT's in photo one can usually be obtained for well under $100 ($25 to $50 is normal). However, the 70-055C will go for well over 100 bucks a pop and even more if in top condition.

■ HAMCALC

VE3ERP, George Murphy, 77 McKenzie St., Orillia, ON L3V 6A6, Canada, is distributing a computer disk called HAMCALC. For five dollars (US funds) George will send you a copy of the disk which has such excellent info as how to build coaxial traps, make baluns, inductive loaded antennas, yagi, quad, engineering programs, and much more. I just obtained one of George's disks and am very pleased with it. There is so much good info on this disk it belongs in every ham shack (available only for PC). As an extra bonus, the disk also includes a program called FOTOCALC for camera buffs. This info on HAMCALC came via W1FB (see Sept. 95 MT p. 106).

■ Band Conditions

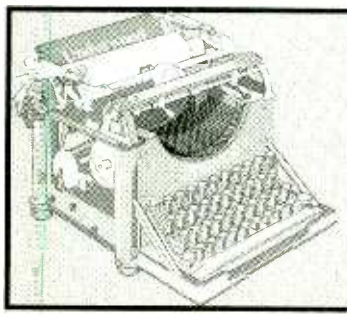
These continue to be erratic, but there has been much improvement on the bands above 20 meters. Ten has had some excellent DX openings to various parts of the world, and bears watching. 17 has been excellent, and 30 meters is producing DX daily at this QTH in spite of temporary (and very low) wire antennas.

■ WANTED:

Simple projects to include in "On the Ham Bands," and suggestions of what you would like to see in this column in 1996. Write to me via Monitoring Times, PO Box 98, Brasstown, NC 28902. 73 de Ike Kerschner, N3IK

SPECIAL EVENT CALENDAR

Feb 3-4	Miami, FL	So. Fla. Convention / Evelyn Gauzens W4WYR, 2780 NW 3rd St, Miami, FL 33125; 305-642-4139
Feb 10	Pensacola, FL	Pensacola Area Hamfest Assoc / Bill Behrends WA4YRN, 1050 West Carlton Rd, Pensacola, FL 32534-1130; 904-476-8537
Feb 10	Blaine, MN	Robbinsdale ARC / Susan Baker N0JND, P.O. Box 22613, Robbinsdale, MN 55422; 612-537-1722
Feb 10	N Charleston, SC	Charleston ARS / Jenny Myers WA4NGV / 2630 Dellwood Ave, N Charleston, SC 29405-6814; 803-747-2324
Feb 11	Mansfield, OH	Intercity ARC & Mansfld AER / Pat Ackerman N8YOB, 63 N. Illinois Ave, Mansfield, OH 44905; 419-589-7133
Feb 16-18	Orlando, FL	Fla State Convention / John Lenkerd W4DNU, 1046 Turner Rd, Winter Park, FL 32789; 407-645-2026
Feb 17	Goshen, NY	Orange Co ARC / Steve Voorman KB2TRG; 914-496-8710. Talk-in 146.76 (100Hz). 9 am. Adm $3.
Feb 17	Smithville, TX	Bastrop Co ARC / Charlie Claiborne N5JWP, PO Box 556, Smithville, TX 78957; 512-237-3817
Feb 18	Rock Is, IL	Davenport RAC / Kent Williams K9UQI, 4245 10th St, E Moline, IL 61244-4154; 309-796-0718
Feb 18	Elkin, NC	Briarpatch & Foothills ARCs / Dave Nicholson N4VMB, PO Box 162, Cana, VA 24317-0317; 703-755-4669
Feb 24	Monterey, CA	Naval Postgraduate School ARC / Max Cornell K0MC, 199 Linde Circle, Marina, CA 93933-2206; 408-883-0491
Feb 24	Brooksville, FL	Hernando Co ARA / Glenn Brown AC4QH, 31188 Park Ridge Drive, Brooksville, FL 34602; 904-799-6755
Feb 24-25	Cincinnati, OH	Gt Lakes Div Convention / Stanley Cohen WD8QDQ, 2301 Royal Oak Ct, Cincinnati, OH 45237; 513-531-1011
Feb 25	Castle Shannon, PA	South Hills ARC / Steve Lane N3RNY, PO Box 11626, Pittsburgh, PA 15228. Location: VFD Memorial Hall, Rte 88 (Library Rd). Talk-in 146.955(-) 146.46 simplex. $3 Admission.
Feb 25	Dearborn, MI	Livonia ARC / Neil Coffin WA8GWL, PO Box 2111, Livonia, MI 48151; 313-261-5486
Feb 25	Cuyahoga Falls, OH	Cuyahoga Falls ARC / Carl Hervol N8JLQ, 11192 Cottingham Circle, Uniontown, OH 44685; 216-497-7047
Mar 2	Tuscaloosa, AL	Black Warrior Swapfest / Kelly Bruce WD4DAT, PO Box 03171, Tuscaloosa, AL 35403; 205-339-7882
Mar 2	Absecon, NJ	Shore Points ARC / SPARC, PO Box 142, Absecon, NJ 08201. Location: Holy Spirit HS, Rte 9 south of Rte 30. Talk-in 146.385/.985, 9 am, $5 admission.
Mar 8-10	Lafayette, LA	Acadiana ARA / Nolen Griffith K5ARH, 123 Normandy Rd, Lafayette, LA 70503; 318-989-9039
Mar 8-10	Norfolk, NE	NE State Convention / Patrick Adams N0AZC, 2002 Sunset Ave, Norfolk, NE 68701; 402-371-7295
Mar 9	Scottsdale, AZ	Scottsdale ARC / Ron Reynolds N7WTF, 2514 E Turney Ave, Phoenix, AZ 85016-5617; 602-240-0473
Mar 9	Puyallup, WA	Mike & Key ARC / Michael Dinkelman WA7UVJ, 637 2nd Ave South, Kent, WA 98032-6137
Mar 9-10	Charlotte, NC	Mecklenburg ARS / Mary Hunt KA4EXP, 3213 Bridgemere Terrace, Matthews, NC 28105; 704-841-HAMS
Mar 14-16	Kulpsville, PA	Winter SWL Festival / PO Box 591, Colmar, PA 18915. Location: Holiday Inn (215-368-3800) $35 registration
Mar 16	Marietta, GA	Kennehoochee ARC / Margaret Durham KB4QKW, 1097 Seven Springs Circle, Marietta, GA 30068; 770-977-4405
Mar 16	Marshall, MI	So MI ARS / Wes Chaney N8BDM, 4405 South Minges Rd, Battle Creek, MI 49017-8321; 616-979-3433
Mar 16-17	Midland, TX	Midland ARC / Larry Nix N5TQU, 3900 Douglas Ave, Midland, TX 79703; 915-699-5441
Mar 17	Maumee, OH	Toledo Mobile RA / Robt Hanna K8ADK, 2154 Circular Drive, Toledo, OH 43614-4205
Mar 17	York, PA	Keystone VHF Club / John Shaffer W3SST, 2596 Church Rd, York, PA 17404; 717-764-4805
Mar 18	Chesterfield, MO	St Louis Co SKYWARN Severe Weather Observation Training. Michael Redman KA0YXU, 314-889-2362. Location St. Luke's Hospital Education Center, Hwy 141 North of Hwy 40-61 in Chesterfield, MO. 6:45-10 pm. No advance registration required.
Mar 23-24	Tulsa, OK	Okla Convention / Merlin Griffin WB5OSM, 11671 E 80th St N, #BB, Owasso, OK 74055-3363; 918-272-3081
Mar 24	Sterling, IL	Sterling-Rock Falls ARS / Lloyd Sherman KB9APW, PO Box 521, Sterling, IL 61081-0521; 815-336-2434
Mar 24	Madison, OH	Lake Co ARA / Roxanne, 5777 Fenwood Court, Mentor, OH 44060; 216-256-0320
Mar 24	Trenton, NJ	Del Valley RA / HAMCOMP, PO Box 7024, W Trenton, NJ 08628. Location: Student Rec Ctr, Trenton State College, Rt 31. Talk-in 146.67, 442.650. $5 admission.
Mar 24	Yonkers, NY	Westchester Emerg Comms Assoc / Tom Raffaelli, PO Box 831, North Tarrytown, NY 10591-0831; 914-741-6606. Location: Yonkers Raceway. Talk-in 147.06/66. $6 admission.
Mar 30-31	Timonium, MD	MD Convention,Gtr Baltimore / William Dobson WA3ZER, 12315 Boncrest Dr, Reisterstown, MD 21136; 410-526-2154 Location: Timonium Fairgrounds, 8am-5pm Sat, 8am-4pm Sun. $5 daily admission.
Mar 31	Grayslake, IL	Libertyville & Mundelein ARS / Francis Avellone W9GLO, 650 Green Bay Rd, Lake Bluff, IL 60044; 708-234-4124



Just do it!

Do you have a topic you've always "thought about" writing up for Monitoring Times? Now is the time! Given our full-spectrum coverage, plus the interest in new technology on the one hand and nostalgia for the past on the other, there is no limit to appropriate subject matter to write about. Bone up on your research, warm up your pen, and you, too, can earn a little spending money!

Pitch your idea to the editor at mteditor@grove.net or call 704-837-9200 and ask for Rachel. Writer's Guidelines are available on the MT homepage at www.grove.net, on the Grove BBS, or for an SASE.

Learning to Work With Diodes

There is probably no simpler semiconductor device than the junction diode. Diodes are inexpensive and easy to use. Despite their widespread availability, and the many applications for diodes, many experimenters are unaware of how to use them in simple circuits. This month we will explore the interesting field of diodes and show how to make them perform routine tasks in your favorite circuits.

Types of Diodes

Diodes are available in many sizes and shapes, but they function in essentially the same manner when ac or dc voltage is applied to them. The two general diode classes are high speed, low power switches (suitable for RF use into the microwave spectrum) and high current rectifier diodes for use in power supplies. There is also the LED (light emitting diode) that is used for visual indication of circuit functions, such as in combination with an ON-OFF switch. LEDs may also be used as 1.5-V reference diodes, because they conduct at 1.5 V. Silicon diodes, on the other hand, conduct at approximately 0.7 V, and germanium diodes (like the 1N34A or 1N60) conduct at roughly 0.4 V.

Voltage-variable capacitor diodes (VVC) are designed for use as RF tuning devices. They are often used instead of mechanical tuning capacitors. The voltage applied to them is varied by means of a potentiometer. The resulting change in potential causes the diode junction capacitance to vary in a reasonably linear fashion. Tuning diodes are sometimes called "varactors" (variable reactance diodes). Special varactors are available for frequency multiplication (like 144 MHz to 432 MHz). They must be used with appropriate high-Q tuned circuits. Frequency multiplication occurs when a few watts of RF power are applied to the input circuit. Varactors require no operating voltage and produce a fair amount of RF power at the chosen output frequency. Efficiencies as great as 70% have been obtained with varactor multipliers.

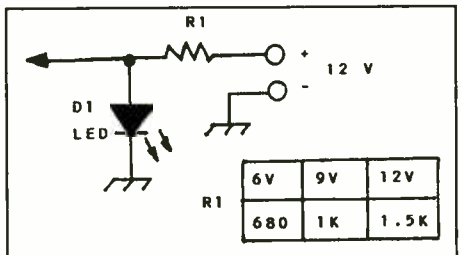


FIGURE 1: LEDs are used as visual indicators by dropping the supply voltage to a safe value. R1 is chosen to limit the LED current to 6-8 mA dc. R1 values for three common supply voltages are provided.

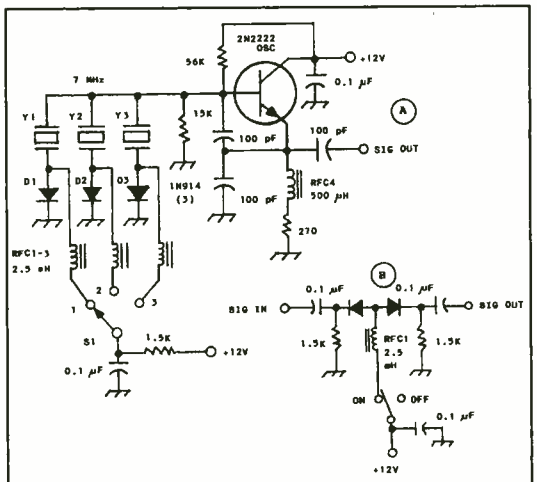


FIGURE 2: Circuit A shows how to use diodes for switching three oscillator crystals. S1 routes the diode turn-on voltage to the crystal of choice. The circuit at B illustrates how diodes can be used as series switches in a signal line.

How to Use LEDs

As I stated earlier, LEDs conduct at 1.5 V dc. A typical LED draws 8-10 mA of current when illuminated. The higher the current the brighter the glow, but the shorter the LED life span. It is a good idea to limit the current (choice of series resistor value) to 6-8 mA for all-round reliable performance. Figure 1 lists R1 values for three common operating voltages.

You may tap into the junction of R1 and D1 to obtain a low current regulated voltage of 1.5. The current drawn by the external circuit must be taken into account when choosing the value for R1. This resistor will need to be lower in value as the total circuit current is increased. The steady-state current taken by the external circuit should not exceed 5 mA.

Diodes as RF Switches

Small-signal, high-speed diodes of the 1N914 class may be used as dc switches for selecting crystals or L and C tuned circuits. An example of crystal switching is provided in Figure 2A. When a positive voltage is applied to the anode of the diode it conducts and creates a short circuit to ground. A mechanical switch is used to activate the diodes when selecting the crystals. An RF choke is used to isolate the RF energy from circuit ground.

Figure 2A shows the shunt method for diode switching. The circuit at B may be used for series switching in signal lines. Sufficient current must be allowed to flow through the diode junction in order to minimize the dc resistance of the junction. Allow approximately 20 mA of current to flow for complete 1N914 diode turn-on. Small rectifier diodes can also be used as RF switches in most circuits that operate below 10 MHz.

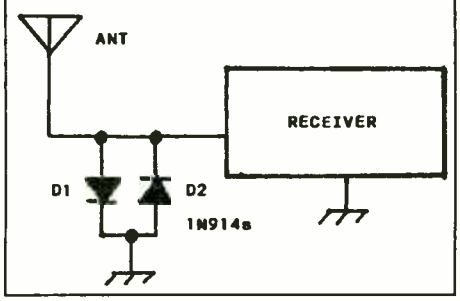
Receiver Input Protection

Small-signal diodes of the 1N914 class are useful for protecting the front-end circuits of receivers when the diodes are used back-to-back, in parallel, as shown in Figure 3. Two diodes connected in this manner will conduct on positive and negative RF sine-wave peaks of 0.7 V or greater. This creates a short circuit across the receiver antenna jack. The diodes do not conduct at RF signal levels below 0.7 V. This makes them "invisible" to the receiver under normal conditions.

This form of protection is especially worthwhile when receivers are used near transmitters or when the receiving antenna is close to a transmitting antenna. If strong nearby commercial radio stations cause the diodes to conduct partially, you may hear spurious signals in your receiver because of rectification effects. If this happens, use two 1N914 diodes in series for each leg of the protective circuit. This will increase the effective diode threshold voltage to 1.4. The diodes will still protect your receiver front end.

Diodes Used With Voltage Regulators

FIGURE 3: Back-to-back diodes can be used, as shown, to prevent damage to receiver input circuits when high level RF energy is picked up by the receiving antenna.



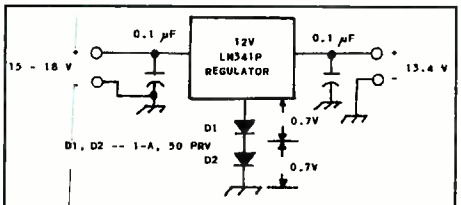


FIGURE 4: The dc output from a voltage regulator IC can be increased by inserting one or more diodes in series with the ground lead of the IC. Each silicon diode will elevate the regulator output by 0.7 volt.

Figure 4 illustrates how you can add one or more diodes to a three-terminal voltage regulator to increase the regulated dc output voltage. For example, one diode in the ground lead of a 5-volt regulator will increase the output voltage to 5.7. Two silicon rectifier diodes in series would increase the output voltage to 6.4. Each diode used will add 0.7 volt to the dc output. The best diodes to use for this application are 1-A, 50-or 100-PRV units.

Polarity-Guarding Diodes

It is not uncommon for an experimenter or ham operator to mistakenly reverse the positive and negative leads of a power supply or battery when attaching the power source to a piece of equipment. Severe damage can occur to the equipment semiconductor devices and electrolytic capacitors if this error is allowed to occur. I once ruined the power-amplifier transistors in a Yaesu FT-301D when I cross-connected a 12-volt battery to the system. It taught me an expensive lesson!

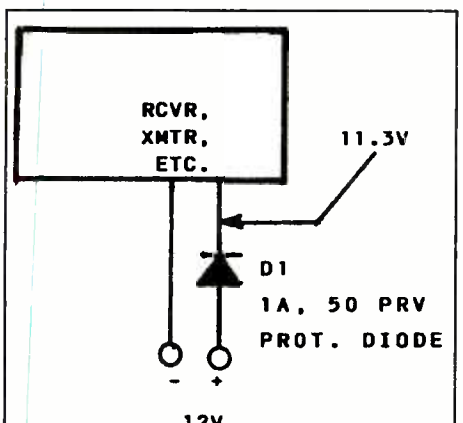


FIGURE 5: Equipment can be protected from cross-polarization of the supply voltage if you install a series diode in the supply line.

You can add a polarity-guarding diode in series with the dc supply voltage to your equipment, as shown in Figure 5. Connected in this manner, positive dc current can flow into the equipment, but negative dc current will be blocked. When this method is used there will be a voltage drop of 0.7 across the diode.

Most home-made and commercial apparatus will work okay at, for example, 11.3 volts rather than 12.0 volts. The diode chosen for this application must have a current rating in excess of the current taken by the equipment. Thus, if a transceiver draws a maximum current of 10 amperes, the diode would be rated at 15 or more amperes to allow a reasonable safety factor.

You should consider mounting large diodes of this type on a heat sink. This will prevent diode junction overheating. Heat sinks are not needed for lower current drains, such as 3 amperes for a 6- or 10-ampere diode.

Diodes as Speech Clippers

The positive and negative voice peaks in a transmitter can be clipped off by means of two small-signal diodes, such as 1N914s. This increases the average talk power, which makes the transmitted signal appear louder. Diodes generate harmonic currents when used as shown in Figure 6. Therefore, some type of filtering is required after the diode clipper in order to help restore the audio to a sine wave. This can be done with resistors and capacitors, or by means of capacitors and inductors. This type of circuit has been used for many years in 2-meter FM transceivers.

