Vol. 15, No. 11 November 1996

U.S. $3.95
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Monitoring Times®

Your Personal Communications Source

Printed in the United States

Face-Off: ICOM R-8500 vs. AOR AR-5900

Eyes in the Sky and Other New Olympic Technology

Guide to International Broadcaster Web Sites

Shopping with Your Scanner at America's MegaMalls

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PERIODICALS

NEW Xplorer

It's a receiver

a counter, a recorder, a decoder....

U.S. Patent No. 5,471,402

•Two-Line LCD display, first line displays frequency. Second line switches between either CTCSS, DCS, DTMF, Signal Strength, or Numerical Deviation.

NMEA-0183 GPS Interface,-Connect your GPS to the Xplorer for Mapping applications. *(GPS and Mapping Software not included)*

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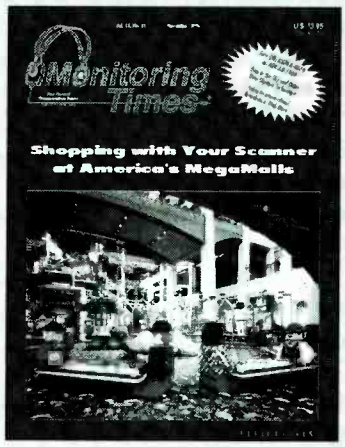

Cover Story

Scanning the MegaMall

By Chuck Penson

One of the main attractions inside Minnesota's Mall of America is LEGO's Imagination Center, brimming with color and incredible LEGO block creations. It also houses "Camp Snoopy"—a full-size amusement park with roller coaster and seven-story Ferris wheel. The sheer size of this mega-mall is mind-boggling, requiring the coordination and services of a small city.

Like all cities, it provides its share of scanning opportunities. Thanks to a group effort, our author sleuthed out the frequencies to plug into your scanner in advance of your visit. Story begins on page 8.

Not interested in mingling with the mega-crowds November 29th? Any mall anywhere can provide plenty of entertainment—see the Scanning Report on page 30 for more on mall scanning.

Cover photo courtesy LEGO Systems, Inc.

CONTENTS

Reviews:

Perhaps the surprise of the season is Drake's SW8, which has experienced so many enhancements it deserves to be called an "SW8A" (even though such a model doesn't exist). If you haven't given a serious look at this portatop, Magne says it deserves a second look. See page 92.

If you always wanted an oscilloscope on your bench, but could never afford one, let Bill Cheek introduce you to ProbeScope—a small, computer-interfaced, probe-type scope from Radio Shack (p. 82).

Yet another ACARS decoder? Universal Radio has introduced the ACT-1, and John Catalano finds it yet another—and a very valid—approach to decoding these aircraft communications addressing and reporting messages. See p. 84.

DEPARTMENTS

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Mfg. suggested list price $699.95/**Special $333.95**
400 Channels · 20 banks · Twin Turbo Search/Scan Frequency Transfer · VFO Control · Automatic Store 10 Priority Channels · Selectable Mode · Data Skip Frequency step resolution 5, 12.5 & 25 KHz.

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25.000-549.995 MHz., 760.000-823.995 MHz., 849.0125-868.995 MHz., 894.0125-1,300.000 MHz.

The Bearcat 3000XLT is the ideal handheld radio scanner for communications professionals. This handheld scanner scans at 100 channels per second and searches at a rate up to 300 steps per second. A selectable attenuator eliminates annoying intermodulation from adjacent frequencies in highly populated areas. Selectable AM, Wide FM and Narrow FM modes allow you to change the default receiving mode of the BC3000XLT. For maximum scanning pleasure, order the following optional accessories: **UA502** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter $14.95; **LC3000** Deluxe swivel leather carrying case $34.95; **BP2500** rechargeable nickel-cadmium battery pack for up to five hours of dependable use $29.95; **ANTMMBNC** Magnetic mount scanner antenna with BNC jack and 12 feet of cable $29.95. **ANTSGBNC** Glass mount scanner antenna with BNC cable $29.95. The BC3000XLT comes with AC adapter, belt clip, flexible rubber antenna, earphone, owner's manual and limited one year Uniden warranty. Order today.

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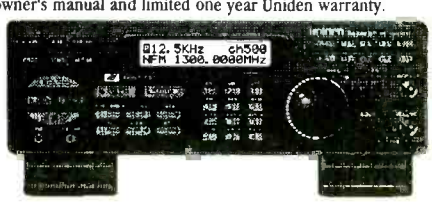
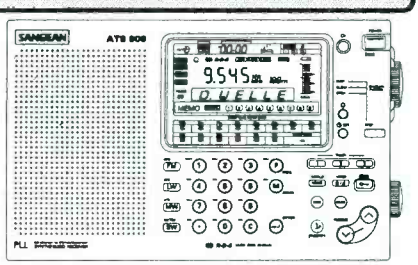
Frequency Coverage: 25.000-549.995 MHz., 760.000-823.995 MHz., 849.0125-868.995 MHz., 894.0125-1,300.000 MHz.

The Bearcat 9000XLT is superb for intercepting communications transmissions with features like TurboSearch™ to search VHF channels at 300 steps per second. This base and mobile scanner is also ideal for intelligence 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 limited one year Uniden warranty.



Shortwave Radio



Sangean ATS909-Z Shortwave Receiver

Mfg. suggested list price $399.95/**Special $283.95**
Size: 8-1/4" Wide x 1-1/2" Deep x 5" High
Frequency Coverage: **LW: 153-513 KHz.; MW: 520-1710 KHz.; SW: 1711-29999 KHz.; FM: 87.5-108.0 MHz.**

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UA502 cigarette lighter adapter for Bearcat 3000XLT	Save $5.00
BC002 Bearcat CTCSS tone board for BC760/890XLT	Save $20.00
BC003 Bearcat switch assembly for BC002	Save $10.00
BC005 Bearcat CTCSS tone board for Bearcat 9000XLT	Save $20.00
EX711 Bearcat scanner external speaker	Save $10.00
LC3000 swivel deluxe leather carrying case	Save $10.00
BP2500 Bearcat ni-cad battery pack for BC3000XLT	Save $10.00
MB001 Mobile mounting bracket for BC9000/890XLT	Save $10.00
ANTSGBNC glass mount antenna with BNC	Save $10.00
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Cobra 148FGTL CB with frequency counter	Save $20.00
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Cobra 2010GTLWX-Z SSB CB Base (†$25.00 shipping)	$299.95
Maxon GMRS210+3-Z1 GMRS transceiver/SPECIAL	$161.95
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Bearcat 560XLA-Z base/mobile	$72.95
Bearcat 220XLT-Z handheld/SPECIAL	$199.95
Bearcat 178XLT-Z base with weather alert	$119.95
Sportcat 150-Z handheld with 800 MHz.	$151.95
Bearcat 148XLT-Z base with weather alert	$83.95
Bearcat 120XLT-Z handheld	$119.95
Bearcat 80XLT-Z handheld with 800 MHz.	$134.95
Bearcat BCT7-Z information mobile	$152.95
Bearcat BCT10-Z information mobile	$139.95

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Why miss any radio or telephone transmissions when you can record everything with an affordable Eventide brand digital communications logger? You get powerful performance with a single DDS-2 DAT drive that records more than 500 channel hours of storage. When you want to record trunking systems, for even more recording time, the Eventide VR240 Mark III logger gives you over two months of unattended recordings on up to 24 channels when ordered with *dual* 8 mm. high density CT tape drives. All systems include 60 channel hours (250 & 500 hours optional) of instant recall. Ideal for quickly replaying emergency calls or radio traffic. FCC approved telephone interface is built-in and beeps are selectable on a channel-by-channel basis. Other options include GPS time sync.

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VR2408MM8 8 channel, single 8 mm. drive, 875+ channel hours	$15,595.95
VR2408MM16 16 channel single 8 mm. drive, 875+ channel hours	$17,790.95
VR2408MM24 24 channel single 8 mm. drive, 875+ channel hours	$19,985.95
Option-add 8 more record channels to a VR240 8 or 16 channel	$2,095.95
Option-add 2nd DAT drive to VR240DAT Mark III system	$2,995.95
Option-add 2nd 8 mm. drive to a VR240 8 mm. Mark III system	$5,699.95
Option-ECW40, satellite chronometer GPS for external time sync.	$1,895.95
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LETTERS

Techno-quackery

Several recent letters relate to the topic of Bob Grove's August "Closing Comments" which adddressed a variety of topics, among them "techno-quackery" and keyless car entry systems. Here are some of your responses.

• "I can relate to your concern about techno-quackery. During the mid-1980s, I was a Radio Shack store manager, and Tandy Corp. was just as guilty as any other electronics retailer. One item that comes to mind was a tabletop TV antenna in the shape of a satellite dish. It sold for $19.95, but it performed no better than our $3.99 rabbit ears. All store managers hated selling it, because we knew it would come back, and we would have an unhappy customer on our hands.

"In 1984 at Radio Shack's annual managers' meeting, Radio Shack's VP of marketing openly joked about this antenna. When asked why Tandy Corp carried the antenna, his reply was, 'If you sell 10 of them, maybe one of them will stay sold.'

"Although none of my customers ever lost any money, it did create ill will and also cast doubts on the quality of other Radio Shack products. In other words, 'If the antenna is sub-standard, maybe their computer is also not worth buying.'

"I am writing this letter to say thank you for your honest way of doing business. Over the years, I have seen many product reviews in *Monitoring Times* by you and Larry Magne, followed by an ad in the Grove catalog for the item. If a product is so-so, there is never any undue hype when it is offered for sale by you. *Economy, budget-minded, beginners radio*, etc., are all acceptable terms the public understands. Also, if an item is really bad, you don't sell it at all. I can all but buy an item just on your word alone.

"If you ever decide to go into the used car business, let me know. I'd buy one from you sight unseen."

—*Jim Weber,* Colton, California

• "In regard to your editorial comments in the August issue (p.104), under the heading of "Same Scam, New Twist?" I think you and Bob Grove either have a lot of nerve or have your tongues firmly in your cheeks when you comment on bogus antenna schemes! I don't see much difference between the worthless gadgets that use your house wiring for an antenna or the magic little ball that goes on the tip of a whip, and the (quite aptly named) 'NoTenna' that is sold through the Grove catalog.

"Grove says the house-wiring gizmo is 'humbug' and contains nothing more than 'voltage blocking capacitors.' OK, I'll buy that, but let's see a schematic of the NoTenna, and compare it to the humbug device. ... I'd like to see some evidence that this device is in any way superior in its basic design of function than either of the other devices you seem to hold in such contempt."

—*Robert Nickels, KE0T,* via e-mail

It was reader Greg Doerschler who made the "clever" connection between house wiring antennas and the NoTenna ad text (which went unnamed in his August letter); we ran it without comment in spite of his inference. Since you took the criticism seriously, I asked Bob Grove for a brief clarification of the difference between the NoTenna and techno-quackery.

Bob writes, "Reader Nickels apparently has trouble differentiating between products which are simple but effective, and products which are simple but ineffective. He also ignores the fact that the value of a completed product is considerably greater than the sum of its individual parts.

"The 'Turn-your-house-wiring-into-a-giant-TV-antenna' nostrums are bogus because they invite electrical interference from commonly-connected household appliances by leading them directly to the TV set. While it is true that cars generate electrical interference, the NoTenna is no more vulnerable to that source of interference than any other mobile antenna."

• "I saw the very thing you wrote about concerning keyless entry systems on Boston TV about eight months ago. Two men were shown with a box maybe 12" by 8" that contained a display, what I thought were thumb wheel switches, and a whip antenna. Whenever anybody locked their car with the remote, they would capture the code. One man would then ask the car's owner for permission to unlock the car without touching it. They then went ahead and transmitted the necessary code to accomplish the task.

"I have remote arming on my car. Since then I have stopped using it in parking lots except for entry (I don't think they will tail me) and let it arm automatically after 30 seconds just in case some high tech criminal is out there."

—*Allan G Dunn,* K1UCY, Holbrook, MA

"With the help of Monitoring Times, we've been able to tune in and hear many different stations around the world," says the Shortwave Listening Club at G.L. Comba Public School in Altamonte, Ontario. Their teacher, Neil Carleton, sent this picture at the end of the last school year in thanks for their complimentary subscription. To request an educational subscription, describe, on school letterhead, how radio is being used in your classroom.

I Beg to Differ

• "In the August 'Ask Bob,' Bob's response to a question about **laser weapons** was that they were impractical and limited. This was not correct: both the United States and the Soviets have been working for a number of years to develop laser weapons. I worked on one of the programs in the mid-1980s while at Fort Benning, Georgia. Some of them have already been fielded and were used on Navy ships deployed to the Gulf during the reflagging operations in the late 1980s. There were also prototypes developed (and possibly fielded) for the Bradley Infantry Fighting System and Special Operations forces.

"The systems were designed to destroy or damage optical targeting and observation devices. Problems which have prevented the widespread use were expense, problems with fratricide, and questions whether their use was within the bounds of the Geneva Convention."

—*Michael Kanner,* Longmont, CO

By the way, regarding the **"Power Tip"** referred to above, Michael confirmed what we have already heard from other servicemen: "people are being asked to pay $19.95 for an antenna end designed to prevent eye injury. As far as I know (and I invite any sparkies out there to differ), there is no increase in transmission capacity when using the 'power tip.' Most of the time we replaced it with a tennis ball and lots of duct tape."

(Continued on p. 102)

An Advanced World Receiver for a Very Affordable Price

ICOM's taken its advanced Next Generation technology and studiously applied it to the world of receivers. The result: ICOM's all new IC-R8500. Sharing the performance level of it's award-winning IC-R9000 big brother, ICOM's newest receiver is available for a fraction of the price.

Extra-Wide Coverage and All Modes!

Cover frequencies from 100 kHz to 1,999.99 MHz* using 10 Hz tuning steps. You'll receive SSB (USB, LSB), AM (normal/narrow/wide), FM (normal/narrow), WFM, and CW modes!

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IF-Shift and APF!

Signals come in loud and clear with ICOM's IC-R8500! An IF-Shift function rejects nearby interfering signals in SSB modes. An APF (Audio Peak Filter) provides tone control when in FM mode and boosts specific frequencies in CW mode. And an AFC (Auto Frequency Control) compensates for FM, FM-N or WFM station frequency drift, keeping the IC-R8500 right on frequency!

Other IC-R8500 Features:

- High Stability (<30 MHz: ±100 Hz VHF/UHF: ±3 ppm)
- 1000 Memory Channels: 20 Banks of 40 (total of 800 "normal"), 100 Skip Scan, and 100 Auto Write Memory Scan
- New DDS (Digital Direct Synthesis)
- New PLL (Phase-Locked Loop)
- Selectable AGC Time Constant
- S-Meter Squelch
- Noise Blanker (SSB/AM)
- 3 Antenna Connectors
- Operates on AC or DC power

IC-R8500

ICOM's Next Generation World Receiver

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ICOM

Good Buddy Newz

CBers in Vancouver, Washington, have always used channel 12 for they call "hash and trash." It's a place where, as one operator reports, "people air gripes about the world and belittle each other, often profanely." In a way, it's a lot like the internet.

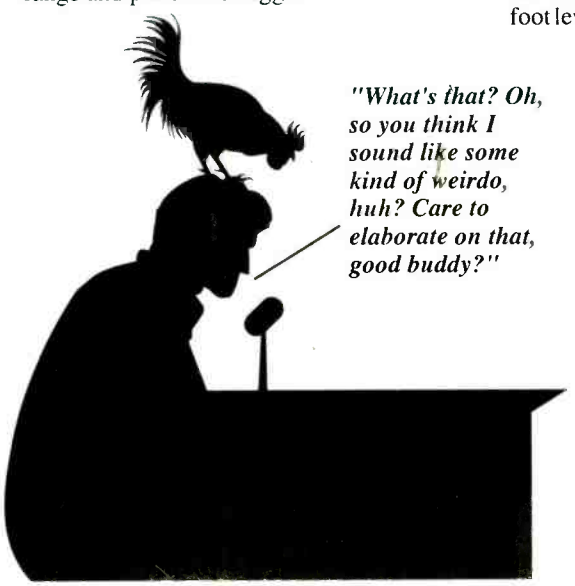
John Maddux and Shawn McDowell were two such CBers who used the channel one night to "cuss at each other [on channel 12] like a couple of drunks." So bad did things get that Gary Sipe, another CBer who was traveling in his car with his mother, asked McDowell to tone things down. McDowell responded with an insult to Sipe's mother.

Maddux, who said that he had already downed a six pack of beer, later invited Sipe over for more drinking. By 10 pm, another six beers were gone and Maddux was back on channel 12, trading nastiness with McDowell.

Apparently, something that was said during the second round infuriated McDowell who appeared without warning at the door of Maddux's radio shack, an old chicken coop in the back yard. When Maddux answered the door, McDowell grabbed Maddux and tossed him into the bushes. He then grabbed Sipe and began beating him with a 3-foot section of pipe. Eventually, Sipe blacked out. McDowell jumped on top of him, choking him and banging his head against the ground.

Meanwhile, Maddux had dragged himself out of the bushes and began hitting McDowell in the head with the butt of a 7mm rifle. "That just seemed to aggravate him further," said Maddux. "I tried to pull him off. I kicked him. I hit him. I couldn't get him off."

At that point, Maddux raised his rifle, aimed for McDowell's head at point-blank range and pulled the trigger.



"What's that? Oh, so you think I sound like some kind of weirdo, huh? Care to elaborate on that, good buddy?"

Sipe is now recovering in the living room of his Clark County home where he recounts his story to reporters.

"I'm not in any way proud of what happened," he says, tears flowing from his eyes. "I'm not proud of this at all."

What a way to meet new friends. Reckon a sobriety test should be required to operate a CB?

FM Friends

Michael Taylor had dreamed of putting a radio station on the air for years. But he didn't have the money to put a commercial station on the air, so he began work on Liberation Radio, an unlicensed, low-power FM station in south central Los Angeles. The decision may have cost him his life.

Authorities and friends say that Taylor was killed because of a dispute over equipment.

"The suspects were looking for equipment," said police Detective Steve Watson. "That's definitely what the issue was. Basically there was some sort of equipment, some sort of transmitter, they wanted to get."

Taylor was found murdered, execution style.

Tower Tragedy

WGVP went on the air only a year ago, but already its tower has been the site of two deaths. When the station was known as WVGA, a local doctor flew his airplane into the tower, knocking it over and sending the station off the air. The doctor died.

Tragedy struck again recently when station officials were trying to lift an old antenna off the tower. Two workers were at the 950 foot level when the rotors of a helicopter hired to lower the pieces to the ground struck the tower within a few feet of one of the men.

"At one point they waved [the pilot] off, and he kind of tilted over back into the tower," Cook County Coroner Mike Futch said. "His top rotor blade caught the top of the tower. It broke that rotor off and the tip of the pole and the strobe light," said one witness. The pilot of the helicopter was killed instantly. One of the two workers on the tower suffered a broken foot.

Get a Charge Out of This

Technology is a wonderful thing. So are batteries.

Michael Rego, 33, was well equipped when he left Hubbard Brook State Park in Thornton, New Hampshire, about 7:00 a.m. with his bear hounds. Rego packed a cellular telephone, a global positioning system unit, as well as compasses and telemetry equipment for tracking the dogs.

Instead of coming home that afternoon, Rego spent a day and a half lost on the mountain, the object of a search by Fish and Game officials.

And the hi-tech gizmos that Rego carried? They didn't work. Dead batteries. Rego's dogs are still missing.

"Heck, I'm not lost. I'm looking for a smarter master!"

Slow, Slower, Slowest

Five months after a Sandy Springs, Georgia, house burned to the ground because of a 911 dispatcher's slow response, Fulton County residents are still waiting for the hearings they were promised on the matter. County Manager Bob Regus says he "misunderstood...who was supposed to hold the public hearings and the purpose of them."

Scanning: Not Just Fun

"My wife and I were doing separate things around the house one afternoon when we heard a fire dispatcher send an engine and a brush truck on a call to 'behind the SunWest Bank'," says *MT* reader Alan Hill of Santa Fe, New Mexico. "We perked up since *we* live behind SunWest Bank!"

"I grabbed the portable scanner and went to the empty field between the bank and our house to observe. A small grass fire was burning 50 yards away.

"My wife stayed near the road to guide the fire department, and I pulled a branch off a small tree and beat the fire out.

"With the wind and the dry grass, the fire would have threatened the bank and probably homes in the area. The scanner sure came in handy that day!"

No More Antenna Rules?

The television industry may well be clearing the way for your rooftop scanner or shortwave antenna—even though your local government or homeowner's association may say no.

The FCC enacted new rules that specifically prevent local governments from restricting the rights of homeowners and businesses to install television antennas and satellite dishes. The new rules prohibit the enforcement of local laws, rules, private covenants, and homeowner association regulations that in any way interfere with television reception. Covered are over-the-air broadcast stations, satellite-delivered services, and microwave-delivered wireless cable systems.

Excluded are historical districts, antennas on common property, and restrictions based on safety, such as antennas mounted on fire escapes.

The commercial two-way radio industry petitioned the FCC last year for a similar ban on local restrictions against communications antennas. If approved, says *WorldRadio* magazine, it may be impossible for regulations to be selectively enforced against ham radio and, we speculate, other hobby-type radio.

More Claims for TV 60-69

The Public Safety Wireless Advisory Committee—a group of federal, state, and local public safety spectrum users—has staked their claim on the frequencies now occupied by TV channels 60-69. Currently, only about 100 TV stations use those channels in the 746-806 MHz band. Public safety users say that they need more spectrum to meet current needs, adopt new technologies, and communicate among agencies. In all, they say that they will need 129 MHz by the year 2010.

All of this is interesting in light of FCC Chairman Reed Hundt's plan to auction off this same spectrum. Last month we reported that Hundt called the auction potential of the frequencies "a pot of gold" that was expected to bring in some $50 billion for cash-starved government coffers.

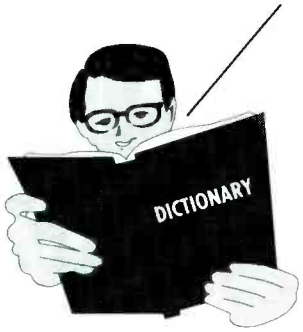
Goodbye AFRTS?

The U.S. Armed Forces Radio and Television Service (AFRTS) is converting its operations to digital transmission to expand its ability to deliver programming to almost one million American military personnel and their family members deployed around the world.

The more than $5.5 million fixed price contract with Scientific-Atlanta permits AFRTS to exercise options for additional equipment in the future. The initial portion of the worldwide satellite television network is scheduled for operation in the spring of 1997.

Satellite Times editor Larry Van Horn says that this marks the end of AFRTS on C-band, but it still should remain on INMARSAT.

gobbledegook ['gobldigu:k] *n. inf.* meaningless official/technical language, as in: *routine RF radiation evaluations.*



50 Watt Radiation

If you run a ham radio transmitter that puts out more than 50W PEP, the FCC now requires that you perform routine RF radiation evaluations. The regulations are contained in Report and Order 93-82 on RF Safety. Part 97 of the Amateur Radio Service rules say that hams who find that their RF fields are sufficient to cause human exposure to RF levels in excess of those specified, are required by law to take immediate action.

This could mean altering operating patterns, relocating an antenna, revising the station's technical parameters, or other remedies.

There is one hang-up, however. No one has defined what is involved in making "routine RF radiation evaluations."

Communications is written by Larry Miller with help from the Brasstown staff of Rachel Baughn, Larry Van Horn, and John Bailey as well as the following readers who are members of the *Monitoring Times* Media Monitoring Team: Mr. (or Mrs.) Anonymous; Harry Baughn, Brasstown, NC; Alex Blaha (*Scanning Illinois*), Joliet, IL; Bob Callaghan, Los Angeles, CA; Peter Fepper, Morton, Kentucky; Larry Fowler, MA; Alan Hill, Santa Fe, NM; Maryanne Kehoe, Atlanta, GA; Bob Mills, San Diego, CA; Abbott Reid, Sigel, PA; Sam Sattleheimer, Toronto, ON; Richard Sklar, Seattle, WA; Frank Timmons, Iowa City, IA; Elmer Vacsulcz, Boston, MA; and John T. Wagner, Pickerington, OH. We also consulted the following publications and organizations and list their names in appreciation: *National Scanning, Radio World, Wireless Week, WorldRadio* and the *W5YI Report*.

Scanning the MegaMall

By Chuck Penson, WA7ZZE

The Mall of America is no ordinary shopping mall. It is the largest shopping mall in the United States. In addition to about 400 merchants, the mall contains a seven acre indoor theme park, "Camp Snoopy," complete with a roller coaster, a seven story Ferris wheel, palm trees, and two indoor lakes.

The locals affectionately refer to the Mall of America as the "MegaMall" and it's a fitting nickname. The mall sits on 4.2 million square feet on land, cost $625 million dollars to build, and has been visited by more than 120 million people. To give you a better perspective of its size, St. Peter's Basilica in Rome would fit inside the mall with room to spare. So would Buckingham Palace and its 40 acres of gardens. Moscow's Red Square would go unnoticed if put inside the mall.

Located in Bloomington, Minnesota, just south of the twin cities of Minneapolis and St. Paul, the Mall of America is really a city within a city. It has everything you would find in a city—merchants, movie theaters, cultural events, restaurants, a school, a wedding chapel, and the equivalant of neighborhoods and streets. And like a city, the mall has problems, too. You can get lost in the mall. There are traffic jams, sanitation problems (700+ tons of waste are recycled each month), crowds, and, of course, there is crime: shoplifting, domestic troubles, disputes, and SWI (shopping while intoxicated). About the only city-like problems the mall *doesn't* have are air pollution and begging—smoking and panhandling are not permitted anywhere in the mall.

"When the going gets tough, the tough go shopping."

—anonymous

But lest you think that the mall is unsafe, you'll be happy to learn that statistically the Mall is about the safest place you could be in any metropolitan area. What is it that makes the Mall so safe? And what it is that makes this mall one of the midwest's premier tourist destinations?

Infrastructure

The Mall of America has a finely tuned infrastructure that holds it all together and keeps it running smoothly—and you can hear it work on your scanner. The mall uses a seven-channel 800 MHz, trunked radio system to ensure that all vital functions can keep in touch with each other. The frequencies used by the system are listed in Table 1.

One of these frequencies is used as a system data channel and will need to be locked out while you scan. The data channel changes every day, so each day you will need to lock out a different channel.

With a rubber duck you should be able to hear the system from five to six miles away. Inside the mall, an antenna is usually not necessary. In fact, removing your rubber duck may actually improve your listening by reducing interference from the data channel.

Trunked systems always present more of a challenge to monitor, and while there are a few other users on the system (including a hotel airport shuttle service and an airport rental car company), mall operations clearly dominate the traffic, especially in the evening and on weekends.

Security

It is interesting to note that, while there are two Radio Shack stores in the mall, neither will give you the frequencies for mall operations. Usually the clerks will say only that they don't know the frequencies. After a little prying, though, one clerk confided to me that they used to have them available but were pressured by the mall security department to keep quiet.

The mall uses two levels of security officers, both armed only with mace. The most visible are the "regular" forces identified by their white shirts. Less obvious and usually most visible in the evening and on weekends are the mall's "quick response teams"—the mall equivalent of a SWAT team. These officers usually travel in groups of three and are easy to spot in their black caps and jumpsuits with military-like stripes on their shoulders and the word 'security' screened in bright yellow on their backs.

View of the Mall of America from above. It's really big! Courtesy Mall of America.

Although both regular and quick response officers are friendly, helpful, and courteous to a fault, they take their jobs very seriously and are not to be trifled with. At especially busy times, mall security is often supplemented by regulation City of Bloomington police officers—identified by their uniforms and sidearms. Officers walk beats inside the mall while mobile units roam the parking ramps and grounds. A sharp visual eye is also kept at all times through security cameras which are *everywhere*.

A group of security officers compare notes while preparing for a busy Friday night. Above, the Mall's "quick response teams" usually travel in groups of three.

Who's who?

There are a number of different functional groups related to mall operations. Principal among these are maintenance, foods, park (theme park), housekeeping, entertainment, and security. These groups use both numerical as well as tactical callsigns like "maintenance 11," "foods 3," "housekeeping 5," and so on. Security operations for the mall are headquartered in the "safety center," or simply "center" as it is often called on the air.

Most security officers are identified by unit numbers in the 2100 and 2200 range. You'll hear calls to and from units like 2230, 2254, and 2213, for example. Mobile units are referred to simply as "mobile 1," "mobile 2," or "mobile 3." Though unconfirmed as of this writing, the quick response teams may be referred to as "delta units." Standard APCO 10 codes are in use.

Another reference you will hear frequently is "guests." All visitors to the mall are referred to as guests. This should give you a sense of how much the mall wants you to feel at ease.

A group of security officers meet under the roller coaster in Camp Snoopy to compare notes in preparation for a busy Friday night.

Where am I?

Workers in the mall often give their location in general terms and will refer to a level and a quadrant. For example, "three north" refers to a worker on level three in the north quadrant. "Two skyway" refers to a worker on the bridge that connects the parking ramp to the mall's second level. In some cases a worker will give a specific location within the mall, usually referring to a shop, restaurant, or amusement ride, or area within Camp Snoopy. For the visitor, maps are available at numerous locations in the mall and use the same quadrant and level number system to help you find your way around.

What's going on?

The Mall of America is a tightly run ship and most of the traffic you will hear is quite routine—similar to the traffic you would expect in any city—except that in addition to security issues you will hear plenty in the way of operational issues as well. These are the calls that really drive home what a huge place the mall really is. Also, from time to time (as in any city) there will be some excitement. For example, in May the mall served as a filming location for *Jingle All the Way*—a new film staring Arnold Schwarzenegger. Talk about action on the radios! Add to all of this the cordless and cellular phone activity generated by both merchants and visitors, and we are talking about a very thick, radio frequency (RF) soup.

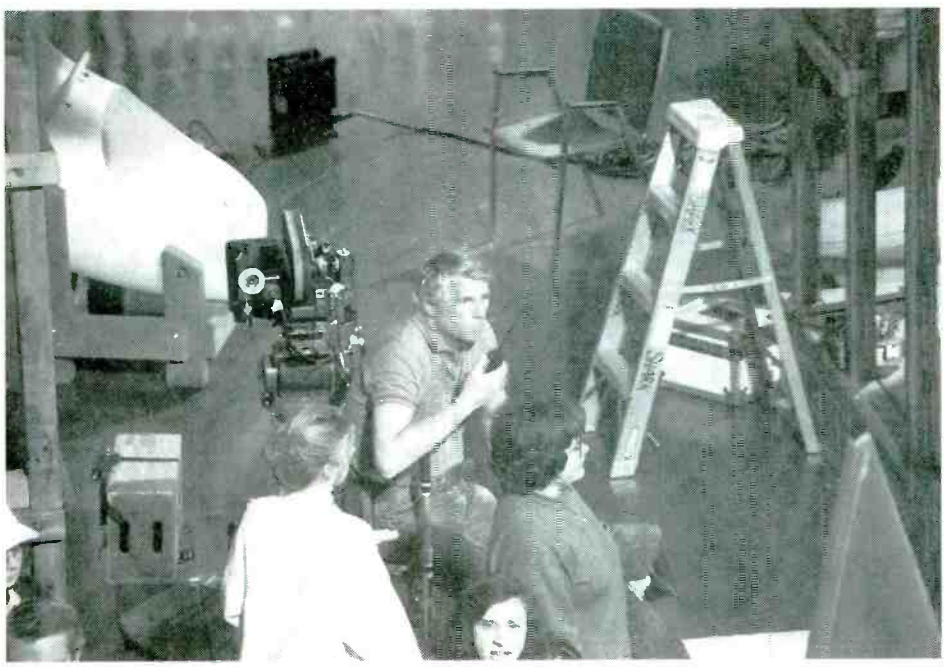
Because of saturation-strength RF fields in the Mall, frequency counters are neither reliable nor easy to use. Also, FCC frequency listings and Internet lookup sites provided little in the way of help. Sniffing out the mall's frequencies was both difficult and time-consuming, and I was fortunate to have had the invaluable assistance of Mike (N0WDM), and John (maus@skypoint.com), both of whom put in a lot of time and hard work to discover the frequencies used at the Mall of America.

A visit to the Twin Cities is not complete without a trip to the Mall. Even the most hardened of hard core shoppers will meet his or her match here. And shopping the Mall of America with a scanner adds a whole new dimension to the experience! Like Disneyland, the Empire State Building, or the Grand Canyon, it is an experience not to be missed.

TABLE 1
Mall of America Operations/Security

853.1375	860.6125*	851.5125
854.4125	858.6125	861.4625
859.6125*		

* One of these is used as control frequency on alternating days

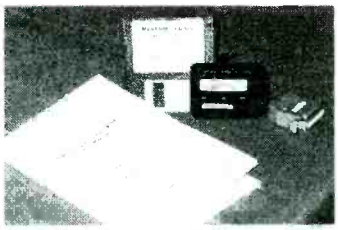


Members of the film crew keep in touch while shooting portions of "Jingle All the Way" at the Mall.

TABLE 2
Major retailers in the mall

Macy's	154.625 (pager)
	464.825 (security)
Bloomingdales	463.8125
	464.3875
Nordstroms	463.8375
	464.0875
General Cinema	462.8125
Bar and Restaurant Common Channels	
	154.570
	154.600

MESSAGE (PAGER) TRACKER

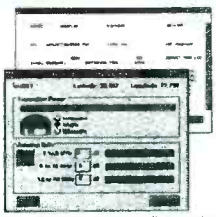


Overview: The Message Tracker allows a user with a 386, 486, or 586 Pentium computer and a VHF/UHF Receiver or scanner to decode and monitor digital pager signals. The Pager messages are displayed on the screen and can be saved automatically to disk with a time stamp. While running the program, a Signal indicator will activate as soon as the frequency is active. If valid data is detected, the Data indicator will also activate along with the baud rate of the transmission. The Error indicator will activate if any uncorrectable error occurs. The pager address with any message is then displayed on the screen for you to view.

Message Tracker Product:

- One 3.5 HD Disk with Message Tracker software program
- 25 Pin Serial Interface Audio Adapter (SIA-100)
- User's Guide

Skywave Propagation Prediction Software



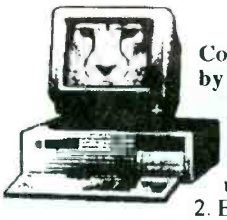
For Windows 3.1/Windows 95

Tell SKYCOM where you are, your transmitter power and antenna gain. Enter the current Sunspot Number or Solar Flux measurement. SKYCOM's windows simplify data entry. Pick a location from SKYCOM's database of over 400 call sign prefixes, using SKYCOM's database search tools or map. You can tailor the SKYCOM database to your own needs by adding additional locations. Instantly obtain prediction reports that tell you the best time and frequency for your transmission. You can also obtain a detailed report that lists the vertical critical frequency, frequency of Optimum Transmission, Signal to Noise ratio, and other data. SKYCOM 2.0 includes an on-line beam heading reference to the direct and long path bearing and distances (in miles and kilometers) from your home station to all locations in the SKYCOM database.

MONITORING ACARS with the new LOWE "AIRMASTER"

The monitoring of air band communications is a hobby that has become more and more popular over the last 10 years. In common with the rest of the communications field, there are far reaching changes in process in this area to cater to the requirements of air traffic control in the next century. ACARS is a very specialized data mode, and only decoders that have been specially designed for it will function. Until now, the only decoders that will work have been fairly expensive devices, as they use dedicated hardware to handle the decoding. The new Lowe Electronics Airmaster uses a small demodulator that plugs into the Com port on the back of a PC and takes its power from it. All the decoding of the data stream is handled by software running on the PC, which also enables some analysis of the messages to take place before they are displayed on the screen. Items such as the registration number of the aircraft, its flight number and the type of message are shown separately from the message text. Because the decoding requires a considerable amount of processing power, you will need at least a 386 PC to enable Airmaster to operate.

SCANCAT GOLD



Complete control of all functions supported by the radio 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.

Cat 232 - Interface

- Supports Icom, AR8000/2700, YAESU and Scout.
- Comes with 6' cable, and adapters to fit all units within a single package (Must Specify Yaesu).
- Unlike " Single radio" adapters, the Cat 232 can be used with ANY radio supported, simply change the adapter, then "Plug and Play".
- Expandable in future with a simple add on adapter.
- No external power required. Draws power from computer.
- "Reaction Tune" scout with NO modifications to radio.

CopyCat - Pro

The only commercial available computer control program for the Universal M-7000 & M-800, AEA's PK-232 and the MFJ-1278

Standard CopyCat FEATURES:

- 32k incoming text buffer
- Pull down menus
- Mouse support (but not required)
- 20+ programmable macros
- Runs on any 640K PC compatible
- 50 page printed manual
- New improved online help

New CopyCat-PRO FEATURES:

- Control BOTH your TNC and radio simultaneously! Send commands to TNC and at same time, send frequency and mode to radio!
- NEW! Multiple pop-up windows for HELP, frequency files, and text editor. Instantly go between any of three windows with single keystrokes.
- Supports ALL SCANCAT frequency file formats, or create your own!
- NEW, easier, "Plain English" MACRO language for control of all radio and TNC functions.
- RADIO SUPPORT for most AOR, JRC, KENWOOD, ICOM, YAESU, plus LOWE's HF-150 and Watkins Johnson's HF-1000

AR8000 AOR

All Mode Wide-Band World Band Radio Receiver
A new breed of radio receiver which combines full computer compatibility with advanced wide-band radio receiver technology.

The AR8000 incorporates the latest PLL technology and offers a multitude of features including true carrier re-insertion SSB (CW) demodulation with 50Hz frequency steps. 4 level alpha numeric LCD indicates the frequency, signal strength, band scope and more. Selectable squelch system, auto-mode, auto-band-plan, serial communication port are all standard. There are a variety of scan/search commands to link banks, scan by mode, programmable delay scan, priority, auto memory store, step offset and a programmable power save circuit to increase the duration of operation from the NiCads. The list goes on and on!

Electronic Distributors
325 Mill Street
Vienna, VA. 22180
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Fax: 703.938.4525
EDCO

Sensormatic SpeedDome™ camera keeps an eye on Olympic Stadium construction in the early phases of preparation for the games.

Of Eyes in the Sky

and other new Olympic Technologies

As with other mega-events on the world stage, the Olympics in Atlanta spawned a host of new technologies that will affect our lives for years to come

By Bennett Liles

It was not only the RF event of all time, the Atlanta Olympics also served as launch pad for hundreds of techno-spinoffs that will help us find each other, walk our dogs, catch crooks, and even help us keep our cool. Never before has so much machinery—high tech and low—come together to serve so many different purposes in one huge event.

This-Cam, That-Cam

Only David Letterman's infamous monkey-cam night provided more unusual camera angles. Remember the movie *The Shining* where Jack Nicholson chases his young son through the snow-covered hedges? That was the renowned camera work of Garrett Brown, inventor of the Steadycam and NBC's mad viewmiester on the Games.

The joystick-operated go-cam that ran with the runners got its technical kinks worked

out in Barcelona, and the lighter, less power-gulping Atlanta version did fine, providing some very dramatic track shots. Brown's dive cam, a miniature camera on a vertical tube, was dropped into the water as the diver plunged with it and for the first time, the diver's water entry was fully in view, without distortion. Unfortunately, the archery event's target cam was a bust. Mounted inside the bullseye, the wide angle lens made the arrows look bent and way off the mark.

These cameras were cabled, but those used on the marathon and some used on the opening and closing ceremonies were RF linked. Each required a camera operator, a transmitter antenna op, a receiver antenna op, and a video engineer. The RF camera links worked well in the stadium, but in the men's marathon—where the entire event went through town—frequent breakup marked the motorcycle and helicopter shots. On that event, buildings and thick fog made helicopter placement both difficult and dangerous.

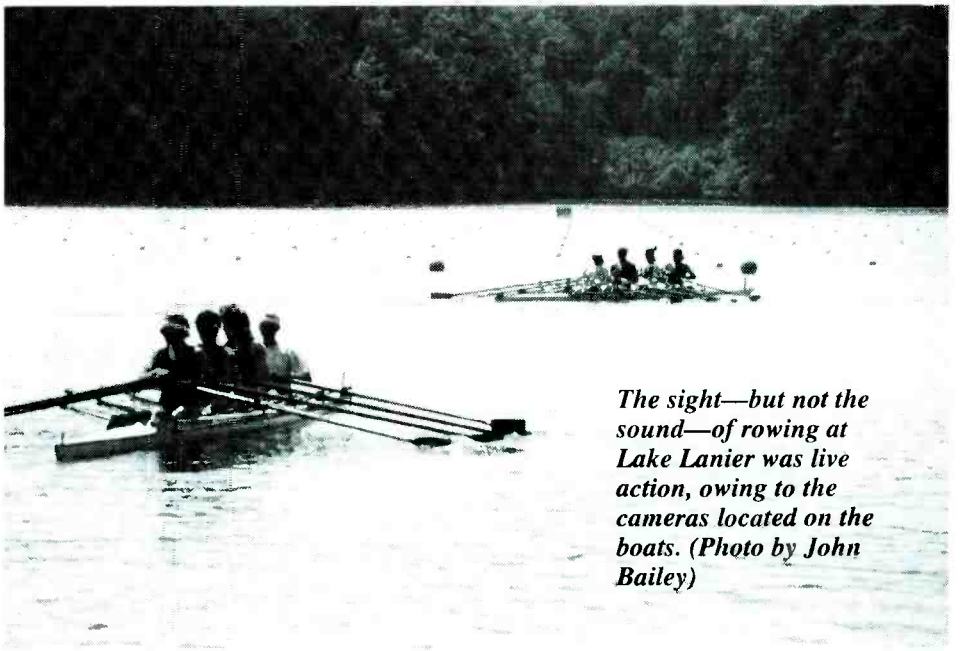
A sky-cam on wires hovered over the Olympic Stadium and the aquatic venue, splash-cams swung twenty-five feet out over the Ocoee River to get up close and personal on the whitewater events, and even the lake rowers had 0.95-kilogram mini cameras on their boats. For equal weight, all boats carried cameras but only some were used. The contestants were not told which boats held the working cameras.

On the RF video links, the key to success seems to have been wide open spaces. The very directional nature of microwave video links only suffered in the concrete canyons downtown.

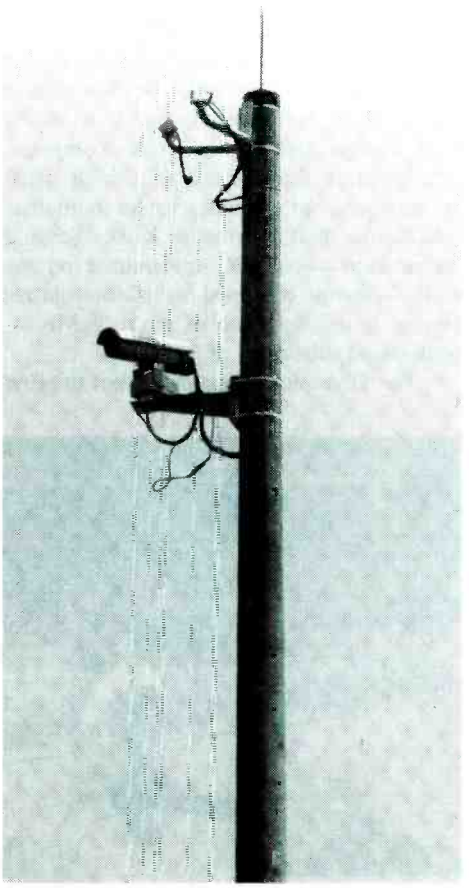
Getting up close sound on the rowing events proved impossible. Even though the course was equipped with numerous floating microphones, NBC technicians found that the motors on the accompanying power boats completely covered the sound of the rowers. In an alternate scheme, rowers were sound-recorded first and then during the races the digitized oar sounds were manually keyed in from a computer in time with the live picture. The oars were live but splashes were canned.

Atlanta commuters were also on candid camera and they will be from now on. The Georgia Department of Transportation reports that their one hundred and forty million dollar Advanced Traffic Management System worked flawlessly. It was already in place and was being used weeks before the festivities began. The computerized system controls over six hundred traffic signals around town.

Perched on poles at known problem areas, its cameras are continually fed by fiber optic cable to a D.O.T. monitoring center on Confederate Avenue from which accident warnings are issued and displayed on electronic billboards above the highways. The warnings are complemented with AM radio broadcasts during rush hours. The video is also fed to the internet (still shots updated every two minutes) and to the commercial TV stations in town. Their live displays have become a regular part of the local morning news shows.



The sight—but not the sound—of rowing at Lake Lanier was live action, owing to the cameras located on the boats. (Photo by John Bailey)



Traffic cams at known trouble spots are a legacy Atlanta commuters truly appreciate.

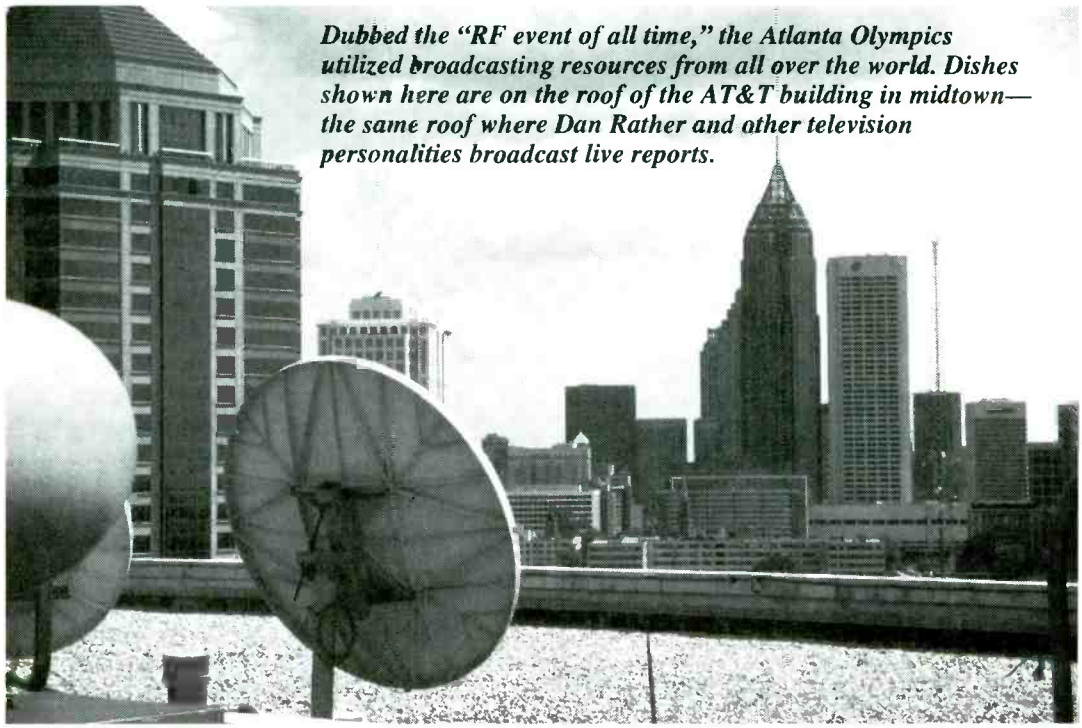
■ Playing the RF Slots

Sun-cooked Atlanta was also fried in radio frequences (RF). As it turned out, the RF challenge was ably met by the ACOG RF team led by Mike Smalls and Lou Libin. As with most Olympic systems in use, there were initial problems, but they were quickly tended.

Says Smalls, "We were plagued by late frequency requests from the European broadcasters but we managed to get everyone an RF slot." Attesting to his RF dilemma, there is a picture of karate star Bruce Lee on Mike's Desk. Lee's characteristic grimmace has been augmented with a comic strip bubble saying, "The deadline for freq requests was in MARCH!"

Four-page letters of instruction had been sent out months before the Games and these bore all the names, phone numbers, and instructions needed. In many cases, Mike and Lou personally made the rounds at the International Broadcast Center (IBC), deep inside the World Congress Center, where they introduced themselves and inspected trailers full of RF gear. Brand-switching caused some headaches.

"We had a few foreign broadcasters tell us they were bringing Sennheiser wireless and then show up with Sony," Mike reported. "On one occasion, the BBC called us about another carrier on their frequency. We called in the FCC tracking vehicles and they had the



Dubbed the "RF event of all time," the Atlanta Olympics utilized broadcasting resources from all over the world. Dishes shown here are on the roof of the AT&T building in midtown—the same roof where Dan Rather and other television personalities broadcast live reports.

culprit identified in minutes. The FCC was great. Their help was courteous and quick." Smalls also had high praise for some local RF vendors.

"Don McCampbell at Musimatic was a godsend," said Mike with a smile. "His familiarity with the EBU (European broadcasters) gave us an inside track on their brand name preferences and on-site practices." The co-chairmen of the Olympic Broadcast Frequency Coordination Committee (OBFCC) were in the Olympic Stadium at the opening ceremonies and, as predicted, the display on their RF analyzer began growing lots of "grass" in the minutes leading up to the big show. Fortunately, it grew only in authorized areas.

Technohiccups

Well, you don't pull off the hottest, most RF-cooked, video-fed, hype-sold, mass-watched, internet-zapped, and computer-chipped extravaganza of an Olympics and do it glitch-free.

The most loudly trumpeted snafu was the initial slowdown in the results notification for journalists. It was a touch of bad luck for ACOG that, in all this Olympics machine, the first two slip-ups occurred in systems used most by the press: the busses and the scoring notification system.

The results of each competition were entered into a personal computer on a local area network at the venue. An IBM setup, these PCs were running DB2 database software for the OS2 operating system. The information was sent by wire from each venue to Atlanta's IBM System 390 central results computer, which in turn sent the scores to high speed printers back at the venues where journalists read them at their information kiosks. Scoring information was also RF-transmitted to journalists' laptops equipped with Motorola receivers issued by MobileComm, a Mississippi-based subsidiary of Bellsouth.

The Olympic contests were not the first test of the results system. It had its trial run at the two-day, IBM Atlanta Gymnastics Invitational last year and suffered similar slowdowns then. Bruce Taylor, IBM project executive stated the basic problem.

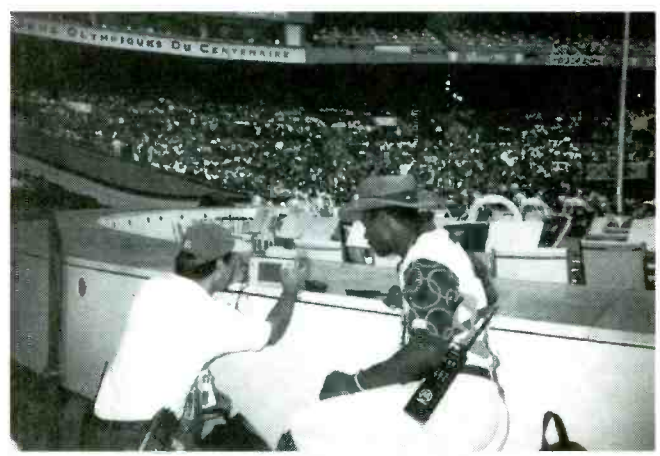
"People, not technology, are the most difficult part of the process." According to Taylor, the person keying in the information at the venue is someone familiar and experienced with the particular sport but not with the computer system. The real challenge is in training these info-system rookies on how to use some fairly complex software and using it in a high pressure, fast moving environment. The initial operations staff fell behind as the results came in and while attempting to catch up, a few typos went down the lines. One boxer's age was listed as ninety-seven. More IBM technicians were hurriedly called in, and the results team caught up to the task.

Out on Lake Lanier, the probability of lightning strikes was computer-generated, added to a special, short-term, localized weather forecast, and forwarded to Steve Kelley, who made the decisions on starting the lake events. On the eve of those contests, Kelley's decision was made for him by a Georgia Department of Natural Resources boat on security patrol. While surveying the course, their propeller sliced and diced three of the submarine cables attached to the starting mechanism, slightly delaying the first day's race while an alternate system was hurriedly configured.

During preliminary competition at the aquatic venue, the scoreboard failed to display results, causing some consternation for athletes, coaches, and fans. By the time the medal rounds were ready to go, however, so was the big board.

Even the high-tech tickets had a few problems. It appears that the heat-sensitive card stock and print actually worked like disappearing ink when left in a very hot environment like the dashboard of any Atlanta car in July. Some fans returned to their cars to find their tickets solid black. Reportedly, there were no refunds.

The much ballyhooed Super Bike II, with its computer design



Lou and Mike check the RF "grass" with a spectrum analyzer and test field strengths at the opening ceremonies.

The Automated Environmental Monitoring Device kept tabs on the weather at Lake Lanier. (Photo by John Bailey)

and lighter weight, was supposed to catapult the U.S. cycling team to medals in the bike events, but not only did the American team not strike gold, they and their Super Bikes were totally outclassed by the European teams and their road machines. Back to the old bike shop.

Not all the gadgets used were sanctioned. After being ejected from the contest area, Croatian coach Bruno Silic was discovered in the stands, continuing to instruct his team by cellphone. It was confiscated. While not allowed to know the current score during a match, U.S. wrestling coach Jesse Ravelo was watching a TV monitor and using hand signals to an assistant coach who yelled the score to his contestant on the mat. Information was everywhere.

Smart Bikes to Smart Bags

If the bikes themselves didn't set the world on fire, their six-hundred-dollar I.D. numbers and the Swatch Timing System did cook right along. Each bike's number bore an RF transmitter chip that sent a continuous signal to a receiver antenna wire embedded in the road course. This ensured accurate results both in time and order of finish. The technology called RFID (Radio Frequency Identification) shows great promise in helping people and their belongings find each other in busy airports and bus stations, as well as aiding in quick recovery of stolen property. It will be like having a LoJack system on your luggage and, eventually, your kids.

Even this technology is being superseded in some areas by a newer system called RIC (Remote Intelligent Communication). In the RIC set-up, the onboard chip incorporates a direct-sequence spread spectrum (DSSS) microwave-frequency radio, a microcontroller, and a low-power static random access memory (SRAM). Operating at 2.45 GHz, the system can calculate, navigate, and transmit its location.

Micron Communications of Boise, Idaho, is currently developing a technical standard for such devices so that many manufacturers can integrate their products in a non-interfering environment. In addition to keeping olympic bikers on track, these devices will soon be enabling inventory without opening a box, securing buildings without guards, and, most importantly, making sure that every

The Sensormatic SpeedDome (top, foreground) provided video surveillance at the main security checkpoint at ACOG headquarters.

piece of luggage that is loaded aboard a plane belongs to someone who is still on that plane.

Similar to these were the chip-bearing I.D. cards worn by all volunteers and ACOG officials. These RF widgets were read at checkpoints for each of the venues, and the information read from each one was considerable. Names, distinguishing features, company affiliation, hand print profile, and even retinal blood vessel patterns can be "burned onto" these chips to be instantly read at a checkpoint similar to a grocery store check out. The hand geometry and other identifying information are stored in the central IBM AC-500 computer, which is automatically accessed as the I.D. badge is read. If all the profiles don't match up, access is denied.

Sensormatic Electronics provided the security machinery, including the hand scanners and the SpeedDomes—controllable cameras perched atop the crowds. Those entering high security areas could be instantly identified in several ways and like a card key, access privileges could be changed without the user having to return the credentials.

Looking Cool and Keeping Cool

Even T-shirts broke new technical ground. French artist Marc Ahr was at the Olympic Stadium with previously prepared watercolor paintings of the scene minus only the actual event winners. As the athletes won the event, Ahr quickly painted them onto the scene and rushed the painting to his nearby headquarters where it was immediately laser-printed onto a load of shirts. These were then madly bicycled back to the stadium where fans just exiting the event were able to buy the T-shirts showing the actual winners crossing medal paydirt only minutes before!

Cool Concepts, an all new system for cooling large, outdoor areas, was on hand at the equestrian venue. The devices fanned water vapor into the air where it absorbed ambient heat and blew away. Previous tests showed the system was capable of lowering the local air temperature by as much as 15 degrees. These helped calm some of the fears shown by officials of the Society of Prevention of Cruelty to Animals. Smaller versions bearing small fans mounted on water-filled plastic bottles were hawked to individual spectators.

Communications

The Atlanta Games were the largest peacetime use of RF communication in history, and some pretty impressive feats were pulled off. In the minutes after the Centennial Park bombing, U.S. coaches sent a simultaneous RF page to a nearly a thousand athletes on the American team, asking them to report their whereabouts immediately to their supervisors in the Olympic Village. Within one hour and five minutes, all were accounted for. That emergency "bed check" would have otherwise required knocking on a whole lot of doors. Motorola, supplier of all cellphones and pagers, was proud to say that when usage soared after the explosion, no problems with their systems were seen.

As with some of the other aspects of the Games, the load anticipated did not match the actual capacity needed. Bellsouth reported that their land line system handled only 79.5 million calls at the highest peak. Their usual business day tally is 74.8 million. Normal business use was way down as many firms virtually shut down during the Olympics.

As expected, cellphone use was up but not by nearly the amount anticipated. After temporarily increasing cellphone capacity eight hundred percent inside the Olympic Ring, actual cellphone use went up by about twenty-five percent.

In the aviation band, a dozen or so new tower frequencies had been added in the 122 and 128 MHz area, but after the first week those were discarded and the local airports returned to using their usual 122.8, 123.0, and 123.05 unicom frequencies. The extra controllers brought in were sent home on the second Monday, and the temporary control towers were closed as it had become clear that private air traffic for the Games was not even going to match normal usage. Epps Air Service at Peachtree-DeKalb Airport reported that their business was about thirty percent of normal.

Although no word is in from the local neighborhoods near the venues, it is safe to say that, with all the 49 MHz walkies freely available from Radio Shack and other vendors, locals with cordless phones were treated to a bit of the United Nations.

The First Cybergames

Among the Centennial Games' many firsts, its internet broadcasts also made history. While many book publishers and other businesses are still grappling with how to best use it, the internet's two-way nature was seized upon by Olympic organizers. Web pages built by ACOG and NBC garnered record setting demand. Traffic on CNN's sports pages doubled.

After the info-slowdowns of the first two days, cyber-scores were racing over the world faster than the traditional broadcast results. At the Surf Shack—a combination video arcade and computer gallery in the Olympic Village—athletes kept in touch with the folks at home and answered megabytes of electronic fan mail. Many athletes received 300 to 400 emailed fan notes per day, with most coming from the United States, Australia, and Brazil. On the NBC site, their "Golden Moments" chat with Kerri Strug was attended online by some fifty-thousand net surfers; another NBC site record.

Of course, one-way cyberselling also set new marks. Xerox, Bellsouth, Nike, and other companies were well represented on the web and their products were pictured and hyped: sometimes creatively but always relentlessly. The IBM web page was visited 189 million times and ACOG sold over four million dollars in tickets on their page. The internet truly brought a new and needed dimension to the Games, allowing people all over the planet to be involved. In Atlanta, the Olympics and the internet were happily joined.

Even with the inevitable glitches, the massive marriage of technology and people, known as the Centennial Olympic Games, was a resounding success, and the technology spinoffs from the event will assure gold medal performace in a host of other industries. On that field, you and I will be the winners.

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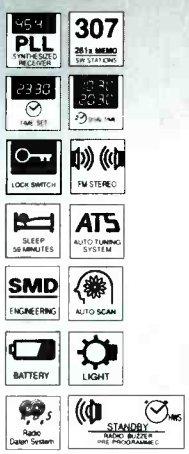

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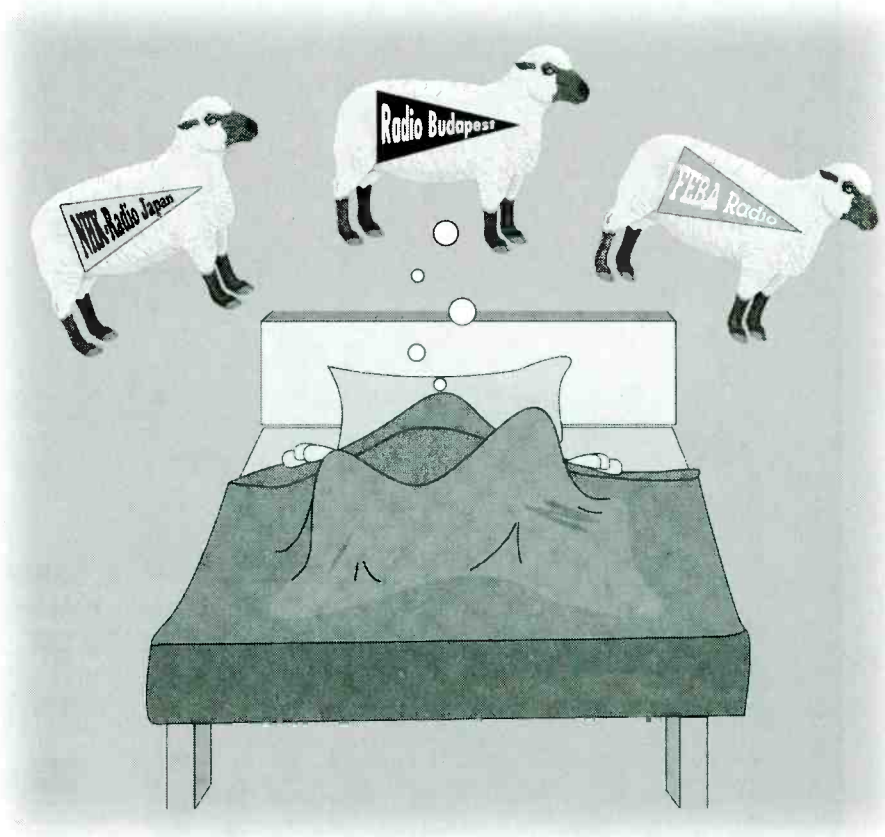
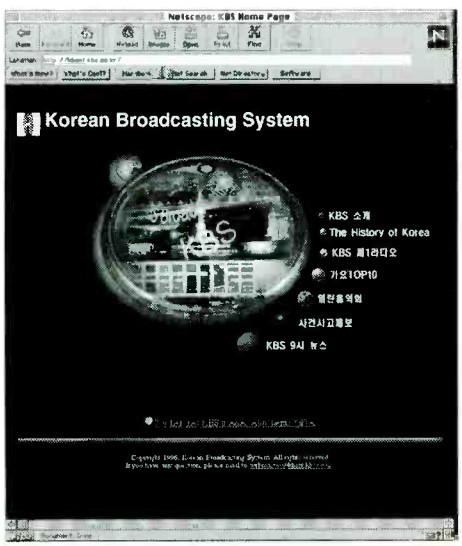
The Insomniac's Guide to International Broadcast Sites on the Internet



Sleepless in Brasstown



Can't sleep? Try a little net DXing. Internet web sites like this one of Radio Korea's, offer lots of information for the SWL.

By Gayle Van Horn

Brasstown, N.C. - Three a.m. on a Saturday morning...and I should be asleep. Everyone else is.

Oh well, I tell myself ... how about a classic movie? Nope, I've seen this Bette Davis flick four times. Okay, how about satellite TV channel surfing? ... I wonder where the remote has gone *this* time?

DX? Nope, radio conditions are lousy. Besides, Binky my faithful DX dog, is asleep, too. There's still some hope; why not try scanner listening? In Brasstown at three a.m.?! You're not in New Orleans anymore, Gayle. Even the county sheriff and his hunting dogs are sleeping.

Suddenly, I realize my hormone-crazed teenage son is asleep, and that means just one thing: now would be an excellent time to log onto the Internet and search for international broadcasters' home pages.

To make this "surf" through cyberspace more interesting, I decided to give the home pages (also called websites) my own rating from worst to the best. Ratings range from * (needs work) to the very best ****.

It should be noted, that, unless otherwise stated, all home pages include English frequency schedules and satellite feed information if applicable. Website addresses can and do change frequently, and those listed remained current during my search. Broadcasters excluded are non-English home pages: Iceland, Italy's RAI, YLE/Radio Finland, Colombia's CARACOL, Spain's Radio Exterior de Espana, Radio Portugal, Brazil's Radio Bras, Polish Radio Warsaw, Taiwan's Voice of Free China/Voice of Asia, and Radio France Internationale.

Come along..surf's up in Austria!

Austria
Radio Austria International **** **http://www.ping.at/rai/** (email: **info@rai.ping.at**) Radio Austria's home page is available in four languages. The English site begins with a preview of up-coming programs on *Report From Austria*, to a text on the history of their station and photo links of the ORF Center. On-line reception reports are available and *Facts and Figures* contain national news and travelogue items. Good site.

Australia
Radio Australia **** **http:www.abc.net.au/ra/default.htm** (English section email: **ratx@radioaus.abc.net.au**) Click-on icons open this site. *OnLine News* and *Grandstand* (the sports page), have details from *Matches of the Day* in the English section. Want more? Try *Resource Center*, a page with hundreds of Australian links and *Beyond The Black Stump* page presents "Australiana," delving deeper into the Aussie culture. Don't forget the ABC Home Page (**http://www.abc.net.au/**) for news links to Aussie radio, TV, and their *Explore Your Interest* page. Go for it, luv.

Belgium
Radio Vlaanderen International, Belgium **1/2 **http:www.brtn.be/rvi/** (email: **rvi@brtn.be**). *All About RVI* takes you to English and five additional language pages. Sites are also available for national radio/TV and links to Deutsche Welle and Radio Netherlands.

Canada
Canadian Broadcasting Corporation ***1/2 **http://www.cbc.ca/** (email: **webmaster@toronto.cbc.ca**)
Everyone should spend an evening traveling through this site! The English Radio page takes you to *Radio Network, News and Information, Regional Radio, Future Radio*, and more. *What's New At the CBC* includes a radio/TV daily hotsheet of air dates, webchat, headlines, and Real Audio (audio on demand across the Internet) for sports and news releases. If you like CBC television, the fall lineup is offered including a site for the popular radio/television comedy series *Royal Canadian Air Farce*. (**http://www.cbc.ca:80/airfarce/**) Radio Canada International can be located at: **http://www.radio.cbc.ca/radio/rci/rci/html**. Send your RCI e-mail to: **rci@montreal.src.ca**.

Costa Rica
Radio For Peace International, Costa Rica *** **http://www.clark.net/pub/cwilkins/rfpi/rfpi.html** (email: **rfpicr@sol.racsa.co.cr**). RFPI's home page is currently under construction. *Technical Information* and the Vista Library—a selection of articles from their quarterly newsletter—is interesting. The *Other Sites List* contains links to activism resources. Reception reports via email are welcomed; however, the reply will be via email as well.

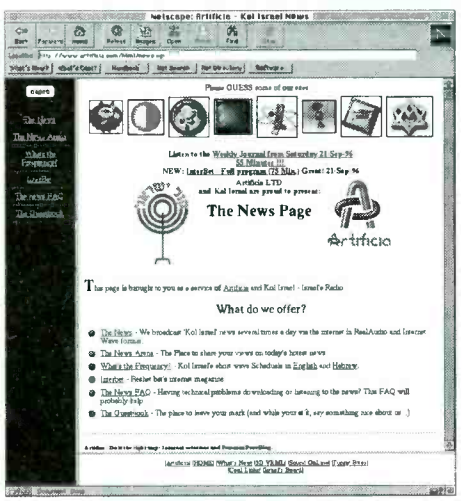
Croatia
HRT/Radio Croatia * **http://www.hrt.com.hr/index_eng.html** (email: **www@hrt.hr**)
Most of this home page is in Croatian, with some English under *Latest News*. Help!

Czech Republic
Radio Prague *** **http://www.radio.cz/** (email: **cr@radio.cz**)
Recently designated a 3-Star Site by Magellan, Radio Prague offers a fine home page. *All About Radio Prague* is extremely informative. Subscriptions to Czech news and FAQ's (Frequently Asked Questions) on the Czech Republic are available by email. *Favorite Links* is fun with national guides and news from central Europe.

Denmark
Radio Denmark ** **http://www.dr.dk** (email: **rdk.ek@login.dknet.dk**)
Welcome to DR Online! The English page (**http://www.dr.dk.dronline.htm**) includes a steadily expanding list of articles on *Cultural Capital News, World Music* and the *TV Entertainment Department*.
Radio ABC *1/2 **http://www. radioabc.dk** (email: **mail@radioabc.dk**) Last summer, Denmark's Radio ABC premiered on shortwave. Reception reports are welcomed either by email or snailmail. Other features include programming, station news, and broadcaster links.

Ecuador
HCJB * email: **english@mhs.hcjb.com.ec** (replace language with Czech, French, German, Japanese, Nordic, Portuguese, Russian, Spanish). For a current directory of text, publications, and schedules go to; ftp://**ftp.hcjb.org.ec/**

Germany
Deutsche Welle *** **http://www.dw.gmd.de/DW/** (email: **deutsche.welle@dw.gmd.de**).
DW Online is available in six languages. The English service has audio on demand of *Newsline Cologne* and *European Journal*. How about some German travelogue or cultural links?

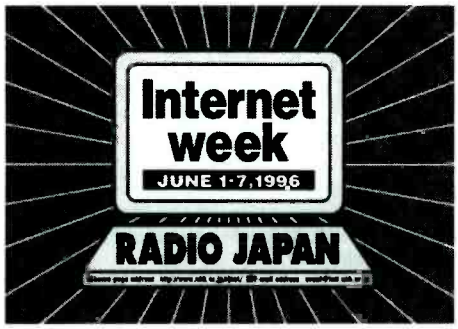


Radio Israel's site.

Greece
Voice of Greece ***1/2 **http://alpha.service.adriadne-t.gr/Docs/Era5_12.html**. I like this site, but I always have liked Greece. General information, news bulletins, sports headlines, and program previews are here. You may email your reception reports to: **skalai@leon.nrcps.ariadne-t.gr.** Click-on QSL cards feature Greece's tourist sites for viewing. My favorite? The Acropolis of course! Pass the ouzo, Demetri.

Guam
Adventist World Radio-Asia **1/2 **http://ourworld.compuserve.com/homepages/awr_asia/**. A click on this site will bring you *Listener News* from around the world, facts on AWR, Real Audio for text and music, photos, and a Seventh-day Adventist Home Page.

Hungary
Radio Budapest **1/2 **http://www.eunet.hu/radio/** Highlighted by the colorful station logo and national flag, the Budapest home page includes personnel/contact points, and sites for their nine languages. The English Home Page has program previews for their 1996 celebrations commemorating the settlement of Hungary. English and Hungarian programming can be heard on your computer at **http://www.wrn.org/**.



India
All India Radio ** **http://air.kode.net/**
AIR's site is fairly new to the Internet and rumored to be under construction. Currently, only their frequency schedules for the various language services are available at; (**http://www.air.kode.net./schedule/target.htm**). *AIR Online Information Service* presents news and editorials from Indian newspapers. I look forward to additions from AIR.

Ireland
Radio Telefis Eireann, Ireland ****
http://www.bess.tcd.ie/ireland/rte.htm.
This is the place to go for anything related to Ireland. RTE is an AM/FM station in Dublin which until recently was available only via satellite on World Radio Network. It has now gained a new and larger international audience via relays over WWCR in Nashville, Tennessee. RTE is a tremendous hit and so is their home page!

Israel
Kol Israel **1/2
http://www.artificia.com/html/news.cgi.
Weekly Journal can be heard on Real Audio. *The News and The News Area* are interactive sites for discussions. Links of *Funny Bites* and *Cool Links* are worth checking. For multilingual schedules on shortwave go to **gopher://israel-info.gov.it:70/00/cul/media/950900.med.**

Italy
NEXUS/IRRS-Milan, Italy *
http://www.nexus.org/ (email:**info@nexus.org**)
NEXUS-IBA is a nonprofit broadcaster on FM, and has been on shortwave since 1988 as IRRS. Links to *IRN-Internet Radio NEXUS* are available on sites for the U.S. and Europe. UNESCO and UN Radio are a click away as well as a Real Audio Server.

Japan
NHK/Radio Japan ***
http://www.nhk.or.jp/rjnet/rj8/index.html
"Hello Dear Web Surfers" greets you to cyberspace from Radio Japan. *What's New in Radio Japan* is a collection of recent programming and frequency updates relating to their General Service. Recently, during a special Internet Week, Radio Japan broadcast programming segments via Real Audio at their home page site. My Internet QSL card arrived in two weeks. For country counting...should I count this as "cyberspace"?

Republic of Korea
KBS/Radio Korea International, ***1/2
http://kbsnt.kbs.co.kr/
(email: **pr@kbsnt.kbs.co.kr**)
With an opening message from the station president, KBS welcomes all Netizens to their home page, in this self-described " land of the morning calm." I enjoyed this site very much. *KBS Newsletter* contained photos and stories from Korea's national news, current affairs, and links to additional Korean sites. Don't forget to visit the *Audio News* files and English News section.