Diode Detectors and Mixers

One of the earliest radio receivers developed was called a "crystal set." A piece of galena was used in combination with a "cat's whisker" wire to form a diode junction that would rectify (demodulate) broadcast band AM signals and convert them to pulsating dc which produced voices and music in a pair of ear phones. A simple crystal radio circuit is shown in Figure 7. An earth ground and a random-length wire antenna are all that you need to hear strong BC

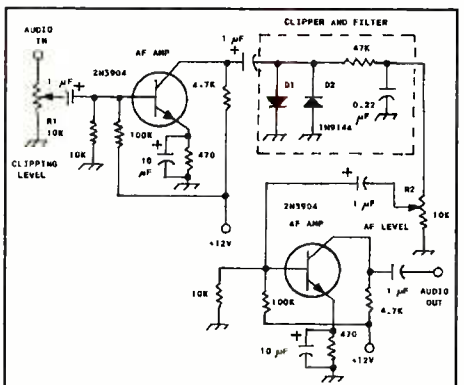


FIGURE 6: Example of two 1N914 diodes in a speech clipper circuit. R1 sets the clipping level and R2 determines the magnitude of the clipped and filtered audio.

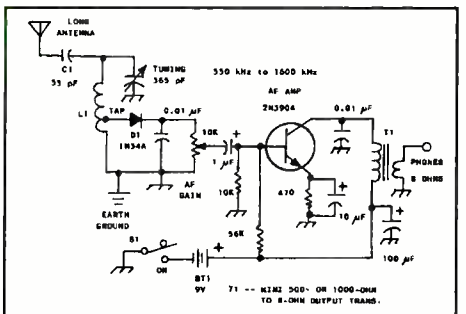


FIGURE 7: Diagram of a simple crystal radio that uses a 1N34A germanium diode. L1 (220 μH) for best station separation (high Q), consists of 85 close-wound turns of no. 22 enamel wire on a 3-inch length of 2-3/8 OD PVC pipe, or equivalent insulating form. C1 may be smaller in value to obtain greater Q, if some signal loss is acceptable. Tap L1 at 15 turns above the grounded end (do not allow adjacent turns at tap point to short circuit).

band stations. A 1N34A or other small signal germanium diode may be used as a detector for maximum sensitivity. A 1N914 can also be used, but it may not respond to weak signals because of its higher barrier voltage.

Diodes are used also in receiver and transmitter mixers, and in receiver product detectors. The preferred diodes for mixers (usually four in combination) are known as "hot carrier" diodes. Rather than containing a silicon sandwich type of junction, these diodes have a sort of cat's whisker that contacts a small piece of semiconductor material. The internal capacitance and resistance of hot-carrier diodes is much lower than that of small signal junction diodes. This makes it easier to select matched pairs of diodes for circuits that require excellent electrical balance (such as mixers and balanced modulators).

Summary Comments

Use care when selecting a diode for a particular task. The PRV (peak reverse voltage) or PIV (peak inverse voltage) rating should exceed the normal circuit voltage in order to prevent diode damage. The diode current rating is important also. Make certain that it is greater than the current that will flow through it. Also, avoid using power-supply diodes for most RF applications. These diodes will, however, be suitable for use in audio circuits. The cathode ends of many diodes are marked with a band. Other diodes have the diode electrical symbol printed on them to make identification of the anode and cathode ends an easy matter.

Jean Baker, KIN9DD

Commercial Ground Stations

Welcome aboard, everyone! A lot of newcomers to HF aero monitoring have been asking about the type of transmissions (traffic) heard on the HF bands. Since it's hard to tell the players without a scorecard, we'll devote this column to the two types of services commercial HF ground stations provide: HF air/ground **Flight Safety Messages** (air traffic service communications within oceanic areas), and **Aeronautical Operational Control** (**AOC**) traffic, (handled on the Long Distance Operational Control Facilities frequencies). We'll also take a brief look at non-ATC domestic air/ground services.

Honolulu (HNL) ARINC operator (R) and supervisor(L), courtesy ARINC

Flight Safety Messages are transmitted on the Major World Air Route Area (MWARA) radio telephone network frequencies by ground stations such as ARINC, Gander Aeradio, Shanwick, Santa Maria, Tokyo, Dakar, and the many others that make up the MWARA frequencies, (these were listed in the April 1995 edition of "Plane Talk"). The messages are relayed by the aeradio ground stations *from* air traffic control centers *to* and *from* aircraft flying through their control areas.

These safety messages are usually routine and consist of position reports, SELCAL checks, fuel remaining, time/location of next position; requests from the aircraft for a higher or lower flight level; approval (clearances) or rejection of these requests from ATC; weather aloft; inquiries from air traffic control centers' oceanic sectors as to when an aircraft can climb or descend to a specific altitude; and other matters pertaining to the course of flight. There are the exceptions, of course, such as a pilot having to shut down an engine, a hijack in progress, and other abnormal situations.

The other type of traffic heard on HF are **Aeronautical Operational Control** communications, and these are very different in content than Safety Messages. In addition, they employ frequencies which are allocated to their application, and are known as **Long Distance Operational Control Facilities**, or LDOCs (pronounced El-Doc). Airlines will either utilize a specific LDOC provider, such as ARINC (yes, they have LDOC frequencies too), Houston Universal, Rainbow Radio, Cedar Rapids Radio, etc., and/or use the service of companies which have their own HF frequencies and will provide LDOC services to other airlines as well. Some of these are Berne (Berna) Aeradio, Speedbird London, Stockholm Aeradio, DragonAir Radio, Lima Radio, Portishead, and others too numerous to list here. Airlines who utilize LDOC services either have a contract with the station for all of their radio contacts, or pay a fee per individual contact.

Transmissions heard on LDOC frequencies can include equipment problems; passengers who have become ill (or died) during flight; changes in arrival/departure times; strange odors reported by passengers and/or crew; or lavatories that have had to be sealed off. A pilot might need to notify his company that they have to return to the airport of origin due to major difficulties with the aircraft. Sometimes a company will contact an LDOC carrier to have them give a warning to particular flights going to a destination where the weather is bad. This writer once monitored a transmission from a pilot who reported numerous cases of food poisoning on his flight!

These are just a few examples of what you might hear on these frequencies—anything and everything out of the ordinary on a flight is usually reported enroute to an airline's company headquarters, either directly or by phone patch.

■ Domestic VHF Air/Ground Voice Services

In the United States and many other countries, VHF is the accepted mode for domestic commercial airline communications. Since aircraft contact ATC facilities directly, the "middleman relay ground station" is not needed. HF contact isn't permitted while flying over the continental U.S., unless *all* the aircraft's VHF radios are completely out of commission. The only other exception is for HF radio checks which pilots preparing for an oceanic flight may get while on the ground from San Francisco ARINC.

Much of the routine domestic radio contacts are done in digital (ACARS) mode, rather than voice transmissions. These include out, off, on, in reports, time doors were closed, number of pax (passenger count), fuel taken on, engine and equipment status, etc. (*For more on ACARS, see this month's Computers & Radio column - ed.*) ACARS frees up the voice frequencies for reporting out of the ordinary occurrences such as gsi (ground security irregularities), difficult and/or ill passengers, equipment/maintenance problems, requests for ball game scores, catering mistakes, wheelchair and/or meet-and-assist requirements, etc.

There are a few airlines which have their own air/ground stations, such as Delta, Northwest, and FedEx; however, the majority of airlines use ARINC to set up a phone patch between pilots and their companies. ARINC calls these voice transmissions "Flight Regularity Messages" or "Operational Control Communications."

It's not unusual to hear an air traffic controller tell a pilot to contact his company, or sometimes a controller will communicate with an airline's dispatch department in order to have them contact a particular flight with instructions to call ATC on a specific frequency. This happens occasionally when a pilot dials up the wrong frequency on a hand-off (and forgets to write down the previous one), or if a controller cannot reach a flight in his sector and needs to regain radio contact with the pilot as soon as possible. Controllers will say that a flight they're trying to call without any response is "nordo" (short for "no radio").

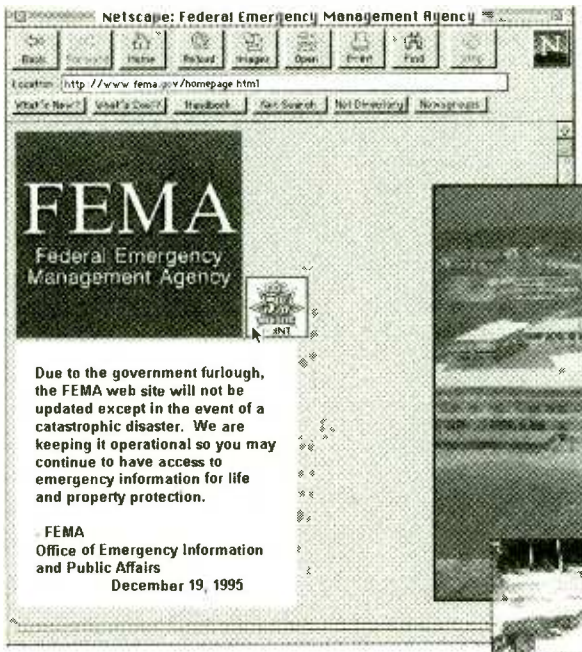
If you have more questions, feel free to drop me a line at the *MT* address and I'll do my best to answer them. Until next month, 73 and out.

John Fulford, WA4VPY

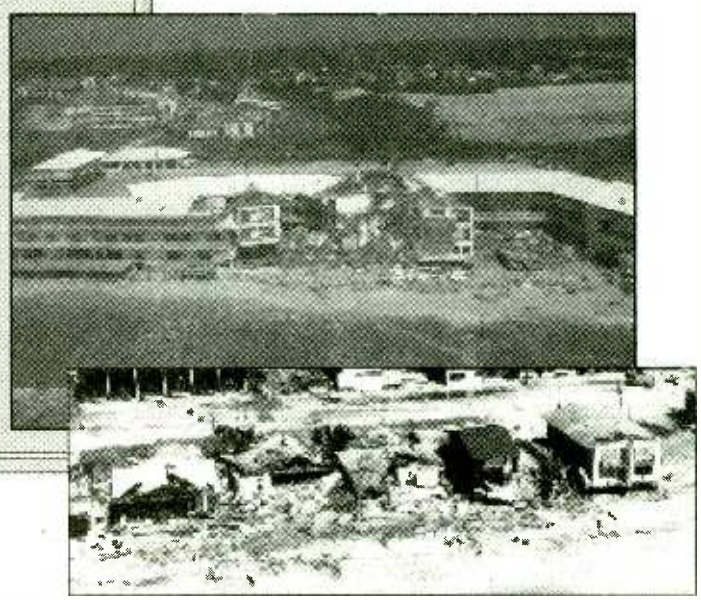
When FEMA Arrives in Town...

We have already discussed the radio systems used by FEMA, the Federal Emergency Management Agency (July and Nov 1994). This month, we'll discuss what happens when FEMA comes into town after a disaster—manmade or otherwise—and sets up its telecommunications system. See the sidebar for explanation of a few terms unique to telecommunications.

In any emergency, it is critical to be able to get information both out of and into the scene of a situation quickly and accurately. Amateur radio has always been relied upon to help get the message out to the waiting world. They have been invaluable in the past and I'm sure they will continue to be in the future.



FEMA's home page bears witness to government reduction by shutdown!



Beach damage from Hurricane Opal taken by Beau Hannah, courtesy of the U.S. Army Corps of Engineers.

Once the initial word regarding survivors and the extent of the emergency has been transmitted—whether it be by two meter FM, Morse code, or even cell phone—it is time for the large information handling systems to take over.

Throughout the country, there are five regional FEMA Disaster Facilities which house complete communications systems already prepackaged for shipping. If there is time for preplanning, such as in the case of a hurricane, then FEMA personnel can tailor the systems to the exact conditions they expect to find when they arrive on the scene. If there is no time for this, then generic packages are sent to the disaster scene.

Arriving by either C5-A transport planes or by tractor trailer, the systems are usually set up and running within thirty minutes after arrival.

For the telecommunications network that must be set up at a disaster scene, FEMA uses the Net Federal Integrated Digital Network Exchange (IDNX). This digital switchboard is manufactured by Net Federal, Inc., of Vienna, Virginia. Associated with this switchboard are IDNX/20 and IDNX/90 multiservice bandwidth managers.

The /90 is designed for multichannel voice and data, using T1, T3, E1, and E3 environments. The /90 can run a maximum of 96 T1 lines having both 56 and 64 trunks. It also will take four T3 trunks, 372 data ports, 2000 voice ports, 32 LAN ports, 256 router Wide Area Network ports, 256 free relay ports, and 96 feature ports. This is a lot of communicating!

For smaller situations, the IDNX/20 brings the power of the large /96 network without a large complex network in 12- or 24- slot versions. It can support 15 T1 trunks, 44 data ports, 360 voice ports, 20 LAN ports, 160 router and network ports, 144 frame relay ports, and 11 or 23 feature slots.

This equipment is stored in shockproof transport cases. It has been used in situations from the Los Angeles earthquake to the recent Hurricane Opal disaster. Also packaged with these transportable units is a Ku band satellite uplink and downlink. The Satcom link is used if there is no connection to terrestrial communications networks.

That's our look at FEMA telecommunications for now. We hope and pray it won't be needed, but FEMA has learned it's best to be prepared.

■ Federal security: is it government or is it private?

With the decreasing federal budget, we'll see many creative methods of cutting out federal programs. One of these ways is to cut out the federal guards at U.S. Government installations and turn the security over to private operations. I have noticed more and more federal installations losing their GSA guards (Government Service Administration) and replacing them with local private security forces. This generally means the replacement of radio frequencies as well.

One of the major private security contractors is Wackenhut. Their communications are usually up in the 800 MHz band, though in some cases they will continue to use the former federal frequencies. A check of your frequency database, such as the Grove CD-ROM, will provide you with their local operating frequencies.

It's always wise to continue checking for the old federal frequencies in case they are retained when there is a change in "management." Rumor has it that the guards in the white trucks at the mysterious Area 51 in Nevada are Wackenhut personnel. The guards

Flooding in Louisiana.

at the Kennedy Space Center were, and still may be, Wackenhut guards. They used federal frequencies at both these locations. One precautionary note—the Wackenhut guards I have dealt with at government installations were all ex-military personnel and were carrying fully automatic M-16 machine guns.

The Government Services Administration operates the guard service for government installations. Usually these will be court houses and federal office buildings. Individual sites that do not fall into these criteria may have their own guard service using their own channels. For example, the National Park Service uses Department of the Interior radio channels.

The GSA operates three security operations. They are, along with their channels, as follows:

Federal Supply Service

Chan	Freq	Use
	164.2750	SIMPLEX

Public Building Service

Chan	Freq	Use
	413.9500	CONTROL/MOBILE
	415.2000	RPTR OUT

Real Property Management, Law Enforcement Branch, (formerly known as Federal Protective Service)

Chan	Freq	Use
01	419.1750	C/M
	417.2000	RPTR OUT
02	417.2000	SIMPLEX
03	412.4000	SIMPLEX
04	417.4250	SIMPLEX.

Other government sites have their own protection frequencies. Some of them are:

Federal Reserve Bank of San Francisco

Chan	Freq	Use
	419.7000	C/M
	415.1000	RPTR OUT

Government Printing Office

Chan	Freq	Use
01	411.2000	SIMPLEX
02	410.2000	C/M
	410.4500	RPTR OUT
03	415.3000	SIMPLEX

Telecommunications Terms

IDNX
Integrated Digital Network Exchange - a digital switchboard

LAN
Local Area Network. If you work in an office where you have several computers tied together and then they operate off of one central system, this is a LAN.

T1, T3 trunks
Digital multiplexed telephone lines. Telephone conversations are converted to digital formats and then put on a single set of wires, or a circuit. A T1 line can handle close to 100 conversations on one pair of wires. A T3 line is a combination of several T1 lines. All of this is done on a single circuit. Usually these data lines operate at 1.54 megabits/second. This is a lot faster than the modem you have in your computer.

Library of Congress

Chan	Freq	Use
	411.4000	C/M
	408.1250	RPTR OUT

Supreme Court of the United States

Chan	Freq	Use
	163.2750	SIMPLEX

Smithsonian Institution

Chan	Freq	Use
01	169.3750	C/M
	169.2000	RPTR OUT
02	169.2000	SIMPLEX

National Gallery of Art

Chan	Freq	Use
	411.5500	C/M
	406.5500	RPTR OUT

Capital Security Force

Location	Freq	Use
DISPATCH	409.6500	C/M
	411.7250	RPTR OUT
TACTICAL	409.5500	C/M
	411.6250	RPTR OUT
JFK CNTR	409.7500	C/M
	411.8250	RPTR OUT
NAT. VISITOR	409.8500	C/M
CENTER	411.9260	RPTR OUT
CAPITOL MALL	172.7500	SIMPLEX

Dept of State: Foreign Mission Security

Chan	Freq	Use
	148.1000	SIMPLEX

United Nations Security

Chan	Freq	Use
01	408.1000	C/M
	409.7000	RPTR OUT
02	409.7000	SIMPLEX
03	407.6000	SIMPLEX
04	408.6000	SIMPLEX

The United States Secret Service is most often thought of as providing plain clothes

Louisiana Office of Emergency Management.

body guard protection for the President and others. The Secret Service also has a uniform division. The guards you see at the entrance to the White House are uniform members of the Secret Service. This uniform branch operates on UHF frequencies, whereas most Secret Service communications operate in the VHF portion of the spectrum. Their frequency layout is as follows:

Secret Service Uniform Division

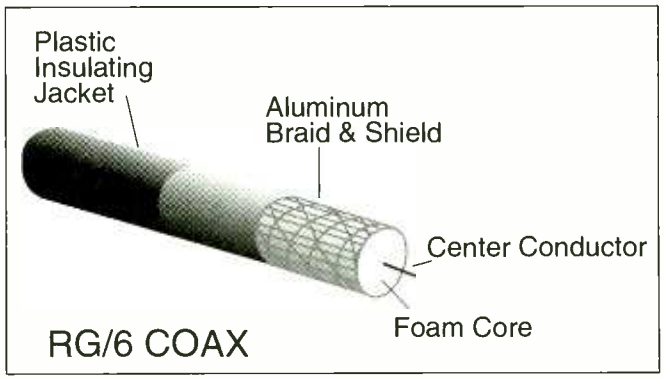
Chan	Freq	Use
GRAY	407.7500	C/M
	418.3500	RPTR OUT
ORANGE	414.9500	C/M
	418.7750	RPTR OUT
BROWN	418.8000	C/M
	414.8500	RPTR OUT
RED	419.7250	C/M
	415.9750	RPTR OUT
SILVER	419.1000	C/M
	415.6500	RPTR OUT
YELLOW	418.1500	C/M
	414.6750	RPTR OUT

Ken Reitz, KS4ZR

Making Connections

One of my neighbors has led a very successful life. A graduate of a reputable technical university, this man holds several degrees and can play the stock market like a pro.

When lightning hit near his home last summer he found that his satellite system wasn't working. At first glance he assumed that the LNB had been fried by the bolt from the blue and promptly ordered a new one. It arrived a week later and he hooked it up. Still no picture. He next assumed that the receiver had been hit and sent it off for repairs. Six weeks later he received the repaired receiver and a bill for nearly $200. He hooked it up and still no picture.



At a loss, he brought the receiver over to my house and we hooked it up to my dish. It worked just fine. I told him it was probably his cable connectors and sent him off with some tools to make repairs. Several days later, after effecting the repairs, he called to say there was still no picture.

By now, I had been lured into this apparent electronic vortex. Assuming that the LNB and the receiver were in working order, I checked out the cable fittings. They pulled easily off the cables. Cutting off each end, I started with fresh cable ends and fitted both with new connectors. After using a volt meter to check for shorts, I attached the cable to the LNB and the receiver and we fired it up. It worked just fine.

As I left, he was promising to dedicate his next beer to me.

■ TVRO Feed Line Basics

Techniques for the reception of electromagnetic signals is the same no matter the frequency band. All reception requires three basic components: the antenna, the feed line, and the receiver. Different feed lines are used for different frequency bands and for transmitting and receiving, but since we are only concerned with reception of C and Ku band satellite signals, we'll concentrate on those.

In the very early days of satellite television, signals in the 3-4 GHz band were amplified by a Low Noise Amplifier (LNA) at the feed horn on the dish. This signal was sent along a 1/2-inch hardline into the house where it was converted down (hence the term "down converter") to 70 MHz and sent to the receiver. By the early 1980's down converters were weatherized and moved out to the dish. Now, instead of a very lossy (and expensive) 100 foot run of hardline, only enough RG/214 to go from the feed horn to the downconverter (usually fixed to the ground mount pole) was required. Eventually, down converters were incorporated into the design of the amplifier (today's Low Noise Block down converter or LNB), thus eliminating the need for *any* feed line between the two.

Since the output of the LNB is the block of frequencies from 950 to 1450 MHz, much less cumbersome (and less expensive) cable can be used. The industry standard became RG/6, used universally as an LNB-to-receiver feed line. This cable is much stiffer, owing to its thicker conductor and larger foam dielectric core, than the RG/59 which is commonly used for terrestrial TV antenna installations. It is also more expensive.

■ Connector Basics

Unlike RG/59, which can be bought in neatly boxed 100 foot lengths with the cable fittings already attached, RG/6 is usually sold by the foot but without the attached fittings. Here's where the trouble for my neighbor (and many other TVRO hobbyists), first started.

In order to reduce the frustration of making cable connections, make sure you're buying the right connectors. My neighbor had unwittingly bought F-59 connectors which were too small for the RG/6 cable. Use F-56 connectors for RG/6 cable. Avoid twist-on connectors (they don't hold nearly as well) and gimmicky gold-plated connectors (you'll never notice the "improvement").

F-56 and F-59 connectors are referred to as "crimp on" connectors, because a crimping device is used to fasten the malleable metal on the outside of the connector to the plastic jacket of the coax. Trying to crimp these connectors with a pair of pliers will only compound your frustrations.

Crimping tools are available at most electronic supply stores, including Radio Shack. The Shack offers three such tools in varying qualities ranging from "Economy" to "Pro." The Economy (catalog #278-220) sells for $2.99; the Medium (#278-242) sells for $6.99; and the Pro (#278-243) sells for $15.99. All three are said to be designed to handle all F-56 and F-59 connectors.

I bought the Economy version first and found it inadequate. It would take a terrific amount of skill and talent to make that device do a proper job and my admiration goes out to those who can. I skipped over the Medium crimper because it didn't look like it was worth twice the price of the cheapest one, which had already proven it wasn't up to half the job! So, I bought the "Pro" model. Weighing in at a hefty 1-1/2 pounds, I believe you could run over it with a tractor trailer rig and still crimp to your heart's content. But, will it do the job? You bet! After preparing the cable end and slipping the connector over the end, this crimper puts the clamps on this small, but very important job.

Still, is it worth $15.99? Sure. Every tool which does a proper job when used with moderate skill is worth the selling price. Remember, you'd pay $50 or more to have a satellite TV repair person come out to your house to do the same thing. It's true that you may not use this tool often but, if you stay in the monitoring hobby long, you'll find it handy to have. And, you just might have a neighbor who could use some help re-doing his connectors.

■ Making The Connection

Preparing for an F-56 connector is simple, and with a little practice you'll be doing it just

like the pros. In fact, you'll find it easy to make your own TV connector cables. Have you ever noticed how the factory-made TV connector cables are never the length you need? That's no problem with your own crimping tool!

First, using a pair of sharp wirecutters, cut the cable to the proper length. F-56 connectors are about 3/4" long. So, measure about 3/4" from the cable end and, using the blade of a pocket knife, gently score a cut through the plastic insulation jacket all the way around the cable. Be careful not to cut too deeply as the jacket is usually quite thin and you might also cut through the shield. Remove the insulation jacket and discard.

Now, remove about 3/8" of the foam core around the center conductor. Again, be careful not to slice or score the center conductor as you do this. Now, slide the F-56 connector over the end of the cable and press it in firmly. The foil around the foam and the aluminum strands around it are the ground and shield. They complete the circuit to the antenna and guard against RF and electrical interference to the conductor. There should be about a 1/32" of conductor protruding from edge of the F-56 connector. You should be able to feel it as you rub your thumb over the F-56 opening.

Now, place the fitted connector into the larger hexagonal hole in the open crimping tool just behind the first ring of the non-rotating end of the connector. Crimp slowly and firmly (this tool could use a little more padding on the grips) and your connector is completed.

The Finishing Touch

On outside installations it's important to seal the connection. No matter how well you do the job of attaching the connector, rain will find its way into the connection. Moisture is the first enemy of microwaves. It is important to seal the connection well against the elements. Electrical tape and rubber coax boots are inadequate. The best thing to use is called Coax-Seal which is widely available. This black, sticky substance is moldable over the entire connection and assures against moisture penetration. Coax-Seal is not necessary on interior connections.

Transponder Notes

We are currently in the middle of another great wave of satellite changes. Most of the changes are positive and offer increased viewing activity for even the most sleep-challenged among us.

- Highlights of the past two months has been watching the progress of Telstar 402R, the replacement bird for the original T402 which failed to make geosynchronous orbit in the fall of 1994. As this is being written we are awaiting the launch of Galaxy 3R which is to replace another aging satellite by the same name.

T402R is a "hybrid" C/Ku band satellite featuring 24 C band channels and 16 Ku band channels, just like its slightly older sister bird T401. On the C side of T402R we'll see some of the same broadcasters now residing on the fast fading Telstar 302. The Ku side will see the digitally compressed Alphastar programming on 6 channels.

Alphastar is a new kid on the DBS block and you'll be hearing much about this company as the year progresses. Uplinking from its facilities in Oxford, CT, Alphastar plans to offer 120 digital video and audio services to consumers using their own DBS equipment. Since all the DBS providers will be using essentially the same programming it would seem that an eventual price war on the hardware side will be forthcoming.

The DBS race is in full swing and according to industry sources DSS subscribers number just over 1 million as of the end of October, 1995. Primestar customers numbered just under 900,000 after the same period and clunky old C band customers number 2.3 million subscribers with probably several hundred thousand more non-subscribers who are watching only "in-the-clear" programming. The C band universe has fallen on hard times of late and the number of systems shipped in 1995 are roughly half of those shipped in 1994, averaging about 28,000 systems per month being installed year 'round.

Meanwhile, the digital universe is growing at a rate of over 200,000 units per month. It would appear that the combination of competition among the various providers and the word-of-mouth satisfaction with the digital product has caused sales to accelerate as the year progresses. It will be interesting to see where the monthly figure peaks. With retailers in a price war for sales and programmers in a bidding war for subscribers, I would imagine that there's quite a bit more growth left in the sales per month figure.

In a nation where some 60 million households are connected to the local cable-TV company, satellite television's total universe of some five million viewers is not much of a dent. Still, at the rate that customers are flocking to satellite—digital and analog—savvy cable operators ought to be able to see the ominous trend for their future.

- And finally, in the "Please-Don't-Hold-Your-Breath Department," the world of High Definition TeleVision (HDTV) is at hand. Or, just around the corner, or, well, we can see it from here and in just a few short years you may be among the first on your block to stand in line for the opportunity to plunk down tens of thousands of dollars for a really neat TV set.

An exaggeration? Probably not. I was recently in a discount electronics store and saw normal, old-style NTSC glass tube TV sets selling for several thousand dollars.

The Grand Alliance HDTV tests, made last summer, were certified by the FCC in late November of 1995. The system uses progressive-scanning formats and an interlaced-scanning format up to a 60 frame per second scan with a pixel format of 1920 x 1080 (which is the number of active picture elements per line times the number of active lines). It also tested its 6 channel digital surround sound audio subsystem known as Dolby AC-3 which met all expectations. The Grand Alliance is a consortium of previous competitors in the HDTV land rush which has resulted in a level of close cooperation unknown in most electronic research and development projects.

Bill Cheek
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Compuserve: 74107,1176; World Wide Web: http://ourworld.compuserve.com/homepages/bcheek

Building & Upgrading Computers—Part 4

Knock me over with a squirt of TV-tuner spray! My computer upgrade series, concluded this month, seems to have drawn you guys 'n gals out of the woodwork much more than electronics experimenting ever has. My mailboxes are flooded with your support, questions, and comments!

I'm not sure what to make of this rush of communications, but it appears that you like the taste of computers as spoon-fed so far. I have a feeling this column should gear up for the 21st Century Information Age. If you want more such, please let the good people in Brasstown know. Thanks for your solid support on this series!

What Else to Know?

The hardest part of building or upgrading a computer is removing and replacing (R&R) the motherboard. Fortunately, it's a no-brainer. High-performance, low-cost 486 motherboards are small, requiring only basic skills, savvy, and time to R&R. The unfun part might be removing the power supply and sometimes, the floppy, CD-ROM, and hard drives. This is purely mechanical, however, and therefore "do-able." Now let's get a few loose ends wrapped up, particularly about things that plug into the motherboard.

RAM and SIMMS

Random-Access-Memory (RAM) is a small circuit board called a SIMM (single in-line memory module) with 30 or 72 pins and an unimportant variety and number of IC chips. A book can be written about RAM, but the upgrader needs to know only a little, like how to remove and replace SIMMs. (Refer to the SIMMS & SOCKETS diagram) There is a tiny "clip" at each end of the SIMM socket that locks the module in place. These clips need to be spread outward all at one time before the SIMM is pushed forward. You need three hands for this job, but two will do if you're careful until you get the hang of it.

There is no performance difference between 30-pin and 72-pin SIMMs—largely just a pin and socket difference. Depending on the motherboard, 386 and 486 computers generally require four 30-pin SIMMs or one 72 pin SIMM to form one memory unit. (Four 1-Mb 30-pin SIMMs = 4-Mb; one 72-pin 4-Mb SIMM = 4-Mb.) Some motherboards allow both kinds of SIMMs, but read the documentation to be sure! Pentium computers require a pair of 72-pin SIMMs per memory unit. (Two 72-pin 4-Mb SIMM = 8-Mb.)

RAM should not be considered an expense; rather an investment. Modern computers need a minimum of 8-Mb of RAM. 4-Mb can get you by, but that's a serious compromise. If in doubt on the type of SIMM needed for your computer, call a RAM dealer and describe your motherboard and existing SIMMs, and they'll steer you right. RAM is not a major caveat.

Video Controllers

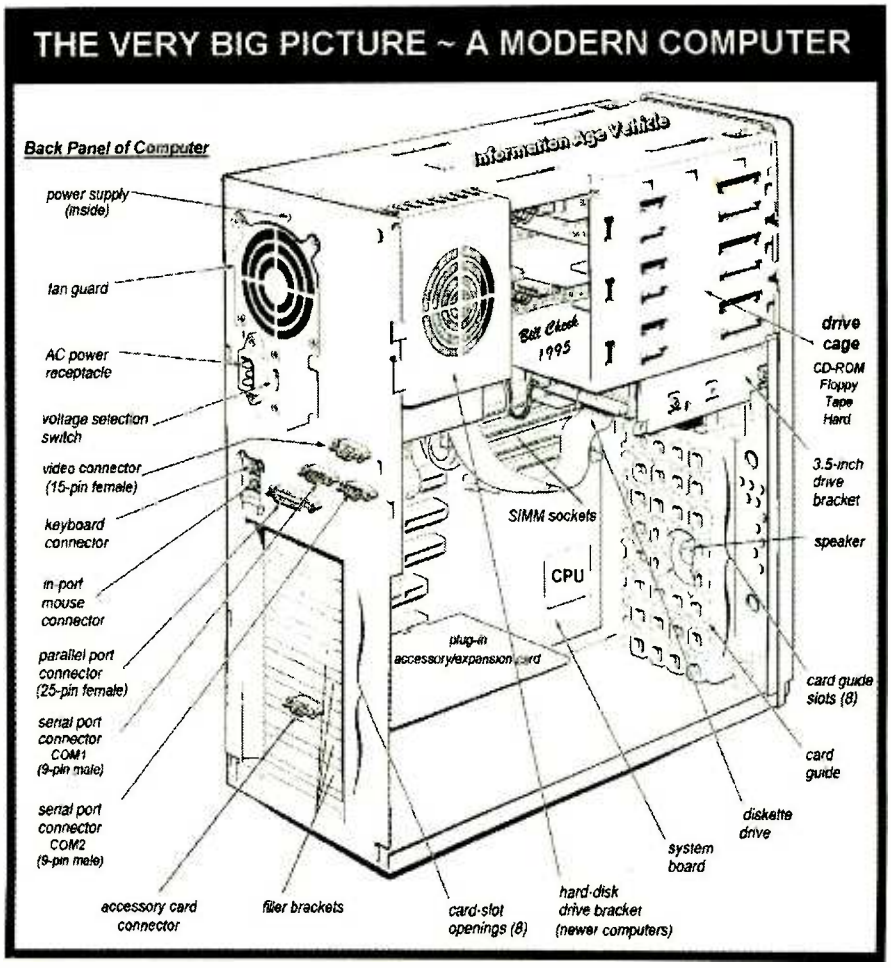
Another book can be written on video, but the hobbyist's needs are not severe. Depending on your motherboard, choices are simple: PCI-bus, VLB-bus, or ISA-bus. PCI isn't common on 486 motherboards, but VLB is, and all PC's have an ISA bus. It makes sense to use the 64-bit PCI or the 32-bit VLB if available. Otherwise, a 16-bit ISA video card will work in all cases.

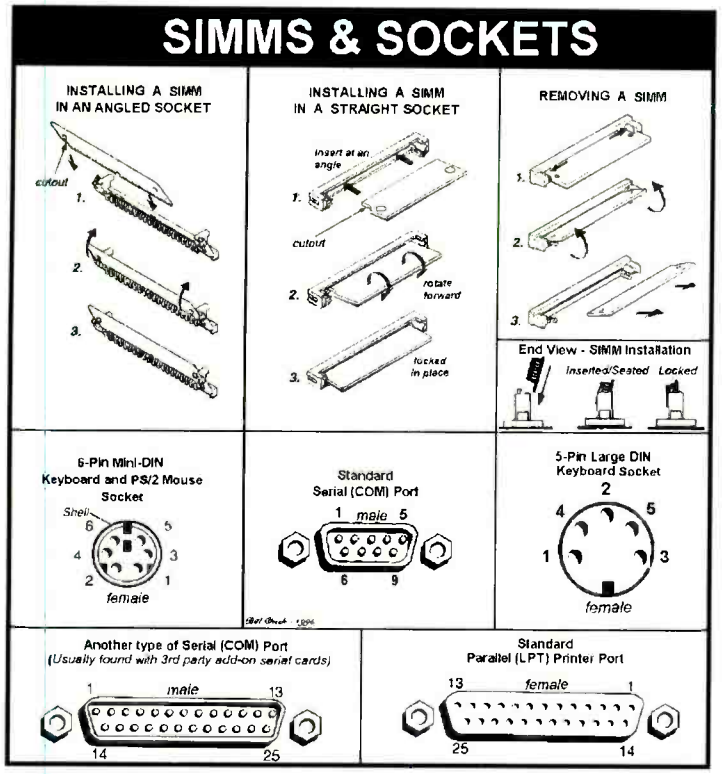
Sophisticated, expensive video is not required on a 486 computer! VLB video cards with 1-Mb RAM cost well under $100 if you shop. The important thing is that your video card have at least 1-Mb of video RAM.

Caveat: 486DX/50 (50 MHz) CPUs are too fast for VLB video. Use a good ISA-video card for this one! All other 486's, including the 486DX4/100 (33 MHz) readily support VLB video.

Disk Drive Controllers

Some motherboards have a built-in hard/floppy disk controller port. Most replacement boards are bare-bones, though. If your





motherboard has the VLB-bus, it probably makes sense to use a cheap and fast VLB disk controller card. Top-of-the-line VLB disk controllers can support at least two hard disk drives and two floppy drives, but some support more.

These same cards are usually equipped with two high speed serial (COM) ports with the 16550-UART, and a bi-directional printer (LPT) port. We're talking well under $50 for the whole banana! Otherwise, plain vanilla ISA-bus IDE and EIDE controllers are available with the same features at the same or less money.

Refer to the CABLES, CONNECTORS, & CPU diagram for details on connecting hard and floppy disk drives. There's not much that you can't glean from the diagram.

SCSI Controllers

SCSI (scuzzy) is a special type of high performance device controller that's largely beyond the scope of this series. If your older computer used an SCSI controller and devices (hard drives, CD-ROMs, page scanners, etc), then move 'em over to the upgraded computer where there will be no problem. SCSI controllers and devices designed for SCSI are more costly, but offer exceptionally high performance, so study up on it at your leisure.

CD-ROMS

If you ran a CD-ROM on your older computer, it will work just fine by the same method in the upgraded machine. Most CD's are controlled either from a sound card or a stand-alone controller.