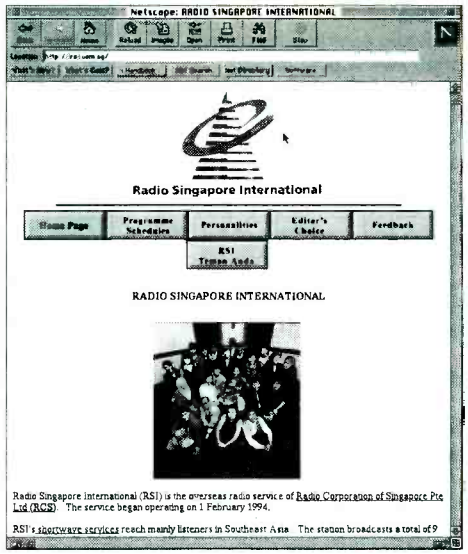
Malaysia
RTM Malaysia, ***
http://www.asia.connect.com.my/rtm-net/
RTM Online contains archived broadcast material via the net. Real Audio complements the "live" broadcast. There are many RTM links including *Radio Live, Online,* and *RTM Web.* Good site!

Netherlands
Radio Netherlands ***
http:///www.rnw.nl/mw/
(email: **letters@rnw.nl**)
RN Online begins with click-on language home pages. You'll find numerous areas to surf on TV, station history, and *What's New,* as well as Real Audio samples. The English page (**http://www.rnw.nl/en/ernwhome.html**) serves up program previews for *Media Network* and sites for *The Sports Report. Real Radio* is very good, with articles on receivers, antennas, propagation, and more. Great site but could use some graphics and photos.

New Zealand
Radio New Zealand International *
http://www.actrix.gen.nz/biz/rnzi
(email:**rnzi@actrix.gen.nz**)
RNZI schedules can be found regularly on **alt.rec.radio.shortwave** newsgroup. For information on contacting the station, reception report requirements, or additional program schedules, send your message to the email address. Needs work, ya'll.

Norway
Radio Norway International *1/2
http://www.nrk.no/utenland/
(email: **webmaster@nrk.no**)
Station Frequency Manager, Olav Grimdalen, established this home page and accepts reception reports between 0500-1330 UTC via the email address. Links to *News in English-Norway Now* can be found, with the remainder being in Norwegian. Photos would improve this one, or perhaps a "virtual Norway" link.

Romania
Radio Romania International **1/2
http://www.indis.ici.ro/romania/news/rri.html
(email: **rri@radio.ror.ro**)



Radio Singapore's web site.

The RRI logo takes you to the daily preview of *Panorama* programs. Extra features and Bucharest links, please.

Russia
Voice of Russia. **
http://www.vor.ru/
World Service frequency schedules by target areas are available and a page on the history and goals of VOR. *Station Feedback* about Voice of Russia can be sent to Audience Relations' email address: **letters@vor.ru**.

Seychelles
FEBC Radio *** **http://www.febc.org/**
(email: **hite@xc.org**.
Interesting site to prowl. Many links and a page on the history of 25 years in gospel broadcasting.

Singapore
Radio Singapore International **1/2
http://rsi.com.sg/
(email: **radiosi@singnet.com.sg**)
Information ranging from staff biographies and photos to *Regional Press Review. Listener's Feedback* has an on-screen form to fill in and send.

Slovakia
Radio Slovakia International ***
http://www.xs4all.nl/~xavcom/rozhlas/index.html
"Welcome to the small home page for our small radio station," is the friendly opening for this three-year-young station. The *Slovakia Document Store* is fun with scenery photos and tourist links. Hockey fans will like SDS's Slovak Hockey Page. Kudos to RSI!

South Africa
Channel Africa ***
http://www.sabc.co.za/units/chanafr/index.html
Current updates remain online, as this station ponders its future and asks for your continued support. Channel Africa offers click-on QSL card photos, plus links to *News Headlines* and *Newsdesk.* This multi-award-winning site includes

a search engine to *Search the Web With Info Search*.

Sweden

Radio Sweden ****
http://www.sr.se/rs/index.htm
(email: **info@rs.sr.se**)

Another award winning site—and no wonder! First, visit *Virtual Sweden*, a hodgepodge of scenes from around the country. Move on to *Nordic Links* for other Scandinavian sites in Iceland, Norway, Finland, and Denmark. You'll find transmitter and staff photos as well as George Wood's *MediaScan DX* page. Finally, for a thoroughly useless page (*their words, not mine*), browse the comical Moose Gallery. Don't say I didn't warn you!

Switzerland

Swiss Radio International *
http://www.srg-.ssr.ch/SRI/index.html.

Reportedly under construction, SRI has one logo graphic, no photos or links. The only additional graphic was a numbered click-on your location worldwide map. My location, at #4, revealed another schedule. Keep an eye out for additions.

United Kingdom

BBC ****
http://www.bbc.co.uk/worldservice/
(email: **worldservice.letters@bbc.co.uk**)

Add this site to your bookmark list ... it's a winner! This outstanding home page contains countless sections to browse. Are you a news junkie? Type in **http://www. bbcnc.org.uk/worldservice/ncaws.html** for a preview of the daily news. Like astronomy? Stargazing charts are available to print (they're great!) (**http://www.bbcnc.org.uk/worldservice/science/starts.html**). Don't forget the complete English radio home page. Jolly good show!

World Radio Network ****
http://www.wrn.org/index1.html.

WRN via London is a 24 hour news and information network via satellite (C-band satellite service—domestic satellite Galaxy 5/transponder 6, audio subcarrier 6.80 MHz), containing programming from the world's leading international broadcasters. Under *Read Me*, find out the history and goals of the station, then move on to *Links to International Broadcasters*. *World Media Page* takes you to links of news services, weather, and our own Grove Link! Studio, transmitters, and staff photos give you a peek inside this highly successful broadcaster. Bravo to WRN.

United States

KNLS-Anchors Point, AK **1/2
http://www.hax.com/WCB/AAAINDEX.HTM
(email: **KNLS@aol.com**).

Web editor Mike Osborne has the beginnings of a fine home page. The official KNLS history article opens this site, with links to my favorite section, *Voice From Alaska*, including Real Audio segments from some of Alaska's most remarkable citizens.

KTBN-Salt Lake City, UT ****
http://www.tbn.org/
(email: **tbntalk@tbn.org**)

Rated in the Best 5% of the Christian Web for 1996, Trinity Broadcasting Network was indeed the best religious home page I viewed. Their opening page is a series of colorful click-on icons

BBC's site gets four stars in this ranking.

for Real Audio, *TBN Information, and Newsletters*. *The Shortwave Radio* link includes KTBN programming information. Additional links under *Christian Sites* are available for viewing.

KVOH-Voice of Hope-Los Angeles, CA ***
http://www.praisenet.com/harvest/

Until recently, KVOH's home page was little more than a one page newsletter. Welcome to the expanded pages of *The Missionary Harvest*. KVOH takes you to links of their worldwide current missionary efforts, plus an Internet search engine and many interesting Christian sites.

Monitor Radio International ***1/2
http://www.csmonitor.com
(email and reception reports: **letterbox@csms.com**.)

A brief synopsis begins *About Monitor Radio* to links on the staff, plus a radio-related network resource to browse and Real Audio files. MRI has expanded their home page to include online contents of their newspaper *Christian Science Monitor* with the click of your mouse.

Radio Miami International **
http://www.nexus.org/WRMI/
(email: **71163.1735@compuserve.com**).

Jeff White, General Manager of WRMI, recently began a world wide web page as an experiment, in conjuction with IRRS. The new site contains programming details, technical data, and a text message from Jeff. Good luck!

Trans World Radio **
http://www.twr.org/

Spreading the Gospel Worldwide contains station history, feature articles, and an *E-Mail Us* page. Links are provided for the various TWR stations and religious broadcasters in Real Audio.

Voice of America **1/2
http://voa.his.com/

Radio-related links and *Cool Other Links* contain recent satellite imagery for the mid-Atlantic and Washington, DC, area. However, VOA schedules and information may be found on their click-on VOA Gopher (**gopher://gopher.VOA.GOV/**) *The VOA Monitoring Homepage* contained additional items on VOA/Radio Liberty/Radio Free Europe, and monitoring articles.

WEWN Birmingham, AL ***
http://www.ewtn.com/index.htm.

Browse through the religious artwork, libraries, and EWTN television network. Shortwave news can be found on the WEWN Catholic Radio home page (**http://www.ewtn.com/wewn.htm**). *EWTN Mail Room* (**http://ewtn.com/mail/room.htm**) contains addresses for online services. Additional links for Catholic organizations and services are also featured.

WJCR, Upton, KY *
http://www.mindspring.com/~brunner/wjcr.html.

Where Jesus Christ Reigns is a Christian format station. *The Bible Online* and WD4MNI Ham/Link page are available plus studio/transmitter photos.

WRNO, New Orleans, LA **
http://www.wrnoworldwide.com/wrno.htm

The Rock of New Orleans has click-on globes for technical notes, coverage map, FAQ's, and the *General Store*. Please Joe...some links to N'Orleans!

WWCR Nashville, TN *
http://www.orn.com/~spectrum/ (email: **spectrum@orn.com**)

On line schedule for *Spectrum* show. *Ribbon Campaign* page (**http://www2.elf.org/blueribbon.html**) is a selection of democracy and technology articles.

WYFR Okeechobee, FL **1/2
http://www.familyradio.com/
(email: **famradio@lanminds.com**)

WYFR's *The Sounds of the New Life* is one of several religious networks on 24 hours a day. Numerous religious sites are here for biblical study and inspiration, Real Audio, and *Useful Links* of ministry sites.

Vatican State

Vatican Radio **
http://www.wrn.org/vatican-radio/
(email: **mc6778@mclink.it**)

Welcome to Vatican Radio opens with a Real Audio welcome and interval signal. The *Main Index* includes feature articles and a CD/cassette offer, plus audio files.

Vietnam

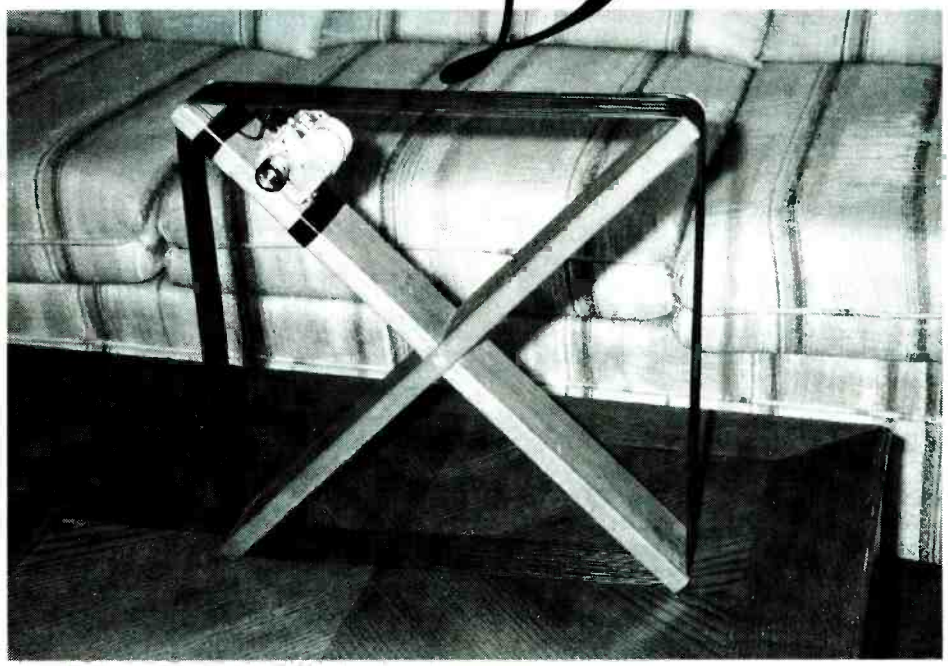
Voice of Vietnam *
http://coombs.anu.edu.au/~vern/tieng_noi_/vn/tnvn.html
(email: **vern@coombs.anu.edu.au**)

Unofficial VOV home page with schedules and link to Australian Vietnam Science Technology.

So there you have it ... an insomniac's "surf" through cyberspace from the worst to the very best in homepages. I found some surprises, disappointments, and even some new discoveries. I had a blast! Now it's your turn to surf while I catch up on some much needed sleep.

Get in the Mediumwave Loop

A loop antenna overcomes many of the disadvantages of the random-length antenna, says the author. Here's a step-by-step approach to building a very capable mediumwave antenna that won't make the neighbors angry.



Building an effective mediumwave loop is not as hard as you might think. Read on for detailed description.

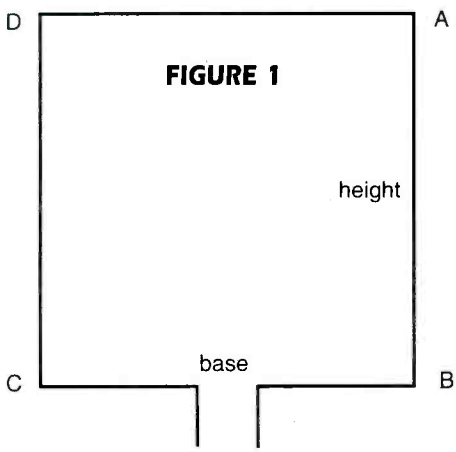


FIGURE 1

A square loop viewed from the side. AB = CD = the height of the loop; AD = BC = the base of the loop. Sides AB and CD are vertical; sides AD and BC are horizontal.

By Philip Gebhardt, VA3ACK

Getting started in mediumwave (MW) DXing is easy. You grab a length of wire, connect an insulator to one end, attach it to a tree and then connect the other end to your receiver. However, almost every MW DXer eventually trades the random-length antenna for a loop antenna. As on any band, the right antenna is the key to success. But getting the most from your loop antenna means understanding how it works.

A loop antenna overcomes the disadvantages of a random-length antenna. Loops can be made very small, whereas a random-length antenna needs to be at least 75-feet long. And although loops have a fixed antenna pattern (so do random-length wires), you can rotate a loop so it points toward the desired station. (It's pretty tough to rotate a 75-foot length of wire.) Alternatively, you can point a loop away from an interfering station. Unlike a wire antenna, a loop doesn't need an antenna tuner or a good ground connection.

Using a simple MW receiving loop, you can hear hundreds of stations throughout the U.S., Canada, the Caribbean, Central America, and South America. Some, like WSB in Atlanta, can be heard almost every night; others, like Deutsche Welle's Caribbean relay station on 930 kHz in Antigua, may take a little work.

Using a simple loop antenna built on a cardboard box, I was able to hear WBMQ (630 kHz with 5 kW) in Savannah, Georgia, from Nassau, Bahamas, at noon. (The 540 km path is almost entirely over salt water.) Late one night (between sunset and sunrise is when most MW DX can be heard), I heard CBL in Toronto, Ontario, (740 kHz with 50 kW) from the same location using the same cardboard box loop.

Loops come in all shapes and sizes. (Not many are built on cardboard boxes, though!) Each has advantages and disadvantages. The main disadvantage of commercially-manufactured loops is the cost. The alternative is to build your own.

Loops can be circular, octagonal, heptagonal, hexagonal, pentagonal, quadrilateral, or triangular. Mechanically, the circular loop is the most difficult to build, mount, and rotate. The octagonal loop is a modification of the circular loop which enables the builder to use straight sections rather than a curve.

The rectangular loop is mechanically simple since its frame is nothing but a single pair of diagonal supports. If you're building or analyzing loop operation, it's the one to start with.

The first design question is: Should such a loop have a long base and short height or a short base and long height? Or, does it matter? Mathematically, a square loop is the best choice. Conveniently, a square loop is the easiest to build and to analyze. The concepts can then be applied to other shapes.

Figure 1 shows a one-turn, square loop antenna. All MW broadcast stations transmit vertically polarized signals (that is, the electric field is vertical and the magnetic field is horizontal). As a vertically-polarized signal passes vertical side AB, a voltage is induced in the wire. Later, when the signal passes vertical side CD, a voltage is induced in that wire.

However, no voltage is induced in the horizontal sides AD and BC.

The total voltage generated in the loop is the difference between the voltages in sides AB and CD. Figure 2 shows how this happens.

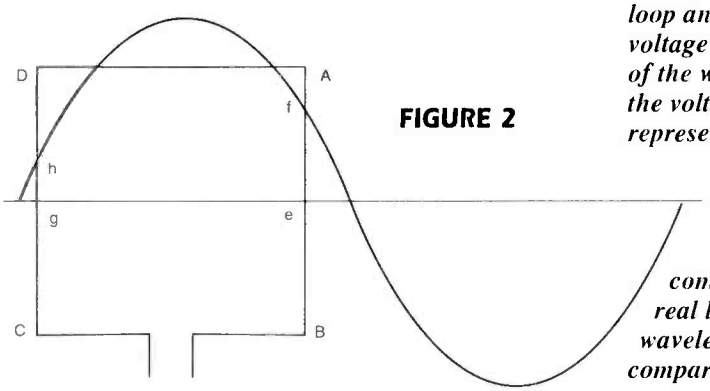


FIGURE 2

At any instant, as a signal travels past a loop antenna, it generates a different voltage in the two vertical wires because of the width of the loop. In loop ABCD, the voltage induced in side CD is represented here by the value "gh" while the voltage induced in side AB is shown by the value "ef." Note that for clarity the loop is deliberately drawn large in comparison to one wavelength. A real loop with a perimeter of 0.08 wavelength would be very small compared to one wavelength.

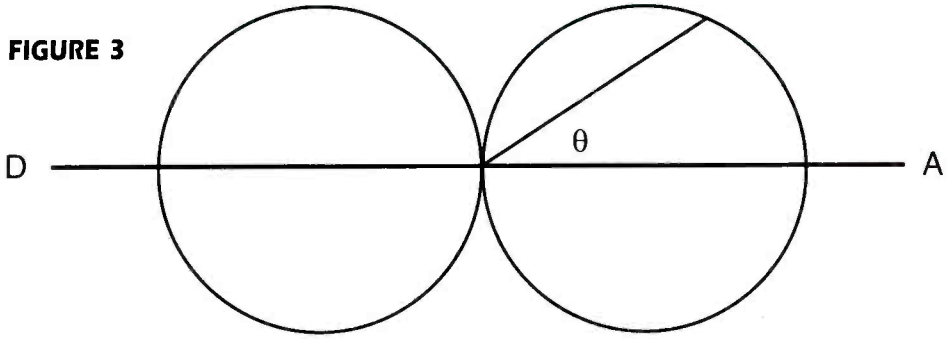


FIGURE 3—*The antenna pattern forms a figure 8. The signal induced in the loop is maximum when the antenna is pointed at the station. This occurs when cosq = 1 (that is, when q = 0°). Maximum signal is induced therefore when points A and D of the loop in Figure 1 and the transmitter are in-line. Nulls occur when the station is broadside to the loop.*

FIGURE 4—*A multi-turn loop antenna with n turns will act like n loops connected together. The frame can be a box form (a) or a pancake form (b). In a box form, the loops are all the same size, but they are not coplanar; in a pancake form, the loops are coplanar, but each one is a different size.*

A signal from a station off the side of the loop (in a direction perpendicular to base BC) reaches sides AB and CD simultaneously. It therefore generates equal voltages in the wires. The two voltages cancel and no signal is heard.

In addition, the loop is bidirectional. That is, the signal could pass through side CD first and then through side AB later. Similarly, the loop nulls signals from either direction perpendicular to the plane of the loop. Therefore, a loop which is pointed north will receive signals from stations to the north and south while signals from eastern and western stations will be nulled.

This produces the classic figure 8 pattern shown in Figure 3. When the loop is neither pointed at a station nor is broadside to the station, the signal induced in the loop is intermediate between the maximum value and zero.

This then gives rise to a major value of the loop antenna: You can point it at a desired station or orient it to null out an interfering station. Keep in mind that you can't necessarily do both at the same time.

The basic multi-turn loop

So far, the loop has a single turn. In an effort to decrease the overall size (a MW loop will have sides about 21-feet long), smaller, multi-turn antennas have been developed. These antennas are configured as a box or as a pancake. (See Figure 4.)

The loops described until now have been non-resonant loops. In practice, a variable capacitor is connected in series with the loop to tune it to resonance.

With no more information than this, you can successfully build and use a loop antenna such as the one described here. Cut the two diagonal, wooden supports approximately 17-inches long. I use pieces of 1-inch by 4-inch lumber. (See Figure 5.) These produce a square with 1-foot sides and a 4-foot perimeter. An 84-foot length of magnet wire will therefore give a 24-turn antenna. (Loops use a maximum of 0.08 wavelength of wire. At 940 kHz, 84-feet is about 0.08 wavelength. This length allows a 365-pF variable capacitor to tune the entire broadcast band.) The two free ends of the wire are connected across the 365-pF variable capacitor. This completes the antenna construction.

In practice, I space the turns 1/8-inch apart. I also notch the ends of the support so the wire cannot move sideways. The most convenient location to mount the capacitor is on one of the diagonal supports.

Using this antenna is equally simple. Any receiver with a built-in ferrite loopstick antenna is suitable. Tune your receiver to a distant, weak station. Now place the loop antenna next to the receiver with the loop pointed toward the station. Place the receiver next to side AB of the loop antenna, but positioned so the receiver is broadside to the station. In this position, the loop antenna and the receiver's built-in ferrite loopstick are coupled together.

The signal can be peaked by tuning the capacitor. You may need to re-aim the loop to get maximum signal. From my listening post near Toronto, Ontario, I cannot hear CJBQ in Belleville (100 air miles to the east) without the loop. Using the loop, the 10 kW broadcaster sounds like a local station.

An easy method of rotating the antenna (while keeping it perpendicular to the

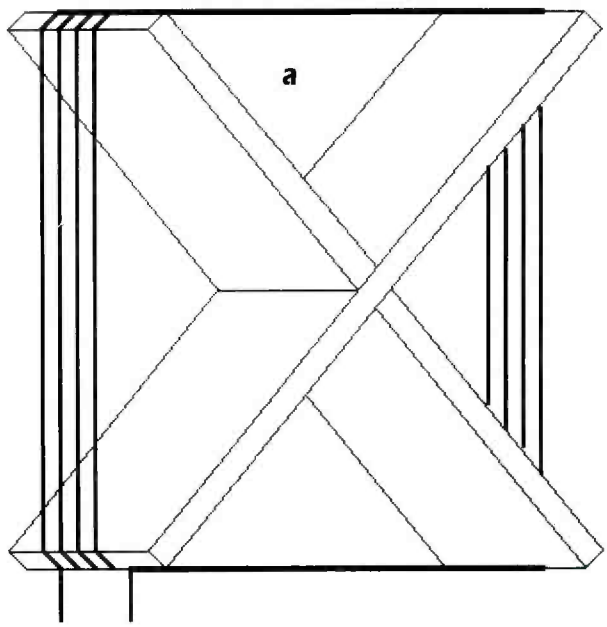
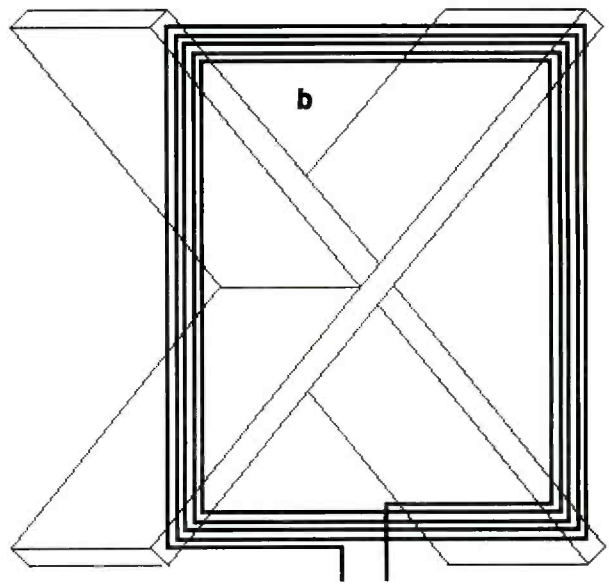


FIGURE 4



receiver) is to place both the antenna and the receiver on a rotatable, lazy Susan tray.

To avoid frustration, it is necessary to be aware of the limitations of loop antennas. A home-made loop is rarely perfectly balanced and therefore the nulls may not be complete. For the same reason, the nulls may not be perpendicular to the direction of maximum signal.

The box antenna exacerbates these problems. This shortcoming is related to the fact that the antenna has a width equivalent to "n" turns. As a result, the box loop acts as if it is two loops—the one you see plus a second, smaller loop perpendicular to the real loop.

You can, to a degree, counter these effects in two ways. First, keep the adjacent turns of the winding closely spaced so the width of the winding is small. This creates a secondary problem, however. Decreasing the spacing increases the capacitance between turns. To offset this effect, use small-diameter wire. (I use #26 enameled wire.) Second, reduce the number of turns in the antenna. As you reduce the number of turns, you will need to increase the length of the sides to maintain the total length of the wire and the signal level.

Some fine tuning tips

Now that you have mastered the simple loop antenna and its operation, you can look into some refinements. Nighttime MW DX signals may experience some Faraday rotation, in which case the electric field of the desired incoming signal will have shifted from vertical. By mounting the loop so it can be tilted sideways (sides AB and CD tip side to side), you can maximize the signal induced in the loop by aligning the wires with the desired signal's electric field.

This gives you two movements: the first points the antenna at the station you want to peak (or null), and the second aligns the wires with the desired signal's electric field.

Notice in Figure 3 that the desired signal changes slowly (initially) as you move away from the station, but the null changes very rapidly as you vary antenna direction. For example, if you orient the antenna to eliminate an interfering signal and this puts you 20° off the desired station, you'll only lose about 6 per cent of the desired signal ($\cos 0° = 1, \cos 20° = 0.94$). However, if you get greedy and try to move the antenna off a nulled station to peak the desired station, the same 20° shift will cause the nulled station to rise from no signal up to 34 percent of its maximum strength ($\cos 90° = 0, \cos 70° = 0.34$).

Some loops are shielded to improve their performance. The shield makes the antenna less susceptible to noise. Furthermore, the antenna can be moved from one location to another with less impact on tuning.

Some loops use pick-up coils so the antenna can be mounted away from the receiver, so the receiver need not be rotated along with the antenna, or so an amplifier can be used.

While all the loops described so far are air-wound, loops can also be wound on ferrite rods.

The simplest modification, however, is to increase the dimensions of the loop. A loop with a long base and height will require fewer turns than a smaller loop, and therefore electrical balance will be easier to maintain. As a result, the nulls will likely be deeper and they will more likely be perpendicular to the plane of the loop.

You can use loop antennas on higher frequencies, as well. For example, I used the same design to build a loop for the tropical bands. My prototype loop used six turns on the same size frame as the MW loop described previously. The one design modification I had to make was to wind a one-turn pick-up winding beside the loop antenna to couple the loop to the receiver's antenna input.

My first attempt at reception started at 0200 UTC. I aimed the loop toward Ottawa to hear CHU (the Canadian time station). The 3 kW signal on 3330 kHz from the station located 195 miles away was strong. Somewhat weaker, but still readable, was WWV (2500 kHz with 2.5 kW) located 1350 miles to the west in Fort Collins, Colorado. Now, full of enthusiasm, I tuned to 3995 kHz. Deutsche Welle's broadcast aimed at Europe was full-strength.

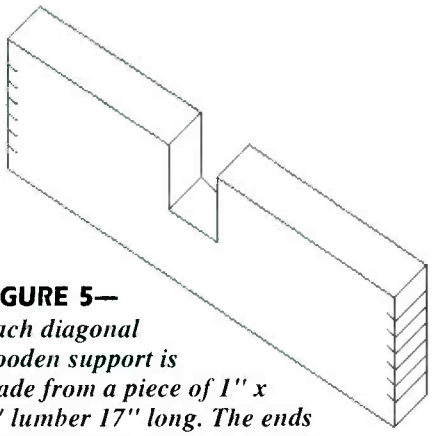
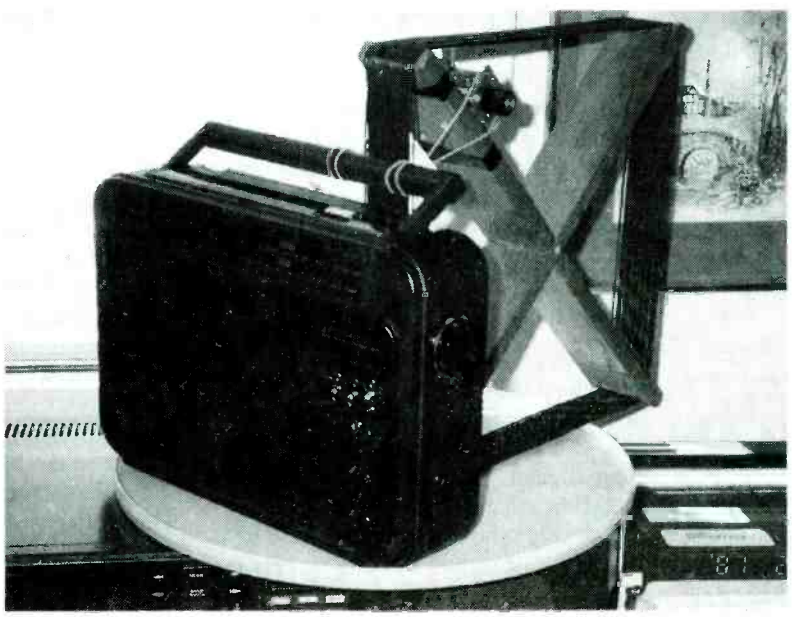


FIGURE 5—
Each diagonal wooden support is made from a piece of 1" x 4" lumber 17" long. The ends are notched to hold the wire in place. Each support is cut halfway through at the center to allow the two supports to interlock. They can then be glued in place.

At 0325 UTC, I was preparing to listen for the BBC's broadcast on 3955 kHz. Rather than the silence I expected to hear, I heard Channel Africa from Johannesburg, South Africa, signing on! And then at 0400 UTC, the BBC came in—weaker than Channel Africa, but readable. In one last test of the loop, I tuned to 3965 kHz to log Radio France Internationale's 4 kW European broadcast. The signal was extremely weak and almost at the noise level, but I eventually managed a positive ID.

My next project (the following night) was a loop for the 49-meter band. Results were not as spectacular as the previous night's effort, but the loop consistently outperformed the receiver's built-in telescoping whip.

Whether you opt for a simple, small loop or a large one that you can tilt and rotate, you're sure to hear a fascinating variety of MW (and higher frequency) stations.



The finished product, mounted to author's radio.

F A C E - O F F

MT Compares the Leaders: ICOM's R-8500 and AOR's AR-5000 Super Receivers

MT REVIEW

By Bob Grove

After months of anticipation, the AR-5000 and R-8500 receivers finally arrived at our testing facility to be put through the grinder. With ICOM's reputation for quality and performance and AOR's growing influence in wide-frequency-coverage monitoring, we were eager to compare the two new entries. The following are my personal first impressions.

Size and Weight

No question about the AOR's compactness; measuring only about 8-1/2 inches wide by 4 inches high by 10 inches deep, and weighing in at a mere 7-5/8 pounds, it is a midget next to the ICOM's substantial 11 inches wide by 4-1/2 inches high by 12 inches deep, nearly 16 pounds. For frequency hunters on the go, the AOR is the clear choice, while the more massive, brushed steel elegance of the ICOM makes an impressive fixed installation, and its larger knobs and keys are easier to use.

Both receivers may be powered by either 120 VAC (separate power supply included) or 12 VDC.

Keys

With the smaller size of the AOR go smaller keys; worse, nearly all 26 of them are dual function, making repeated operation a royal pain. This is especially true when there are so many seemingly unnecessary ancillary functions.

While ICOM has 40 keys, they are larger and nearly all of them are single function; many are factory-defaulted to practical choices matching frequencies with modes, making additional selections unnecessary.

Frequency Coverage

The AOR has the widest frequency coverage ever manufactured for consumers, 5 kHz to 2600 MHz, while the ICOM has a "mere" 100 kHz to 2000 MHz (both less cellular 825-849, 869-894 MHz). These ranges are outstanding, of course, and even the ICOM covers in excess of 99% of any listening that will ever be done by virtually all hobby monitors.

Sensitivity

Both receivers have excellent sensitivity throughout their frequency ranges. For the first 200 megahertz or so their sensitivities were virtually identical; from there through approximately 500 MHz, however, the ICOM had a slight edge. Above 1000 MHz—and we only measured one frequency, 1090 MHz—the AOR had a barely perceptible margin. Keep in mind, these were only moderate differences, and results could vary from unit to unit.

Squelch break sensitivity to weak signals is equally good in both receivers. On the AOR, however, the squelch control may also be alternatively selected as an RF gain control (see noise blanker discusssion under *Audio Quality*).

Selectivity

IF bandwidth filters (-6 dB BW) for the AOR are 3, 6, 15, 30, 110, and 220 kHz for any mode (AM, FM, USB, LSB, CW); an optional 500 Hz filter is available. ICOM chose to provide different filters for different modes: 150 kHz WFM, 12 kHz FM/WAM, 5.5 kHz NFM/AM, 2.2 kHz NAM/USB/LSB/CW; an optional 500 Hz filter is available for CW.

What this means is that ICOM defaults to the most desirable filters for each mode, while AOR allows the user to choose. Only AOR includes a 30 kHz filter, required for weather satellite imagery and some military low-band voice communications. An automatic mode permit defaults to be selected on the AOR as well. Both receivers utilize triple conversion for image rejection.

A substantial shortwave advantage goes to ICOM for the inclusion of passband tuning—a highly-effective means of separating closely-spaced SSB signals in the close-packed HF spectrum. No such tunable selectivity options are present on the AOR.

For the vast majority of applications, the bandwidths offered are satisfactory. On a side-by-side comparison, the ICOM filters seem to be identical to those used on the previous R7000/R7100 models, with the addition of a sharper single sideband filter.

Intermod Rejection

I was very disappointed in the ICOM's vulnerability to strong-signal overload. Third order intermod was severe: considerably worse than ICOM's previous, and venerable, R7100 or the AOR. A local FM broadcaster produced approximately 30 dB more intermod than on its predecessors, indicating a dynamic range some 10 dB less than on the the two classics. If the designers left out some filtering in an attempt to lower costs, the expedient lowered performance as well.

Tuning

The 1-1/4 inch main tuning knob on the AOR has a lever-activated "torque" option to allow greater stiffness in tuning if desired. Tuning increments may be selected from 1, 10, 50, 100, and 500 Hz as well as 1, 5, 6.25, 9, 10, 12.5, 20, 25, 30, 100, and 500 kHz, matching virtually every channelization bandplan except the American VHF-high band (15 kHz). A separate 3/8 inch coarse control allows larger tuning increments (X10) without having to key-select another step; the control also doubles as a second-function option selector.

The ICOM's larger 1-7/8 inch tuning knob is inherently more comfortable to use, and a tension screw is available to tighten or loosen the "feel" of the dial. Two adjacent keys allow press-selection of tuning increments without having to use AOR's cumbersome combination of pushbutton and rotary knob. But ICOM's tuning steps are limited to 10, 50, and 100 Hz, and 1, 2.5, 5, 9, 10, 12.5, 20, 25, 100, and 1000 kHz.

In both cases, however, the available steps are perfectly adequate for any application. Even ICOM's finest resolution, 10 Hz, is more than adequate for any receiving application.

There was some setability error in the AOR tuning, with increments oftennot moving, or moving in the wrong direction, as the dial was turned—the modern-day equivalent of old-fashioned, analog dial backlash.

Direct keypad frequency entry is afforded on both receivers, with AOR allowing either kHz or MHz entry; the ICOM must have MHz entry, so 600 kHz would be entered as 0.600 (MHz). The keys on the AOR are small, densely packed, low on the panel, and nearly all dual function, making key presses a daunting task for most of us club-fingered males.

Both radios have have alphanumeric display capability for station identification, allowing you to type in "POLICE," "VOA," or any other identifier within a reasonable character length limit.

One very nice feature on the AOR is a (defeatable) default which matches correct tuning steps, bandwidths, and modes with any frequency entered on the keyboard or dialed up by the tuning knob. With the exception of the expanded 136-137 MHz AM aircraft band, frequency ranges we tested were quite accurately mode- and step-defaulted.

The down side of this user selectability is that any attempt to alter a setting requires several annoying pushbutton steps to make any change.

Scanning

The AOR offers 1000 memory channels in 10 banks, scannable at 25 and 45 channels per second; 2100 discrete frequencies may be locked out. The ICOM has 800 memory channels in 20 banks, scannable at about 13 channels per second; 100 frequencies may be locked out.

The AOR has a tone-reject function, adjustable from 400 to 4400 Hz, which mercifully skips over frequencies or channels on which a selected-frequency, continuous tone is being transmitted.

Display

The LCD is backlit in both cases; the AOR window is smaller, and weakly backlit by a green-tinted illumination source, while the ICOM is strongly backlit by an amber light source. The larger size, brighter illumination, and thicker, more contrasty characters make the ICOM considerably easier to read. Both receivers have the traditional (and widely preferred) mechanical (D'Arsonval movement) S meter.

The AOR has a 12/24 hour clock timer with alarm and sleep functions; the ICOM has a sleep timer only.

Audio Quality

AOR's bottom-mounted speaker, albeit a good sound producer, compresses its sound fidelity somewhat compared to ICOM's unobstructed top-mounted speaker. While AOR does provide FM de-emphasis selection—essentially a step-selectable treble cut—and low pass/high pass audio filter selection, ICOM's availability of audio peak filtering (APF) allows continuous contour selection from bassy through flat to crisp. Sound quality from both receivers is quite acceptable.

The ICOM also has a highly effective noise blanker which works, in varying degrees, on both electrical line noise pulses and natural static crashes. The AOR does not have a noise blanker or limiter, but the squelch control can be used alternatively as an RF gain control to limit the overall sensitivity and, thus, reduce the background noise on stronger signals.

For tape recording applications, the ICOM has conventional recorder audio output and activator jacks, while AOR provides this access from a front panel DIN connector. In addition, AOR provides an FM discriminator output for digital and SCA decoding.

The AOR offers CTCSS (subaudible "PL" tone) decoding; optional DTMF and inversion are available according to their literature.

Instruction Manual

By their own admission, the original AOR instruction manual was abominable and is undergoing continuous rewrite. At this time, the manual is quite usable, although not wholly complete or accurate. The ICOM manual, on the other hand, is the usual superbly-professional publication, filled with well-illustrated operational documentation.

Both receivers may be computer-controlled via their RS232 ports; additionally, the ICOM offers a CI-V control port.

The Bottom Line

For compact installation requirements, widest frequency coverage, and the greatest variety of options, select the AOR. For intuitive ease of use, display readability, and professional appearance, the ICOM wins hands down; ICOM officials are aware of the intermod problem; for the latest on their response, visit our web site (www.grove.net).

Both models offer 10.7 MHz IF outputs on the rear panel, making them fully compatible with the Grove SDU-100 Spectrum Display Unit, allowing up to 10 MHz of signals to be shown visibly on screen on frequenices above 30 MHz. Under 30 MHz, the ICOM displyas about 30 kHz before signals roll off at the edges—making it nearly useless except for single-signal display. The AOR, on the other hand, maintains a 10 MHz bandwidth throughout its frequency range, a clear advantage for spectrum analysis.

Next Month: A Closer Look

The December and January issues of *Monitoring Times* will take a much closer look at these two fine, new receivers, including specifications. Noted *MT* scanner columnist Bob Parnass is putting them through their paces. Stay tuned!

Dan Veeneman
dan@decode.com

Crossing the Cellular Divide

Cellular telephones seem to have passed the watershed: they are everywhere. The Cellular Telephone Industry Association (CTIA) claims more than 30 million subscribers have a mobile phone, with growth rates approaching fifty percent each year. In 1995 alone more than nine million customers started cellular service. The Federal Communications Commission (FCC) expects well over 50 million cellular subscribers by the year 2000.

The first, and currently dominant, cellular system in the United States is known as Advanced Mobile Phone Service (AMPS). Although the roots of a cell-based communication system go back several decades, in the late 1970's Bell Laboratories proved its viability with networks in New Jersey and Chicago. More than 15 years later this analog cellular service is available in almost every city in the United States.

In defining the initial rules for cellular telephone service, the FCC divided the nation into 306 Metropolitan Service Areas (MSAs) and 428 Rural Service Areas (RSAs), and gave away two operator licenses in each. The existing local telephone company, called the wireline company, received one, and an FCC lottery was held to determine the other, non-wireline license winner.

Frequency Use

The key concept in cellular systems is frequency re-use. Prior mobile telephone services in the United States dedicated a single channel to a mobile telephone user across the entire coverage area during a call. Since the FCC dedicated only a dozen or so frequencies in each service area, the system was often fully loaded while supporting a relatively few number of users. These frequencies, in the 150 MHz and 450 MHz bands, were very crowded, and it was very common at at peak usage times for more than half of all call attempts to fail due to lack of available channels. As late as 1976 there were only 12 channels supporting the entire New York metropolitan area.

The FCC initially allocated two slots for cellular telephone use in the 800 MHz band, one at 825 MHz to 845 MHz, and the other from 870 MHz to 890 MHz. These two 20 MHz slots are divided into 30 kHz wide channels, numbered from 1 to 666. Channels are paired in each of the slots, so a 30 kHz channel in the lower slot corresponds to a 30 kHz channel in the upper slot. The non-wireline company, also known as the A Band carrier, was granted use of channels 1 to 333, and the wireline company (the B Band carrier), was given use of channels 334 to 666. In 1985 the FCC allocated another 10 MHz of spectrum, providing an additional 166 channels, which gave cellular networks a total of 832 channels.

In a cellular system, the service region is divided into much smaller areas called cells, which have a base station at the center. Each base station covers from 1 to 40 miles—5 to 10 miles on average. Each base station is configured to handle calls on a small subset of the available channels. That subset will also be served by other base stations, but adjacent base stations will not have any channels in common. This re-use pattern allows a much greater number of customers to share the same set of frequencies, since the same channel may be in use in several locations at the same time across the entire service area.

Base stations are linked to a Mobile Telephone Switching Office (MTSO), which connects the base station voice channels to voice trunks in the Public Switched Telephone Network (PSTN). The MTSO also controls the operation of the base station equipment, processing call requests and other support functions for each mobile telephone in the service area.

Full Duplex Channels

The base station transmits on the upper slot of frequencies, and these are referred to as the forward channels, going from base to mobile. The cellular telephones transmit on the lower slot of frequencies, which are referred to as reverse channels, going from mobile to base. By selecting the same channel, a base station and a mobile unit can maintain a full-duplex connection, with the transmitted signals separated by 45 MHz. For example, if a connection is active on channel 452 (a channel assigned to the wireline, or B band carrier), then the base station is transmitting on 883.560 MHz (the forward channel) and receiving on 838.560 MHz (the reverse channel). The mobile telephone in this example is transmitting on 838.560 MHz and receiving on 883.560 MHz.

Channels in a cellular network are divided into two types, known as voice and control. The bulk of the channels, 395 for each carrier, are assigned to carry the actual voice audio of a conversation, and are

Frequency Range

666 channel system

Reverse (Mobile Tx)	825.030	844.980
Forward (Mobile Rx)	870.030	889.980

832 channel system

Reverse (Mobile Tx)	824.040	848.970
Forward (Mobile Rx)	869.040	893.970

Frequency Determination

For Channels 1 to 799

$$\textbf{Reverse Frequency} = Channel \times 0.030 + 825.000$$
$$\textbf{Forward Frequency} = Channel \times 0.030 + 870.000$$

For Channels 991 - 1023

$$\textbf{Reverse Frequency} = 825.000 - 0.030 \times (1023 - Channel)$$
$$\textbf{Forward Frequency} = 870.000 - 0.030 \times (1023 - Channel)$$

referred to as forward voice (FOVC) and reverse voice (REVC) channels. During a conversation the audio is sent analog FM modulated, but when a mobile telephone switches from one cell to another in a process called hand-off, the audio is briefly muted and a burst of digital data is sent from the base to the mobile, indicating the new voice channel to use.

When a base station sends out administrative information it uses a forward control channel (FOCC). When a mobile telephone responds to commands or originates a call, it uses a reverse control channel (ROCC). Twenty-one control channels for each carrier are dedicated to one of two functions: access or paging.

Access control channels handle administrative matters related to registering and monitoring mobile telephones using a digital stream of data. The paging channel is a digital stream of system information and telephone call "pages." All mobile telephones, while idle, listen to this paging channel. If a mobile telephone decodes its own number from the paging channel, it will respond to the incoming call. Not every base station has or needs a paging channel to adequately cover the cellular area.

With this as a background, next month we'll cover cellular signals and the procedures a cellular phone goes through to place and receive calls.

■ PCS Comments

Bob Grove's *Closing Comments* in the September issue elicited a response from Francis Hemming, who writes, in part:

Public Service agencies should stop jumping onto new 800 MHz trunked systems in favour of a PCS-based solution in the near future. Why? Simply because the network diversity offered by PCS is exactly what these agencies need to ensure adequate communications under all normal and extraordinary conditions.

Trunked 800 systems grew out of a need for Public Service agencies to more effectively utilize the spectrum they had, while allowing a number of mobiles to share a common voice channel. Trunked 800 systems have their shortfalls, to be sure, but the network concept is one that meshes well with a dispatch-type of operation. PCS networks are not designed to support the one-to-many, highly configurable "task force" groupings that trunked systems offer. This fundamental difference in design will prevent PCS from replacing trunked 800 in the near future.

There is also the problem of local capacity. For example, a report entitled *Metropolitan Washington Area Interoperability*, produced this year by the Public Safety Wireless Advisory Committee (PSWAC), estimates that 25 channels (RF communications paths) are required to implement a Mutual Aid Plan for a single major incident (such as the 1982 Air Florida crash in Washington, D.C.). Additional complications or simultaneous disasters will require many more.

Their final recommendation was "for 100 channels/RF communications paths, in contiguous spectrum and paired for repeater access, be reserved for public safety mutual aid operations, for use by any public safety agency anywhere in the nation."

Local base stations, whether cellular or PCS, simply do not have the capacity to support large numbers of extended calls. The switches also cannot support a common voice path for many simultaneous mobiles.

That being said, some agencies are already using cellular and PCS services for one-to-one communications, where it is feasible to do so. In California, after the 1989 Loma Prieta earthquake and the 1991 Oakland fires, residents were requested to keep cellular calls to a minimum, since emergency crews were using cell phones to keep in contact. It is now common for emergency medical crews to use cellular telephones to contact local hospitals, rather than use crowded medical voice and telemetry channels.

The use of cellular and PCS will continue to grow in the Public Safety sector, but it will not replace common-channel wireless radios, because, as currently designed, PCS cannot do what trunked 800 and similar systems can do.

Francis continues: *I must say, however, that looking at the current cellular standard (AMPS), and the political environment that allowed it to be created, there is little hope for a PCS implementation that achieves 10 percent of what's promised. That is because such a system demands standards. I want secure communications without some government holding the codes. I want to be able to activate a GPS receiver in the phone and send my coordinates accurate to within 1 meter. I don't want to send it to anyone else without my authorization. I don't think North America is capable of creating and enforcing a set of standards that would allow the potential of PCS to be seen.*

As we say in the computer software business, that's what's so nice about standards: there are so many to choose from!

The United States and Europe seem to be trading places on standards. When the FCC began issuing cellular licenses they required each operator to meet specific technical standards, which followed a design worked out by AT&T. Each operator had to provide a set of well-defined services, which guaranteed that any customer's cellular equipment would operate in any service area. Customers could travel coast to coast, through many cellular service regions, and be able to operate in each one.

Europe started down a different path. In the 1970's, several nations proposed and began building a variety of different systems following different, incompatible standards including Total Access Communication System (TACS) in the United Kingdom, Nordic Mobile Telephone (NMT) in Scandinavia, as well as others.

In 1982 representatives of 26 nations agreed to begin the development of a European standard called GSM (Groupe Speciale Mobile, or today, Global System for Mobile Communications), to operate in the 900 MHz band. The idea was for any GSM phone to be operable in any member country. By 1992 these fully digital networks started to come in to service, and by the end of 1995 were serving more than 12 million customers, and ninety countries had signed the GSM Memorandum of Understanding.

The FCC, however, in auctioning the PCS spectrum, decided to step away from the standards-setting business and stated they would "let the marketplace decide." There are currently no less than seven different standards vying for attention in the PCS marketplace. A future column will describe these standards in more detail, but for now, suffice it to say that customer confusion will be the norm until a winner or two emerge.

Send comments, questions, and criticisms to *dan@decode.com*. Until next month, happy monitoring!

Channel Allocations

Band	Voice Channels	Control Channels
A (Non-Wireline)	001 - 312 667 - 716 991 - 1023	313 - 333
B (Wireline)	355 - 666 717 - 799	334 - 354

Richard Barnett
ScanMaster@aol.com, Compuserve at 102354,3643

Mall Call

There are many unique places in which you can create your own monitoring challenge. The local mall happens to be one of those places. Guys who are dragged to the mall by their wives or girlfriends can while away the time by tucking a portable in their back pocket, along with their frequency counter if they have one.

Mall of America.

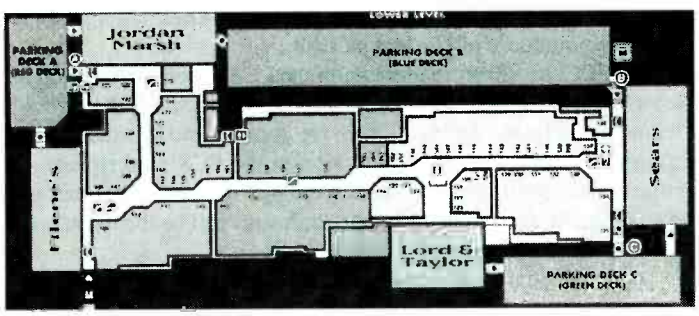
A small- to medium-sized mall will typically only have one active voice channel: mall security. (Note that hand-held inventory devices may be in use to transmit information to a store's central computer, but this is data only.) These single-channel, mall security frequencies are typically found on low-power UHF splinter frequencies in the 461 to 470 MHz range—for instance, 463.5125 MHz.

The systems may be simplex, or even low-power repeaters, needing only to provide coverage in all stores of the mall, in the parking lot, and in the parking garage. At best, you generally will only be able to monitor these systems within a few miles of the mall, although some malls locate their transmitters atop four-story anchor stores and coverage is therefore greater.

Larger malls will typically have additional channels: maintenance, engineering, and the like. Newer malls, such as the new Natick Mall here in Massachusetts, will operate multi-channel systems for all these services and more.

One very interesting aspect of a few malls is a PBX-type interconnect. This is common in smaller malls where there may be only one security guard on duty. If a customer uses a mall "house-phone," or perhaps calls from a cellular phone in the mall garage to the mall security office, this system will allow the call to ring through to the guard's portable radio if the lone security officer is on patrol. The guard can answer the call and respond as if he or she were in the security office.

Mall anchor stores will also often have radio communications gear on hand. These channels are generally used by plain-clothed store security staff who are charged with deterring shoplifting, a crime which costs retailers billions every year. Some fascinating conversations can be heard between on-floor personnel, who are dressed as though they were typical shoppers, and the security staff watching the action via closed-circuit cameras similar to those found in casinos.



Natick Mall.

You don't have to make a trip to a mega-mall like in this month's cover story to have great fun with mall monitoring, particularly during the holiday shopping season. Between shoplifting, auto theft in the parking lots, broken escalators, and the like, security and maintenance channels seem to chatter non-stop. They're often much more active than local police frequencies!

Drive-Through Dilemma

An acquaintance of mine relayed a story to me recently about how he felt compelled to, just for a moment, transmit on a channel for which he was not authorized.

Going through a McDonald's drive-through one day he was monitoring the order-taker-to-customer frequency (469.0125 MHz with a tone of 77.0 Hz) as well as the order-taker-to-cook intercom channel (464.0125 MHz with a tone of 123.0 Hz). When it was his turn to order, this acquaintance had to turn down his scanner so that feedback wouldn't interrupt his order. Feeling extra hungry that day, this fellow ordered three Quarter-Pounders for himself along with large fries, but just one large soda.

After being told to drive-up to the first window, this scannist then tuned back to the intercom channel and heard the order taker exclaim to the cook, "Hey, that last guy, he just ordered three burgers and a large fries, what a blankety-blank pig!" Enraged, my acquaintance pulled out his ham rig, which had been modified for extended receive (and by happenstance, transmit). He keyed the mike with the proper intercom CTCSS tone, and said, "You'd better watch out what you're saying....you never know who's listening!"

That was the last he heard of the chatter on the intercom frequency. When he drove up to receive his order, he was met with a wide-eyed stare from the now well-mannered clerk, who glanced curiously at the antennas dotting this fellow's car. My acquaintance does not condone illegal transmissions, even at low-power. He regrets his actions. The moral of the story: if you're going to be a blankety-blank pig at a fast-food drive-through, keep your scanner off!

Wrong about New Hampshire

There are a lot of misconceptions about the state of New Hampshire. One reported by this editor in the September issue was that New Hampshire had rejected keeping the equipment from a Motorola Astro™ digital beta test for the New Hampshire State Police.

During a trip to the APCO (Association of Public-Safety Communications Officials) convention in San Antonio recently, I was informed that, in reality, New Hampshire had been pleased with the test and had allocated funds to construct a statewide digital system. At present, the system is designed to operate on non-trunked VHF high-band channels. If enough channels can be found, the system may go trunked.

This is disappointing news for hobbyists; however, it will be interesting to see how digital performs on a statewide basis in such a mountainous, tree-covered state. The initial test was run in the relatively flat terrain of southeastern New Hampshire, and, we understand, it was determined that, unlike analog trunking, the engineers were not able to reliably simulcast the digital signals and therefore had to rely upon a single site. Will digital signals 'Live Free or Die' short of range in New Hampshire? Only time will tell.

The Digital Olympics?

There has been a lot of confusion over whether the communications at the Olympic Games were in the analog or digital mode. A good friend in Atlanta, an astute monitor, told me that all of the radio traffic he heard was analog 800 and 900 MHz trunked. Others reported to Larry Van Horn, *MT*'s Ute World editor and the editor of *Satellite Times*, that everything was digital. Claims were made prior to the Games, and reported in this publication as well as others, that all communications would be digital.

Could it be that the USOC (United States Olympic Committee) and the two-way vendor were referring to the fact that trunking data channels are digital? Perhaps some of the USOC communications may have been conducted on NEXTEL digital systems.

According to a recent story in the *Washington Post*, 12,000 two-way radios, 7,500 pagers and more than 1,400 cellular phones were in use without a hitch at the Games. There's no mention of digital or analog modes, however. It's all very puzzling.

We urge readers who visited the Games or who live in the area to write us with their reports. Also, we had been told that local Atlanta agencies might inherit the digital radio gear (for a discounted price) after the Games concluded. It's all hearsay. Any definitive information would be appreciated. Also, if anyone was monitoring when the pipe bomb exploded in Olympic Park, please let us know. Emergency equipment arrived on-scene very quickly. Communications in this instance, be they analog or digital, seemed to work quite well.

All-Time Favorite Scanner Redux

Alex Blaha of Illinois wrote us with his all-time favorite radio: "Your question did stir up some nostalgia....My favorite scanner of all time has to be the Bearcat 210. While it is not popular, to me it is special. Thanks to a ham operator, I received one as a gift and listened to my first police calls. Now I look back and remember listening to the Aurora Police Department, Cook County Sheriff, and others for the first time.

"Sadly, Aurora moved to 800 MHz, so the 210 doesn't let me listen in, but I will always treasure the memories that the 210 gave me. Since then I have bought many scanners. About a year ago, I noticed a neighbor had a 210 sitting up on a shelf, among some books. Remembering how much fun the first one was I quickly made a motion to buy it. The deal went through and proudly I was able to add another 210 to my collection."

Thanks, Alex. This is just the type of memory we've been looking for. Alex is also the publisher of *Scanning Illinois*, a relatively new newsletter for hobbyists in that state. You can write him at 2054 Hawthorne, Joliet, IL, 60435. To reach one of the most long-standing, and active, scanner clubs in the United States, contact CARMA, the Chicago Area Radio Monitors Association, at P.O. Box 2861, Glenview, IL, 60025.

Cajun Frequency Hunt

On a recent excursion to Ft. Worth, Texas, I took the opportunity to drive to Shreveport, Louisiana, in search of some frequencies and some gumbo. (Incredibly, I was told in Shreveport that I was too far north for good gumbo!) To the best of my knowledge, Louisiana is quite unique in that it is the only state in the nation licensed for major statewide State Police radio systems on all bands: low-VHF, high-VHF, UHF, and 800 MHz. However, despite loading the scanner with frequencies from all bands, little was heard in the two or three hours spent in the northwestern corner of the state.

Below are the 800 MHz frequencies licensed to the Louisiana State Police, along with their transmitter sites. We understand that the LSP are operating on their trunking system statewide now. The information is courtesy of *Monitor America*, the national communications guide of which I am editor.

Abbeville
851.6875, 852.1875, 852.6625, 853.1375, 853.5875, 854.0875, 854.5625, 855.0125, 855.5125, 855.9875

Alexandria
851.6875, 852.1875, 852.6625, 853.1375, 853.6125, 854.0875, 854.5625, 855.0125, 855.5125, 855.9875

Angola
855.9875, 856.7625, 857.7625, 858.7625, 859.7625

Bellevue
856.4375, 856.9875, 857.4375, 857.9875, 858.4375, 858.9875, 859.4375, 859.9875, 860.4375, 860.9875

Berwick
856.4375, 856.9875, 857.4375, 857.9875, 858.4375, 858.9875, 859.4375, 859.9875, 860.4375, 860.9875

Bohemia
852.0625, 853.0125, 853.9625, 854.9125, 855.3875

Bridge City
851.6625, 852.1875, 852.6625, 853.1375, 853.5875, 854.0875, 854.5625, 855.0125, 855.5125, 855.9875, 856.7625, 857.7625, 858.7625, 859.7625, 866.3125, 867.1375, 867.2625, 868.425

Calhoun
855.9875, 856.4625, 856.9625, 857.4625, 857.9625, 858.4625, 858.9625, 859.4625, 859.9625, 860.4625, 860.9625

Columbia
852.5375, 853.5875, 854.2125, 854.9875, 859.4625

Farmerville
852.0625, 852.6625, 853.1375, 856.4875, 860.4375

Geismar
866.350, 866.8875, 867.875, 868.4125

Goudeau
853.8625, 856.4375, 856.9875, 857.4375, 857.9875, 858.4375, 858.9875, 859.4375, 859.9875, 860.4375, 860.9875,

Greensburg
856.4375, 856.9875, 857.4375, 857.9875, 858.4375, 858.9875, 859.4375, 859.9875, 860.4375, 860.9875

Hackberry
855.9625, 856.4625, 856.9625, 857.4625, 857.4625, 857.9625, 858.4625, 858.9625, 859.4625, 859.9625, 860.9625

Holly Ridge
856.4375, 856.9875, 857.4375, 857.9875, 858.4375, 858.9875, 859.4375, 859.9875, 859.9875, 860.4375, 860.9875

Jackson
851.6875, 852.1875, 852.5625, 853.1375, 853.5875, 854.9875, 854.5625, 855.0125, 855.2125, 855.9875, 856.7625, 857.7625, 858.7625, 859.7625, 860.7625

Jena
856.2375, 856.7625, 857.2375, 857.7625, 858.2375, 859.2375, 859.7625, 860.2375

Jonesboro
856.2375, 857.2375, 858.2375, 859.2375, 860.2375

Larose
859.4625, 856.9625, 857.4625, 857.9625, 858.4625, 858.9625, 859.4625, 859.9625,

8680.4625, 860.9625
Lauderdale
851.5625, 852.5375, 853.9625, 854.4375, 854.9125, 855.8625, 852.0625, 853.0125, 853.4875, 855.3875
Leesville
855.4625, 855.9875, 859.2375, 859.4625, 860.4625
Louisville
851.5625, 852.0625, 852.5375, 853.0125, 853.4875, 853.9625, 854.4375, 854.9125, 855.3875, 855.8875, 856.2375, 857.2375, 858.2375, 859.2375, 860.2375
Mansfield
856.9875, 857.9875, 858.9875, 859.9875, 860.4375
Many
856.4625, 856.9625, 857.4625, 857.7625, 858.4625, 858.9625, 859.4625, 859.9625, 860.4625, 860.9625
Plain Dealing
852.1875, 856.9625, 857.9625, 858.9625, 859.9625
Ramah
866.375, 866.9125, 868.3625, 868.8625
Ringgold
856.2375, 857.2375, 858.2375, 859.2375, 860.2375, 856.7625, 857.7625, 858.7625, 859.7625, 860.7625
Rosepine
856.2375, 856.7625, 857.2375, 857.7625, 858.2375, 858.7625, 859.2375, 859.7625, 860.2375, 860.7625
Saint Rosa
866.4875, 867.6625, 868.300, 868.800
Sheridan
856.9625, 857.9625, 858.9625, 859.9625
Slidell
856.4625, 857.4625, 858.4625, 859.4625
Sunset
852.1875, 856.4375, 857.4375, 858.4375, 860.2375
Tallulah
857.2375, 858.2375, 859.2375, 860.2375, 859.4375
Waldheim
856.4625, 856.9625, 857.9625, 859.4625, 857.4625, 858.4625, 858.9625, 859.9625, 860.4625, 860.9625
Wheeling
856.4375, 856.9875, 857.4375, 857.9875, 858.4375, 858.9875, 859.4375, 859.9875, 860.4375, 860.9875, 866.1125, 866.350, 866.900, 868.725
Woodlawn
854.9875, 857.7625, 858.7625, 859.7625, 860.7625,

Had we more time in Shreveport, we would have taken the following steps to help bring in those elusive signals:

a) Purchase either a standard mag-mount mobile scanner antenna, which is optimal for a mobile configuration, or an on-glass scanner antenna, which is only recommended for frequencies UHF and above. (Longer and lower radio waves do not seem to travel well through the glass. Most on-glass antennas are rated for use above 50 MHz).

b) Find the nearest State Police barracks and park near a transmitter tower, either listening to all the possible frequencies, or watching our counter sniff out an unsuspected frequency.

c) Stop by a local electronic or ham radio store. See if a scanner-savvy clerk might have the answer.

We finally decided to try out Step C above. The clerk didn't have the answer and he couldn't provide a local frequency list for either. (It seems that the Shreveport Police had come into his store and all but forbidden the distribution of such a free list.)

There is a lot of other radio traffic in Shreveport to monitor, though. Below is a police channel plan for the city. Shreveport had a very extensive list of "10-codes." Generally speaking, codes are dying a slow death as the "Incident Command System" employed by many public safety departments now requires "plain English" for clarity's sake.

Shreveport Police Channel Plan

453.900 (F-1)	Police Tactical/Traffic Engineering
453.800 (F-2)	Police Information/Detectives
453.950 (F-3)	Police North and East Operations
453.825 (F-4)	Police South and West Operations
453.450 (F-5)	Police Field Dispatch/Car to Car
453.550 (F-6)	Police Field Dispatch/Car to Car
453.650 (F-7)	Airport Police
453.700 (F-8)	City Marshals
453.500 (F-9)	Police Special Operations
155.310 (F-10)	Paging
460.500	Police
460.200M	Police (Mobiles)
855.9875	Police

Police Unit Identifiers

PD1	Chief of Police
PD2	Deputy Chief of Police
PD3	Assistant Chief of Police
PD4	Assistant Chief of Police
PD5	Chief of O.S.I.
PD6	Chief of Central Records
PD7	Chief of Selective Enforcement
PD8	Chief of Identification
PD9	Chief of Staff Services
PD11-59	Detectives
PD60-68	Juvenile Officers
PD80-99	Support (I.A.D.; Jailers, etc.)
C101-103	Patrol Captains
L104-108	Patrol Lieutenants
S109-121	Patrol Sergeants
117-190	Patrol Cars
194	DWI Van
195-199	Wagons
200-210	Selective Enforcement Supervisors
211-218	Selective Enforcement 3-Wheelers
230-244	Selective Enforcement Cycles
260-280	Selective Enforcement Cars
282-283	Accident Investigation
300-399	Traffic Engineering
400-499	Special Investigations
500-599	City Marshal
700-799	Identifcation Technicians
800-899	Supervisors
900-999	Foot Patrol (Downtown beats)
MP1-MP2	Mounted Patrol

Bossier City and Parish operate on a trunking system: 856-860.7375 MHz

The Shreveport area is home to a number of casinos. We discussed in the March issue some of the interesting radio traffic heard on casino channels. Monitoring the games of chance of Shreveport provides similar fun.

Harrah's Casino Shreveport

461.0375, 461.4375, 461.8125, 463.7875, 463.9125, 464.1125, 464.2375, 464.250, 464.925, 468.6875 MHz

Isle of Capri Casino

461.625, 461.6375, 461.7875, 461.850, 463.275, 463.600, 463.8875 MHz

Synthesized FM Stereo Transmitter

Microprocessor controlled for easy freq programming using DIP switches, no drift, your signal is rock solid all the time - just like the commercial stations. Audio quality is excellent, connect to the line output of any CD player, tape deck or mike mixer and you're on-the-air. Foreign buyers will appreciate the high power output capability of the FM-25; many Caribbean folks use a single FM-25 to cover the whole island! New, improved, clean and hum-free runs on either 12 VDC or 120 VAC. Kit comes complete with case set, whip antenna, 120 VAC power adapter - easy one evening assembly.

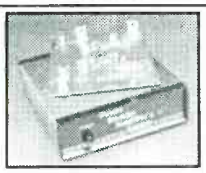
FM-25, Synthesized FM Stereo Transmitter Kit $129.95

Tunable FM Stereo Transmitter

A lower cost alternative to our high performance transmitters. Offers great value, tunable over the 88-108 MHz FM broadcast band, plenty of power and our manual goes into great detail outlining aspects of antennas, transmitting range and the FCC rules and regulations. Connects to any cassette deck, CD player or mixer and you're on-the-air, you'll be amazed at the exceptional audio quality! Runs on internal 9V battery or external power from 5 to 15 VDC, or optional 120 VAC adapter. Add our matching case and whip antenna set for a nice finished look.

FM-10A, Tunable FM Stereo Transmitter Kit $34.95
CFM, Matching Case and Antenna Set. $14.95

RF Power Booster Amplifier



Add some serious muscle to your signal, boost power up to 1 watt over a frequency range of 100 KHz to over 1000 MHz! Use as a lab amp for signal generators, plus many foreign users employ the LPA-1 to boost the power of their FM Stereo transmitters, providing radio service through an entire town. Power required: 12 to 15 volts DC at 250mA, gain of 38dB at 10 MHz, 10 dB at 1000 MHz. For a neat, professionally finished look, add the optional matching case set.

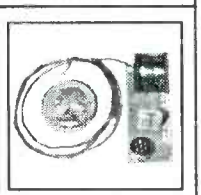
LPA-1, Power Booster Amplifier Kit $39.95
CLPA, Matching Case Set for LPA-1 Kit. $14.95
LPA-1WT, Fully Wired LPA-1 with Case $99.95

Micro FM Wireless Mike

World's smallest FM transmitter. Size of a sugar cube! Uses SMT (Surface Mount Technology) devices and mini electret condenser microphone, even the battery is included. We give you two complete sets of SMT parts to allow for any errors or mishaps-build it carefully and you've got extra SMT parts to build another! Audio quality and pick-up is unbelievable, transmission range up to 300 feet, tunable to anywhere in standard FM band 88 to108 MHz. 7/8"w x 3/8"h x 3/4"h.

FM-5 Micro FM Wireless Mike Kit $19.95

Crystal Controlled Wireless Mike



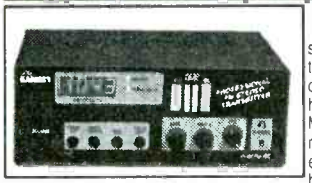
Super stable, drift free, not affected by temperature, metal or your body! Frequency is set by a crystal in the 2 meter Ham band of 146.535 MHz, easily picked up on any scanner radio or 2 meter rig. Changing the crystal to put frequency anywhere in the 140 to 160 MHz range-crystals cost only five or six dollars. Sensitive electret condensor mike picks up whispers anywhere in a room and transmit up to 1/4 mile. Powered by 3 volt Lithium or pair of watch batteries which are included. Uses the latest in SMT surface mount parts and we even include a few extras in case you sneeze and loose a part!

FM-6, Crystal Controlled FM Wireless Mike Kit $39.95
FM-6WT Fully Wired FM-6 ..... $69.95

Call for our Free Catalog !

RAMSEY

Super Pro FM Stereo Radio Transmitter

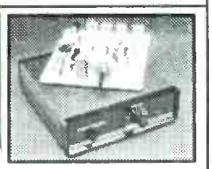


A truly professional frequency synthesized FM Stereo transmitter station in one easy to use, handsome cabinet. Most radio stations require a whole equipment rack to hold all the features we've packed into the FM-100. Set frequency easily with the Up/Down freq buttons and the big LED digital display. Plus there's input low pass filtering that gives great sound no matter what the source (no more squeals or swishing sounds from cheap CD player inputs!) Peak limiters for maximum 'punch' in your audio - without over modulation, LED bargraph meters for easy setting of audio levels and a built-in mixer with mike and line level inputs. Churches, drive-ins, schools and colleges find the FM-100 to be the answer to their transmitting needs, you will too. No one offers all these features at this price! Kit includes sharp looking metal cabinet, whip antenna and 120 volt AC adapter. Also runs on 12 volts DC.

We also offer a high power export version of the FM-100 that's fully assembled with one watt of RF power, for miles of program coverage. The export version can only be shipped outside the USA, or within the US if accompanied by a signed statement that the unit will be exported.

FM-100, Professional FM Stereo Transmitter Kit $299.95
FM-100WT, Fully Wired High Power FM-100. ..... $429.95

Speech Descrambler Scrambler



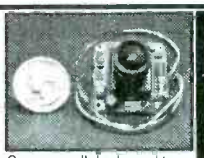
Decode all that gibberish! This is the popular descrambler / scrambler that you've read about in all the Scanner and Electronic magazines. The technology used is known as speech inversion which is compatible with most cordless phones and many police department systems, hook it up to scanner speaker terminals and you're in business. Easily configured for any use: mike, line level and speaker output/inputs are provided. Also communicate in total privacy over telephone or radio, full duplex operation - scramble and unscramble at the same time. Easy to build, all complex circuitry contained in new custom ASIC chip for clear, clean audio. Runs on 9 to 15VDC, RCA phono type jacks. Our matching case set adds a super nice professional look to your kit.

SS-70A, Speech Descrambler/Scrambler Kit $39.95
CSS, Custom Matching Case and Knob Set $14.95
SS-70AWT, Fully Wired SS-70A with Case $79.95
AC12-5, 12 Volt DC Wall Plug Adapter $9.95

Tone-Grabber Touch Tone Decoder / Reader

Dialed phone numbers, repeater codes, control codes, anywhere touch-tones are used, your TG-1 will decode and store any number it hears. A simple hook-up to any radio speaker or phone line is all that is required, and since the TG-1 uses a central office quality decoder and microprocessor, it will decode digits at virtually any speed! A 256 digit non-volatile memory stores numbers for 100 years - even with the power turned off, and an 8 digit LED display allows you to scroll through anywhere in memory. To make it easy to pick out numbers and codes, a dash is inserted between any group or set of numbers that were decoded more than 2 seconds apart. The TG-1 runs from any 7 to 15 volt DC power source and is both voltage regulated and crystal controlled for the ultimate in stability. For stand-alone use add our matching case set for a clean, professionally finished project. We have a TG-1 connected up here at the Ramsey factory on the FM radio. It's fun to see the phone numbers that are dialed on the morning radio show! Although the TG-1 requires less than an evening to assemble (and is fun to build, too!), we offer the TG-1 fully wired and tested in matching case for a special price.