Communications - I/O

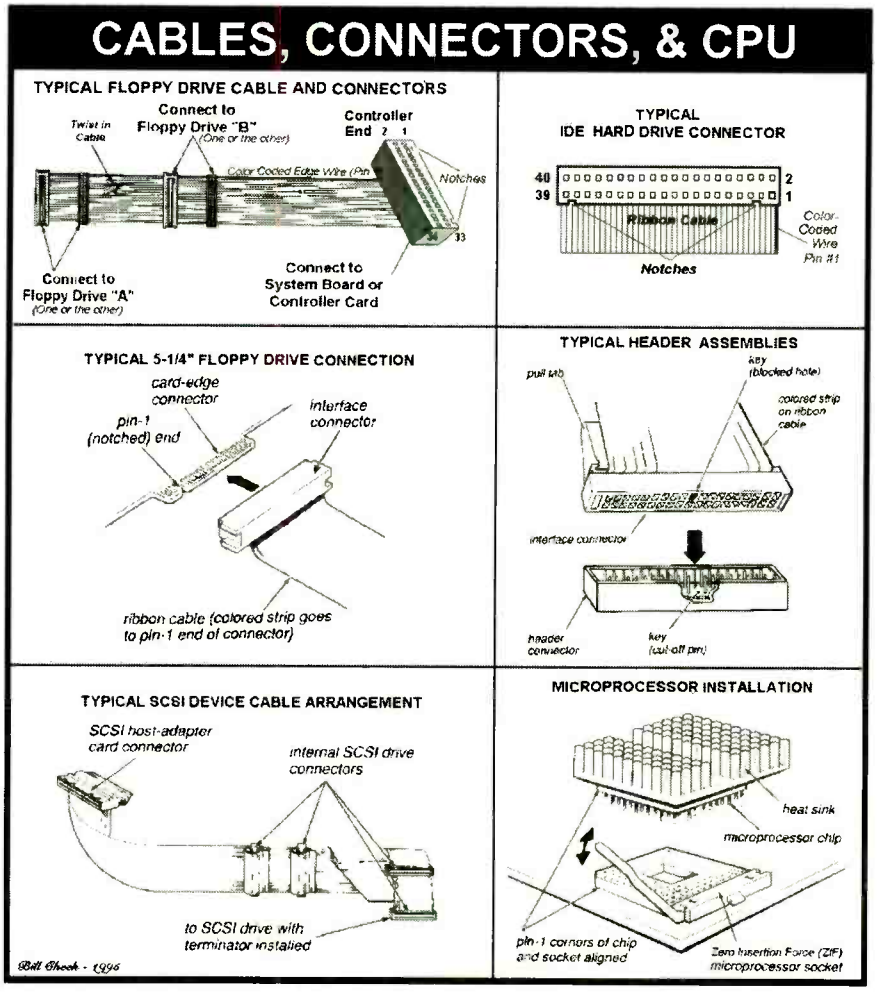
This is the biggie for the "compleat radioist," but it's also a no-brainer. Major-name motherboards sometimes have serial I/O (COMports) built into the board. That's fine, so long as they're driven by the high speed 16550 UART. If not, and if you use a high-speed external modem, disable the on-board serial I/O and install an add-on I/O card with 16550 UARTs—a must for sustained high speed telecom at 14.4-kbps or faster. A serial mouse does not require a 16550 port, but high speed modems do! MSD.EXE—a diagnostic utility that comes with Windows 3.x and MS-DOS 6.0/up—will disclose the types of UARTs in your serial I/O.

Conclusion

There is no conclusion. We've only begun with an outline of the minimum basic system that will be needed to support your radio needs for the next couple of years. You can build it and profit immeasurably from the experience. Give this and my last three columns a close scrutiny and then get to work, and I will be available for support at any of the addresses at the top of this column. If you want me to continue and expand upon computerized radio, please take a moment to let me—and our editor—know.

CONTEST TIME

Remember my offer for the next five months: submit an idea or a project for this column and if selected, you'll receive an autographed copy of my latest book, *The Ultimate Scanner*.



Wayne Mishler, KG5BI

GPS is Everywhere

I sat obediently if not patiently in a squeaky folding chair while the barber of Berryville clipped gray hair from a withered farmer and talked about the deer harvest in Carroll County.

When the farmer agreed with something, which was often, he nodded and the barber had to wait for the wrinkled head to stop bobbing.

Over the years the barber shop has become a museum of northwest Arkansas lifestyle. There's sassafras stick candy in a jar on a scratched glass display case filled with vintage pocket knives for whittling shavings on the front porch. A for-real cash register that goes ka-ching when a barbered head rises from the chair. A wall collection of rusty farm tools, old guns, a twisted horse shoe or two, and a half-dozen stuffed deer heads that stare holes through you.

I shuffled through a pile of magazines on a wobbly coffee table. Some were half my age. All were tattered, except one. Its newness stood out like a neon sign. I picked it up. It was a catalog—for hunters, of course.

"Came in the mail this morning," the barber said to me over the buzz of his clippers while waiting for the bobbing head to settle.

The pages fluttered under my thumb from back to front, the way I read all magazines of questionable interest. Suddenly my thumb stopped on a page of UHF FM walkie talkies and something else I'd never seen before—shirt-pocket GPS receivers.

With eyebrows raised I read the description aloud to share my discovery. "Find your way no matter where your travels take you, using the tracking power of up to 12 satellites." I turned my eyes to the barber and bobbing head. They squinted at me, then looked away and talked about the barber's grandson's heroism on the high school football team last night.

Whip out your trusty GPS

Wow, I thought (silently this time.) You can store your location in memory, plot a course to your destination, and program-in multiple reverse routes. When you feel lost, just whip out your trusty GPS receiver, which looks like a hand-held calculator with computer screen, push a button and a graphic appears on the screen showing your location relative to your starting point and destination.

How do they do it? I knew better than to ask the barber or bobbing head. So when I returned home with my shiny new haircut (the top is naturally shiny) I did some hunting of my own—online with my computer.

Simple Boy Scout trick

I learned, among other things, that the complex GPS process is really based on a simple theory. Think of it as a system of man-made stars (satellites) for navigation. A GPS receiver reads the satellites and finds its location relative to their known positions.

The process is similar to the old Boy Scout trick of using geometry to find yourself at the intersection of several compass bearings to known points. A GPS receiver finds itself by measuring its distances from geostationery satellites. The satellites transmit codes at intervals of one millisecond (one one-thousandth of a second) timed by atomic clocks. A receiver can tell how long it takes the signals to reach it by comparing the transmitted codes with its own internally generated code. Then, by multiplying the time by speed of light, the receiver calculates the distances and plots its position using geometry formulas.

Is that all there is?

Okay, aside from finding yourself, what else can you do with GPS? It might be easier to name the things you *cannot* do with GPS. The only limit is human imagination inspired by sales.

The U.S. government and tax dollars put the 24-satellite GPS system in orbit. Commercial enterprises are bringing the technology back down to earth for practical applications in public safety, business, and consumer markets.

Those markets did not exist until the 1980's. The Trimble corporation began pioneering GPS services in 1982. "There wasn't a market then. We predicted there would be. But we never guessed GPS would go this far this fast," says a writer for Trimble's communications staff.

For example, there's now a GPS aircraft landing system that lets airliners come in on *auto-pilot* all the way to the runway, with accuracy measured in *centimeters*.

San Diego County used GPS to survey the entire county in three days. Then, using the survey, they created a geographic information system that enables firefighters to route emergency vehicles, county clerks to issue permits, and county officials to manage transportation and plan new developments.

Rental cars are already equipped with GPS road maps. Soon, when a consumer calls for a reservation, a computer using GPS will locate a car within walking distance of the caller. A swipe of a credit card will unlock the ignition. And the driver will leave the car at destination for the next customer, instead of returning it.

And now GPS devices are showing up in catalogs for hunters. Maybe I should tell the barber and bobbing heads of Berryville that GPS can help them find their way out of the Ozark Mountains. Then again, maybe not.

Turbocharge your Scanning *and* Save $350!

Purchase the AR-8000 handheld scanner with the Optoelectronics Frequency Scout, plus the SAC 8000 cable to interface the two, and receive ***free*** Grove's FCC Database CD-ROM—a **$100 value**!

Here's what you get:

Grove #	Produce	Sugg. Retail	Our Price
SCN 27	AR-8000 scanner	$799.95	$599.95
CTR 8	Optoelectronics Freq. Scout (latest v. 3.1)	$449.95	$399.95
SAC 8000	Interface Cable	$29.95	$29.95
FCC CD	Complete FCC Database	99.95	FREE
	Package Total	$1,379.80	**$1,029.85**

Please include $4 First Class or $5 UPS shipping ($6 Can. App;$7 UPS)

Optional accessories for Opto:

ANT 27	1-1/2" close range antenna	$31.95
CASE	(Heavy duty leather)	$29.95

Save $350 off Suggested List Price when you buy the Package! Your total is $1,029.85!

Not only is the AR-8000 handheld scanner in a class of its own (this all-mode, all-band unit offers full 500 kHz-1900 MHz coverage—less cellular, restorable*), but its flexibility is unmatched when paired with the Optoelectronics Frequency Scout and the SAC 8000 interface cable. Any frequency tuned by the Scout will automatically tune the scanner—a tremendous aid when trying to scan weak two-way communications.

With the Scout's Memory Tune feature™, the AR-8000 can be tuned later to a frequency logged into memory on the Opto.

Other features of the AR-8000 include 1000 memory channels, AM/FM/SSB reception, selectable tuning steps from 50 Hz-999.995 kHz, edgelit LCD window displaying 44 alphanumeric numbers, autostore, RS232 control, second radio cloning, power saver, and more.

**After you purchase your AR-8000, we can restore the missing 800-900 MHz range for only $40 plus return shipping. The unit is also fully restorable when used with Scancat-Gold software (order SFT 2, only $94.95 plus $4.50 UPS)*

Grove Enterprises

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John Catalano, PhD

At Last - Affordable ACARS

A few years ago, while tuning through the VHF commercial air band, I heard a signal that sounded like a shortened version of packet (a digital communications method used by hams), or a de-compressed military burst transmission. Unbeknownst to me, I had heard my first ACARS transmission.

ACARS stands for Aircraft Communications Addressing and Reporting System. In an e-mail message to *Monitoring Times*, reader Mike Agner wrote, "... I can't seem to find ANY articles on equipment for receiving and decoding this (ACARS)..." This month, for Mike and all the other Computers & Radio readers who have been pondering this question, we will fire up Lowe's Airmaster ACARS decoder.

Figure 1: Main Screen

ACARS was developed in the late 1970's to reduce the work load of airliner flight crews, while maintaining a real-time data link with ground stations. Enroute weather, mechanical problem reports, special passenger requirements, flight conditions, current location, estimated time of arrival, estimated time in range of VHF communications, and much more are some of the uses of the ACARS system.

In the past few years one of the hot topics that you have asked for is information on decoding ACARS. Decoders have been available as part of $300+ digital decoders for a few years, but I knew of no relatively inexpensive ACARS decoder that I could recommend. Fortunately, Airmaster was also listening and has developed just such a product. I can tell you, I couldn't wait to get my hands on Lowe's Airmaster ACARS decoder.

■ Worth the Wait

I first heard of the Lowe ACARS project, which promised relatively low cost ACARS decoding, about eighteen months ago. Having lived in the UK, I knew Lowe long before the introduction of their current stable of very fine shortwave receivers. They confirmed that the project was in the works, but not ready for release. At the 1994 *MT* convention the friendly Lowe people told me the product's introduction would be in mid-1995. Well, I'm sure you can guess my first stop at this year's Grove Communications Expo: Lowe's US distributor. They were ready for me: Before I could say a word, they presented me with Airmaster for review.

Airmaster version 2.0 consists of a single 3.5" floppy, a twenty-five page instruction manual, and the decoder hardware. System requirements are modest: PC/XT/AT with either EGA or VGA monitors. I tried it on a CGA PC and observed some flicker—as the manual warns may occur with CGA—but it was still readable. Using just about any DOS version seems to work fine, but the manual warns against using memory resident programs such as DOS Shell. I didn't experience any problems using DOS 6.

The decoder hardware is housed in a small gender changer-like plastic adapter box. The manual, although quite short, is very well-written, making installation painless. However, make sure you know which serial (COM) port you are connected to and its interrupt number. This can be determined using a program such as QAPLUS. In most cases the interrupt numbers of the ports are standard. The default value will usually do the trick. Software installation is nothing more than three key strokes.

Since the basic program is about 500K it can easily be installed on a 720K floppy. However, since Airmaster can save to disk all decoded ACARS intercepts, I recommend its use with a hard drive. As we will see, during peak air traffic times the ACARS messages come fast and furious—almost ten per minute—so you can see the need for off-line storage. The manual also contains a wealth of information concerning abbreviations and coding of the ACARS that we will need.

■ AirMastering the Hardware Installation

Airmaster communicates to the computer via its serial port. The 2.5-inch decoder has a 25-pin D-type connector at both ends. The female connector goes to the serial port of the computer. A 9- to 25-pin adapter will be required if your serial port is of the 9-pin version. This is not included with Airmaster but can be easily purchased at Radio Shack, local computer stores, or even WalMart. The 25-pin connector at the other end of Airmaster allows you to connect other serial devices to your computer without having to remove Airmaster. Mechanically, the decoder is very similar to AEA's FAX III decoder.

A shielded cable with a 3.5mm phone plug comes out of the side of the decoder and plugs into either the headphones, speaker, or record output of your airband receiver/scanner. Although the record output would be the most convenient to use, since it is independent of volume setting, check your receiver manual to make sure the record output is at least 100 millivolts. I suggest you first get it working using the headphone output.

Tune your scanner to 131.550 MHz and wait for a short buzzing tone. You can also try the secondary frequencies of 131.475, 131.025, 129.125, and, in Europe, 131.725 MHz. Looking at the Airmaster's main screen in Figure One, we can see that it uses the now-familiar pull-down menus across the top of the screen: Logging, Review, Utilities, Quit.

■ Decoding ACARS at Last!

Under the Utilities menu we turned on the data indicator, which shows us the presence of an audio signal (even noise). This data indicator is now visible at the bottom right corner of the screen. Shut the squelch off so you can hear noise with no signal present and adjust the volume until the bottom right corner starts "jumping around." Now wait until you hear an ACARS signal. Either use another scanner tuned to the same frequency or use a Y-adapter on the headphones so that a

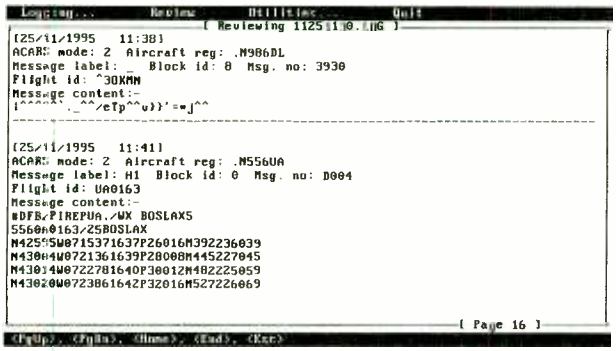


Figure 2: A recorded message

speaker can be connected at the same time as the decoder. If the volume is set correctly the screen will come alive with an ACARS decode.

Look at the field marked "Aircraft reg." All US aircraft are given numbers that begin with N, so if your decoder is working and you are in the US, a group of letters starting with ".N" should appear in this field. Other common letters are: C=Canada, D=Germany, G=United Kingdom and PH=Netherlands. If you get junk in this field, adjust the volume and wait for the next ACARS transmission. Once you get good results mark the position of your volume control and try using your scanner's Record output.

Each ACARS transmission will be separated from the next with dotted lines. Within each transmission there are five (5) fields. The first line gives the time and date of the transmission. The next field gives the ACARS mode. Aircraft registration is useful information, but the Message label, Block ID, and Message number fields are of limited interest. The Flight ID field shows the flight number, from which you can determine the destination and origin of the flight if you have an airline schedule. The airline company is relatively simple to figure out: AA=American Airline, UA=United Airlines, BA=British Air and so on.

Message Content ...Yeah...Right

The last field's title held great promise: Message Content. Now I'll get to the real meat of the message, I thought. The assumption was correct, in a fashion. Yes, Airmaster does a great job decoding and displaying messages in this field. But, even with the assistance of the information contained in the Airmaster manual, the message is not easily understandable by laymen more than 50% of the time.

In Figure One you can see a fairly rare, understandable message from aircraft N976VJ in the Message content field—trouble with their ACARS unit and an estimated time of arrival (ETA). Sometimes only pieces of the message can be understood, such as in the second message, where aircraft N994DL is giving some kind of in-range (INRANG) information.

The majority of the messages either look like these two or a longer enroute time and location, or like enroute weather (WX) as we see in Figure Two. We can assume from the BOSLAX that this aircraft is flying a route from Boston (BOS) to Los Angeles (LAX). Pages fourteen through twenty-five of the Airmaster manual give much more information on what this alphabet soup means. With these pages at your side, and a lot of patience, you can understand much more of the messages.

Logging & Review - Much Needed Features

Because it takes a Rosetta Stone of sorts to understand messages, and due to the frequency of messages, they really require off-line analysis. The Airmaster program lets you sit and analyze messages in two ways. As new messages are received, the existing ones scroll off the screen. By pressing the PageUp key you can go back to see previously received messages while still receiving new messages—pretty neat. After looking at the old messages a press of the PageDn key brings you right to the latest ACARS message received.

Okay, but what about reviewing messages you decoded yesterday or last week? The Logging function allows you to save anything that comes on the screen to a dated/timed file. This file is saved when you quit the program using the Quit function. Next time you run Airmaster and go to the Review function you will be presented with a list of message files titled by the date and time they were saved. Highlighting the one of interest and pressing Enter displays the file. Figure Two is actually a recalled message.

So, What Did I Think?

As a pilot, I found it fascinating just to be able to "ride along" with the messages that I could understand. The messages I couldn't easily understand still told me what planes were in my area. Due to VHF line-of-sight propagation, aircraft flying in a radius of a few hundred miles of your location can be decoded. If you live near an airport you really ought to have this product; I very much enjoyed being "in" on a part of airband communications that was previously useless to me.

In all respects Airmaster performed very well. With the one exception of setting the proper input audio level, the program is bulletproof and a pleasure to use.

What would I like to see done better? No question in my mind on this one: The next Airmaster version would be greatly enhanced by the inclusion of auto clear language conversion software for the Message Content field. The makings of this program feature are contained in manual, but would require supplemental material from ICAO airport and airline designator lists. This is not too different from the weather SYNOP conversion programs that are now available. Perhaps this version could be called Airmaster Gold.