TG-1, Tone Grabber Kit $99.95
CTG, Matching Case Set for TG-1 Kit. $14.95
TG-1WT, Fully Wired Tone Grabber with Case $149.95
AC12-5, 12 Volt DC Wall Plug Adapter $9.95

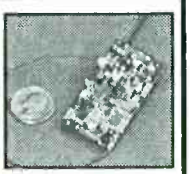


Mini-Peeper Micro Video Camera

Super small, high quality fully assembled B & W CCD TV camera the size of an ice cube! Provides excellent pictures in low light (2 lux), or use our IR-1 Infra-Red light source to invisibly illuminate an entire room on a pitch black night! Imagine the possibilities... build it into a smoke detector, wall clock, lamp, book, radio. Exact same camera that's in big buck detective catalogues and stores. Kit includes: fully assembled CCD camera module, connectors, interface PC board kit with proper voltage regulation and filtering, hook-up details, even a mini microphone for sensitive sound! Two models available: Wide Angle Lens 3.6mm/f2, adjustable focus lens, 92 degree view; Pinhole Lens 5.5mm/f4.5, 60 degree view. The Pinhole Lens is physically much flatter and provides even greater depth of focus. The camera itself is 1.2" square. The Wide Angle Lens is about 1" long, Pinhole Lens about 1/2", interface PC board is 1" x 2" and uses RCA jacks for easy hook-up to VCRs, TVs or cable runs. Power required is 9 to 14 VDC @ 150 mA. Resolution: 380 x 350 lines. Instruction manual contains ideas on mounting and disguising the Mini-Peeper along with info on adding one of our TV Transmitter kits (such as the MTV-7 unit below) for wireless transmission!

MP-1, Wide Angle Lens CCD TV Camera Outfit $169.95
MP-1PH, Pin-Hole Lens CCD TV Camera Outfit $189.95

MicroStation Synthesized UHF TV Transmitter



Now you can be in the same league as James Bond. This transmitter is so small that it can fit into a pack of cigarettes - even including a CCD TV camera and battery! Model airplane enthusiasts put the MTV-7A into airplanes for a dynamite view from the cockpit, and the MTV-7A is the transmitter of choice for balloon launches. Transmitter features synthesized, crystal controlled operation for drift-free transmission of both audio and video on your choice of frequencies: Standard UHF TV Channel 52 (which should only be used outside of the USA to avoid violating FCC rules), and 439.25 MHz or 911.25 MHz which are in the amateur ham bands. The 439.25 MHz unit has the nifty advantage of being able to be received on a regular 'cable-ready' TV set tuned to Cable channel 68, or use our ATV-74 converter and receive it on regular TV channel 3. The 911.25 MHz unit is suited for applications where reception on a regular TV is not desired, an ATV-79 must be used for operation. The MTV-7A's output power is almost 100 mW, so transmitting range is pretty much 'line-of-sight' which can mean many miles! The MTV-7A accepts standard black and white or color video and has its own, on-board, sensitive electret microphone. The MTV-7A is available in kit form or fully wired and tested. Since the latest in SMT (Surface Mount Technology) is used to provide for the smallest possible size, the kit version is recommended for experienced builders only. Runs on 12 VDC @ 150 mA and includes a regulated power source for a CCD camera.

MTV-7A, UHF TV Channel 52 Transmitter Kit $159.95
MTV-7AWT, Fully Wired Channel 52 Transmitter $249.95
MTV-7A4, 439.25 MHz TV Transmitter Kit $159.95
MTV-7A4WT, Fully Wired 439.25 MHz Transmitter $249.95
MTV-7A9, 911.25 MHz TV Transmitter Kit $179.95
MTV-7A9WT, Fully Wired 911.25 MHz Transmitter $269.95
ATV-74, 439.25 MHz Converter Kit $159.95
ATV-74WT, Fully Wired 439.25 MHz Converter $249.95
ATV-79, 911.25 MHz Converter Kit $179.95
ATV-79WT, Fully Wired 911.25 MHz Converter $269.95

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Victor, NY 14564

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ORDERING INFO: Satisfaction Guaranteed. Examine for 10 days, if not pleased, return in original form for refund. Add $4.95 for shipping, handling and insurance. Orders under $20, add $3.00. NY residents add 7% sales tax. Sorry, no CODs. Foreign orders, add 20% for surface mail or use credit card and specify shipping method.

Larry Van Horn, N5FPW
steditor@grove.net

Marine HF Radio Scaling Down

Recently, while monitoring e-mail traffic on the WUN newsgroup, I came across some interesting items regarding the current status of several marine coastal stations and HF RTTY press services.

Day Watson in Clevedon, UK—the WUN *Nautical News* columnist---posted the news that DAN-Norddeich Radio, Germany, will have shut down their CW traffic and SSB radiotelephone frequencies by the time this issue of *MT* reaches you. Norddeich will discontinue their MF radiotelephone frequencies on January 1, 1997. Digital traffic (SITOR) frequencies will be the only signals available from Norddeich Radio after January 1. Markus Buttinger in Salzburg, Austria, confirmed Day's information via the German radio-related magazine *Funk*.

Day also verified that PJC-Williemstad in Curacao, Netherlands Antilles, will have discontinued its commercial HF marine radio services by the time this issue gets to *MT* readers.

In a related story, Rick Baker says that NMF, the U.S. Coast Guard station in Boston, Massachusetts, will go the way of USCG station NMA in Miami, Florida, very soon. Here is the official announcement that Rick received via a NAVTEX broadcast on 518 kHz:

ZCZC FV02
1. REMOTING OF US COAST GUARD COMMUNICATIONS STATION BOSTON MA (NMF). AS PART OF THE USCG COMMUNICATIONS SYSTEM 2000 PLAN, COMMSTA BOSTON (NMF) IS SCHEDULED TO RELINQUISH OPERATIONAL CONTROL OF ALL MF/HF ASSETS TO CAMSLANT CHESAPEAKE VA (NMN) BY 01NOV96. ALL OF THE SERVICES CURRENTLY PERFORMED BY NMF WILL CONTINUE BUT WILL BE PERFORMED REMOTELY BY NMN. THE REMOTING OF NMF CIRCUITS TO NMN WILL BE ACCOMPLISHED IN SEVERAL PLANNED PHASES STARTING 16SEP96. DURING THIS SERVICE-BY-SERVICE CUTOVER, NMF WILL CONTINUE TO MONITOR ALL CIRCUITS AND BE READY TO ANSWER CALLS OR PERFORM BROADCASTS IN THE EVENT THAT NMN CANNOT. AS SERVICES ARE REMOTED TO NMN, CALLS TO COMMSTA BOSTON OR NMF, WILL BE RESPONDED TO EITHER AS CG CAMSLANT CHESAPEAKE OR NMN AS APPROPRIATE. THERE ARE NO PLANNED OR SCHEDULED SERVICE INTERRUPTIONS ASSOCIATED WITH THIS REMOTING. IF UNFORESEEN INTERRUPTIONS OCCUR, NMN AND NMF WILL ENSURE YOU ARE KEPT INFORMED OF THE EXTENT AND ANTICIPATED DURATION OF THE OUTAGE VIA THE MOST RAPID MEANS AVAILABLE. PLEASE KEEP NMN OR NMF INFORMED OF ANY SERVICE DEGRADATION OR PROBLEMS ENCOUNTERED.
NNNN BRK

In the case of DAN and PJC, it is likely that the INMARSAT satellite system and the increased use of digital modes in traffic handling are the culprits in the demise of these two stations.

Our thanks to Day, Markus, and Rick for passing along the bad news about the loss of these maritime services.

RTTY Press Services Leave HF

The marine coastal stations aren't the only utility stations disappearing from HF. Longtime digital utility monitors are keenly aware that HF press services have been moving their operations to satellite for several years now.

Two more RTTY press services have disappeared from HF and moved to satellite and Internet-based systems. Fabrizio Magrone, in Italy, reports that the Chinese news agency Xinhua from Beijing, China, will stop all HF transmissions on January 1, 1997. They will be moving their press files to satellite.

The Central News Agency in Taipei, Taiwan, left HF earlier this year and now makes their news files available on the Internet (for a fee, of course), at the following URL: **http://www.cna.com.tw/**. Thanks to Murray Lehman in Perth, Australia, for that bit of bad news.

Regular *Ute World* reporter Robert Hall in Capetown, South Africa, checks in below with some interesting intercepts from Bangui and Bahrain.

Bad Times in Bangui (by Robert Hall)

The increase in fighting in Bangui in the Central African Republic caused a big increase in radio traffic between French forces in Libreville and Paris. The French had some 1500 soldiers in and around Bangui who became involved in peacekeeping operations in that violent area. The following is an example of signals logged within just 30 minutes in May 1996, all on 16262.0 kHz using ARQ-E3 at 192/390:

1305	RFTJD	FF Libreville with 5-letter groups to RFFUAJ/ Villacoublay (Paris)
1309	RFTJD	FF Libreville with 186 5-letter groups to RFFUAJ, RFFXI (FF Bangui), RFFXIA (Bangui), RFGW (MOD Paris), and RFTPA.
1323	RFGW	MOD Paris with A1945 Paris and "Code de Voie" on the HAI circuit.
1325	RFTJD	"FM GROUPTAM Libreville" to "RFFAB/Guerre CENTOPS Paris" with 5-letter groups.
1335	RFTJD	5-letter groups for RFFUAJ/Villacoublay (Paris)

French forces in Bangui normally transmit on 15860.0 kHz using ARQ-E at 72/388, but strangely, nothing was heard on this frequency during the times noted above.

Troubles in Bahrain (by Robert Hall)

There I was, just twiddling the dials on the old ICOM R-71E and worrying about black algae in the swimming pool, when up came the familiar high speed buzz of a French forces station on 16280.3 kHz. Tuning in the signal with my Universal M7000 decoder we soon had all the lights flashing indicating the ARQ-M2 mode at 200/380. Three identifications were observed in rapid succession: RFFLC-French Navy Toulon calling RFQPJVN-Frogship *Jules Verne* via Jibouti on the RQF circuit; then RFFTB-MOD Paris with pages of 5-letter groups

for numerous addressees with callsigns beginning with the letters "RU" (?); and finally, RUMGSGG-MOD Paris (for NATO?) with yet more pages of 5-letter groups mixed up with some French forces traffic to yet more "RU" callsigns.

Traffic was marked URGENT and PRIORITE, and mostly encrypted to well over 60 different ship callsigns. The traffic continued for over an hour. Many naval ship's names were in the clear and some were troopships. The fleet of ships included French, British, and U.S. warships. Dramatic stuff indeed!

I forgot about the pool algae; obviously this was important stuff. Maybe we were about to witness Desert Storm II? Reaching for the printer (which didn't work for the first time ever), the only clues to what was happening came when I saw the names BAHREIN and MASIRAH cropping up amongst all the crypto traffic.

A day or so later, we heard that there was internal trouble within Bahrain, but with all those signals coming from Paris it seemed that another Middle East war might be looming.

The Gulf is a sensitive area, but based on this traffic, it is interesting to ponder on the size of the U.S., UK, and French fleets in that area. The HF communications were presumably used to supplement satellite communications. One also wonders whether U.S. and British ships were equipped to read ARQ M2/200; I don't recall ever having logged the mode being used by any other military services other than French military stations.

A big *Ute World* thanks to Robert for those two fine reports from the troubled African continent.

LN2A Identified

Markus Buttinger recently posted this bit of information on the WUN newsgroup regarding the identity of a station which has been heard widely on HF. He says that the International Telecommunications Union (ITU) is operating LN2A, a beacon for their propagation prediction survey program.

The beacon is transmitting in CW and 850 Hz AFSK (USB) with 1 kW from Sveio/Norway on a 5-band vertical antenna. Frequencies include: 5470, 7870, 10407, 14405, and 20945 kHz. Each is active for 4 minutes and after 20 minutes the beacon restarts on the lowest frequency again.

Markus says that the ITU has plans to bring into operation more of this type of beacon from locations all over the globe in the future.

Airline Company Freq Found

Juan Carlos Muñoz in Guatemala has discovered an HF company frequency for the Guatemalan Airline Aviateca—8850 kHz using upper sideband. Juan says there is quite a bit of traffic in Spanish passing information about the various flights of that company. Thanks for the update, Juan.

One of the aircraft you will hear on the Nightwatch nets—USAF EC-135 Looking Glass.

Zulu Designator Update

The USAF NAOCE-4B Nightwatch aircraft.

Several of our *Ute World* regulars continue to report new Zulu designators and frequencies being used by the Nightwatch nets as reported in the August and September issues of *MT*. At press time, we have received no reports of the former Papa, Sierra, Whiskey, or X-ray designators being used by the Nightwatch net. We can only conclude that these designators have been superseded by the Zulu designators.

Another aircraft you will hear on Nightwatch is the USN E-6A Tacamo.

Here is the latest information available on Zulu designators and their companion frequencies.

Stratcom Zulu Designators mentioned on the air, but not found:
Z124 / Z174 / Z235 / Z240

Zulu Designator Found List:

Z110	3134.0 (Tentative)	Z170	7831.0
Z115	3143.0	Z175	9016.0
Z120	3295.0	Z180	9057.0
Z125	4495.0	Z185	9809.0
Z130	4472.0	Z190	10204.0
Z135	4745.0	Z200	11181.0
Z140	5026.0	Z205	11494.0
Z145	5705.0	Z210	11229.0
Z150	5800.0	Z211	12070.0
Z155	5875.0	Z215	13242.0
Z160	6715.0	Z220	13245.0
Z165	6757.0	Z225	13907.0
		Z230	15046.0

That wraps it up for this month; now it is time to see what you have been hearing this month in the world of utility listening. Good DX to all and Happy Thanksgiving (to our stateside readers).

Utility Loggings

Larry Van Horn

Abbreviations used in this column

AM	Amplitude Modulation
ANDVT	Advanced Narrowband Digital Voice Terminal
ANG	Air National Guard
ARQ	Synchronous transmission and automatic repetition teleprinter system
ARQ-E	Single channel ARQ teleprinter system
ARQ-E3	Single channel ARQ ITA3 teleprinter system
ARQ-M2	Multiplex ARQ teleprinter system with 2 data channels
AT&T	American Telephone and Telegraph
CG	Coast Guard
Coquelet	8 or 13 tone multi-frequency-shift keying teleprinter system
Crowd36	Russian diplomatic teleprinter code
CW	Continuous Wave (Morse code)
DOE	Department of Energy
EAM	Emergency Action Message
FAA	Federal Aviation Adminstration
Fax	Facsimile
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GHFS	Global HF System
HF	High Frequency
LSB	Lower Sideband
MARS	Military Affiliate Radio System
MFA	Ministry of Foreign Affairs
MOD	Ministry of Defense
NAVTEX	Navigational and meteorological warnings and urgent information for ships
NCS	National Communications System
NTCN	National Telecommunications Coordinating Network
PACTOR	Teleprinter system combining certain characteristics of packet radio and SITOR
POL-ARQ	Polish diplomatic ARQ teleprinter system
PNA	Philippine News Agency
RAF	Royal Air Force
RTTY	Radioteletype
SITOR	Simplex teleprinting over radio system
SITOR-A	Simplex teleprinting over radio system, mode A
SITOR-B	Simplex teleprinting over radio system, mode B
Twinplex	Four-frequency duplex teleprinter system
Unid	Unidentified
USB	Upper Sideband
USCG	US Coast Guard
USN	US Navy
USNG	US National Guard

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

448.5 LGT-Rogaland Radio, Norway, with CW traffic list at 2200. (Ary Boender-Netherlands)

518.0 PBK-Netherlands CG with NAVTEX broadcast using SITOR-B at 2348. Cross Ile d'Ouessant, France, with NAVTEX broadcast in SITOR-B at 0000. (Boender-Neth)

1946.0 GND-Stonehaven Radio, UK, with phone patch traffic at 1917. (Boender-Neth)

2182.0 Palma Radio, Spain, announcing traffic list at 2338. (Boender-Neth)

2287.0 Unid station sending 5-letter groups in CW at 2324. (Boender-Neth)

2379.0 Unid station '98' with the following CW message at 2245, "98 12744 13111 11111." Noted parallel to 3153 kHz. (Boender-Neth)

2510.0 DSK-German Navy working LBA and LPG with radio checks then into 75 baud RTTY at 2035. (Boender-Neth)

2610.0 Unid station sending 5-letter groups using 50 baud RTTY at 2300. All messages ended with "QRU F R." (Boender-Neth)

2643.5 SPS-Witowo Radio, Poland, with CW marker at 2259. (Boender-Neth)

2691.0 GND-Stobehaven Radio, UK, with a weather broadcast at 2157. (Boender-Neth)

2761.0 OST-Oostende Radio, Belgium, with navigation warnings at 2238. (Boender-Neth)

2832.7 MOD Paris, France, with ARQ-M2 200 baud encrypted messages at 2157. (Boender-Neth)

2844.0 YHF-Israeli Mossad number station at 2300. (Boender-Neth)

2892.3 MGJ-Royal Navy Faslane, UK, with 75 baud RTTY availability messages at 2254. (Boender-Neth)

2896.0 IGJ41-Italian Navy Augusta, Italy, with 75 baud availability messages at 2256. (Boender-Neth)

3153.0 Unid station '98' with the following CW message at 2245, "98 12744 13111 11111." Noted parallel to 2379 kHz. (Boender-Neth)

3235.0 US Marines at 29 Palms Marine Training Base, CA on this frequency and 6501 in USB/LSB 24 hours a day. (Anonymous)

3615.7 GKY1-Portishead Radio, UK, with SITOR\CW marker at 2150. (Robin Hood-UK)

3712.0 SXA33-Greek Naval with CW ID marker at 2148. (Hood-UK)

3795.0 FFB-Boulogne Radio, France, with navigation warnings in French and English at 2135. (Hood-UK)

4131.0 Italian shipping network noted here at 2005. (Boender-Neth)

4143.0 Italian shipping network noted here at 2023. (Boender-Neth)

4145.5 D6K working ZOY and many others coordinating fire control and data traffic. USN/USMC type chatter. (Jeff Jones-CA)

4163.0 Navy London, UK, with 100 baud RTTY encrypted messages at 2238. (Boender-Neth)

4232.0 Navy London, UK, with 100 baud RTTY encrypted messages at 2246. (Boender-Neth)

4268.0 CKN-Vancouver military, BC Canada, with 75 baud RTTY transmission at 1932. (Sheldon F. Crook-Crescent City, CA)

4274.0 GKB2-Portishead Radio, UK, with CW weather at 2145. (Boender-Neth)

4275.0 TBA5-Navy Ankara, Turkey, with a CW marker at 2143. (Boender-Neth)

4325.0 R-Russian Navy single letter CW HF marker in Ustinov at 2250. (Boender-Neth)

4387.0 WOO-AT&T Manahawkin, NJ, with traffic list followed by weather report at 2200. (Bob Fraser-Cohasset, MA)

4408.0 VCS-Canadian CG Halifax, NS, Canada, with weather broadcast off suddenly at 2214. Parallel to 6513, 8785, 13113, and 1751. (Fraser-MA)

4472.0 Nightwatch 01 working WAR46 and others at 0200. (Jones-CA)

4625.0 Unid buzz possibly from Russia at 1909. (Boender-Neth)

5010.0 Russian Air Defense forces at 2111 sending the following QRV message; "BT990110??8?????." Note the time is UTC+4 hours. (Boender-Neth)

5140.0 Very faint Oklahoma Operation Secure station calling WNBM839-Stillwater, OK, at 1506. All stations moved to 7477 at 1514. May be an Altus AFB station in this net. (JL Metcalfe-KY)

5142.6 CG 41319 working CG 41329 at 0636. Possible fisheries patrol comms. (RD Baker-Austintown, OH)

5203.5 M9K as net control with a Wdenesday 1300 20+station check-in to a net. USNG? (Metcalfe-KY) *Absolutely, Jack-Larry.*

5329.0 Unid station in CW sending the following traffic: "BT NR69 S 26 10:07:18 1996 BT+5-letter groups" at 0800. No ID and signal faded out in 14 minutes. (Boender-Neth)

5535.0 Lima Radio, Peru, (SAM LDOC) working American 951 at 0725. (Baker-OH)

5724.5 Bravo Foxtrot at 0631 working F4X with Link 11 coordination. (Baker-OH)

5798.5 NNNOMDM-USN MARS HF mailbox at 2135 with PACTOR traffic. (Baker-OH)

6020.0 Alley Cat Base and Alley Cat Deployed at 1351. Possible US Army. (Metcalfe-KY) *My notes show this is a US Army Corps of Engineers contingency channel-Larry.*

6320.0 WCC-Chatham Radio, MA, with a SITOR-A traffic list at 2300. (Crook-CA)

6660.0 CIO-Israeli Mossad number station at 2147. (Boender-Neth)

6683.0 SAM 27000 working Andrews at 0000. (Larry Fowler-MA)

6697.0 Dogpound with EAM, simulcast on 11267 the same time that McClellan broadcast on GHFS frequencies. Dogpound moves to Z175 (9016) and repeats above EAM at 0410. At 0458, Dogpound broadcast EAM on 6697/9016/11267 while Lajes and McClellan pass same on GHFS frequencies. (Fowler-MA)

6713.5 Ops working King 04 at 0342. (Fowler-MA)

6728.0 SAM 26000 working Andrews at 0510. Also checked 11056 and 13247. (Jones-CA)

6738.0 Architect-Royal Air Force in the UK with a "celebrity" broadcast at 1200. (Boender-Neth) *Interesting frequency selection, Ary-Larry.*

6751.0 Husker Control (Nebraska ANG) working Husker 85 (KC-135) regarding maintenance problems at 1307. (Fowler-MA)

6785.0 6PXJ-Unid station with CW marker at 1000. (Jim Bedient-Honolulu, HI) *Welcome onboard, Jim, please check in often-Larry.*

6802.0 KGD34-NCS Arlington, VA, at 1350 in PACTOR. HF mailbox being worked by KCI623 during Shares exercise. (Baker-OH)

6834.0 US Navy units off the East Coast at 1115. Heard echo safety, big orange, and a mention of Wallops Island. Range safety moving fishing vessels clear of the range. (James Luman-Tiffin, OH)

6840.0 Y5W-Heard station do a tactical callup at 2252 followed by spy number broadcast (very brief, no header) at 2258. (Bob Grove-Brasstown, NC)

6860.0 RPFN-Portuguese Naval with 75 baud RTTY test tape to RETJ at 2123. (Hood-UK)

6993.0 Air Force 2 working Andrews at 0450. (Jones-CA)

7680.0 Unid sweeper that sweeps over eight frequencies: 7680, 7690, 7700, 9185, 9310, 9332, 10120, 13420. Signal stays on for 27 seconds each frequency. Total cycle time is four minutes and six seconds. Noted at 1632. (Boender-Neth)

7743.0 Spanish female number station at 0407 in AM. (Fowler-MA)

7962.5 Flight (or Right) Alpha working Flight Bravo for data comms at 0330. (Jones-CA)

8027.5 Very weak, military sounding unid passing crew members names, dates of birth, and social security numbers at 0010. (Jones-CA) *No, that is very unusual, and a no-no, to boot-Larry.*

8038.5 WWJ74-FHWA Cadillac, MI, calling AAB1DE-USNG Wilmington, DE, for Shares exercise traffic at 1243. (Metcalfe-KY)

8040.0 Andrews working SAM 28000 at 2212. (Jones-CA)

8125.0 KIT88-FAA Martinsburg, WV, with Eastern net roll call using voice privacy mode at 1445. FAA nets rotate among VP-100, voice only, and selscan week to week. (Metcalfe-KY)

8148.0 MFA Warsaw, Poland, with POL-ARQ 100 baud Claris and coded messages for various embassies at 0844. (Boender-Neth)

8420.0 FFT41-St. Lys Radio, France, with CW marker at 0842. (Boender-Neth)

8440.0 VCS-Canadian CG Halifax, NS, Canada, with CW marker at 1530. (Brett Saylor-PA)

8463.0 CKN-Vancouver military, BC, Canada, with a 75 baud RTTY transmission at 1650. (Crook-CA)

8496.0 CLA-Havana Radio, Cuba, with CW marker at 2005. (Saylor-PA)

8511.0 XSW2-Taichung Radio, Taiwan, with CW marker at 0943. (Bedient-HI)

8525.0 WNU33-Slidell Radio, LA. with CW marker at 0227. (Saylor-PA)

8538.0 6WW-French Navy Dakar, Senegal, with 75 baud RTTY "RY/Le Brick/SIX WHISKEY WHISKEY" at 1940. (Robert Hall-Capetown, South Africa) Same at 2140. (Hood-UK)

8555.5 UIW-Kaliningrad Radio, Kazakhstan, working UBCI in CW at 0835. (Boender-Neth)

8577.0 HOL-Seoul Radio, South Korea, with CW marker at 0950. (Bedient-HI)

8582.5 KLB-Seattle Radio, WA, with CW marker at 0245. (Saylor-PA)

8601.0 HLJ-Seoul Radio, South Korea, with CW marker at 1000. (Bedient-HI)

8609.5 9VG73-Singapore Radio with CW marker at 1004. (Bedient-HI)

8630.0 WCC-Chatham Radio, MA, with CW marker at 1850. (Saylor-PA)

8655.3 Omaha 2 working Doe Boy at 0423, "we have target Alpha 1 in sight. Roger Omaha 2, 1 Alpha is ten key jackpot and please switch to low level bravo channel." Any ideas? (Mike Baker-Santa Ana, CA) *Possibly USN, but I have never heard them sound like this-Larry.*

8665.0 XSG-Shanghai Radio, PRC, with CW marker at 1010. (Bedient-HI)

9006.0 0 Lima working 0 Mike for radio check. 0M advised the net would be down for 20 minutes. (Jones-CA)

9011.4 Habitat working unid station at 0157. (Fowler-MA) Kilo 2 working Magic Carpet Sierra advising them they were still on deck at 1834. Magic Carpet working X1H with alligator traffic, Magic Carpet passed 308.5 UHF at 2215. Habitat on self-IDed W03 working Oscar 0. Talked about going to W-02 (maybe 6719.4). (Jones-CA)

9014.0 Tuff 15 working Raymond 7 with request for phone patch to Raymond 6 (Barksdale). Mudbug Control answers at 0136. (Fowler-MA) Heard same at 0130. (Jones-CA)

9023.0 Dallas Bravo working Eye in the Sky who was ready to start an arming drill. Dallas Bravo said he was garbled and asked him to meet him on NORAD Delta Link at 1410. Who is this? (Baker-CA) *A couple of NORAD units-Larry!*

9025.0 Y4X (Australian accent) working Z4J at 0542. Gave position as 280 miles west of Darwin. (Jones-CA)

9055.5 NNN0ART-USN MARS-Camden, SC, and NNN0ASQ-unknown location discussing ammo at 1410. Haven't seen this frequency used before. (Metcalfe-KY) *NNN0ASQ is a generic call for the Chief, Technical Library. As for the frequency, 9052 is Navy MARS, but I haven't seen anything on this one either-Larry.*

9064.0 WGY912-FEMA Berryville, VA, and KNY80-NCS, unknown location with NTCN exercise message at 1548. This frequency is NC20. (Metcalfe-KY)

9068.6 KNY62-NCS Bedminster, NJ, working WGY908-FEMA Denver, CO, on frequency NC04 at 1519. Moved to NC05 (11448.0) at 1521. (Metcalfe-KY)

9079.9 RFQP-French Forces Djibouti, with 100 baud ARQ-E3 idler at 1930. (Hall-RSA)

9274.6 KNY62-NCS Bedminster, NJ, calling WGY912-FEMA Berryville, VA on frequency NC30 at 1515. WGY912 was on 9275.0 and couldn't hear KNY62. (Metcalfe-KY)

9320.0 Executive 1 Foxtrot working Andrews at 2300. Also heard Nightwatch 01 here working Andrews for data comms. (Jones-CA)

10199.0 Broadsword working Crossbow-8 at 2304. (Jones-CA)

10201.0 Broadsword calling Crossbow-7, "Forwarding to Charlie-Oscar-Echo-India." (Jones-CA)

10424.0 Very strong unid station in 75 baud encrypted RTTY at 1530. Off with QRU SK. (Metcalfe-KY)

11043.7 RFTJ-French Navy Dakar, Senegal, with 192 baud ARQ-E3 transmission on the JOJ circuit at 1645. (Hall-RSA)

11053.5 Ghost working unid for message relay to a UK phone number at 2245. (Jones-CA)

11061.0 U5N working D2E and others in the clear and with ANDVT at 0122. E2T working P60 setting up satellite comms at 0012. (Jones-CA)

11074.4 Russian diplomatic traffic using Crowd36 mode at 1650. (Hall-RSA)

11181.0 Army Archer working QGY916 for date/time message H231840 at 1842. (Jones-CA)

11214.0 Bandsaw Golf working Raymond 24 regarding satellite comm problems at 1729. (Fowler-MA)

11220.0 SAM 682 working Andrews, shifted to 13440 (F646). (Fowler-MA)

11244.0 Molasses working Thule GHFS requesting working frequencies for Nightwatch. Passed Z130/Z125 at 1013. At 1518 Molasses makes a phone patch via Incirlik GHFS to Boomtown at DSN 339-3961. Heard Toadstool calling Ramshead and Best Idea, no answer from either. (Mr TV-UK)

12586.0 WCC-Chatham Radio, MA, with a SITOR-A traffic list at 2107. (Crook-CA)

12660.5 UGW-Novorossiysk Fisheries Radio with CW ID/frequency list as follows: 8704.5, 12660.5, and 16980 kHz. Also broadcast a traffic list for 4LA7 at 1610. (Hood-UK)

12671.5 YLQ-Riga Radio with 50 baud RTTY traffic at 1431. (Hood-UK)

12687.0 OFJ-Helsiniki Radio with traffic list in CW at 1606. (Hood-UK)

12750.0 NMF-USCG Boston, MA, with a weather Fax broadcast at 0343. (Crook-CA)

12887.5 EAD44-Madrid Radio, Spain, with CW marker at 0829. (Boender-Neth)

12932.5 Navy Madrid, Spain, sending 75 baud RTTY encrypted messages at 0831. (Boender-Neth)

13206.0 PACAF 01 working Air Force Sydney at 0540. (Jones-CA)

13217.0 SAM 27000 working Andrews with phone patch to SAM Command Post at 2158. (Fowler-MA) Same at 2151. (Jones-CA)

13440.0 SAM 682 working Andrews at 0336. (Jones-CA)

13457.0 KJK77-FAA Palmdale, CA, with an unsuccessful phone patch attempt for Reach 444 (USAF aircraft) at 2113. (Metcalfe-KY)

13722.0 KBW49-DOE Las Vegas, NV, calling any station during Shares exercise at 1623. (Metcalfe-KY)

13777.0 Striker 35 working unid station at 0222. Tiger 13 requesting a radio check on Hotel Fox at 0043. Probably a B-1B out of Ellsworth. (Fowler-MA)

13881.4 MKK-RAF London, UK, with 50 baud RTTY transmission at 1838. (Hall-RSA)

13907.0 Pingpong 47 working Pingpong, advising that 47 to RTB because of equipment at 2346. (Jones-CA)

14462.8 Unid Meteo station with 96 baud RTTY transmission at 1138. (Hall-RSA)

14441.5 NNN0CZN-*USS Booner* working unid shore station at 0100. (Michael Rivkin-Pomona, NY)

15000.0 BPM-Time Station Shanghai, PRC, with Morse code ID during one minute preceeding the hour at 0759. (Bedient-HI)

15855.8 Unid station sending what sounded like ARQ, but wasn't. Nil on the screen at 1310. (Hall-RSA) *SNN299-MFA Warsaw has been reported here in POL-ARQ-Larry.*

15861.8 Unid station on SAM-MFA Stockholm frequency with 48 baud RTTY at 1316. (Hall-RSA)

16312.6 C37A-Israeli Mossad station, Tel Aviv, Israel, with ARQ-E 288 baud transmission at 1329. Sadly my M7000 can't read 288 baud. (Hall-RSA)

16788.0 PNA Manila, Philippines, SITOR-B news at 1935. (Crook-CA)

16919.0 HMZ-Pyongyang Radio, North Korea, with CW marker at 0400. (Bedient-HI)

16922.0 RBSL-Indian Naval Radio Bombay, India, with weather forecast using 50 baud RTTY at 1100. (Hood-UK)

16940.0 XSW-Kaosiung Radio, Taiwan, with CW marker at 0406. (Bedient-HI)

17077.0 ESA-Tallinn Radio with traffic list and listening on 16737 using CW at 1602. (Hood-UK)

17093.0 JOR-Nagasaki Radio, Japan, with CW marker at 0415. (Bedient-HI)

17189.6 D3E71-Luanda Radio. Angola, with CW marker at 1452. (Hood-UK)

17220.5 JOU-Nagasaki Radio, Japan, with CW marker at 0417. (Bedient-HI)

17422.2 Embacuba Harare, Zimbabwe, with East/South African news in Spanish using 50 baud RTTY at 1229. (Hall-RSA)

17940.0 Southern Air Transport calls Cedar Rapids and gets Houston, relays ETA at 2012. (Fowler-MA)

17973.0 Hickam Global working PACAF 01 for new primary frequency. Moved from 15043 and 13242.0 at 0241. (Jones-CA)

18268.1 HBD20/5-MFA Berne, Switzerland, with a bunch of 5-letter groups at 0928. (Hall-RSA)

18316.2 Unid station using 100 baud RTTY with what looked like Czech news at 0923. (Hall-RSA)

18415.2 8BY-Unid station, now listed as French intelligence per the WUN group using CW at 1146. (Hall-RSA)

18597.7 MFA Madrid, Spain, with Twinplex transmission at 1135, unable to decode. (Hall-RSA)

18943.7 Unid station (listed in WUN logs as Algerian Embassy-Dar-es-Salaam) using Coquelet at 1514. (Hall-RSA)

19519.1 Unid station sending 75 RTTY at 1125, unable to decode. (Hall-RSA)

20950.0 Unid station with an ARQ-E 192 baud transmission at 1120, unable to decode. (Hall-RSA)

Glenn Hauser, P.O. Box 1684-MT, Enid, OK 73702
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What's brewing at the Beeb

The BBC World Service budget cut of $10 million means the loss of 90 jobs and many more vacancies that won't be filled, as well as the cancellation of *South Asia Survey*, and the reduction of English streams from five to three. If a similar reduction is required next year, some language services will have to go, Sam Younger said on the BBCWS program *Newsdesk*.

Danish Telecom authorities maintain 15010-15100 is not available for broadcasting, and the BBC must terminate its use of 15070 after some 50 years, despite the lack of interference complaints. Andy Sennitt recalls that out-of-band frequencies used by the BBC were originally allocated to the British Post Office for radio-telephone stations around the UK. When the PO no longer needed all the frequencies, some were assigned to the BBC on a non-interference basis. (Part of the problem is that the band is aeronautical, not fixed.) It was reported in *Shortwave Magazine* that from Oct. 27, 15070 is to be replaced by 15575 (via Ray Woodward, rec.radio.shortwave via Thurman) Radio ABC/Denmark pointed out that other stations use the range as well as BBC (via Kai Ludwig, *BC-DX*)

Richard Buckby visited the BBC relay station in Hong Kong before it was too late, and found it in a remote area, best accessible by hovercraft. The two 250 kW transmitters, which are remote-controlled from London outside business hours in Hong Kong; employ Pulse Width Modulation. The new Thailand relay may take over as early as October. By next March, BBC HK will have been dismantled, removed, and the area returned to a green field (via Wolfgang Büschel, *EDXP*) The last BBC Hong Kong broadcast will probably come at the end of November. (Miles Ashton via Buckby, HCJB *DXPL*)

Watch for the BBC to be available via Internet from early 1997, through BBC Online, a software package and access service. Initially the presence will be primarily text, graphics, and advertising tailored to Britons; audio and visual services and more international marketing will be added later. The project is in partnership with Japanese-controlled technology company ICL, which must fund the project, since no public money may be used to finance financial ventures. (Reuter via David R. Alpert)

After countless hours at the radio and the computer, and sifting through a foot-thick stack of paper, I bring you the news:

ALASKA KNLS W-96 English/Japanese thru March 29: 0800-0900 on 6150, 1300-1400 on 7365; Z-97 from March 30 0800 tentatively changes to 9615 (KNLS)

ANGOLA VORGAN reverted to its previous frequencies: 0450-0900 on 9755, 1150-1530 on 11830, 1650-2100 on 7100 (BBCM)

ANGUILLA Caribbean Beacon tested SW a few times in July, days on 11775, nights on 6090; local radiation effects evaluated. If and when finally authorized, may be on different channels (R. ABC/Denmark DX)

ARGENTINA New freq for MW stations on SSB SW, weekend evenings is 11055, such as R. Rivadavia sports to Antarctica; also may carry R. Provincia de Buenos Aires, Sun 2300-0200 (Marcelo A. Cornachioni, Argentina, DSWCI *DX Window*) 11055 has been used for decades for SSB traffic among British, US, and German Antarctic bases, alternate to 9106 (Harald Kuhl, Germany, DSWCI *DX Window*) 8100-LSB with R. Rivadavia? 0525-0750+, mostly music (Brian Alexander, PA)

AUSTRALIA R. Australia is trying to serve NAm on 9580 after 1230, and objects to WEWN using that frequency. A review of ABC including R. Australia is underway, and support from individuals is needed specifying their needs and expectations. Send to: Mr Bob Mansfield, ABC Review, P. O. Box 1873, Canberra 2601; phone +61-62856653; fax +61 62791165; E-mail <abcsubmit@mailhost.dca.gov.au> (Arie Schellaars, RA Asst. Transmission Mgr) RA is running USB on 17880 at 0100-0800 including *Grandstand*, live sports Sat and Sun (BBCM)

AUSTRIA ORF plans to use 7325 to Americas at 2200-0400 for W96 (*KW-Panorama* via *BC-DX*) *Ex-BBC channel!-gh* Should be much better than 9 MHz last winter (Joe Hanlon, PA)

BELGIUM RVI W96 English to NAm at 1400 (exc Sun 1330) on 13685 (Bob Thomas, CT) //13795 to SEAs; 0030 NAm 5900, SAm 9925 (RVI *Radio World* via Steven Cline)

BOLIVIA Strange things on 4632.4; one day at 2259, test from R. 11 de Octubre, Cobija and satellite program from ERBOL; next day at 2330, R. Frontera, Cobija //4449.9. On 6065.7, R. Mauro Núñez ex-6142 at 2230-2400, 1000-1100 (Henrik Klemetz, *Dateline Bogotá*)

BULGARIA Varna 9774.8 100 kW with omni antenna carries special program for seamen Fri 2110-2300 (*DX Mix* via Nikolai Pashkevich, *BC-DX*)

BURUNDI R. Umwizero, presently on FM plans SW in future, financed by EEC counteracting hate radios (Bernard Chenal, DSWCI *DX Window*)

[non] R. Democracy announced it is on FM and SW 41, 49 and 60m. Formerly called R. Rutomorangingo, extremist pro-Hutu, anti-Tutsi which Burundi officials say broadcasts from Zaire (BBCM)

CANADA CBC's gigadollar budget is being cut by one third; unclear how this will affect RCI (gh) RCI has a new website: **http://www.rcinet.ca** and includes live audio feeds (Larry Nebron, CA)

COLOMBIA R. Fortaleza, Sogamoso at 1010 on harmonic 4853 ex-4702v. R. Macarena reactivated 5974.3 Sept 17, heard at 2130 with strong het (Klemetz, *DB*) *And het all evening to main BBC frequency to us as previously; why does BBC accept this?-gh*

R. Patria Libre clandestine at 2200 on 6255, back to normal 6250 next day. Invited listener input for Fri 1830 broadcast on 6666 USB. FARC cland on 6325 at 2214-2223*, heavy CW on lower side (Klemetz, *DB*)

COSTA RICA New on RFPI's 4th-quarter sked: *Africa Speaks*, Wed 1900-2000, Thu 0300 and 1000. Your columnist's *World of Radio* remains: Fri 2000, Sat 0400, 1100, 1800, Sun 0200, 0900, 2300, Mon 0700, Tue 1900, Wed 0300, 1000 on some of: 6205-USB, 7385, 15050-USB or AM (gh)

CROATIA Zagreb program booklet by E-mail shows English rescheduled to H+05: 0005, 0805, 1005, 1405, 2005 (Arthur Cushen, NZ, RNZI *Mailbox*)

CUBA *Rebelde-DX* is new show on 5025 and 42-station MW net, UT Sats 0430 in two 5-minute segments (RHC *En Contacto*)

CZECH REPUBLIC R. Prague has four 60th anniversary QSLs, repros of 1936-37 cards from the CPRV collection (Jerry Berg, *NU* via HCJB)

DENMARK Julian Isherwood said Sept. 15 on the only English program on R. Denmark that there were no plans to continue it after 1996. Send protests to Mr. Hans Jorgen Skov, Dir. Gen. of R. Denmark (Anker Petersen, DSWCI)

[non] With longest nights approaching, R. ABC/Denmark via Kaliningrad 7570, Sun 0800-1200 should be propagating to NAm now if MUF permits (gh) Tried a new aerial beam on Sept. 29: did that help? (Stig Hartvig Nielsen, R. ABC/Denmark)

ECUADOR HCJB Spanish programs include: *Galápagos* Wed 2145 on 15550, UT Fri 0145 on 6050, 15140; *Música del Ecuador* Sun 1100 on 11960, 6050; *Allegro—Música Clásica* Sun 1800-1900 on 15140 (via Rich McVicar, HCJB) *The Latest Catch* ended in August in preparation for McVicar's departure; *DX Partyline* continues with Ken MacHarg (gh) Major problem at Pifo site is high winds, pulling antenna wires apart or changing their critical spacing and SWR caus-

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; Z-96 = Summer season; W-96 = Winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there.

ing transmitter shutdowns (McVicar via Veldhuis, *BC-DX*)

ERITREA V. of the Broad Masses of Eritrea with two different programs *0325-0340+ on 7085, 7390 (Brian Alexander, PA)

ETHIOPIA V. of Tigray Revolution, much later than sked, 2023-2100*, slightly better on 5500 than on 7515 (Bob Hill, MA, DSWCI *DX Window*) This is no longer clandestine, from Mekele, Tigray region (BBCM) Both opened on a Sunday at *0356, vs *0329 other days (Brian Alexander, PA)

FRANCE RFI announced it would go all-news in French from Sept. 16; I'm distressed that this may mean the end of some very good music programs (Mike Cooper, GA, rec.radio.shortwave) Two days after RFI was to go all-news in French, a one-day strike of journalists forced the English hour at 1200 to fill with music after a short management newscast (Martin Gallas, IL)

GUAM Electronic DX Press is now prime sponsor of DX info on KTWR's *Pacific DX Report*, Sat 0820 on 15200, 0940 on 11830, Mon 1615 on 11580. Full-data QSLs for correct reports to: Bob Padula, 404 Mont Albert Rd., Surrey Hills, Vic. 3127, Australia; return postage appreciated (Padula) KTWR new 100 kW should start in January on 25, 31 and 41mb to North China (Hans Johnson, *Cumbre DX* via *BC-DX*)

HONDURAS R. Copán Int'l tests on 15675 last summer lasted only a few days; will not be back until someone signs a major contract to finance improvements (Marcel Rommerts, DSWCI *DXW*)

La Voz Evangélica, 4819.7, gave English ID at 0330 as Voice of Honduras (Paul Ormandy, NZ, *DXing with Cumbre*)

INDIA The city of Madras has changed name to Chennai, Tamil name (Jose Jacob, *Wavescan* via Jeff White via *Cumbre DX* via DSWCI *DX Window*) *Bet that doesn't 'take' any faster in English than Bombay into Mumbai-gh*

INDONESIA RRI Programa Nasional has split into two services—First Program *Satu* and Second Program *Dua*. But First normally does not specify *Satu*. I heard *Dua* on 15150 at certain times, *Satu* at other times. Mon at 1015, *Dua* has *Kang Guru II Radio English Show* (Juichi Yamada, DSWCI *DX Window*)

DEPARTEMEN PENERANGAN R.I

RADIO REPUBLIK INDONESIA

STASIUN NASIONAL JAKARTA

Jl. Merdeka Barat 4 - 5 Jakarta 10110. PO Box 356 Jakarta 10110 Telp. 3846557

IRAN [non] V. of Southern Azerbaijan [see last month] moved to 9927 at 1530-1633v (BBCM, Victor Goonetilleke, DSWCI *DXW*)

IRAQ [non] V. of the Iraqi People, communist in Arabic 0500-0600, 1730-1830 on 3930-3955v. Formerly used 7025-7045, 5820-5845 (BBCM) Still heard on 5816v afternoons (Finn Krone, DSWCI *DXW*) *Washington Post*, Sept. 15 ran a lengthy story on CIA operations in Iraq, including radio stations, but short on details; mentioned V. of Free Iraq, and a base in Salahuddin, Kurdistan (gh) V. of Iraq, the Iraqi National Congress station in Arbil had its offices destroyed by the Iraqi army and the KDP (V. of Islamic Rep. of Iran via BBCM)

ISRAEL Due to early end of DST, all Kol Israel programs one hour later from Sept. 16, English at 0500, 1500, 2000 (Wojciech Zaremba, Poland) Surprised to hear some feature programs again, on a Thursday, *Diplomatic Dialog* by David Zeev and *High Tech Scene* with Ben Dalfen (Doni Rosenzweig, rec.radio.shortwave via George Thurman)

ITALY Rai plans new station with 500 kW, revolving curtains. Current Prato Smeraldo site has only 6 x 100 kW in a densely populated area (*Qui Rai* via Kai Ludwig, *Electronic DX Press*)

IRRS-Shortwave, Milano, tentative W96: 0600-0830 on 3985, 0830-1430 on 7125, 1430-2000 on 3985, 2100-2300 on 3955, A3A mode (via *Paniview*)

Proposed new AWR station at Argenta, northern Italy, is on property reclaimed from the Adriatic, probably 4 x 100 kW (Adrian Peterson, AWR, *EDXP*)

JORDAN R. Jordan on strange 10000.0 at 2030 in Arabic (Harald Kuhl, Germany, DSWCI *DXW*)

KOREAS On a brief visit to S. Korea I found these N. Korean frequencies jammed in the afternoon/evening: 3925, 3985, 4120, 4400, 6100 until 0900, 6250; other listed NK freqs were not jammed (Gerry Bishop, Song Tan)

KURDISTAN V. of the People of Kurdistan, the PUK station in Suleimaniya which was strong on 4105 and 6295v was missing the day KDP forces were close to PUK and people were fleeing to Iran. I love this type of DXing, but we should never lose sight of the hardship, fear and anguish people must be undergoing (Victor Goonetilleke, Sri Lanka, DSWCI *DX Window*) VOPK back the following week at 1528 on 4025v in Arabic, Kurdish, next day 0400 on 4030. IRNA news agency reported it had moved to an undisclosed location in NE Iraq. V. of Iraqi Kurdistan, Salah al-Din, supporting the KDP party, in Kurdish, Arabic on 4070 at 0245-0500, 0920-1100, 1645-1930 (BBCM) VOPK presumed on 4105 // 6301.2 at 0236-0310+, next day 6290 (Brian Alexander, PA) V. of Iranian Kordestan, 6293.8 at 0330 clear ID, surprisingly strong (Wolfgang Büschel, Germany)

LEBANON V. of Hope uses 9960 at 2100-1330, last half-hour in English; 9965 in several languages 1330-2100, 25 kW (High Adventure Ministries, England) According to this, both Palau and Lebanon are on 9965 at 1330-1530 (gh) VOH on new 9990 24h, running 25 kW transmitter at only 5 kW, says Gary Huil, manager (Hans Johnson, *Cumbre DX* via *EDXP*)

V. of Lebanon [6550]. Christian station said it would suspend news and political programs in accordance with a new law allowing only a few stations to do this (R. Lebanon via BBCM) VOL, a Meronite station, must go off by end of Nov (Int'l Freedom of Expression Exchange via DevMedia via Don Moore via HCJB *DXPL*)

LESOTHO LNBS will apparently remain on SW 4800 even tho BBC is no longer relayed from here (Dave Kenny, BBCM, HCJB *DX Partyline*)

LIBERIA R. Liberia Int'l, 5100 abruptly on at *0614 in English; another day from *0649 (Brian Alexander, PA)

LITHUANIA [non] R. Vilnius to us at 0030-0100 back on 6120 via Jülich, Germany (Ivan Grishin, Ont., BBCM)

MÉXICO XERMX announced new E-mail address: <imer@mpsnet.com.mx> and Julian Santiago mentioned they were running only 5 kW on 5985, 9705, not 10 (gh, *W.O.R.*)

MOROCCO Maghreb Arabe Presse RTTY broadcasts on F1B, 50 baud in English: 1200-1400 on 19171.1, 18496.1, 18265, 18220.9, 15654.9 daily exc Sun; also has Arabic, French (BBCM)

MYANMAR Home Service 5990 in August around 1217 varied to 5993, 6003.9, 5988.6. Thabye Radio at 1150-1230* on 6357.2 (David Foster, Australia, *NU* via *Cumbre DX* via *BC-DX*)

NEW ZEALAND RNZI until 16 March 1997: 9875 from 1650 M-F (1900 Sat, 1850 Sun); 11735 from 1953 Sun-Thu (2008 Fri, 1959 Sat); 15115 from 2135 Sun-Thu (2206 Fri and Sat); 11905 from 0458 daily; 9700 (6100 until Oct 27) from 0816 M-F (0758 Sat and Sun) to 1206 [*Wed 1230, they forget to specify -gh*]; 6100 from 1206 for occasional sport (RNZI via Gigi Lytle) *Sounds Historical* is covering the 70th anniversary of radio in NZ, culminating on the Nov. 17 show. Suns 0700-0900 (Chet Copeland, DC)

NIGERIA V. of Nigeria is to run 24-hours after installation of new transmitters (R. Nigeria Kaduna via BBCM) All government radio stations have been stopped from airing BBC news (Nat Cole, Nigeria Watch via Lund, DSWCI *DX Window*) Maybe in light of R. Kudirat office in London? (Finn Krone, *DXW* ed.)

VOICE OF NIGERIA

. . . the authoritative choice

[non] R. Democrat International Nigeria changed name at end of August to R. Kudirat Nigeria, V. of Democracy. R. Kudirat denied a report by R. Nigeria that the USIS supports R. Kudirat and was preparing travel documents for a Hausa language broadcaster. R. Kudirat does broadcast in Hausa on Saturday nights. (BBCM) Time changed Oct 1 to 1905 to 2005, news at 1910, still on 6205 via South Africa (Ivan Grishin, Ontario) Nigerian gov't pretends to be searching for source, but R. Kudirat appears openly on SENTECH's website (gh)

NORWAY RNI W96 to NAm, Sundays in English: 1200, 1300, 1600 on 11840; 2000 on 7480, 2100 and 0100 on 7465, 0300 on 7520 (Bob Thomas, CT)

PALAU KHBN fall 1996 sked includes English Sat and Sun: 0730-1130 and 1400-1430 on 9965 and 9730. 9965 has 90 kW, 9730 has 50 kW (High Adventure Ministries, England) see LEBANON

PALESTINE [non] V. of the Palestinian Islamic Revolution, via Iran in winter may be one hour later than: Arabic 0400-0500 on 9670, 5995; 1200-1300 11745; 1930-2030 9665, 7190, 6025 (BBCM)

PERÚ R. Luz y Sonido, Huánuco on 3234.9 ex-6471.9v not only with own program, but relay of disco from R. 1160, Lima at 0125. R. San Nicolás heard daily on 5470.6 around sunrise and 2300/2400. R. Perú, San Ignacio at 2300 on 6076.8

ex-5926.6. R. Altura, Huarmaca on 6479.8 ex-7143.1. R. Lircay, 4830.6 0030-0200 with dedications during Táchira power outage. R. Huarmaca 5485.7 and Reina de la Selva, 5486.7 heterodyning each other at 0010 (Henrik Klemetz, Colombia, *Dateline Bogotá*)

R. Ondas del Sur Oriente, Cusco, 5068.7 at 2155-0234. R. Horizonte, Chachapoyas, 5019.9 at 1128-1210, not to be confused with Ecos del Atrato, CARACOL, Colombia on 5019.7. R. San Ignacio, Cajamarca at 0110-0142 on 6753.2 ex-6747.3. R. Soledad, Parcoy, 1136-1205 and 2304-2325 on 4581.8 ex-4583.3 (Pedro F. Arrunátegui, *Chasqui DX*, Lima) R. Victoria, 6018.1v, 0600-0700+ rarely gives own ID but has religious program *La Voz de la Liberación*, also in Portuguese (Ernie Behr, Ont.)

PORTUGAL R. Portugal English at 0330-0400 Tue-Sat on 6150 ex-6095 // 9570 (Jim Frimmel, TX) *Now clashes with AWR Costa Rica-gh*

RDP / Internacional
RÁDIO PORTUGAL
P.O. BX 1011
LISBON 1001 PORTUGAL

QATAR QBS Arabic program: 0245-2130 on 9570 and also: 0245-0707 and 1705-2130 on 7210, 0707-1305 on 15265, 1305-1705 on 11750. There may be a 30-minute break for freq changes (BBCM)

RUSSIA Things look bleak this winter for V. of Russia: 5940 blasted by Dr. Gene Scott 5935, 7125 OK but only until 0100*, no freq audible in early/mid afternoon (Ivan Grishin, Ont.) 7125 best at 2230-2400; 2100-2200 on 7420, 7260, 7350, 7175 (Tom Sundstrom, NJ)

A pirate contest for Europeans Dec. 27-Jan. 6 includes numerous broadcasts during local darkness from Russian Radio, Radio Magic, Southern Hobby Radio on 5780, 6209 or 6255 (Patrik Willför, *Play-DX*)

SÃO TOMÉ VOA relay tropical band transmitter uses 4750 in English at 0300-0330, 4950 at 1900-2030 (VOA *CW*)

SERBIA [non] R. Yugoslavia W96 English: 0100-0130 exc Sun on 6195, 7115; 0200-0230 on 7230, 6100 or 7130; 1330-1400 on 11835; 1930-2000 on 6100, 9720; 2200-2230 on 6100, 6185 (Bernhard Klink, *BC-DX*)

SIKKIM AIR Gangtok 3390 now regular 1200-1600 or 1630, and on 6085 0700-0850. Not regular at 0100-0300 (Alok Das Gupta, India, *EDXP* via *BC-DX*)

SOLOMON ISLANDS SIBC, R. Happy Isles, sent 1996 program sked with QSL for 5020 until 1130* including this lineup at 1030: Mon *Our Environment,* Tue *Our Resources*, Wed *Radio Magazine*, Thu *Calling Provinces,* Fri *Snippets,* Sat from 1010 *Local Bands Hit Parade,* Sun *House Wives Choice* (via Randy Stewart, MO, *W.O.R.*)

SOMALIA R. Mogadishu, V. of the People, 6969, had news in English at 2000 (David Foster, Australia, and Finn Krone, Denmark, *NU* via HCJB *DXPL*)

SOUTH AFRICA Two of four new 100 kW transmitters at Meyerton began testing Sept 16 on 11900, 6125, 3280. BBC will use them on 3255, 6190, 11940 replacing Lesotho (Kathy Otto, SENTECH via Conradie via *Cumbre DX* via *BC-DX*)

Channel Africa has been given a 6-month reprieve, pending a thorough investigation into the service's future (*Pretoria News* via Godfrey Clemitson, RSA, DSWCI *DXW*) But a delay in interim funding might force it to close abruptly (SAPA via BBCM)

SPAIN REE English from Oct. 27 to us moves from 9540 to 6055 at 0100-0300, 0500-0556; 9540 will switch to Spanish. Other W96 English: 2000-2100 M-F and 2200-2300 Sat/Sun on 6125, 11775 to Eu/Af (REE)

SRI LANKA Eelam People's Democratic Party via SLBC 6035 heard around 1230-1330* (David Foster, Australia, *NU* via DSWCI *DXW*) Construction of VOA Iranawila relay has been hampered by crooked foundations for antenna masts, causing them to twist (*W.O.R.*)

SUDAN R. Omdurman on 9200 including English at 1800 (Wojtek Zaremba, Poland) Rep. of Sudan R. on new 9200 at 2115-2301* ex-9024v //7199.94, both fair-good; lower one again from *0246 with interval signal, 0300 program, joined by 9200 *0257-0415+.

[non] V. of Sudan opposition on 8000.1 //9025.29 at 0402-0430+ and 1900-1916* on 8000.06, 9025.27, 12008 (Brian Alexander, PA, *World of Radio*) Weak but clear at 0450 on 8000.1, 9025.1, 12008 (Finn Krone, Denmark, DSWCI *DXW*)

TASMANIA Techno SW, pirate on 4795, 7555 and FM closed down after a friendly E-mail message from the Spectrum Management Authority (Hobart *Mercury* via *EDXP*)

THAILAND R. Thailand domestic service has reactivated 4830, 7115 along with 6070 (Victor Goonetilleke, Sri Lanka, RN*MN*)

TIBET [non] V. of Tibet, 15480 via Seychelles at 1145-1200 was jammed by China R. Int'l English/Tagalog service replacing Easy-FM as jammer when on 15445 (BBCM) VOT returned to 15445, escaping jamming for a while (Victor Goonetilleke, Sri Lanka, RN*MN*) And to add 17MHz outlet (Alok das Gupta, India, *EDXP*) Easy FM is a joint venture with an Australian firm, who were unaware it was used to jam (R. Australia via BBCM) New E-mail: <vot@sn.no> (Ashok Kumar Bose, India, *BC-DX*)

TINIAN USIA has awarded a $13 million contract to Sayed Hamid Behbehani and Sons, who built the Kuwait MW relay, to build a new relay station here for VOA and APN; three 500 kW transmitters will be moved from Maxoqueira, Portugal, total cost over $20 million, on air by Dec. 1998. Site has been cleared by environmental and historical studies (George Mackenzie, USIA, rec.radio.shortwave and via Aaron Pilchick)

U S A USIA denied my Freedom of Information Act request for a schedule of IBB broadcasts, based on 22 USC 1461 of 1948; there are exceptions and appeal may be made (George Thurman, TX)

Chief of the VOA Burmese service, who had been under investigation for alleged connections to Burma's military government, has been fired from VOA, leaving the Burmese service in serious disarray at a most critical time for the democracy movement (*World of Radio*)

Asia Pacific Network made last-minute name change back to original Radio Free Asia, inaugurated Sept 28 with two 60-minute Mandarin broadcasts at 2300 and 1500; transmitter sites and freqs secret at first (Richard Richter, RFA, RN*MN*) KHBI Saipan was rearranging its schedule, so via it? (Jim Moats, OH) APN was denounced by the Vietnamese army newspaper in a lengthy article referring to the culture behind it as "decadent" and "debauched" (Voice of Vietnam via BBCM) Thailand denied permission for APN to broadcast via VOA Udorn, in deference to its neighboring countries (*The Nation*, Bangkok via VOA *Communications World*) China and Vietnam thanked Thailand for resisting American pressure (UPI via David Alpert) APN planned to start broadcasting Sept. 30 at 1500 in Mandarin, 2300 in other languages (AFP via David Alpert)

R. Martí managers were hurriedly moving to Miami before office space was arranged or money allocated, just in case Pres. Clinton is re-elected and ceases to be so beholden to the exiles (Christopher Marquis, Miami *Herald* via Aaron Pilchick) RM has always operated a news bureau in Miami, and since 1994 has originated some live programming from there weekdays. The complete move may be stopped by congressional action; it has deeply divided the staff into two camps, pro- and anti-Mas Canosa. Even a cursory sample reveals the extent to which Mas Canosa now controls RM broadcasts. He is mentioned in at least every other newscast; one weekend, RM aired no less than five times a re-creation of a debate between him and Cuban official Ricardo Alarcón (Rick Seifert, Office of Cuba Broadcasting)

Southern Music Radio, New Zealand will broadcast special via WRMI 9955, Sat Dec 14 at 1900-2000, with special QSL. Also offering their own QSLs at weekly post-DST timings are *Rock-it Radio*, Sun 2000-2100, and *Horizon Worldwide* ending Nov 10 Sat 2100-2130 (Jeff White, WRMI) WRMI expects FCC approval soon for new antenna toward Canada; then it will take two months to put on air; existing antenna already being modified for better NAm, Eu coverage (Marcel Rommerts, DSWCI *DXW*) *AWR Wavescan* may become a half-hour show recorded by Adrian Peterson himself starting in January (*Viva Miami*)

Monitor Radio had to make more cuts, dropping live newscasts on weekends, reassigning staff; expansion of NPR *All Things Considered* to start an hour earlier knocked *MR* off many public radio stations; and MRI has not been able to sell ads on WSHB, KHBI (Jim Moats, OH) Only certain portions of Monitor Radio broadcasts are available in RealAudio: *Newscasts, Today's Show*, and *Latest Hits*, but not *Letterbox, Sentinel, Herald*, or church services (via Moats)

WVHA's 1800-2200 broadcast was on 9900 for a few days instead of 9930, clashing with Cairo after 1900 (Jim Moats, OH) *Error?*

WJCR FM
WJCR World Wide

WJCR claimed to reach China on 13595, inactive recently due to lightning strike, but it is registered at 270°, nowhere near the direction of China from Kentucky except on a Mercator map (gh)

WEWN is occasionally missing from all frequencies. When a lightning storm approaches they have to close down the station for safety (George Thurman, TX) see also AUSTRALIA

Chuck Harder suddenly went on extended vacation until after the election, turning *For the People* via WHRI over to other hosts; sold his network to Pat Choate, who soon became Perot's running mate and also withdrew from the radio business (*Wall Street Journal*, Chet Copeland)

Ask WWCR answers FAQs about propagation, technical and business matters, false charges of censorship, etc., Fri 2100 on 15685, Sat 1015 on 5065, 2100 on 12160, Mon 0015 on 5065 after shift off DST. WWCR-4 on 9475/7435/2390 has been sold exclusively to Brother Stair 24h (George McClintock, WWCR) *Media Bypass* got the coveted M-F 9-11 pm CT 5065 block vacated by Tom Valentine (gh)

Broadcast Loggings

GLOBAL FORUM

Gayle Van Horn

0000 UTC on 9900
EGYPT: Radio Cairo. English news and Egyptian music. Modulation slightly improved from usual low level. (Lee Silvi, Mentor, OH/via email; Sue Wilden, Columbus, IN/via email)

0003 UTC on 4799.70
GUATEMALA: Radio Buenas Nuevas. Spanish. Announcer reading text to 0005. Vocal tune to evening program of talk and regional news. Guatemala's **Radio Tezulutlán** noted on 4835 at 2350, with children's choral tunes and "canned" ID. (Richard T. Leinweber, Marble Falls, TX)

0007 UTC on 5930
CZECH REP.: Radio Prague. Czech economic/political news, // 7345. Press reviews and Czech military report. (Brian Bagwell, St. Louis, MO; Leinweber, TX)

0010 UTC on 5955.1
PERU: Radio Estación Uno. Spanish. Modern music, ID, "Y ya son las 7 y 24 en Estación Uno." Music to ID as, "A través de radio Estación Uno..la maxima." Fair signal quality to 0205* and national anthem. (Pedro Arrunategui, Lima, Peru/*The Four Winds*)

0014 UTC on 5260
KAZAKHSTAN: Kazakh Radio. Domestic service 2 with regional programming and music from grayline DXing. (James A. DeYoung, Arlington, VA/via email)

0014 UTC on 9990
LEBANON: Voice of Hope. Arabic. Lady's Arabic vocals on this new frequency (ex 9965). Very weak SIO=232. Recheck at 0035 with minimal audio level. Fair signal for subsequent afternoon checks at 2203 with Arabic vocals. (GVH/NC)

0015 UTC on 6020
NETHERLANDS: Radio Netherlands. Feature on music interpretation and cultural reactions to differing styles, noted on // 6165, 9845 (Netherlands Antilles relays). (Bagwell, MO)

0015 UTC on 4682.2
BOLIVIA: Radio Paititi. Spanish. Regional messages to ID, "De esta manera Radio Paititi." Noted interference on frequency, station monitored in LSB. (Arrunategui/*The Four Winds*)

0028 UTC on 7150
UKRAINE: Radio Ukraine Int'l. Ukrainian folk music program celebrating their independence, audible on // 9550. QRM from Radio Havana's Spanish service. (John Richter, Santa Monica, CA; Wilden, IN; Leinweber, TX; Bagwell, MO)

0029 UTC on 6120
LITHUANIA: Radio Vilnius. English service sign-on with interval signal, ID, and tonight's program preview. *Weekly Press Review* of news and sports. *Mailbag* show's pan flute melody to letter on Lithuanian honey and beekeeping. (Tom Banks, Dallas, TX)

0030 UTC on 6050
IRAN: VOIRI. Readings from the Holy Koran to station ID. Frequency schedule and editorial. (William McGuire, Cheverly, MD)

0040 UTC on 4755
GEORGIA: Radio Georgia. Noted while searching for Brazil's Radio Roraima. Good signal with great music to 0100. Station ID, // 5020. (Zacharias Lianga, Tessaloniki, Greece/*The Four Winds*.)

0056 UTC on 7250
RUSSIA: Voice of Russia. Instrumental music program to 0059. (Wilden, IN) Letters segment at 0249 on 15180 // 15580. (Gerald R. Brookman, Kenai, AK)

0110 UTC on 9840
HUNGARY: Radio Budapest. Featured program of opera music. Frequency monitored to 0235. (McGuire, MD)

0115 UTC on 6000
CUBA: *Viewpoint* feature with editorial on U.S./Cuban relations, //9820, 9830 USB. Discussion on Cuban insurance conference to 0130 news headlines. (Sam Wright, Biloxi, MS) Letters program heard on 9820 at 0206. (Brookman, AK)

0135 UTC on 9640
GERMANY: Deutsche Welle. *Inside Europe* program, monitored on // 6040, 6085, 6145, 11740. Discussion on curbing drug smuggling at 2140 on 9735 // 15135. (Wright, MS; Banks, TX; McGuire, MD) Monitored 0504 on 9515 / / 5960 (Brookman, AK)

0147 UTC on 9540
SPAIN: Radio Exterior de España. Music from Spanish artist. Sunday afternoon programming noted at 2145 on 11775 // weaker on 6125 to Europe. (Frank Hillton, Charleston, SC; Wilden, IN)

0207 UTC on 7250
RUSSIA: Voice of Vietnam relay via Armavir. News in English. *Vietnam Land and People* program. Fair signal quality with fading. (Brandon M. Artman, West Chester, PA)

0258 UTC on 7199
SUDAN: Radio Omdurman. Arabic. Station internal signal, ID and *0300. Holy Koran to 0315 and news coverage on Khartoum and Omdurman. (Racenis, *MARE*)

0311 UTC on 5980
BOTSWANA: VOA relay. *Dateline Africa* program about November's election preparations. Weather forecast for various cities in Africa. (Racenis/ *MARE*)

0400 UTC on 15115
NEW ZEALAND: Radio NZ Intl. Newscast to regional Pacific music, monitored to 0458. (Silvi, OH)

0533 UTC on 6015
AUSTRIA: Radio Austria Intl. Story on Austrian judicial system, music from Bach and listener's letters. (Wilden, IN)

0802 UTC on 17900.02
PAKISTAN: Radio Pakistan. Newscast to sports update at 0804. Program preview to regional music, heard on // 15470.05. (Giovanni Serra, Rome, Italy/*The Four Winds*)

1007 UTC on 3925
JAPAN: Radio Tampa. Weak, but local music audible and female announcer's text. Amateur radio QRM from tune-ups! (DeYoung, VA)

1120 UTC on 9525
INDONESIA: (Java) RRI-Jakarta. Indonesian. SIO=233. Pop music to announcement and ID at 1130. Address in Jakarta given to news about Papua New Guinea. (Racenis, *MARE*)

1210 UTC on 13625
FRANCE: Radio France Intl. Report on trade and the European Union. (McGuire, MD)

1256 UTC on 15540
BELGIUM: Radio Vlaanderan. *Brussels Calling* show to southeast Asia. French service at 1330 on 15322. (Silvi, OH)

1356 UTC on 15600
GERMANY: Radio Telefis Eireann (RTE). Special broadcast relayed from Deutsche Telecom's (Juelich) station in Germany. Station abruptly on the air amid interview with former soccer player. Live programming for today's soccer match of the *Gaelic Finals* in Dublin. (Mayo vs Meade). Local commercials for Malloy's liquor store, CD offer, sheep vaccine, and Bridgestone tires. Station IDs, taped segments from the 95' finals, player interviews, parade commentary (before a frenzied crowd!) and sports commentary from a delightful Irish brogue announcer. Fair // on 12055 to Europe at 1413; Very weak on // 9815 to Australia. (GVH/NC)

1429 UTC on 6020
PHILIPPINES: Radio Veritas. English announcements by lady to Mandarin service at 1430. (Brookman, AK)

1536 UTC on 9640
NORTH KOREA: Radio Pyongyang. Usual propaganda programming. Station audible on 13650, 2341-2348* (Brookman, AK)

1600 UTC on 6155
SINGAPORE: Radio Singapore Intl. Local time check, "it's midnight," into national newscast. (Brookman, AK)

1600 UTC on 17750
USA: Voice of Free China relay via Okeechobee, FL. World news in English and story on Indonesia. (Edward H. Schwartz, Chicago, IL)

1607 UTC on 9530
SOUTH AFRICA: Channel Africa. News to 1609, with headline repeat and ID. Time check and program preview. Afro pops and interview segment. (Serra, *The Four Winds*)

1740 UTC on 15205
ALGERIA: Radio Algeria Int'l. French. Regional music with English ID at 1806. World news headlines and update on conflicts in northern Iraq. (Dennis Ruga/via email)

1813 UTC on 15050 USB
COSTA RICA: Radio for Peace Intl. Spanish programming to 2000 English service. (Silvi, OH; Wilden, IN) World of Radio heard on 7385 at 0331, station audible on 7385 at 0506. (Brookman, AK; Banks, TX)

1830 UTC on 11990
KUWAIT: Radio Kuwait. Pop music progam to ID, regional news and updates on Israel. (McGuire, MD)

2150 UTC on 9430
SWEDEN: Radio Sweden. *Sounds Nordic* show featuring music from Bruce Springsteen, // 6065 to Europe with SIO=333. (Hillton, SC) Audible on 7290 at 0140. (McGuire, MD)

2204 UTC on 9485
NORWAY: Radio Norway Intl. News topics on Norwegian health care service and national parliament to 2211. Station ID into *Nordic Report* on morals and ethics in the Nordic countries. (Banks, TX)

2356 UTC on 6746
PERU: Radio San Ignacio. Spanish. A clear "San Ignacio" ID at 2358 by male announcer. Regional music interspersed with text. (DeYoung, VA)

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

Hobby Potpourri

We have quite a collection of tidbits this month. Are you amazed at the growing number of on-line radio newsletters? This month, we have four to pique your interest.

The Michigan Area Radio Enthusiasts (MARE) is a non-profit hobby club devoted to promoting the radio hobbies as both an email newsletter and a bi-monthly paper news bulletin. For more information write to; MARE Inc., P.O. Box 530933, Livonia, MI 48153-0933 USA. Email inquiry; **xx024@detroit.freenet.org**.

The Four Winds monthly newsletter, edited by Giovanni Serra, is one of the latest to join cyberspace from Rome, Italy. *TFW* contains excellent detailed loggings and you will receive, free of charge, issues to which you have contributed. Send your best logs to; **g.serra@iol.it**.

DX-Hotline, from Jan Nieuwenhuis of The Netherlands contains station schedules and information at; **nieuw@nioz.nl**.

Fine Tuning, a communications journal emphasizing rare and difficult DX, publishes a bi-monthly (weekly in winter) newsletter of loggings, news and QSL information. Correspondence or subscription information about *FT* should be sent to; Mitch Sams, 779 Galilea Court, Blue Springs, MO 64014 USA. *FT Updater*, an electronic supplement to the printed bulletin is available to subscribers at; **72700.31@compuserve.com**.

Still trying to verify Brazil's Radio Nacional da Amazonia? Sorry, but this Nacional outlet does not target their broadcast to an overseas audience, and encloses only a program guide pertaining to Radio Nacional do Brasil's international division.

KJES, an international religious shortwave station, has recently changed their address to the following; 230 High Valley Rd., Vado, NM 88072.

Are you a fan of Andean music? The Japan Shortwave Club is offering a musical CD for $11.00 (includes postage). Send your request to: HCJB CD, c/o Japan Shortwave Club, P.O. Box 29, Sendai 980-91 Japan.