And speaking of gold, at a retail price of $179.95 I feel Airmaster is pricey as it stands. With the added data translation program that we have proposed, the price may be justified. But at $180 it is almost half the price of Universal's ACARS, RTTY, CW, Baudot, SITOR, ARQ, FAX, DTMF, CTCSS, DCS, Packet, POCSAG, and GOLAY Reader/Decoder. Perhaps Lowe can convince the authors of Airmaster to include some of these modes, especially the VHF/UHF-used DTMF, CTCSS, POCSAG, and GOLAY, in a future Gold version. What a package that would be!

Even so, Airmaster version 2.0 is an excellent performer that lets you decode ACARS for less money than any other ACARS decoder/program, using almost any PC, and with such simplicity that anyone can decode ACARS. Check Lowe dealers for availability and latest pricing.

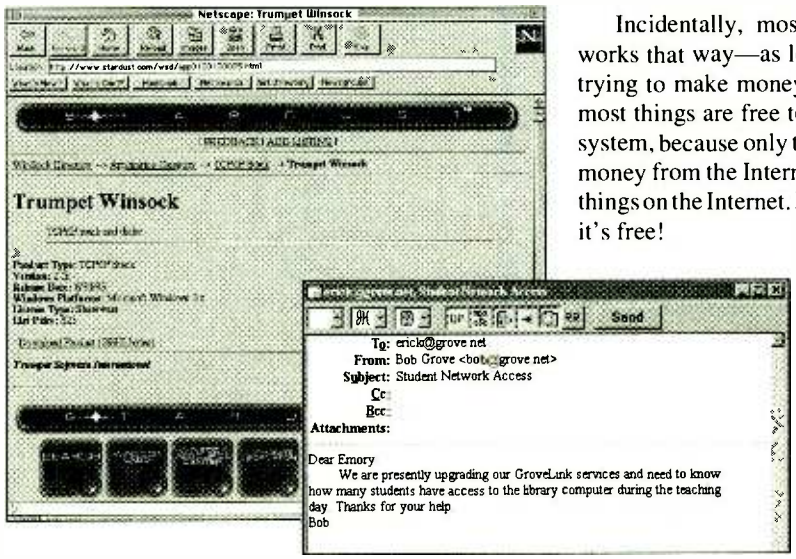
Still to come: ScanStar's latest, Computer Aided Technologies' universal serial interface, K&L Technology's latest software, and much more!

Bill Grove
bill@grove.net

On-Ramp to the Superhighway

The world has changed. People have moved from their porches to enter—and to create—a new world: the vast unknown called the Internet.

The Internet's popularity is quite recent. Until a few years ago, the Net was quite unfriendly; you had to know many complex commands in order to navigate through cyberspace. But, with the introduction of the World Wide Web the Internet became available to both Windows and Macintosh machines. Getting a picture or a document from far away is now as easy as point and click. So what do you need to get started?



■ Map-Reading 101

In order to use the Internet, it helps to understand a few basic ideas. First, the Internet is nothing more than a huge network. It's millions of computers all talking to each other 24 hours/day over our current phone lines, satellite links, and so on. Each computer has its own address, known as an IP address, which is a series of numbers that identify where the machine is in the world.

Since numbers are impersonal and more difficult to remember, there are a lot of very fast, intelligent computers on the Internet that make locating a specific computer much easier. For example, Grove Enterprises' computer system is at the IP address of 205.244.12.2. That's a lot of numbers to remember. However, those super-computers allow us to assign it a name. Ours is www.grove.net—much easier.

Most addresses on the World Wide Web are just as simple. Most addresses start with www, which stands for World Wide Web. Next is a period (.), followed by who the person is. In our case, it's grove, for Grove Enterprises.

Finally, there is another period, followed by the type of organization we are—in this case net, or Internet Service Provider. Some of the other types are .gov for government, .mil for military, .org for organization (usually non-profit), .com for commercial, and .edu for educational. Here are a few examples: www.whitehouse.gov (the WhiteHouse), www.microsoft.com (Microsoft Corporation), and www.unca.edu (the University of North Carolina at Asheville).

■ Mode of transportation

Now that you have the address of where you want to go, how do you get there? First, you'll need a computer. Any computer running Windows (3.1, 3.11 or 95) is fine. Also, any color-capable Macintosh with a 68030 processor or higher is fine (including Power Macs). You'll need a modem (14,400 bps or higher) for either machine.

You'll need some special software to connect your computer. For Windows, you'll need three programs. Trumpet Winsock is a program that connects your computer to ours or another server, and thus, to the Internet. Macintosh's equivalent is MacTCP which comes with version 7.5 of the system. If you don't have it, you'll have to buy it. The best place to get it is from a book called the *Internet Starter Kit for Macintosh version 3*. This book has MacTCP included with it. Trumpet Winsock is available from other sources, such as computer bulletin board services, for free download.

Next, you'll need a WWW browser. This program is the one that allows you to see all the Internet enhancements on your screen. The browser translates the language of the web, known as HTML or Hypertext Markup Language, into a form that is friendly and usable. The most popular browser and the one that we use at Grove is Netscape. Netscape is free for Macintosh and Windows-based systems, as long as you are not a company.

Incidentally, most of the Internet works that way—as long as you're not trying to make money off the Internet, most things are free to you. It's a good system, because only the people making money from the Internet have to pay for things on the Internet. For everyone else, it's free!

Lastly, you'll need an e-mail program. We recommend Eudora. It's also available for free for both Macintosh and Windows systems. This program allows you to send mail to any other user on the Internet in a matter of seconds. And with about 40,000,000 people on-line, that's a lot of power! Even if you're not on-line at the time, your Internet Service Provider will hold your mail for you until you come on-line. Again, these programs can be downloaded from computer bulletin board services, downloaded from the Internet, or given to you by the company that sells Internet access in your area. Try contacting your local college or university if you don't know how to get local Internet access.

These three programs aren't the only things available on-line. They are just the basics. The rest you'll find for yourself as time goes along. The learning curve for the Internet is amazing. You'll start out a bit bumpy, trying to learn all this new terminology, but after getting on that first time, the curve goes straight up. The more you browse, the more you learn, and the more you learn, the more you want to learn! Out there in cyberspace are libraries, games, chat areas, weather, news, magazines, and all of it is interactive, which means it constantly changes, depending on what you're looking for.

This new frontier is not a fad. It's not going to go away. It's the future of communications, even though live communication is in its infancy on the Internet. By the turn of the century, businesses will undoubtedly depend upon the Internet. But for today, it's primarily a very exciting place to be.

WHAT'S NEW?

BOOK REVIEWS AND NEW PRODUCTS

by Larry Miller

Guest reviewers: Bob Grove, Larry Van Horn, Bob Rose

Message Tracker

Just about everyone who has ever turned on a scanner has run into paging noise. It's annoying and –even more irritating– can't be decoded on your average scanner. Pagers are used by everyone from doctors to drug dealers to hormone-heavy teenagers who now wear them as a kind of high-tech umbilical cord to family and friends.

The messages are short and range from mundane to the kind of things that you can't print in a family magazine. The Message Tracker is an amazing, easy-to-use, and surprisingly low-cost add-on that allows you to actually decode and monitor pager messages as they are sent.

You need a scanner, a 386, 486, or 586 computer, and Message Tracker's 3.5" HD disk with software and 25 pin serial interface adapter. Hook-up is simple—one end plugs into your earphone or speaker jack, the other into your computer's RS-232 serial port. Period.

The pager's digital messages are displayed on the screen in readable text and can be saved automatically to disk with time stamps. Message Tracker is a DOS program that decodes Golay and multi-speed POCSAG (2400, 1200, and 512) modes. Mesage Tracker is manufactured by K&L Technologies of Garland, Texas, and sold by Grove Enterprises.

There are two versions ranging in price from $139.95 to $239.95. The Pro version adds text search, display split screen, and the ability to handle groups of addresses. To find out which version is right for you, call Grove's technical assistance line at 704-837-7081 or 800-438-8155 to order.

Cellular Phone Monitoring

There have been several books written about cellular phones, usually from the point of view of the cellular phone user, the cellular phone repairman, or the cellular phone industry. Up until now, there's never been an "inside" book written specifically for the cellular phone *monitor*.

Monitoring Cellular Phones is a Violation of Federal Law is a 60-page book written by a well-known but anonymous hobby radio author who happens to work for a major cell service provider. (Now you know why he's anonymous.) It covers everything from how cell phones work (so you can learn to track calls better) to using your scanner so that you don't miss a thing, to a complete list of frequencies and much more—even a plan for building a simple cellular-only antenna.

Monitoring Cellular Phones is a Violation of Federal Law is available from DX Radio Supply, Box 360, Wagontown, PA 19376 for $9.95 plus $3.95 shipping. You can also order using your credit card by calling 610-273-7823.

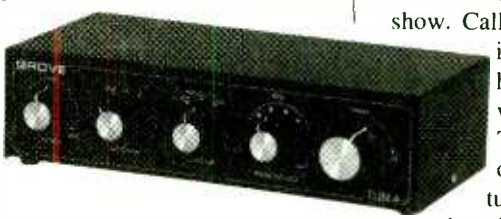
Portable Loop

We have the inside scoop on Kiwa Electronics latest invention: a portable antenna called the "Pocket Loop." The unit is a 12-inch air-core loop that tunes from 530 to over 20 MHz and collapses to fit in your pocket! It's perfect for everyone from broadcast band listeners and DXers, to tropical band buffs and other shortwave listeners.

There's no direct connection to the receiver—a special coupler slips over the whip antenna. You can use it anywhere and it's small enough to take with you on trips, vacation, or anytime you're on the go and still need a precision piece of monitoring equipment. Check with Craig for price and availability. His phone number is 509-453-5492, order line 800-398-1146, home page **www.wolfe.net/~kiwa**. Or, you can write to Kiwa at 612 South 14th Ave., Yakima, WA 98902.

TUN-4A

Sooner or later almost every shortwave listener wishes that his or her receiver could be pushed just a little bit further. The desire often arises just after losing a once-in-a-lifetime catch in a swirl of static. For years, an upgrade to a really professional-level listening post was often achieved by the purchase of a Grove TUN MiniTuner. I owned one of the first versions and remember to this day the difference it made in my DXing.



The TUN has gone through a number of changes over the years and at one time was even dropped from the Grove product line. Fortunately for a whole new crew of DXers, it's back. And the TUN-4A is light years ahead of the palm-sized unit I used.

The TUN-4A is a high-performance, frequency-tunable system for 400 kHz to 30 MHz continuous coverage. It can give you the tools you need to haul in the tough ones or it can be used to make everyday listening more enjoyable. The unit's razor-sharp selectivity allows you fine tuning you only dreamed of. And you can amplify weak signals or attenuate (decrease) interfering signals at will. It's been designed by shortwave listeners, so everything's been thought of: amplified/unamplified preselection, dual antenna switch, dual receiver output, even built-in lightning protection.

The TUN-4A comes with a 120VAC/12VDC power supply, a three-foot PL-259 receiver interconnect cable, and full instructions. It's $99.95 from Grove Enterprises at 800-438-8155, or at Box 98, Brasstown, NC 28902.

Another CB!

Last month Uniden unveiled another new citizen's band radio at the Consumer Electronics show. Called the Pro350XL, it's a portable handheld with seven weather channels. There are a couple of other nice features, too. First, even though it's a handheld, it's got provisions for a 12-volt DC power cord (something buyers of handheld scanners might enjoy). Second, the Pro350XL can scan all 40 CB channels or just two user-selectable channels (called "Dual Watch" by the manufacturer).

The unit comes with built-in mike, up/down electronic channel selectors, volume and squelch control, high/low power selector and an LCD TX indicator. The price was announced as $169.95 and should appear on store shelves around April.

CB Mikes

Sadelta is a Barcelona firm hoping to enter the U.S. Citizens Band market with a line of handheld, hands-free, loudspeaker, and base microphones. Already a well-known name in more than 40 countries, they are just now beginning to market their products in America.

Their base microphones,

looking like something that came off the bridge of the Starship Enterprise, come with a full range of features. If you'd like to know more about the full Sadelta line of CB microphones, contact export director Anton Masso at Sadelta, Parc Tecnologic Del Valles, 08290 Cerdanyola (Barcelona) Spain. He can be reached by phone at 580-01-02. Mention *MT* when you call.

Grove Carries Sony DSS

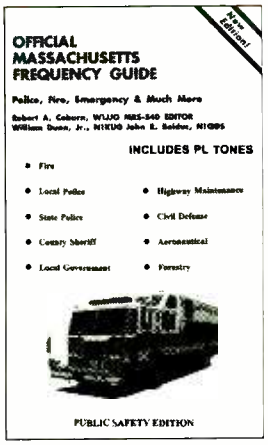
The direct broadcast satellite (DBS) equipment competition continues to heat up now that Sony has released its new line of DSS (direct satellite system) products. Now consumers have more than one choice when making their decision on a 18-inch DSS system. Grove Enterprises is an authorized Sony dealer and now stocks their complete line of DSS products.

The new Sony systems are compatible with the DSS satellite broadcasts from DirecTV® and USSB™. These systems use the small, 18-inch satellite antenna and LNB that have Sony's patented SignalSeeker LED for ease of dish alignment. The consumer can also choose from five different receiver models with prices that fit everyone's pocketbook. These receivers offer a variety of basic features and advanced options.

The Sony line delivers digital-quality picture and sound using the MPEG-1 and MPEG-2 digital compression standards. Basic features of the Sony line include the Express Navigator™ on-screen menu system and the Remote Commander™ remote control that operates the DSS receiver plus most TV sets and cable boxes.

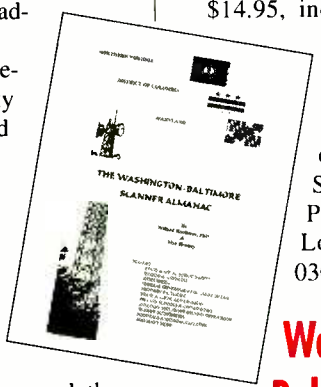
To order the Sony DSS system, contact Grove Enterprises at (800) 438-8155. For more information call the Grove technical support line at (704) 837-7081.
- *LVH*

Official MA Pocket Edition



The new 176 page *Official Massachusetts Frequency Guide* has been updated and now contains some 6,962 frequencies. Included are the new Boston police frequecies, new Boston EMS channels and codes, 800 MHz state police, PL codes, as well as notification systems. The handy pocket size makes it ideal for quick reference and a new commmunity listing format makes it easy to look up frequencies.

The new *Massachusetts Frequency Guide Pocket Edition* is $14.95, including shipping and handling. You can get yours by calling 1-800-351-7226 or from Official Scanner Guide, P.O. Box 525-M, Londonderry, NH 03053.



Washington-Baltimore Almanac

Over an inch thick and more than 500 pages, the *Washington-Baltimore Scanner Almanac* by Willard Hardman and Alan Henney is one of the most comprehensive printed frequency directories we've ever seen! Concentrating on the dense communications spectrum of the DC/Baltimore/Northern Virginia area, the giant reference directory includes federal government and military, state and local public safety and medical facilities, aviation and transit authorities, news media and educational institutions, and many more highly-detailed listings..

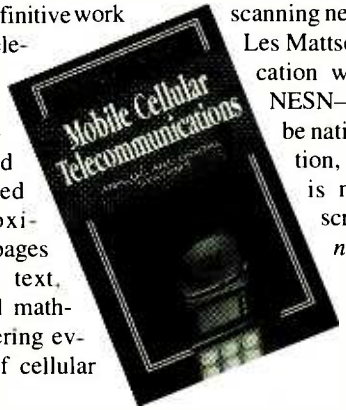
The authors, who edit the Capitol Hill Monitors' newsletter, have provided an unusually comprehensive collection, with frequencies, callsigns, locations, squelch tones, licensees, simplex/repeater identifications, channelization plans, and uses for each listing (as applicable).

The organization of the reference volume is first by location, then service or agency, and finally cross-referenced by frequency. This book is 'way underpriced, a must for every serious scanner enthusiast in the DC metroplex area, and as an excellent federal/military bandplan guide nationwide.

Washington/Baltimore Scanner Almanac, published by authors, is $19.95 plus $3 bookrate shipping from the publisher, Alan Henney, 6912 Prince George's Avenue, Takoma Park, MD 20912-5414; ph. 301-270-2531 or fax 301-270-5774.
- *BG*

Cellular Telecommunications

A year ago we reviewed the first edition of *Mobile Cellular Telecommunications*—William C.Y. Lee's definitive work on cellular telephone systems. This second edition is revised and expanded with approximately 670 pages of technical text, graphics and mathematics covering every aspect of cellular telecommunications systems for the designer, installer, manufacturer, and planner.



Both analog and digital systems are extensively examined from every aspect, including distance computation, foliage loss, specifications of land and mobile stations, foreign cellular systems, antennas, interference, frequency management, operational technologies, switching and handoffs, datalinks and microwave relays, intelligent networking, Personal Communications Service (PCS), and related topics such as the wireless information superhighway and the Diversity Media System with millimeter wavelength and optical networking.

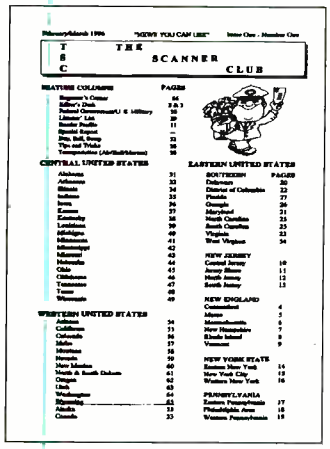
Mobile Cellular Telecommunications is $60 from McGraw-Hill, 11 West 19th St., New York, NY 10011.
- *BG*

New Scanning Club

It was a year or two ago that Les Mattson and Larry Miller merged their respective publications. *North East Scanning News* (NESN) was a popular, regional, frequency-dense newsletter and *National Scanning* was an editorial-heavy national magazine. The merger was a success and both sides continued to grow.

It wasn't too long before it became apparent that certain hardcore *NatScan* readers wanted more frequencies and began deluging the offices with their lists. But where to put them? The frequency section began to take over the magazine! Something would have to give.

And so, *National Scanning* has spun off a new, frequency-only scanning newsletter. The editor is Les Mattson and the new publication will resemble the old NESN—only its coverage will be nationwide. The first edition, containing 60 pages, is now available. Subscriptions to *The Scanning Club* are $24.95 and are available from Mattson at Box 62, Gibbstown, NJ 08027.



The Scanning of Your Dreams

If you dream of New York City-hot scanning action but your town sounds more like Mayberry RFD, Dave Conte may have the answer to your dreams. Dave has produced an all-new series of Fire Department New York (FDNY) 1996 audio tapes that capture actual working fires. You can specify Manhattan, Bronx, Queens, or Brooklyn boro. Tapes are $10.00 each and include a 10-code list which helps you to learn the FDNY language. To order or to request a free brochure, write Dave at Mountain Sales, Unit 257, 163 East Main Street, Little Falls, NJ 07424 or call 1-800-575-1075. Mention *MT* when you ring him up.

TapeTenna

If you've ever been in a situation where you needed to put up an external antenna but couldn't because of a homeowner's association, landlord, or crazed neighbor, let me suggest the "TapeTenna." TapeTenna is an antenna kit consisting of 108 feet of space-age super-conductive, 1/2" copper foil tape, connectors, and an instruction manual.

With the kit, stealth antennas of any description can be mounted virtually anywhere—and then painted over. The kit also lends itself nicely to temporary and emergency operations.

Whether you're a shortwave listener or scanner monitor, the TapeTenna could be the antenna solution you've been looking for. The TapeTenna is available for $29.95 plus $4.00 shipping and handling from Hamco, Dept. MT, 3333 W. Wagon Trail Drive, Englewood, Colorado 80110. Tape-only refills are just $19.95 plus $4.00 shipping and handling.

Wireman

Press Jones is well-known in the ham radio community as The Wireman but, regrettably, is less known among monitors. That's a shame.

The Wireman is a company that deals primarily with the components for producing antennas—coax, wire, insulators, and so forth. Examples: right now, The Wireman is selling a pair of 4" antenna insulators for $1.50 (half of the proceeds go to charity). Other new products include certified quality, 19-strand, 14 AWG, heavy duty "window" type ladderline, and 1/4" dacron double-weave ultra-violet-resistant rope.

You'll be amazed at the variety of wire, cable, and whatnot stocked by The Wireman. If you "roll your own" antennas, you need a copy of his catalog. The mini catalog is free of charge. Their bigger catalog, called *Wire Book III*, is a 60-page practical manual that's just $3.00. Both can be ordered by calling 800-433-WIRE. Or, you can write to The Wireman, 261 Pittman Rd., Landrp um, SC 29356. Tell 'em you read about them in *MT*'s "What's New" column.

Same Time... Same Station

For decades, long before TV and lo-o-ong before the Internet, Americans would gather by the radio to hear the latest installment of their favorite radio program. Would Buck Rogers save his girlfriend Vilma from the notorious Killer Kane? Would Bulldog Drummond finally come across a case he couldn't solve? And what was happening to our boys in Normandy?

Same Time...Same Station is an A to Z guide to radio from Jack Benny to Howard Stern. Included in this unique book are synopses of hundreds of radio shows, their broadcast histories and air times, biographies of individual radio personalities and key network figures, plus 120 vintage photos of radio stars—many never before published.

With over 1,000 entries, *Same Time...Same Station* is an indispensible guide to anyone who wants to relive a golden time in America's entertainment history. The author is Ron Lackmann. The book is published in hardback only, has 304 pages, and carries a suggested retail price of $45.00. Order from your favorite bookstore. (ISBN#0-8160-2862-1)

Yo Ho Yoder and a Bottle of Rum

The ad copy is great: *There's another world on your radio dial... a world of free thinkers and rugged individualists who take to the air in defiance of the Federal Communications Commission.... This is the world of 'pirate' radio.*

Yes, it's another Andrew Yoder book. How is it? I don't know. Never saw a copy. Would I recommend it, sight unseen? A book written by Yoder, sure.

According to the publisher, Andrew Yoder has managed to gain the confidence of dozens of pirate radio operators and learn their secrets. (Wait a minute. Wasn't Yoder himself charged by the FCC with actually *being* a pirate?) Yoder includes numerous interviews with actual pirate operators, case histories of well-known stations, and insights into recent court decisions that he says might legitimize some forms of pirate radio. And here's what's really neat: The book comes with a CD.

Yep, a CD is included with clips of some of the most famous pirate stations of all time — the Voice of the Voyager, CSIC, World Music Radio, KIWI Radio, Hope Radio International, and a number of others. You can get a copy of *Pirate Radio: The Incredible Saga of America's Underground, Illegal Broadcasters*, for $29.95. To get yours, call 1-800-247-6553 or send your money to High Text, P.O. Box 1489, Solana Beach, CA 92075.

Electronic Media Law

Media law is designed by a lot of the same minds that wrote tax law, with the same result: rules that are complex, intimidating, and exclusive. That's why you don't see a lot of everyday individuals starting new broadcasting, cable, or emerging media ventures. At least one story in your corporate headquarters must be devoted to a stable of lawyers.

Electronic Media Law is a book to help current and prospective electronic media professionals. It attempts to provide an overview of the major legal and regulatory issues facing broadcasting, cable, and emerging media, from broadcast station licensing to copyright and intellectual property rights. You won't be able to launch your own network after reading *Media Law* but you'll have a better grasp of the fundamentals. *Media Law* is $39.95 from Focal Press, 313 Washington St., Newton, MA 02158 or call 1-800-446-6520.

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Hwy 64 West, Brasstown, NC 28902

DXAID (Version 4.5)

An HF Propagation Prediction Program for SWLs

By Bob Rose - K6GKU

As the effects of the sun sliding toward solar minimum cause shortwave broadcasters to scramble for less spectrum, listeners are confronted with using lower frequencies and hearing weaker signals. DXAID (Version 4.5) is a PC-based, HF propagation prediction program designed specifically for SWLs. The latest release in August 1995 is a quick, efficient program that has the capability to satisfy a broad spectrum of users, from those who want quick predictions on certain paths to those SWLs who want detailed analysis and to do research.

DXAID passed the first test with this user: "could it be used without reading the 'readme' file or the 'Help' commands?" The floppy I received from its developer, Peter Oldfield, was inserted into my computer, the command "install" was typed in. The DXAID software made a directory, loaded the program, and it was ready to go.

DXAID is a multi-level program; the first level provides a variety of features while the second level actually performs the desired function. The developer has provided various utilities to allow the user to customize the program to suit his special needs. It also contains an extensive database on geographical locations of major cities of the world as delivered. The user can expand this to any size he desires.

The first level contains 10 functions. Only two will be described in detail because of space limitations. The "MAPS" function provides the user with either a Mercator or Great Circle map. The Great Circle can be centered on the user's location or any other location. There is also an "AURORA" mode which will show the location of the auroral oval and its size as a function of K-index.

The most impressive feature of DXAID (4.5) is the FORECAST mode. Once the user has set up the end points of the propagation path of interest and updated the solar/geophysical information, the program quickly provides a screen (and/or printer) output product consisting of (1) a bar-graph of expected signal quality for each shortwave broadcast band; (2) the expected signal level in dB above a microvolt; (3) the number of days a month the user can expect the path to be open; and (4) the expected propagation mode (i.e., 1F0E is 1 hop off the F-region and no E-region modes).

As I learned long ago, the use and popularity of a HF propagation prediction depends a lot on the man-machine-interface or how the output product is displayed. The bar-graph DXAID is a very strong feature. Each bar displays different textures ranging from Excellent to Poor in five ranges. It allows very quick assessment of expected signal conditions for each SW band.

The actual propagation code in DXAID is based on Frickers work in 1985 (ref.1) which uses a quasi-statistical approach. Oldfield has added a function to derive the D-layer absorption, replaced Frickers E-region critical frequency by a more sophisticated one, and modified how certain functions are calculated.

Most of the on-the-air tests were conducted on the 19 and 31 meter SW broadcast bands using a restored Hammarlund HQ-140X and a long wire antenna. DXAID was routinely correct in predicting whether a signal would be hearable and it seemed to be very accurate when it predicted a band would be closed. It was easy to set up and move around in.

It must be remembered that DXAID, as with any propagation prediction program, provides median numbers; that is, 50% of the time the actual observed values will higher than the predicted and 50% of the time they will be lower. Very seldom will they be exactly as predicted. Users will be much happier with shortwave predictions if they use the products as general indicators of how signal conditions will be.

I use the number of days as my main indicator. If the number is up around 30, which is a high "circuit availability," then I can expect to use that band for that path almost every day. On the other hand, the use of the signal strength from this program, or any other program for that matter, shouldn't be taken too seriously—but that is the subject of an entirely separate article.

Over the past four years, I have used and reviewed about every HF propagation program available in North America and some from overseas (ref.2). In comparison, for my location, DXAID (Version 4.5) ranks highly for quickness, ease of use, and accuracy. And the SWL oriented bar-graph is a definite plus.

References:

1. Fricker, R., "A Microcomputer Program for the Critical Frequency and Height of the F Layer of the Ionosphere," 4th International Conference on Antennas and Propagation (ICAP 85), 16-19 April 1985, pp.546-550

2. Jacobs, George (W3ASK), Theodore Cohen (N4XX) and Robert B. Rose (K6GKU), *The New Shortwave Propagation Handbook*, CQ Communications Inc., Hicksville, NY, April 1995 (Chapter 6)

DXAID is available from Peter Oldfield, 251 Chemin Beaulne, Piedmont QC, JOR 1K0; for US$25, Can$30, or UK £15.00, postpaid worldwide.

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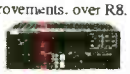

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Lawrence Magne
Editor-in-Chief, Passport to World Band Radio

Sony ICF-SW1000T: The Radio/Recorder We've Been Waiting For (At a Price!)

Even DXers dream about it: a radio that will check automatically to see if long-sought Radio Itititi will manage to come in at 4:30 AM. Of course, that can take the fun out of things, like using a trip wire to bag a long-sought deer.

But for shortwave listeners, motivated more by what programs have to offer than by *Cumbre*-type DX exotica, a radio/recorder that functions like a VCR could be a godsend. Sangean found this out when they introduced their ATS-818CS radio/recorder. It quickly became a nice little seller, even though it has only one event which shuts off only when the tape runs out. However, with a street price under $250, it is fairly priced.

Enter Sony, with its usual technical aplomb. Just before Christmas of 1995, it introduced the ICF-SW1000T, another small radio with a mouthful of a model designation sounding like the code for a KGB operation. More compact than most ordinary compacts, this radio is best described as an ICF-SW7600G, but with a built-in cassette recorder and a three-page-based system of 32 station presets. Given that the '7600G's street price is around $200, you'd figure the '1000T should sell on the street for, say, $299.

Front and back views of the Sony ICF-SW1000T

■ Ouch, the price!

Guess again. Although the radio is so new as we go to press that a street price is only just beginning to evolve, it appears it will initially be around $529-549, although this will probably drop to $499 over time. Incredibly, the '1000T's list price is a sticker-shocking $699!

Why so much? One can only assume the '1000T was priced when the yen was so high that it may as well have been put aboard the Challenger spacecraft. Nervous planners presumably didn't know how much higher it might go, so decided to cover their hindquarters by pricing for a worst-case foreign-exchange scenario. Of course, things have eased up since then, but the di had already been cast.

■ Compact, with first-rate technology

For all that money, you do get a radio that in a number of respects does what none others do, and does it well. To begin with, Sony's micro-thinking engineers have shoehorned all manner of gear into a surprisingly small piece of cabinet real estate. In part, this has been done by using a diminutive speaker and only three little "AA" batteries. Remarkably, only one battery is used to drive the recorder. The other two are dedicated to operating the radio, and they last a surprisingly long time when you consider all they do. Again, this is heads-up Sony technology at the fore, and it works.

■ Easy to operate after jumping initial hurdle

The '1000T is straightforward to operate. Here, Sony has managed to take the sum of its recent world band technology and, this time, to put it to common-sense use. The "page" system of presets, for example, is handy and nigh foolproof, as is operation of the synchronous selectable sideband (which, on our unit, worked very well, indeed).

The radio is surprisingly intuitive to operate...with one glaring exception: One of the two radio batteries has to be installed with the positive end against the battery case's coiled-spring contact. Of course, this flies against a universal norm going back decades. One can almost hear the collective groan of thousands of frustrated users whose first reaction is, "It doesn't work!"

■ Generally worthy performance, with superior sensitivity

Performance is at least as good as on the '7600G, or even the pricier ICF-SW100S. On our unit, at any rate, sensitivity to weak signals below 16 MHz is excellent, as good as we've found in a compact portable—good news, indeed, for West Coast and Midwestern listeners. Above 16 MHz, it's typical of other Sony digital compact models. Although there's no second bandwidth—a surprising omission in a radio at this price point—that lone bandwidth does the trick nicely.

It's been a long time since Sony turned out a world band radio with worthy audio quality through the speaker, and the '1000T is no exception. It's only okay, in the Sony tradition, and the little news-music tone switch does little to rescue the situation. For occasional use, it's fine, but for hour-after hour

listening it becomes tiring unless the standard-equipment earbuds are used.

Two-event recording

The built-in recorder has two user-programmable on/off events, like a VCR, which is a big improvement over the Sangean offering's single event with only the "on" setting being programmable, like an ordinary alarm clock. Operation is straightforward, with good results in both mono and stereo. However, it's easy to activate the recorder by accident if you grasp the radio, as the buttons are at the top, where hands usually land when a radio is grabbed on the fly. True, you can deactivate those buttons with a lock switch, but that also deactivates the radio controls, as well. Rewind time was found to be slow.

All recorders have bias circuits which can cause radio interference, so the '1000T has a three-position "ISS" switch to alter the bias slightly should you encounter internally generated interference while taping. Of course, to put this to use, you have to do a dry run on the frequency to be taped *before* setting the timer unless you're also going to be around to monitor the taped broadcast. In practice, the odds are with you if you just take your chances and record without adjusting the ISS switch beforehand.

The tape has to be flipped manually to record on the second side, but the LCD kindly tells you which side is in use to help prevent accidental erasure of the first side. Ironically, although the recorder automatically detects and adjusts for the type of magnetic media (regular or CrO2) in use, the owner's manual twice indicates CrO2 cassettes are not to be used!

Unlike most compact cassette recorders, the 1000T comes with no built-in mic, which is a pity. However, it does come standard with a plug-in lapel mic.

Nice radio, nasty price

In all, Sony's ICF-SW1000T does just about everything we would hope it to do, and has only minor drawbacks. It's clearly a better recording device, and overall a better radio receiver, than Sangean's ATS-818CS offering. Its size is much handier, too, although the Sangean has better, if also not inspiring, audio quality.

But all this begs the question as to whether the Sony version is worth more than twice the cost of that from Sangean. The answer is arguably no, loud and clear, but for those of us on the testing team it was difficult to imagine going back to the relatively large and clunky ATS-818CS after having lived with the '1000T. Radio lovers like us will probably grit our teeth, quit buying imported cigars for a while, and spring for the Sony. But there's no question that this route stresses performance and convenience, not value. Whatever else Sony offers in the ICF-SW1000T, it is most definitely not value.

This equipment review is performed independently by Lawrence Magne and his colleagues in accordance with the policies and procedures of International Broadcasting Services, Ltd. It is completely independent of the policies and procedures of Grove Enterprises, Inc., its advertisers and affiliated organizations.

Bob Parnass, AJ9S

The Radio Shack PRO-2042 Scanner

Bob Grove reviewed Radio Shack's premium PRO-2035 scanner in October 1994 *MT*. Three months later, we compared it to the classic PRO-2006 and ended by saying, "The PRO-2035 is a very good scanner. With a few changes, it could be a great scanner."

As if to meet the challenge, Radio Shack recently replaced the PRO-2035 with the new PRO-2042. How much better is the PRO-2042? We obtained a PRO-2042 bearing serial number 000614 to find out.

Ergonomics Still Lacking

Both the PRO-2042 and PRO-2035 are manufactured by General Research Electronics and appear outwardly identical except the keys on the new PRO-2042 are dark gray, the same color as the front panel and cabinet. This makes the small keys even more difficult to see than on the earlier model.

In January 1995, we noted that the PRO-2035's swarthy squelch and volume knobs are poorly marked — same story with the PRO-2042.

The front panel headphone jack is still incompatible with common lightweight stereo headphones.

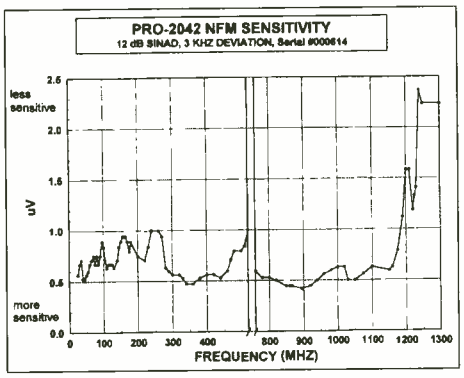
Both models employ LEDs for backlighting but provide no dimmer control. The PRO-2035 liquid crystal display is backlit in green, but the new PRO-2042 display is backlit in amber which affords better contrast.

Same Frequency Coverage

The PRO-2042 tunes 25 - 520, 760 - 823.995, 849.005 - 868.995, and 894.005 - 1300 MHz. There are only three step sizes available: 5, 12.5, and 50 kHz, while the Uniden/Bearcat BC9000XLT includes a 25 kHz step.

More Memory Features

The PRO-2042 and PRO-2035 share the same memory organization and many of the same features. There are 1000 conventional memory channels divided into 10 banks. A 2-second rescan delay can be associated with each channel. The 100 channel bank size is a cumbersome arrangement compared with the Uniden/Bearcat BC9000XLT 25 channel banks. (See March 1995 *MT*.) The PRO-2042 sports 100 Monitor channels.

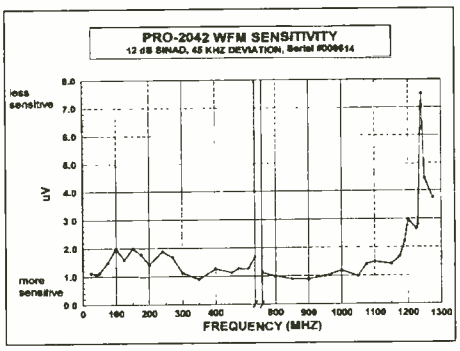


Memory is backed up by a special 3 volt rechargeable battery soldered onto the main circuit board. The owner's manual implies that four days of supplying power to the scanner is sufficient to charge the backup battery so the memory contents will be retained for up to three months in the event of a power interruption.

Like the earlier PRO-2035, the PRO-2042 provides keystroke sequences to:

1) zero all 100 memories in any single bank
2) zero all 1000 memories in all banks
3) zero all the locked out memories in any bank
4) display the number of "empty" channels (i.e., 0.0000 MHz) in any bank.
5) move all the nonempty channels in a bank downwards to fill in the empty channels in the bank
6) transfer multiple Monitor channels into one or more banks
7) transfer all the channels in any bank into the Monitor channels

The PRO-2042 provides new keystroke sequences to sort the channels within a specified bank in ascending or descending order of frequency. Sorting makes it easier to review the frequencies found during an Auto Store operation.