AIRCRAFT TRAFFIC

Nippon Cargo B747-200F/JA8194, 8891 kHz USB. Prepared QSL card verified in 18 days for an English utility report. QSL address: Nippon Cargo Airlines, Flight Operations Dept., P.O. Box 1025, Tokyo Airport Post Office, Narita, Chiba 282, Japan. (Steve McDonald-Port Coquitlam, BC Canada via email)

Transcolombian DC8-51F/HK-3816, 6637 kHz USB. Prepared QSL card verified in 31 days for an English utility report. QSL address: Aero Transcolombiana De Carga Ltda., Terminal de Carga Internacional, Aeropuerto El Dorado, Santefe de Bogota, Colombia. (McDonald-CAN)

LTU 769, B757-200/D-AMUW, 6556 kHz USB. Prepared QSL card verified in 28 days for an English utility report. QSL address: LTU Lufttransportunternehmen GmbH & Co. KG, Flughafen Halle 8, 4000 Dusseldorf 30, Germany. (McDonald-CAN)

Zimbabwe 725, B707-300B/Z-WKU, 8903 kHz USB. Prepared QSL card verified in 28 days for an English utility report. QSL address: Air Zimbabwe Operations Department, P.O. Box AP 1, Harare Airport, Zimbabwe. (McDonald-CAN)

Brunei 97, B767-300ER/V8-RBF, 6556 kHz USB. Prepared QSL card verified in 21 days for an English utility report. QSL address: Royal Brunei Airlines, P.O. Box 737, Bandar Seri Begawan 1907, Brunei Darussalam. (McDonald-CAN)

ALGERIA

Radio Algeria, 15205 kHz. Partial data QSL card unsigned. Program schedule and reception report form enclosed. Received in 178 days for a French report. Station address: 21 Boulevard des Martyrs, Algiers, Algeria. (Darren White-Hattiesburg, MS)

AUSTRIA

Radio Austria International, 9655 kHz. Full data verification on ORF station letterhead, initialed by staff of Listeners Service. Received in 26 days via airmail, for an English report sent by email at ORF website (**http://www.ping.at/rai/**). Program schedule, station sticker and reception report form enclosed. Station address: A-1136 Wien Wurzburggasse 30, Vienna, Austria. (Gayle Van Horn-Brasstown, NC)

AUSTRALIA

Australian Defense Forces Radio/NAVCOMMSTA Canberra-13525 kHz. Full data letter on station letterhead signed by Adam Iffland. Assorted military stickers, Defense Forces refrigerator magnets and Australian travel brochures enclosed. Received in 36 days for an English report and two IRCs (returned with reply). Station address: Anzac Park West Offices, APW 1-B-07, REID ACT, Australia. (White-MS)

BULGARIA

Radio Bulgaria, 7480 kHz. Full data QSL card unsigned. Card was #6 of a series, plus bronze diploma signed by Iva Delcheva. Received in 152 days for a series of English reports within a specified time period. Two Bulgarian magazines (in English) and a tourist guide of Sofia. Station address: 4 Dragan Tsankov, Sofia 1040, Bulgaria. (Paul Jablonowski-Greenfield, WI)

CANADA

CHU, Time/Freq Station, 7335 kHz. Full data *Standard Time Zone* card unsigned. Cover letter signed by W.J. Cazemier. Received in 16 days for an English report, one U.S. dollar and return address label. Station address: National Research Council, Ottawa, Ontario, Canada K1A OR6. (Brandon Artman-West Chester, PA)

FM/MEDIUMWAVE

WFBC-FM 93.7 kHz. Date/frequency letter (multi-colored printing), signed by Jerry K. Massey-CSBE. Received in 239 days for an English FM report, mint stamps, and address label (used on reply). Station address: 501 Rutherford St., Greenville, SC 29609-5313 (Ph#864-271-9200). (Mike Hardester-Jacksonville, NC)

WWKB 1520 AM kHz. Full data form letter signed by Salvatore J. D'Angelo. Received in 11 days for an English AM report, mint stamps and address label (used on reply). Station address: 695 Delaware Ave., Buffalo, NY 14209. (Hardester, NC)

WFAN 660 AM kHz. Full data QSL card unsigned. Received in 11 days for an English AM report and mint stamps. Station address: 34-12 36th St., Astoria, NY 11106. (Jose Moura-Washington, DC)

GUYANA

Voice of Guyana, 3290 kHz. Partial data (date only) form letter signed by Shiroxley Goodman-Chief Engineer. Info sheet on Guyana and program schedule enclosed. Received in 60 days for a taped report and two IRCs. Station address: 44 High Street, Werk-en-Rust, Georgetown, Guyana. (Randy Stewart-Springfield, MO)

INDONESIA

Voice of Indonesia (Java), 9525 kHz. Full data *Tana Toraja* card unsigned. VOI decal enclosed. Received in 66 days for an English report and three IRCs. Station address: P.O. Box 1157, Jakarta 10001, Indonesia. (White-MS)

RUSSIA

Voice of Vietnam via Tbilisskaya, 5940 kHz. Full data QSL card unsigned. Station sticker and schedule enclosed. Received in 33 days for an English cassette of programming. Station address: 58 Quan Su St., Hanoi, Vietnam. (Moura-DC)

SOLOMON ISLANDS

Solomon Islands Broadcasting Corp., 5020 kHz. Full data station logo card unsigned and form letter with illegible signature. Received in 30 days for a taped report and one U.S. dollar. Station address: Box 654, Honiara, Solomon Islands. (Stewart-MO)

UNITED STATES

World Harvest Radio, 5745 kHz. Full data *10 Years of Ministry* card signed by Joseph Brashier. Personal letter and program/frequency guide enclosed. Received in 26 days for an English report and mint stamps. Station address: 61300 S. Ironwood Rd., South Bend, IN 46614. (G.Van Horn-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.

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

0030 Voice of America (ca): "Communications World"
0030 WRMI (Florida): "Wavescan"
0031 Radio Exterior de Espana: "Distance Unknown"
0045 WRMI (Florida): "Wavescan"
0109 HCJB (am): "DX Partyline"
0131 Radio Exterior de Espana: "Distance Unknown"
0200 WWCR #4 (Tennessee): "World of Radio"
0200 Radio For Peace Intl: "World of Radio"
0234 Radio Havana Cuba: "DXers Unlimited"
0249 Radio Romania Intl: "DX Mailbag"
0258 Vatican Radio: "On-the-Air"
0300 WWCR #3/4 (Tennessee): "Spectrum"
0330 WHRI (Angel 2): "DXing with Cumbre"
0400 WGTG (Georgia): "North of 49"
0410 Australia, Radio: "Feedback"
0415 Voice of Turkey: "DX Corner" (biweekly)
0430 Australia, Radio: "The Media Report"
0434 Radio Havana Cuba: "DXers Unlimited"
0508 Vatican Radio: "On-the-Air"
0509 HCJB (am): "DX Partyline"
0525 Radio Japan: "Media Roundup"
0531 Radio Exterior de Espana: "Distance Unknown"
0610 Australia, Radio: "Feedback"
0634 Radio Havana Cuba: "DXers Unlimited"
0725 Radio Japan: "Media Roundup"
0735 Radio Vlaanderen Intl: "Radio World"
0830 Radio Korea: "Shortwave Feedback"
0900 WWCR #1 (Tennessee): "World of Radio"
0900 Radio For Peace Intl: "World of Radio"
1040 Radio Korea: "Shortwave Feedback"
1100 AWR Latin America: "Wavescan"
1130 Radio ABC Denmark: "ABCDX-Report"
1230 Radio Korea: "Shortwave Feedback"
1240 Radio Korea: "Shortwave Feedback"
1300 WRMI (Florida): "Wavescan"
1335 Radio Vlaanderen Intl: "Radio World"
1352 Vatican Radio: "On-the-Air"
1425 Radio Japan: "Media Roundup"
1630 WHRI (Angel 2): "DXing with Cumbre"
1630 Radio Korea: "Shortwave Feedback"
1725 Radio Japan: "Media Roundup"
1830 KWHR (Hawaii): "DXing with Cumbre"
1840 Radio Korea: "Shortwave Feedback"
1905 Radio Vlaanderen Intl: "Radio World"
1930 Radio Korea: "Shortwave Feedback"
2000 WWCR #3 (Tennessee): "World of Radio"
2010 Radio Korea: "Shortwave Feedback"
2125 Radio Japan: "Media Roundup"
2130 Radio Korea: "Shortwave Feedback"
2205 Radio Vlaanderen Intl: "Radio World"
2215 Radio Budapest Intl: "DX Show"
2215 AWR-Europe (Slovakia): "Wavescan"
2230 WWCR #4 (Tennessee): "World of Radio"
2249 Radio Bulgaria: "Radio Bulgaria Calling"
2300 AWR Latin America: "Wavescan"
2300 KSDA (Guam): "Wavescan"
2300 Radio For Peace Intl: "World of Radio"
2306 WWCR #4 (Tennessee): "Ham Radio and More"
2325 Radio Japan: "Media Roundup"

Mondays

0030 WWCR #1 (Tennessee): "World of Radio"
0035 Radio Vlaanderen Intl: "Radio World"
0100 WGTG (Georgia): "The Domestic SW Report"
0125 Radio Japan: "Media Roundup"
0130 WRMI (Florida): "Wavescan"
0200 WRMI (Florida): "Wavescan"
0230 Radio Korea: "Shortwave Feedback"
0330 KWHR (Hawaii): "DXing with Cumbre"
0343 Radio Budapest Intl: "DX Show"
0405 WWCR #1 (Tennessee): "Ham Radio and More"
0430 WWCR #3 (Tennessee): "World of Radio"
0430 Radio New Zealand Intl: "Mailbox" (biweekly)
0545 Radio Bulgaria: "Radio Bulgaria Calling"
0700 Radio For Peace Intl: "World of Radio"
0905 WWCR #1 (Tennessee): "Spectrum"
1005 WWCR #1 (Tennessee): "Ham Radio and More"
1040 All India Radio: "DX-ers Corner" (11th,25th)
1315 Radio Bulgaria: "Radio Bulgaria Calling"
1355 Radio Romania Intl: "For Radio Amateurs"
1435 All India Radio: "DX-ers Corner" (11th,25th)
1525 Radio Romania Intl: "For Radio Amateurs"
1615 KTWR (Guam): "Pacific DX Report"
1840 All India Radio: "DX-ers Corner" (11th,25th)
1915 Radio Tallinn: "Radio Estonia DX Program"
1920 AWR Latin America: "Wavescan"
1955 Radio Romania Intl: "For Radio Amateurs"
2045 Radio Dnestr: "DX Herald (3)"
2130 WWCR #1 (Tennessee): "World of Radio"
2130 All India Radio: "DX-ers Corner" (11th,25th)
2155 Radio Romania Intl: "For Radio Amateurs"
2355 Radio Romania Intl: "For Radio Amateurs"

Tuesdays

0130 WRMI (Florida): "Wavescan"
0255 Radio Romania Intl: "For Radio Amateurs"
1146 Radio Sweden: "MediaScan" (5th,19th)
1210 AWR Latin America: "Wavescan"
1246 Radio Sweden: "MediaScan" (5th,19th)
1330 WWCR #1 (Tennessee): "World of Radio"
1445 WRMI (Florida): "Wavescan"
1846 Radio Sweden: "MediaScan" (5th,19th)
1900 Radio For Peace Intl: "World of Radio"
1946 Radio Sweden: "MediaScan" (5th,19th)
1950 Polish Radio: "DX Club"
2139 Radio Havana Cuba: "DXers Unlimited"
2146 Radio Sweden: "MediaScan" (5th,19th)
2239 Radio Havana Cuba: "DXers Unlimited"
2340 All India Radio: "DX-ers Corner" (12th,26th)

Wednesdays

0046 Radio Sweden: "MediaScan" (6th,20th)
0116 Radio Sweden: "MediaScan" (6th,20th)
0130 WRMI (Florida): "Wavescan"
0135 Radio Havana Cuba: "DXers Unlimited"
0146 Radio Sweden: "MediaScan" (6th,20th)
0246 Radio Sweden: "MediaScan" (6th,20th)
0300 Radio For Peace Intl: "World of Radio"
0335 Radio Havana Cuba: "DXers Unlimited"
0346 Radio Sweden: "MediaScan" (6th,20th)
0535 Radio Havana Cuba: "DXers Unlimited"
0800 HCJB (eu): "Ham Radio Today"
0930 HCJB (pac): "Ham Radio Today"
1000 Radio For Peace Intl: "World of Radio"
1230 WWCR #1 (Tennessee): "World of Radio"
1315 FEBC (Philippines): "DX Dial"
1445 WRMI (Florida): "Wavescan"
1720 Polish Radio: "DX Club"
1920 Argentina, RAE: "DX'ers Special"
1930 HCJB (eu): "Ham Radio Today"
2015 Radio Budapest Intl: "DX Show"

Thursdays

0130 WRMI (Florida): "Wavescan"
0130 HCJB (am): "Ham Radio Today"
0153 Radio Netherlands Intl: "Media Network"
0215 Radio Budapest Intl: "DX Show"
0235 Argentina, RAE: "DX'ers Special"
0530 HCJB (am): "Ham Radio Today"
0752 Radio Netherlands Intl: "Media Network"
0830 Radio New Zealand Intl: "Mailbox" (biweekly)
0953 Radio Netherlands Intl: "Media Network"
1153 Radio Netherlands Intl: "Media Network"
1220 Polish Radio: "DX Club"
1352 Radio Netherlands Intl: "Media Network"
1445 WRMI (Florida): "Wavescan"
1553 Radio Netherlands Intl: "Media Network"
1753 Radio Netherlands Intl: "Media Network"
1952 Radio Netherlands Intl: "Media Network"
2130 WWCR #1 (Tennessee): "World of Radio"

Fridays

0053 Radio Netherlands Intl: "Media Network"
0130 WRMI (Florida): "Wavescan"
0253 Radio Netherlands Intl: "Media Network"
0453 Radio Netherlands Intl: "Media Network"
1445 WRMI (Florida): "Wavescan"
1446 Radio Portugal Intl: "Radio Portugal DX" (triweekly)
1930 Radio New Zealand Intl: "Mailbox" (biweekly)
1930 AWR Latin America: "Wavescan"
2000 Radio For Peace Intl: "World of Radio"
2016 Radio Portugal Intl: "Radio Portugal DX" (triweekly)
2047 Radio Bulgaria: "Radio Bulgaria Calling"
2210 Australia, Radio: "Feedback"
2230 WHRI (Angel 2): "DXing with Cumbre"
2315 WWCR #1 (Tennessee): "World of Radio"

Saturdays

0010 Australia, Radio: "Feedback"
0130 WRMI (Florida): "Wavescan"
0200 KWHR (Hawaii): "DXing with Cumbre"
0346 Radio Portugal Intl: "Radio Portugal DX" (triweekly)
0400 Radio For Peace Intl: "World of Radio"
0500 KWHR (Hawaii): "DXing with Cumbre"
0530 WHRI (Angel 1): "DXing with Cumbre"
0739 HCJB (eu): "DX Partyline"
0815 KTWR (Guam): "Pacific DX Report"

(Continued on page 48)

0000 UTC SHORTWAVE GUIDE 7:00 PM EST 4:00 PM PST

Frequencies

0000-0100	Australia, Radio	9660pa	11640as	12080pa	13605pa
		13755pa	15240pa	15365pa	15415as
		15510as	17715as	17750pa	17795pa
		17860as			
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			
0000-0100	China, China Radio Intl	9710na	11695na		
0000-0100	Costa Rica, Adv World R	7375am	9725am	13750am	15460am
0000-0027	Czech Rep, Radio Prague	5930na	7345na		
0000-0030	Egypt, Radio Cairo	9900na			
0000-0015 vl	Ghana, Ghana Broadc Corp	3366do	4915do		
0000-0045	India, All India Radio	7155as	9705as	9950as	11620as
		11660as			
0000-0100	Lebanon, Voice of Hope	9990va			
0000-0100	Malaysia, Radio	7295do			
0000-0100	Malaysia, RTM Kuching	7160do			
0000-0100	Netherlands, Radio	6020na	6165na	9845na	
0000-0100	New Zealand, R NZ Intl	15115pa			
0000-0050	North Korea, R Pyongyang	11335na	13760na	15130na	
0000-0100 vl	Papua New Guinea, NBC	9675do			
0000-0100	Russia,Voice of Russia WS	7125na	9825na		
0000-0030	Thailand, Radio	9690as			
0000-0100	Thailand, Radio	9655as	11905af		
0000-0100	United Kingdom, BBC WS	5965as	5970sa	5975va	6175na
		6195as	7265as	7325va	9410as
		9590va	9915sa	11750sa	11955as
0000-0030	United Kingdom, BBC WS	7110as	9580as	11945as	15280as
0000-0100	USA, KAIJ Dallas TX	5810am			
0000-0100	USA, KTBN Salt Lk City UT	15590am			
0000-0100	USA, KWHR Naalehu Hi	17510as			
0000-0100	USA, Monitor Radio Intl	7535na	9430sa	15665as	
0000-0100	USA, Voice of America	5995am	6130am	7215va	7405am
		9455am	9770va	9775am	11695am
		11760am	13740am	17735va	17820va
0000-0030	USA, Voice of America	6873va			
0000-0100	USA, WEWN Birmingham AL	5825eu	7425na		
0000-0100	USA, WGTG McCaysville GA	6950am	9400am		
0000-0100	USA, WHRI Noblesville IN	5745am			
0000-0100	USA, WJCR Upton KY	7490na	13595na		
0000-0100 mtwhf	USA, WRMI/R Miami Intl	9955am			
0000-0100	USA, WRNO New Orleans LA	15420am			
0000-0100 mtwhf	USA, WVHA Greenbush ME	9900af			
0000-0100	USA, WWCR Nashville TN	3215am	5065am	7435am	13845am
0000-0045	USA, WYFR Okeechobee FL	6085na	11855ca		
0005-0010	Croatia, Croatian Radio	5895eu	7165eu		
0030-0055	Belgium, R Vlaanderen Int	5900na	9925sa		
0030-0100	Ecuador, HCJB	9745am	21455va		
0030-0100	Iran, VOIRI	6050na	9022na	9685na	
0030-0056	Lithuania, Radio Vilnius	6120na			
0030-0100	Sri Lanka, Sri Lanka BC	15425as			
0030-0100	Sweden, Radio	6065am			
0030-0100	Thailand, Radio	15370na			
0035-0040	India, All India Radio	4860do	7110do	11830do	11870do
0038-0055 1&3rd m	Denmark, R Denmark Intl	7275na	7465ca	9560sa	
0040-0050	Georgia, Radio	4755eu	5020eu		
0050-0100	Italy, RAI Intl	6005na	9675na	11800na	

Selected Programs

Sundays

0000 Russia, Voice of: News. Every hour on the hour.
0000 USA, VOA Washington DC (am/as/ca): VOA News. Ten minutes of worldwide news on the hour.
0010 USA, VOA Washington DC (am/ca): Agriculture Today. Basic farming, biotechnology, food marketing, and related issues.
0010 USA, VOA Washington DC (as): All About English. A program designed for those learning to speak English.
0011 Russia, Voice of: News and Views. Russian views on news developments.
0030 Russia, Voice of: News in Brief. Ninety seconds news summary every hour on the half-hour.
0030 USA, VOA Washington DC (am/as): News (Special English). Ten minutes of news in slow English.
0030 USA, VOA Washington DC (ca): Communications World. A look at the people, technologies, economics, and politics involved in modern telecommunications.
0032 Russia, Voice of: This is Russia. A program which helps you to get to know Russia, the Russians, and it's ethnic minorities better.
0040 USA, VOA Washington DC (am/as): Words and Their Stories (Special English). The origin and use of common words and phrases in American English.
0045 USA, VOA Washington DC (am/as): People in America (Special English). Stories about famous Americans.

Mondays

0000 Russia, Voice of: News. See S 0000.
0000 USA, VOA Washington DC (am/as/ca): VOA News. See S 0000.
0010 USA, VOA Washington DC (am): Encounter. See S 1210.
0010 USA, VOA Washington DC (as/ca): VOA Business Report. A weekday review of business and financial matters.
0011 Russia, Voice of: News and Views. See S 0011.
0030 Russia, Voice of: News in Brief. See S 0030.
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.
0030 USA, VOA Washington DC (as): News (Special English). See S 0030.
0032 Russia, Voice of: Folk Box. One of the top ten entertainment programs (Passport to World Band Radio).
0040 USA, VOA Washington DC (as): Development Report (Special English). Helpful information for developing nations.
0045 USA, VOA Washington DC (as): This is America (Special English). Informative reports on life in the United States.

Tuesdays

0000 Russia, Voice of: News. See S 0000.
0000 USA, VOA Washington DC (am/as/ca): VOA News. See S 0000.
0010 USA, VOA Washington DC (am/as): VOA Business Report. See M 0010.
0010 USA, VOA Washington DC (ca): Report to the Caribbean. The latest news affecting the region, as well as a roundup of sports, financial news, and the weather forecast.
0011 Russia, Voice of: News and Views. See S 0011.
0030 Russia, Voice of: News in Brief. See S 0030.
0030 USA, VOA Washington DC (am/as): News (Special English). See S 0030.
0030 USA, VOA Washington DC (ca): Now Music USA. Rock and soul hits of today and yesterday.
0032 Russia, Voice of: Yours for the Asking. A 30-minute musical request program.
0040 USA, VOA Washington DC (am/as): Agriculture Report (Special English). Developments and reports on farming and agriculture.
0045 USA, VOA Washington DC (am/as): Science in the News (Special English). Recent scientific developments.

Wednesdays

0000 Russia, Voice of: News. See S 0000.
0000 USA, VOA Washington DC (am/as/ca): VOA News. See S 0000.
0010 USA, VOA Washington DC (am/as): VOA Business Report. See M 0010.
0010 USA, VOA Washington DC (ca): Report to the Caribbean. See T 0010.
0011 Russia, Voice of: News and Views. See S 0011.
0030 Russia, Voice of: News in Brief. See S 0030.
0030 USA, VOA Washington DC (am/as): News (Special English). See S 0030.
0030 USA, VOA Washington DC (ca): Now Music USA. See T 0030.
0032 Russia, Voice of: Your Top Tune. See S 0332.
0040 USA, VOA Washington DC (am/as): Science Report (Special English). See M 1110.
0045 USA, VOA Washington DC (am/as): Exploration (Special English). NEW! Steve Ember and Shirley Griffith report on space news.
0047 Russia, Voice of: You Write to Moscow. See S 0347.

Thursdays

0000 Russia, Voice of: News. See S 0000.
0000 USA, VOA Washington DC (am/as/ca): VOA News. See S 0000.
0010 USA, VOA Washington DC (am/as): VOA Business Report. See M 0010.
0010 USA, VOA Washington DC (ca): Report to the Caribbean. See T 0010.
0011 Russia, Voice of: News and Views. See S 0011.
0030 Russia, Voice of: News in Brief. See S 0030.
0030 USA, VOA Washington DC (am/as): News (Special English). See S 0030.
0030 USA, VOA Washington DC (ca): Now Music USA. See T 0030.
0032 Russia, Voice of: Music at Your Request. See M 1232.
0040 USA, VOA Washington DC (am/as): Science Report (Special English). See M 1110.
0045 USA, VOA Washington DC (am/as): The Making of a Nation (Special English). Chapters from U.S. history in special English.

Fridays

0000 Russia, Voice of: News. See S 0000.
0000 USA, VOA Washington DC (am/as/ca): VOA News. See S 0000.
0010 USA, VOA Washington DC (am/as): VOA Business Report. See M 0010.
0010 USA, VOA Washington DC (ca): Report to the Caribbean. See T 0010.
0011 Russia, Voice of: News and Views. See S 0011.
0030 Russia, Voice of: News in Brief. See S 0030.
0030 USA, VOA Washington DC (am/as): News (Special English). See S 0030.
0030 USA, VOA Washington DC (ca): Now Music USA (Top Ten). See H 1130.
0032 Russia, Voice of: The Jazz Show. See M 0532.
0040 USA, VOA Washington DC (am/as): Environment Report (Special English). A five-minute report on a specific environmental subject.
0045 USA, VOA Washington DC (am/as): American Mosaic (Special English). Reports about music, books, movies, and student life in the USA.

Saturdays

0000 Russia, Voice of: News. See S 0000.
0000 USA, VOA Washington DC (am/as/ca): VOA News. See S 0000.
0010 USA, VOA Washington DC (am/as): Newsline. See M 1510.
0010 USA, VOA Washington DC (ca): Report to the Caribbean. See T 0010.
0011 Russia, Voice of: News and Views. See S 0011.
0030 Russia, Voice of: News in Brief. See S 0030.
0030 USA, VOA Washington DC (am/as): News (Special English). See S 0030.
0030 USA, VOA Washington DC (ca): Country Music USA. See F 1130.
0032 Russia, Voice of: Folk Box. See M 0032.
0040 USA, VOA Washington DC (am/as): In the News (Special English). Focus on a person, organization, or issue in news reports.
0045 USA, VOA Washington DC (am/as): American Stories (Special English). Readings of short stories by American authors in slow English.

Frequencies

0100-0200	Australia, Radio	9660pa	11640as	13755pa	15240pa
		15365pa	15415as	15510as	17715as
		17750pa	17795pa	17880pa	
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 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			
0100-0159	Canada, R Canada Intl	6020am	6120am	9535am	9755am
		11715am	13670am		
0100-0200	Costa Rica,RF Peace Intl	6205am	7385am	15050am	
0100-0200	Cuba, Radio Havana	6000na	9820na	9830na	
0100-0127	Czech Rep, Radio Prague	6200na	7345na		
0100-0200	Ecuador, HCJB	9745am	21455va		
0100-0150	Germany, Deutsche Welle	6040na	6085na	6145na	9640na
		11740na			
0100-0115	Ghana, Ghana Broadc Corp	3366do	4915do		
0100-0200	Indonesia, Voice of	9525na			
0100-0128	Iran, VOIRI	6050na	9022na		
0100-0110	Italy, RAI Intl	6005na	9675na	11800na	
0100-0200	Japan, NHK/Radio	5960na	11790as	11840as	11860as
		11885as	11890as	11910as	17810as
		17845as			
0100-0200	Lebanon, Voice of Hope	9990va			
0100-0200 smtwh	Malaysia, Radio	7295do			
0100-0130 s/vl	Malta, VO Mediterranean	15550as	17570au		
0100-0125	Netherlands, Radio	6020na	6165na	9845na	
0100-0200	New Zealand, R NZ Intl	15115pa			
0100-0130 m	Norway, Radio Norway Intl	9560na			
0100-0200 vl	Papua New Guinea, NBC	9675do			
0100-0200	Philippines, FEBC/R Intl	15450as			
0100-0200	Russia,Voice of Russia WS	7125na	7240na	7250na	
0100-0130	Slovakia, R Slovakia Intl	5930na	7300na	9440na	
0100-0200	Spain, R Exterior Espana	6055na			
0100-0200	Sri Lanka, Sri Lanka BC	15425as			
0100-0130	Sweden, Radio	9435pa			
0100-0130	Switzerland, Swiss R Intl	6135na	9885na	9905ca	
0100-0200	Ukraine, R Ukraine Intl	7150na	9550na		
0100-0200	United Kingdom, BBC WS	5970sa	5975va	6175va	6195as
		7265as	7325va	9410as	9560va
		9590va	9915va	11750sa	11955as
		15360as			
0100-0200	USA, KAIJ Dallas TX	5810am			
0100-0200	USA, KTBN Salt Lk City UT	7510am			
0100-0200	USA, KWHR Naalehu HI	17510au			
0100-0200	USA, Monitor Radio Intl	7535na	9430am		
0100-0200	USA, Voice of America	5995am	6130am	7115as	7205as
		7405am	9455am	9635as	9775am
		11705as	11725as	13740am	15170as
		15205as	15250as	17740as	17820as
0100-0200	USA, WEWN Birmingham AL	5825eu	7395na	7425na	
0100-0200	USA, WGTG McCaysville GA	6950am	9400am		
0100-0200	USA, WHRI Noblesville IN	5745am			
0100-0200	USA, WJCR Upton KY	7490na	13595na		
0100-0200 mtwhf	USA, WRMI/R Miami Intl	9955am			
0100-0130 s	USA, WRMI/R Miami Intl	9955am			
0100-0200	USA, WRNO New Orleans LA	7355am			
0100-0200	USA, WWCR Nashville TN	3215am	5065am	5935am	7435am
0100-0200	USA, WYFR Okeechobee FL	6065na	9505na		
0100-0130	Uzbekistan, R Tashkent	7190as			
0100-0126	Vietnam, Voice of	5940na			
0100-0130 mtwhfa	Yugoslavia, Radio	6195na	7115na		
0115-0130 f	Greece, Voice of	6125na	7448na	9420na	
0130-0155	Austria, R Austria Intl	9655na			
0130-0150	Greece, Voice of	6125na	7448na	9420na	
0130-0200	Kazakhstan, R Alma Ata	6230eu			
0130-0200	Netherlands, Radio	5905as	7305as	9860as	11655as
0130-0200	Sweden, Radio	7290am			
0130-0156	Vietnam, Voice of	5940na			
0138-0155 1&3rd m	Denmark, R Denmark Intl	7465am	9560am		
0140-0200	Vatican State, Vatican R	5980as	7335as		

Selected Programs

Sundays

0100 Russia, Voice of: News. See S 0000.
0100 USA, VOA Washington DC (am/as/ca): VOA News. See S 0000.
0110 USA, VOA Washington DC (am/ca): On the Line. A discussion of U.S. policies and contemporary issues.
0110 USA, VOA Washington DC (as): VOA Sunday. See F 2310.
0111 Russia, Voice of: Moscow Mailbag. Joe Adamov answers listener questions.
0130 Russia, Voice of: News in Brief. See S 0030.
0130 USA, VOA Washington DC (am/ca): Press Conference USA. Newsmakers are questioned by Washington journalists in the VOA studios.
0132 Russia, Voice of: Audio Book Club. The best of Russian classic and contemporary literature.

Mondays

0100 Russia, Voice of: News. See S 0000.
0100 USA, VOA Washington DC (am/ca): VOA News. See S 0000.
0110 USA, VOA Washington DC (am/ca): New Horizons. See S 1110.
0110 USA, VOA Washington DC (as): VOA Today. See S 2310.
0111 Russia, Voice of: Moscow Mailbag. See S 0111.
0130 Russia, Voice of: News in Brief. See S 0030.
0130 USA, VOA Washington DC (am/ca): Issues in the News. See S 1130.
0132 Russia, Voice of: Russian by Radio. A course in the Russian language.

Tuesdays

0100 Russia, Voice of: News. See S 0000.
0100 USA, VOA Washington DC (am/as/ca): VOA News. See S 0000.
0110 USA, VOA Washington DC (am/ca): Report to the Americas. See T 0010.
0110 USA, VOA Washington DC (as): VOA Today. See S 2310.
0111 Russia, Voice of: Focus on Asia and the Pacific. News and comments on events in the region.
0130 Russia, Voice of: News in Brief. See S 0030.
0132 Russia, Voice of: This is Russia. See S 0032.
0155 USA, VOA Washington DC (am/ca): VOA Editorial. See S 1457.

Wednesdays

0100 Russia, Voice of: News. See S 0000.
0100 USA, VOA Washington DC (am/as/ca): VOA News. See S 0000.
0110 USA, VOA Washington DC (am/ca): Report to the Americas. See T 0010.
0110 USA, VOA Washington DC (as): VOA Today. See S 2310.
0111 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
0130 Russia, Voice of: News in Brief. See S 0030.
0132 Russia, Voice of: Moscow Yesterday and Today. See S 0532.
0155 USA, VOA Washington DC (am/ca): VOA Editorial. See S 1457.

Thursdays

0100 Russia, Voice of: News. See S 0000.
0100 USA, VOA Washington DC (am/as/ca): VOA News. See S 0000.
0110 USA, VOA Washington DC (am/ca): Report to the Americas. See T 0010.
0110 USA, VOA Washington DC (as): VOA Today. See S 2310.
0111 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
0130 Russia, Voice of: News in Brief. See S 0030.
0132 Russia, Voice of: This is Russia. See S 0032.
0155 USA, VOA Washington DC (am/ca): VOA Editorial. See S 1457.

Fridays

0100 Russia, Voice of: News. See S 0000.
0100 USA, VOA Washington DC (am/as/ca): VOA News. See S 0000.
0110 USA, VOA Washington DC (am/ca): Report to the Americas. See T 0010.
0110 USA, VOA Washington DC (as): VOA Today. See S 2310.
0111 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
0130 Russia, Voice of: News in Brief. See S 0030.
0132 Russia, Voice of: Moscow Yesterday and Today. See S 0532.
0155 USA, VOA Washington DC (am/ca): VOA Editorial. See S 1457.

Saturdays

0100 Russia, Voice of: News. See S 0000.
0100 USA, VOA Washington DC (am/as/ca): VOA News. See S 0000.
0110 USA, VOA Washington DC (am/ca): Report to the Americas. See T 0010.
0110 USA, VOA Washington DC (as): VOA Saturday. See F 2310.
0111 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
0130 Russia, Voice of: News in Brief. See S 0030.
0132 Russia, Voice of: This is Russia. See S 0032.
0155 USA, VOA Washington DC (am/ca): VOA Editorial. See S 1457.

Hauser's Highlights

North Korea: Korean Central News Agency (KCNA)

English Broadcasts on RTTY F1B, 50 baud

0400-0600	Mon-Sat As 14568, 10580
	Mon-Sat Eu 15633, 11430
daily Am	12175, 11536
0800-1000	daily Af 14452, 11536
1000-1100	daily As 10580, 8512
1000-1200	daily Eu 15633, 11430
1230-1430	Mon-Sat Am 13580, 11536
	Mon-Sat Af 11476, 8020
1500-1700	Mon-Sat As 10580, 8020
	Mon-Sat Eu 13780, 9395

Also has fax, F3C mode, in English, Korean, Japanese, daily 2330-0000 and 0030-0100 to As 13580, 11476 (BBC Monitoring)

0200 UTC SHORTWAVE GUIDE 9:00 PM EST 6:00 PM PST

Frequencies

0200-0300 twhfa	Argentina, RAE	11710am			
0200-0300	Australia, Radio	9660pa	11640as	11695as	12080pa
		13605pa	13755pa	15240pa	15365pa
		15415as	17715as	17750pa	17795pa
		17880pa			
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	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			
0200-0259	Canada, R Canada Intl	6010am	6120ca	9535ca	9755na
		11715am	13670am		
0200-0300	Costa Rica,RF Peace Intl	6205am	7385am	15050am	
0200-0300	Cuba, Radio Havana	6000na	9820na	9830na	
0200-0300	Ecuador, HCJB	9745am	21455va		
0200-0300	Egypt, Radio Cairo	9475na			
0200-0250	Germany, Deutsche Welle	7285as	7355as	9640as	9690as
		11545as	11945as	11965as	
0200-0230	Hungary, Radio Budapest	9840na	11870na		
0200-0300 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0200-0300	Lebanon, Voice of Hope	9990va			
0200-0300 smtwh	Malaysia, Radio	7295do			
0200-0300 s/vl	Malta, VO Mediterranean	15550as	17570au		
0200-0300	Netherlands, Radio	5905as	7305as	9860as	11655as
0200-0300	New Zealand, R NZ Intl	15115pa			
0200-0300 vl	Papua New Guinea, NBC	9675do			
0200-0300	Philippines, FEBC/R Intl	15450as			
0200-0300	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		11940na			
0200-0300	Russia,Voice of Russia WS	7240na	12010na	12050na	13665na
		13790na	15580na		
0200-0300	Slovakia, Adv World Radio	11610as			
0200-0300	South Korea, R Korea Intl	7275am	11725am	11810am	15575am
0200-0300	Sri Lanka, Sri Lanka BC	15425as			
0200-0300	Taiwan, VO Free China	5950na	7130as	9680na	11740ca
		11825as	15345as		
0200-0300	United Kingdom, BBC WS	5970sa	5975va	6175va	7235va
		9410na	9560na	9590na	9605as
		9915sa	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, Voice of America	7115as	7205as	7651as	9635as
		11705as	11725as	15170as	15250as
		17740as	17820as		
0200-0300	USA, WEWN Birmingham AL	5825eu	7395na	7425na	
0200-0300	USA, WGTG McCaysville GA	6950am	9400am		
0200-0300	USA, WHRI Noblesville IN	5745am	7315am		
0200-0300	USA, WJCR Upton KY	7490na	13595na		
0200-0300 mtwhf	USA, WRMI/R Miami Intl	9955am			
0200-0300	USA, WRNO New Orleans LA	7355am			
0200-0300 mtwhf	USA, WVHA Greenbush ME	5850eu			
0200-0300	USA, WWCR Nashville TN	2390am	3215am	5065am	5935am
0200-0300	USA, WYFR Okeechobee FL	6065na	9505na		
0200-0226	Vietnam, Voice of	5940na			
0200-0230	Yugoslavia, Radio	6100na	7230na		
0215-0225	Nepal, Radio	7165do			
0230-0259	Austria, R Austria Intl	9655na	9870ca	13730sa	
0230-0245	Pakistan, Radio	7290as	15190as	15485as	17705as
0230-0300	Sweden, Radio	6090na			
0230-0256	Vietnam, Voice of	5940na			
0238-0255 1&3rd m	Denmark, R Denmark Intl	7465am	9560am		
0245-0300	Albania, R Tirana Intl	6140na	7160na		
0245-0300	India, All India Radio	3945do	6045do	7110do	11830do
		15135do			
0250-0300	Vatican State, Vatican R	6095na	7305na		
0250-0300	Zambia, ZNBC Radio 2	6165do			

Selected Programs

Sundays

0200 Russia, Voice of: News. See S 0000.
0200 USA, Monitor Radio Intl: Bible Lesson. Lesson-sermons from the King James Version of the Bible and Mary Baker Eddy's textbook.
0200 USA, VOA Washington DC (as): VOA News. See S 0000.
0200 USA, WJCR Upton KY: Gospel Music and Prayer. Old time religion.
0210 USA, VOA Washington DC (as): VOA Sunday. See F 2310.
0211 Russia, Voice of: Music and Musicians. World-famous performers and composers play for you.

Mondays

0200 Russia, Voice of: News. See S 0000.
0200 USA, Monitor Radio Intl: Sunday from the Mother Church. See S 2300.
0200 USA, VOA Washington DC (as): VOA News. See S 0000.
0200 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
0210 USA, VOA Washington DC (as): VOA Today. See S 2310.
0211 Russia, Voice of: Music and Musicians. See S 0211.

Tuesdays

0200 Russia, Voice of: News. See S 0000.
0200 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
0200 USA, VOA Washington DC (as): VOA News. See S 0000.
0200 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
0206 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
0210 USA, VOA Washington DC (as): VOA Today. See S 2310.
0211 Russia, Voice of: Commonwealth Update. See M 2311.
0230 Russia, Voice of: News in Brief. See S 0030.
0232 Russia, Voice of: Folk Box. See M 0032.
0249 USA, Monitor Radio Intl: Letterbox. See M 1249.
0252 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Wednesdays

0200 Russia, Voice of: News. See S 0000.
0200 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
0200 USA, VOA Washington DC (as): VOA News. See S 0000.
0200 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
0206 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
0210 USA, VOA Washington DC (as): VOA Today. See S 2310.
0211 Russia, Voice of: Commonwealth Update. See M 2311.
0230 Russia, Voice of: News in Brief. See S 0030.
0232 Russia, Voice of: Music at Your Request. See M 1232.
0249 USA, Monitor Radio Intl: Letterbox. See M 1249.
0252 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Thursdays

0200 Russia, Voice of: News. See S 0000.
0200 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
0200 USA, VOA Washington DC (as): VOA News. See S 0000.
0200 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
0206 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
0210 USA, VOA Washington DC (as): VOA Today. See S 2310.
0211 Russia, Voice of: Commonwealth Update. See M 2311.
0230 Russia, Voice of: News in Brief. See S 0030.
0232 Russia, Voice of: The Jazz Show. See M 0532.
0249 USA, Monitor Radio Intl: Letterbox. See M 1249.
0252 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Fridays

0200 Russia, Voice of: News. See S 0000.
0200 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
0200 USA, VOA Washington DC (as): VOA News. See S 0000.
0200 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
0206 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
0210 USA, VOA Washington DC (as): VOA Today. See S 2310.
0211 Russia, Voice of: Commonwealth Update. See M 2311.
0230 Russia, Voice of: News in Brief. See S 0030.
0232 Russia, Voice of: Music at Your Request. See M 1232.
0249 USA, Monitor Radio Intl: Letterbox. See M 1249.
0252 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Saturdays

0200 Russia, Voice of: News. See S 0000.
0200 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
0200 USA, VOA Washington DC (as): VOA News. See S 0000.
0200 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
0206 USA, Monitor Radio Intl: Christian Science Sentinel Radio Edition. Discussions on how the Bible addresses the trends of thought of today.
0210 USA, VOA Washington DC (as): VOA Saturday. See F 2310.
0211 Russia, Voice of: Commonwealth Update. See M 2311.
0230 Russia, Voice of: News in Brief. See S 0030.
0232 Russia, Voice of: The Jazz Show. See M 0532.

Frequencies

0300-0400	Australia, Radio	9660pa	11640as	12080pa	13605pa
		13755pa	15240pa	15365pa	15415as
		15510as	17715as	17750pa	17795pa
		17880pa			
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			
0300-0400	China, China Radio Intl	9690na	9710na	11695na	
0300-0400 vl	Costa Rica,Faro del Carib	5055do			
0300-0400	Costa Rica,RF Peace Intl	6205am	7385am	15050am	
0300-0400	Cuba, Radio Havana	6000na	9820na	9830na	
0300-0327	Czech Rep, Radio Prague	5930na	7345na		
0300-0400	Ecuador, HCJB	9745am	21455va		
0300-0330	Egypt, Radio Cairo	9475na			
0300-0350	Germany, Deutsche Welle	6085na	6185na	9535na	9615na
		9640na			
0300-0400	Guatemala, Radio Cultural	3300do			
0300-0400	Japan, NHK/Radio	11790na	11840as	15230na	17810as
0300-0400 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0300-0400	Lebanon, Voice of Hope	9990va			
0300-0400 s/vl	Malta, VO Mediterranean	15550as	17570au		
0300-0330	Mexico, Radio Mexico Intl	5985na	9705na		
0300-0325	Netherlands, Radio	5905as	7305as	9860as	11655as
0300-0400	New Zealand, R NZ Intl	15115pa			
0300-0330 m	Norway, Radio Norway Intl	7520na			
0300-0400 vl	Papua New Guinea, NBC	9675do			
0300-0400	Russia,Voice of Russia WS	7240na	12010na	12050na	13645na
		13665na	13790na	15580na	
0300-0400	S Africa, Channel Africa	3220af	5955af		
0300-0400	Sri Lanka, Sri Lanka BC	15425as			
0300-0400	Taiwan, VO Free China	5950na	9680na	11745as	11825as
		15345as			
0300-0330	Thailand, Radio	15370na			
0300-0315 mtwhf	Uganda, Radio	3340do			
0300-0330	United Kingdom, BBC WS	5970sa	6135af	7235va	7325sa
		15360as			
0300-0400	United Kingdom, BBC WS	3255af	3955eu	5975va	6005af
		6175va	6190af	6195eu	9410na
		9600af	9605as	9895va	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, KVOH Los Angeles CA	9975am			
0300-0400	USA, KWHR Naalehu HI	17510au			
0300-0400	USA, Monitor Radio Intl	5850na	7535af		
0300-0400	USA, Voice of America	5980af	6035af	6080af	6115af
		7105af	7280af	7290af	7340af
		7405af	7415af	9575af	9775af
		9885af			
0300-0330 smtwh	USA, Voice of America	4750af			
0300-0400	USA, WEWN Birmingham AL	5825eu	6890na	7425na	
0300-0400	USA, WGTG McCaysville GA	6950am	9400am		
0300-0400	USA, WHRI Noblesville IN	5745am	7315am		
0300-0400	USA, WJCR Upton KY	7490na	13595na		
0300-0400	USA, WRNO New Orleans LA	7395am			
0300-0400	USA, WWCR Nashville TN	2390am	3215am	5065am	5935am
0300-0400	USA, WYFR Okeechobee FL	6065na	9505na		
0300-0310	Vatican State, Vatican R	6095na	7305na		
0300-0400 mtwhfa	Zambia, ZNBC Radio 2	6165do			
0300-0400 vl	Zimbabwe, Zimbabwe BC	3396do			
0315-0330 s	Greece, Voice of	6125na	7448na	9420na	
0320-0350	Vatican State, Vatican R	7360af	9660af		
0330-0400	Albania, R Tirana Intl	6140na	7160na		
0330-0357	Czech Rep, Radio Prague	9480as			
0330-0400	Hungary, Radio Budapest	9840na	11870na		
0330-0355 mtwhf	Moldova, R Moldova Intl	7520na			
0330-0400 vl	Philippines, R Pilipinas	13770as	15330na	17730as	
0330-0400 twhfa	Portugal, R Portugal Intl	6150am	9570am		
0330-0400	Slovakia, Adv World Radio	9465af			
0330-0400	Sweden, Radio	7115na			
0330-0353	UAE, Radio Dubai	13675na	15395eu	21605na	
0330-0400	United Kingdom, BBC WS	9610af	11730af	11955as	15280as
0335-0355 vl	India, All India Radio	7110do	11930do	15135do	
0338-0355 1&3rd m	Denmark, R Denmark Intl	7165am	7465am	9565am	
0340-0350	Greece, Voice of	6125na	7448na	9420na	
0345-0400 irreg	Burundi, Radio Nationale	6140do			
0345-0400 as	Uganda, Radio	3340do			
0356-0400	Zambia, Christian Voice	3330af			

Selected Programs

Sundays

0300 Russia, Voice of: News. See S 0000.
0300 USA, VOA Washington DC (af): VOA News. See S 0000.
0310 USA, VOA Washington DC (af): VOA Sunday. See F 2310.
0311 Russia, Voice of: Moscow Mailbag. See S 0111.
0330 Russia, Voice of: News in Brief. See S 0030.
0332 Russia, Voice of: Your Top Tune. Win a prize by guessing which song of the three is the most popular.
0347 Russia, Voice of: You Write to Moscow. Listener letters are read, questions answered, and program announcements given.

Mondays

0300 Russia, Voice of: News. See S 0000.
0300 USA, VOA Washington DC (af): Daybreak Africa. Magazine program of African news, sports, features, and correspondent reports.
0301 USA, VOA Washington DC (af): Africa News. News from and about the African continent.
0311 Russia, Voice of: Moscow Mailbag. See S 0111.
0330 Russia, Voice of: News in Brief. See S 0030.
0330 USA, VOA Washington DC (af): News (Special English). See S 0030.
0332 Russia, Voice of: Timelines. Estelle Winters hosts a variety program with an upbeat flair and an insight into Moscow life.
0340 USA, VOA Washington DC (af): Development Report (Special English). See M 0040.
0345 USA, VOA Washington DC (af): This Is America (Special English). See M 0045.

Tuesdays

0300 Russia, Voice of: News. See S 0000.
0300 USA, VOA Washington DC (af): Daybreak Africa. See M 0300.
0301 USA, VOA Washington DC (af): Africa News. See M 0301.
0311 Russia, Voice of: Moscow Mailbag. See S 0111.
0330 Russia, Voice of: News in Brief. See S 0030.
0330 USA, VOA Washington DC (af): News (Special English). See S 0030.
0332 Russia, Voice of: Kaleidoscope. See S 1132.
0340 USA, VOA Washington DC (af): Agriculture Report (Special English). See T 0040.
0345 USA, VOA Washington DC (af): Science in the News (Special English). See T 0045.

Wednesdays

0300 Russia, Voice of: News. See S 0000.
0300 USA, VOA Washington DC (af): Daybreak Africa. See M 0300.
0301 USA, VOA Washington DC (af): Africa News. See M 0301.
0311 Russia, Voice of: Science and Engineering In the CIS. See S 0611.
0330 Russia, Voice of: News in Brief. See S 0030.
0330 USA, VOA Washington DC (af): News (Special English). See S 0030.
0332 Russia, Voice of: Your Top Tune. See S 0332.
0340 USA, VOA Washington DC (af): Science Report (Special English). See M 1110.
0345 USA, VOA Washington DC (af): Exploration (Special English). See W 0045.
0347 Russia, Voice of: You Write to Moscow. See S 0347.

Thursdays

0300 Russia, Voice of: News. See S 0000.
0300 USA, VOA Washington DC (af): Daybreak Africa. See M 0300.
0301 USA, VOA Washington DC (af): Africa News. See M 0301.
0311 Russia, Voice of: Moscow Mailbag. See S 0111.
0330 Russia, Voice of: News in Brief. See S 0030.
0330 USA, VOA Washington DC (af): News (Special English). See S 0030.
0332 Russia, Voice of: Audio Book Club. See S 0132.
0340 USA, VOA Washington DC (af): Science Report (Special English). See M 1110.
0345 USA, VOA Washington DC (af): The Making of a Nation (Special English). See H 0045.

Fridays

0300 Russia, Voice of: News. See S 0000.
0300 USA, VOA Washington DC (af): Daybreak Africa. See M 0300.
0301 USA, VOA Washington DC (af): Africa News. See M 0301.
0311 Russia, Voice of: Moscow Mailbag. See S 0111.
0330 Russia, Voice of: News in Brief. See S 0030.
0330 USA, VOA Washington DC (af): News (Special English). See S 0030.
0332 Russia, Voice of: Russian by Radio. See M 0132.
0340 USA, VOA Washington DC (af): Environment Report (Special English). See F 0040.
0345 USA, VOA Washington DC (af): American Mosaic (Special English). See F 0045.

Saturdays

0300 Russia, Voice of: News. See S 0000.
0300 USA, VOA Washington DC (af): VOA News. See S 0000.
0310 USA, VOA Washington DC (af): VOA Saturday. See F 2310.
0311 Russia, Voice of: Moscow Mailbag. See S 0111.
0330 Russia, Voice of: News in Brief. See S 0030.
0332 Russia, Voice of: Audio Book Club. See S 0132.

0400 UTC SHORTWAVE GUIDE 11:00 M EST 8:00 PM PST

Frequencies

0400-0500	Australia, Radio	9660pa	11880pa	12080pa	13605as
		15240pa	15365pa	15415as	15510as
		17750as	17795pa	17880pa	
0400-0500 as	Australia, Radio	11640as			
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, R Canada Intl	11835me	11905me	15275me	
0400-0500	China, China Radio Intl	9560na	9730na		
0400-0500	Costa Rica,RF Peace Intl	6205am	7385am	15050am	
0400-0500	Cuba, Radio Havana	6000na	6180na	9820na	9830na
0400-0500	Ecuador, HCJB	9745am	21455va		
0400-0450	Germany, Deutsche Welle	5990af	6015af	6185af	7150af
		7225af	9565af	11765af	
0400-0500 twhfa	Guatemala, Radio Cultural	3300do			
0400-0500 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0400-0500	Lebanon, Voice of Hope	9990va			
0400-0430 s/vl	Malta, VO Mediterranean	15550as	17570au		
0400-0430 vl/m-a	Mexico, Radio Mexico Intl	5985na	9705na		
0400-0458	New Zealand, R NZ Intl	15115pa			
0400-0450	North Korea, R Pyongyang	15180as	15230as	17765as	
0400-0430 m	Norway, Radio Norway Intl	7520na			
0400-0500 vl	Papua New Guinea, NBC	9675do			
0400-0500	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		11940na			
0400-0500	Russia,Voice of Russia WS	12050na	13645na	13790na	15580na
0400-0455	S Africa, Channel Africa	3220af	5955af		
0400-0427	S Africa, Trans World R	7165af			
0400-0430	Slovakia, Adv World Radio	11600af			
0400-0430	Sri Lanka, Sri Lanka BC	15425as			
0400-0430	Switzerland, Swiss R Intl	6135na	9885na	9905na	
0400-0430	Tanzania, Radio	5050af			
0400-0450	Turkey, Voice of	9655na	9685eu	17705eu	
0400-0415	Uganda, Radio	5026do			
0400-0500	Ukraine, R Ukraine Intl	7150na	9550na		
0400-0500	United Kingdom, BBC WS	3255af	3955eu	5975af	6005af
		6175va	6180eu	6195eu	7160af
		9410af	9600af	11760va	11955as
		12095af	15280as		
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	17780as			
0400-0500	USA, Monitor Radio Intl	7535eu	9840af		
0400-0500	USA, Voice of America	6080af	7170va	7180af	7265af
		7280af	7405af	9575af	11965va
0400-0430	USA, Voice of America	6145af	7340af		
0400-0500	USA, WEWN Birmingham AL	5825eu	6890na	7425na	
0400-0500	USA, WGTG McCaysville GA	6950am	9400am		
0400-0500	USA, WHRI Noblesville IN	5760am	7315am		
0400-0500	USA, WJCR Upton KY	7490na	13595na		
0400-0500 smtwhf	USA, WMLK Bethel PA	9465eu			
0400-0430 a	USA, WRMI/R Miami INtl	9955am			
0400-0500	USA, WRNO New Orleans LA	7395am			
0400-0500	USA, WWCR Nashville TN	2390am	3215am	5065am	5935am
0400-0500	USA, WYFR Okeechobee FL	9985af			
0400-0445	USA, WYFR Okeechobee FL	6065na	9505na		
0400-0430	Vietnam, Voice of	5940na	7270na	7400na	9840na
		12020na	15010na		
0400-0500	Zambia, Christian Voice	3330af			
0400-0410	Zambia, ZNBC Radio 2	6165do			
0400-0500 vl	Zimbabwe, Zimbabwe BC	3396do			
0415-0440 vl	Italy, RAI Intl	5975eu	7275eu		
0425-0500	Nigeria, FRCN/Radio	3326do	4990do		
0430-0500	Australia,DefenseForces R	13525as			
0430-0455	Moldova, R Moldova Intl	7520eu			
0430-0500	Netherlands, Radio	6165na	9590na		
0430-0500	Swaziland, Trans World R	3200af	4775af	6070af	
0430-0500	Switzerland, Swiss R Intl	9905na			
0430-0500	United Kingdom, BBC WS	7150eu	15420af		
0430-0500	USA, Voice of America	5970af			
0438-0455 1&3rd s	Denmark, R Denmark Intl	7520na	9565na	13805na	
0440-0500	Russia,Voice of Russia WS	7270na	9825na		
0459-0500	New Zealand, R NZ Intl	11905pa			

Selected Programs

Sundays

0400 Russia, Voice of: News. See S 0000.
0400 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0410 USA, VOA Washington DC (af/eu): VOA Sunday. See F 2310.
0411 Russia, Voice of: News and Views. See S 0011.
0430 Russia, Voice of: News in Brief. See S 0030.
0432 Russia, Voice of: Music. Music as selected by Radio Moscow staff.

Mondays

0400 Russia, Voice of: News. See S 0000.
0400 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0410 USA, VOA Washington DC (af/eu): VOA Business Report. See M 0010.
0411 Russia, Voice of: News and Views. See S 0011.
0430 Russia, Voice of: News in Brief. See S 0030.
0430 USA, VOA Washington DC (af): Daybreak Africa. See M 0300.
0430 USA, VOA Washington DC (eu): Stateside. Issues and personalities, science and politics, sports and entertainment inside America.
0431 USA, VOA Washington DC (af): Africa News. See M 0301.
0432 Russia, Voice of: Music. See S 0432.

Tuesdays

0400 Russia, Voice of: News. See S 0000.
0400 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0410 USA, VOA Washington DC (af/eu): VOA Business Report. See M 0010.
0411 Russia, Voice of: News and Views. See S 0011.
0430 Russia, Voice of: News in Brief. See S 0030.
0430 USA, VOA Washington DC (af): Daybreak Africa. See M 0300.
0430 USA, VOA Washington DC (eu): Stateside. See M 0430.
0431 USA, VOA Washington DC (af): Africa News. See M 0301.
0432 Russia, Voice of: Our Treasure Chest. No information available.

Wednesdays

0400 Russia, Voice of: News. See S 0000.
0400 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0410 USA, VOA Washington DC (af/eu): VOA Business Report. See M 0010.
0411 Russia, Voice of: News and Views. See S 0011.
0430 Russia, Voice of: News in Brief. See S 0030.
0430 USA, VOA Washington DC (af): Daybreak Africa. See M 0300.
0430 USA, VOA Washington DC (eu): Stateside. See M 0430.
0431 USA, VOA Washington DC (af): Africa News. See M 0301.
0432 Russia, Voice of: Our Treasure Chest. See T 0432.

Thursdays

0400 Russia, Voice of: News. See S 0000.
0400 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0410 USA, VOA Washington DC (af/eu): VOA Business Report. See M 0010.
0411 Russia, Voice of: News and Views. See S 0011.
0430 Russia, Voice of: News in Brief. See S 0030.
0430 USA, VOA Washington DC (af): Daybreak Africa. See M 0300.
0430 USA, VOA Washington DC (eu): Stateside. See M 0430.
0431 USA, VOA Washington DC (af): Africa News. See M 0301.
0432 Russia, Voice of: Audio Book Club. See S 0132.

Fridays

0400 Russia, Voice of: News. See S 0000.
0400 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0410 USA, VOA Washington DC (af/eu): VOA Business Report. See M 0010.
0411 Russia, Voice of: News and Views. See S 0011.
0430 Russia, Voice of: News in Brief. See S 0030.
0430 USA, VOA Washington DC (af): Daybreak Africa. See M 0300.
0430 USA, VOA Washington DC (eu): Stateside. See M 0430.
0431 USA, VOA Washington DC (af): Africa News. See M 0301.
0432 Russia, Voice of: Culture and the Arts. An overview of a Russian cultural activity.

Saturdays

0400 Russia, Voice of: News. See S 0000.
0400 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0410 USA, VOA Washington DC (af/eu): VOA Saturday. See F 2310.
0411 Russia, Voice of: News and Views. See S 0011.
0430 Russia, Voice of: News in Brief. See S 0030.
0432 Russia, Voice of: Russian History. A look back at a significant event in Russia's past.

Radio Programs

(Continued from page 43)

0909 HCJB (pac): "DX Partyline"
0940 FEBC (Philippines): "DX Dial"
0940 KTWR (Guam): "Pacific DX Report"
1030 Voice of America (as pac): "Communications World"
1100 Radio For Peace Intl: "World of Radio"
1230 WWCR #4 (Tennessee): "World of Radio"
1230 Voice of America (as pac): "Communications World"
1300 WHRI (Angel 2): "DXing with Cumbre"
1315 Radio Bulgaria: "Radio Bulgaria Calling"
1342 Radio Tashkent: "Radio Tashkent DX Program"
1345 Voice of Turkey: "DX Corner" (biweekly)
1349 Radio Romania Intl: "DX Mailbag"
1519 Radio Romania Intl: "DX Mailbag"
1730 Voice of America (af/as/me): "Communications World"
1730 WHRI (Angel 1): "DXing with Cumbre"
1800 Radio For Peace Intl: "World of Radio"
1909 HCJB (eu): "DX Partyline"
1949 Radio Romania Intl: "DX Mailbag"
1958 Vatican Radio: "On-the-Air"
2015 Voice of Turkey: "DX Corner" (biweekly)
2030 Australia, Radio: "The Media Report"
2045 Radio Onestr: "DX Herald" (16th)
2130 Voice of America (me): "Communications World"
2131 Radio Exterior de Espana: "Distance Unknown"
2136 Radio Havana Cuba: "DXers Unlimited"
2149 Radio Romania Intl: "DX Mailbag"
2215 Radio Budapest Intl: "DX Show"
2230 WHRI (Angel 1): "DXing with Cumbre"
2236 Radio Havana Cuba: "DXers Unlimited"
2300 Vatican Radio: "On-the-Air"
2300 KSDA (Guam): "Wavescan"
2315 Voice of Turkey: "DX Corner" (biweekly)
2330 WRMI (Florida): "Wavescan"

FREQUENCIES

0500-0600	Australia, Radio	9660pa	11880pa	12080pa	13605as
		15240pa	15365pa	17715pa	17795pa
		17880pa			
0500-0600 as	Australia, Radio	11640as			
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	9700na	11720na		
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			
0500-0529 mtwhfa	Canada, R Canada Intl	6050eu	7295va	15430af	17840va
0500-0600	China, China Radio Intl	9560na			
0500-0600	Costa Rica, Adv World R	5030ca	6150ca	9725ca	
0500-0600	Costa Rica,RF Peace Intl	6205am	7385am		
0500-0600	Cuba, Radio Havana	9820na	9830na		
0500-0600	Ecuador, HCJB	9745am	21455va		
0500-0550	Germany, Deutsche Welle	5960na	6045na	6185na	9515na
0500-0515	Israel, Kol Israel	7465na	9435na	17545au	
0500-0600	Japan, NHK/Radio	6110na	7230eu	11725as	11740as
		11920na	17810as		
0500-0530	Japan, NHK/Radio	11885na	11895na	15230na	
0500-0600 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0500-0600	Lebanon, Voice of Hope	9990va			
0500-0510 mtwhf	Malawi, MBC	3380do			
0500-0525	Netherlands, Radio	6165na	9590na		
0500-0600	New Zealand, R NZ Intl	11905pa			
0500-0505	Nigeria, FRCN/Radio	3326do	4990do		
0500-0600 vl	Papua New Guinea, NBC	9675do			
0500-0600	Russia,Voice of Russia WS	9895na	13790na	15580na	
0500-0555	S Africa, Channel Africa	5955af	9675af		
0500-0600	Slovakia, Adv World Radio	7215eu			
0500-0556	Spain, R Exterior Espana	6055na			
0500-0600	Swaziland, Trans World R	6070af			
0500-0515	Uganda, Radio	3340do			
0500-0600	United Kingdom, BBC WS	3255af	3955eu	5975va	6005af
		6175va	6195eu	7160af	9410va
		9600af	9640va	9740as	11760va
		11955as	15280as	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	17780as			
0500-0600	USA, Monitor Radio Intl	7535eu			
0500-0600	USA, Voice of America	5970af	6035af	6080af	7170va
		7195af	7295af	9775af	9885af
		11675af	11965va	15205va	
0500-0600	USA, WEWN Birmingham AL	5825eu	7395na	7425na	
0500-0600	USA, WHRI Noblesville IN	5760am	7315am		
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	2390am	3210am	5065am	5935am
0500-0600	USA, WYFR Okeechobee FL	5985na	7355eu	9985eu	11580af
0500-0530	Vatican State, Vatican R	9660af	11625af	15570af	
0500-0600	Zambia, Christian Voice	3330af			
0500-0510	Zambia, ZNBC Radio 1	7220do			
0500-0510	Zambia, ZNBC Radio 2	6165do			
0500-0530 vl	Zimbabwe, Zimbabwe BC	3396do			
0505-0600	Swaziland, Trans World R	3200af	5055af	9500af	
0525-0600	Ghana, Ghana Broadc Corp	3366do	4915do		
0530-0559	Austria, R Austria Intl	6015na			
0530-0600	Romania, R Romania Intl	11810af	11940af	15270af	15340af
		17790af			
0530-0600	Russia,Voice of Russia WS	7345na	9895na		
0530-0600	Slovakia, Adv World Radio	11600eu			
0530-0600	Thailand, Radio	9655eu	11905eu	15115eu	
0530-0600 a	USA, WRMI/R Miami Intl	9955am			
0530-0600 vl	Zimbabwe, Zimbabwe BC	5975do			
0538-0555 1&3rd s	Denmark, R Denmark Intl	7465va	13805va		
0555-0600	Malaysia, Voice of	6175as	9750as	15295au	

SELECTED PROGRAMS

Sundays

0500 Russia, Voice of: News. See S 0000.
0500 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0500 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
0510 USA, VOA Washington DC (af/eu): VOA Sunday. See F 2310.
0511 Russia, Voice of: Program Preview. A review of programs to be featured in the coming week.
0530 Russia, Voice of: News in Brief. See S 0030.
0532 Russia, Voice of: Moscow Yesterday and Today. Sit back and enjoy a great program about Russian history with magnificent sound effects.

Mondays

0500 Russia, Voice of: News. See S 0000.
0500 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0500 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
0510 USA, VOA Washington DC (af/eu): VOA Today. See S 2310.
0511 Russia, Voice of: Program Preview. See S 0511.
0530 Russia, Voice of: News in Brief. See S 0030.
0532 Russia, Voice of: The Jazz Show. The world of Russian jazz.

Tuesdays

0500 Russia, Voice of: News. See S 0000.
0500 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
0500 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0500 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
0506 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
0510 USA, VOA Washington DC (af/eu): VOA Today. See S 2310.
0511 Russia, Voice of: Commonwealth Update. See M 2311.
0530 Russia, Voice of: News in Brief. See S 0030.
0532 Russia, Voice of: Yours for the Asking. See T 0032.
0549 USA, Monitor Radio Intl: Letterbox. See M 1249.
0552 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Wednesdays

0500 Russia, Voice of: News. See S 0000.
0500 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
0500 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0500 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
0506 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
0510 USA, VOA Washington DC (af/eu): VOA Today. See S 2310.
0511 Russia, Voice of: Commonwealth Update. See M 2311.
0530 Russia, Voice of: News in Brief. See S 0030.
0532 Russia, Voice of: Music at Your Request. See M 1232.
0549 USA, Monitor Radio Intl: Letterbox. See M 1249.
0552 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Thursdays

0500 Russia, Voice of: News. See S 0000.
0500 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
0500 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0500 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
0506 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
0510 USA, VOA Washington DC (af/eu): VOA Today. See S 2310.
0511 Russia, Voice of: Commonwealth Update. See M 2311.
0530 Russia, Voice of: News in Brief. See S 0030.
0532 Russia, Voice of: Folk Box. See M 0032.
0549 USA, Monitor Radio Intl: Letterbox. See M 1249.
0552 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Fridays

0500 Russia, Voice of: News. See S 0000.
0500 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
0500 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0500 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
0506 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
0510 USA, VOA Washington DC (af/eu): VOA Today. See S 2310.
0511 Russia, Voice of: Commonwealth Update. See M 2311.
0530 Russia, Voice of: News in Brief. See S 0030.
0532 Russia, Voice of: Kaleidoscope. See S 1132.
0549 USA, Monitor Radio Intl: Letterbox. See M 1249.
0552 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Saturdays

0500 Russia, Voice of: News. See S 0000.
0500 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0500 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
0510 USA, VOA Washington DC (af/eu): VOA Saturday. See F 2310.
0511 Russia, Voice of: Commonwealth Update. See M 2311.
0530 Russia, Voice of: News in Brief. See S 0030.
0532 Russia, Voice of: Timelines. See M 0332.

0600 UTC SHORTWAVE GUIDE 1:00 AM EST 10:00 PM PST

Frequencies

0600-0700	Australia, Radio	9660pa	9860pa	11880pa	12080pa
		13605as	15240pa	15365pa	15415as
		15530as	17715as	17880pa	
0600-0700 vl	Australia, VL8A ALice Spg	2310do			
0600-0700 vl	Australia, VL8K Katherine	5025do			
0600-0700 vl	Australia, VL8T Tent Crk	4910do			
0600-0633	Australia,DefenseForces R	13525as			
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			
0600-0700	Costa Rica,RF Peace Intl	7385am	15050am		
0600-0700	Cuba, Radio Havana	9820na	9830na		
0600-0700	Ecuador, HCJB	9745am	21455am		
0600-0650	Germany, Deutsche Welle	11915af	13790af	15185af	15225af
		17875af			
0600-0615	Ghana, Ghana Broadc Corp	3366do	4915do		
0600-0700 vl	Italy, IRRS	3985va			
0600-0700	Japan, NHK/Radio	11725as	11850au	17810as	
0600-0700 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0600-0700 vl	Kiribati, Radio	9825do			
0600-0700	Lebanon, Voice of Hope	9990va			
0600-0700	Malaysia, Voice of	6175as	9750as	15295au	
0600-0700	New Zealand, R NZ Intl	11905pa			
0600-0630	Nigeria, FRCN/Radio	3326do	4990do		
0600-0700	North Korea, R Pyongyang	15180as	15230as		
0600-0630 s	Norway, Radio Norway Intl	7180au	7295af	9590au	
0600-0700 vl	Papua New Guinea, NBC	9675do			
0600-0645 vl	Romania, R Romania Intl	9550eu	9665eu	11815eu	
0600-0700	Russia,Voice of Russia WS	7175na	7270na	7345na	9825na
		15470as	15580na		
0600-0700	S Africa, Trans World R	11730af			
0600-0610	Sierra Leone, SLBS	3316do			
0600-0630	Slovakia, Adv World Radio	13715af			
0600-0700	Slovakia, Adv World Radio	5905am			
0600-0630 vl	Solomon Islands, SIBC	5020do	9545do		
0600-0700	Swaziland, Trans World R	11730af			
0600-0630	Switzerland, Swiss R Intl	9885af	11860af	13635af	
0600-0700	United Kingdom, BBC WS	3955eu	5975va	6175eu	6195eu
		7145pa	7160af	9410eu	9600af
		9640af	9740as	11760eu	11955as
		12095as	15280as	15310as	15360va
		15420af	15575va	17640af	17790as
0600-0700	USA, KAIJ Dallas TX	5810am	9815am		
0600-0700	USA, KTBN Salt Lk City UT	7510am			
0600-0700	USA, KVOH Los Angeles CA	9975am			
0600-0700	USA, KWHR Naalehu HI	17780as			
0600-0700	USA, Monitor Radio Intl	7535eu			
0600-0700	USA, Voice of America	5970af	6035af	6140af	7195af
		9630af	11805af	11950af	11965af
		12080af	15205af		
0600-0630	USA, Voice of America	6080af	9435af		
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, WRNO New Orleans LA	7355am			
0600-0700	USA, WWCR Nashville TN	2390am	3210am	5065am	5935am
0600-0700	USA, WYFR Okeechobee FL	5985eu	7355eu	9985af	
0600-0620	Vatican State, Vatican R	5880eu	7250eu		
0600-0645 vl/m-f	Vatican State, vatican R	15215me			
0600-0630	Vietnam, Voice of	5925as	10060as		
0600-0700	Yemen, Yemeni Rep Radio	9780do			
0600-0700	Zambia, Christian Voice	3330af			
0600-0605 mtwhfa	Zambia, ZNBC Radio 1	7220do			
0600-0630	Zambia, ZNBC Radio 2	6165do			
0600-0700 vl	Zimbabwe, Zimbabwe BC	5975do			
0605-0700	Swaziland, Trans World R	5055af	6070af	9500af	9650af
0615-0630	Switzerland, Swiss R Intl	6165eu	9535eu		
0630-0655	Austria, R Austria Intl	6015na			
0630-0639	Kazakhstan, R Alma Ata	11705eu			
0630-0700 as	USA, Voice of America	6080af			
0630-0700	Vatican State, Vatican R	11625af	13765af	15570af	
0638-0655 1&3rd s	Denmark, R Denmark Intl	7180va	7295va	9590va	13805va
0645-0700	Romania, R Romania Intl	11740pa	11840pa	15250pa	15270pa
		17720pa			

Selected Programs

Sundays

0600 Russia, Voice of: News. See S 0000.
0600 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0600 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
0610 USA, VOA Washington DC (af/eu): VOA Sunday. See F 2310.
0611 Russia, Voice of: Science and Engineering in the CIS. The latest developments in science and technology.
0630 Russia, Voice of: News in Brief. See S 0030.
0630 USA, WJCR Upton KY: Dr. Stan Weisbrod. Inspiration and music from Upton, Kentucky.
0632 Russia, Voice of: This is Russia. See S 0032.

Mondays

0600 Russia, Voice of: News. See S 0000.
0600 USA, VOA Washington DC (af): Daybreak Africa. See M 0300.
0600 USA, VOA Washington DC (eu): VOA News. See S 0000.
0600 USA, WJCR Upton KY: Prayer Line. Prayers are dedicated to listeners' requests.
0601 USA, VOA Washington DC (af): Africa News. See M 0301.
0610 USA, VOA Washington DC (eu): VOA Today. See S 2310.
0611 Russia, Voice of: Moscow Mailbag. See S 0111.
0630 Russia, Voice of: News in Brief. See S 0030.
0632 Russia, Voice of: This is Russia. See S 0032.

Tuesdays

0600 Russia, Voice of: News. See S 0000.
0600 USA, VOA Washington DC (af): Daybreak Africa. See M 0300.
0600 USA, VOA Washington DC (eu): VOA News. See S 0000.
0600 USA, WJCR Upton KY: Prayer Line. See M 0600.
0601 USA, VOA Washington DC (af): Africa News. See M 0301.
0610 USA, VOA Washington DC (eu): VOA Today. See S 2310.
0611 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
0630 Russia, Voice of: News in Brief. See S 0030.
0632 Russia, Voice of: Moscow Yesterday and Today. See S 0532.

Wednesdays

0600 Russia, Voice of: News. See S 0000.
0600 USA, VOA Washington DC (af): Daybreak Africa. See M 0300.
0600 USA, VOA Washington DC (eu): VOA News. See S 0000.
0600 USA, WJCR Upton KY: Prayer Line. See M 0600.
0601 USA, VOA Washington DC (af): Africa News. See M 0301.
0610 USA, VOA Washington DC (eu): VOA Today. See S 2310.
0611 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
0630 Russia, Voice of: News in Brief. See S 0030.
0632 Russia, Voice of: This is Russia. See S 0032.

Thursdays

0600 Russia, Voice of: News. See S 0000.
0600 USA, VOA Washington DC (af): Daybreak Africa. See M 0300.
0600 USA, VOA Washington DC (eu): VOA News. See S 0000.
0600 USA, WJCR Upton KY: Prayer Line. See M 0600.
0601 USA, VOA Washington DC (af): Africa News. See M 0301.
0610 USA, VOA Washington DC (eu): VOA Today. See S 2310.
0611 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
0630 Russia, Voice of: News in Brief. See S 0030.
0632 Russia, Voice of: Moscow Yesterday and Today. See S 0532.

Fridays

0600 Russia, Voice of: News. See S 0000.
0600 USA, VOA Washington DC (af): Daybreak Africa. See M 0300.
0600 USA, VOA Washington DC (eu): VOA News. See S 0000.
0600 USA, WJCR Upton KY: Prayer Line. See M 0600.
0601 USA, VOA Washington DC (af): Africa News. See M 0301.
0610 USA, VOA Washington DC (eu): VOA Today. See S 2310.
0611 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
0630 Russia, Voice of: News in Brief. See S 0030.
0632 Russia, Voice of: This is Russia. See S 0032.

Saturdays

0600 Russia, Voice of: News. See S 0000.
0600 USA, VOA Washington DC (af/eu): VOA News. See S 0000.
0600 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
0610 USA, VOA Washington DC (af/eu): VOA Saturday. See F 2310.
0611 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
0630 Russia, Voice of: News in Brief. See S 0030.
0632 Russia, Voice of: Moscow Yesterday and Today. See S 0532.

New VOA Programs Launched

At 0000 UTC Sept 29 the VOA launched a new, 24-hour-a-day global English-language satellite network which will provide programming to local affiliate broadcasters and satellite listeners around the world.

A few of the eight new programs to be introduced are *Studio 38*, a lively look at life in the U.S.; *VOA Worldwide*, an in-depth hour featuring news analysis and opinion; two area-specific news half-hours; a music program called *Border Crossings*, which will invite listeners' telephone calls; and an English teaching program called *All About English*.

George Mackenzie of VOA provided us with the times these programs will be aired on shortwave. We have not placed them into this month's "Selected Programming," since we don't know if they replace current programming in all cases. Check VOA frequencies for these new programs, all Mon thru Fri except for the first entry:

American Agenda	Sat 1510, 1710 UTC
Mideast Edition	1606
Europe Edition	1906
VOA Today	1010
VOA Worldwide	2310, 0210, 0610
Studio 38	0330, 0430
All About English	1310, 1510, 1810
Border Crossings	2010

FREQUENCIES

0700-0800	Australia, Radio	9580pa	9660pa	9710as	9860pa
		12080pa	15240pa	15365pa	15415as
		15530as	17715pa	17880as	
0700-0800 as	Australia, Radio	11640as			
0700-0800 vl	Australia, VL8A Alice Spg	2310do			
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	15050am		
0700-0727	Czech Rep, Radio Prague	7345eu	9530eu		
0700-0800	Ecuador, HCJB	9445pa	11615eu	21455au	
0700-0800 as	Eqt Guinea, R East Africa	15186af			
0700-0800 mtwhf	Eqt Guinea, Radio Africa	15186af			
0700-0715	Ghana, Ghana Broadc Corp	3366do	4915do		
0700-0800 vl	Italy, IRRS	3985va			
0700-0800	Japan, NHK/Radio	7230eu	11725as	11740as	11850pa
		11920as	15165me	17810va	17815af
		21610as			
0700-0800 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0700-0800 vl	Kiribati, Radio	9825do			
0700-0800	Lebanon, Voice of Hope	9990va			
0700-0800 asmtwh	Malaysia, Radio	7295do			
0700-0800	Malaysia, Voice of	9750as	15295au		
0700-0710	Malaysia, Voice of	6175as			
0700-0715 mtwhf	New Zealand, R NZ Intl	11905pa			
0700-0758 as	New Zealand, R NZ Intl	11905pa			
0700-0750	North Korea, R Pyongyang	15340af	17765me		
0700-0745	Romania, R Romania Intl	11740pa	11840pa	15250pa	15270pa
		17720pa			
0700-0800	Russia,Voice of Russia WS	7175as	7270as	7345as	9895as
		15470as	15490as		
0700-0710	Sierra Leone, SLBS	3316do			
0700-0800 vl	Solomon Islands, SIBC	5020do	9545do		
0700-0800	Taiwan, VO Free China	5950na			
0700-0800	United Kingdom, BBC WS	3955eu	6175eu	6190af	6195eu
		7145va	7325eu	9410eu	9600af
		9640va	9740as	11760as	11940af
		11955as	12095va	15280as	15310as
		15360va	15400va	15575me	17640va
	17790as	17830af	17885af		
0700-0730	United Kingdom, BBC WS	6180eu	11780eu		
0700-0715	United Kingdom, BBC WS	6005af	7160af		
0700-0800	USA, KAIJ Dallas TX	5810am	9815am		
0700-0800	USA, KTBN Salt Lk City UT	7510am			
0700-0800	USA, KVOH Los Angeles CA	9975am			
0700-0800	USA, KWHR Naalehu HI	17510au			
0700-0800	USA, Monitor Radio Intl	7535eu			
0700-0800	USA, WEWN Birmingham AL	5825eu	7425na		
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	2390am	5065am	5935am	7435am
0700-0745	USA, WYFR Okeechobee FL	7355eu	9985eu		
0700-0800	USA, WYFR Okeechobee FL	13695af			
0700-0800 vl	Vanuatu, Radio	3945do	7260do		
0700-0745 vl/m-f	Vatican State, Vatican R	4005eu	5880eu	7250eu	9645eu
0700-0800	Zambia, Christian Voice	6065af			
0700-0800	Zambia, ZNBC Radio 2	6165do			
0700-0800 vl	Zimbabwe, Zimbabwe BC	5975do			
0705-0800	Swaziland, Trans World R	5055af	9500af	9650af	
0710-0800 vl	Papua New Guinea, NBC	4890do			
0715-0730	Switzerland, Swiss R Intl	6165eu	9535eu		
0730-0755	Austria, R Austria Intl	6155eu	13730eu	15410me	17870me
0730-0745 s	Greece, Voice of	7450eu	9425eu	11645au	
0730-0735	India, All India Radio	15185do	15260do		
0730-0800	Netherlands, Radio	9700pa	9720au	11895pa	
0730-0800 as	Palau, KHBN/Voice of Hope	9730as			
0738-0755 1&3rd s	Denmark, R Denmark Intl	7180va	7295va	9590va	13805va
0745-0800 s	Ghana, Ghana Broadc Corp	3366do	4915do		
0745-0755	Greece, Voice of	7450eu	9425eu	11645au	
0745-0755 as	Monaco, Trans World Radio	7115eu			
0755-0800 mtwhf	Monaco, Trans World Radio	7115eu			
0758-0800 as	New Zealand, R NZ Intl	9700pa			

0800 UTC

0800-0900	Australia, Radio	5995pa	6020pa	6080pa	9510as
		9580pa	9710pa	9860pa	12080pa
		13605pa	15530as	17715pa	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 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			
0800-0830	Chile, Radio Esperanza	6090sa			
0800-0900	Costa Rica,RF Peace Intl	7385am			
0800-0830	Ecuador, HCJB	11615eu			
0800-0900	Ecuador, HCJB	9445pa	21455au		
0800-0900 as	Eqt Guinea, R East Africa	15186af			
0800-0900 mtwhf	Eqt Guinea, Radio Africa	15186af			
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	3985va			
0800-0900 vl	Kiribati, Radio	9825do			
0800-0900	Lebanon, Voice of Hope	9990va			
0800-0900	Malaysia, Radio	7295do			
0800-0825	Malaysia, Voice of	6175as	9750as	15295au	
0800-0900	Monaco, Trans World Radio	7115eu			
0800-0825	Netherlands, Radio	9700pa	9720au	11895pa	
0800-0850	North Korea, R Pyongyang	15180as	15230as		
0800-0830 s	Norway, Radio Norway Intl	17860au			
0800-0850	Pakistan, Radio	15470eu	17900eu		
0800-0900 as	Palau, KHBN/Voice of Hope	9730as			
0800-0900 vl	Papua New Guinea, NBC	4890do			
0800-0900	Russia,Voice of Russia WS	15470as	15560as	17570as	17665as
0800-0810	Sierra Leone, SLBS	3316do			
0800-0900 vl	Solomon Islands, SIBC	5020do	9545do		
0800-0900	South Korea, R Korea Intl	7550eu	13670eu		
0800-0900	United Kingdom, BBC WS	6190af	6195va	9410eu	9600af
		9740as	9805va	11760as	11940af
		11955as	15280as	15310as	15400va
		15575me	17640va	17790as	17830af
		17885af			
0800-0815	United Kingdom, BBC WS	3955eu	7145va	12095eu	
0800-0900	USA, KAIJ Dallas TX	5810am	9815am		
0800-0900	USA, KTBN Salt Lk City UT	7510am			
0800-0900	USA, KWHR Naalehu HI	9930as			
0800-0900	USA, Monitor Radio Intl	7535eu	9845pa	11550pa	15665eu
0800-0900	USA, WEWN Birmingham AL	5825eu	7425na		
0800-0900	USA, WHRI Noblesville IN	5760am	7315am		
0800-0900	USA, WJCR Upton KY	7490na	13595na		
0800-0900 smtwhf	USA, WMLK Bethel PA	9465eu			
0800-0900	USA, WWCR Nashville TN	2390am	5065am	5935am	7435am
0800-0830 vl	Vanuatu, Radio	3945do	7260do		
0800-0900	Zambia, Christian Voice	6065af			
0800-0805 mtwhfa	Zambia, ZNBC Radio 2	6165do			
0800-0900 vl	Zimbabwe, Zimbabwe BC	5975do			
0805-0810	Croatia, Croatian Radio	5920eu	7165eu	9830eu	13830eu
0805-0835 mtwhf	Swaziland, Trans World R	4775af	9500af	9650af	
0815-0900 mtwtf	Nigeria, FRCN/Radio	3326do	4990do		
0816-0900 mtwhf	New Zealand, R NZ Intl	9700pa			
0830-0900 s	Armenia, Voice of	15270eu			
0830-0900 vl	Australia, VL8K Katherine	2485do			
0830-0900	Belgium, R Vlaanderen Int	5985eu	9925au		
0830-0900	Georgia, Radio	11910me			
0830-0840	India, All India Radio	7250do	15185do	15260do	
0830-0900 vl	Italy, IRRS	7125va			
0830-0900	Netherlands, Radio	9720au	13700pa		
0830-0900	Slovakia, R Slovakia Intl	11990au	15460au	17550au	
0838-0855 1&3rd s	Denmark, R Denmark Intl	15220va	17855va		
0850-0853 s	Russia, R Pacific Ocean	7185as			
0855-0900	Guam, TWR/KTWR	11830pa			

Your Name in Lights!

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

Frequencies

0900-1000	Australia, Radio	5995pa	6020pa	6080pa	9510as
		9580pa	9710pa	9860pa	12080pa
		13605as	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	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	17690au	
0900-1000	Costa Rica,RF Peace Intl	7385am			
0900-0930	Czech Rep, Radio Prague	15640me	17485af		
0900-1000 s	Denmark, Radio ABC	7570eu			
0900-1000	Ecuador, HCJB	9445pa	21455au		
0900-1000 as	Eqt Guinea, R East Africa	15186af			
0900-1000 mtwhf	Eqt Guinea, Radio Africa	15186af			
0900-0950	Germany, Deutsche Welle	6160as	9565af	12055as	15225af
		15410af	17800af	21600af	21680as
0900-0915 mtwtf	Ghana, Ghana Broadc Corp	3366do	4915do		
0900-0915	Guam, TWR/KTWR	15200as			
0900-1000	Guam, TWR/KTWR	11830pa			
0900-1000 mtwhf	Italy, IRRS	3985va			
0900-1000	Japan, NHK/Radio	9610as	11850au	15190as	
0900-0930 vl	Kiribati, Radio	9825do			
0900-1000	Lebanon, Voice of Hope	9990va			
0900-1000	Malaysia, Radio	7295do			
0900-0920 mtwhf	Monaco, Trans World Radio	7115eu			
0900-0905 a	Monaco, Trans World Radio	7115eu			
0900-0925	Netherlands, Radio	9720au	13700pa		
0900-1000	New Zealand, R NZ Intl	9700pa			
0900-1000 as	Palau, KHBN/Voice of Hope	9730as			
0900-1000 vl	Papua New Guinea, NBC	4890do			
0900-1000	Russia,Voice of Russia WS	9835va	11800pa	12025as	15470as
		15560pa	15580as		
0900-0930	Switzerland, Swiss R Intl	9885pa	13685pa	17515pa	
0900-1000	United Kingdom, BBC WS	6190af	6195va	9410eu	9740as
		11750as	11940af	12095eu	15190sa
		15280va	15400va	15575me	17640va
		17705eu	17830va	17885af	
0900-0915	United Kingdom, BBC WS	6065as	7180as	9580as	11760as
		11955as	15310as	15360as	17790as
0900-1000	USA, KAIJ Dallas TX	5810am			
0900-1000	USA, KNLS Anchor Point AK	6150as			
0900-1000	USA, KTBN Salt Lk City UT	7510am			
0900-1000	USA, Monitor Radio Intl	7395sa	7535eu	9430as	13840pa
0900-1000	USA, WEWN Birmingham AL	5825eu	7425na		
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, WWCR Nashville TN	2390am	5065am	5935am	7435am
0900-1000	Zambia, Christian Voice	6065af			
0900-1000 vl	Zimbabwe, Zimbabwe BC	5975do			
0915-1000	Ghana, Ghana Broadc Corp	6130do	7295do		
0930-0955 mtwhfa	Austria, R Austria Intl	6155eu	13730eu	15450as	17870au
0930-1000	Canada, CKZN St John's	6160do			
0930-1000	Lithuania, Radio Vilnius	9710eu			
0930-1000	Mongolia, R Ulan Bator	11850as	12085as		
0930-1000	Netherlands, Radio	9720au	12065pa	13705pa	
0930-1000	Philippines, FEBC/R Intl	11635as			
0938-0955 1&3rd s	Denmark, R Denmark Intl	13800va	17855va		

1000 UTC

1000-1100	Australia, Radio	5995as	6020pa	6080pa	9510as
		9580pa	9860pa	13605as	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 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	17690au	
1000-1100	Costa Rica,RF Peace Intl	7385am			
1000-1100 s	Denmark, Radio ABC	7570eu			
1000-1100	Ecuador, HCJB	9445pa	21455au		
1000-1100 as	Eqt Guinea, R East Africa	15186af			
1000-1100 mtwhf	Eqt Guinea, Radio Africa	15186af			
1000-1100	Guam, AWR/KSDA	9370as			
1000-1100	India, All India Radio	13700as	15050as	17387au	17890as
1000-1100	Iraq, Radio Iraq Intl	13680eu			
1000-1100 vl	Italy, IRRS	7125va			
1000-1100	Lebanon, Voice of Hope	9990va			
1000-1100	Malaysia, Radio	7295do			
1000-1100 vl	Malaysia, RTM Kuching	7160do			
1000-1100 vl	Malaysia,RTM KotaKinabalu	5980do			
1000-1025	Netherlands, Radio	9720pa	11895au	13700pa	
1000-1100	New Zealand, R NZ Intl	9700pa			
1000-1100 as	Palau, KHBN/Voice of Hope	9730as			
1000-1100 vl	Papua New Guinea, NBC	4890do			
1000-1100	Philippines, FEBC/R Intl	11635as			
1000-1100	Russia,Voice of Russia WS	7150va	9835pa	11800as	12025as
		15580as			
1000-1100	United Kingdom, BBC WS	5965na	6190af	6195va	9410eu
		9740as	11750as	11760as	11940af
		12095eu	13745va	15190sa	15280va
		15310as	15400af	15575me	17640va
		17705va	17790as	17830va	17885af
1000-1100	USA, KAIJ Dallas TX	5810am			
1000-1100	USA, KTBN Salt Lk City UT	7510am			
1000-1100	USA, KWHR Naalehu HI	9930as			
1000-1100	USA, Monitor Radio Intl	6095na	7395sa		
1000-1100	USA, Voice of America	5985va	6165am	7405am	9590am
		11720va	15425va		
1000-1100	USA, WEWN Birmingham AL	7425na	15665eu		
1000-1100	USA, WHRI Noblesville IN	6040am	6185am		
1000-1100	USA, WJCR Upton KY	7490na	13595na		
1000-1100	USA, WMLK Bethel PA	9465eu			
1000-1100 as	USA, WVHA Greenbush ME	13825va			
1000-1100	USA, WWCR Nashville TN	5065am	5935am	9475am	15685am
1000-1100	USA, WYFR Okeechobee FL	5950na			
1000-1100 vl/m-f	Vatican State, Vatican R	11740af	15210af	17550af	
1000-1030	Vietnam, Voice of	5940as	7270as	7400as	9840as
		12020as	15010as		
1000-1100	Zambia, Christian Voice	6065af			
1000-1005 mtwhfa	Zambia, ZNBC Radio 2	6165do			
1005-1010	Croatia, Croatian Radio	5895eu	7165eu		
1030-1055	Austria, R Austria Intl	15450as	17870au		
1030-1057	Czech Rep, Radio Prague	7345eu	9505eu		
1030-1100	Finland, YLE/R Finland	13645as	15235au		
1030-1100	Netherlands, Radio	6045as	9650as	12065as	13705as
1030-1100	South Korea, R Korea Intl	11715am			
1030-1055	UAE, Radio Dubai	13675eu	15395eu	17825eu	21605me
1038-1055 1&3rd s	Denmark, R Denmark Intl	9480eu	15220na		

MT Monitoring Team

Next Reporting Deadline: November 21, 1996

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Thank You...

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Based upon the Supreme Court rulings of McLeod vs. Dillworth (1944), Bellas Hess (1967) and the proposed Brooks legislation (H.R. 2230), effective September 1, 1990, Grove Enterprises will no longer collect sales or use taxes apparently invalidly levied by states against residents when they purchase from us in North Carolina. We have neither economic presence nor nexus in these states as established by the U.S. Supreme Court.

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* Two-year subscription to *Monitoring Times*, $45.95; Three years, $67.95. Foreign air mail, one year $85.95

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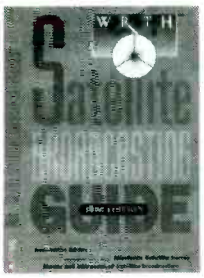
1996 SATELLITE BROADCASTERS GUIDE



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As more and more people become fed up with cable TV services, they are turning to the option of satellite dishes. Learn how to set up your own home satellite system and receive hundreds of TV and radio stations that you probably didn't know existed! This book also reveals how dishes work and provides a guide to satellite broadcasters, maps of satellite locations, and a directory of reputable dealers. Use shipping code B. Target Audience: general.

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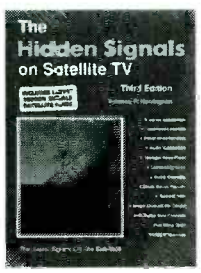

By Thomas P. Harrington

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TUNE TO SATELLITE RADIO ON YOUR SATELLITE SYSTEM

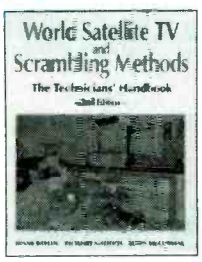
By Thomas P. Harrington

Very few TV satellite dish owners are aware of the myriad other services available--if you know where to look! Sports events, classical and ethnic music, international broadcasters, special news services, weather satellite imagery, facsimile press photos, and more. Harrington tells you, in non-technical terms, just what you need to tune it in. Use shipping code B. Target Audience: advanced.

BOK 84 ..... $19.95

WORLD SATELLITE TV AND SCRAMBLING METHODS, THE TECHNICIAN'S HANDBOOK

3rd Edition



By Dr. Frank Baylin, Richard Maddox and John McCormac

This thorough text is a must buy for technicians, satellite professionals and do-it-yourselfers. The design, operation and repair of satellite antennas, feeds, LNBs and receivers/modulators are examined in detail. An in-depth study of scrambling methods and broadcast formats is the backdrop to a discussion of all current American and European satellite TV technologies. Use shipping code B. Target Audience: advanced.

BOK 91 ..... $39.95

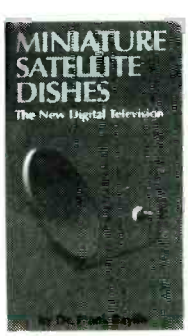
INSTALL, AIM AND REPAIR YOUR SATELLITE TV SYSTEM

By Dr. Frank Baylin *2nd Edition*

This booklet, a shortened version of *The Home Satellite TV - Installation and Troubleshooting Manual* (BOK 94), explores how to install a satellite TV system, aim the dish at the arc of satellites, as well as how to trouble-shoot and repair the system if a problem arises. It also covers the periodic maintenance work that is required to keep a system tuned up and aligned onto the arc of satellites. Use shipping code B. Target Audience: general.

BOK 95 ..... $9.95

MINIATURE SATELLITE DISHES, THE NEW DIGITAL TELEVISION



By Dr. Frank Baylin

Direct broadcast satellite technology is hot and this new release by Baylin Publications covers all aspects of the DBS industry. Nine chapters delve into the DBS technology, corporations offering the service, programming, installation, and more. Illustrated and written for the laymen this is essential reading for anyone considering purchasing a DBS system. Use shipping code B. Target Audience: general.

BOK 96 ..... $19.95

THE "HOW TO" OF SATELLITE COMMUNICATIONS

By Dr. Joseph Pelton

Communications satellites represent a powerful technology that can do many things well. This excellent book by a seasoned veteran in the satellite industry thoroughly explores the world of satellite communications. Learn what makes up a satellite system, where this technology came from and what we can expect or hope for in the future. Use shipping code B. Target Audience: general.

BOK 92 ..... $24.95

GROVE

SCANNER MODIFICATION HANDBOOK VOL. 1 & 2

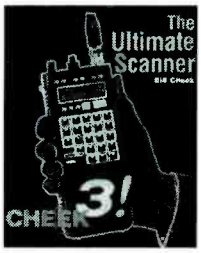
By Bill Cheek

Although concentrating on mods for Realistic® scanners, excellent hints are included for scanners in general. Cellular telephone frequency plans, adding S meters, squelch improvements, voltage protection, cellular restoration, increasing memory capacity, portable power supplies, choosing antennas and coax, and more!

Vol. 2 covers the PRO-2006, PRO-34, PRO-2022, Uniden BC200/205XLT, BC100XLT, and BC760/950XLT. Many of the techniques may be applied to other scanners as well. Use shipping code B. Target Audience: advanced.

BOK 2/BOK 2V $17.95 ea. Both for only $29.95

THE ULTIMATE SCANNER

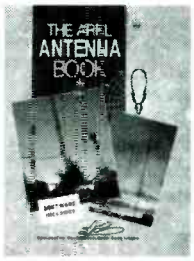


By Bill Cheek

This indispensible bench manual includes memory enhancements, up to 25,600 channels, cellular restoration, simple ways to automate arduous scanning tasks, signal discrimination, computer interfaces, plus generic and specific information on improving scanner performance. You may already own the better part of a "next generation scanner!" Shipping Code B. Target Audience: advanced.

BOK 83 ..... $29.95

THE ARRL ANTENNA BOOK



(ARRL)

Experts agree, if there's one book that covers virtually every aspect of antenna design, theory and construction—with eminent authority and accuracy—it's the ARRL Antenna Book!

Included at no extra charge is a new software disk for Yagi design, propagation forecasting and transmission line analysis along with many other antenna utilities. Use shipping code B. Target Audience: advanced.

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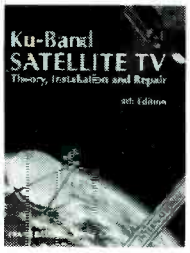
Recognized worldwide for their thoroughness and objectivity, Lawrence Magne's White Papers tell you everything you want to know about the receiver of your choice before you buy.

Puzzled by terms like "IF rejection," "dynamic range," and "selectivity"? You need Magne's "How to Interpret Receiver Specifications and Lab Tests". Order it below. Target Audience: general.

WP01	ICOM R71	WP07	Lowe HF 150
WP02	ICOM R9000	WP09	"How to Interpret Receiver Specifications and Lab Tests"
WP03	Kenwood R5000		
WP04	Sony ICF2010	WP10	Drake SW8
WP05	Drake R8		

KU-BAND SATELLITE TV - THEORY, INSTALLATION AND REPAIR

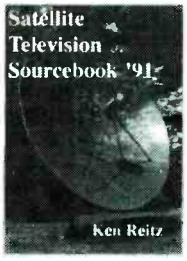


By Dr. Frank Baylin, Brent Gale and John McCormac — 4th Edition

A clear presentation and explanation of all aspects of worldwide Ku-band satellite television. Ku-band satellite communications systems are becoming commonplace throughout the world. This comprehensive manual provides do-it-your selfers, technicians and managers with the knowledge necessary to fully understand all technical aspects of this rapidly growing field. Use shipping code B. Target Audience: general.

BOK 93 ..... $29.95

1991 SATELLITE TELEVISION SOURCEBOOK



By Ken Reitz

This ultimate reference to TV satellites provides more information than anything else on the market. Lists of dealers, manufacturers and publishers, including addresses and phone numbers, for magazines, books and equipment. Detailed chapters on how satellite TV works.C band, Ku band, weather, amateur and even international satellites are covered. **A free update sheet is included.** Use shipping code B. Target Audience: general.

BOK 19 ..... $3.95 *New low price— while supplies last!*

HOME SATELLITE TV INSTALLATION & TROUBLESHOOTING MANUAL

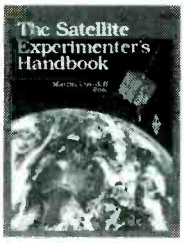
3rd Edition

By Dr. Frank Baylin, Brent Gale and Ron Long

The completely revised third edition is an invaluable sourcebook for owners of home satellite TV systems and professional installers alike.An excellent working tool, it presents all the details anyone needs to install, operate and maintain a home TV satellite system. Use shipping code B. Target Audience: general.

BOK 94 ..... $29.95

THE SATELLITE EXPERIMENTER'S HANDBOOK



By Martin Davidoff

With the launching of Satellite Times magazine, more listeners are focusing their antennas overhead! Get in on this exciting, new aspect of monitoring with projects and information from Davidoff's authoritative, easy-to-read handbook. Antenna design, construction and tracking; amateur, TV and weather satellites; computer programs; graphs, tables and overlays. A great reference collection for beginners and experienced space enthusiasts alike. Use shipping code B. Target Audience: general.

BOK 85 ..... $19.95

UPS Second Day Air at Ground Rates on ALL PRODUCTS!

SHORTWAVE DIRECTORY

8th Edition!

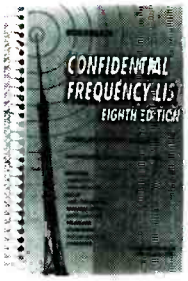
New Low Price!

By Bob Grove

Edited by MT's own Larry Van Horn, the 8th edition Shortwave Directory is the consummate DXer's bible for the first 30 MHz of radio spectrum. Completely revised and updated, the 256 page, loose-leaf, three-hole punched edition features every HF listening target. Worldwide military organizations are featured and include all new U.S. and foreign listings. Now includes RTTY, FAX and other digital listings, coastal stations, non-directional beacons, and much more! A matching, professional, 2" slant D-ring binder is available for only $5! Use shipping code B. Target Audience: general.

BOK 14-94...$9.95 With Binder..$16.45

CONFIDENTIAL FREQUENCY LIST



By Geoff Halligey

This 9th edition is the latest update to an excellent reference on 4-28 MHz communications. Listings by frequency include ship and shore stations, embassy communications, aeronautical radio, INTERPOL, spy numbers stations, military tactical communications, and more.

Thousands of utilities (two-way communications) frequencies, conveniently arranged in numeric order. If you hear it on the air, it is probably listed in this edition of the famous CFL. Use shipping code B. Target Audience: general.

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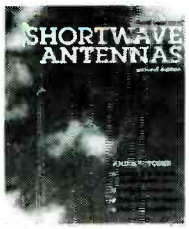
BUILD YOUR OWN SHORTWAVE ANTENNAS



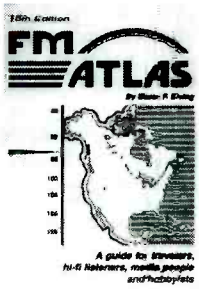
By Andrew Yoder

2nd Edition!

No other accessory can add so much to your listening satisfaction as the proper antenna. With the expertise that comes only from experience, Yoder presents this highly informative, profusely-illustrated handbook on how to design and install indoor, limited space, portable and directional antennas as well as tuners and couplers, providing optimal reception throughout the shortwave frequencies. Use shipping code A. Target Audience: general.

BOK 89 ..... $16.95

FM ATLAS



NEW 16th Edition. By Bruce Elving

This is the authoritative reference on U.S., Canadian and Mexican FM broadcasting stations for FM DXers. All mapped by state and province with cross-reference by frequency, callsign and city. Use shipping code A. Target Audience: general.

BOK 64 ..... $14.95

TRAVELER'S GUIDE TO WORLD RADIO

By Andrew Sennitt

This handy pocket guide fits neatly in your suitcase or alongside your shortwave radio and provides instant access to English language programs from 55 major cities around the globe! Easy-to-read charts show time and frequency schedules for shortwave, medium wave and FM broadcasting as well. 200 information-packed pages relate time conversion, main languages, electric power type, currency, country telephone prefixes, and area codes as well. Use shipping code A. Target Audience: general.

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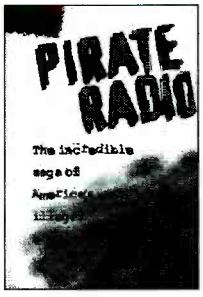
PIRATE RADIO



By Andrew Yoder

Yoder's reputation as an authority of pirate radio broadcasters is legend, and his newest book takes readers on a walk on radio's wild side!" Containing historical perspectives as well as insightful views into modern pirate broadcasting, we also learn of pirates' probable future. Included is an excellent CD recording of actual broadcasts from the most famous—and notorious—pirates of the Past. Use shipping code B. Target Audience: general.

BOK 47 ..... $29.95

ARRL HANDBOOK FOR RADIO AMATEURS

(ARRL) 1996 Edition!

Its 1200 pages contain authoritative and accurate, yet simply explained, chapters on the amateur radio hobby, basic electronics, radio transmitters and receivers, digital technology, antennas and transmission lines, video and data communications, amplifiers, power supplies, projects and techniques, interference and more! Liberally illustrated and exhaustively indexed. Use shipping code B. Target Audience: advanced.

BOK 58-96 ... $38.00

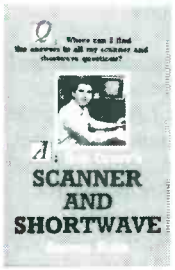
SHORTWAVE RADIO LISTENING FOR BEGINNERS

By Anita Louise McCormick

This publication provides excellent insight into shortwave radio—its history, its intrigue, its players. Broadcasters, pirates and clandestines, utility communicators, hams, and even scanner topics are covered in this easy-to-read, liberally illustrated work by a veteran listener. nformative, fun reading with source lists for equipment, publications and clubs. Use shipping code A. Target Audience: beginner.

BOK 69 ..... $11.95

SCANNER AND SHORTWAVE ANSWER BOOK



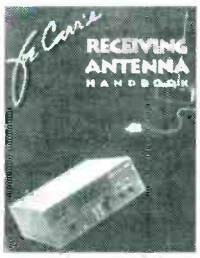
By Bob Grove

What is the best antenna for your requirements? When do you need a preselector rather than a preamp? What is the difference between "meter band," "megahertz" and "kilohertz"?

These are samples of the hundreds of questions expertly answered by Bob Grove's guide to monitoring. Liberally illustrated and professionally printed. Affordably priced for hobbyists, new and experienced. Use Shipping Code A. Target Audience: beginner.

BOK 5 ..... $12.95

RECEIVING ANTENNA HANDBOOK



By Joe Carr

This handy guide to home-brew shortwave antennas is the best in recent history. Authoritative and comprehensive, Carr's treatment of receiving antennas is first rate. Basic theory is easy to understand. Construction articles cover random wire, dipoles, multiband designs, disguise antennas, verticals, loops, longwires, direction finding, arrays, loops, and more. Use shipping code B. Target Audience: general.

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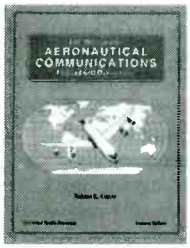
THE WORLDWIDE AERONAUTICAL COMMUNICATIONS FREQUENCY DIRECTORY

2nd Edition

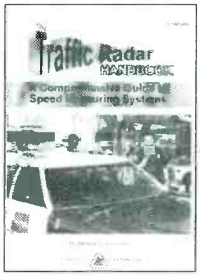


By Robert E. Evans The most complete and up-to-date aeronautical frequency guide in publication! Over 2,350 frequencies in the commercial and military air services, including voice and digital modes in the HF, VHF and UHF ranges.

RTTY, SSB, ACARS, and VOLMET services worldwide along with glossary of terms, source list, extensive codes, designators, waypoint data, and sector maps. Explanatory text reveals how to decipher the contents of messages. Use shipping code A. Target Audience: general.

BOK 86 ..... $19.95

TRAFFIC RADAR HANDBOOK



By Don Sawicki

This most exhaustive book ever written on the subject explains every kind of traffic speed measuring system in use, along with scientific proof of errors and misreadings which commonly occur.

Over 100 pages include how to fight a ticket in court, laser radar, biological effects of radar beams, radar countermeasures, and much more, loaded with illustrations and tables for documentation. Use shipping code B. Target Audience: general.

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New 1997 Edition!

KLINGENFUSS GUIDE TO UTILITIES

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By Joerg Klingenfuss

The most comprehensive directory of worldwide utilities ever produced for the first 30 MHz of the spectrum. Lists SSB, RTTY, Fax, CW and other modes as well. Extremely accurate; nearly 20,000 frequencies with callsigns, station name, location and mode. Military, diplomatic, maritime, air, federal, press, etc. Includes glossary of Q and Z signals, terms and definitions. CD-ROM, sold separately, contains the Klingenfuss database plus other useful data! Use shipping code B. Target Audience: general.

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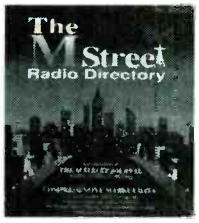

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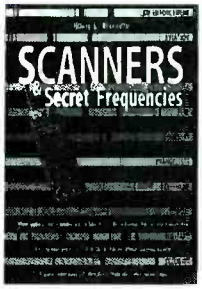
New 1997 Edition Edited by Robert Unmacht

Considered by experts as the most authoritative and comprehensive guide to AM and FM broadcasting stations in the US and Canada, this latest edition by the publishers of the prestigious M Street Journal is packed with program formats, frequencies, Arbitron (and other) ratings, market information, and addresses of thousands of licensees. Use shipping code B. Target Audience: advanced.

BOK 53-97 ... Call for price/availability

SCANNERS AND SECRET FREQUENCIES

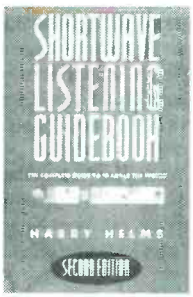


By Henry Eisenson

This giant (320 page), comprehensive guide to monitoring the VHF/UHF communications spectrum is loaded with useful information, from basics of radio and choosing a scanner to learning about the radio spectrum and where to find the most interesting frequencies. Use shipping code B. Target Audience: beginner.

BOK 77 ..... $19.95

SHORTWAVE LISTENING GUIDEBOOK



Second Edition by Harry Helms

Excellent information for the beginner and experienced listener alike. Receivers, antennas and accessories are discussed in considerable detail, and in easy-to-read language.

Shortwave broadcasters—legitimate, clandestine and pirate—are presented extensively, along with a brief overview of utilities, the two-way users of the spectrum. Use shipping code B. Target Audience: general.

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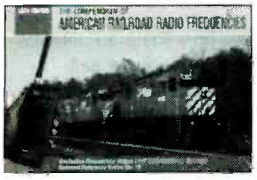
UPS Second Day Air at Ground Rates on ALL PRODUCTS!

COMPENDIUM OF AMERICAN RAILROAD RADIO FREQUENCIES



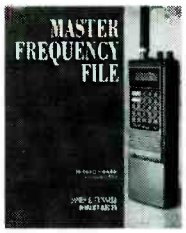
14th Edition!

By Gary L. Sturm and Mark J. Landgraf

Avid rail fans have long awaited this revised 13th edition of our most popular railroad frequency directory! 200 pages offer comprehensive listings of all frequencies used by U.S. and Canadian railroads, arranged alphabetically by name. Maps are included to show route details. Use shipping code A. Target Audience: general.

BOK 48 ..... $16.95

MASTER FREQUENCY FILE



By James Tunnell and Robert Kelty

Over 530 pages of top notch information on federal government HF, VHF and UHF communications. Thousands of frequencies, uses, locations, callsigns, repeater pairs, and squelch tones for FBI, ATF, DEA, Secret Service, State Department, Interior, National Parks, Forestry, Capitol Police, Smithsonian, FCC, EPA, Energy, Commerce, Congress, Customs, Prisons, Border Patrol, VA, and more. Use shipping code B. Target Audience: general.

BOK 78 ..... $29.95

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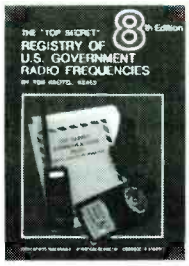


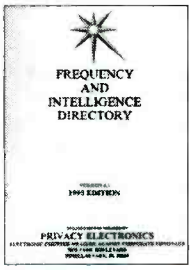
By Tom Kneitel

This 8th edition continues the tradition of having the largest amount of federal frequency data ever compiled into a single volume.

Concentrating on VHF and UHF scanner frequency ranges, agencies include Secret Service, Customs, DEA, CIA, NSA, White House, Border Patrol, ATF, and dozens of other government bureaus. Use shipping code B. Target Audience: general.

BOK 8 ..... $21.95

FREQUENCY AND INTELLIGENCE DIRECTORY



By Jay Harris

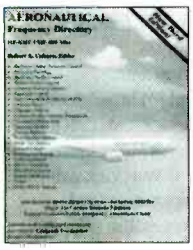
For south Florida scanner buffs, this book is a bonanza with its regionalized listings of business, public safety, cellular, cordless, tourist attractions, aircraft, press, marine, broadcasting, medical, railroad, sports, and transportation frequencies. And for nationwide federal/military VHF/UHF monitors, this may well be the most accurate frequency ever published. Use shipping code B. Target Audience: general.

New low price—while supplies last!

BOK 81 ..... $19.95

AERONAUTICAL FREQUENCY DIRECTORY

3rd Edition

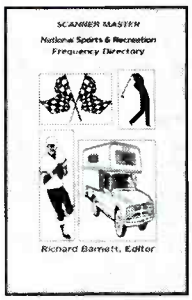


By Robert A. Coburn

This most-comprehensive aeronautical frequency directory, arranged alphabetically by state and city, lists both civilian and military air-to-ground frequencies throughout the spectrum, including location, name, callsign, frequency, and use. Includes traffic control centers, Civil Air Patrol, military, and civilian HF SSB tower frequencies as well. Use shipping code B. Target Audience: general.

BOK 6 ..... $21.95

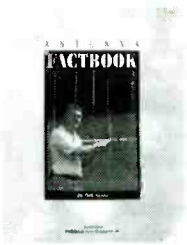
NATIONAL SPORTS AND ENTERTAINMENT FREQUENCY GUIDE!



Richard Barnett, well-known scanner frequency expert, has released this exhaustive directory of frequencies used by racing teams, sports events, parks and recreational areas, game and wildlife agencies, TV news teams, security forces, theme parks, colleges, and museums. Common frequencies used by GMRS, itinerants, public safety, federal government, cordless phones, wireless mikes, railroads, and marine are listed as well. Use shipping code A. Target Audience: general.

BOK 90 ..... $7.95

THE ANTENNA FACTBOOK

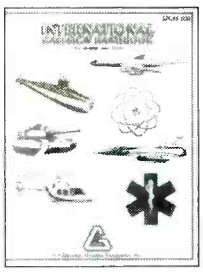


By Bob Grove

Is a tuner really necessary? How important is the choice of coax? Are all connectors the same? Which accessories are most valuable and which *don't* I want? What is antenna resonance and is it really necessary? What determines an antenna's efficiency? The answers to these and dozens more questions are found in this new book, meticulously researched and well illustrated. Written for hams, shortwave listeners and scanning enthusiasts. Get the best performance out of the most valuable accessory you can own—your antenna! Use Shipping Code A. Target Audience: general.

BOK 104 ..... $9.95

INTERNATIONAL CALLSIGN DIRECTORY



By Gayle Van Horn

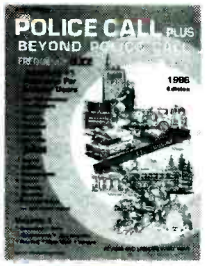
The most exhaustive list of tactical callsigns and their identifications ever assembled for shortwave and scanner listeners in a massive 250 page directory!

Codes from the US Air Force, Navy, Customs, Secret Service, Marine Corps, and foreign military as well as internationally registered callsigns and their users around the world, plus many more. Use shipping code B. Target Audience: general.

BOK 51 ..... $9.95

1996 POLICE CALL PLUS RADIO GUIDE

Now includes Beyond Police Call



1996 Edition—Edited by Gene Hughes

This accurate directory has become the standard reference for the scanner listener, providing comprehensive frequency location and usage information, as well as radio signals, codes, maps, and jargon for law enforcement, fire fighters, rescue, federal agencies, forestry service, military bases, and national parks.

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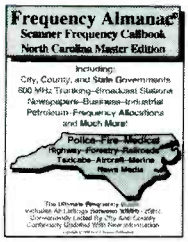
FREQUENCY ALMANAC!



By R. L. Smith

This state-by-state scanner frequency directory takes over where other guides leave off. Not only police, fire and ambulance, but trunking, broadcasting, news agencies, business, and industrial as well. Includes county, city, licensee name, callsign, frequency, and mobile/base class. Comprehensive and accurate. Target Audience: general.

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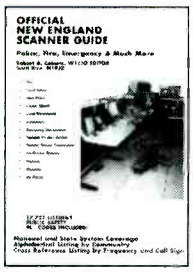
OFFICIAL NEW ENGLAND SCANNER GUIDE



By Robert Coburn

Nearly 18,000 listings for law enforcement, firefighting, hospital and ambulance, medical, road departments, railroads, emergency management, conservation, and weather. Listings include frequency, location, callsign, agency, use, and CTCSS (PL) tones where applicable. Even provides state bandplans and operational maps for key agencies in CT, ME, MA, NH, RI, and VT. Use shipping code B. Target Audience: general.

BOK 99 ..... $19.95 *New low price—while supplies last!*

AIR SCAN

6th Edition

By Tom Kneitel

State-by-state listing of VHF civilian tower frequencies, air traffic control center frequencies, some military VHF operations. Includes list of special government/commercial frequencies and Canadian aircraft frequencies as well!Use shipping code B. Target Audience: general.

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U.S. REPEATER MAPBOOK

New Edition!

By John Smith and John Mitchell

This new 1996/97 edition shows input/output frequencies, mapped locations and access tone codes for thousands of ham radio repeaters through-out the United States, Canada and Mexico, from 29-1300 MHz! Bandplans included. Exhaustive and accurate. A must for hams and scanner listeners alike. CD ROM version available; see software section. Use shipping code A. Target Audience: general.

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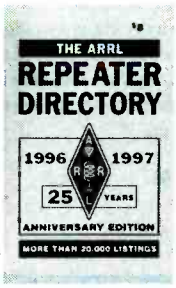
BOK 101CD .. $29.95

THE ARRL REPEATER DIRECTORY

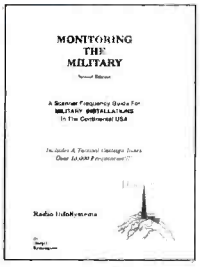
1996-97 Edition (ARRL)



Thousands of VHF/UHF amateur repeaters are in use throughout the U.S., Canada and Mexico, operating in the 29, 50, 144, 222, 420, 902, and 1240 MHz bands. This comprehensive pocket guide lists all that are registered, including many South American and European countries as well. Frequencies, callsigns, locations, sponsor names, and modes are included. Use shipping code A. Target Audience: general.

BOK 103 ..... $8.00

MONITORING THE MILITARY



Second Edition by Darryl Symington

Over 130,000 frequencies plus a tactical callsign index highlight this updated military scanning guide. Hundreds of Air Force, Navy and Army bases as well as munitions and supply depots nationwide are listed alphabetically, covering fire/crash, security, medical, command posts, military police, tactical, maintenance and security communications. Use shipping code B. Target Audience: general.

BOK 15 ..... $9.95

MONITOR AMERICA

By Richard Barnett

This 3rd edition contains over 800 pages of frequencies for federal, state, county, and city public safety agencies all across the United States! Includes channelization plans and usages, maps, ten codes, and unit designators. Also lists many amusement, sport, railway, aircraft, and national park frequencies. Use shipping code A. Target Audience: general.

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New 4th Edition COLLECTOR'S GUIDE TO ANTIQUE RADIOS

3rd Edition by Marty and Sue Bunis

If you're among the rapidly-growing number of antique radio collectors, this book is a must! Hundreds of full-color photos, thousands of listings of tube-type radios from America's yesteryear. Includes a brief description, model number, date of manufacture, and average market value. Shipping code B. Target Audience: general.

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By Marty and Sue Bunis New!

That AM-only transistor radio you passed up at the yard sale could be worth money! Transistor radios are fast becoming collector's items, some worth tens or even hundreds of dollars! A jade-green Regency TR-1 brings $600! Enjoy reminiscing through the hundreds of early transistor radios, as well as learning about their values, in this well-illustrated collector's guide. Shipping code B. Target Audience: general.

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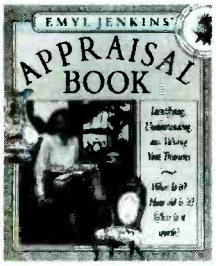
APPRAISAL BOOK



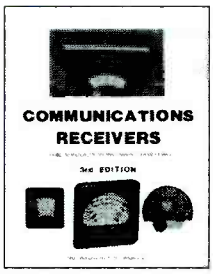
New!

by Emyl Jenkins

How much is that old silverware worth? Have you insured your family treasures adequately? How old is that furniture? Is that an original, a fake, or a reproduction? What are the identifying marks on glass and silver? This well-illustrated book lets you in on the collectors' and appaisers' secrets. Use shipping code B.

BOK 10 ..... $14.95

COMMUNICATIONS RECEIVERS The Vacuum Tube Era



by Raymond S. Moore New!

Truly a collector's delight, this richly-illustrated compilation of shortwave receivers from 1932-1981 is an indispensible reference for flea market addicts and hamfest devotees! Hundreds of models, civilian and military, from dozens of manufacturers like Hammarlund, National, Hallicrafters, Drake, Collins, Heathkit, Lafayette, and Howard are described, dated and pictured for identification. Use shipping code B.

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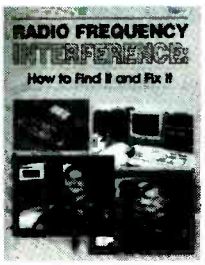
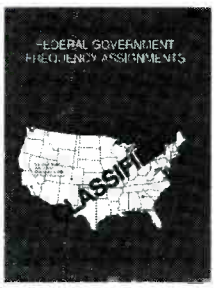
RADIO FREQUENCY INTERFERENCE... How to Find it and Fix it! (AARL)



This popular ARRL publication is welcome in an age of overwhelming interference problems. TV, ham radio, telephones, power lines, vehicles, CB, computer, appliance, and many other devices causing and affected by radio frequency interference (RFI) are covered along with preventive measures and even direction-finding antennas and methods. Extensively illustrated. Shipping Code B. Target Audience: general.

BOK 32 ..... $14.95

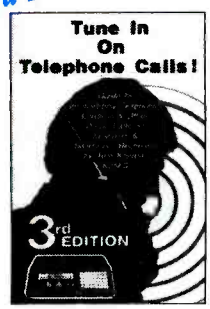
FEDERAL FREQUENCY ASSIGNMENT MASTER FILE



This new 4th edition, now with 350 controversial pages, provides the most comprehensive look at federal government frequencies in print. Over 100 agencies from the Central Intelligence Agency to the National Security Agency are listed; scanner and shortwave as well. Alphabetized by department and agency and their locations, then listed in frequency order, this compendium is the most authoritative reference for armchair monitoring of "forbidden" frequencies we've ever seen! Use shipping code B. Target Audience: general.

BOK 1 ..... $24.95

New 1996 3rd Edition TUNE IN ON TELEPHONE CALLS

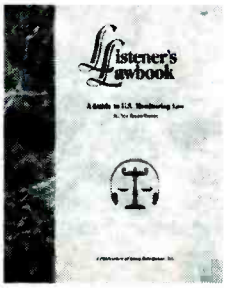


By Tom Kneitel

No listener's book in recent history has caused so much consternation as Kneitel's expose on where to listen to cellular, new and conventional cordless, air to ground, ship to shore, military, satellite, and wilderness radio phones—even pagers and baby monitors!
160 information-packed pages let you know just how vulnerable your calls are! Use shipping code A. Target Audience: general.

BOK 41 ..... $16.95

LISTENER'S LAWBOOK



By Frank Terranella

Now expanded, this all-new edition contains all the latest listening laws across the country, state by state (as applicable). Includes the new anti-cellular scanner amendment and thorough discussions, in simple language, of how these laws affect your listening hobby. A must for scanner enthusiasts! Use Shipping Code A. Target Audience: general.

BOK 16 ..... $9.95

GROVE
BUYER'S GUIDE

NOVEMBER, 1996

Originally produced as an integral section of *Monitoring Times* magazine, November 1996 issue, this 16-page Grove product section is distributed separately on request, along with other sections featuring scanners and shortwave equipment and accessories. The various sections will appear on a rotating basis as part of *Monitoring Times*.

Also see Grove's stocking stuffer ideas on page 2.

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Bob's Holiday Gift Picks

Radio listeners are notoriously difficult to buy gifts for, given the highly technical nature of the monitoring hobby. Grove Enterprises has a wide range of products for shortwave and scanner listeners and satellite communications enthusiasts—plus items of interest to the collector and the public at large. Bob Grove, our president, invites you to peruse the gift ideas below and throughout this catalog, featuring values from a few dollars to $2,000. If you need advice, please don't hesitate to call our technical department at (704) 837-7081. Then order toll-free at 1-800-438-8155. From Bob and all the folks at Grove, have a great holiday!

❄ $2000 range

AR 5000 Super Wide Coverage Receiver ..... RCV 12 ..... $1999.95
(See Grove Scanner Catalog, p. 4)

ICOM R8500 Communications Receiver ..... SCI 1 ..... $1999.95
(Shown above; see Grove Scanner Catalog, front page)

❄ $1000 range

AR 3000 Professional Desktop Scanner ..... SCN 26 ..... $1062.95
(See Grove Scanner Catalog, p. 4)

Drake R8 Communications Receiver ..... RCV 3 ..... $1059.95
(Shown above; see Grove Shortwave Catalog, p. 3)

❄ $600 range

Drake SW8 World Band Receiver ..... RCV 19 ..... $679.95
(See Grove Shortwave Catalog, p. 3)

AR8000 Handheld Scanner ..... SCN 27 ..... $599.95
(Shown at right; see Grove Scanner Catalog, p. 4)

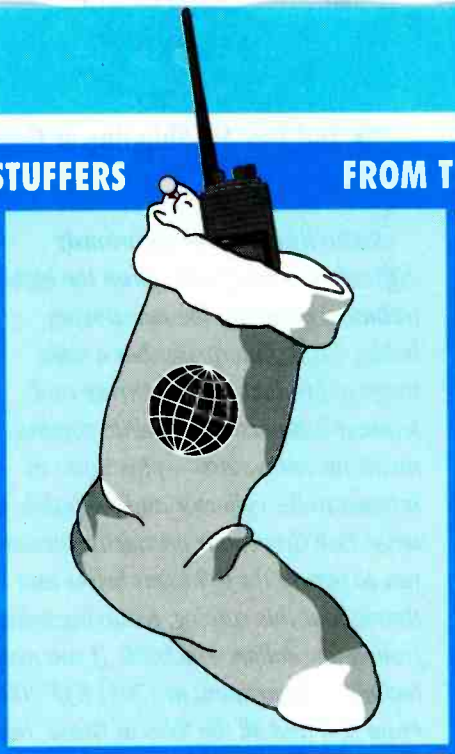
❄ Under $400

Uniden BC9000XLT Desktop Scanner ..... SCN 30 ..... $389.95
(See Grove Scanner Catalog, p. 2)

Optoelectronics Frequency Scout ..... CTR 8 ..... $399.95
(See Grove Scanner Catalog, p. 8)

Sangean ATS 909 Multiband Radio ..... RCV 8 ..... $259.95
(Shown above; see Grove Shortwave Catalog, p. 4)

GREAT STOCKING STUFFERS FROM THE GROVE CATALOG



GRE Super Amplifier

Boost the range of your hand-held scanner. GRE Super Amplifier has 20 dB (adjustable) gain from 100-1000 MHz! BNC connectors allow the Super Amplifier to be mounted between the scanner and antenna; a bypass switch permits the unit to be disabled without having to remove it. A 9-volt alkaline battery (not supplied) will provide up to 24 hours of continuous operation; a convenient external power jack permits the unit to be used continuously from a 9 V DC wall adaptor (not supplied).

ORDER PRE 1
$49.95

SHIPPING
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ACCESSORIES

ANT 22	High gain 800 MHz antenna	$29.95
PWR 13	Universal power supply	$9.95
BAT 4	9volt battery	$2.25

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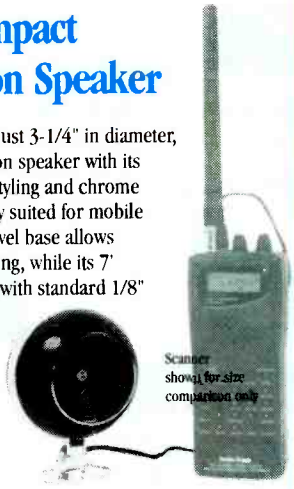
Measuring just 3-1/4" in diameter, this tiny extension speaker with its black textured styling and chrome accents is ideally suited for mobile mounting. A swivel base allows proper positioning, while its 7' extension cable with standard 1/8" (3.5 mm) miniplug will reach anywhere in the listening area.



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ACCESSORIES
ADP 29 3/32" (2.5 mm) sub-mini adaptor $1.50

SW Universal Reel Antenna

Whether you have a Sony, Sangean, Realistic®, Grundig, or other whip-portable shortwave radio, this 23-foot, reel-out antenna can be firmly attached for better reception. When not in use it can be conveniently stored in a pouch or even your pocket!

Comes with whip clip and 1/8" (3.5 mm) standard antenna adaptor.

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Dramatically increase your mobile range with a hand-held scanner or two-way radio without resorting to a permanent or magnetic whip. Simply slip this unobtrusive, durable custom bracket on a side window and roll it up! Equipped with standard BNC connector to accommodate most compact whips.

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Get organized in your car! The **BRK 1** (at right) holds one hand-held, while the **BRK 7** holds two (or one scanner and a beverage container)—with a handy compartment in the middle for other accessories!

Their sturdy jaws do an excellent job of supporting your radio — even with cables and antennas connected — on a desk or table top or even the bumpy environment of a vehicle, plane or boat.

Need an even bigger mount? Order the **BRK 10** Deluxe Mobile Organizer with room for two scanners, frequency organizer, cassettes and CDs, notepads—and more!

One final, smaller option is our hand-held radio caddy that attaches to the inside ledge or your car's window for super convenient access? Order the **BRK 11.**

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BRK 7	$12.95
BRK 10	$14.95
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Protect your delicate radio, computer, TV, stereo, test equipment, and other electronic equipment from devastating power-line voltage spikes and current surges. For all standard U.S. and Canada power lines (120 VAC, 1875 W, 60 Hz, 15 A).

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See our other great low-cost gift ideas (like the Voice-It recorder shown) and Grove's collectibles on pages 6-7 of this catalog section and our wide selection of radio-related books on pages 8-15!

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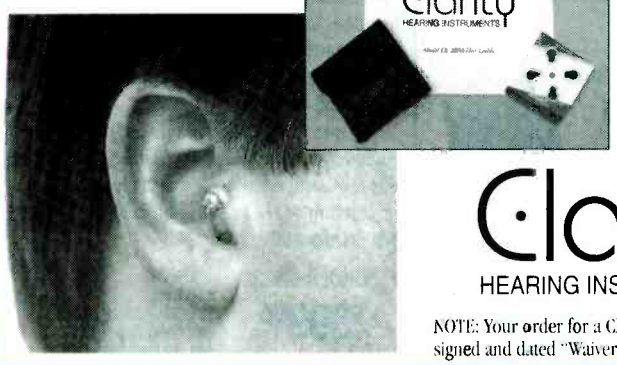
For an exceptional value buy 2 and get the second unit for half-price! See our site on the World Wide Web for additional information (http://www.grove.net/~clarity).



Comes with batteries, pouch, cleaning tool and user guide.

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ORDER TWO AND SAVE $239.95!
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Satellite Broadcasting Guide — Everything you need to know about installing, repairing, maintaining and enjoying your satelllite system. You'll learn how to set up your own home satellite system and receive hundreds of TV and radio stations that you probably didn't know existed. This book also provides a guide to satellite broadcasters, maps of satellite locations, and a directory of reputable dealers. Order BOK 79-97.

*Free shipping inside the US only.
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Please Note: 1996 editions shown here. New covers not yet available.

Great Caller ID Value!

The Bel-Tronics AD100 intercepts unwanted or unidentified calls and even displays the name and phone number of the caller on a giant LCD! And just look at these advanced features:

- **Call Reject:** Reject up to 100 unwanted phone numbers; the AD100's computerized voice says politely that the call will not be accepted!
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- **Call Screening:** Shows incoming name and phone number immediately for you to see.
- **Automatic Logging:** Memorizes and displays last 100 incoming calls for your reference.

Attractive off-white color; compact (5.3" x 3.4" x 2.1"). Requires 9-volt alkaline battery; low battery indicator on screen. Stand-up or wall-mount capable; telephone cord included.

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Value-Packed Magellan GPS Units

These compact Magellan navigational satellite receivers earned their renown for reliability during Desert Storm. Now this accurate position-determining instrument can be yours at a fraction of its original cost. Ruggedly built and waterproof, yet barely more than 6" high and weighing only 10 ounces, this pocket precision receiver homes in on 1.2-1.5 GHz global positioning satellites, using their signals to establish your exact location within a few feet in as little as 2-1/2 minutes from a cold start (35 seconds warm start), even your altitude, and allows you to plot and track your motion as well, so you can find your way back if necessary.

Ideal for pinpointing campsites, fishing holes, boating, travelers, trailheads, map locations, landmarks. Selectable graphic screens assist you in tracking and plotting where you've been, where you're going, and where you *ought* to be going! Shows distances, directions, times, speed, course corrections, latitude/longitude coordinates, all on a backlit LCD display.

Up to 17 hours of continuous use on one set of standard alkaline AA cells. Operates over a 14 to 140 degree Fahrenheit temperature range. Lanyard strap inlcuded.

All these features make the GPS 2000 Satellite Navigator an incredible value. Or select the upgraded GPS 3000 and get two additional navigation screens, a data port (RTCM 104 in, NMEA out), OSGB coordinates, 100 additional waypoints, 5 more routes, external antenna capability, celestial calculations, swivel mounting bracket, batteries, manuals, and a carrying case.

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ORDER GPS 3000

$249.95

Accessories For BOTH

ACC 13	Instr. video for 2000	$14.95
ACC 14	Instr. video for 3000	$14.95
CAS 7	Carrying case (GPS 2000 only)	$9.95
BAT 1	AA Alkaline Batteries	$.79
BAT 13	AA Energizer Batteries	$2.75

GP 3000 EXTRA Accessories

ACC 11	Power/ Data Module and External Antenna Kit, 20' Coax	$149.95

Icom GP-22 *with Interface*

Grove is now offering this great GPS unit (formerly $499.95) PLUS an accessory kit valued at $506 for only $399.95—that's a $605 discount off the regular combined price of $1,005.95! The included OPK-4 kit includes an external antenna, antenna mounting bracket and computer interface!

This tiny (2-1/2" x 5-1/4", 11 oz.) earth station fits in the palm of your hand! The easy-to-read digital display reveals bearing information from up to five earth-orbiting satellites, providing your latitude and longitude to within 300 feet (limited by the Department of Defense)—even your altitude!

Track your direction or return to a precise location. Create a route. Confirm your waypoints. Compute estimated time of arrival (ETA). Display heading, speed, bearing and range. Compute world and local time.

Powered by rechargeable battery pack. Includes carrying case, cigarette lighter power cord, AC wall adaptor/charger, illustrated instruction book. Prices subject to change due to yen fluctuations.

ORDER GPS 22

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ACCESSORIES

BAT 1	AA Alkaline Batteries	$.79
BAT 13	Rechargeable Nicad Batteries	$2.75

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16MB (4x32) EDO 60 ns, non-par. ..... RAM 16E $119.95*

For use with Pentium processor only. All prices subject to change—call!

Universal SCPC-200

Pull in Hundreds of SCPC Radio Channels On Your Standard TVRO Home Dish Satellite System!

Replacing the ever-popular SCPC-100, this flexible, new, microprocessor controlled receiver has automatic LNB drift compensation and offers direct frequency tuning with frequency readout on a high contrast LCD, and direct transponder tuning as well. Its large memory bank of 50 channels, wide/narrow bandwidth selection and automatic tuning indicators add to the feature list which also includes digital frequency lock-on, service name readout, and standard 70 MHz baseband output (tunable 50-90 MHz).

High quality audio is available from either a line output or 8 ohm speaker jack; RF input is standard 950-1450 MHz from C and Ku band LNBs. Powered by either 120 VAC, 60 Hz, or 12 VDC @ 500 mA, the SCPC-200 measures 12"W x 1-3/4"H x 8"D and weighs 8 lbs.

Use the optional SPL 2 SCPC splitter to connect your R7100 and R100 to your dish and listen to those single channel per carrier (SCPC) satellite radio broadcasts from major networks—news, music, interviews, sports, religion, international broadcasting, and more! Connects in seconds between your satellite cable and receiver, then to your R7100 or R100 antenna port, no modification necessary!

ORDER RCV 28

$399.95

SHIPPING
$9 UPS
$18 US Priority Mail
$22.00 Canadian APP
$20.50 Canadian UPS

SPL 2 Splitter
ORDER SPL 2

$64.95

SHIPPING
$5.50 UPS
$6.50 US Priority Mail
$11 Canadian UPS
$10 Canadian APP

ADPK 13 Cable "F" Male $2.50

UPS Second Day Air at Ground Rates on ALL PRODUCTS!

Scancat-Gold

Use your 640k (or better) computer to control your AOR, Drake, Kenwood, ICOM, Yaesu, JRC, Lowe, WJ, and Radio Shack PRO-2005/6/35/42 with this fast, all-new software program! Operates from the RS-232 port. Just check the features listed below:

For listeners—

- Integrates multiple data sources and removes duplicates
- Search between any two frequencies in any tuning step
- Autolog new active frequencies and create disk files
- Display spectrum analysis on screen or printer
- Scan frequencies from up to 15 disk files and 4500 frequencies
- Import from text formats and virtually any database
- Link up to 15 search banks, output to any printer or disk file
- Automatic "birdie" lockout, rapid DTMF capture/storage with OPTO 456

For commercial users—

- Demographic search for frequency coordination and usage profiling
- ASCII file logging of date, time, signal strength, air time
- Unlimited file sizes
- Macro control by frequency of dwell, hang, resume, threshhold, audible alarms
- Unattended on/off times for logging and searching
- Stores terminal control commands in comment field
- 800MHz restorable on AOR AR8000 & PRO-2035/42

Works with any IBM compatible system and Windows 95.

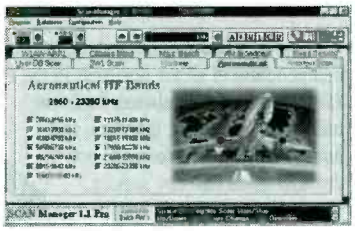
ORDER SFT 2 **$94.95**

SHIPPING
$4.50 UPS or First Class
$6 Canadian APP
$6.50 Canadian UPS

Tech support after the sale from Computer Aided Technology call (318)687-2555.

Because software is easily copied, it is not refundable. Defective copies will be replaced at no charge.

SCAN MANAGER PRO v.1.1



Now shortwave listeners and hams can have the same computer control power used by serious scanner enthusiasts by installing this powerful KC4ZGL Ham Software. If you have a modern IBM compatible computer equipped with Windows 3.1 or higher, you can edit databases and control all Kenwood, Icom, Drake R8A (R8 not supported) and Yaesu (except FT-767) transceivers and receivers! Display your data in powerful spreadsheet style, controlled and edited by keyboard or mouse.

Your database size is limited only by your hard disk space. Scan at 10 channels per second with selectable delay, choosing any standard mode (AM, FM, USB, LSB, CW, FSK/RTTY) throughout the typical 100 kHz-30 MHz frequency range. You can even select a service (CB, amateur, aeronautical, maritime, AM broadcast, etc.) For automatic band scanning.

Factory-loaded database lists hundreds of broadcast times and frequencies from dozens of countries worldwide with provision to add, edit and delete listings as schedules change. Colorful world map displays location, national flag, local and universal time.

Scan Manager 1.1 Pro includes SWL Manager 2.0. Both programs are full integrated for one low price.*

NEW VERSION!

ORDER SFT 13 **$68.95**

SHIPPING
$6 UPS
$8 US Priority Mail
$10.50 Canadian UPS
$11.50 Canadian APP

** Because software is easily copied it is not refundable. Defective copies will be replaced at no charge.*

ScanStar™

SCANSTAR FOR WINDOWS PLUS (ADVANCED)

This powerful new software package, ready for Windows 95, 3.1, or WFW 3.11, will restore full 800 MHz coverage and allow you to customize the band plan on theAR8000, as well as display spectrum analysis and support printing on the AOR AR3000A, Drake R8 and R8A, Icom R7000, R7100, R9000, JRC NRD535, NRD525,Kenwood R5000 and the PRO-2006 and PRO-2035 or PRO-2042 when equipped withOptoElectronics OS456 or OS535. Scan-controls up to 10 radios at one time; dual-receiver priority handoff for window viewing; sub-list scanning for split channels and trunk groups; monitoring assistant with frequency following for reception logging; user-defined database files. Blend up to 25 groups and search ranges; tactical display for all in "viewpicture;" scans, searches and logs PL/DPL/DTMF tones; provides alarm for highpriority channels via wave files or PC speaker; opens multiple files at the same time with full-feature editor; browses and imports dBase files like the popular Grove FCCdatabase; commercial logging features include air time, hit count andPL/DPL/DTMF loggings per channel; import/export from other formats like ASCIIand ScanCat. *

ORDER SFT 9 **$159.95**

SHIPPING
$4.50 UPS or First Class
$6 Canadian APP
$6.50 Canadian UPS

SCANSTAR FOR WINDOWS SE (BASIC)

Get all of the incredible features of the SFT-9 described above, except the basic package has no support for the Drake R8 and R8A, JRC NRD535, NRD525, and Kenwood R5000. *

ORDER SFT 10 **$99.95**

SHIPPING
$4.50 UPS or First Class
$6 Canadian APP

SCANSTAR COMMERCIAL

ScanStar Commercial offers all the features of the popular ScanStar Professional edition plus: Multi-radio scanning with search/save (handoff) and peer strategies; Use any combination of radio type or port, port sharing for CI-V devices; Graphical User Interface (GUI) command center shows activity, history and status of channels in real time; Quickly reconfigure as the action unfolds!; Priority system with 256 levels and selectable preemption; High resolution VGA/SVGA/S3 graphics modes: 32 bit code for maximum performance on 386, 486 and 586 processors.; 640X480, 800X600 & 1024X763; and much more!

*Requires IBM PC 386/486/586 with 4 MEG RAM, hard disk, VGA/SVGA, mouse, serial port(s), DOS 5/6 or OS/2 3.0. warp. Windows and 286 not supported. Supports: R7000, R7100, R9000, FRG9600, AR3000, AR8000, NRD535, R8, and MR8100 and Optoelectronic's OS456, OS535 and DC440. **

ORDER SFT 7 **$129.95**

SHIPPING
$4.50 UPS or First Class
$6 Canadian APP
$6.50 Canadian UPS

1996 Enhanced Grove FCC Database v6.0

Available on both CD-ROM and High Density Diskette

The new Grove FCC Database is a spectacular compendium of all the licensees in the FCC Master File! Public safety, railroad, business, industrial, broadcast, maritime and many, many others. 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.
Simply choose from either CD-ROM or High Density Disk.

Grove FCC Database on CD-ROM offers a unique and useful mapping program. This program shows you on a map where your desired station is including major roadways, cities, state and county borders. To operate the mapping program you must have a VGA card, 386 or higher processor, 4 M RAM, 10 M free hard disk space, and a mouse is recommended.

Shipping for both CD-ROM and High Density Disk: $4 First Class Mail

Send in your old version for trade-in and get a new FCC-CD (w/o mapping) for only $49.95

Diskette:
FCC96 (Indicate State)-HD
— *CA, TX, FL* $49.95
Additional Data Disks $39.95
— *All Other States* $39.95
Additional Data Disks $29.95
CD-ROM:
FCC-CDM w/ Mapping: $169.95
FCC-CD w/o Mapping: $99.95

NEW: Pager Message Tracker Software V3.0!

Now DOS and Windows compatible! Ideal for law enforcement Title 18 surveillance of drug trafficking!

Now you can copy standard 512/1200/2400 baud POCSAG and 600 baud GOLAY alphanumeric digital pager messages on your 386 or higher computer. Includes SIA-200 interface with 1/8" miniplug to DB25 connector cable to connect between your system receiver or scanner and computer to keep track of your messages on a high volume system.

With the Basic Message Tracker your pager system can now monitor, record and recall, display, edit, and time stamp all conventional alphanumeric digital paging modes, monitor only selected messages from a CAP code list, and buffer and display previously-read messages.

Choose the Message Tracker Pro if you would also desire text search capability (looking for key words or numbers), handle groups of up to 100 CAP codes and addresses, or display split screen to display target messages.*
(Note: For non-law-enforcement, this product is legal only for monitoring of your own system)

Order SFT 11
Message Tracker Basic 3.0
Only **$179.95**

Order SFT 12
Message Tracker 3.0 PRO
Only **$279.95**

SHIPPING
$4.50 UPS or First Class
$6 Canadian APP
$6.50 Canadian UPS

OTHER SOFTWARE

Grove has great values on all the latest software for scanner enthusiasts, hams and shortwave listeners. Please call for additional information or availability on items not shown on these pages.

PRODUCT	CODE	PRICE
TUNE-IN SCANNER DATABASE (Organizes logged frequencies in database)	**SFT 6**	**$24.95**
CD-ROM REPEATER MAP BOOK (Ham callsign database for all platforms)	**BOK 101CD**	**$29.95**
THE SUPER DX EDGE (Determines best DX conditions, max. usable freq.)	**SFT 5**	**$29.95**

Cassette Audio Adaptor

Listen to your scanner or shortwave receiver through your home stereo, boom-box, etc. Shaped like a normal cassette, this adaptor slides into your cassette player. Your scanner or audio device then attaches to the adaptor with a 1/8" (3.5 mm) stereo or mono plug (included with flexible cord).

ORDER ACC79
$9.95

SHIPPING
$2 First Class
$4 UPS
$6 Canadian UPS

Tiny Clip-on Studio Mike

Standard 600 ohm line impedance, and 100-12,000 kHz frequency response assure crisp, clean audio. Removable tie clip, breath screen, 10' of shielded, flexible cord with 1/8" (3.5 mm) plug included.

ORDER MIC03
$4.95

SHIPPING
$2 First Class
$4 UPS
$6 Canadian UPS

Voice It™ Recorder

Record up to 60 voice messages without a bulky tape recorder. The revolutionary Voice It utilizes cutting-edge microchip memory and long-life lithium cells to give you unprecedented convenience. Batteries included.