Another PRO-2042 improvement is a memory query feature, as found in Uniden/Bearcat models, which indicates if and in what channel a given frequency is programmed. That is, if one attempts to program a frequency which is already in another memory channel, the PRO-2042 flashes the pertinent channel number. Pressing Enter stores the duplicate frequency into the current memory channel.

Better Scanning and Searching

Unlike the PRO-2035, the PRO-2042 automatically skips over empty channels while scanning—a major improvement.

The specifications state 50 channels per second as the fastest scanning speed, which we confirm using an unsorted mixture of frequencies and modes on different bands. Sorting the memory channels has no discernible effect on scan speed.

The PRO-2042 supports 10 pairs of search limits and allows "linking" search ranges together sequentially. You can set search range #1 limits to 418 - 419 MHz and search range #2 to 165 - 166 MHz, for example, and the PRO-2042 will alternate searching both ranges.

The Auto Store (aka Search and Store) searches between two programmable limits and stores active frequencies in one or more banks. It is "smart enough" to store active frequencies only if they are not already in a memory channel—a welcome refinement of the PRO-2035 which unwittingly stores duplicate frequencies. Our PRO-2042 not only stores the right active frequencies, but it sometimes erroneously stores frequencies 12.5 kHz away, too.

The Direct search mode causes immediate searching starting from the currently displayed frequency. The tuning knob can be used to select memory channels, monitor memories, or adjust the frequency like a VFO. The tuning rate is accelerated when the tuning knob rotated quickly, which is different than the PRO-2035. Our PRO-2042 searches at either 40 or 50 steps per second depending on step size.

The PRO-2042 includes an excellent sys-

Photo by Pam Parnass, N9HRZ

tem for locking out channels during a scan and frequencies during a search. Up to 200 channels may be locked out from a search, compared with 50 channels in the BC9000XLT. Either the tuning knob or lockout review key may be used to scroll through all the locked out frequencies or channels.

Other Features

A Weather key scans 10 channels preprogrammed with frequencies allocated to continuous NOAA broadcasts. The Sound Squelch skips unmodulated signals, i.e., "dead carriers," unless they are noisy. A red LED lights up when the Sound Squelch key is pressed.

A rear panel jack allows for powering the PRO-2042 from a 12 VDC source, although the scanner is large for mobile application.

Sensitivity

We measured the 12 dB SINAD sensitivity in NFM and WFM modes across the 25 - 1300 MHz spectrum and graphed the results in the accompanying charts. Spot checks of AM 12 dB SINAD sensitivity show it to be about 3 dB less sensitive than NFM on the same frequencies. There were no surprises except for less sensitive performance near 1250 MHz.

Measurements made for this review apply specifically to our borrowed unit and other PRO-2042 samples may vary.

Dynamic Range

Back in January 1995, we wrote that our PRO-2035 did not perform as well as our PRO-2006 when listening to weak signals in the presence of a strong station transmitting in the same band.

Using the PRO-2035, a moderately strong signal from the 460.525 MHz sheriff's repeater 10 miles distant obliterates weaker signals on frequencies 50 kHz in either direction and produces hiss on weak signals 100 kHz away. The desense phenomenon is a problem in the 155 MHz band, too. Our PRO-2042 behaves slightly better than the PRO-2035 in this regard but is still disappointing. Neither the PRO-2006 nor BC9000XLT are disturbed.

The PRO-2042 uses different 455 kHz filters than the PRO-2006, and the PRO-2006 NFM selectivity specs are better: 9 and 15 kHz (at 6 and 50 dB points respectively) versus 10 and 20 kHz for the PRO-2042. Experimenters might consider replacing the PRO-2042's 455 kHz NFM filter with a narrower filter of similar size.

Images and Spurious Responses

The PRO-2042 uses triple "up conversion" with a first IF of 609.005 - 612 MHz. We measured the image rejection on several frequencies by injecting signals at twice the IF away from the programmed frequency for each of the IFs. The results are reasonable and appear in Table 1.

While up conversion promises improved image rejection, triple conversion and frequency synthesis circuitry are complicated, and the PRO-2042 has a few spurious responses. By the term "spurious responses," we mean the receiver hears out of band signals besides those normally called images. A 904.5 MHz data transmission appears on 146.495 MHz, for instance. Our scanner rejects 900 MHz signals by about 38 dB when tuned in the VHF-high band. In both the PRO-2042 and PRO-2035, paging images are heard on 159.15 MHz, the sheriff's frequency in the next county.

Like the PRO-2035 we sampled last year, our PRO-2042 receives cellular phone images, reduced in strength by 20 dB, between 1105 and 1115 MHz.

The squelch on our PRO-2042 has an acceptable amount of hysteresis.

Summing Up

The PRO-2042 performs like the earlier PRO-2035 in the RF performance area and we are still somewhat disappointed with the selectivity. The enhanced Auto Store and skipping of empty channels make the PRO-2042 much better at hunting down new frequencies, and the memory query is welcome in this 1000 channel radio.

When purchasing a scanner, it is natural to compare one model against others, so we will differentiate the PRO-2042 from its BC9000XLT competitor. Both scanners are top of the line and worth owning.

The BC9000XLT offers better selectivity, faster scanning and searching, a 25 kHz step size, friendlier keypad and larger tuning knob, more sensible bank size, a great CTCSS option, alpha display, and per-channel attenuator, activity counter, and tape activation.

TABLE 1: PRO-2042 Measurements*

Intermediate frequencies:
- 1st: approx 609 - 612 MHz
- 2nd: 48.5 MHz
- 3rd: 10.7 MHz (WFM), 455 kHz (NFM, AM)

Sensitivity:
- (see charts)

Attenuator:
- 10 - 14 dB, depending on frequency

Modulation acceptance:
- 12 kHz

Audio output power:
- 1.25 watts at 8 ohms with 10% distortion

Tape Out jack voltage:
- approx. 450 mv at 10,000 ohms with 3% distortion. Level is independent of Volume control setting.

Image rejection:
- due to 1st IF: greater than 42 dB
- due to 2nd IF: greater than 65 dB at 97 MHz away
- due to 3rd IF: greater than 50 dB at 910 kHz away

Scan rate:
- approximately 50 channels/sec.

Search rates:

5 kHz steps:	50 steps/sec.,	250 kHz/sec.
12.5 kHz steps:	40 steps/sec.,	500 kHz/sec.
50 kHz steps:	40 steps/sec.,	2 MHz/sec.

* Serial number 000614

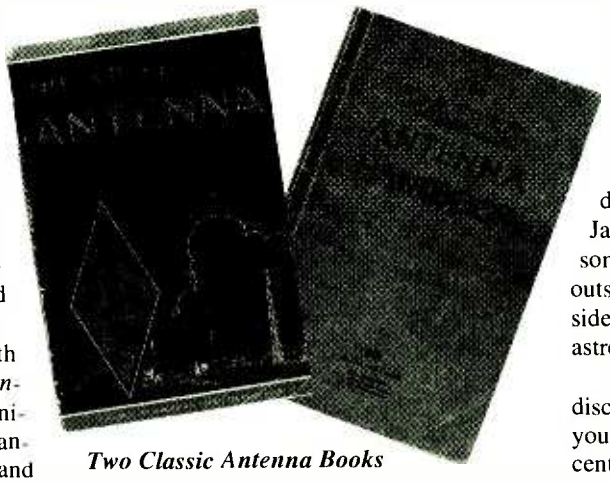
The PRO-2042 includes more channels and search banks, direct search, and more search lockouts, including an easy way to review locked out channels and search frequencies. Experimenters who own a personal computer and elect to spend the money may fit the PRO-2042 with an aftermarket control board and appropriate control software.

W. Clem Small, KR6A, CET

Two Classic Antenna Books

Contemporary radio technology has essentially been developed within the 20th century. Reference books on this technology have appeared throughout its history from the early 1900's on; however, it took a long time for texts dedicated specifically to the technology of antennas to appear. The first actual antenna engineering texts I have been able to find were published in the late 1940s.

Prior to that, in 1936, Woodrow Smith and the staff of *Radio* produced *The Antenna Handbook*, a text filled with technical and practical information on radio antennas. Then in 1939 George Grammer and Byron Goodman produced the first *ARRL Antenna Book*. Each of these excellent handbooks were the harbingers of a series, but unfortunately Woody Smith's *Antenna Manual*—the descendent of the earlier *The Antenna Handbook*—dropped from publication years ago. Today the *ARRL Antenna Book* is without an equal in its extensive coverage of the practical aspects of antenna technology.



Two Classic Antenna Books

Voices From The Past

There are several interesting differences between the older and the more modern antenna handbooks. Possibly the most significant difference between present practice and that covered in the older books is in the choice and use of transmission lines (feedlines or lead-ins). Today almost every communication application that requires a feedline utilizes some form of coaxial cable for that feedline. There is good reason for this difference: Good, low-loss coaxial cable is a relatively recent commodity, not available in radio's early days.

Older antenna systems usually used either twisted-pair feedline or open-wire feedline similar to what we call "ladder line" today. Twisted-pair line was simply two insulated wires twisted into a cable. AC lamp cord was often used for this on the lower frequencies of the HF band. The high signal-loss of twisted-pair cables limited their use to short runs or relatively low frequencies. On the other hand, open-wire line was, and still is, a very low-loss feedline, approached in quality only by the best coax available today, or by hardline. It is also much cheaper than good coax or hardline.

"OK," you may say, "if open-wire line has such a low loss-level, then why did we switch to coax for most applications?" Well, there are three major reasons: one, coax has evolved such that now, in most applications, its loss is acceptably low; two, coax is much more convenient to use as, unlike open-wire line, it can be run beside or through metal, and even run underground or underwater; and three, the signal path for coax is electrically shielded—it is far superior to open-wire line for reducing noise pickup in antenna lead-ins and for reducing signal leakage from the antenna feedline during transmission. Nevertheless, when we must run a really long feedline, then open-wire line (or its near cousin, twinlead), is often our best choice due to their very low loss.

Wire Antennas

Another significant difference between the contents of the old and the new antenna books is the greater proportion of space devoted to long-wire antennas and wire-element beams in the older manuals. How many of us have ever made, much less even heard of, the W8JK beam? This wire beam was the first close-spaced (super gain) amateur beam ever devised. What about the Lazy H, the Sturba Curtain, or the Bruce Array?

(Incidentally, the Bruce Array—a high performance wire beam popular in days gone by—is the antenna used by Jansky in the studies where he found that some radio-interference noise comes from outside our solar system. This finding is considered to be the birth of the field of radio astronomy.)

You may find some of these old beams discussed in today's antenna books, but do you know anyone who has made one recently? These old antenna designs all have considerable gain over the halfwave dipole and good directivity, too. We seldom see them these days, but they will work just as well as they used to, should you choose to make one. If enough readers write in requesting plans for some of these older antennas I'll cover them in a future column.

Another difference between the older and newer manuals is that the older ones often contained plans for wooden beam-towers. Today all towers seem to be metal, but wooden ones were once considered quite acceptable. I have prepared a "freebie" on an old-time design for a wooden A-frame tower, useful up to 40 feet high for light antennas. You can get it by sending an SASE to me in care of *Monitoring Times*.

In the older books there were also several different, non-electric ways to rotate beams from the operating position. These included rope and pulley systems and others made from bicycle sprockets, chains, and pedals.

Receiving vs. Transmitting

The older texts are also more likely to have a discussion of the differences in requirements for a good receiving antenna versus a good transmitting antenna for your specific application—the law of reciprocity notwithstanding! Do you know what these differences are? We've covered them in this column in the past, and will do so from time to time in the future.

One thing I really like in the older antenna books: they often had advertisements for radio products in their back

We can still learn a thing or two from the old timers.

pages. Flipping through the ads in those old books is like a trip into yesterday. We may be cheating future generations of some very pleasant nostalgia by not including ads in *today's* books.

RADIO RIDDLES

Last Month:

I said, "It is common knowledge that a dipole antenna has more gain than a quarterwave groundplane, and lots more gain than the theoretical isotropic antenna. How then can it be reasonable to say, as is often said, that the halfwave dipole has 0 dB gain?"

Well, a decibel scale, such as we use to report antenna gain levels, has no true zero point. To make the scale useful to us we pick a zero point for it. A common practice in antenna work is to compare the gain of an antenna in which we are interested—let's call it "the antenna being measured"—to the gain of a halfwave dipole antenna. To do this we assign the value of zero dB to the signal level obtained from the halfwave dipole. Then if the antenna being measured has more gain than the dipole we will say that it has some value of dB gain over the dipole.

For instance, if the antenna being measured gives twice as much signal-power output to a signal as the dipole gives to that same signal, then the antenna being measured has 3 dB gain over a dipole. If the antenna being measured has exactly the same signal power output as the dipole then it has zero dB gain compared to the dipole, and if it has only half the signal power as compared to the dipole then it has negative gain, -3dB, as compared to the dipole.

Another antenna often used as the basis of comparison for antenna gain measurements is the theoretical isotropic antenna. When using the isotropic standard, its output is used as the zero point on the decibel scale, just as was done with the dipole above. You can tell which standard was used to derive the gain measures reported for an antenna: when the dipole is the standard, then gain is reported in dBd; and when the isotropic is used, gain is reported in dBi.

This Month:

We use the dB, or decibel, frequently in radio work. Splitting the word into its parts, what is the meaning of "deci" and the meaning of "bel?"

You'll find the answer to this month's riddle, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

LETTERS

(Continued from Page 4)

mors surrounding 800 MHz radio systems and promulgate the following truths:

1.Not all 800 MHz systems are alike, nor do they necessarily use the same technology. When commenting on specific 800 MHz systems, care must be taken to differentiate between vendors as well as trunking vs. non-trunking, and digital vs. analog.

2.A poorly designed, constructed, or maintained radio system is as the name implies regardless of what frequency band it occupies.

"Thank you for allowing me to share my thoughts. Please monitor safely!"

I sense some good editorial material here, and I'm itching to get to my file of news clippings to do a little tally of positive vs. negative press, as well as seeing what's been said in the papers about LA's system. True, those systems that work like they ought to probably don't make the news. It's also true there is a tendency to lump together very dissimilar systems by the catch-all phrase of "800 MHz."

On the other hand, the high-pressure salesmanship of some vendors have left some communities feeling bankrupt and betrayed. Scanner listeners have likewise felt misrepresented in the push to sell privacy to a community that may not really need it.

We'd like to hear from you readers. What has been the experience in your community? Do they use 800 MHz frequencies? Digital or analog? Trunked or non-trunked? Is the signal coverage adequate for safety? What's the relationship between scanner listeners and local public service agencies? How much of their communications are in the clear and accessible by the public? How many of you know that your community is planning to move to an 800 MHz system within the next couple of years?

Reporters from other publications as well as citizens whose city councils are debating the issue often consult *Monitoring Times* concerning the success rate in other communities. What has been your experience? We'd really like to know what the listeners (and those who, like Brian, are public servants as well as hobbyists) have to say.

Selected Shorts

"Having recently scanned a copy of both your catalog and *MT* for the first time, I've decided that after having several scanners for years and recently adding a Radio Shack DX-390, I've barely scratched the surface when it comes to the listening possibilities out there. Your publications are a boon to the beginner as well as the serious enthusiast."

—David Kohler, Thornton, CO

Until I saw this B-52 at the Seymour Johnson airshow, I didn't know that MT had its own Air Force!
—Duke Rumley, Madison, North Carolina

Wesley Loven of Spruce Pine, NC, inquired a while back about help with the SE Optiscan scanner. He says, "I have already received two different letters from Grove fans. ... I am a scanner nut! But I am a completely disabled person who had to have a hobby, so I took up scanners, and I couldn't have a better hobby. Thanks for putting my request in your magazine. It really helped me out."

Jacques d'Avignon, *MT*'s propagation guru and author of the feature on DX Camps wrote, "I have just spent three days with some shortwave listeners at a DX camp in Northern New York and I did receive many compliments on the quality of *MT* and on the tone of the articles. To sum up the comments: 'It is always a pleasure to read an article in *MT* and be able to understand it no matter if you are a novice or a pro.'"

Larry Miller, former editor and current "Communications" and "What's New" columnist, made this observation the other day: "This issue (January) marks my 15th year as a full-time radio hobby editor/writer, virtually all of them associated with *MT* and/or its pre-merger predecessor. (*He celebrates his 10th year with MT in June of '96.*) In any case, I figure I've written hundreds upon hundreds of articles, reviewed thousands (somewhere around 2,500) of products and had a hand in at least 25,000 pages of hobby text (writing, editing, books, mags, etc.). If Bob will send a limo, I'll come down for the party." All that time and still not tired of it? It's got to be love.

"I thank you and your staff for a fine publication. You offer material for the mind."

—Henry Schultz, Erie, PA

"I really enjoyed the December Magne piece ("Should You Buy a Receiver Now?"). I wrestled with this issue last year and decided to purchase a Yaesu FRG100. I felt that I was making the right decision, but wasn't 100% confident. Now I *know* why I was correct in buying at the time. Furthermore, the piece leads me to believe that there will be time for the Yaesu to 'earn its keep' before it's time to upgrade. Whew! Thanks."

—Dennis Hoffman, Hartford, WI

Editor's Notes

This one is a note of apology to Bob Coburn of the *Official Scanner Guide*. For the second year in a row he donated several issues of the *Aeronautical Guide* for giveaway at the Grove Expo. We neglected to acknowledge him in the list of donors, and wish to do that now: Many thanks!

Also, readers have probably noticed a couple of switched photo captions. In the January "Scanner Equipment" column the Plectron and Motorola captions are reversed, as is evident from the picture. In the December issue, Jacques d'Avignon has this to say about the December article on Swiss Radio International: "For the past few days I have had an uneasy feeling anytime I look at page 18. I believe that the legends have been interchanged. The antenna at the top is the TOUCAN installed by TDF of France for relay of Swiss radio and others in French Guyana. This is a second generation ALLIS but without the transmitter in the base of the antenna. The transmitter is located in the regular transmitter building because of heat and humidity concerns."

Jacques says what triggered his uneasiness was that there are no plowed fields in Guyana!

Thanks to all our readers and writers. We hope you find our lead feature on monitoring the peacekeeping operations in Bosnia to be extremely useful. May all your hours at the radio bring you the best of monitoring times.

—Rachel Baughn
mteditor@grove.net

The World's Oldest non-US Station

By Arthur Cushen

Most Americans are aware of the early days of broadcasting and the pioneer stations like KDKA which opened up the wireless to the first radio listeners. In Dunedin, New Zealand, on October 4, 1922, the Otago Radio Association commenced broadcasting with the first radio station outside North America—an event which was celebrated by New Zealand issuing a special stamp in honor of the occasion.