REC 1 (1-1/2 minutes) $49.95
REC 2 (4 minutes) $69.95

SHIPPING
$5.50 UPS
$9 Canadian

Leatherman Pocket Tool

Full-size needlenose/regular pliers, wire cutters, knife blade, ruler, can/bottle opener, large and small screwdrivers, Phillips screwdriver, and more—all in a sturdy, 4", stainless steel frame! Leather belt case, 25-year warranty!

ORDER TOL 1
$39.95

SHIPPING
$6 UPS
$10 Canadian UPS

Trifield Radiation Monitors

The TST-2 (right) detects electric and magnetic fields and is so sensitive it will respond to the electric disturbance produced by someone—or something—moving in an adjacent room! A built-in tone provides audible indication of these phenomena.

It can detect the earth's magnetic field in the magnetic mode, and it can operate as an excellent field strength meter in the radio/microwave mode.

The TST-1 takes readings of home appliances, computers, microwave ovens, TV sets, electric blankets, fluorescent lights,and other sources of electromagnetic energy.

ORDER TST 1 **$119.95**
ORDER TST 2 **$199.95**

SHIPPING
$7.50 UPS
$7 US Priority Mail
$10 Canadian UPS
$7.50 Canadian APP

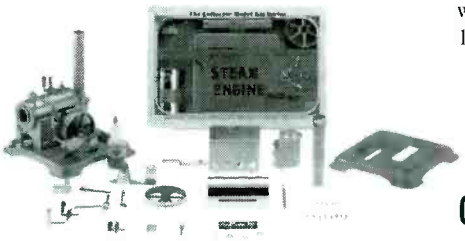
UPS Second Day Air at Ground Rates on ALL PRODUCTS!

Real, Working Steam Engines!

Since 1932, Pennsylvania's Jensen Steam Engine Co. has been hand-crafting the finest model steam engines and power generating plants for industry, schools and collectors. The Jensen family works 7 days a week, still using the actual tooling & dies from the 1930's & 40's, to keep up with the demand for their high quality steam engines. (Their engines even saw action in WWII, powering small air pumps!)

Whether you want the popular #76-kit or the rugged, deluxe cast iron #55 twin cylinder high speed steam engine, all Jensens are crafted using the finest materials: solid brass, (nickel plated, not zinc) and stainless steel—no plastic! Features include silver soldered boilers, water gauge, pop valve, whistle, throttle, lube oil and operator's manual.

The much larger Model #55 twin has a reversing lever and cast iron flywheel as standard and is also available in a power plant version, the #55-G, complete with two brass exhaust stacks, unique A/C generator/multi-speed line shaft combo, providing 9 different PTO's, (power take offs.) Reserve your piece of American history and order your Jensen today. Satisfaction guaranteed.



Order COL 7/Model 76 kit:

(Helps in Math, science & physics education, plus it's FUN!)

This unique oscillating cylinder engine, includes a $40 value package of accessories & upgrades, plus a certificate for free engraved owner's plaque. Powered with safe, dry fuel tablets. Easily asssembles in about an hour. (Size 7"x7"x8") For ages 9 and over. Shipped directly from Grove.

$124.95

SHIPPING
$11 UPS
$11 US Priority Mail
$15 Canadian APP
$15 Canadian UPS

Order COL 6/Model 55 factory assembled:

This twin-cylinder monster is truly awe-inspiring! Features a 1/2"bore, 5/8" stroke and water recovery system. Measures an impressive 10" x 15" x 10" and weighs a hefty 12 pounds!

$449.95

SHIPPING
$20 UPS
$20 US Priority Mail
$25 Canadian APP
$25 Canadian UPS

Order COL 9/Model 55-G factory assem.:

The Power Plant version of the Model 55 features two brass exhaust stacks, unique A/C generator/multi-speed line shaft combo, providing 9 different PTO's (power take offs).

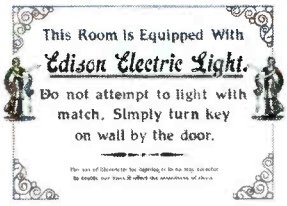
$574.95

SHIPPING
$25 UPS
$25 US Priority Mail
$35 Canadian APP
$35 Canadian UPS

Model 55 shown

NOTE: Both of the Model 55's are custom-made, signed and numbered by Mr. Jensen, and shipped directly. Allow 6 to 8 weeks for delivery.

Edison Wall Plaque



Its origin lost to the pages of history, this all-metal, 5" x 7" replica is a charming addition to any monitoring post or ham shac—a unique memento of the 19th century when electric lighting began to replace the gaslight. Satin brass-look finish and four corner holes lend authenticity to this plaque.

ORDER COL 3
$6.95

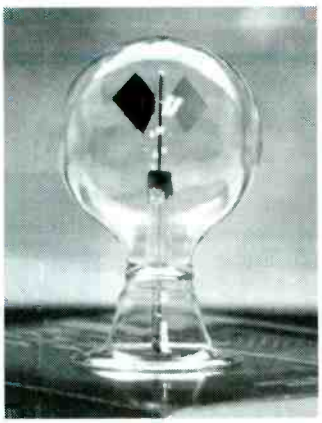
SHIPPING
$3 First Class
$4 UPS
$5.50 Canadian APP
$6 Canadian UPS

The Edison Bulb!

Functional reproduction of the original carbon-filament Edison electric lamp is a rare find. Its warm glow provides a nostalgic reminder of simpler times past. A delightful highlight for the radio room. Standard brass screw base, 60W (nom.). Porcelain fixture not included.

ORDER COL 8
$6.95

SHIPPING
$3 First Class
$4 UPS
$5.50 Canadian APP
$6 Canadian UPS



Spinning Vane Radiometer!

Probably every science museum finds its briskest sales in these eye-catching glass bulbs with their spinning white and black vanes. Demonstrating kinetic energy from light photons, this "perpetual motion" device will continue to spin as long as enough light is present. A conversation piece for the desk and a superb gift for the science enthusiast.

ORDER COL 1
$6.95

SHIPPING
$3 First Class
$4 UPS
$5.50 Canadian APP
$6 Canadian UPS

Personal Radiation Detector

A Relic from the Cold War

Nuclear winter—the Red Menace—pressing issues in the 1960s-70s, and this personal **Radiac meter** was worn by military personnel attending our nuclear missile silos or exposed to high levels of gamma rays (.02-200r/hr). Originally costing nearly $150 each, these few remaining relics were just uncovered in a military warehouse. Used, these meters may or may not work and are sold for display or experimentation only. Measures 2-1/4" x 3-3/4". Batteries and nuclear missile not included.

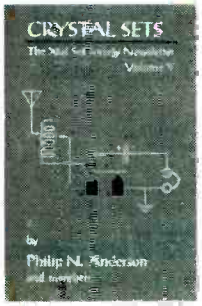
ORDER COL 5
$9.95

SHIPPING
$5.50 UPS
$5 US Priority Mail
$6.50 Canadian APP
$8 Canadian UPS

GROVE

New!

CRYSTAL SETS, Volume V



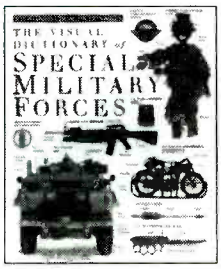
by Philip N. Anderson

Nothing evokes the nostalgic memories of old time radio like the crystal set; a long wire aerial and a chunk of galena bringing in music and voices for hundreds of miles. Phil Anderson tells us how to do it in this compilation of newsletters and correspondence of the Xtal Set Society—88 pages of hints and kinks for antennas, headsets, choosing crystal materials, detecting whistlers, grounding, and more. Use shipping code A.

BOK 88 ..... $9.95

THE VISUAL DICTIONARY OF SPECIAL MILITARY FORCES

New!

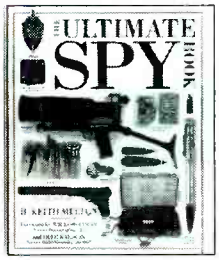


This colorful collection of more than 200 photographs and graphic illustrations shows the fantastic tools of America's OSS, Britains SOE, and many other super-secret insurgent forces since the beginning of World War II. Pencil bombs and other exotic weapons, covert communications and code machiines, survival and sabotage kits, spy cameras and special vehicles—they're all in this eye-opening, hard-cover collection. Use shipping code B.

BOK 108 ..... $16.95

New!

THE ULTIMATE SPY BOOK



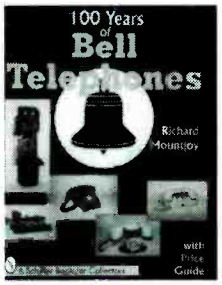
by H. Keith Melton

The consummate spy memorabilia collector has finally published his extensive catalog of museum pieces from hot and cold wars, more than 600 glossy color photos, from the Civil War to the present, documented with gripping anecdotal accounts. Examples: suitcase radios, ciphering equipment, spy cameras, microdots, and fanciful concealments. Use shipping code B.

BOK 62 ..... $29.95

New!

ONE HUNDRED YEARS OF BELL TELEPHONE



by Richard D. Mountjoy

From the coffin sets of the late 1870s through the Princess phones of the 1960s and beyond, This definitive, new publication contains 350 color photos and exhaustive historical and technical information for telephone collectors, technical historians, and restorers. Use shipping code B.

BOK 70 ..... $29.95

New!

PHILCO RADIO: 1928-1942

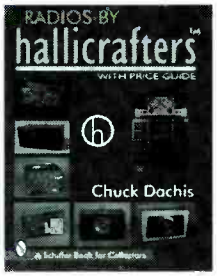
by Michael Prosise

Just a glance through this nostalgic collection evokes warm thoughts of families in front of the fireplace, listening to Fibber McGee and Molly, Jack Benny, and the myriad radio programs that populated the unspoiled airwaves of radio's Golden Age. Over 800 illustrations, most in color, highlight this year-by-year chronology of the most popular home radio ever made. Use shipping code B.

BOK 71 ..... $29.95

New!

RADIOS BY HALLICRAFTERS



by Chuck Dachis

Contains over 1000 photos of Hallicrafters receivers, transmitters, TVs, accessories and literature, this new, informative directory includes descriptions of every known model made by Hallicrafters, including dates, accessories and pricing. Use shipping code B.

BOK 65 ..... $29.95

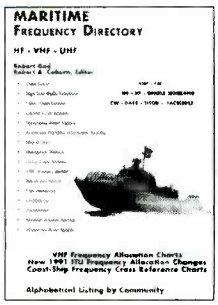
THE ZENITH TRANSOCEANIC ... THE ROYALTY OF RADIOS

By John Bryant and Harold Cones

No manufacturer has drawn more recent attention from the vintage radio collector than Zenith, maker of the legend Trans-Oceanic series. Flea markets are being combed for this popular collectible. This lavishly illustrated, glossy, historical essay is the most complete work ever done on the fabled Zenith. Fascinating to read, beautiful to admire. Ideal as a gift for the collector and the radio hobbyist. Use shipping code B. Target Audience: general.

BOK 102 ..... $24.95

US MARITIME FREQUENCY DIRECTORY



By Robert Gad and Robert A. Coburn

Whether your maritime listening interests involve a scanner or a shortwave receiver, this is the book for you! A massive compilation from official lists of US Coast Guard, high seas radio telephone, coastal and ship stations, emergency distress, marine operator, weather service, inland waterways, and more! Use shipping code B. Target Audience: general.

BOK 52 ..... $24.95

UPS Second Day Air at Ground Rates on ALL PRODUCTS!

FREQUENCIES

1100-1200	Australia, Radio	9580pa	9615as	9860pa	12080pa
		13605as	21725as		
1100-1200 vl	Australia, VL8A Alice Spg	2310do			
1100-1200 vl	Australia, VL8K Katherine	2485do			
1100-1200 vl	Australia, VL8T Tent Crk	4910do			
1100-1130 mtwhfa	Belgium, R Vlaanderen Int	6035eu	15545af	17595af	
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, Adv World R	7375am	9725am	13750am	
1100-1200	Costa Rica,RF Peace Intl	7385am			
1100-1200 s	Denmark, Radio ABC	7570eu			
1100-1130	Ecuador, HCJB	9445pa	12005am		
1100-1200 as	Eqt Guinea, R East Africa	15186af			
1100-1200	Eqt Guinea, Radio Africa	9530as			
1100-1150	Germany, Deutsche Welle	15370af	15410af	17715af	17800af
		17860af	21600af		
1100-1200	Iraq, Radio Iraq Intl	13680eu			
1100-1200 vl	Italy, IRRS	7125va			
1100-1200	Japan, NHK/Radio	6120na	9610as	15350as	
1100-1200	Jordan, Radio	11970eu			
1100-1200	Lebanon, Voice of Hope	9990va			
1100-1200	Malaysia, Radio	7295do			
1100-1200 vl	Malaysia, RTM Kuching	7160do			
1100-1200 vl	Malaysia,RTM KotaKinabalu	5980do			
1100-1125	Netherlands, Radio	6045as	9650as	12065as	13705as
1100-1200	New Zealand, R NZ Intl	9700pa			
1100-1150	North Korea, R Pyongyang	6575na	9975na	11335na	
1100-1115	Pakistan, Radio	15470eu	17900eu		
1100-1130 as	Palau, KHBN/Voice of Hope	9730as			
1100-1200 vl	Papua New Guinea, NBC	4890do			
1100-1200	Russia,Voice of Russia WS	4740as	11655as	15460as	15520as
		15560as	17560as	17755as	17775as
		17870as			
1100-1200	Singapore,R Singapore Int	6015as	6155as		
1100-1130	Switzerland, Swiss R Intl	6165eu	9535eu	13635as	15415as
		17515as			
1100-1200	Taiwan, Voice of Asia	7445as			
1100-1200	United Kingdom, BBC WS	5965na	6190af	6195va	7180as
		9410eu	9580as	9740va	11750as
		11760as	11940af	11955as	12095eu
		15220va	15310as	15575me	17640va
		17705va	17830af	17885af	21660af
1100-1130	United Kingdom, BBC WS	9700au	15190sa	15400eu	17790va
1100-1200	USA, KAIJ Dallas TX	5810am	9815am		
1100-1200	USA, KTBN Salt Lk City UT	7510am			
1100-1200	USA, KWHR Naalehu HI	9930as			
1100-1200	USA, Monitor Radio Intl	6095na	7395sa		
1100-1200	USA, Voice of America	5985va	6110va	6165am	7405am
		9590am	9645va	9760va	11720va
		15160va	15425va		
1100-1200	USA, WEWN Birmingham AL	7425na	15665eu		
1100-1200	USA, WGTG McCaysville GA	6950am	9400am		
1100-1200	USA, WHRI Noblesville IN	6040am	6185am		
1100-1200	USA, WJCR Upton KY	7490na	13595na		
1100-1200 as	USA, WVHA Greenbush ME	13825am			
1100-1200	USA, WWCR Nashville TN	5935am	7435am	9475am	15685am
1100-1200	USA, WYFR Okeechobee FL	5950na	11830na		
1100-1200 vl/m-f	Vatican State, Vatican R	5880eu			
1100-1130	Vietnam, Voice of	7285as	9730as		
1100-1200	Zambia, Christian Voice	6065af			
1115-1127	Zambia, ZNBC Radio 1	7220do			
1115-1200	Zambia, ZNBC Radio 2	6165do			
1130-1155	Austria, R Austria Intl	13730na			
1130-1200 vl	China, China Radio Intl	8660as	11445as	11700as	
1130-1200	Ecuador, HCJB	15115na	21455am		
1130-1200	Finland, YLE/R Finland	11900na	15400na		
1130-1200	Iran, VOIRI	11875me	11930me	15260af	
1130-1200	Myanmar, Voice of	5990do			
1130-1200	Netherlands, Radio	6045eu	7190eu		
1130-1200	Sweden, Radio	11650na	15240na		
1130-1200 f	Vatican State, Vatican R	15210as	15570as	17550au	
1135-1140	India, All India Radio	9595do	11620do	11710do	15185do
1138-1155 1&3rd s	Denmark, R Denmark Intl	7295eu	17740af		

SELECTED PROGRAMS

Sundays

1100 Russia, Voice of: News. See S 0000.
1100 USA, VOA Washington DC (as/ca): VOA News. See S 0000.
1110 USA, VOA Washington DC (as): New Horizons. A twenty-minute documentary on a scientific, technological, or medical subject.
1110 USA, VOA Washington DC (ca): Critic's Choice. The performing arts in America.
1111 Russia, Voice of: Science and Engineering in the CIS. See S 0611.
1130 Russia, Voice of: News in Brief. See S 0030.
1130 USA, VOA Washington DC (as): Issues in the News. Members of the Washington press corps discuss current topics.
1130 USA, VOA Washington DC (ca): Studio One. Dramatizations and documentaries on significant events and personalities.
1132 Russia, Voice of: Kaleidoscope. A variety of topics ranging from science and ecology to cultural matters.

Mondays

1100 Russia, Voice of: News. See S 0000.
1100 USA, VOA Washington DC (as/ca): VOA News. See S 0000.
1110 USA, VOA Washington DC (as): Science Report (Special English). Developments in the world of science and technology.
1110 USA, VOA Washington DC (ca): Stateside. See M 0430.
1111 Russia, Voice of: Science and Engineering in the CIS. See S 0611.
1115 USA, VOA Washington DC (as): This is America (Special English). See M 0045.
1130 Russia, Voice of: News in Brief. See S 0030.
1130 USA, VOA Washington DC (as): Music USA (Standards). Classics of American popular music.
1132 Russia, Voice of: Kaleidoscope. See S 1132.

Tuesdays

1100 Russia, Voice of: News. See S 0000.
1100 USA, VOA Washington DC (as/ca): VOA News. See S 0000.
1110 USA, VOA Washington DC (as): Agriculture Report (Special English). See T 0040.
1110 USA, VOA Washington DC (ca): Stateside. See M 0430.
1111 Russia, Voice of: Commonwealth Update. See M 2311.
1115 USA, VOA Washington DC (as): Science In the News (Special English . See T 0045.
1130 Russia, Voice of: News In Brief. See S 0030.
1130 USA, VOA Washington DC (as): Now Music USA. See T 0030.
1132 Russia, Voice of: Russian by Radio. See M 0132.

Wednesdays

1100 Russia, Voice of: News. See S 0000.
1100 USA, VOA Washington DC (as/ca): VOA News. See S 0000.
1110 USA, VOA Washington DC (as): Science Report (Special English). See M 1110.
1110 USA, VOA Washington DC (ca): Stateside. See M 0430.
1111 Russia, Voice of: Commonwealth Update. See M 2311.
1115 USA, VOA Washington DC (as): Exploration (Special English). See W 0045.
1130 Russia, Voice of: News in Brief. See S 0030.
1130 USA, VOA Washington DC (as): Now Music USA. See T 0030.
1132 Russia, Voice of: Audio Book Club. See S 0132.

Thursdays

1100 Russia, Voice of: News. See S 0000.
1100 USA, VOA Washington DC (as/ca): VOA News. See S 0000.
1110 USA, VOA Washington DC (as): Science Report (Special English). See M 1110.
1110 USA, VOA Washington DC (ca): Stateside. See M 0430.
1111 Russia, Voice of: Commonwealth Update. See M 2311.
1115 USA, VOA Washington DC (as): The Making of a Nation (Special English). See H 0045.
1130 Russia, Voice of: News in Brief. See S 0030.
1130 USA, VOA Washington DC (as): Now Music USA (Top Ten). Top ten pop music hits of the week in the USA.
1132 Russia, Voice of: Russian by Radio. See M 0132.

Fridays

1100 Russia, Voice of: News. See S 0000.
1100 USA, VOA Washington DC (as/ca): VOA News. See S 0000.
1110 USA, VOA Washington DC (as): Environment Report (Special English). See F 0040.
1110 USA, VOA Washington DC (ca): Stateside. See M 0430.
1111 Russia, Voice of: Commonwealth Update. See M 2311.
1115 USA, VOA Washington DC (as): American Mosaic (Special English). See F 0045.
1130 Russia, Voice of: News in Brief. See S 0030.
1130 USA, VOA Washington DC (as): Country Music USA. Country, bluegrass, and western swing, plus conversations with country performers.
1132 Russia, Voice of: Audio Book Club. See S 0132.

Saturdays

1100 Russia, Voice of: News. See S 0000.
1100 USA, VOA Washington DC (as/ca): VOA News. See S 0000.
1110 USA, VOA Washington DC (as/ca): Agriculture Today. See S 0010.
1111 Russia, Voice of: Commonwealth Update. See M 2311.
1130 Russia, Voice of: News in Brief. See S 0030.
1130 USA, VOA Washington DC (as): Press Conference USA. See S 0130.
1130 USA, VOA Washington DC (ca): Music USA (Standards). See M 1130.
1132 Russia, Voice of: Timelines. See M 0332.

1200 UTC SHORTWAVE GUIDE 7:00 AM EST 4:00 AM PST

Frequencies

1200-1300	Australia, Radio	5995pa	9580pa	9615as	9710as
		9770as	9860pa	11660as	11800pa
1200-1300	Brazil, Radio Bras	15445na			
1200-1215	Cambodia, Natl Voice of	11940as			
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			
1200-1259	Canada, R Canada Intl	9640am	11855am	13650am	
1200-1300	China, China Radio Intl	7385na	7410as	9565as	9715as
		11660as	11795pa	15440au	
1200-1230 vl	China, China Radio Intl	8660as	11445as	11700as	12110as
1200-1300	Costa Rica, Adv World R	5030am	6150am	9725am	13750am
1200-1300	Costa Rica,RF Peace Inti	7385am	15050am		
1200-1300 s	Denmark, Radio ABC	7570eu			
1200-1300	Ecuador, HCJB	12005am	15115am	21455am	
1200-1300 as	Eqt Guinea, R East Africa	15186af			
1200-1300	Eqt Guinea, Radio Africa	9530as			
1200-1300	France, Radio France Intl	9805eu	11600as	11670as	13625am
		15155eu	15195eu	15325af	15530ca
1200-1230	Iran, VOIRI	11875me	11930me	15260af	
1200-1300	Iraq, Radio Iraq Intl	13680eu			
1200-1300 vl	Italy, IRRS	7125va			
1200-1300	Lebanon, Voice of Hope	9990va			
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			
1200-1230 s	Norway, Radio Norway Intl	9590eu	11840na	13800eu	15305eu
1200-1300	Russia,Voice of Russia WS	7150va	9835oa	11655as	11800pa
		12025as	15520as	17560as	17775as
		17870pa			
1200-1300	Singapore,R Singapore Int	6015as	6155as		
1200-1300	South Korea, R Korea Intl	7285va			
1200-1300	Taiwan, VO Free China	7130au	9610as		
1200-1300	United Kingdom, BBC WS	5965na	6190af	6195va	7180as
		9410eu	9580as	9740va	11750as
		11760as	11940af	11955as	12095eu
		15220va	15310as	15575me	17640va
		17705va	17830af	17885af	21660af
1200-1300	USA, KAIJ Dallas TX	5810am	9815am		
1200-1300	USA, KTBN Salt Lk City UT	7510am			
1200-1300	USA, KWHR Naalehu HI	9930as			
1200-1300	USA, Monitor Radio Intl	6095na	9355as	9430pa	9455sa
1200-1300	USA, Voice of America	6110va	9645va	9760va	11715va
		15160va	15425va		
1200-1300	USA, WEWN Birmingham AL	7425na	15665eu		
1200-1300	USA, WGTG McCaysville GA	6950am	9400am		
1200-1300	USA, WHRI Noblesville IN	6040am	6185am		
1200-1300	USA, WJCR Upton KY	7490na	13595na		
1200-1300 as	USA, WVHA Greenbush ME	13825va			
1200-1300	USA, WWCR Nashville TN	5935am	7435am	9475am	15685am
1200-1300	USA, WYFR Okeechobee FL	5950na	6015na	11830na	17750na
1200-1230	Uzbekistan, R Tashkent	7190as	9715as	15295as	
1200-1300	Zambia, Christian Voice	6065af			
1200-1300 mtwhf	Zambia, ZNBC Radio 2	6165do			
1206-1300 occsnal	New Zealand, R NZ Intl	6105pa			
1215-1300	Egypt, Radio Cairo	17595as			
1230-1300 as	Australia, Radio	5995pa			
1230-1300	Bangladesh, Radio	7185as	9548as		
1230-1300	Bulgaria, Radio	13790as			
1230-1259	Canada, R Canada Intl	6150as	15195as		
1230-1300 mtwhf	Finland, YLE/R Finland	11900na	15400na		
1230-1235	India, All India Radio	4860do	6185do	17865do	
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	Mongolia, R Ulan Bator	9745as	12085as		
1230-1300	South Korea, R Korea Intl	9570as	9640as	13670as	
1230-1300 mtwhf	Sri Lanka, Sri Lanka BC	15425as			
1230-1300	Sweden, Radio	13740as	15240pa		
1230-1300	Thailand, Radio	9655as	9885as	11905as	
1230-1300	Vietnam, Voice of	5940as	7270as	7400as	9840as
		12020as	15010as		
1238-1255 1&3rd s	Denmark, R Denmark Intl	9590va	13800va	15305va	15480va
1240-1250	Greece, Voice of	9915af	11645af	15650af	

Selected Programs

Sundays

1200 Russia, Voice of: News. See S 0000.
1200 USA, VOA Washington DC (as): VOA News. See S 0000.
1200 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
1210 USA, VOA Washington DC (as): Encounter. Two experts debate their contrasting views on a subject of current importance.
1211 Russia, Voice of: News and Views. See S 0011.
1230 Russia, Voice of: News in Brief. See S 0030.
1230 USA, VOA Washington DC (as): Studio One. See S 1130.
1230 USA, VOA Washington DC (as): The Writers' World (monthly). American poet, journalist and human rights activist Rose Styron interviews her American and international contemporaries.
1232 Russia, Voice of: This is Russia. See S 0032.

Mondays

1200 Russia, Voice of: News. See S 0000.
1200 USA, Monitor Radio Intl: Monitor Radio News. Five minutes of the latest world news at the beginning of the hour.
1200 USA, VOA Washington DC (as): VOA News. See S 0000.
1200 USA, WJCR Upton KY: Prayer Line. See M 0600.
1206 USA, Monitor Radio Intl: Monitor Radio International. News, analysis, commentary, interviews and features in a magazine format.
1210 USA, VOA Washington DC (as): Stateside. See M 0430.
1211 Russia, Voice of: News and Views. See S 0011.
1230 Russia, Voice of: News in Brief. See S 0030.
1232 Russia, Voice of: Music at Your Request. Music as requested by listeners.
1249 USA, Monitor Radio Intl: Letterbox. Listeners make their views known by telephone or letter to host Lisa Dale.
1252 USA, Monitor Radio Intl: Religious Article from the CSM. As published in the christian Science Monitor.

Tuesdays

1200 Russia, Voice of: News. See S 0000.
1200 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
1200 USA, VOA Washington DC (as): VOA News. See S 0000.
1200 USA, WJCR Upton KY: Prayer Line. See M 0600.
1206 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
1210 USA, VOA Washington DC (as): Stateside. See M 0430.
1211 Russia, Voice of: News and Views. See S 0011.
1230 Russia, Voice of: News In Brief. See S 0030.
1232 Russia, Voice of: Folk Box. See M 0032.
1249 USA, Monitor Radio Intl: Letterbox. See M 1249.
1252 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Wednesdays

1200 Russia, Voice of: News. See S 0000.
1200 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
1200 USA, VOA Washington DC (as): VOA News. See S 0000.
1200 USA, WJCR Upton KY: Prayer Line. See M 0600.
1206 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
1210 USA, VOA Washington DC (as): Stateside. See M 0430.
1211 Russia, Voice of: News and Views. See S 0011.
1230 Russia, Voice of: News in Brief. See S 0030.
1232 Russia, Voice of: Folk Box. See M 0032.
1249 USA, Monitor Radio Intl: Letterbox. See M 1249.
1252 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Thursdays

1200 Russia, Voice of: News. See S 0000.
1200 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
1200 USA, VOA Washington DC (as): VOA News. See S 0000.
1200 USA, WJCR Upton KY: Prayer Line. See M 0600.
1206 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
1210 USA, VOA Washington DC (as): Stateside. See M 0430.
1211 Russia, Voice of: News and Views. See S 0011.
1230 Russia, Voice of: News In Brief. See S 0030.
1232 Russia, Voice of: The Jazz Show. See M 0532.
1249 USA, Monitor Radio Intl: Letterbox. See M 1249.
1252 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Fridays

1200 Russia, Voice of: News. See S 0000.
1200 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
1200 USA, VOA Washington DC (as): VOA News. See S 0000.
1200 USA, WJCR Upton KY: Prayer Line. See M 0600.
1206 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
1210 USA, VOA Washington DC (as): Stateside. See M 0430.
1211 Russia, Voice of: News and Views. See S 0011.
1230 Russia, Voice of: News in Brief. See S 0030.
1232 Russia, Voice of: Yours for the Asking. See T 0032.
1249 USA, Monitor Radio Intl: Letterbox. See M 1249.
1252 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Saturdays

1200 Russia, Voice of: News. See S 0000.
1200 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
1200 USA, VOA Washington DC (as): VOA News. See S 0000.
1200 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
1206 USA, Monitor Radio Intl: Christian Science Sentinel Radio Edition. See A 0206.
1210 USA, VOA Washington DC (as): On the Line. See S 0110.
1211 Russia, Voice of: News and Views. See S 0011.
1230 Russia, Voice of: News in Brief. See S 0030.
1230 USA, VOA Washington DC (as): Communications World. See S 0030.
1232 Russia, Voice of: Music at Your Request. See M 1232.

Frequencies

1300-1400	Australia, Radio	5995pa	9580pa	9615as	11800pa
1300-1320	Brazil, Radio Bras	15445na			
1300-1330	Bulgaria, Radio	13790as			
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			
1300-1359 mtwhfa	Canada, R Canada Intl	9640am	11855am	13650am	
1300-1400	China, China Radio Intl	7385na	9715as	11660pa	
1300-1330	China, China Radio Intl	7410as			
1300-1400	Costa Rica,RF Peace Intl	7385am	15050am		
1300-1330	Czech Rep, Radio Prague	11660eu	17845af		
1300-1400	Ecuador, HCJB	12005am	15115am	21455am	
1300-1330	Egypt, Radio Cairo	17595as			
1300-1400 as	Eqt Guinea, R East Africa	15186af			
1300-1400	Eqt Guinea, Radio Africa	9530as			
1300-1400	Iraq, Radio Iraq Intl	13680as			
1300-1400 vl	Italy, IRRS	7125va			
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		
1300-1400 occsnal	New Zealand, R NZ Intl	6105pa			
1300-1350	North Korea, R Pyongyang	9345as	9640eu	11740as	15230as
		15430as			
1300-1330 s	Norway, Radio Norway Intl	11840na	13800as	15340na	
1300-1400	Philippines, FEBC/R Intl	11995as			
1300-1355	Poland, Polish R Warsaw	6095eu	7145eu	7270eu	9525eu
		11815eu			
1300-1400	Romania, R Romania Intl	9690eu	11940eu	15365eu	17720eu
1300-1400	Russia,Voice of Russia WS	15460as	15560as	17755as	
1300-1400	Singapore,R Singapore Int	6015as	6155as		
1300-1400 mtwhf	Sri Lanka, Sri Lanka BC	15425as			
1300-1330	Switzerland, Swiss R Intl	7230as	7480as	13635as	15240as
1300-1400	Switzerland, Swiss R Intl	6165eu	9535eu		
1300-1400	United Kingdom, BBC WS	5965na	5990as	6190af	6195va
		9410eu	9515va	9590va	9740as
		11750as	11760as	11940af	12095eu
		15220am	15310as	15420af	15575me
		17640va	17705va	17830af	17885af
	21470af	21660af			
1300-1400	USA, KAIJ Dallas TX	5810am	15725am		
1300-1400	USA, KTBN Salt Lk City UT	7510am			
1300-1400	USA, KWHR Naalehu HI	9930as			
1300-1400	USA, Monitor Radio Intl	6095na	9355as	9385as	9455na
1300-1400	USA, Voice of America	6110va	9645va	9760va	15160va
		15425va			
1300-1330	USA, Voice of America	11715va			
1300-1400	USA, WEWN Birmingham AL	9580na	11875na	15665eu	
1300-1400	USA, WGTG McCaysville GA	6950am	9400am		
1300-1400	USA, WHRI Noblesville IN	6040am	15105am		
1300-1400	USA, WJCR Upton KY	7490na	13595na		
1300-1330 s	USA, WRMI/R Miami Intl	9955am			
1300-1400 as	USA, WVHA Greenbush ME	15745eu			
1300-1400	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1300-1400	USA, WYFR Okeechobee FL	5950na	11830na	13695na	17750na
1300-1400	Zambia, Christian Voice	6065af			
1300-1330 mtwhf	Zambia, ZNBC Radio 2	6165do			
1330-1355	Austria, R Austria intl	6155eu	13730eu		
1330-1400	Bulgaria, Radio	15620as			
1330-1359 s	Canada, R Canada Intl	11855am	11935eu	15325va	21455va
1330-1359 mtwhfa	Canada, R Canada Intl	17820va			
1330-1359	Canada, R Canada Intl	9535as	11795as		
1330-1400	Guam, AWR/KSDA	9650as			
1330-1400	India, All India Radio	11620as	13750as		
1330-1400	Netherlands, Radio	9895as	13700as	15585as	
1330-1400 vl	Pakistan, Radio	11570af	13590me	15565me	
1330-1400	Sweden, Radio	9830as	13740na	15245na	
1330-1355	UAE, Radio Dubai	13675eu	15395eu	17630eu	21605me
1330-1400 mtwhf	USA, WRMI/R Miami Intl	9955am			
1330-1400	Uzbekistan, R Tashkent	7190as	9715as	15295as	
1330-1400	Vietnam, Voice of	5940eu	7270eu	7400eu	9840eu
		12020eu	15010eu		
1330-1400	Yugoslavia, Radio	11835eu			
1338-1355 1&3rd s	Denmark, R Denmark intl	9590va	13800va	15305va	15340va
1345-1400	Vatican State, Vatican R	9500as	11625as	13765au	

Selected Programs

Sundays

1300 Russia, Voice of: News. See S 0000.
1300 USA, VOA Washington DC (as): VOA News. See S 0000.
1310 USA, VOA Washington DC (as): Critic's Choice. See S 1110.
1311 Russia, Voice of: Music and Musicians. See S 0211.
1330 USA, VOA Washington DC (as): News (Special English). See S 0030.
1340 USA, VOA Washington DC (as): Words and Their Stories (Special English). See S 0040.
1345 USA, VOA Washington DC (as): People in America (Special English). See S 0045.

Mondays

1300 Russia, Voice of: News. See S 0000.
1300 USA, VOA Washington DC (as): VOA News. See S 0000.
1310 USA, VOA Washington DC (as): All About English. See S 0010.
1311 Russia, Voice of: Newmarket. This program tells where and how to invest in Russia, how to sell your product, or start a business.
1330 Russia, Voice of: News in Brief. See S 0030.
1330 USA, VOA Washington DC (as): News (Special English). See S 0030.
1332 Russia, Voice of: Russian by Radio. See M 0132.
1340 USA, VOA Washington DC (as): Development Report (Special English). See M 0040.
1345 USA, VOA Washington DC (as): This is America (Special English). See M 0045.

Tuesdays

1300 Russia, Voice of: News. See S 0000.
1300 USA, VOA Washington DC (as): VOA News. See S 0000.
1310 USA, VOA Washington DC (as): All About English. See S 0010.
1311 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
1330 Russia, Voice of: News in Brief. See S 0030.
1330 USA, VOA Washington DC (as): News (Special English). See S 0030.
1332 Russia, Voice of: This is Russia. See S 0032.
1340 USA, VOA Washington DC (as): Agriculture Report (Special English). See T 0040.
1345 USA, VOA Washington DC (as): Science in the News (Special English). See T 0045.

Wednesdays

1300 Russia, Voice of: News. See S 0000.
1300 USA, VOA Washington DC (as): VOA News. See S 0000.
1310 USA, VOA Washington DC (as): All About English. See S 0010.
1311 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
1330 Russia, Voice of: News in Brief. See S 0030.
1330 USA, VOA Washington DC (as): News (Special English). See S 0030.
1332 Russia, Voice of: Moscow Yesterday and Today. See S 0532.
1340 USA, VOA Washington DC (as): Science Report (Special English). See M 1110.
1345 USA, VOA Washington DC (as): Exploration (Special English). See W 0045.

Thursdays

1300 Russia, Voice of: News. See S 0000.
1300 USA, VOA Washington DC (as): VOA News. See S 0000.
1310 USA, VOA Washington DC (as): All About English. See S 0010.
1311 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
1330 Russia, Voice of: News in Brief. See S 0030.
1330 USA, VOA Washington DC (as): News (Special English). See S 0030.
1332 Russia, Voice of: This is Russia. See S 0032.
1340 USA, VOA Washington DC (as): Science Report (Special English). See M 1110.
1345 USA, VOA Washington DC (as): The Making of a Nation (Special English). See H 0045.

Fridays

1300 Russia, Voice of: News. See S 0000.
1300 USA, VOA Washington DC (as): VOA News. See S 0000.
1310 USA, VOA Washington DC (as): All About English. See S 0010.
1311 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
1330 Russia, Voice of: News in Brief. See S 0030.
1330 USA, VOA Washington DC (as): News (Special English). See S 0030.
1332 Russia, Voice of: Moscow Yesterday and Today. See S 0532.
1340 USA, VOA Washington DC (as): Environment Report (Special English). See F 0040.
1345 USA, VOA Washington DC (as): American Mosaic (Special English). See F 0045.

Saturdays

1300 Russia, Voice of: News. See S 0000.
1300 USA, VOA Washington DC (as): VOA News. See S 0000.
1310 USA, VOA Washington DC (as): All About English. See S 0010.
1311 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
1330 Russia, Voice of: News in Brief. See S 0030.
1330 USA, VOA Washington DC (as): News (Special English). See S 0030.
1332 Russia, Voice of: Your Top Tune. See S 0332.
1340 USA, VOA Washington DC (as): In the News (Special English). See A 0040.
1345 USA, VOA Washington DC (as): American Stories (Special English). See A 0045.
1347 Russia, Voice of: You Write to Moscow. See S 0347.

1400 UTC SHORTWAVE GUIDE 9:00 AM EST 6:00 AM PST

Frequencies

1400-1500	Australia, Radio	5995pa	9580pa	9860pa	11660as
		11800pa	12080pa		
1400-1500 mtwhfa	Belgium, R Vlaanderen Int	13685na	13795as		
1400-1430	Bulgaria, Radio	15620as			
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			
1400-1459	Canada, R Canada Intl	11855au	13650am		
1400-1500	China, China Radio Intl	7405na	9530as	9785as	11815as
1400-1500	Costa Rica,RF Peace Intl	7385am	15050am		
1400-1500	Ecuador, HCJB	21455am			
1400-1430	Ecuador, HCJB	12005am	15115am		
1400-1500 as	Eqt Guinea, R East Africa	15186af			
1400-1500	France, Radio France Intl	7110as	15405as	17560me	
1400-1500	India, All India Radio	11620as	13750as		
1400-1430 vl	Italy, IRRS	7125va			
1400-1500	Japan, NHK/Radio	9535na	9610as	11705na	11895as
		11915as			
1400-1500	Jordan, Radio	11970eu			
1400-1500	Malaysia, Radio	7295do			
1400-1500 vl	Malaysia, RTM Kuching	7160do			
1400-1500 vl	Malaysia,RTM KotaKinabalu	5980do			
1400-1430	Mexico, Radio Mexico Intl	5985na	9705na		
1400-1500	Netherlands, Radio	9895as	13700as	15585as	
1400-1500 occsnal	New Zealand, R NZ Intl	6105pa			
1400-1430 as	Palau, KHBN/Voice of Hope	9730as			
1400-1500	Philippines, FEBC/R Intl	11995as			
1400-1500	Russia,Voice of Russia WS	4740as	4975as	15110as	15435as
		15510as			
1400-1500	Sri Lanka, Sri Lanka BC	15425as			
1400-1430	Thailand, Radio	9655as	9830as	11905as	
1400-1500	United Kingdom, BBC WS	5990as	6195as	7205as	9410eu
		9515na	9590va	9740as	11750as
		11865am	11940af	12095eu	15220am
		15260na	15575me	17640va	17705va
		17830af	17840af	21470af	
1400-1500	USA, KAIJ Dallas TX	13815am			
1400-1500	USA, KJES Mesquite NM	11715na			
1400-1500	USA, KNLS Anchor Point AK	7365as			
1400-1500	USA, KTBN Salt Lk City UT	7510am			
1400-1500	USA, Monitor Radio Intl	9355as	12160pa		
1400-1500	USA, Voice of America	6110va	6160as	7125as	7215as
		9645as	9760as	15255va	15395as
		15425va			
1400-1500	USA, WEWN Birmingham AL	9580na	11875na	15665eu	
1400-1500	USA, WGTG McCaysville GA	6950am	9400am		
1400-1500	USA, WHRI Noblesville IN	6040am	15105am		
1400-1500	USA, WJCR Upton KY	7490na	13595na		
1400-1500 mtwhf	USA, WRMI/R Miami Intl	9955am			
1400-1500	USA, WRNO New Orleans LA	15420am			
1400-1500 as	USA, WVHA Greenbush ME	15745eu			
1400-1500	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1400-1500	USA, WYFR Okeechobee FL	11550as	11830na	17750eu	
1400-1415	Vatican State, Vatican R	9500as	11625as	13765au	
1400-1500	Zambia, Christian Voice	6065af			
1400-1405 mtwhf	Zambia, ZNBC Radio 2	6165do			
1405-1410	Croatia, Croatian Radio	5920eu	7165eu	13830am	
1415-1500 mtwhfa	Bhutan, Bhutan BC Service	5030do			
1415-1425	Nepal, Radio	7165do			
1430-1455 s	Belgium, R Vlaanderen Int	13685na			
1430-1500 vl	China, China Radio Intl	8660as	9880as	11445as	15135as
1430-1440	India, All India Radio	3945do	6185do	9565do	9685do
1430-1440 mtwhf	Indonesia, RRI Uj Pandang	4753do			
1430-1500 vl	Italy, IRRS	3985va			
1430-1500 mtwhf	Portugal, R Portugal Intl	21515me			
1430-1500	Romania, R Romania Intl	11775as	15335as		
1430-1500	United Kingdom, BBC WS	15400af			
1435-1445	Greece, Voice of	12105na	15175na		
1438-1455 1&3rd s	Denmark, R Denmark Intl	13800na	15340as		
1440-1500	Myanmar, Voice of	5990do			
1458-1500	Seychelles, FEBA Radio	9810as	11870as		

Selected Programs

Sundays

1400 Russia, Voice of: News. See S 0000.
1400 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1400 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
1410 USA, VOA Washington DC (as/eu): The Concert Hall. Classical music and interviews with America's great artists and conductors.
1411 Russia, Voice of: Science and Engineering in the CIS. See S 0611.
1430 Russia, Voice of: News in Brief. See S 0030.
1432 Russia, Voice of: Your Top Tune. See S 0332.
1447 Russia, Voice of: You Write to Moscow. See S 0347.
1457 USA, VOA Washington DC (as/eu): VOA Editorial. Comments expressing the official position of the U.S. Government on various subjects.

Mondays

1400 Russia, Voice of: News. See S 0000.
1400 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1400 USA, WJCR Upton KY: Don Powell. Preaching from Upton, Kentucky.
1410 USA, VOA Washington DC (as/eu): Asia Report. Correspondents' reports and background on the news, with emphasis on events in East and South Asia.
1411 Russia, Voice of: Moscow Mailbag. See S 0111.
1430 Russia, Voice of: News in Brief. See S 0030.
1432 Russia, Voice of: Audio Book Club. See S 0132.
1457 USA, VOA Washington DC (as/eu): VOA Editorial. See S 1457.

Tuesdays

1400 Russia, Voice of: News. See S 0000.
1400 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1400 USA, WJCR Upton KY: Don Powell. See M 1400.
1410 USA, VOA Washington DC (as/eu): Asia Report. See M 1410.
1411 Russia, Voice of: Newmarket. See M 1311.
1430 Russia, Voice of: News in Brief. See S 0030.
1432 Russia, Voice of: Kaleidoscope. See S 1132.
1457 USA, VOA Washington DC (as/eu): VOA Editorial. See S 1457.

Wednesdays

1400 Russia, Voice of: News. See S 0000.
1400 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1400 USA, WJCR Upton KY: Don Powell. See M 1400.
1410 USA, VOA Washington DC (as/eu): Asia Report. See M 1410.
1411 Russia, Voice of: Moscow Mailbag. See S 0111.
1430 Russia, Voice of: News in Brief. See S 0030.
1432 Russia, Voice of: Kaleidoscope. See S 1132.
1435 USA, WJCR Upton KY: The World's Greatest Music. Classical and eclesiastical music.
1457 USA, VOA Washington DC (as/eu): VOA Editorial. See S 1457.

Thursdays

1400 Russia, Voice of: News. See S 0000.
1400 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1400 USA, WJCR Upton KY: Don Powell. See M 1400.
1410 USA, VOA Washington DC (as/eu): Asia Report. See M 1410.
1411 Russia, Voice of: Moscow Mailbag. See S 0111.
1430 Russia, Voice of: News in Brief. See S 0030.
1432 Russia, Voice of: Kaleidoscope. See S 1132.
1457 USA, VOA Washington DC (as/eu): VOA Editorial. See S 1457.

Fridays

1400 Russia, Voice of: News. See S 0000.
1400 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1400 USA, WJCR Upton KY: Don Powell. See M 1400.
1410 USA, VOA Washington DC (as/eu): Asia Report. See M 1410.
1411 Russia, Voice of: Moscow Mailbag. See S 0111.
1430 Russia, Voice of: News in Brief. See S 0030.
1432 Russia, Voice of: Russian by Radio. See M 0132.
1457 USA, VOA Washington DC (as/eu): VOA Editorial. See S 1457.

Saturdays

1400 Russia, Voice of: News. See S 0000.
1400 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1400 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
1410 USA, VOA Washington DC (as/eu): Music USA (Jazz). Willis Conover hosts the VOA jazz hour.
1411 Russia, Voice of: Program Preview. See S 0511.
1430 Russia, Voice of: News in Brief. See S 0030.
1432 Russia, Voice of: Audio Book Club. See S 0132.
1457 USA, VOA Washington DC (as/eu): VOA Editorial. See S 1457.

Hauser's Highlights
USA: WWCR

WWCR-1:	
1100-2300	15685
2300-0100	9475
0100-0500	3215
0500-1100	3210
WWCR-2:	
1300-0100	13845
0100-1300	5935
WWCR-3:	
1500-2300	12160
2300-1200	5065
1200-1500	7435
WWCR-4:	
1100-1400	12160
1400-2300	9475
2300-0200	7435
0200-1100	2390

Dec-Feb changes:
WWCR-1: 15685 to 9475 at 2200, 9475 to 3215 at 0000
WWCR-2: 5935 to 13845 at 1400
WWCR-3: 12160 to 5065 at 2200
WWCR-4: 9475 to 7435 at 2200, 7435 to 2390 at 0100

FREQUENCIES

1500-1600	Australia, Radio	5995pa	9580pa	9860pa	11660as
		11800pa	12080pa		
1500-1555 mtwhfa	Belgium, R Vlaanderen Int	13610na	15540as		
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			
1500-1559 s	Canada, R Canada Intl	11855am	13650am		
1500-1600	China, China Radio Intl	7405na	9785as	11815as	
1500-1600	Costa Rica,RF Peace Intl	7385am	15050am		
1500-1600	Ecuador, HCJB	15115sa	21455va		
1500-1600 as	Eqt Guinea, R East Africa	15186af			
1500-1600	Guam, TWR/KTWR	11580as			
1500-1530	Israel, Kol Israel	12077va	15615na		
1500-1600	Italy, Adv World Radio	7230eu			
1500-1600 vl	Italy, IRRS	3985va			
1500-1600	Japan, NHK/Radio	9535na	11915as	11930me	15355af
1500-1600	Jordan, Radio	11970eu			
1500-1600	Malaysia, Radio	7295do			
1500-1600 vl	Malaysia, RTM Kuching	7160do			
1500-1600 vl	Malaysia,RTM KotaKinabalu	5980do			
1500-1530	Mexico, Radio Mexico Intl	5985na	9705na		
1500-1530	Mongolia, R Ulan Bator	9745as	12085as		
1500-1515 s	Myanmar, Voice of	5990do			
1500-1525	Netherlands, Radio	9895as	13700as	15585as	
1500-1600 occsnal	New Zealand, R NZ Intl	6105pa			
1500-1550	North Korea, R Pyongyang	9325eu	9640eu	9975na	13785me
1500-1600	Philippines, FEBC/R Intl	11995as			
1500-1530	Romania, R Romania Intl	11775as	15335as		
1500-1600 vl/s	Russia, Voice of Assyria	7325do	9730do	9880do	
1500-1600	Russia,Voice of Russia WS	4740me	4940me	4975me	7225me
		9595me	11835me	11985me	15320me
		15350me	15540me	15560me	
1500-1600	S Africa, Channel Africa	3220af	7155af		
1500-1600	Seychelles, FEBA Radio	9810as	11870as		
1500-1600	Singapore,R Singapore Int	6155do			
1500-1600 mtwhf	Sri Lanka, Sri Lanka BC	9720as	15425as		
1500-1530	Switzerland, Swiss R Intl	12075as	13635as	15530as	
1500-1600	United Kingdom, BBC WS	5990as	6190af	6195va	7205as
		9410eu	9515na	9740va	11750as
		11865am	12095as	15220am	15400as
		15575as	17705va	17830af	17840af
		21660af			
1500-1530	United Kingdom, BBC WS	11860af	11940af	15420af	17880af
		21490af			
1500-1600	USA, KAIJ Dallas TX	13815am			
1500-1600	USA, KJES Mesquite NM	11715na			
1500-1600	USA, KTBN Salt Lk City UT	15590am			
1500-1600	USA, Monitor Radio Intl	9355as	12160pa		
1500-1600	USA, Voice of America	6160as	7125as	7215as	9645as
		9700va	9760as	15205as	15255va
		15395as			
1500-1600	USA, WEWN Birmingham AL	9580na	11875na	15665eu	
1500-1600	USA, WGTG McCaysville GA	6950am	9400am		
1500-1600	USA, WHRI Noblesville IN	13760am	15105am		
1500-1600	USA, WJCR Upton KY	7490na	13595na		
1500-1600 mtwhf	USA, WRMI/R Miami Intl	9955am			
1500-1600	USA, WRNO New Orleans LA	15420am			
1500-1600 as	USA, WVHA Greenbush ME	15745eu			
1500-1600	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1500-1600	USA, WYFR Okeechobee FL	11830na	17750na		
1500-1600	Zambia, Christian Voice	6065af			
1530-1555	Austria, R Austria Intl	11780as			
1530-1545	India, All India Radio	3945do	6185do	7140do	7410do
		9530do	9565do	9685do	9910do
		11740do			
1530-1600	Iran, VOIRI	7290as	9635as		
1530-1600	Netherlands, Radio	9895as	9895as	12090as	
1530-1600	United Kingdom, BBC WS	7180as	11720as		
1538-1555 1&3rd s	Denmark, R Denmark Intl	11840va	13805va	15230va	
1545-1600 a	Vatican State, Vatican R	9940as	11640as		

SELECTED PROGRAMS

Sundays

1500 Russia, Voice of: News. See S 0000.
1500 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1500 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
1510 USA, VOA Washington DC (as/eu): New Horizons. See S 1110.
1511 Russia, Voice of: News and Views. See S 0011.
1530 Russia, Voice of: News in Brief. See S 0030.
1530 USA, VOA Washington DC (as/eu): Studio One. See S 1130.
1530 USA, VOA Washington DC (eu): The Writers' World (monthly). See S 1230.
1532 Russia, Voice of: Kaleidoscope. See S 1132.

Mondays

1500 Russia, Voice of: News. See S 0000.
1500 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1500 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
1510 USA, VOA Washington DC (as/eu): Newsline. Background and insight on the news from experienced VOA correspondents and journalists.
1511 Russia, Voice of: News and Views. See S 0011.
1530 Russia, Voice of: News in Brief. See S 0030.
1530 USA, VOA Washington DC (as/eu): Music USA (Standards). See M 1130.
1532 Russia, Voice of: Folk Box. See M 0032.

Tuesdays

1500 Russia, Voice of: News. See S 0000.
1500 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1500 USA, WJCR Upton KY: Dan McCraw. See S 0630.
1510 USA, VOA Washington DC (as/eu): Newsline. See M 1510.
1511 Russia, Voice of: News and Views. See S 0011.
1530 Russia, Voice of: News in Brief. See S 0030.
1530 USA, VOA Washington DC (as/eu): Now Music USA. See T 0030.
1532 Russia, Voice of: Yours for the Asking. See T 0032.

Wednesdays

1500 Russia, Voice of: News. See S 0000.
1500 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1500 USA, WJCR Upton KY: Dan McCraw. See S 0630.
1510 USA, VOA Washington DC (as/eu): Newsline. See M 1510.
1511 Russia, Voice of: News and Views. See S 0011.
1530 Russia, Voice of: News in Brief. See S 0030.
1530 USA, VOA Washington DC (as/eu): Now Music USA. See T 0030.
1532 Russia, Voice of: The Jazz Show. See M 0532.

Thursdays

1500 Russia, Voice of: News. See S 0000.
1500 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1500 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
1510 USA, VOA Washington DC (as/eu): Newsline. See M 1510.
1511 Russia, Voice of: News and Views. See S 0011.
1530 Russia, Voice of: News in Brief. See S 0030.
1530 USA, VOA Washington DC (as/eu): Now Music USA (Top Ten). See H 1130.
1532 Russia, Voice of: Yours for the Asking. See T 0032.

Fridays

1500 Russia, Voice of: News. See S 0000.
1500 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1500 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
1510 USA, VOA Washington DC (as/eu): Newsline. See M 1510.
1511 Russia, Voice of: News and Views. See S 0011.
1530 Russia, Voice of: News in Brief. See S 0030.
1530 USA, VOA Washington DC (as/eu): Country Music USA. See F 1130.
1532 Russia, Voice of: Music at Your Request. See M 1232.

Saturdays

1500 Russia, Voice of: News. See S 0000.
1500 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1500 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
1510 USA, VOA Washington DC (as): Agriculture Today. See S 0010.
1510 USA, VOA Washington DC (eu): International Focus. A look at international issues and developments of regional or global interest and impact.
1511 Russia, Voice of: News and Views. See S 0011.
1530 Russia, Voice of: News in Brief. See S 0030.
1530 USA, VOA Washington DC (as/eu): Press Conference USA. See S 0130.
1532 Russia, Voice of: Timelines. See M 0332.

HAUSER'S HIGHLIGHTS
RTT NATIONAL NETWORK, TUNISIA
ALL IN ARABIC

0359-0459	12005, 7475, 7280
0459-0559	15450, 12005, 7475, 7280
0559-1659	17500, 15450, 11730v
1659-1900	12005, 11730, 7280
1900-2100	12005, 11730, 7475, 7280
2100-2400	12005

(BBC Monitoring)
Frequencies vary: 7474.7, 11730.2, 12005.2, 17498.2 (*Paniview*)

Frequencies

1600-1700	Australia, Radio	5995pa	6060pa	6080pa	6090pa
		9580pa	9615va	9860pa	11660pa
		11800pa	12080pa		
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	China, China Radio Intl	4130af	11575as	15110af	15130af
1600-1700	Costa Rica,RF Peace Intl	7385am	15050am		
1600-1627	Czech Rep, Radio Prague	5930eu	17485af		
1600-1630	Ethiopia, Radio	7165af			
1600-1700	France, Radio France Intl	6175eu	11615me	11700af	12015af
		15210af	15460af	15530af	
1600-1650	Germany, Deutsche Welle	7225as	9875as	13690as	
1600-1700	Germany, Deutsche Welle	7185af	9735af	11965af	17800af
1600-1700	Guam, AWR/KSDA	7395as			
1600-1615 mt	Guam, TWR/KTWR	11580as			
1600-1630 whfas	Guam, TWR/KTWR	11580as			
1600-1630	Iran, VOIRI	7290as	9635as		
1600-1700 vl	Italy, IRRS	3985va			
1600-1630	Jordan, Radio	11970eu			
1600-1700	Malaysia, Radio	7295do			
1600-1625	Netherlands, Radio	9895as	13700as	15585as	
1600-1650 occsnal	New Zealand, R NZ Intl	6105am			
1600-1630 s	Norway, Radio Norway Intl	11840eu	13800eu		
1600-1630	Pakistan, Radio	9425af	9515af	11570af	15555af
1600-1700	Russia,Voice of Russia WS	7240eu	7350eu	7440af	9480eu
		9830va	9880eu	9955eu	9975eu
1600-1655	S Africa, Channel Africa	9530af			
1600-1700	S Africa, Trans World R	9500af			
1600-1700	Slovakia, Adv World Radio	13590as			
1600-1700	South Korea, R Korea Intl	5975eu	9515af	9870af	
1600-1630 mtwhf	Sri Lanka, Sri Lanka BC	9720as	15425as		
1600-1700	Swaziland, Trans World R	9500af			
1600-1640	UAE, Radio Dubai	11795me	13675eu	15395me	17825me
1600-1700	United Kingdom, BBC WS	3915as	6190af	6195va	7135as
		9410va	9515na	9590na	9740va
		11750as	12095as	15400af	15575as
		17830af	17840va	21470af	21505af
1600-1615	United Kingdom, BBC WS	5990as	7180as	7205as	17705af
1600-1700	USA, KAIJ Dallas TX	13815am			
1600-1700	USA, KTBN Salt Lk City UT	15590am			
1600-1700	USA, KWHR Naalehu HI	6120as			
1600-1700	USA, Monitor Radio Intl	9385af	11550eu	18930af	
1600-1700	USA, Voice of America	7125as	7215as	9645as	9700va
		11880af	11920af	12040af	13710af
		15205va	15225af	15255va	15395as
		15410af	15445af	17895af	
1600-1630 as	USA, Voice of America	6035af			
1600-1700	USA, WEWN Birmingham AL	11875na	13615na	15665eu	
1600-1700	USA, WGTG McCaysville GA	6950am	9400am		
1600-1700	USA, WHRI Noblesville IN	13760am	15105am		
1600-1700	USA, WJCR Upton KY	7490na	13595na		
1600-1700 mtwhf	USA, WRMI/R Miami Intl	9955am			
1600-1700	USA, WRNO New Orleans LA	15420am			
1600-1700 as	USA, WVHA Greenbush ME	15745eu			
1600-1700	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1600-1700	USA, WYFR Okeechobee FL	11705na	11830na	15695eu	17750eu
		21525af	21745eu		
1600-1620 a	Vatican State, Vatican R	5880as	7250as		
1600-1630	Vietnam, Voice of	5940eu	7270eu	7400eu	9840eu
		12020eu	15010eu		
1600-1700	Zambia, Christian Voice	3330af			
1600-1610 mtwhfa	Zambia, ZNBC Radio 2	6165do			
1615-1700	United Kingdom, BBC WS	9510as	11860af		
1620-1630 mtwhf	Estonia, Radio	5925eu			
1630-1659	Canada, R Canada Intl	7150as	9550as		
1630-1700	Egypt, Radio Cairo	15255af			
1630-1700	Slovakia, Adv World Radio	15620af			
1630-1700	USA, Voice of America	11765af			
1638-1655 1&3rd s	Denmark, R Denmark Intl	11860na	13800na	15540na	
1645-1700 mtwhf	Canada, R Canada Intl	9555va	11935va	15325eu	17820eu
1650-1700	Eqt Guinea, Radio Africa	15186af			
1650-1700 mtwhf	New Zealand, R NZ Intl	9875pa			

Selected Programs

Sundays

1600 Russia, Voice of: News. See S 0000.
1600 USA, VOA Washington DC (af): Nightline Africa. News, correspondent reports, backgrounders, and features on world and African issues.
1600 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1610 USA, VOA Washington DC (as/eu): Encounter. See S 1210.
1611 Russia, Voice of: Program Preview. See S 0511.
1630 USA, VOA Washington DC (af): News Summary. A five-minute wrap-up of the hour's news.
1630 USA, VOA Washington DC (as/eu): News (Special English). See S 0030.
1632 Russia, Voice of: Moscow Yesterday and Today. See S 0532.
1640 USA, VOA Washington DC (as/eu): Words and Their Stories (Special English). See S 0040.
1645 USA, VOA Washington DC (as/eu): People in America (Special English). See S 0045.
1657 USA, VOA Washington DC (af): VOA Editorial. See S 1457.

Mondays

1600 Russia, Voice of: News. See S 0000.
1600 USA, VOA Washington DC (af): News (Special English). See S 0030.
1600 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1610 USA, VOA Washington DC (af): Development Report (Special English). See M 0040.
1610 USA, VOA Washington DC (as/eu): All About English. See S 0010.
1611 Russia, Voice of: Moscow Mailbag. See S 0111.
1615 USA, VOA Washington DC (af): This is America (Special English). See M 0045.
1630 USA, VOA Washington DC (af): Africa World Tonight. News, sports, correspondent reports, backgrounders, and features on world and African issues.
1630 USA, VOA Washington DC (as/eu): News (Special English). See S 0030.
1632 Russia, Voice of: This is Russia. See S 0032.
1640 USA, VOA Washington DC (as/eu): Development Report (Special English). See M 0040.
1645 USA, VOA Washington DC (as/eu): This is America (Special English). See M 0045.

Tuesdays

1600 Russia, Voice of: News. See S 0000.
1600 USA, VOA Washington DC (af): News (Special English). See S 0030.
1600 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1610 USA, VOA Washington DC (af): Agriculture Report (Special English). See T 0040.
1610 USA, VOA Washington DC (as/eu): All About English. See S 0010.
1611 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
1615 USA, VOA Washington DC (af): Science in the News (Special English). See T 0045.
1630 USA, VOA Washington DC (af): Africa World Tonight. See M 1630.
1630 USA, VOA Washington DC (as/eu): News (Special English). See S 0030.
1632 Russia, Voice of: Moscow Yesterday and Today. See S 0532.
1640 USA, VOA Washington DC (as/eu): Agriculture Report (Special English). See T 0040.
1645 USA, VOA Washington DC (as/eu): Science in the News (Special English). See T 0045.

Wednesdays

1600 Russia, Voice of: News. See S 0000.
1600 USA, VOA Washington DC (af): News (Special English). See S 0030.
1600 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1610 USA, VOA Washington DC (af): Science Report (Special English). See M 1110.
1610 USA, VOA Washington DC (as/eu): All About English. See S 0010.
1611 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
1615 USA, VOA Washington DC (af): Exploration (Special English). See W 0045.
1630 USA, VOA Washington DC (af): Africa World Tonight. See M 1630.
1630 USA, VOA Washington DC (as/eu): News (Special English). See S 0030.
1632 Russia, Voice of: This is Russia. See S 0032.
1640 USA, VOA Washington DC (as/eu): Science Report (Special English). See M 1110.
1645 USA, VOA Washington DC (as/eu): Exploration (Special English). See W 0045.

Thursdays

1600 Russia, Voice of: News. See S 0000.
1600 USA, VOA Washington DC (af): News (Special English). See S 0030.
1600 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1610 USA, VOA Washington DC (af): Science Report (Special English). See M 1110.
1610 USA, VOA Washington DC (as/eu): All About English. See S 0010.
1611 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
1615 USA, VOA Washington DC (af): The Making of a Nation (Special English). See H 0045.
1630 USA, VOA Washington DC (af): Africa World Tonight. See M 1630.
1630 USA, VOA Washington DC (as/eu): News (Special English). See S 0030.
1632 Russia, Voice of: Moscow Yesterday and Today. See S 0532.
1640 USA, VOA Washington DC (as/eu): Science Report (Special English). See M 1110.
1645 USA, VOA Washington DC (as): The Making of a Nation (Special English). See H 0045.
1645 USA, VOA Washington DC (as/eu): The Making of a Nation (Special English). See H 0045.

Fridays

1600 Russia, Voice of: News. See S 0000.
1600 USA, VOA Washington DC (af): News (Special English). See S 0030.
1600 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1610 USA, VOA Washington DC (af): Environment Report (Special English). See F 0040.
1610 USA, VOA Washington DC (as/eu): All About English. See S 0010.
1611 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
1615 USA, VOA Washington DC (af): American Mosaic (Special English). See F 0045.
1630 USA, VOA Washington DC (af): Africa World Tonight. See M 1630.
1630 USA, VOA Washington DC (as/eu): News (Special English). See S 0030.
1632 Russia, Voice of: This is Russia. See S 0032.
1640 USA, VOA Washington DC (as): Environment Report (Special English). See F 0040.
1640 USA, VOA Washington DC (as/eu): Environment Report (Special English). See F 0040.
1645 USA, VOA Washington DC (as/eu): American Mosaic (Special English). See F 0045.

Saturdays

1600 Russia, Voice of: News. See S 0000.
1600 USA, VOA Washington DC (af): Nightline Africa. See S 1600.
1600 USA, VOA Washington DC (as/eu): VOA News. See S 0000.
1610 USA, VOA Washington DC (as/eu): On the Line. See S 0110.
1611 Russia, Voice of: Focus on Asia and the Pacific. See T 0111.
1630 USA, VOA Washington DC (af): News Summary. See S 1630.
1630 USA, VOA Washington DC (as/eu): News (Special English). See S 0030.
1632 Russia, Voice of: Moscow Yesterday and Today. See S 0532.
1640 USA, VOA Washington DC (as/eu): In the News (Special English). See A 0040.
1645 USA, VOA Washington DC (as/eu): American Stories (Special English). See A 0045.
1655 USA, VOA Washington DC (af): VOA Editorial. See S 1457.

FREQUENCIES

1700-1800	Australia, Radio	6060pa	6080pa	6090pa	9580pa
		9615as	9860pa	11660pa	11880pa
		12080pa			
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	11910af		
1700-1800 as	Costa Rica, Adv World R	13750am			
1700-1800	Costa Rica,RF Peace Intl	15050am			
1700-1727	Czech Rep, Radio Prague	5835eu	15640af		
1700-1800	Ecuador, HCJB	15540eu	21455eu		
1700-1800	Egypt, Radio Cairo	15255af			
1700-1800	Eqt Guinea, Radio Africa	15186af			
1700-1730	France, Radio France Intl	6175eu	11615me	11700af	12015af
		15210af	15365af	15460af	15530af
1700-1800 vl	Italy, IRRS	3985va			
1700-1800	Japan, NHK/Radio	6035na	9535na	9580as	11880as
1700-1800 mtwhf	New Zealand, R NZ Intl	9875pa			
1700-1750	North Korea, R Pyongyang	9325eu	9640af	9975af	13785me
1700-1800 vl	Pakistan, Radio	11570eu			
1700-1800	Russia,Voice of Russia WS	4740va	4940va	4975va	7305me
		9595me	9830va	9955af	9975af
		11775va	11835va	12025af	12035va
		15320me	15350va		
1700-1755	S Africa, Channel Africa	3220af	7155af		
1700-1730	Sri Lanka, Sri Lanka BC	15425as			
1700-1800	Swaziland, Trans World R	9500af			
1700-1730	Switzerland, Swiss R Intl	9885me	12075af	13635af	
1700-1800	United Kingdom, BBC WS	3955eu	6190af	6195eu	7150eu
		9410va	9710as	9740as	11750as
		11760as	11860af	15400af	15420af
		15575af	17830af	17840af	
1700-1745	United Kingdom, BBC WS	3915as	7135as	9630af	12095va
1700-1715	United Kingdom, BBC WS	9515va	9590na		
1700-1800	USA, KAIJ Dallas TX	13815am			
1700-1800	USA, KTBN Salt Lk City UT	15590am			
1700-1800	USA, KWHR Naalehu HI	13625as			
1700-1800	USA, Monitor Radio Intl	9385af	11550eu	18930af	
1700-1800	USA, Voice of America	6035as	7125as	7215as	9645as
		9700va	9760va	11765af	11890af
		11920af	12040af	13710af	15255va
		15395as	15410af	15445af	17895af
1700-1800 mtwhf	USA, Voice of America	5990va	6045va	7125as	7150va
		7170as	9550as	9770va	11870va
1700-1800	USA, WEWN Birmingham AL	11875na	13615na	15665eu	
1700-1800	USA, WGTG McCaysville GA	6950am	9400am		
1700-1800	USA, WHRI Noblesville IN	13760am	15105ca		
1700-1800	USA, WJCR Upton KY	7490na	13595na		
1700-1800 mtwhf	USA, WRMI/R Miami Intl	9955am			
1700-1800	USA, WRNO New Orleans LA	15420am			
1700-1800 as	USA, WVHA Greenbush ME	15745eu			
1700-1800	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1700-1800	USA, WYFR Okeechobee FL	15695eu	17555eu		
1700-1800	Zambia, Christian Voice	3330af			
1700-1800 a	Zambia, ZNBC Radio 2	6165do			
1700-1800 vl	Zimbabwe, Zimbabwe BC	4828do			
1715-1730	Albania, R Tirana Intl	7155eu	9740eu		
1715-1800	United Kingdom, BBC WS	7160va			
1715-1730 a	Vatican State, Vatican R	9645eu	11810eu		
1730-1755	Austria, R Austria Intl	6155eu	9665me	11780as	13730eu
1730-1800	Guam, AWR/KSDA	9370as			
1730-1800	Netherlands, Radio	6020af	7120af	11655af	
1730-1756	Romania, R Romania Intl	9550af	9750af	11830af	11940af
1730-1800	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu	
1730-1800	United Kingdom, BBC WS	6180eu			
1730-1800	Vatican State, Vatican R	9660af	11625af	15570af	
1738-1755 1&3rd s	Denmark, R Denmark Intl	7485va	11860va	15220va	
1745-1800 mtwhf	Armenia, Voice of	4810eu	4990eu	7480eu	9965eu
1745-1800	Bangladesh, Radio	7185as	9548eu		
1745-1800	India, All India Radio	7410eu	9650eu	9950af	11620af
		11935af	13750as	15075me	
1745-1800 mtwhf	Swaziland, Trans World R	3200af			
1800-1900	Algeria, R Algiers Intl	15160eu	15205eu		
1800-1900	Australia, Radio	9580pa	9860pa	11880pa	12080pa
1800-1830	Australia, Radio	6060pa	6080as		
1800-1900	Bangladesh, Radio	7185eu	9548as		
1800-1900	Brazil, Radio Bras	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	15050am			
1800-1830	Egypt, Radio Cairo	15255af			
1800-1900	Eqt Guinea, Radio Africa	15186af			
1800-1900	India, All India Radio	7410eu	9650eu	9950af	11620af
		11935me	13750as	15075as	
1800-1900	Kuwait, Radio	11990na			
1800-1900 s	Morocco, RTVM Marocaine	17815af			
1800-1825	Netherlands, Radio	6020af	7120af	11655af	
1800-1900 mtwhf	New Zealand, R NZ Intl	9875pa			
1800-1830 s	Norway, Radio Norway Intl	7485af	9590af	13805af	15220af
1800-1900 vl	Pakistan, Radio	11570eu			
1800-1855	Poland, Polish R Warsaw	6095eu	7270eu	7285eu	
1800-1900	Russia,Voice of Russia WS	7350eu	9480eu	9830va	9880va
		9955af	9975af	11675eu	
1800-1900	Sudan, Radio Omdurman	9200af			
1800-1830	Swaziland, Trans World R	9500af			
1800-1900	Swaziland, Trans World R	3200af			
1800-1830	Switzerland, Swiss R Intl	9505eu	9905eu		
1800-1900	United Kingdom, BBC WS	3255af	3955eu	6180eu	6190af
		6195eu	9410va	12095eu	15400af
		15575af	17830af	17840ca	
1800-1830	United Kingdom, BBC WS	7150eu	7160va	9510as	11750as
1800-1900	USA, KAIJ Dallas TX	13815am			
1800-1900	USA, KTBN Salt Lk City UT	15590am			
1800-1900	USA, KWHR Naalehu HI	13625au			
1800-1900	USA, Monitor Radio Intl	9385eu	11550me	13770eu	17510af
1800-1900	USA, Voice of America	6035va	9760va	9770va	11920af
		11975af	12040af	13710af	15410af
		15580af			
1800-1830	USA, Voice of America	11765af			
1800-1900	USA, WEWN Birmingham AL	11875na	13615na	15745eu	
1800-1900	USA, WGTG McCaysville GA	6950am	9400am		
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 s	USA, WRMI/R Miami Intl	9955am			
1800-1900	USA, WRNO New Orleans LA	15420am			
1800-1900	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1800-1900	USA, WYFR Okeechobee FL	15695eu	17555eu		
1800-1830	Vietnam, Voice of	5940eu	7270eu	7400eu	9840eu
		12020eu	15010eu		
1800-1900	Zambia, Christian Voice	3330af			
1800-1810	Zambia, ZNBC Radio 1	7220do			
1800-1857	Zambia, ZNBC Radio 2	6165do			
1800-1900 vl	Zimbabwe, Zimbabwe BC	4828do			
1830-1900	Australia, Radio	7240pa	7330as		
1830-1900	Netherlands, Radio	6020af	7120af	9860af	11655af
		13700af	15315af	17605af	
1830-1857	S Africa, Trans World R	9525af			
1830-1855 irreg	Somalia, Radio Mogadishu	6710af			
1830-1900	South Korea, R Korea Intl	3955eu			
1830-1900	Sweden, Radio	6065eu	9655eu	11615me	
1830-1900	United Kingdom, BBC WS	6005af	9630af	9740va	
1830-1900	USA, Voice of America	12080af			
1833-1900	Cote D' Ivoire, RDTV	11920do			
1838-1855 1&3rd s	Denmark, R Denmark Intl	7485eu	9590eu	13805va	15220va
1840-1850	Greece, Voice of	11645af	15150af		
1845-1900 irreg s	Mali, RDTV Malienne	4783do	4835do	5995do	
1850-1900 s	New Zealand, R NZ Intl	9875pa			

FREQUENCIES

1900-2000 mtwhf	Argentina, RAE	15345eu			
1900-2000	Australia, Radio	6080pa	7240pa	7330as	9580pa
		9860pa	11880pa	12080pa	
1900-1930	Azerbaijan, Voice of	4957eu			
1900-1920	Brazil, Radio Bras	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	6955af	9440af	11515me	
1900-2000	Costa Rica, Adv World R	13750am	15460am		
1900-2000	Costa Rica,RF Peace Intl	15050am			
1900-1930	Cote D' Ivoire, RDTV	11920do			
1900-2000	Ecuador, HCJB	15540eu			
1900-2000	Eqt Guinea, Radio Africa	15186af			
1900-1950	Germany, Deutsche Welle	9735af	11740af	11785af	13690af
		13790af			
1900-2000 s	Germany, R Alpha & Omega	6110eu			
1900-1910	Greece, Voice of	9375eu			
1900-2000	Guatemala, Adv World R	5980am			
1900-1945	India, All India Radio	7410eu	9650eu	9950me	11620eu
		11935af	13750as	15075as	
1900-2000 vl	Italy, IRRS	3985va			
1900-2000	Japan, NHK/Radio	6035as	7140pa	9535na	9580as
1900-2000 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
1900-2000	Kuwait, Radio	11990eu			
1900-2000	Malta, VO Mediterranean	9765eu	12060af		
1900-1930	Mexico, Radio Mexico Intl	5985na	9705na		
1900-2000	Netherlands, Radio	6020af	7120af	9860af	9895af
		11655af	13700af	15315af	17605af
1900-1952 mtwhs	New Zealand, R NZ Intl	9875pa			
1900-1958 fa	New Zealand, R NZ Intl	9875pa			
1900-1956	Romania, R Romania Intl	9550eu	9690eu	11810eu	11940eu
1900-2000	Russia,Voice of Russia WS	7440af	9480eu	9830va	9880eu
		9955af	9975af		
1900-2000	South Korea, R Korea Intl	5975eu	7275as		
1900-2000	Swaziland, Trans World R	3200af			
1900-2000	Thailand, Radio	7210eu	9555eu	11905eu	
1900-2000	United Kingdom, BBC WS	3255af	3955eu	5975me	6005af
		6180eu	6190af	6195va	9410af
		9630af	9740af	15400af	15575af
		17830af			
1900-2000	USA, KAIJ Dallas TX	13815af			
1900-2000	USA, KJES Mesquite NM	15385na			
1900-2000	USA, KTBN Salt Lk City UT	15590am			
1900-2000	USA, KWHR Naalehu HI	13625au			
1900-2000	USA, Monitor Radio Intl	9835eu	11550eu	13770eu	17510af
1900-2000	USA, Voice of America	4950af	6035af	7415af	9525va
		9760va	9770va	11870va	11920af
		11975af	12040af	12080af	13710af
		15180va	15410af	15445af	15580af
1900-2000	USA, WEWN Birmingham AL	11875na	13615na	15745eu	
1900-2000	USA, WGTG McCaysville GA	6950am	9400am		
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, WRNO New Orleans LA	15420am			
1900-2000 smtwhf	USA, WVHA Greenbush ME	9900af			
1900-2000	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1900-2000	USA, WYFR Okeechobee FL	17555eu	21745eu		
1900-1930	Vietnam, Voice of	5940eu	7270eu	7400eu	9840eu
		12020eu	15010eu		
1900-2000	Zambia, Christian Voice	3330af			
1900-2000 vl	Zimbabwe, Zimbabwe BC	4828do			
1905-1910	Croatia, Croatian Radio	5920eu	7165eu	9830eu	
1930-2000	Albania, R Tirana Intl	7270eu	9740eu		
1930-1955	Austria, R Austria Intl	9655me	13730af		
1930-2000	Iran, VOIRI	7260af	9022eu		
1930-2000	Mongolia, R Ulan Bator	9745as	12085as		
1930-2000 vl	Papua New Guinea, NBC	4890do			
1930-2000	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu	
1930-2000	Sweden, Radio	6065eu			
1930-2000	Turkey, Voice of	9445na	9535na		
1930-2000	Yugoslavia, Radio	6100eu	9720eu		
1935-1955	Italy, RAI Intl	7235eu	9670eu	11905eu	
1938-1955 1&3rd s	Denmark, R Denmark Intl	7520af	11860af	13805eu	15220au
1945-2000 t	Belarus, Radiosta Belarus	7180eu	7210eu	9875eu	11960eu
1953-2000 smtwh	New Zealand, R NZ Intl	11735pa			
1959-2000 a	New Zealand, R NZ Intl	11735pa			

2000 UTC

2000-2100	Algeria, R Algiers Intl	11715me	15160eu		
2000-2100	Angola, Radio Nacional	3355do	9535do		
2000-2100	Australia, Radio	6080pa	7240pa	7330as	9580pa
		9860pa	11880pa	12080pa	
2000-2025	Belgium, R Vlaanderen Int	5910eu	13645af		
2000-2100	Bulgaria, Radio	9700eu	11720eu		
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			
2000-2059	Canada, R Canada Intl	5995va	7235va	11690va	13650eu
		13670eu	15150eu	15325eu	17820eu
		17870eu			
2000-2100	China, China Radio Intl	5220eu	6950eu	9440af	9920eu
		11715af	15110af		
2000-2100	Costa Rica,RF Peace Intl	15050am			
2000-2027	Czech Rep, Radio Prague	5930va	11600va		
2000-2100	Ecuador, HCJB	15540eu	21455eu		
2000-2100	Eqt Guinea, Radio Africa	15186af			
2000-2030 mt	Estonia, Radio	5925eu			
2000-2050	Germany, Deutsche Welle	7170eu	9615eu		
2000-2030	Ghana, Ghana Broadc Corp	3366do	4915do		
2000-2100	Guatemala, Adv World R	5980am			
2000-2030	Hungary, Radio Budapest	3975eu	6140eu	7130eu	9835eu
2000-2100	Indonesia, Voice of	9525as			
2000-2030	Iran, VOIRI	7260af	9022eu		
2000-2030	Israel, Kol Israel	7465na	9435eu	11605na	15640sa
2000-2100 vl	Italy, IRRS	3985va			
2000-2100 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
2000-2100	Kuwait, Radio	11990eu			
2000-2030 as	Latvia, Radio	5935eu			
2000-2030	Mexico, Radio Mexico Intl	5985na	9705na		
2000-2025	Netherlands, Radio	7120af	7205af	7895af	9860af
		11655af	15315af	17605af	
2000-2006 fa	New Zealand, R NZ Intl	9875pa			
2000-2100 mtwh	New Zealand, R NZ Intl	11735pa			
2000-2005	Nigeria, FRCN/Radio	3326do	4990do		
2000-2050	North Korea, R Pyongyang	6575eu	9345as	9640af	9975as
2000-2030 s	Norway, Radio Norway Intl	9590au			
2000-2100 vl	Papua New Guinea, NBC	4890do			
2000-2030 mtwhf	Portugal, R Portugal Intl	6130eu	9780eu	9815eu	15515af
2000-2100	Russia,Voice of Russia WS	7350eu	9480eu		
2000-2015	Sierra Leone, SLBS	3316do			
2000-2100 mtwhf	Spain, R Exterior Espana	6125eu	11775af		
2000-2015	Swaziland, Trans World R	3200af			
2000-2030	Switzerland, Swiss R Intl	6165eu	9870af	9885af	9905af
		11640af			
2000-2020	Turkey, Voice of	9445na	9535na		
2000-2015	Uganda, Radio	3340do			
2000-2100	United Kingdom, BBC WS	3255af	3955eu	5975me	6005af
		6180eu	6190af	6195eu	7325eu
		9410af	9630af	11750sa	11835va
		11955as	12095eu	15400af	15575eu
		17830af			
2000-2100	USA, KAIJ Dallas TX	13815am			
2000-2100	USA, KTBN Salt Lk City UT	15590am			
2000-2100	USA, KWHR Naalehu HI	15405as			
2000-2100	USA, Monitor Radio Intl	11550eu	13770eu	13840pa	
2000-2100	USA, Voice of America	6035af	7415af	9760va	9770va
		11975af	12080af	15410af	15580af
		17725af	17755af		
2000-2030 as	USA, Voice of America	4950af			
2000-2100	USA, WEWN Birmingham AL	7425na	13615na	13695eu	
2000-2100	USA, WGTG McCaysville GA	6950am	9400am		
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 mtwhf	USA, WRMI/R Miami INtl	9955am			
2000-2100	USA, WRNO New Orleans LA	15420am			
2000-2100 has	USA, WVHA Greenbush ME	9900af			
2000-2100	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
2000-2100	USA, WYFR Okeechobee FL	17555eu	17845sa	21525af	
2000-2030	Zambia, Christian Voice	3330af			
2000-2005	Zambia, ZNBC Radio 2	6165do			
2000-2100 vl	Zimbabwe, Zimbabwe BC	4828do			
2005-2100	Syria, Radio Damascus	12085na	13610eu		
2007-2100 fa	New Zealand, R NZ Intl	11735pa			
2015-2045 as	Swaziland, Trans World R	3200af			
2025-2045	Italy, RAI Intl	7110af	11840af		
2030-2100	Armenia, Voice of	9965eu	11615eu	11665eu	
2030-2100	Egypt, Radio Cairo	15375af			
2030-2100	Finland, YLE/R Finland	9855af	15440af		
2030-2100 mwh	Moldova, R Dniester Intl	11750na			
2030-2100	Netherlands, Radio	9860af	9895af	11655af	
2030-2100	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
2030-2100	Slovakia, Adv World Radio	9455af			
2030-2100 as	Sweden, Radio	6065eu	9430eu	9655af	
2030-2045	Thailand, Radio	7210eu	9555eu	11905eu	
2030-2100 a	USA, WRMI/R Miami Intl	9955am			
2030-2100	Vietnam, Voice of	5940eu	7270eu	7400eu	9840eu
		12020eu	15010eu		
2038-2055 1&3rd s	Denmark, R Denmark Intl	7485eu	9590me		
2045-2100	India, All India Radio	7410eu	9910au	9950eu	11620eu
		11715pa	15225pa		
2050-2100	Vatican State, Vatican R	4005eu	5880eu	7250eu	

FREQUENCIES

2100-2200	Australia, Radio	7240pa	9660pa	9850pa	9860as
		11695pa	11855as	11880pa	12080pa
		13605pa			
2100-2130	Australia, Radio	6080pa	11800pa		
2100-2200 vl	Cameroon, Radio Garoua	5010do			
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, R Canada Intl	7235eu	11690eu	13650eu	13670eu
		15150eu	15325eu	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	15050am			
2100-2200	Cuba, Radio Havana	13715eu			
2100-2200	Ecuador, HCJB	15540eu	21455eu		
2100-2200	Egypt, Radio Cairo	15375af			
2100-2200	Eqt Guinea, Radio Africa	15186af			
2100-2150	Germany, Deutsche Welle	7115as	9670as	9735af	9765as
		11765af	15135af		
2100-2200	India, All India Radio	7410eu	9910eu	9950eu	11620au
		11715au	15225au		
2100-2200 vl/fas	Italy, IRRS	3955va			
2100-2200	Japan, NHK/Radio	6035as	9535as	9560as	11850pa
2100-2110	Japan, NHK/Radio	9570as	11685as		
2100-2105 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
2100-2200	Lebanon, Voice of Hope	9990eu			
2100-2125	Netherlands, Radio	9860af	9895af	11655af	
2100-2135 smtwh	New Zealand, R NZ Intl	11735pa			
2100-2200 fa	New Zealand, R NZ Intl	11735pa			
2100-2200	Nigeria, FRCN/Radio	3326do	4990do		
2100-2200 vl	Papua New Guinea, NBC	4890do			
2100-2125	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
2100-2156	Romania, R Romania Intl	5990eu	7105eu	7195eu	9690eu
2100-2200	Russia,Voice of Russia WS	7350af	7440af	9480eu	9880eu
		17875af			
2100-2200	Slovakia, Adv World Radio	6055eu			
2100-2200	South Korea, R Korea Intl	6480eu	15575eu		
2100-2130	Switzerland, Swiss R Intl	6165eu			
2100-2110	Uganda, Radio	3340do			
2100-2200	United Kingdom, BBC WS	3255af	3915as	3955eu	5975va
		6005af	6120as	6180eu	6190af
		6195va	7325eu	9410va	9740au
		11750sa	11835va	11955as	12095eu
		15575eu			
2100-2130	United Kingdom, BBC WS	9630af			
2100-2200	USA, KAIJ Dallas TX	13815am			
2100-2200	USA, KTBN Salt Lk City UT	15590am			
2100-2200	USA, KWHR Naalehu HI	9930as			
2100-2200	USA, Monitor Radio Intl	11550na	13770eu	13840pa	
2100-2200	USA, Voice of America	6035af	7415af	9760na	11870na
		11965va	11975af	13710af	15185va
		15410af	15445af	15580af	17725af
2100-2130	USA, Voice of America	11855af	12080af		
2100-2200	USA, WEWN Birmingham AL	7425na	13615na	13695eu	
2100-2200	USA, WGTG McCaysville GA	6950am	9400am		
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 mtwhf	USA, WRMI/R Miami Intl	9955am			
2100-2200 mtwhf	USA, WVHA Greenbush ME	9900eu			
2100-2200 s	USA, WVHA Greenbush ME	9900af			
2100-2200	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
2100-2200	USA, WYFR Okeechobee FL	17555eu	17845eu	21525af	
2100-2130	Vatican State, Vatican R	7365eu	9645eu	11625eu	
2100-2105	Zambia, ZNBC Radio 2	6165do			
2100-2200 vl	Zimbabwe, Zimbabwe BC	4828do			
2115-2200	Egypt, Radio Cairo	9900eu			
2115-2130	United Kingdom, BBC WS	15390am	17715am		
2130-2200	Australia, Radio	13755pa	17795pa	17860pa	
2130-2200	Guam, AWR/KSDA	15310as			
2130-2200	Iran, VOIRI	6175au			
2130-2135 mtwhf	Latvia, Radio	5935eu			
2130-2200	Sweden, Radio	6065eu	9430na	9655af	
2130-2145	United Kingdom, BBC WS	11680sa			
2136-2200 smtwh	New Zealand, R NZ Intl	15115pa			
2138-2155 1&3rd s	Denmark, R Denmark Intl	7205na	9495na	9590au	
2145-2200 a	Greece, Voice of	9425au			
2145-2200	United Kingdom, BBC WS	5990as	7160as	9580as	

2200-2300	Australia, Radio	11695pa	11855as	12080pa	13755pa
		15365pa	17795pa	17860pa	
2200-2300	Bulgaria, Radio	9700eu	11720eu		
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			
2200-2300	Canada, R Canada Intl	5960am	9755va	13650va	13670am
		13740va			
2200-2230	Canada, R Canada Intl	5960am	11705as	15305am	
2200-2300	China, China Radio Intl	7110eu	9880eu		
2200-2230	China, China Radio Intl	3985eu			
2200-2300	Costa Rica,RF Peace Intl	7385am	15050am		
2200-2300	Cuba, Radio Havana	6180na			
2200-2245	Egypt, Radio Cairo	9900eu			
2200-2300	Eqt Guinea, Radio Africa	15186af			
2200-2215	Ghana, Ghana Broadc Corp	4915do			
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	6175au			
2200-2300 vl/fas	Italy, IRRS	3955va			
2200-2225	Italy, RAI Intl	5975as	9710as	11815as	
2200-2300	Lebanon, Voice of Hope	9990va			
2200-2300	Malaysia, Radio	7295do			
2200-2225 mtwhf	Moldova, R Moldova Intl	7520eu			
2200-2300 smtwh	New Zealand, R NZ Intl	15115pa			
2200-2215	Nigeria, FRCN/Radio	3326do	4990do		
2200-2230 s	Norway, Radio Norway Intl	9485au			
2200-2208 vl	Papua New Guinea, NBC	4890do			
2200-2300	Russia,Voice of Russia WS	7240eu	7350eu	9480eu	
2200-2215	Sierra Leone, SLBS	3316do			
2200-2300	Slovakia, Adv World Radio	6055af			
2200-2300 as	Spain, R Exterior Espana	6125eu	11775af		
2200-2205	Syria, Radio Damascus	12085na	13610eu		
2200-2300	Taiwan, VO Free China	15600eu	17750eu		
2200-2300	UAE, Radio Abu Dhabi	9605na	9695na	9770na	
2200-2300	Ukraine, R Ukraine Intl	5905eu	6010eu	6020eu	6080eu
		9560eu	9735eu	9875eu	
2200-2300	United Kingdom, BBC WS	3955eu	5905as	5975va	6175va
		6195va	9590va	9915va	11750sa
		11835va	11955as	12095eu	15400af
2200-2230	United Kingdom, BBC WS	9410eu			
2200-2300	USA, KAIJ Dallas TX	13815am			
2200-2300	USA, KTBN Salt Lk City UT	15590am			
2200-2300	USA, Monitor Radio Intl	7510eu	13770am	13840as	15405as
2200-2300	USA, Voice of America	7215va	9705va	9770va	11760va
		15185va	15290va	15305va	17735va
		17820va			
2200-2230 mtwhf	USA, Voice of America	6035af	7415af	12080af	13710af
2200-2300	USA, WEWN Birmingham AL	7395na	11820eu	13615na	
2200-2300	USA, WGTG McCaysville GA	6950am	9400am		
2200-2300	USA, WJCR Upton KY	7490na	13595na		
2200-2300 smtwhf	USA, WMLK Bethel PA	9465eu			
2200-2300 mtwhf	USA, WRMI/R Miami Intl	9955am			
2200-2300	USA, WRNO New Orleans LA	15420am			
2200-2300 smtwhf	USA, WVHA Greenbush ME	5850eu			
2200-2300	USA, WWCR Nashville TN	7435am	9475am	12160am	13845am
2200-2245	USA, WYFR Okeechobee FL	17845af	21525eu		
2200-2230	Yugoslavia, Radio	6100eu	6185eu		
2200-2210	Zambia, ZNBC Radio 2	6165do			
2206-2300 fa	New Zealand, R NZ Intl	15115pa			
2210-2300 vl	Papua New Guinea, NBC	9675do			
2230-2255	Austria, R Austria Intl	5945eu	6155eu	9880eu	
2230-2257	Czech Rep, Radio Prague	7345na	9430na		
2230-2300	Russia,Voice of Russia WS	7240eu			
2230-2300	United Kingdom, BBC WS	7325va			
2238-2255 1&3rd s	Denmark, R Denmark Intl	9495na	11840au		
2240-2250	Greece, Voice of	9425au			
2245-2300	Ghana, Ghana Broadc Corp	3366do	4915do		
2245-2300	India, All India Radio	7155as	9705as	9950as	11620as
		11660as			
2245-2300	Vatican State, Vatican R	7305as	9600as	11830au	

Frequencies

2300-0000	Australia, Radio	9660pa	11695as	11855as	13755as
		15365pa	17795pa	17860pa	
2300-2325	Belgium, R Vlaanderen Int	5910na			
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			
2300-2359	Canada, R Canada Intl	5960am	9755am	11940am	13670am
		15305am			
2300-0000	Costa Rica, Adv World R	5030am	6150am	7375am	9725am
		13750am	15460am		
2300-0000	Costa Rica,RF Peace Intl	7385am	15050am		
2300-0000	Egypt, Radio Cairo	9900na			
2300-2350	Germany, Deutsche Welle	7235as	9690as	12045as	
2300-0000	Guam, AWR/KSDA	11775as			
2300-0000	Guatemala, Adv World R	11775am			
2300-0000	India, All India Radio	9705as	9950as	11620as	13700as
		15145as			
2300-0000	Japan, NHK/Radio	5965eu	9535eu	9560as	11850pa
2300-0000	Lebanon, Voice of Hope	9990va			
2300-0000	Malaysia, Radio	7295do			
2300-2325	Moldova, R Moldova Intl	7520na			
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 vl	Papua New Guinea, NBC	9675do			
2300-0000	Romania, R Romania Intl	7135na	9570na	9625na	11940na
2300-0000	Russia,Voice of Russia WS	7125na	7240na		
2300-2350	Turkey, Voice of	7280na	9560na	9655na	11810na
2300-0000	UAE, Radio Abu Dhabi	9605na	9695na	9770na	
2300-0000	United Kingdom, BBC WS	3955eu	5975va	6175va	6195va
		7295as	9580as	9590na	9915va
		11750sa	11945as	11955as	
2300-2330	United Kingdom, BBC WS	3915as			
2300-2315	United Kingdom, BBC WS	11835va			
2300-0000	USA, KAIJ Dallas TX	13815am			
2300-0000	USA, KTBN Salt Lk City UT	15590am			
2300-0000	USA, Monitor Radio Intl	7510eu	13625pa	13770am	15405as
2300-0000	USA, Voice of America	7215va	9705va	9770va	11760va
		15185va	15290va	15305va	17735va
		17820va			
2300-0000	USA, WEWN Birmingham AL	7395na	11820eu	13615na	
2300-0000	USA, WGTG McCaysville GA	6950am	9400am		
2300-0000 vl	USA, WHRI Noblesville IN	5745am	9495am		
2300-0000	USA, WJCR Upton KY	7490na	13595na		
2300-0000 mtwhf	USA, WRMI/R Miami Intl	9955am			
2300-0000	USA, WRNO New Orleans LA	7355am			
2300-0000 s	USA, WVHA Greenbush ME	5850eu			
2300-0000	USA, WWCR Nashville TN	5065am	7435am	9475am	13845am
2300-2315	Vatican State, Vatican R	7305as	9600as	11830na	
2310-2315	Kyrgyzstan, Kygyz Radio	4010eu	4050eu		
2330-2359	Netherlands, Radio	6020na	6165na	9845na	
2330-0000	Vietnam, Voice of	5940as	7270as	7400as	9840as
		12020as	15010as		
2335-2345	Greece, Voice of	9935sa	11595sa	11640sa	
2338-2355 1&3rd s	Denmark, R Denmark Intl	7275va	7490va	9485va	
2355-0000	Japan, NHK/Radio	9570as	11685au		

Selected Programs

Sundays

2300 Russia, Voice of: News. See S 0000.
2300 USA, Monitor Radio Intl: Sunday from the Mother Church. From the First Church of Christ, Scientist, in Boston, MA, USA.
2300 USA, VOA Washington DC (as): VOA News. See S 0000.
2300 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
2310 USA, VOA Washington DC (as): 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.
2311 Russia, Voice of: Program Preview. See S 0511.
2330 Russia, Voice of: News in Brief. See S 0030.
2332 Russia, Voice of: Audio Book Club. See S 0132.

Mondays

2300 Russia, Voice of: News. See S 0000.
2300 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
2300 USA, VOA Washington DC (as): VOA News. See S 0000.
2300 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
2306 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
2310 USA, VOA Washington DC (as): VOA Today. See S 2310.
2311 Russia, Voice of: Commonwealth Update. Commonwealth of Independent States (CIS) developments.
2330 Russia, Voice of: News in Brief. See S 0030.
2332 Russia, Voice of: Russian by Radio. See M 0132.
2349 USA, Monitor Radio Intl: Letterbox. See M 1249.
2352 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Tuesdays

2300 Russia, Voice of: News. See S 0000.
2300 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
2300 USA, VOA Washington DC (as): VOA News. See S 0000.
2300 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
2306 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
2310 USA, VOA Washington DC (as): VOA Today. See S 2310.
2311 Russia, Voice of: Commonwealth Update. See M 2311.
2330 Russia, Voice of: News in Brief. See S 0030.
2332 Russia, Voice of: Audio Book Club. See S 0132.
2349 USA, Monitor Radio Intl: Letterbox. See M 1249.
2352 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Wednesdays

2300 Russia, Voice of: News. See S 0000.
2300 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
2300 USA, VOA Washington DC (as): VOA News. See S 0000.
2300 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
2306 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
2310 USA, VOA Washington DC (as): VOA Today. See S 2310.
2311 Russia, Voice of: Commonwealth Update. See M 2311.
2330 Russia, Voice of: News in Brief. See S 0030.
2332 Russia, Voice of: Russian by Radio. See M 0132.
2349 USA, Monitor Radio Intl: Letterbox. See M 1249.
2352 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Thursdays

2300 Russia, Voice of: News. See S 0000.
2300 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
2300 USA, VOA Washington DC (as): VOA News. See S 0000.
2300 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
2306 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
2310 USA, VOA Washington DC (as): VOA Today. See S 2310.
2311 Russia, Voice of: Commonwealth Update. See M 2311.
2330 Russia, Voice of: News In Brief. See S 0030.
2332 Russia, Voice of: Audio Book Club. See S 0132.
2349 USA, Monitor Radio Intl: Letterbox. See M 1249.
2352 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Fridays

2300 Russia, Voice of: News. See S 0000.
2300 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
2300 USA, VOA Washington DC (as): VOA News. See S 0000.
2300 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
2306 USA, Monitor Radio Intl: Monitor Radio International. See M 1206.
2310 USA, VOA Washington DC (as): VOA Saturday. Interviews and features about science, sports, agriculture, and business, plus the latest American music.
2311 Russia, Voice of: Commonwealth Update. See M 2311.
2330 Russia, Voice of: News in Brief. See S 0030.
2332 Russia, Voice of: Timelines. See M 0332.
2349 USA, Monitor Radio Intl: Letterbox. See M 1249.
2352 USA, Monitor Radio Intl: Religious Article from the CSM. See M 1252.

Saturdays

2300 Russia, Voice of: News. See S 0000.
2300 USA, Monitor Radio Intl: Monitor Radio News. See M 1200.
2300 USA, VOA Washington DC (as): VOA News. See S 0000.
2300 USA, WJCR Upton KY: Gospel Music and Prayer. See S 0200.
2306 USA, Monitor Radio Intl: Christian Science Sentinel Radio Edition. See A 0206.
2310 USA, VOA Washington DC (as): VOA Sunday. See F 2310.
2311 Russia, Voice of: Program Preview. See S 0511.
2330 Russia, Voice of: News in Brief. See S 0030.
2332 Russia, Voice of: Timelines. See M 0332.

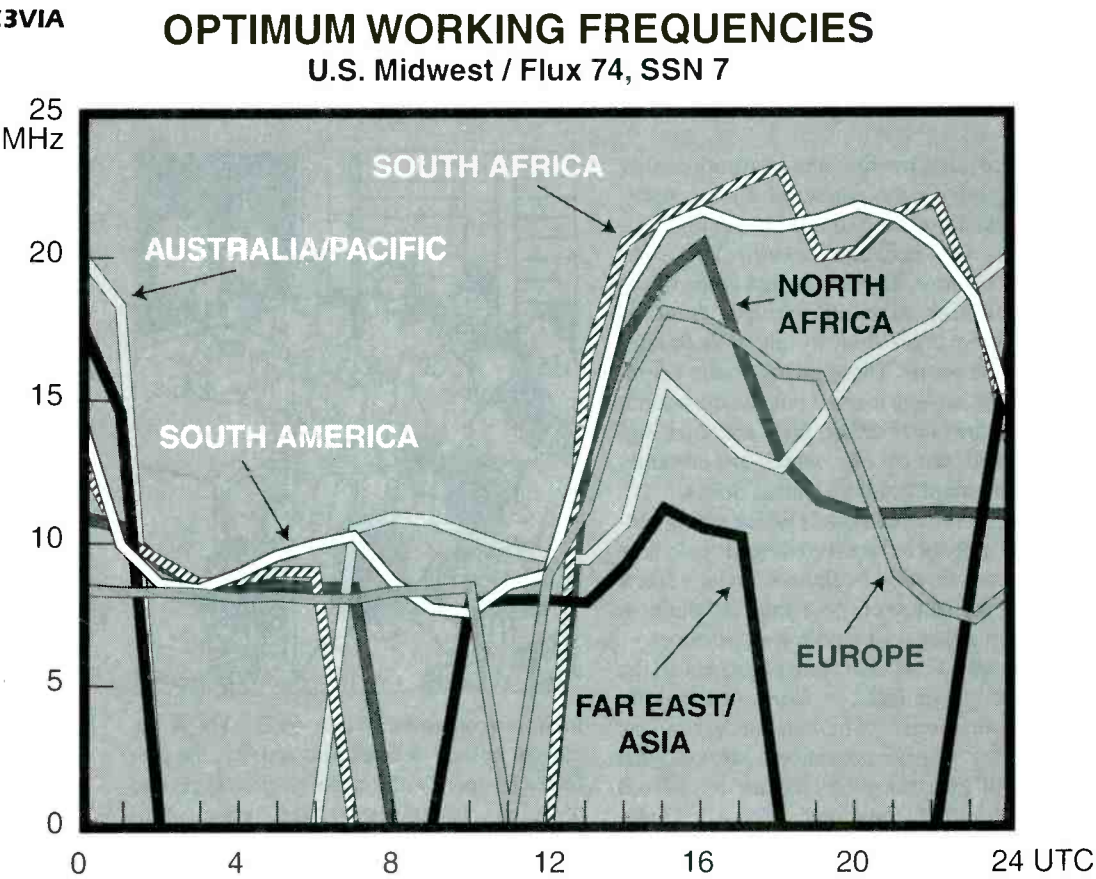
Hello, Writers...

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, or for an SASE.

PROPAGATION CONDITIONS, UNITED STATES

By Jacques d'Avignon, VE3VIA



Many readers and listeners are still puzzled by the radio propagation forecasting graphs or tables found in various magazines such as *MT*. I will try to explain the two main types of propagation forecasting and how they are used.

Short-Term vs. Long-Term Forecasting

There are two basic types of propagation forecasting: *nowcasting*, used to anticipate what international broadcaster can be heard or what region of the world might be open for an amateur radio contact; and *long-term forecasting* seen in magazines or used by broadcasters for long term planning of frequency use and transmitting station location/construction.

The nowcasting type of forecasting is normally used on fixed circuits (a "circuit" is the signal path between two points) when you have the ability to choose at a moment's notice which frequency to use on a specific circuit. This would apply, for example, to the armed forces and organizations that have many frequencies spread across the RF spectrum, available for communications if and when required.

Some nowcasting programs even have the capability of automatically accessing and updating the A and K indices from a time standard station such as WWV in the U.S..

The long-term type of forecasting is more often used for frequency management—finding and registering the best frequency(ies) for use during a specific broadcasting season for a specific circuit. Long-term forecasting is used by broadcasters that have to make frequency management decisions, months (and in some cases, years) ahead of time. Another use is for planning how to serve a specific target area, either by the construction of new relay station or by buying time from another broadcaster's station. In this age of shrinking budgets, whether to buy or exchange time with another international broadcaster, or whether to build a new station, is a crucial decision.

I presently prepare radio propagation forecasts for at least four magazines, and when I prepare these forecasts I can only assume that the ionosphere will be "normal" when the publications come out. There is no way I can forecast what the Sun will exactly be doing a month from now, much less three months from now! So I prepare predictions without taking into account the A and K indices, letting the user make the decision if the predictions will be correct according to the indices available that day.

What I am really doing is telling the listener/user: "Assuming that the Sun follows its normal pattern, on the circuit from North America to Australia in July 1997 the best frequency (Optimum Working Frequency or Frequence Optimale de Travail) should be around 12.5 MHz. Do not expect to find any reliable transmissions above 17 MHz, the Maximum Usable frequency."

If I was offering a nowcasting service to a user, I would be using a different technique, and would say: "According to the trend of the indices and the actual indices recorded today, the MUF on the North America - Australia will be 17 MHz, and the best frequency (OWF or FOT) for your use is 12.9 MHz."

The A and K can be taken into account if you are doing some nowcasting and have a program that will accept one or the other. But, if you do nowcasting, be cautious: don't use only the numbers available for that day as broadcast by WWV or WWVH. It is necessary to use a mean of the A or K or SSN or Flux to plug in the program—a running mean of 10 to 15 days should be sufficient to be reliable.

In an upcoming installment we will discuss the A and K indices in more depth: what they are, how they are calculated, and what they mean to the shortwave user. Don't forget to send us your questions and comments about propagation, along with your preference for chart or graphic presentation of the forecast. Until next month, good DX.

SKIP AREY, WB2GHA
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Beyond the Fringe

The rules, treaties, and conventions that govern radio communication activity exist to manage the radio spectrum in a more or less civilized manner. That's the theory anyway. The fact is that some of the most exciting monitoring comes from resources that don't abide by any of these rules and conventions. These include radio operations that manage to exist outside the boundaries of the law. Further, there are some signals, protected by law, which are currently illegal to monitor in the United States.

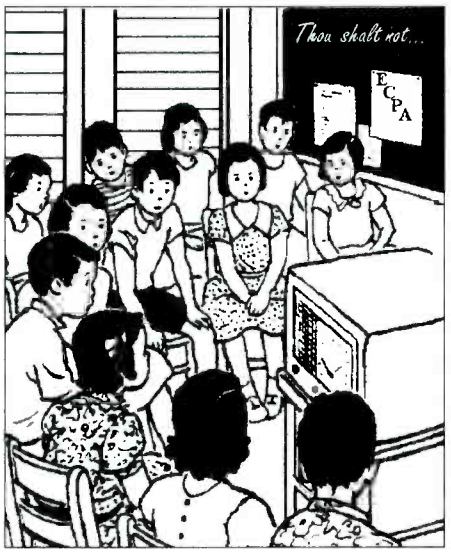
The presence of signals which can broadcast illegally or be received illegally is an area of concern for most beginners. So let's take a look at the nature of these subjects and how they can affect your monitoring practices.

One question I hear from beginners all the time is: *"Is it legal to listen in on radio communications?"* The best answer is yes, with a few specific exceptions. Most of what you will hear on your receiver is covered under the 1934 Communications Act. Under this federal law, radio-monitoring hobbyists are considered third-party listeners. The law states that third-party listeners are prohibited from revealing the content of intercepted transmissions and cannot use the information they gain from listening for personal profit. So basically, you can listen in to most things, but revealing the content is a no-no under the law.

However, this also begs the question: *"What about listening to illegal broadcasts or signals?"* Again, there is no current law to prevent you from listening in on signals that are illegally transmitted. The person or persons doing the transmitting may have some serious problems with the authorities, but you can listen without fear of retribution. So what are these signals that can be monitored that represent illegal transmitting activity? Let's take a look.

Pirate Radio

On any weekend or holiday evening, a quick trip down to the area around 6955 kHz will yield a few interesting pirate stations. The loggings and activities of these stations are often found in my colleague George Zeller's *Outer Limits* column. There is no place in all of the radio spectrum where you will hear more intriguing signals. Pirate activities run the gamut from professional quality programming to people just ranting into



their microphones. While 6955 kHz is the current hotbed of free radio activity, the preferred frequency of activity often changes due to various reasons such as interference, conditions, or activity by authorities.

Currently pirate radio is in a bit of a renaissance after several hard years. This is probably due to recent reductions in the number of the Federal Communications Commission's monitoring stations across the United States. With the steadily improving propagation conditions, these could be some of pirate radio's finest hours.

By the way, it is not only perfectly legal to monitor pirate radio activity, it is even possible to receive QSL cards from these stations. Most pirates respond to confirmation letters sent to one or more of the various "maildrops" that you will often find listed in the *Outer Limits* column. The stations will usually list their preferred maildrop in their programming. Always remember to include three mint first class stamps with your report for domestic pirates or two international reply coupons (IRCs) for pirates using foreign maildrops.

Spy Numbers

Among the international shortwave broadcasters and the many utility stations that cover the HF bands, you will occasionally hear signals that are little more than somebody repeating a series of groups of numbers and/or letters. These are believed by many to be genuine espionage communications.

The coded message is sent to a spy somewhere who uses a technique called a "one-time-pad" to decipher the message. You have no hope of translating this communication or ever receiving any confirmation. However, finding, monitoring, and logging spy number stations can be loads of fun.

To get an idea of what's out there, keep an eye on Larry Van Horn's *Utility World* column. Numbers stations often appear in the loggings section. As you monitor you will discover that numbers stations broadcast in several languages, most notably English, Spanish, and German. You will also hear both male and female announcers. Some signals will sound as if they are tape recordings and other will be obviously live. These broadcasts make any monitor feel like James Bond when tuning through the shortwave spectrum.

Clandestine Stations

Many governments try to suppress dissenting points of view, forcing dissenters to resort to measures such as unauthorized broadcasting to get their point across. These activities are also chronicled in the *Outer Limits* column.

This type of monitoring represents some of the most dynamic and exciting stuff on the bands. While clandestines are usually targeting a specific audience (and may not be in English), some have been known to QSL. Keep an eye on George's column for the latest information.

Freebanders

Operating just outside of the legal limits of the 11 meter citizens band you will find CB activity unlike anything you will hear within the legal 40 channels designed for this radio practice. Tune your receiver slightly below 26.965 MHz or slightly above 27.405 MHz most any evening and you will hear folks stretching the limits of the law with levels of power well in excess of the four watts that are authorized in this neck of the spectrum.

Illegal operation in the area of the CB channels has been around for longer than I've been involved in the radio hobby. I logged my first "freebander" in the mid-sixties. Many of these operators use modified amateur radio equipment and amplifiers to get their signal well beyond normal range.

Another practice you may find within the

legal CB channels is known as "sliding." Normal CB operation depends on crystal-controlled transmitting and receiving. Some people modify their equipment (or use adapted amateur radio gear) to allow for tuning in between the legally established 10 kHz channels.

Smugglers

A bit harder to track down than some of the above stations, international drug traffic can also be monitored on the shortwave bands. You can follow the activities of South American drug runners as they attempt to move their cargo toward the southeastern shores of the United States by keeping an eye on unusual activity just outside the 20 and 40 meter amateur radio bands. Most of the communications will be in Spanish or English and the discussion will be decidedly non-ham in nature.

So not to leave scannists out of the fun, let's take a look at what questionable transmissions can be heard in the VHF/UHF ranges. If your scanner tunes down far enough you might also check those areas slightly above and below the authorized CB frequencies (26.965 through 27.405 MHz). In urban areas these frequencies are often used by independent "gypsy" cab drivers and sometimes for other less savory activities such as drug dealing.

The "itinerant" frequencies of 151.625, 154.57, and 154.60 MHz are the most common of these non-location-specific business channels, and can be subject to abuse for such activity as drug dealing. Since VHF/UHF transmitting gear is so common in the business and hobby world it is conceivable that almost any frequency can be subject to illegal use. The relative short range transmitting capabilities of much of the handheld gear does lend itself to abuse. Keep an ear open; you never know what you may hear.

Listening Laws

Now let's take a look at the receiving side of things. There are a small number of signals to which it constitutes a violation of existing law to listen. These signals are protected communications under a body of law known to most people as the Electronic Communications Privacy Act (ECPA).

In 1986, the federal government produced the laws behind the ECPA. Without getting into all the legal mumbo-jumbo, the law "protects" cellular telephone owners and users from being monitored by making it against the law to listen to the frequencies that contain cellular transmissions.

Further, in 1994 it became illegal to manufacture or import receivers capable of hearing these frequencies. Later provisions under the law restricted listening in on cordless phone signals, and it has been long against the rules to monitor the Subsidiary Carrier Authorization (SCA) signals without the express permission of the transmitting station. SCA signals carry programming riding on a portion of an FM common transmission. These signals normally require a special receiver or modification to an existing receiver to be detected.

So let me state most clearly...*Do not listen to cellular telephone frequencies. Do not listen to cordless telephone frequencies. Do not listen to SCA signals without permission. No, no, no, a thousand times no! You are a bad little radio monitor if you commit these illegal acts! If you come near a receiver and one of these frequencies can be heard, quickly cover your ears and begin to shout loudly as you run from the room.*

Now that that's said, let me also tell you that more than just a few folks think that the ECPA is the silliest law put on the books. But, still, it is the law and in every neighborhood there are folks who take this law very seriously—mostly people with a lot of money invested in the cellular radio service.

Practically speaking, if your receiver happens to accidentally stumble across a cellular signal, there is no ECPA radio police to smash your door down and drag you off to the pokey. As you move on in the hobby you will even discover that this law has a few holes in it big enough to drive a large truck through.

For example, it is still legal to own a receiver made before 1994 that covers these frequencies: you're just not allowed to listen to those frequencies that are prohibited by the ECPA. Ironically, the standard UHF television channels 80 through 83 tune right through the cellular frequency bands. Also, it is perfectly legal to construct signal adapters to make post-ECPA receivers cover these banned frequencies, just as it is not against the law to build a circuit to decode SCA signals. You just aren't supposed to listen to anything you hear.

If your momma raised you right, you will just avoid these signals and continue to enjoy all the other exciting things there are to hear in the radio frequency spectrum. However, if your momma also didn't raise no fool, you can see how silly and essentially unenforceable certain aspects of this law are. Still, it is important that you know the law is on the books.

Protect yourself as you, your conscience, and any legal counsel see fit. I'm sorry I had to burden you with this so early in your hobby experience, but the world has become a crazy place.

Kevin Carey, WB2QMY
kevinc@mdsroc.com

Portable Pick-ups

I get many requests from listeners who'd like to improve the longwave performance of their portable receiver. These sets employ an internal ferrite antenna for longwave, so it is not always easy to connect an external antenna or preamp as could be done with a tabletop set.

An alternative for portables is to use an inductively-coupled external antenna. These antennas require no power and need only be placed near the receiver to operate. They work by re-radiating signals to the receiver's internal antenna via inductive coupling.

Coupled antennas are not new. Perhaps you've seen models optimized for AM broadcast reception (the Select-A-Tenna, for example). They are useful for AM DXers or for those living outside the primary coverage area of an AM broadcast station.

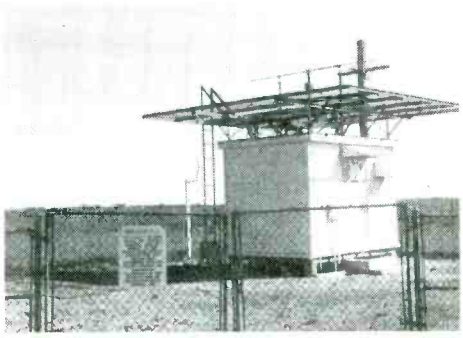
For longwave enthusiasts, there are at least two firms offering suitable antennas of this type. One is Radio Plus+ Electronics, 3635 Chastain Way, Pensacola, Florida 32504. Their Q-Stick antenna is designed to be positioned atop a portable receiver and contains a switch to select between MW and LW operation.

Another manufacturer is Black Box Antenna, 14624 Deon Dr., Sonora, California 95370. As supplied, their antenna covers 360 to 1800 kHz, but a modification is available to extend its coverage down to 150 kHz.

A benefit of most coupled antennas is that they can be sharply tuned to the frequency of interest, thereby optimizing reception and minimizing the chance of overload from out-of-band stations. As with all loop antennas they are also highly directional, allowing you to null out an unwanted signal or focus on a desired one.

Want to make your own high performance antenna? The September 1992 *Below 500 kHz* column presented detailed plans for a homespun LF loop (reprints available from *MT* for $2). Although the design is primarily intended for direct connection to a receiver's external antenna jack, it will also work fine as an inductively-coupled antenna. Just leave the feedline disconnected and tune the antenna in the usual manner.

At a recent swap meet in Rochester, New York, I saw a fellow using a loop with a transistor radio to hear an AM broadcast station over 350 miles away—in broad daylight. Moving the radio a few inches away from the loop made the signal completely disappear.



MT reader John Horton snapped this picture of CM (407 kHz) near Champaign, IL

Seeing this confirmed my belief in the utility of coupled loops. It's almost like getting something for nothing!

Winter DXing

With the static crashes of summer behind us, this is a great time to pursue DX on the beacon band. In the past, we've focused on hunting high-powered Canadian beacons, but this time, let's look to the south for something new. Our destination will be Cuba—a rather small country in geographic terms, but home to many interesting non-directional beacons (NDBs).

You do not need to be located in the southern U.S. to hear these stations. From my location in upstate New York I have logged several Cuban beacons at reasonably strong levels during the winter months.

What can you expect from Cuban NDBs? They usually have an identifier beginning with "U", but that's about all you can count on. Don't be surprised if you hear a station that is not on an exact 1 kHz channel or uses an identifier tone other than the usual 400/1020 Hz pair common to the United States and Canada. Cuban beacons play by their own rules.

An excellent reference for Cuban beacons (and other utilities) is the Cuban ute site on the world wide web: **http://nersp.nerdc.ufl.edu/~decrawf/misctxt/cubaute.html**. The foreign section of *The Aero Marine Beacon Guide* is another reliable source. Table 1 shows selected beacons from each of these sources as well as loggings from *MT* readers.

QSLs from these stations are somewhat rare, so I would be interested in seeing photocopies of any cards or verie letters that *MT* readers have received for their efforts. I will try to present these in future columns as space permits.

It's About Time

A common sight in many homes is a VCR flashing 12:00 at all hours of the day. A news story submitted by Walter Szczepaniak in Pennsylvania could bring relief, with the help coming from low frequency radio.

In this scheme VCRs, computers, wall clocks, and even wrist watches would be equipped with miniature receivers for time station WWVB on 60 kHz from Ft. Collins, Colorado. The precise timing signals broadcast by WWVB could be used to keep the clocks accurate at all times, even after a power outage.

To make this possible, the National Institute of Standards and Technology is planning a fourfold increase in WWVB's transmitter power. This will enable reception without large antennas. If you are able to tune into WWVB, it might be interesting to note its signal strength now, and then after the increase.

73 kHz News

As reported in this column in August, the British government has authorized United Kingdom amateurs to use the spectrum from 71.6 to 74.4 kHz for experimental purposes. Much of the work involves experimentation with cave radio systems, but the regulations do not limit other types of communications. For more information on this new band, check out the 73 kHz homepage on the web at **http://www.stonix.demon.co.uk/73kHz/**. This web site has topics of interest to *all* LF experimenters, such as antennas, propagation tips, and links to other LF-related pages.

Good DX and I'll see you next month.

TABLE 1: SELECTED CUBAN NDBs

Frequency	ID	CITY
212	UMO	Moa
232	UMZ	Manzanillo
256	UNV	Nuevitas
268	UBY	Bayamo
278	UBA	Baracoa
296	UBO	Batabano
300	UGT	Guantanamo
315	USR	Simon Reyes
348	UHA	La Habana
370	UCM	Camaguey
382	UPA	Punta Alegre
390	UCA	Ciego de Avila
412	UNG	Nueva Gerona
450	USC	Santa Clara
465	ULM	La Coloma

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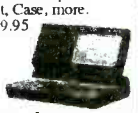

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What's in a name?

"WRLG Smyrna, WYYB Dickson, Nashville's Thunder 94!" If you listen to one of these stations, you've probably heard that announcement hundreds of times. And you've probably ignored it hundreds of times. To the ordinary listener, the letters "W-Y-Y-B" mean absolutely nothing. To the DXer, the station, and the FCC, they mean much more.

Call letters have their origin in the earliest days of radio. When everything had to be sent in Morse Code, the idea of sending the entire name of your ship, or the full location of your shore station, was rather cumbersome. Operators began using their initials or other self-selected call signs. Without government registration, however, there were a lot of duplicates.

By 1914, the U.S. government had signed a treaty allocating beginning letters for callsigns, and it began to assign three-letter calls beginning with the letters K and W. (History doesn't seem to record why those two letters were chosen. Other countries received more logical letters— I in Italy, F in France, D (Deutschland in Germany, etc.)

To avoid confusion, the U.S. government assigned K callsigns to shore stations on the Pacific Coast and W calls to those on the Atlantic and Gulf Coasts. Then, they reversed the process for ships: K for ships based in the East, and W for ships based in the West. This scheme would work well through World War I. Most stations were either maritime or amateur (amateurs received a different type of callsign, beginning with a number.)

In 1920, Westinghouse executives discovered people were having radios built specifically to listen to the transmissions of one of their engineers, Frank Conrad of Pittsburgh. Sensing a business opportunity, they worked with Conrad to build experimental station 8XK. The famous November 11, 1920, election return broadcast, often credited as the first broadcast in history, would actually be transmitted under a "special amateur" license with the call letters 8ZZ, but a commercial license for KDKA would soon be issued.

Broadcasting would prove a very successful industry. Hundreds of licenses would be issued, and each one would need a set of call letters. Only 1,950 3-letter calls were available, and they were running out fast. The inevitable was only slightly delayed by a change in policy to assign four-letter calls to ships, rapid turnover in the industry (many early stations failed quickly), and the return of ship calls (maritime operators didn't want to reuse the callsign of a ship that had sunk!).

"Z100" in New York is one of those stations that likes to "bury" its call letters. You should still hear a legal identification— WHTZ Newark—once an hour, probably a few minutes before the top of the hour.

WBT Charlotte, on the other hand, is proud of its call letters. Note the mention of the April 10, 1922 sign-on; I believe WBT was one of the last of the randomly-assigned three-letter calls. Thanks to Donald Pipa of suburban New York for both logos.

By April 1922, new broadcasters who didn't request a specific callsign began receiving four letter calls. Stations could, however, request a shorter call. Not counting return of a previously-held call, or assignment to a co-owned FM or TV station, the last three letter call was issued in January 1930 to WIS, Columbia, South Carolina. (The station is today WVOC-560, though the WIS calls are still used by their TV station on channel 10.)

The growth of broadcasting would also affect the dividing line between K and W territory. When all stations were maritime, the line could be "soft." But as broadcasting grew, stations were built in places like Colorado, Kansas, and North Dakota, where no ship would sail. The original (and informal) border would be the eastern borders of New Mexico, Colorado, Wyoming, and Montana. Population growth in the East would force the dividing line to be changed to the Mississippi River by 1923. This three year period accounts for most of the "W" stations west of the river—WNAX in South Dakota, WOW in Nebraska, WDAF in Missouri, WBAP in Texas, among others.

Shortly before World War II, FM and TV broadcasting would be introduced. These stations would also require callsigns. FM began with an interesting scheme to incorporate the station's frequency and city into the callsign. Calls would start with a W or K, followed by the last two digits of the frequency, and then one or two letters indicating the city. A station on 44.7 MHz in Nashville was W47NV; WTMJ's 45.5 MHz station in Milwaukee was W55M.

The TV plan was more familiar, and simply used four-letter K and W calls. At first, the TV suffixes used today weren't permitted; the four letters chosen for a TV station had to be unique. This restriction would be deleted shortly before the end of the war; at the same time, FM stations were switched to the current system. Technically, the FM and TV calls are still unique. The FM and TV suffixes are considered part of the callsign, so to the FCC, WSM-FM is a *five*-letter callsign.

There have been a few relatively minor recent changes in callsign policy. From the end of World War II to a few years ago,

SKIPPING IN

NRC member Brandon Artman near Philadelphia sent in his summertime AM catches:

WLUX-540	Islip, NY
WSB-750	Atlanta, GA
CKLW-800	Windsor, ON
WQSI-820	Frederick, MD
WWL-870	New Orleans, LA
WTTM-920	Trenton, NJ
WOBM-1160	Toms River, NJ
WPOP-1410	Hartford, CT
WMMW-1470	Meriden, CT
WNRB-1510	Boston, MA
WARD-1550	Pittston, PA
WJDM-1660	Elizabeth, NJ

Brandon lists the 1550 station in Pittston as "WARD/WKQV." Larry Van Horn reports WKQV is a callsign change.)

common callsigns could be used in different services only if the stations were commonly owned and in the same city. For example, if WAAA (AM) existed in Winston-Salem, the calls WAAA-FM could only be assigned to a station they owned, and also located in Winston-Salem. This regulation has been recently repealed.

Also, regular four-letter calls are now available to low-power TV stations.(LPTVs) These stations grew out of the TV translator service, and were assigned special callsigns consisting of a K or W, then their channel number, then two more letters. A channel 24 LPTV might be W24AE.

If you've been reading closely, you're probably wondering: If four-letter calls weren't assigned to broadcast stations until 1922, then why did KDKA (which was licensed in 1920) get four letters? The answer lies in a brief change in policy. In June of 1920, the Department of Commerce had just run out of four-letter ship calls. They formulated a new policy for these stations, and decided to apply it to shore stations as well. In April of 1921, they reconsidered their action and went back to distinguishing between ships and land. The second broadcasting license would be issued in May of that year (WJZ Newark, now WABC New York), making KDKA the only broadcaster to receive a call under the four-letter policy.

In the early days, many callsigns were assigned sequentially by the government. Today, most stations choose their own—and even many of the old 3-letter calls stand for something. WTMJ=*T*he *M*ilwaukee *J*ournal, WCOR=*W*ilson *C*ounty's *O*wn *R*adio", etc.. Stations spend thousands asking consultants to suggest the best new callsign for a programming change; they also defend their calls in the civil courts. And if they can't get something they like, they bury it and adopt a slogan instead.

Bits and Pieces

• Here's an item we wouldn't have seen two years ago. Donald Dunn KA2OMV in suburban Rochester, New York, sent an article from the Rochester *Democrat and Chronicle* regarding the proposed sale of two local radio stations to American Radio Systems (ARS). The sale of WHAM-1180 and WPXY-97.9 would give ARS two AM stations, three FMs, and an agreement to sell airtime on a fourth FM.

The sale, which would have been illegal two years ago, has local advertising buyers worried. The combined rating of the five stations would be nearly 71% of all listeners between the ages of 25 and 54. Lawyers from the Justice Department visited Rochester in late July; they'll try to determine whether an anti-trust action is justified.

• Another newspaper item from the Newport News, Virginia, *Daily Press* details some "friendly competition" that ceased to be quite so friendly. The program director and a promotion assistant at WNOR-FM Norfolk have been charged with assault after an attack on three employees of rival WKOC-FM. Charges allege the WKOC employees went to a Virginia Beach K-Mart to check out a WNOR promotional event, and were attacked there. WNOR's general manager denies the charges.

Any callsign changes in your area? Write me at Box 98, Brasstown NC 28902-0098, or by email at *72777.3143@compuserve.com*.

DX TEST BULLETIN

These special broadcasts provide a unique opportunity to hear and identify the following stations. If you hear these broadcsats, please report to the address provided.

Sun Nov 3, 10, 17, 24 - WWCN-770 (P.O. Box 9600, Estero, FL 33928) will test at 1,000 W directional 3:00 - 4:00 am EST. Morse code IDs, test tones, and big band music. Note: the test will be repeated every Sunday morning at the same time during November. Send reports to: Mr. "Joey C," Program Director.

Mon Nov 4 - WIMN-1220 (104 North Main Street, Stillwater, MN 55082; E-mail: DSRadioman@aol.com) will test at 254 W nondirectional 1:30 - 2:00 am EST. Oldies music and Morse code IDs. Send reports to: Mr. Doug Smith, President & General Manager.

Sun Nov 10 - WJCE-680 (5904 Ridgeway Center Parkway, Memphis, TN 38120) will test at 10,000 W nondirectional 1:00 - 7:00 am EST. Test will include many slogans and voice IDs, plus 70's rhythm & blues music. Send reports to: Mr. Skip Reynolds, Chief Engineer.

Mon Nov 11 - CIGM-790 (880 LaSalle Boulevard, Sudbury, ON P3A 5W7, Canada; E-mail: Ssloan@osiris.isys.ca) will test 1:00 - 1:30 am EST. Morse code IDs, country music, and voice IDs between each song, and will be run at a power of 50,000 W at 135% modulation using a daytime antenna pattern. Send reports to: Mr. Scott Sloan, Director of Engineering.

Mon Nov 18 - KALM-1290 (P.O. Box 15, Thayer, MO 65791; E-mail: Watson@enet.net) will test at 1,000 W 1:00 - 1:30 am EST. Morse code. Send reports to: Mr. Dave Watson (KB0YF), Program Manager.

Mon Nov 18 - KKOJ-1190 (P.O. Box 29, Jackson, MN 56143) will test at 5,000 W directional daytime pattern 1:30 - 2:00 am EST. Morse code IDs and oldies music. Send reports to: Mr. Doug Potter, Engineer.

These tests were arranged by J.D. Stephens for the International Radio Club of America Courtesy Program Committee. (Send 32-cent stamp, or US$1 or 1 IRC if overseas, to P.O. Box 1831, Perris, CA 92572-1831 for sample IRCA bulletin.)

George Zeller
George.Zeller@acclink.com

New Name for Nigerian Clandestine

Radio Democrat International has changed its name on August 29. This English language clandestine voice of the Nigerian political opposition now identifies itself as **Radio Kudirat International, the Voice of Democracy**. They put out a fine signal on 6205 kHz at 2100 UTC daily. The station now announces a United States address over the air: NALICON, PO Box 175, Boston, MA 02131.

It is certain that the transmitter being used by this clandestine is the big Sentech complex at Meyerton, South Africa. If you'd like to see the site, Sentech's web site at **http://www.sentech.co.za/meyerton.html** includes multiple transmitter photos and a complete transmission schedule.

When I heard the station's September 15 broadcast, the first two minutes were the sign-off announcement of the **Voice of America,** complete with several bars of Yankee Doodle! It's unclear if the Nigerian clandestine has any relationship with the VOA; it's possible that the two stations are just using the same satellite feed.

Bougainville Pirate?

Lee Silvi of Mentor, Ohio, sends in a fascinating log of a station that played a speech at the opening of clandestine station **Radio Free Bougainville.** I also heard this pirate, which operated on August 18 from 2140 to 0007 sign off UTC. It's unclear if this was an authorized relay of programming from this disputed portion of Papua New Guinea.

Wellsville Maildrop Replaced

The Wellsville, New York, address has been the largest maildrop in North American pirate radio for some time. The drop operator advises *MT* that this address has been changed to P.O. Box 1, Belfast, New York 14711. Some pirate stations are still announcing the Wellsville address, but reports to these stations should now be sent to Belfast.

FRN Grapevine Returns

The excellent Free Radio Network internet web site has returned to normal after a period of reconstruction during the summer. Webmasters John Cruzan of Missouri and Kirk Trummel of Illinois point out that the "Grapevine" message center was the last part to reactivate. Since the closure of the ANARC and ACE BBS last spring, the Grapevine has filled a void as a place to leave pirate radio messages. The **http://www.clandjop.com/~jcruzan/frn.html** URL still works to access this wonderful resource.

Rush Limbaugh "endorses" Up Your Radio Shortwave.

Europirate Reception

Regular *MT* reporter Niel Wolfish of Toronto, Ontario, was pleased to log Europirate **Weekend Music Radio** on 6952.6 kHz at 0018 to 0052 sign off from his inland location. With winter conditions returning, some Europeans may be trying for transatlantic reception around local sunset on this band. Other Euros like to operate on the high end of the 80 meter ham band. For instance, Mike Prindle of New Suffolk, New York, and Jesse Rose of Hampton, Virginia, snagged **Live Wire Radio** from 2319 to 0010 UTC on 3927 kHz. These stations can be a real DX challenge!

What We Are Hearing

We have another record 64 different pirates reported this month: activity has never been higher! Your pirate logs are welcome via P.O. Box 98, Brasstown, NC 28902, or via the e-mail address at the top of the column. All frequencies are in kHz, with times in UTC.

North American pirate stations listed here use the following addresses: P.O. Box 1, Belfast, NY 14711; P.O. Box 109, Blue Ridge Summit, PA 17214; P.O. Box 28413, Providence, RI 02908; P.O. Box 146, Stoneham, MA 02180; P.O. Box 605, Huntsville, AL 35804; P.O. Box 5617, Ventura, CA 93005; 770 Sycamore Ave. #J193, Vista, CA 92083; P.O. Box 510, 4010 Basel, Switzerland; and P.O. Box 3103, Napier, New Zealand. For return postage, enclose three 32¢ stamps in the envelope to United States addresses. $2 U.S. or two international reply coupons go to foreign maildrops.

Action Radio- 6955 at 0130. A. J. Michaels dusted off his transmitter to air rock music, pirate commentary, and criticism of the **Voice of the Night**. Addr: Huntsville. (Ross Comeau-MA)
Alan Masyga Project- 6955 at 0000. Alan Parsons Project rock music dominates their shows, but they always have a singsong promotion of DXer Alan P. Masyga of Minnesota. Addr: Providence. (Rich and Talea Jurrens-Katy, TX; Harold Frodge-Midland, MI; Barry Williams-Enterprise, AL;Wolfish)
All Average Music Radia- 6955 at 1430. The station name is self-explanatory, although TV audio is mixed in. Addr: None. (Silvi; Pat Murphy-Chesapeake, VA)
Altered States Radia- 6955 at 2130. William Hurt recently produced an elaborate drama about an alien planet. Addr: Merlin. (Wolfish; Williams)
Anarchy One- 6955 at 0330. They made it to the West Coast with a speech about the U.S. military, plus rock and classical music. Addr: Vista. (Randy Ruger-North Hollywood, CA)
Anonymous Radia- 6955 at 0315. Announcer John Doe plays rock music, but his announced addresses are phony. Addr: None. (Wolfish)
Big Johnson Radia- 6955 at 0100. Rock music and old TV audio clips are the fare on this station. Some of the programming is risqué, leading some to think that the station name does not come from a Johnson Viking transmitter. Addr: Providence. (Wolfish; Williams)
CHST- 6954 at 2245. The DX humor on this Canadian pirate is hilarious. Much of it, including the station slogan, involves chickens. Addr: None. (John Mello-North Scituate, RI)
Chuck E. Cheese Pizza Parlor- 6955 at 2300. This one specializes in parodies and novelty tunes. Addr: None. (Williams)
Club 30- 10040 at 1615. Some stations are using 31 meters during daylight hours, so here's a new frequency for your receiver's memories. This one programmed cartoon and TV theme songs. Addr: None; try the FRN Grapevine. (Jurrens; Frodge; Silvi; Wolfish; Williams)
COPS- 6955 at 0045. "Canada's Only Pirate Station" plays country music with this Cuban call sign, but it's by no means the only Canadian pirate. Addr: None. (Wolfish; Williams)
DC Radia- 6955 at 1915. The election is this month, so this unusual Morse code station is back with its loop message, "Don't Vote Republican." Addr: None, sometimes verifies logs in *The ACE*. (Silvi)
DT-306- 6955 at 2330. This three pirate extravaganza features A. J. Michaels of **Action Radia**, Dr. Blue of **Radia EXP**, and Radio Animal of **WKND** with his dog Yoder. This was Sue's first pirate! Addr: Belfast. (Sue Wilden-Columbus, IN; William Hassig-Mt. Prospect, IL;

Rose; Everhart; Murphy; Jurrens)
East Coast Beer Drinker- 6952 at 0200. Especially around the holidays, this pirate breaks out the brewskis. Addr: Blue Ridge Summit. (Frodge)
Fake Radio is Not Radio USA- 6955 at 0045. This odd ID appeared in late August as a program designed to stop several QSO's monotonously repeating the "Macarena" song. Addr: None. (George Zeller-Cleveland, OH; Frodge; Silvi; Wolfish; Rose)
Hip Hop Radio- 6955 at 0445. This one plays various music, mixed with religious messages and relays of other pirates such as **Solid Rock Radio.** Addr: Providence. (Jurrens; Rose; Williams)
Hitchhiker's Guide to the Galaxy- 6955 at 0230. They feature Arthur Dent with a sci-fi space drama. Addr: Blue Ridge Summit. (Pat Murphy-Chesapeake, VA; Silvi; Ross; Wolfish; Comeau)
Interstate 44- 6952 at 0230. They have returned with a show of march music and rock music. Addr: Merlin. (Wolfish)
Johnny Canuck- 7425 at 1700. After a long wait, QSLs have materialized in mailboxes from this harsh clandestine that opposed the Quebec separatist referendum. They promise to return if the political situation warrants. Addr: Merlin. (Ross; direct from the station)
K-9 Kitty Radio- 6955 at 1330. Their shows are full of comedy and parody, from Barbara Walters imitations to cow whipping songs. Addr: None. (Silvi; Murphy)
KAMP- 6954 at 0130. The main fare from announcer I Am Nutts is rock music, but this is another one of the Alan Masyga parodies. Addr: Blue Ridge Summit. (Williams; Hassig; Wolfish)
KAT- 6950 at 0030. Their second broadcast aired several times in late summer from the Kappa Alpha Tau fraternity house of the University of Wisconsin at Madison. Look for their "Spank Me" interval signal. Addr: Blue Ridge Summit. (Ross; Rose; Silvi; Comeau; Wolfish)
KGDR- 6955 at 0200. This is one of the Grateful Dead music stations. Addr: Providence. (Jurrens)
KIRK- 6955 at 0245. They play punk rock with strange commercials. Addr: None; announced ones phony. Addr: None. (Wolfish)
KIWI- 6955 at 0030. Graham Barclay still transmits direct from New Zealand, but he now has a North American relay. Addr: Napier. (Andrew Everhart, Carmel, IN; Robert Ross, London, Ontario; Silvi; Jurrens; Wolfish; Williams)
KMCR, Magic Carpet Radio- 6955 at 0700. You sometimes have to stay up late to hear Magic Mike and Wanda. A child sometimes gives their ID's. Addr: Blue Ridge Summit. (Ruger)
KTLA- 6955 at 2245. They have changed their format from oldies to alternative rock. Addr: Providence. (Williams; Rose)
Mystery Radio- 6955 at 0030. The Shadow hosts new age, industrial, and techno instrumental music that you don't hear every day. Addr: Stoneham. (Paul Roales-Tulsa OK; Dennis Myhand-Mercedes, TX; Prindle; Silvi; Jurrens; Wolfish; Rose; Williams)
North American Pirate Relay Service- 6955 at 2300. Richard T. Pistek still relays other pirate stations, including Europirates such as **Radio Mirage** and **Sunshine Radio.** Addr: Belfast. (Williams; Rose; Prindle; Hassig)
Orson Wells Radio- 6955 at 0115. A pirate operator has been playing old Orson Wells radio dramas, but little is known about the station. Addr: None. (Williams)
Radio Azteca- 6955 at 0245. Bram Stoker's funny parodies always include a top ten DX list, like David Letterman uses on TV. Addr: Belfast. (Frodge; Jurrens; Everhart; Murphy; Ruger; Wolfish; Silvi; Hassig; Comeau; Rose)
Radio Beaver- 6957 at 2300. Bucky Beaver is back with rock music, Canadian humor, and commentaries. Addr: Merlin. (Michael Prindle, New Suffolk, NY; Everhart; Wolfish;)
Radio CSA- 6955 at 0145. Southern country and rock music is the staple on this new operation, where host Stonewall Jackson identifies with the Confederacy. Addr: Belfast. (Williams)
Radio EXP- 6956 at 0030. Dr. Blue's rock and sly wit has been around for over ten years. Addr: Belfast. (Comeau; Prindle)
Radio Free Euphoria- 6960 at 0130. Captain Ganja has announced that he will stop smoking marijuana and will become a yuppie, but don't bet on it. Addr: Belfast. (Silvi; Murphy; Ross; Mello; Prindle; Rose; Hassig; Jurrens)
Radio Free Speech- 6955 at 0215. Bill O. Rights' funniest bits are actual speeches by political figures like Oliver North and Rush Limbaugh, spliced for hilarious effect. Addr: Belfast. (Mello; Prindle; Wolfish; Everhart; Murphy; Silvi; Comeau; Everhart; Hassig; Williams; Ross; Rose)
Radio Fusion Radio- 6955 at 2130. They have added political speeches by black orators to their slick productions of rap music. Addr: Providence. (Williams; Wolfish; Prindle; Jurrens; Rose; Silvi)
Radio KAOS- 6955 at 0100. Joe Mama has created a consistent format for his rock and comedy shows, which are sometimes transmitted live. Addr: Belfast. (Joel Gosse-St. Paul, MN; Everhart; Jurrens; Williams; Silvi; Frodge; Murphy; Wolfish; Prindle; Myhand; Ross; Hassig; Jurrens; Ruger; Rose)
Radio Mauser Worldwide- 6954 at 1915. Dr. Selsyn has returned for the first time in six years. CIA-style coded messages are sprinkled through the shows. Addr: Old address defunct. (Prindle; Wolfish)
Radio Nine- 6955 at 0415. Their rock music and sound effect collages sound much different from the oldies on the other numbered pirates. Addr: Providence. (Williams; Silvi; Wolfish)
Radio Sparks- 6950 at 2330. This Swiss pop music pirate buys time on licensed stations in Italy and Switzerland, but it also makes appearances on the pirate bands. Addr: Basel. (Ranier Brandt-Germany; Wolfish; Jurrens; Silvi; Rose)
Radio Texan International- 6955 at 2215. Only a few pirates function as jammers. This one, targeting **Radio Fusion Radio**, had a powerhouse signal. Addr: None. (Zeller)
Radio Three- 6956 at 2100. Sal Amoniac now says that his rock station *might* verify logs in *The ACE*, implying that he may not. Addr: None. (Silvi; Murphy; Comeau)
Radio USA- 6950 at 0115. When you hear Mr. Blue Sky with punk rock and comedy, you're hearing a veteran of over a decade on the pirate bands. Addr: Belfast. (Prindle; Rose; Wolfish; Jurrens; Murphy; Mello)
Rockabilly Radio- 6956 at 1415. Here's another old one that has returned, appropriately enough with a rockabilly music format. Addr: None, has verified logs in *The ACE*. (Wolfish; Prindle)
Rock-It Radio- 6955 at 1500. Their professionally produced rock oldies program is relayed via **WRMI** in Miami and **IRRS** in Italy, but they also appear via pirate relays. Addr: Ventura. (Silvi; Ross; Prindle; Rose; Murphy; Wolfish)
The Fox- This station has established a Europirate relay arrangement, so our readers overseas might look for it on the Europirate bands. Addr: Blue Ridge Summit. (direct from the station)
Up Your Radio Shortwave- 6955 at 1515. Woody B. Serious' comedy bits are selected with a left wing political stance, as we see in their QSL pictured this month. Addr: Blue Ridge Summit. (Silvi; Williams; Rose; Wolfish; Murphy; direct from the station)
Voice of Bizarro World- (Zeller; Ross; Jurrens; Frodge; Murphy; Hassig) Addr: None. Everything is backwards on this strange new pirate, so our log is also. They say if you send them a QSL, they will send you three stamps and a reception report. 6955 at 0100.
Voice of the Blue and the Gray- 6953 at 1530. This one still promises Civil War documentary programming during the fall. Addr: Providence. (Wolfish; Mello)
Voice of the Rock- 6955 at 1215. Last year this low powered station used a Radio Animal "Grenade" transmitter only once from an island off the Boston coast. This year they have been active on multiple weekends. Addr: Providence. (Murphy; Wolfish; Prindle)
VOXXX- 6955 at 2330. The last three letters are the key to this risqué sailor's station. Addr: None. (Wolfish; Hassig)
WARR- 6955 at 0100. After WPRS, this has been the second most active pirate lately. They have a marijuana advocacy format, but still refuse to contact listeners. Addr: None. (Monte Carroll-Nashville, TN; Jim Gershman-Warwick, RI; Myhand; Wolfish; Mello; Williams; Jurrens; Frodge; Prindle; Silvi; Rose)
WKND- 6956 at 0145. Most famous for his transmitters, Radio Animal still produces pirate shows from time to time. Jesse heard them relayed direct from Europe! Addr: Blue Ridge Summit. (Rose; Hassig; Frodge; Jurrens)
WLIS- 3910 at 2200. Jack Boggan now has arrangements with Europirate relays for his interval signal programs, but he's still heard regularly in North America. Addr: Blue Ridge Summit. (Brandt; Jurrens; Wolfish; Williams; Hassig; Rose; Silvi; Prindle; Mello)
WMPR- 6955 at 1930. This relatively rare one came out of the woodwork with a show of techno rock and a "micropower radio" slogan. Addr: None. (Murphy)
Woody Allen Radio- 6955 at 0100. Guess which comedian is profiled on this one? Addr: None. (Everhart; Silvi; Jurrens; Frodge; Williams; Wolfish)
WORK- 6956 at 0200. It's been a while since we heard from Workingman, but he's back with rock music and commentary, all regarding work. Addr: Belfast. (Jurrens)
WPN- 6955 at 0015. The World Parody Network mixes rock and comedy. Addr: Huntsville. (Wolfish)
WPRS- 6955 at 0000. Willy B. Quiet's station has been the most active pirate of the late summer and early fall. He programs rock and pop music mixed with genuine old radio commercials. Addr: Providence. (Mark Fine-Remington, VA; Murphy; Ross; Carroll; Frodge; Ruger; Williams; Comeau; Everhart; Jurrens; Silvi; Wolfish; Hassig; Rose)
WREC- 6953 at 0100. P. J. Sparx at **Radio Free East Coast** has made it to Europe again with his rock music and comedy programming. Addr: Belfast. (Brandt; Williams)
WRRN- 6955 at 0200. The election year has caused the **World Republican Radio Network** to maintain regular activity. Addr: Belfast. (William Stibgen-Horsham, PA; Frodge; Mello; Wolfish; Jurrens)
WRV- 6955 at 0045. Pete the Pirate still cranks out the rock music from **The Radio Virus**. Addr: Belfast. (Murphy; Prindle; Rose; Wolfish; Silvi)
WSM, Grand Old Opry Radio Network- 6955 at 1600. Portions of their shows are recordings from very old Grand Old Opry broadcasts. Addr: Huntsville. (Wolfish; Silvi; Williams)

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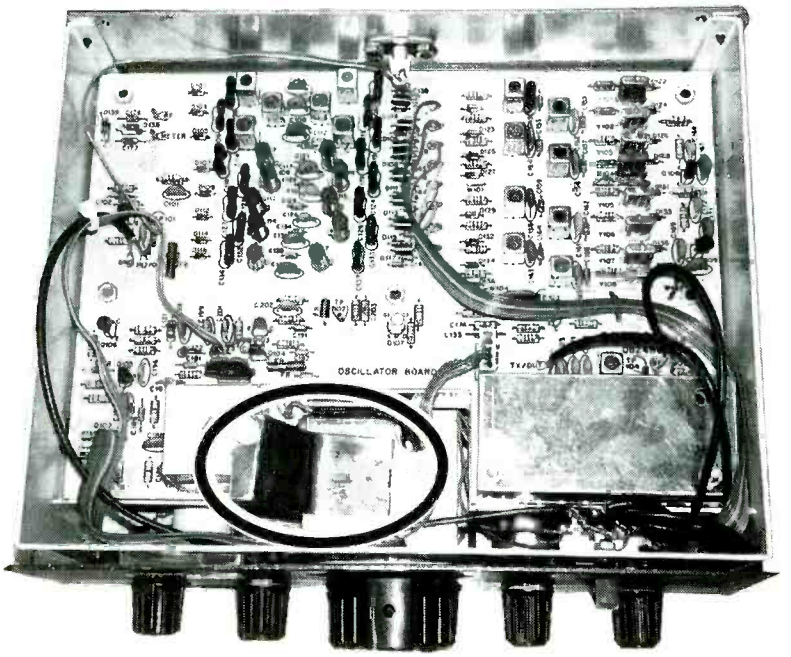
Quebec's clandestine QSLs after nearly a year

Ike Kerschner, N3IK

The Heath HW-9

When Heath Kit brought out the HW-9 transceiver, I was one of the first to own one. This little rig had it all, great sensitivity, all bands, selectivity, and five watts of solid state power. I worked stations all over the world with my HW-9, but all was not love and roses. My HW-9 drifted continuously. A letter to Heath brought fast response in the form of new parts for the VFO; they were installed—alas, to no avail.