In the South Pacific, the opening of the Otago Radio Association station was followed two years later in Australia by their first broadcasters, including 2FC, Sydney, (now bearing the call 2RN), South Australia's 5DN, which began its experimental broadcasts in June 94, and 5CL, which officially opened in November 1924.

Public interest in broadcasting was initially generated in Dunedin by experiments carried out at Otago University by Dr. Robert Jack, Professor of Physics. In 1921 Dr. Jack made the first radio telephony broadcast ever heard in Dunedin with a transmission of speech and music. Interested wireless enthusiasts met throughout 1922, culminating with the formation of the Otago Radio Association on August 1. A temporary transmitter was acquired by the Association and a license to transmit on a wavelength of 300 meters at 50 watts was granted by the Post and Telegraph Department. On October 4th, 1922, the station began broadcasting regularly on Tuesday and Friday evenings.

Financing was difficult to obtain, but due to some generous offers of equipment and studio facilities they managed to continue broadcasting. Their first call sign, 4ZB, wasn't allocated until October 1926. In 1930 a new home was found for 4ZB in Rattray Street, which was to be the station's home for 40 years.

When the first commercial station in Dunedin opened under state operation in 1937, they claimed the call sign 4ZB in common with the calls in Auckland, Wellington, and Christchurch. The Otago Radio Association received the call 4ZD, which they retained until 1948. At that time noncommercial stations were given the "X" callsign, so the Otago Radio Association station changed to its current call of 4XD. Today, the X denotes private radio stations.

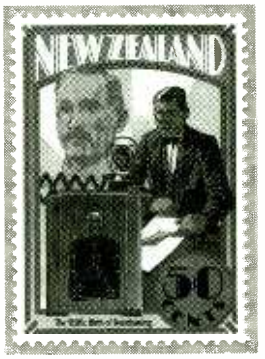
Mr. D.G. Mitchell, a founding member of the Otago Radio Association and Station Manager for more than 50 years, in the old station with a selection of 78 recordings.

For most of its history, 4XD has been operated by volunteers. When the Government purchased all broadcasters in 1936, the Dunedin station was exempt because it was a hobby station and was allowed to continue. However, recent deregulation in New Zealand has allowed 4XD to become a full-time commercial operation, broadcasting 24 hours a day on 1305 kHz with 2.5 W. It features an easy-listening format which is regularly heard as far away as Australia.

The modern 4XD studio at Dunedin which operates a 24-hour commercial service featuring easy listening music.

Special Stamp

The New Zealand Post, in saluting this radio pioneer, said that following the success of the Otago Radio Association the country became wildly enthusiastic about the new-fangled "wireless" that could pick up voices and music from the air, and that by the end of 1927 more than 30,000 homes had radio licenses. The state-operated Radio Broadcasting Company of New Zealand (the forerunner of the present Radio New Zealand) was established in 1925. "The 1920's: Birth of Broadcasting" says the New Zealand stamp, and so it was.



This stamp, issued by NZ Post, commemorates 70 years of broadcasting in New Zealand.

When one reflects on the 70 years of broadcasting achieved by this pioneer radio station, it is clear how much it did to promote radio. Following the early success of 4XD there were many private non-commercial stations in New Zealand in the early 1930s. The original equipment used by Professor Jack for his wireless experiments is stored in a cabinet at Otago University where he performed his first experimental broadcast. One member of the original Committee formed in 1922 was Mr. D. G. Mitchell, who remained with the station for nearly 50 years as its manager and engineer.

In recent years, the studios of 4XD have been moved to three different sites. They are now housed in a modern building in Tennyson Street, Dunedin. The mailing address of 4XD is: The Otago Radio Association, PO Box 404, Dunedin, New Zealand.

Operating on 1305 kHz, reception in North America should be possible under favorable conditions, as many New Zealanders have heard United States stations of similar power around dusk in this country or from 0600-0800 UTC.

The Roots of Modern Technology

By W. Clem Small, KR6A, CET

What's inside your shortwave receiver and scanner that makes them perform so well? What are the critical high-tech components that make them able to do so much with such a small package?

Well, without question, the most hi-tech of the components in your receiver's insides are the transistors, integrated circuits, and microprocessors residing there.

Modern technology really got off the ground when the transistor came into practical use in electronic circuitry. And with the ensuing development of small, efficient, solid-state logic circuits, the growth of digital computers took off by leaps and bounds.

Now, as you know, the same circuits that make a computer work are responsible for what was formerly an undreamed-of amount of control in radio receivers. Did you ever wonder where the solid-state revolution—to which the field of radio owes so much—got started? The answer may surprise you.

Birthplace of "Silicon Valley"

This garage is the birthplace of the world's first high-technology region, "Silicon Valley." The idea for such a region originated with Dr. Frederick Terman, a Stanford University professor who encouraged his students to start up their own electronics companies in the area instead of joining established firms in the East. The first two students to follow his advice were William R. Hewlett and David Packard, who in 1938 began developing their first product, an audio oscillator, in this garage.

From simple beginnings

A small wood-shingle home on a quiet, residential, dead-end street is probably no one's idea of a place where a technical revolution of such world-wide proportions would be started. Well, actually, it wasn't: it was born in the small garage *behind* the brown house.

While working in California several years ago, I "discovered" the marker and took the accompanying picture. The plaque, placed there by the California State Department of Parks, reads:

Many readers will recognize Dr. Frederick Terman as the author of what were probably the most popular radio engineering texts and the most popular radio engineering handbook ever published.

Excellence in radio test gear

Hewlett-Packard went on to become one of the most respected names in electronic test gear. Few radio engineering design labs have evolved that did not depend heavily on Hewlett-Packard radio signal generators, oscilloscopes, and other H-P test equipment to design the receivers of yesterday and today.

Later, when Shockley, co-inventor of the transistor, decided to get into the business of manufacturing transistors, where did he choose to start? Silicon Valley: the by-then giant industrial area which had grown from its humble beginnings in Hewlett and Packard's garage to become the cradle of modern high-technology.

When industry began the really serious production of transistors and integrated circuits, where did the action get started? From the same place that is producing the designs for new, high-powered microprocessors. After all, where do you think the name Silicon Valley came from if not from the silicon used in solid-state devices?

The wonderful high-tech radios we enjoy today owe much to Silicon Valley and the radio and electronic test gear made there. The Valley has become the world's focal point for solid-state, high-technology engineering. Your radio receiver may have been made in the Far East, but without the developments nurtured in Silicon Valley it would never have been made at all.

ASK BOB

ANSWERS TO YOUR RADIO QUESTIONS

Bob Grove, WA4PYQ
bob@grove.net

***Q.** If an AC adaptor is plugged into the wall, but no accessory is connected to the adaptor, is any power being wasted? (Hugh Waters, Singapore)*

A. Yes. There is a transformer in the AC wall adaptor, the primary winding of which remains connected across the AC line; this causes continuous current drain which increases when the output cord is activating an accessory.

Even batteries on the shelf self-discharge due to their internal resistance representing a low current path between the positive and negative electrodes, gradually dissipating their electrochemical charge.

***Q.** Were all of the Radio Shack PRO2006 scanner cellular restorable? Also, is it possible that Tennessee prisons are using 135.160, 135.460 and 135.440 MHz here in Memphis? That's where I'm hearing them! (R.A., Memphis, TN)*

A. When Grove Enterprises bought out the remaining inventory of the PRO2006, every one was cellular restorable, but then one (and only one) customer sent in a late model of the PRO2006 which was missing the notorious diode and couldn't be restored. Perhaps there was a last-minute "fix" to prevent restoration, but it's hard to make that determination with only one example.

The three frequencies you list are in the aeronautical band; the FCC and the FAA are extremely protective of those frequencies to prevent potentially disastrous interference. It is more likely you are hearing a scanner-generated image from another frequency range, although quick arithmetic doesn't bring up any logical alternatives at the moment. Readers?

***Q.** Is it possible that the growing use of Digital Voice Privacy (DVP) among law enforcement agencies is more due to the zealous marketing of Motorola than a demonstrated need for expensive, high-level, voice security by the agencies? (Simon L. Scheiner, Cherry Hill, NJ)*

A. Sure. Motorola is extremely aggressive, some clients say unscrupulously so. We are presently investigating a complaint from a major corporation that a promotional Motorola video tape displays a copy of *MT*, characterizing subscribers as criminals who engage in cellular telephone fraud! Officials in Florida have been complaining for years that their state-wide, Motorola communications system doesn't perform as promised, with serious areas of non-coverage.

***Q.** What is the direction-finding antenna of choice in the 6 MHz range? (Hugh Waters, Singapore)*

A. Pretty much whatever *your* choice is. At those long wavelengths, beams are out, but open loops work reasonably well; check the new release from Kiwa. Wire rhombics and Beverages are fine for fixed installations, and government stations use Wullenweber arrays ("elephant cages") or Adcock arrays.

The problem with DFing at the higher shortwave frequencies is the arrival of skywaves ("skip") which throw off bearings considerably.

***Q.** Are the so-called "tropical bands" really still listened to by locals in third world countries? In my travels to Thailand, Indonesia, and Malaysia I've never heard of radio listeners tuning to these services since they have plenty of medium wave, FM and satellite stations. (Hugh Waters, Singapore)*

A. According to Larry Magne of International Broadcasting Services, these stations are widely listened to around the world, primarily by the economically disadvantaged who cannot afford the satellite terminals and desire more regional information than provided by the local AM and FM stations.

Bob's Tips of the Month

What is a BC230XLT?

When is a BC230XLT really a BC220XLT?

Uniden has released their newest scanner-in-a-box, the BC230XLT. It looks surprisingly like the BC220XLT—so surprisingly, in fact, that it even says BC220XLT on the scanner! What gives?

According to a Uniden spokesman, the number refers to the entire package; the BC220XLT is now supplied—at slight additional cost—with a spare rechargeable battery and charger.

How can you keep wire from slipping when you wind a coil on a form?

William Mewes of Oakville, Ontario, first wraps his tubular coil form with double-sided carpet-layer's tape; then, when he wraps his turns of fine wire, they stay right in place. A spray layer or two of clear varnish finishes the job.

Is there a way to shut off that annoying "beep" on your PRO43 scanner?

Robert Cross of Tucker, Georgia, advises that a ten pin connector (CN 3) on the logic board, the last circuit board down during disassembly, is the key element. Carefully unplug the cable, gently bend down pin 6, and reseat the plug. That takes care of it.

Robert advises that most scanners have one lead from the microprocessor that it used for the beep tone control; if you have a schematic diagram you should be able to find that pin and follow the wiring to a similar plug. Sometimes it is necessary to cut a wire or a trace.

What are the Tropical Bands?

By Jacques d'Avignon

Over the last few months there has been some talk about the use of the "tropical bands" by North American broadcasters. Let's try to understand what are these bands, why they were set aside, and how they should be technically used.

The tropical bands are normally referred to as the 120, 90, and 60 meter bands. You will notice that the 75 meter band, which is used in Asia and Europe by at least France and Germany as a domestic band, is not included in this list.

Originally the tropical bands were set aside to be used by countries between the Tropic of Cancer and of Capricorn for domestic services. Why domestic services in those particular bands? The area to be covered by a "domestic" station in tropical countries is geographically very large—very unlike what we here consider a domestic service on the normal 530 to 1700 kHz band. We also have to remember that most tropical countries have a very lush, dense vegetation.

Using a normal AM band frequency, a regular transmitter/power combination, and antenna system to cover the "tropical domestic" area, the ground-wave signal would not reach a very large portion of the intended market. The tropical vegetation has an attenuation of about 100dB/kilometer at 1000 kHz (!), and increases rapidly as the frequency increases. Thus, the power necessary to cover a suitable area around the station would be enormous and require extremely large amount of electricity to operate the transmitter.

By transmitting on a frequency in the tropical bands and loading an antenna that directs the energy mostly in the vertical plane (such as a Shirley or a Jamaica or simply a half-wave dipole), the local tropical station can cover its market with very low power and good reliability. This propagation mode, called Near Vertical Incidence Skywave (NVIS), is what normally is used on the tropical bands.

This propagation mode relies on the fact that the Maximum Usable Frequency (MUF) above the station will support such propagation mode without the signal getting lost in space; most of the radiated energy will return to the ground.

Some of the stations of the Australian outback –Alice Springs is a good example– are apparently using such a propagation mode in the 2.3 MHz band, but part of their power is refracted and we hear these stations in Eastern North America.

If a station in North America transmits on the "Tropical Bands" using the standard, low angle HFBC antenna instead of using the NVIS propagation mode, the signal will not be of very good quality when it reaches the intended target whether it be Europe or Africa. If the NVIS mode is attempted, in order to cover an area around the station, the signal that "may" reach overseas targets will be very poor.

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 **bob@grove.net**. (Please include your name and address.) The current "Ask Bob" is now online at our WWW site: www.grove.net.

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FOR SALE: Completely new—unused in original box, Japan Radio NVA 319 speaker, $50. Allen Young, day (510) 416-6638; eve. (510) 376-7765.

For Sale: YB 500, 3 mo. old, mint, extras included. Call (717) 399-9291.

Uniden 4900 new in box with 2 remote controls. Will pay shipping, $550 or best. (203) 288-4477.

ICOM R71A RECEIVER 500 kc filter, P.B.T.. $800 OBO.. Dan, N2PTF (315) 684-3045.

ICOM R7000, new in box, $1100; AR-2500 with computer control software and SpectraVu spectrum analyzer, continuous coverage 1 to 1300 MHz. $500; Poor Mans Spectrum Analyzer, complete with digital frequency readout and manual $225. Dave (910) 868-5234.

WANTED: Radio West's "Shotgun Loop" (AM antenna) or any similar product to fit on to Sony 2010. Allen, day (510) 416-6638; eve. (510) 376-7765.

FOR SALE: Kiwa MW Loop Antenna. Cost me $359. Like new condition. Asking $180 plus UPS. Tom Kulis. (970) 226-6313 after 6 PM.

For Sale: Kenwood R-1000 and Sony SW-1. Both excellent, prices firm, shipping incl. Call: Pete (205) 773-5505.

R-390A, with rare cabinet, all manuals, covers, extra new PTO, Miltronix rebuild, collectors quality. R-1051, govt.rebuild, all papers, built in 89. Mint $325. JRC NRD 535D with speaker, xtal osc., $1300. John Miller (907) 337-9157, AK time, please.

FOR SALE: Universal M7000V7 Decoder, Epson FX85 Printer, Goldstar 9" Amber Monitor. All Manuals. Mint $750. Call Carl (516) 427-7782, 1-5 PM EST.

PRO-2006 new in box, $475; PRO-2022 200CH., full 800 MHz , $240; Bearcat 855 100CH., full 800 MHz, $150; PRO-2004 New backlight panels, $42.50. Call (303) 840-0727. Please leave message.

Kenwood R2000 narrow filter, box, manual, $350; Sangean ATS 803A, Box, Manual, $110; Realistic DX 150A (analog radio), $100. Call Roger (603) 357-7741.

Yupitero MVT-7100. New in box including all accessories. (519) 945-6370.

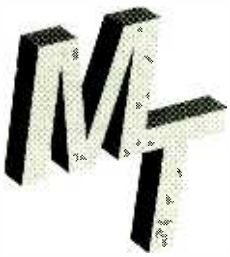
TAKE A TAX DEDUCTION: Radio club for mentally "challenged" residents is in need of the following equipment donations: six 6mtr sideband and VHF/UHF portable radios; converters for 50-144-220-450 MHz. Please send to Orchard Village Radio Club, Attention Ronald Fine K9RRK, 7640 Marmora Ct., Skokie, IL 60077. A tax letter will be supplied for all donations.

LOOKING FOR A FIX-IT CHALLENGE: Martin Theil would like old or outdated CB radios, scanners, or any type of electronic equipment which would otherwise be discarded. He says he is paralyzed but needs activities to keep his hands occupied. Send to: Martin Theil, 3521 Atlantis Dr, Holiday, FL 34691.

CLOSING COMMENTS

Bob Grove
Publisher

The Scam That Wouldn't Die



No sooner did I finish writing my feature on medical quackery (Nov "Radio Reflections) than I spotted an ad which looked all too familiar—a new pitch for an old scam: "Turn your house wiring into a giant TV antenna." This recent marketing hyperbole is being foisted by a mail order ad appearing in *USA Today* for the "Spectrum Universal Antenna/ Tuner." It isn't accompanied by a bottle of snake oil; it does come with a money-back guarantee. Good thing; you'll be wanting your $43 back.

If you want to try this huckster classic with less risk, get the Radio Shack version (15-1835) for about $13; it won't work either, but it's more convenient to return. A check with our local Radio Shack outlet confirmed a 100% return-for-refund rate from all buyers of this device who actually believed it would give them better TV reception. I advised Radio Shack's buyer when it was first brought out that this was a quack device but, instead of dropping the worthless gimmick, Radio Shack now advises "Great for strong signal areas." So is a paper clip.

The Spectrum ad advises customers to get rid of their antennas and substitute their device which plugs into the wall socket and uses "your home's electrical wiring to give non-subscribers, cable subscribers and satellite users better TV reception!" Yeah, right. The ad continues, "Your TV will suddenly display a sharp, focused picture thanks to its advanced design..." Truly amazing. And I always thought that focusing was done by the TV set.

A little—very little—theory

The *USA Today* ad shows a graph captioned: "Other antennas can't offer center frequency tuning like the Spectrum Antenna can. They only offer such tuning up to the edge of the center frequency. As a result your TV picture remains snowy." I tolerate a little marketing hype, but that's a lie.

So how does it boost TV signals? According to the ad's pitchman, David Evans (think that's his real name?): "Just think how much power runs through your home's AC wiring system—all that power will be used to receive your local broadcasting signals."

Whoa! Wait just a darn minute! Does good ol' Dave really expect me to believe that somehow my home's 50,000 watts are being used to give me snow-free PBS? I can see the lights dimming now, all over the neighborhood, as I sit down to watch NBC Nightly News and plug in my power-hungry Spectrum Antenna antenna. Hope my circuit breakers don't fry.

We are in a period of unparalleled technological acceleration; Americans are ripe for the picking. P.T. Barnum once observed, "there's a sucker born every minute." W.C. Fields' cine-character refined that observation: "...and there's somebody born every ten minutes to take advantage of that sucker!"

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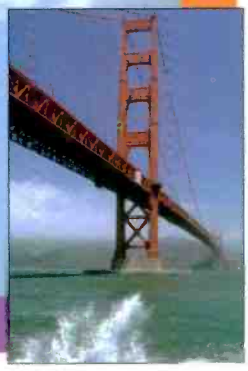

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