I had seen several mods for the HW-9 to improve stability, and have tried them all. The only thing that seemed to work was an outboard VFO; however, I did not appreciate dragging another box along on my DXpeditions. Neither did the thought of completely modifying the guts of the HW-9 appeal to me. As a result, the HW-9 did a lot of sitting while other rigs took its place.



The mod that did the trick was this copper strap (see circle) soldered between the VFO can and the tuning cap, just in front of the oscillator

One mod that seemed especially strange was to remove the VFO can and paint the inside of the can black: it didn't help, either. Then, a few weeks ago, I came across a mod sheet for the HW-9 by Rod Breaux WA5OIH. Again the VFO can was mentioned as the culprit. Rod suggested removing the can and making sure everything was separated and not touching, neither other components nor the can. I thought, why not try it? I did, and noted a definite improvement, although still not adequate.

Stability Restored

Since it seemed the secret to stability was in the can, so to speak, I examined the VFO can very carefully and noted that the VFO coil (L118) was touching the top of the can. Using a drift pin (large punch), I pushed the top of the can up to keep the coil from touching; the improvement was dramatic.

The only small problem remaining was to improve mechanical stability. Rod mentioned in his article that electrical ground connections were poor, and a piece of flexible copper from the tuning capacitor shield to the ground lug of the AF gain control (R3) would help: it did, but mechanical stability was still inadequate. I took a one inch wide piece of copper, 1/16th inch thick and 2-1/2 inches long, bent it into an obtuse Z-shape with the top lip being a quarter inch and the lower lip an inch. The underside of the top and bottom were liberally tinned and then soldered from the top of the VFO can to the cover of the tuning cap (see photo).

It worked! The receiver stayed zero beat on WWV for over 24 hours. Now no longer do I need to keep my hand on the tuning dial, and my love affair with this little rig has been renewed.

Offset Adjustment

Rod also mentioned offset adjustment for the HW-9 in his article. I found it to be easy to do, and well worth the effort. Set another rig up into a dummy load. (Do not use another HW-9: use the best rig obtainable with a sharp filter.) Adjust it to put out a watt or two of power. Key the rig, and peak the signal on the receiver of the HW-9 (with HW-9 filter in sharp position). Unkey the station rig and key the HW-9 into a dummy load. While keyed up, tune R131 on the HW-9 oscillator board until the signal peaks in the big rig's receiver (again use sharpest filter on the rig). This adjustment will make quite an improvement in the number of QSO's you will have with your HW-9.

Conditions

As we all know band conditions have not been outstanding; however, over the past two months 20 and 17 meters have shown some improvement, and a lot of nice contacts were made on 20 using the above-mentioned HW-9 with an extended zepp dipole. 15 meters, too, has had a few openings. While improvements have not been sensational, there does seem to be an upward trend. It's nothing to get too excited about yet, but there's cause for hope that the doldrums will soon be at an end.

As might be expected, conditions on six meters have been far from outstanding. There have been a few minor openings, but nothing as spectacular as in the summer of '95. Sunday afternoons always turn up a few contacts on SSB and an occasional CW QSO has been had.

FM activity seems to be at an all-time low. Local activity in my area does seem to be on an upswing, but FM does not seem to have the following it should on six meters. On a recent three-day trip, I heard only one contact on six.

I suggest we use this column to report on six meter activity. If you are active on the band, drop me a note to keep me informed of what is going on around your area. I will report it here, and hope to stimulate more activity on this under-utilized but excellent band.

That's all for November: Keep the letters and cards coming. Happy Thanksgiving, all—BCNU. Ike, N3IK

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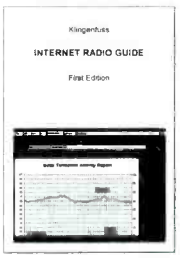

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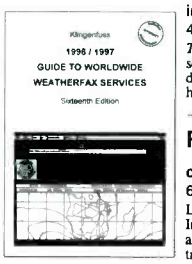

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Working with Toroids

Among the many letters I receive from *MT* readers there is one topic that seems to draw the most questions. Scarcely a week passes in which I am not asked, "How do I wind a toroid core?" This subject has been discussed in many magazine articles over the years, but those who are new to experimenting may not have read about how to use toroids. This month I will respond to the question at the grass-roots level.

Understanding the Toroid

A toroid is a donut-shaped coil or transformer foundation onto which one or more helical windings may be placed. Toroid cores are made from powdered-iron material, ferrite or many layers of hypersil steel tape. Toroidal coils and transformers are useful from AC into the VHF frequencies. A toroid need not be made from the foregoing materials, however. A donut-shaped piece of low-loss plastic can be used as a toroid at the higher frequencies.

Toroids exhibit what is called a self-shielding property. Conventional air-wound solenoidal coils must have metal cans over them or be in metal compartments to shield them from nearby components (isolation). Inadequate shielding in critical circuits can cause unwanted self-oscillation in amplifiers, as well as other performance problems.

The toroidal coil is more compact than its air wound brother for an equivalent inductance and power rating. Also, it is possible to obtain a higher Q (quality factor) with a toroidal coil. This is because less wire is needed for a particular inductance than is required for a coil that has no magnetic core. The reduction in overall wire length minimizes the RF resistance and makes the coil more efficient.

Core Material Choice

Experimenters are sometimes misled by listings for bargain toroids in surplus electronics catalogs. Most of the cores offered are sold without identification concerning the core brand and electrical characteristics. This is the old "pig in a poke" situation. It is best to avoid unidentified toroids unless you have the expertise to test and grade them at home.

FIGURE 1—*Examples of three types of ferrite balun cores. These are discussed in the text.*

Generally speaking, powdered-iron toroids are used for RF circuits from medium frequency to VHF. Various core mixes or recipes are used to ensure high Q at the chosen operating frequency. Ferrite cores, on the other hand, are most often used for audio, RF broadband, and power-supply transformers. They are sometimes used in non-critical RF circuits up to, say, 10 MHz.

The permeability (μ) of powdered-iron toroids exhibits very little change in the presence of temperature variations. Ferrite core μ changes markedly as the temperature increases or decreases. Therefore, powdered-iron toroids are preferred for the resonant circuits in VFOs and RF filters where stability is important.

A principal U.S. toroid supplier[1] provides a catalog that lists the optimum operating frequencies for ferrite and powdered-iron cores. The toroid AL factor is also given. This factor is used for calculating the required number of wire turns for a specified inductance, versus the type of core you want to use. AL relates directly to the permeability of the core material. The greater the permeability, the higher the AL number.

An excellent shareware DOS program that provides solutions to toroid winding sizes vs AL factor (plus countless other radio design programs) is available for $5 from G. Murphy, VE3ERP.[2] It is written in GW Basic.

The incorrect toroid for a particular operating frequency will cause dismal performance. For example, never use a low frequency core at high frequency. Although you will be able to wind it for the required inductance, the coil Q may be so low that the circuit won't function. Conversely, the use of an HF core at LF will ensure high Q, but there may not be enough room on the core for all of the turns needed to obtain the desired inductance.

Other Core Types

Another style of ferrite core that acts like a toroid is the so-called balun or "binocular" device. See figure 1. These cores are widely used as foundations for broadband impedance-matching transformers in RF power amplifiers. Figure 2 shows how they and toroids are wound. Some of these cores are tubular in shape and may have as many as six small holes through them. This type is commonly used to make chokes for use in RF filtering circuits.

How to Wind a Toroid

A reader once asked me. "Do I wind the wire around the outer perimeter of the toroid?" No way, Jose! The windings are always looped through the core, as illustrated in Figure 2.

Drawing A shows the smaller (primary) winding bunched at the grounded end of the main (secondary) winding. This method is used in RF tuned circuits to minimize unwanted capacitive coupling between the two (or more) windings. Capacitive coupling may encourage the transfer of harmonic currents, and would result from spreading the smaller winding over all of the larger one. Always leave a 30-degree gap between the ends of the winding, as shown. The windings should occupy only 330 degrees of the core area.

Drawing B shows the smaller winding over all of the larger one. This is a common procedure when we wind broadband RF transformers. In either case, be sure that all of the windings on a core are wound in a clockwise or counterclockwise sense or direction. Don't mix the senses!

The correct wire length for a specified number of toroid turns may be determined by first placing one complete turn on the core, then removing it and measuring the wire length. Multiply this dimension by the number of turns. Allow two additional inches of wire to serve as pigtails for connections to the circuit.

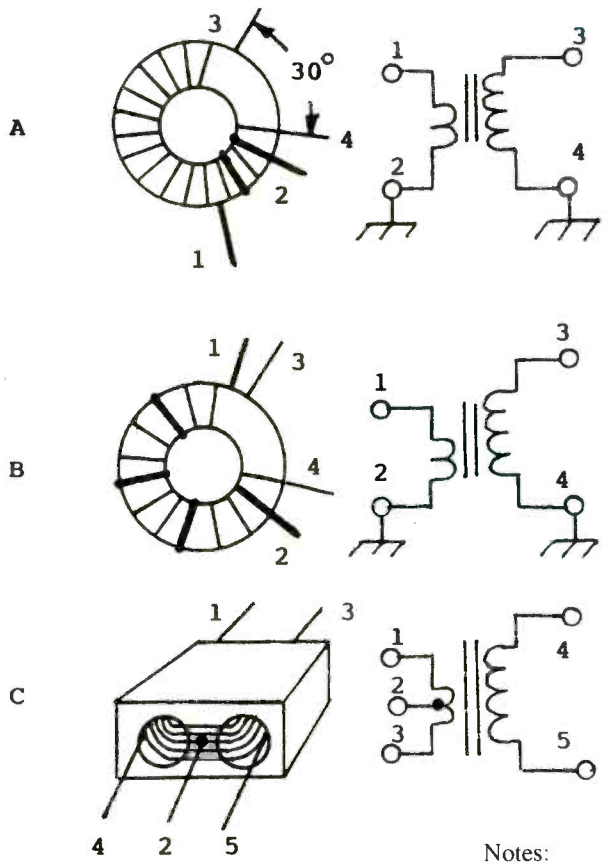


FIGURE 2—*Methods for winding toroid and balun cores. Example A shows the smaller winding placed over the grounded end of the larger winding for use in narrow-band resonant circuits. The drawing at B is for a broadband transformer that has both windings spread over 330 degrees of the core. The illustration at C shows how a balun core is wound. If the smaller winding has a center tap, it exits at the rear of the core, as shown.*

Toroidal coils can be tapped if desired. Figure 3 shows a large tapped toroid, plus two prewound smaller ones without taps. Remove the enamel insulation at each tap point, then solder a short bare wire to the areas where the taps will be located. Use care to avoid allowing any of the coil turns to short circuit to one another. A shorted turn will ruin the coil Q.

Notes:

1 — Amidon Assoc., Inc., 3122 Alpine Ave., Santa Ana, CA 92704. Phone: (714) 850-4660. Catalog available.

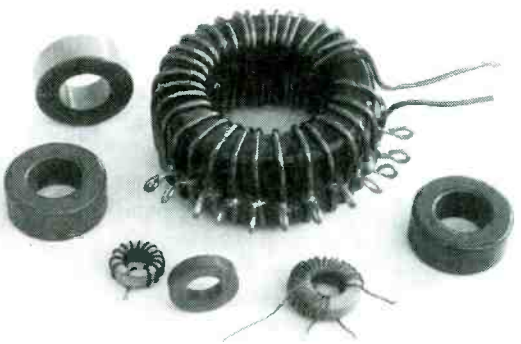
2 — HAMCALC V.20, available from George Murphy, VE3ERP, 77 McKenzie St., Orillia, ON L3V 6A6, Canada. Send $5 to cover the cost of shipping and handling

Some Final Thoughts

Equations for calculating the required number of turns for a toroidal inductor are provided in *The ARRL Handbook*, and in the Amidon Associates catalog (Reference 1). Toroids are neither mysterious nor difficult to work with. They are relatively inexpensive. They allow us to build miniature equipment. Toroids may be mounted flat on a PC board, or they can be installed vertically in the interest of saving space.

Author's Note: *MT* columnists receive many written requests for technical and other information. The cost of postage and envelopes can become prohibitive at times. To be assured of an answer to your inquiry, always include an addressed and stamped return envelope (s.a.s.e.).

FIGURE 3—*The large toroid has been tapped for use as a variable inductor (see text). The smaller toroids with windings show how the wire is placed on a toroid core.*



Jean Baker, KIN9DD

Omni-Directional VHF/UHF Navigation Aids

Welcome aboard, everyone. From the looks of our mail, our readers like the idea of *Plane Talk* as a monthly column. Thanks to all of you who wrote in contributing material and supporting *Plane Talk*. Keep those cards and letters coming!

In this month's column we will continue our examination of aeronautical NAVAIDS and we will feature omni-directional navigation aids as our main subject.

TACAN

The tactical air navigation (TACAN) system was developed by the United States military to support their mission-specific aeronautical navigation requirements. TACAN is an ultra high frequency (UHF), omni-directional, radio range which provides continuous, accurate slant-range distance and directional information.

The ground equipment consists of either a fixed or a mobile transmitting unit. The airborne unit, in conjunction with the ground unit, presents the transmitted signal as a graphic display of both azimuth and distance information. TACAN is a pulse system and operates in the UHF frequency band between 960 and 1215 MHz.

VOR/VORTAC

VHF omni ranges (VORs) used to be totally separate from TACAN NAVAIDs, and simply transmitted VHF signals 360 degrees in azimuth, oriented from magnetic North. However, at least half of the NAVAIDs in the U.S. are now integrated facilities and are known as VHF omnidirectional range/tactical air navigation (VORTAC) aids. A VORTAC provides three individual services—VOR azimuth, TACAN azimuth, and TACAN distance at one site. Simply stated, VORTACs provide bearing (azimuth) info on VHF frequencies (108-117.95 MHz) and slant range/bearing information on UHF frequencies (960-1215 MHz).

Bill Battles in the captain's seat of a 757

As the name suggests, the VOR portion of the NAVAID transmits in the VHF band and the range is limited to line of sight, normally 200 nautical mile. Frequency assignment between 108.000 and 112.000 MHz is in the even 10th decimal to preclude any conflict with instrument landing system (ILS) localizer frequency assignments.

Aircraft equipped with VOR/DME (distance measuring equipment) receivers use bearing information from the VOR part of the NAVAID and range information from the TACAN portion. TACAN-only equipped aircraft (usually military) receive both bearing and range information from the TACAN portion. Although it consists of more than one component, incorporates more than one operating frequency, and uses more than one antenna system, a VORTAC is considered to be a unified navigational aid.

All VHF/UHF omni-directional facility signals follow an approximate line-of-sight course. Reception distance increases with altitude to a reliable operating range of about 40 miles at minimum *en route* altitude (1,000 feet above terrain). Omni facilities are spaced approximately 90 miles apart to ensure navigation coverage of the airway. They are relatively free of atmospheric and precipitation static.

Does this all sound complicated? As far as the navigating pilot is concerned, he receives range and bearing information; *which* method is used to arrive at the data is largely invisible and automatic.

One of the other major functions of a VORTAC/VOR on airways is to give centerline guidance and indicate reporting points. The VORTAC generates directional information and transmits it by ground equipment to the aircraft, providing 360 magnetic courses, called radials, to the VORTAC station. VORTACs have whatever power output is necessary to provide coverage within their assigned operating service area.

A VOR/VORTAC at a small midwest airport (photo by Harry Baughn)

Omni-directional facilities are classified according to their intended use. There are three station classes:

T-TERMINAL
L-LOW ALTITUDE
H-HIGH ALTITUDE.

VORTACs identify by transmitting a standard three-letter identifier in Morse code. Many VORTACs are equipped with voice capabilities on the VORTAC frequency, so that, in addition to navigation signals, pilots can also receive weather broadcasts and severe weather information. VORTAC or VORs without voice capability are shown on aeronautical charts with the letter "W" included in the class designator (e.g., VORTAC-W).

Identification of a VORTAC is transmitted continuously, except when interrupted by an actual voice transmission on the voice feature of the NAVAID or during periods of maintenance, in which case the identification of the facility is removed. The only positive method of identifying a VOR/VORTAC is by its Morse identification or by the recorded automatic voice ID, which is always indicated by the use of the word "VORTAC" or "VOR" following the range name. An example of a VORTAC voice identification would be "INDIANAPOLIS VORTAC," alternating with its three-letter Morse code identification—in Indy's case, VHP.

Reader's Corner

Bill Battles in New Hampshire sends this photo of himself in the Captain's seat of a United 757. He and a friend toured at Boston's Logan Airport. Bill says that they were also permitted to see the hangars and ramps, look inside the avionics, engines, and hydraulic bays of an aircraft, and ended up in the flight deck of the 757 as shown in the picture.

Thank you to the anonymous reader who sent the very complete Pittsburgh aero frequency printout to us: we'll be using some of those frequencies in a future issue.

That's all for November. Next month we'll explore distance measuring equipment (DME). Until then, 73 and out.

FEDERAL FILE

A GUIDE TO GOVERNMENT COMMUNICATIONS

John Fulford, WA4VPY
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Telling Who's Who Without a Program

Sometimes we overlook the obvious right under our noses. A story found on the Internet told of a federal monitor who was scanning the federal UHF band while in his hotel on the Chicago riverfront.

It seems our monitor was hearing French communications on 418.075 and 418.575 MHz. Because of the proximity to the U.S./Canada border, our intrepid listener thought he might be hearing a joint multi-national drug operation. Not speaking any French, our listener sat on his balcony perched more than 30 stories above the ground, his ears hanging on every word. To keep himself amused, he was watching the Canadian traveling show, the *Cirque du Soleil*, performing in their circus tents below him.

He finally suspected something as he watched the performers speaking into their two-way radios with the attached UHF antennas, and heard the voices coming out of his scanner. To end a mystery, the radios were used by the circus—not drug agents.

What does this have to do with federal monitoring? There are only a finite number of frequencies. What are used for federal operations in this country are used for land mobile operations in other countries. To further complicate the matter, some of the Federal agencies are becoming very conspicuous by their absence on the federal bands.

As an example, if you travel in South Florida, you will be hard pressed to hear anything on the frequencies used by the United States Marshall's Office. The activity is gone. For a point of reference, here is the nationwide assignment of their frequencies:

United States Marshalls Office

Chan	Frequency	Use
01	163.812	5C/M
	163.2000	Rptr out
02	163.2000	Simplex
03	163.8125	C/M
	164.6000	Rptr
04	164.6000	Simplex
05	170.8000	C/M
	162.7125	Rptr out
06	162.7125	Simplex
07	170.8500	C/M
	162.7875	Rptr out
08	162.7875	Simplex
09	170.8750	Bureau of Prisons
10	170.9250	Bureau of Prisons
11	170.9000	Bureau of Prisons
12	170.7500	Federal Court Security
13	170.8500	Federal Court Security

Can you tell the clowns from the feds? It's not as easy as it used to be.

As noted, there is no activity down here on the usually busy channel of 163.2000 MHz. A visual check of the U.S. Marshall's vehicles show a 160 MHz antenna still on them, so we have to assume there is still VHF capability. One additional antenna was noticed: an 800 MHz antenna. Some vehicles had two of these antennas on them. A quick look inside these vehicles showed a cellular telephone—this was expected, as more and more traffic is being done on the cellular frequencies—and also another 800/900 MHz radio.

What could the other radio be? This is the SMR (Specialized Mobile Radio) system that is being used more and more. With a Motorola SMR radio, such as a STX821 series, the officer can have access to all the Motorola compatible citywide, countywide, or even statewide systems in use in his assignment area. He can also have access to private service providers where he and his other agents are running their communications right along with the pizza delivery service, the pool man, and the local escort service.

For the past couple of years down here in South Florida, there has been a joint federal/state operation running against drugs and violent crime. This was a multi-agency group composed of FBI, DEA, State of Florida, and who knows who else. They operated as a business up on the 800 MHz trunking frequencies off tower systems based in Boca Raton, Ft. Lauderdale, and Miami, Florida. This tower combination provided reliable communications over all of South Florida and even into the Bahama Island chain.

This group came active on the trunked system around 2100 hrs in the evening and quieted down towards sunup. They were first noticed by a very astute monitor who noticed all of the trunked activity at 3 am. Not many people were getting their pizzas then.

Anyway, this is something to think about when looking for federal activity in your area. How can you determine if another "stealth" radio system is in use? The easiest way is to go and look at the equipment. Be discreet. Visit your local federal courthouse and sit in on a federal trial. The main point is: DO NOT go around federal buildings carrying frequency counters or other intercept equipment. It can be done visually or from a safe distance in the parking lot. Also, the evening news generally shows federal agencies making arrests. Get a look at their radios.

Once you have figured out there is another radio system in use, your task is to find it.

We are seeing more and more local and state agencies that are equipped with federal radios. As an example, on Feb. 16, 1996, there was a passenger train collision in Silver Springs, Maryland. There was great property damage and loss of life. As with most major disasters, everybody and his brother showed up, each with their own radio system.

The Montgomery County, Maryland, Fire and Rescue showed up with their assortment of federal radios. The frequency use at the scene was:

Montgomery Co., Maryland, Fire & Rescue

Ch	Frequency	Use
01	408.4000 418.0500	Simplex and Input to
02	417.6000 418.0750	Simplex and Input to
03	418.0500	Simplex and Rptr out
04	418.0750	Simplex and Rptr out
05	418.5750	Simplex

The frequencies of 408.4000, 418.0500, and 418.5750 are intermittent use, wide area channels available for use on a shared agency basis by the U.S. Government. The frequencies are in heavy use in the Washington, D.C., area with many agencies using the frequencies jointly.

More National Forest Frequencies

I received a list of frequencies from a reader in the Missoula, Montana, area. It

seems one of the local retail stores distributes this list for radio monitoring in the national forests out there. Here is a summary of the listings:

Lolo National Forest, Missoula, Montana

Chan	Frequency	Use
01	164.7000	East Forest Simplex
02	164.7000	East Forest Rptr out
	164.1000	Rptr Input
03	164.9125	West Forest Simplex
04	164.9125	West Forest Rptr out
	164.1750	West Forest Rptr Input

Bitterroot National Forest, Hamilton, Montana

Chan	Frequency	Use
01	168.7500	Forest Simplex
02	168.7500	Forest Rptr out
	168.1500	Forest Rptr Input
03	170.5000	Forest Work Net

Kootenai National Forest, Libby, Montana

Chan	Frequency	Use
01	171.3875	Forest Simplex
02	171.3875	Forest Rptr out
	172.0750	Rptr Input

Poplar National Forest, Ft. Peck, Montana

Chan	Frequency	Use
01	167.0750	Forest Simplex
02	167.0750	Forest Rptr Output
	166.3250	Forest Rptr Input

West Glacier National Park

Chan	Frequency	Use
01	166.3750	Primary Simplex
02	167.0250	Secondary Simplex

West Yellowstone National Park

Chan	Frequency	Use
01	168.6500	Primary Simplex

Yellowstone National Park

01	166.3750	Primary Dispatch

Lewis and Clark National Forest, White Sulpher Springs

Chan	Frequency	Use
01	168.7750	Primary Dispatch

Lewis and Clark National Forest, Mt. Home, Montana

Chan	Frequency	Use
01	168.7750	Primary Simplex
02	168.7750	Rptr Output
	168.1750	Rptr Input

El Dorado National Forest, Northern California

171.5250	164.1250	172.3250	166.6750
415.5250	415.3250	415.2250	415.5750
415.2500			

Local Intrigue

As mentioned in earlier columns, there are a lot of low power frequencies in the 169/171 MHz band which are being licensed throughout the country. These are for low power, short range work. They could be used by the local fast food chain, the school board for their wireless mikes, or for surveillance transmitters. These frequencies should be entered in your frequency bank in your scanner. You may never hear anything more interesting than the local drive through, but on one occasion I did overhear a body bug on one of the frequencies utilized in a drug deal by federal agents.

The frequencies are:

169.4450	169.5050	170.2450	170.3050
171.0450	171.1050	171.8450	171.9050

Ken Reitz, KS4ZR

The SBCA Show: Futurewatch

The Opryland Hotel in Nashville, Tennessee, is a good place to be in the middle of the summer. And that's exactly where the Satellite Broadcasting and Communications Association (SBCA) holds its annual summer trade show. The country music capital of America is an attractive place for America's satellite TV dealers to go. Most are from rural areas of the country, particularly the south, where country music is king; a chance to go to the Grand Ole Opry and see the latest in satellite technology for three days is truly mixing business with pleasure.

The SBCA is the national trade organization representing all segments of the home satellite industry. It is composed of satellite manufacturers, system operators, equipment makers, distributors, retailers, DBS companies, encryption vendors, and programmers. At the summer show in Nashville, the industry unveils new products in front of thousands of retailers and the industry press from all over the country. Here new receivers, programming, and hardware can be seen for the first time; dealers get hands-on experience; and vendors pitch the hard sell.

As proof of the vitality of the satellite TV industry, last summer's SBCA show set an all-time record. On the convention floor over 6,000 participants came to check out the wares of 163 companies, including 30 first-time exhibitors. Attendees had the chance to compare first-hand the five satellite TV systems currently marketed: C-band, DSS (DirecTV and USSB), Primestar, AlphaStar, and Echostar.

In addition, 25 different panels and workshops were offered to educate dealers on a variety of topics. Workshop titles included *System Troubleshooting, Satellite and the Internet, Selling Techniques that Sell, Introduction to Merging Technologies, FCC Preempts Zoning/Covenant Restrictions, Test Equipment and the Use of the Spectrum Analyzer*, and many more.

On The Floor

Cautions against hearing loss were tossed to the wind as all 163 exhibitors seemed to have raised their display volume to a new notch in order to be heard. The result was a strange din of music, beat, sales harangue, and video stimulation that could only be described as a frenzy. Large vendors like Uniden, General Instrument, and AlphaStar had created little glass-enclosed sanctuaries within their displays where sales people and clients could shout at each other at a more normal pitch. All 6,000 attendees seemed to be on the floor at all times, and my canvass General Instrument 4DTV tote bags were quickly filled up with sales literature.

RCA DSS complete system from Thomson Consumer Electronics set a record for unit sales for a home electronics product in ten months: 1 million.

It was organized mayhem as various characters dressed as Uncle Sam or DISH Man accosted attendees. Dealers and their wives stood in long lines to get their picture taken next to an actual NASCAR race car. An adult TV channel booth featured a buxom blonde goddess who was signing her autograph to a black and white photo of herself, as over-the-hill satellite TV dealers stood patiently in line. Over at the Disney channel an artist was drawing Winnie-the-Pooh over and over for an equally long and considerably less patient line of youngsters and their moms.

All the big programmers were there: HBO, ESPN, MTV, Playboy lesser programmers like The Golf Channel, Mor Music Television, and channel hopefuls like the Wisdom Network, America's Health Network, and CNNSI (The Sports News Network from CNN and Sports Illustrated) vied for what was left of the ears and eyes of attendees.

Antenna manufacturers, receiver makers, system component makers, and dozens of peripheral equipment manufacturers brought their goods for display. Accessory suppliers abounded, like trencher machines, wire suppliers, and at least one company selling genuine theater accessories such as popcorn machines ($726) and theater seats ($372 for a velour rocker with padded armrest and cupholder). They all slugged it out with Hi-Tech encryption and digital compression systems sellers for attention on the floor.

DBS Domination

The direct broadcast satellite (DBS) industry dominated the show. Primestar, Echostar, AlphaStar, DirecTV, and USSB all had large sophisticated displays with banks of video monitors showing off their channels as plucked from the sky at the show's dish farm just outside the convention floor. DBS-related peripheral suppliers hawked their wares. Most receiver manufacturers had no new C-band gear to show but offered their latest wrinkle in the DSS market. Traditional C-band hardware vendors, such as Uniden and Toshiba,

Sony model SAS-AD2 top of the line DSS features a universal joystick programmable remote control, one button record with VCR mouse, direct tuning on-screen menu system, dual output LNB (for two receivers), wide-band data interface for future HDTV, low speed data port for connecting your computer and more.

joined Hitachi, Samsung, RCA, Philips, and others with their nearly identical versions of the same DSS product.

Intriguing, though expensive, DSS-related products were also to be seen. A company called Datron makes a mobile satellite receiving system for fixed and in-motion viewing of DirecTV and USSB. Yes, you can be rocketing down the Interstate in your RV and the rest of the family can be enjoying DSS TV. Housed in a 14.5-inch high enclosure to shield it from the wind, the antenna aligns itself to receive DSS signals from anywhere in the continental U.S. as you weave in and out of traffic. It's their DBS-4000 (and that's an indication of the price, too).

RF-Link is a company which makes a portable DSS dish with carrying case. You needn't miss that next NASCAR race when you go to visit your mother-in-law if you'll just set this up in the back yard. It comes complete with compass and "...strong suction cup for quick mounting on top of any flat and smooth surface."

Portable DBS from RF-Link. Add your own DSS receiver and you've got satellite TV anywhere!

C-band Salvation

The news on the C-band front was not all gloomy. There were the familiar (and hearty) dish manufacturers: Orbitron, Kaul-Tronics, and Perfect 10. The venerable actuator makers Venture and Von Weise were there, too. But the sensation for the C-band side of the show belonged solely to General Instrument (former scourge turned savior), whose new and long-awaited receiver, the 4DTV (formerly called "Triple Play") was the first thing to assault the senses when you walked onto the convention floor.

With an enormous screen and ear-numbing audio, satellite TV dealers were summoned to the G.I. booth with a seductive look into the future (and stacks of G.I. T-shirts on the back of which was printed "Wild Feed, I Think I Love You"). Promising 600-plus channels (including audio subcarriers) increasing to 1,000 channels, G.I. has set out to right the sinking C-band industry single-handedly with 4DTV, the receiver that does it all.

Using technology that makes DSS gear look like yesterday's AM radio, 4DTV gives viewers everything. It receives in-the-clear analog, VCIIRS encrypted, digital in-the-clear, and digital encrypted.

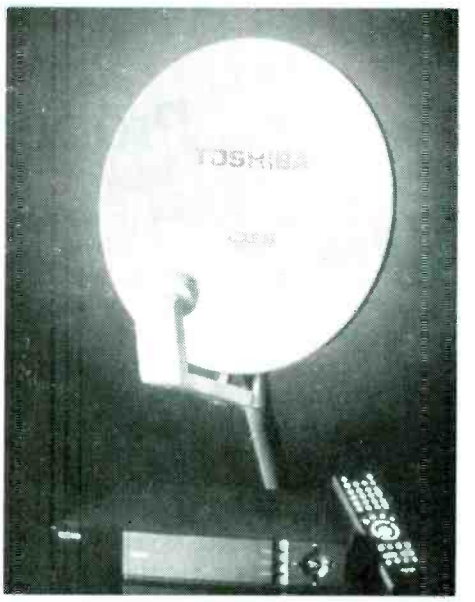
But wait, there's more! You get a high-speed synchronous port for data applications such as video games and Internet access; a high-speed data port for high definition television (HDTV) capabilities and other future applications; low-speed data port for PC computer applications; a graphical user interface (GUI) driven program guide; VCR interaction, universal UHF/IR remote and more!

G.I. has devised a carefully planned multi-faceted strategy to revitalize the C-band industry which should have quite an effect in the next 12 months. I'll have an in-depth look at this revolutionary receiver in next month's column.

Bright Future for Satellite TV

Few things have changed faster than the satellite TV industry. Ten years ago, hulking fiberglass dishes dominated the television receive only (TVRO) landscape; systems typically cost $2,000; there were fewer channels, fewer satellites, and DBS was unheard of. All this changed just two years ago as DBS tore through the landscape like a tornado: nothing would look the same.

Now with competition not just in the DSS service, but in the whole DBS structure, and the addition of G.I.'s 4DTV, viewers have the widest possible range of choices. Folks who just want cable fare and don't mind the big bills can get a DBS system for under $200. Folks who want cable fare and international programming, wild feeds, and back-hauls can get a full view system for about $1,500. And, folks who want it all—cable, full-view, and digital—can do so for about $2,500 with 4DTV. Everybody wins except the cable companies. Reckon what they'll do with all that cable that nobody needs?



No longer in the C-band satellite receiver business, Toshiba unveiled its entry into the DSS field.

Bill Cheek
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ProbeScope from Radio Shack

One of the first items I noticed in Radio Shack's 1996 catalog (released in August 1995), was their "Probe Style Oscilloscope," touted to be available on November 30, 1995. In fact it took almost a year, but ProbeScope finally arrived! After dogged persistence, I was able to learn the delay was due to ProbeScope's failure to meet FCC emission standards.

The 1996 catalog description called it a "20-MHz oscilloscope in a probe!" but the version that actually came to market is only good for 5 MHz. Perhaps it had to be throttled back to meet emission standards? If so, this suggests a possible modification to "restore" the 20 MHz bandwidth. I'll look into it this year; if you discover a mod before I report it, please send me the details.

At any rate, the fact that 5 MHz ProbeScope is trickling to the store shelves should be a matter of great interest to you. Until now, oscilloscopes have occupied the domain of professional labs and the more affluent service shops. The price of a basic oscilloscope really hasn't dropped below $500 yet, and those with any sort of bandwidth, sensitivity, and features start at $1000 and go through the roof.

While ProbeScope isn't going to bring down any roofs because it is a *very* basic oscilloscope, but it's certainly affordable for electronics students and experimenting hobbyists at $100. It will do a fine job of detecting and displaying analog and digital waveforms and logic signals up to about 5 MHz. ProbeScope is also good for checking ± DC levels.

Its real claim to fame is in the software and its ability to interface to a computer. ProbeScope comes with software for both DOS and Windows 3.1/Windows 95. This effectively means that ProbeScope is also a storage oscilloscope. Figure 1 shows ProbeScope and most of the materials that come with it.

Specs, Controls, and Ports

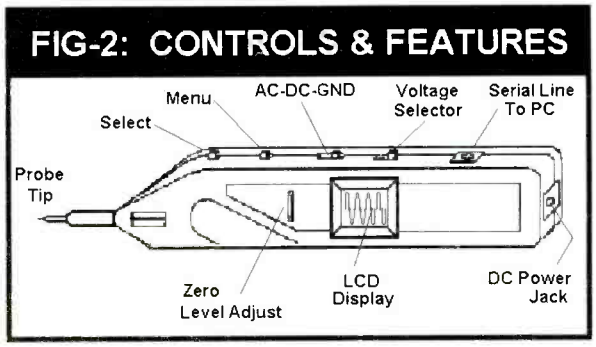
As already mentioned, ProbeScope's bandwidth is DC to 5 MHz. The maximum DC voltage that can be safely sampled is ±100 volts. Maximum AC voltage is 33-volts (RMS) because the peak value of an AC signal is much higher than the RMS value. Ten sampling rates are provided from 50-nanoseconds to 1-millisecond. ProbeScope has an on-board 6-bit analog-to-digital (A/D) converter for 64 levels of resolution. There are six selectable levels for auto and internal trigger, as well as a port for external triggering. The on-board LCD display has a resolution of 16 by 32 dots, and a switchable backlight.

A serial port sends data to the PC at 19.2-kbps. The accuracy of the digital voltmeter (DVM) section is ±2 to ±5 percent. External DC power of 9- to 13-volts is required, and an all-purpose cable is supplied for a 9-volt battery, a bench supply, or even a "wall-cube" adapter, so long as the 13-volt maximum is not exceeded. Current drain is 85-milliamps with the backlight and 12-milliamps without. Physical dimensions are 6-1/2-inches by 15/16-inches by 3/4-inches. Weight is a little less than one pound.

A 386 or better CPU is required to operate ProbeScope under Windows, but even though 128-kilobytes random access memory (RAM) is specified, I'd not feel comfortable with less than 4-megabytes. Operation from MS-DOS 3.3 or later is a different story where the 128-kilobytes of RAM is probably about right. My "gut feel" is that a 286 computer could run ProbeScope, but that's no guarantee. A VGA or EGA monitor is required.

Figure 2 shows the controls and most of the input/output ports of ProbeScope. Not shown are the signal ground and external trigger ports located on the other side of the probe.

The "menu" and "select" buttons are the extent of the main operating controls. The "menu" button presents four different screens, and the "select" button picks details from each screen. The "AC-DC-Gnd" switch selects the type of signal to be detected by the ProbeScope (AC or DC) and the Gnd position grounds the input so that no signals can get in, allowing a noise-free baseline to be set by the "zero level adjust." The "voltage selector" has three positions: 1-volt, 10-volts, and 100-volts. Resolution of a few millivolts is possible.

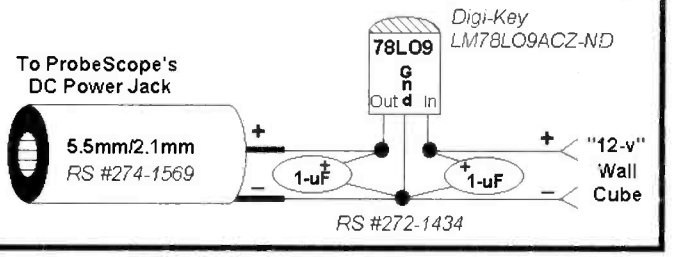


The "serial line to PC" jack is a mini 2-pin coaxial jack that accepts the mating plug on one end of the supplied serial cable. The other end of this cable terminates in a female DB-9 plug that connects to a COM (serial) port on the PC. The software automatically detects the active com port and no setup is required.

The "DC power jack" is also a coaxial jack, but a different size than the "serial line jack," so confusion between the two is not likely. I am not especially pleased with the external power requirements and the one supplied power cable for the ProbeScope, so I modified mine for a simpler connection, using a 12-volt at 100-milliamp "wall adapter" cube that really puts out 17-VDC under no load. I was afraid this could damage the ProbeScope, so I built in a TO-92 size 9-volt 3-port regulator into the end of the adapter cube wire where it feeds a (5.5-mm outside diameter/2.1-mm inside diameter) coaxial plug. See Figure 3 for how to do this.

The 78LO9 regulator and two 1-uF capacitors are hard-wired into the rear end of the coaxial plug. After the regulated 9-volt output tested OK, I sealed the coaxial plug assembly in hot-glue and heat shrink tubing. This took care of the power needs for my test bench. For portable requirements, I use the stock supplied power cable clipped to a 9-volt battery. 12-volt automotive electrical supplies are fine, too.

FIG-3: HOME-MADE POWER



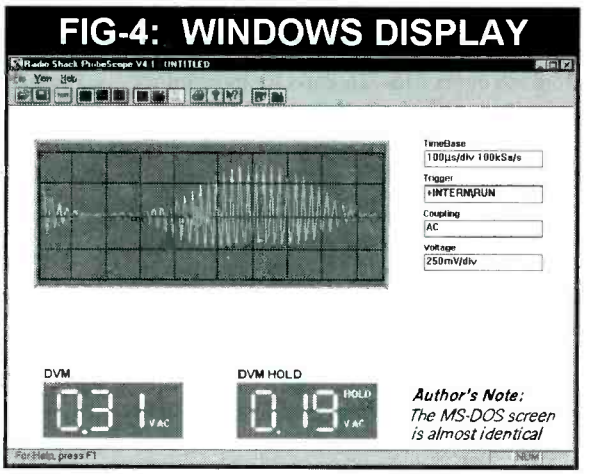
Radio Shack specifies a "wall cube" adapter, #273-1651, that will work without modification if you don't have a generic spare adapter laying around like I did.

The PC interface feature of the ProbeScope is one of its strongest points, but also one of the weakest: strong for its PC operation, weak, because it's a one-way interface. That is, the PC collects, processes, and displays data from the ProbeScope, but cannot control it. All control of the ProbeScope is manually done at the probe. Settings of the probe are sent to the PC for display and logging, right along with the actual signal data, but from the PC, all you can do is control the display; not the probe itself. Bummer.

You don't have to have a computer to operate the ProbeScope. The liquid crystal display (LCD) on the side of the probe is functional. I suppose this is great for portable or remote situations where a PC is not convenient, but the resolution on the tiny display leaves something to be desired. You can live with it, though you will want to use a computer whenever possible because the monitor display is almost exactly like a "real" oscilloscope.

Figure 4 shows a display using the Windows software: however, the DOS software is looks exactly like it with only a little less resolution, typical of DOS graphics. Both are acceptable.

FIG-4: WINDOWS DISPLAY



Author's Note: The MS-DOS screen is almost identical

Operating the ProbeScope

Unlike a real oscilloscope that can give you hives and upset your day, ProbeScope is child's play to operate. First you determine whether you want to analyze DC or AC and set that switch accordingly. Then you estimate the level of the signal to be sampled (1-10-100v), and set the voltage selector accordingly.

Then press the "menu" button a few times to see all the choices. Start with the first choice, use the "select" button. Advance the "menu" button one tap and run the "select" options again. Two more repetitions of this and you're ready to connect a (supplied) ground wire from the Probe to the chassis or ground of the equipment under test. Then, touch the Probe tip to the signal point and read the LCD display. That's it, in a nutshell.

Of course, you'll want a PC in on the act, too, so connect the supplied serial cable between the Probe and a com port on the PC. Launch either the ProbeScope Windows program or the "ScopeDOS" program for DOS. Either of these programs detects the active com port, so there is no setup required. Whatever is displayed on the LCD screen of the Probe appears on the monitor in nearly real oscilloscope resolution and appearance.

If you prefer the DOS program, press "print screen" on the keyboard for an immediate printout of the screen. Press "ALT+print screen" in the Windows program and then fire up your Windows Paint or Paint Brush program, and paste into the display and print from there, or save it as a bit map (BMP) graphic file.

You can also save waveform screens to a file, according to the documentation, but try as I may, I can't decipher enough about it to tell you the inside scoop. Just follow the instructions and you'll get the hang of it. Apparently, you open a file for the running program, and then every time you save it, the latest screen replaces any earlier ones in the file. Therefore, it appears necessary to create a new file for each screen you want to save. For now, I am more inclined to copy a screen to the clipboard and then paste it into a paint program to make a graphic file out of it. DOS users may want a "screen cut" utility to make it a little easier to capture waveforms.

Conclusion

ProbeScope is much more than a toy, and almost, although not quite the "real thing." It's good enough for the student and hobbyist so long as signal limitations are not exceeded. ProbeScope might even suit certain needs around the "pro-shop" where one "real" oscilloscope serves two benches and where the budget won't afford a second $2000 scope. ProbeScope is fine for basic audio and intermediate frequency (IF) signal analyses. In my opinion, though, it represents more of what the future holds in store than any greatness of the moment. In other words, if you can hold off purchase until next year's model comes out, do so. If not, well, this first version definitely works.

Other ways to contact Bill Cheek:
BBS & FAX: 5:30-1:30 p.m. PDT: 619-578-9247
Compuserve: 74107,1176;
World Wide Web: http://ourworld.compuserve.com/homepages/bcheek;
FTP: ftp://ftp.cts.com/pub/bcheek

John Catalano, PhD
j_catalano@conknet.com

News Bytes, and an ACARS Alternative

Yes, this month we will look at yet another ACARS, but don't go away. This one, from Universal Radio, is different enough to get our attention. But first, let's look at what is happening in the world of computers and radio in this pre-Christmas season.

First—A WiNRADiO Update

The reported slow scanning speed which we saw in last month's review has already been greatly improved with software revision 3.1. This doubles the scan speed to almost forty-eight channels per second. Not bad at all. In fact, the difference is dramatic and now allows WiNRADiO to be used as a pretty good VHF/UHF scanner.

The new software is available for downloading on the Rosetta (WiNRADiO) web page (**http://www.winradio.net.au**). By the way, the U.S. price for WiNRADiO is $700, and it's available from a number of distributors. Check the Rosetta web page for details of their distributors worldwide.

A Marriage of Shortwave/Internet

You would either have to be in a coma or just arrived from another planet not have read something about the effect the internet has had on the wireless radio industry. The pros and cons have been debated in the pages of *MT* and around the entertainment, communications, and hobby industries.

But, according to an article in the *San Francisco Examiner*, one company has been able to utilize the best points of both to develop a profitable business. The Global Wireless company has been around for a number of decades, providing shortwave radio communications services to commercial and professional customers.

You might ask, in this era of satellite communications, who needs shortwave any more? The answer may surprise you as much as it did me.

Although the U.S. military brass has become enamored with the high-tech space communications and images provided by satellites, battlefield commanders are not as entranced. Since the field guys are just trying to prepare for a possible life-threatening confrontation in the field, their viewpoint sometimes varies from that of the top echelon.

Besides, currently—and for the foreseeable future—the demand for military satellite communications far outweighs the available channels. This is causing some "priority bumping" of scheduled users—an uncomfortable, but common, occurrence these days.

The commercial world is experiencing a similar situation. The cost of a sea-to-land telephone call is very high: around $10 per minute. Imagine the monthly telephone bills for an oil tanker company at that rate! Global Wireless thought of that, too. So, by using a shortwave link to obtain the ship (mobile) message, and by using the internet's e-mail capability, the circuit is completed by Global. Although the message is not quite instantaneous, the cost to the user is substantially less than the direct satellite link. It's a pretty nifty use of new and old technologies.

Global Wireless has added the old Voice of America (VOA) Dixon, California, transmission site to its constantly growing Global Radio Network. Their newly announced GlobeEmail is now available to private as well as commercial vessels anywhere in the world. Call 415-726-6588 or fax 415-726-8604 for more information. We wish them the best of luck.

Consumers Beware

As we all know, the only thing that's certain in electronics is that the price will go down. Now, if you remember back to the dark days of computing you'll remember that terminals were how people used a computer. Due to their high cost, computers were located at a central location and many users connected to it. The terminal was only a keyboard and display. Did I hear you say, "how old and archaic?" Yes, I agree in these days of inexpensive hard drives and sinking random access memory (RAM) memory costs.

But, there are some companies out there who either didn't learn the lesson, or were selling used cars during this phase of evolution. Some of them are now making a big deal out of the old network computer (sometimes called the NC). Don't be fooled by the promise of a $500 low price. Other than being able to use your TV instead of a monitor, they have very little to offer. In fact, the TV hook-up can now be accomplished by *any* computer, given the new rash of PC-to-TV converters now on the market.

Add to this the fact that ACER and other PC manufacturers have announced a $500 *full feature* computer; and where does that leave the network computer concept? Hopefully, for the consumer's sake, back in the late sixties, where it should have stayed.

RAMing Speed!

I just paid $90 for 16 megabytes of RAM for my Pentium. On a special deal from a magazine ad? No, this was a newspaper-advertised price from a walk-in computer store. Just four months ago I had to dig very hard to get 16 megabytes at under $200. Although the industry says that the RAM price slide has stopped (wishful thinking), I think it will continue, although not at the dramatic rate that we have seen in the past year.

Magnetic Drives Are Going Crazy!

Hard drive prices continue to fall. One gigabyte (that is 1,000 megabytes) IDE drives are between $150-185. I've seen two gigabytes drives at a low price of $150, but they're usually around the $200 mark. News is that a 50 megabyte floppy drive is about to be brought into the market. Recordable CD-ROM prices are falling, and are now under $700.

Digital video disks (DVD) can be had for $800 and contain four hours of video on a CD-ROM size disk. Can you imagine what that will mean for the next generation of CD-ROMs? *Hours* of video interspersed in the program, enabling even more realistic simulations.

Net Browser TVs

The internet continues to grow, and now TV manufacturers have caught the internet bug. Watch for new TVs which have internet capabilities. Not in one or five years: You'll start seeing them in a few short weeks. The race to be the first TV manufacturer to introduce one is rounding the final turn. And the internet just keeps on growing.

YAA = Yet Another ACARS

The aircraft communications addressing and reporting system (ACARS) is a digital signal broadcast by commercial airliners at various times during their flight. Takeoff details, landing estimates, enroute waypoints, and weather are some of the information which is broadcast via ACARS. We have already looked at a number of ACARS decoders from various manufacturers in this column. But the ACT-1, available from Universal Radio, Inc., differs enough to warrant yet another look.

As the thirty-three page ACT-1 instruction

```
 File  Search  Log  xFilter  Options            [ REVIEW MODE ]          Help
Seq.   Date      Time    M    ADDR   ML B  MSN   FID    MESSAGE
---- -------- -------- - ------- -- - ---- ------ ----------------------------
0248 09/01/96 14:31:53 2 .4X-ELC H1 8 D8NN 3&3&0N \:9=_IMNGJJLJIMMOMLFLKFMFINMF
                                                GGLOJNLOKIru_IJ_IL_IK_IMNGJIL
                                                JIM-8241349294429638025382?7 6
                                                5 63 64 6 OGJHLJIMMOMKNruLKFM
                                                FIGLONNLOMNLO,9 65 63 64 6218
                                                583562280241353295129793841301
                                                F_IJ_73   64 62185935FMMOMLFL
                                                JLMFJGh 6
0249 09/01/96 14:31:54 2 .N777UA 5Z 7 M68A UA8987 /C6 LHREWR EWR NEED 3 WHLCHRS
                                                 ON ARVL.
0250 09/01/96 14:32:58 2 .N777UA 5Z 8 M69A UA8987 /71 LHREWR E1696121
0251 09/01/96 14:34:14 2 .N371AA Q8 1 383H >>ONKN !ii
0252 09/01/96 14:34:39 : .N3GN>> J* M 398r AA8141 OS JF4_PPX*;<>!E3
0253 09/01/96 14:35:59 2 .NFMJ*.    H M78A 6T141K !09
0254 09/01/96 14:36:01 2 .N984UJ Q8 7 4823 U#OKJN !D_
0255 09/01/96 14:36:19 2 .N8FH*\ Q8 3 48KL *.OHKJ !M
0256 09/01/96 14:36:29 2 .N885DE H1 9 D97A DL8819 #DFB2398800000N0_N_F__NFKOLI
                                                829 4226 -7144338 -9-41582 43
                                                J2-111 62888  'MFI_KHG_8818
0257 09/01/96 14:36:44 2 .2FOI;3 5U 5 4NOJ GL1JFH __ON_('R!___1697/01 KB83P4>W

ACT-1 1.01  Viewing: 96090100.TXT (press ESC to exit)
```

FIGURE 1

booklet indicates, in the United States and Canada 131.550 MHz is the primary ACARS channel. When heard on a scanner the ACARS signal sounds like a rapid burst of audio, much like a short Canadian goose honk. They last for an average of five seconds or less. As with all the other ACARS decoders we have reviewed, the decoded messages are not really in plain language and it takes considerable translation of abbreviations and format to understand them.

So how does ACT-1 differ from the others? Good question. For one thing, you can put to work that old XT computer that has been sitting around the radio shack doing nothing. ACT-1's minimum computer requirements are very modest, requiring only an XT with an 8088 CPU running at 8 MHz. These can be found at radio flea markets for under $20. You'll also need a serial port and a 3.5-inch, 720 kilobyte floppy drive.

Now remember, these are just minimum requirements. We tried ACT-1 on a Franklin XT (8088), a 386SX 16 MHz laptop, and a Pentium 120 MHz. It worked perfectly with all of them.

The ACT-1 hardware, which attaches to the serial port via a 25 pin connector, is contained in the plastic connector holder, as are the ACARS decoders from other manufacturers. However, a nice feature of ACT-1 is a second 25 pin connector on the back of the adapter which allows the simultaneous use of a second serial device such as a mouse. For use on my laptop ACT-1 required a 25 pin to 9 pin converter which is not supplied. As with the other decoders, a miniature phone plug connects to the scanners' headphone or external speaker output.

Software installation went as advertised on two of the computers. All it took was running the "install" program from the floppy. In less than two minutes, I was receiving ACARS messages. But the laptop gave me real problems by not recognizing the existence of the decoder on the serial port. Finally, I tried manually defining the serial ports' parameters as described on page 30 of the ACT-1 manual. Instant laptop success.

You can see the main screen of ACT-1 in Figure 1. Across the top are pull-down, command line menus which are accessed either via mouse or the "control" key. From here you can choose to save an ACARS reception session to disk in one of four data formats, or have it printed as you receive it. Exiting the program is also done from here, as well as recalling previously saved-to-disk message files.

Below this command line is where ACARS message details are displayed in 10 columns of information. Many are self-explanatory. ACT-1 allows the user to customize the screen by turning off columns—unique, I think, to ACT-1 ACARS.

In my view, the three most important message details are FID (flight ID), ML (message label), and the message (text). The ML column tells you what kind of a message you have received and how to help translate all the abbreviations and acronyms to plain English. Be aware that there are over 100 different ACARS message formats. This is a very nice screen layout which gives the user easily separated and viewed access to all data; again, I think, unique to the ACT-1.

Back to the command line, I found the xFilter menu one of the most interesting. The xFilter command allows you to control which message will be processed and displayed. Here the user can pick up to ten different combinations of field "conditions" which will result in the message being processed and displayed. For example, if you only wanted messages from TWA aircraft concerning landing at Lambert field, using the xFilter command would allow only those meeting the conditions to be displayed.

Operation was simple and easy; a mid-range volume control setting on a Radio Shack Pro-2004 provided excellent copy via connection to the headphone jack.

However, the problem which detracts from all other ACARS decoders still exists. No one has yet figured out a program that can automatically change all the abbreviations into easily read and understood plain language. There is the challenge to you hot shot programmers out there.

ACT-1's manual does give an example of translating a message and a list of message types. The book *Understanding ACARS* by Ed Flynn, is helpful and is free upon request with the purchase of ACT-1 from Universal.

So, Do We Need YAA?

I think that ACT-1 has enough different features that if anyone is in the market for an ACARS decoder it should definitely be considered. ACT-1 with the Flynn book is available for $99.95 (plus $6 shipping and handling) from Universal Radio, Inc., 6830 Americana Pkwy, Reynoldsburg, Ohio 43068, telephone (800) 431-3939. Also check their web site on the internet at: **http:/www.universal-radio.com**.

'Til we get together next month, stay sharp and smart.

SPECIAL EVENT CALENDAR

Nov 1	Agawam, MA	Hampden Co RA (Auction) / Steve Nelson, WA1EYF, 1 Marilyn Dr., Wilbraham, MA 01095, 413-596-8216
Nov 2	Sorrento, FL	Lake ARA / Tony Summerlin, KE4NLG, 9210 Fernery Rd., Leesburg, FL 34788, 352-360-1380
Nov 2	Godfrey, IL	Lewis and Clark RC / Brent Urfer, N9SCM, 400 North State St., Jerseyville, IL 62052, 618-498-4865
Nov 2	Enid, OK	Enid ARC / Jeff Worth, N5UBY, 405-233-8473
Nov 2	Milwaukee, WI	Milwaukee Rptr Club / Burt, N9VBI, PO Box 2123, Milwaukee, WI 53201, 414-328-0535
Nov 2-3	Lawrenceville, GA	Alford Memorial RC / Randy Bassett, KR4NQ, PO Box 1282, Stone Mountain, GA 30086-1282, 770-410-3989. Location: Gwinnet Co Fair Grounds, Sat 9-5, Sun 9-3. Talk-in 146.76 (PL 107.2). $8 gen adm.
Nov 2-3	Odessa, TX	W Texas ARC / Robert Jordan, N5RKN, PO Box 7033, Odessa, TX 79760, 915-335-7980
Nov 3	Canton, OH	Massillon ARC / Jack Cale, N8FEB, 6021 Longbrook St. SW, Massillon, OH 44646, 216-477-8261
Nov 9	Montgomery, AL	Montgomery ARC / Dennis Rumbley, KS4UO, 1853 Llanfair Rd., Montgomery, AL 36106, 334-409-9971
Nov 9	Titusville, FL	Titusville ARC / Clyde Lee, K4EOS, PO Box 73, Titusville, FL 32781-0073, 407-267-9375
Nov 9	Watkinsville, GA	Athens RC, UGA Bulldog ARC / P.O. Box 6337, Athens, GA 30604, 800-959-8273, WB4VNT@Athens.net. Location: Oconee Co Civic Center, Ga Rte 53 10 mi S of Athens. Talk-in 146.745 downshift. Sat 9-2. $5 gen adm.
Nov 9	West Monroe, LA	Twin City HC / Becky Ketchell, KB5SUI, PO Box 1871, West Monroe, LA 71294, 318-343-3530
Nov 9	Hershey, PA	Central Rptr Assn / Harold Baer, KE3TM, 619 West 2nd St., Hummelstown, PA 17036, 717-566-8895
Nov 9	Myrtle Beach, SC	SC State Conv / David Berry, KE4OOW, 100 Longwood Ln., Conway, SC 29527-6011, 803-347-3186
Nov 10	Branford, CT	S Central Conn ARA / Bill DeBenedetto, K1PVT, PO Box 705, Branford, CT 06405-0705, 203-483-0856
Nov 10	Washington, PA	W.A.Com / Ted Lockman, WB3BZK, PO Box 1386, Washington, PA 15301, 412-222-6473. Location: Chartiers-Houston High School, I-79 Exit 8, follow racetrack road W to top, turn right, 1 mi N on Pike St. Talk-in 145.49-.
Nov 16	Watkinsville, GA	Athens RC / David Alper, KD4STZ, 328 Georgetown Dr., Athens, GA 30605-3087, 706-354-1952
Nov 16-17	Fort Wayne, IN	Ind. State Conv / Don Gagnon, WB8HQS, Allen County Amateur Radio Technical Society, PO Box 10342, Fort Wayne, IN 46851, 219-484-1314
Nov 17	Poughkeepsie, NY	Mt. Beacon ARC/ Ken Akasofu, KL7JCQ, 316 Titusville Rd., Apt. 4, Poughkeepsie, NY 12603-2944, 914-485-9617, Fax: 914-485-2402
Nov 17	Benson, NC	Johnston ARS / Bill Lambert, AK4H, 8917 NC 50 N, Benson, NC 27504, 919-894-3352
Nov 20	St. Petersburg, FL	Pelican Chapter #128 (QCWA) / Don Bice, W4PCO, 5511-18th Ave. North, St. Petersburg, FL 33710, 813-347-2702
Nov 23-24	Tampa, FL	SE Div Conv / Charlotte Frazier, WB4PEL, 617 Highland Ave., Dunedin, FL 34698, 813-733-6937, Fax: 813-585-7055
Nov 30	Litchfield, IL	Central IL/St. Louis Area ATV Club / Scott Millick, K9SM, 907 Big Four Ave., Hillsboro, IL 62049, 217-532-3837
Nov 30	Evansville, IN	Electronic Applications Radio Service / Neil Rapp, WB9VPG, 1506 South Parker Dr., Evansville, IN 47714-3154, 812-479-5741
Nov 30	Newtonville, MA	Waltham ARA / Eliot Mayer, W1MJ, 254 Main St. #4, North Reading, MA 01864, 508-664-0773

Send announcements of events or club information to: Editor, Monitoring Times, P.O. Box 98, Brasstown, NC 28902-0098. Fax 704-837-2216; e-mail mteditor@grove.net. See MT's homepage on **www.grove.net** for complete listings.

CLUB CIRCUIT

North American Club Listings M-O

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: James Dale, 16330 Germane Court, Rosemount, MN 55068, 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; Internet jimfun@aol.com. 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: Bill Oliver, 45 Wildflower Lane, Levittown, PA 19057, naswa1@aol.com (215) 945-0543. Worldwide; Shortwave broadcast only. *The Journal.* Web site: http://www.mcs.com/~ralph/html/naswa/. Regional meetings. $26 annual in NA.

North Central Texas SWL Club: Alton Coffey, 1830 Wildwood Drive, Grand Prairie, TX 75050. North Central TX area; All bands.

Ontario DX Association: Joe Robinson, General Mgr., P.O. Box 161, Station A, Willowdale, Ontario M2N 5S8, Canada: Internet 70400.2660@compuserve.com; (416) 293-8919 voice & fax, (416) 444-3526 DX-Change information svce; (905) 841-6490 BBS. Predominantly Province of Ontario; All bands. *DX Ontario.* Meet 3rd Wednesdays, Toronto

WHAT'S NEW?

PRODUCTS AND BOOKS OF INTEREST TO THE RADIO HOBBYIST *by Larry Miller*

Guest reviewers: Bob Grove, Gayle Van Horn

Hot Stuff from the Shack

There's still no 800 MHz trunked-following scanner in the new 1997 Radio Shack catalog, but that's not to say they haven't introduced some new and interesting radios—three new handhelds, four new base models, and one new mobile unit, in fact.

The new handhelds are all under $200 with the PRO-63 "event" scanner leading the way at $199.99. It's a 100 channel radio with VHF air band and a pushbutton, 20 dB attenuator. The attenuator is designed to block out all but the loudest, local signals, making it easier to search for frequencies at air shows, car races, and so forth.

The PRO-66 is the Shack's most affordable handheld with 800 MHz coverage. It has 50 channels, band search, search skip, and a $179.99 price tag. The PRO-70 is $149.95 and is also a 50 channel unit with one-touch weather, minus the 800 MHz.

One of the new base scanners is an upper-end model, second only to the popular '2042. The PRO-2045 is a triple conversion 200 channel model that, like the '2042, begins to look quite a bit more like a communications receiver than a scanner, despite somewhat attenuated frequency coverage: 29-54, 108-174, 216-512 and 806 to 1,000 MHz (minus cellular). HyperScan, HyperSearch, programmable attenuator, auto-store, data skip, search skip, 10 priority channnels, hit counter, and weather-alert tone make this a radio worthy of serious consideration.

The other three base models are competent consumer-grade radios including the $189.99 workhorse PRO-2044 (80 channels, VHF air-band, HyperScan/HyperSearch, one-touch weather), and the mom-and-pop, on-the-night-table PRO-2014 (50 channel, HyperScan/HyperSearch one-touch weather, compact size at $139.99), and PRO-2043 (30 channels, search skip, 3 priority channels, one-touch weather at $119.99).

The new mobile is the PRO-2046 (reviewed last month by Bob Parnass). It's billed as a preset unit with one-touch VHF police, weather, DOT, highway and 800 MHz police/fire frequency range scan. It's a 100 channel scanner with 29-54, 108-174, 406-512, and 806-956 MHZ (minus cellular) coverage. The price is $229.99.

It goes without saying that Radio Shack also has a new Family Radio Service radio, since Radio Shack started the service. The FRS-105 is a 7 channel rechargeable handheld (manufactured by Motorola), which sells for $179.99. The Family Radio Service, you may recall, is a low-power, short-range service designed for consumer use.

You can get a copy of the Radio Shack catalog at your favorite Shack for about $3.00.

Spectrum Guide

Where in the radio spectrum would you find stratospheric balloons? How about Malaysian elephants? Or secret nuclear sleuths? Just before the Olympics, members of the little-known Nuclear Emergency Search Team (NEST) mapped Atlanta for radiation that might expose nuclear terrorists. Who wouldn't like to scan that action?!

These and thousands of other radio users are included in the new and updated third edition of *SpectrumGuide: Radio Frequency Allocations in the United States, 30 MHz-300 GHz*. Bennett Kobb, a Washington-based technology reporter, is the author.

SpectrumGuide profiles government, commercial, and scientific applications of the U.S. radio spectrum in more than 300 VHF through UHF radio bands. These include amateur and aviation, cellular telephone, digital radio and TV, personal communications, space exploration and radio astronomy, military, interactive data technologies, and much more. The book even details several "hidden" radio services whose users would probably prefer that you don't know about their operations.

Kobb's work is the best in the industry. In fact, it just might be that he knows more about the U.S. radio spectrum than the government that administers it.

SpectrumGuide, published by New Signals Press (800-460-0090), is a must-have for anyone who wanders the radio bands. It's $29.95 ($6 UPS shipping) from Grove Enterprises (800-438-8155; PO Box 98, Brasstown, NC 28902).

More Low Power FM

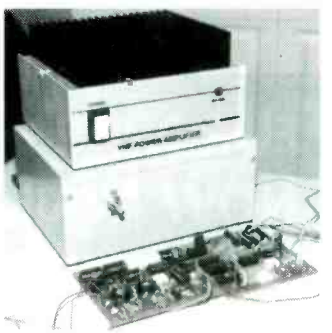
We've been watching the development of the "micro-power" broadcasting industry in this country for some time. From local efforts by technical types with home-brew transmitters, to Ramsey Electronics' constantly improving line of kits, to the controversial entry of Free Radio Berkeley into the market—the line has been upward but not without disappointment.

We just received a packet of information from R. Scott Communications—a company in Canada that sells FM broadcast transmitters to users in the U.S. Their units are wired and tested, come with a 90 day warranty, and offer a 10 day, money-back guarantee.

Power levels run from 1/2 watt to (with amplifiers) 110 watts.

The least expensive unit is a fully assembled 1 to 18 watt transmitter. It's stable and tunable from 88 to 108 MHz. Power comes from any 12 VDC 3 amp source. All you do is plug it in and go on the air. Range is about 15 miles. The price of the mono unit is $195 plus $20 shipping. The stereo unit is $360 plus $20 shippping.

You can increase the power and range of these units with one of R. Scott's R.F. Amplifiers. Available in either kit or assembled form, it includes the model 2100, which will bring the FM transmitter described above to a whopping 110 watts. The kit is $410; the assembled unit is $510. Shipping is $25. By the way, the '2100 RF amp is compatible with the Ramsey FM-25 or the Panaxis FME transmitter.



To order or for more information, contact R. Scott Communications at 604-642-2859. Their e-mail address is kscott@pinc.com. Their local address is 6974 Larkspur Road, RR-3, Sooke, B.C. Canada VOS-1NO. We remind you that these units are not legal in the U.S. if you don't have a license to broadcast.

Log Those One-Lungers

The National Radio Club *Distance and Bearing Handbook* contains a list of all the AM radio stations in the United States and Canada along with their transmitter coordinates. The information can be used to accurately locate

transmitters of radio stations. If you know your own location, then the range and bearing from the listener's location to the transmitter can be calculated, providing you yet another entry for your logbook.

The book is a bound 8-1/2 x 11 inch format with 102 pages of easy-to-read type. The list includes frequency, city of license, state, latitude, and longitude. All known day/night site coordinates and CP's (construction permits) for new sites are included. Complete step-by-step formulas are included for figuring distance and bearing as well as sunrise and sunset.

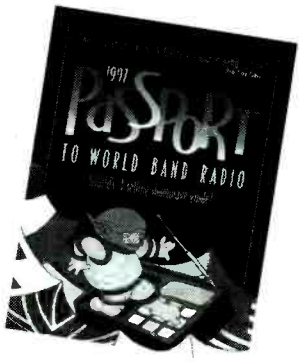
The *Distance and Bearing Handbook* is only one of dozens of helpful publications for the AM DXer from the NRC. All publications have two prices: member and non-member. In the case of the *Distance and Bearing Handbook*, the price is $14.95 postpaid. If you are a member of the National Radio Club, the price drops dramatically to $8.95 postpaid.

Think about it: If you purchase only a couple of NRC publications over the course of a year, you could very well end up saving enough money to pay for your NRC membership! So what are you waiting for? When you order your next NRC publication, make sure you ask for a membership application. Their address is National Radio Club, Publications Center, P.O. Box 164, Mannsville, NY 13661-0164. Tell them *MT* sent you.

1997 Passport to World Band Radio

This is my absolute favorite time of the year. The DX improves for world band listening, the summer static is history and *Passport to World Band Radio* arrives to make the fall season official. If you haven't yet ordered the "must-have" guide to your "must-hear" world, let me tell you a little about the excellent issue Editor-in-Chief Larry Magne and his staff have prepared for 1997.

Beginning with *Ten of the Best: 1997's Top Shows* leads you through a range of choices of English programs. There's something here for everyone.



Complete Idiot's Guide to Getting Started guides you through the basics, and *First Tries: Easy Catches* offers a sampling of easy-to-tune stations.

New for '97 is the *Web Radio* section where you, too, can learn how to "get wired." *Web Radio II* tells you where to tune in web radio with web site addresses for world broadcasters, and U.S. stations' home pages.

Still shopping for a world band radio? Equipment reviews and accessories are a regular part of *PWBR*, along with tuning tips.

Addresses Plus lists by country e-mail and postal addresses, contact personnel, future plans, and free gifts available from the station.

Completing this fine edition are *Passport's Blue Pages*, a channel-by-channel guide to world band schedules, frequencies, languages, and transmitter information.

New York Times calls *PTWBR*, "the closest thing to *TV Guide* for world band radios," and I couldn't agree more! You can buy *Passport* from your favorite radio or book store, including Grove Enterprises ($19.95 plus $6 shipping; call 800-438-8155). — *GVH*

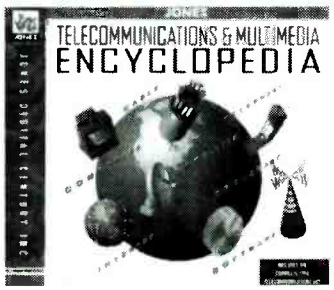
CD for Our Times

The Telecommunications Act of 1996 marked a threshold for the communications industry. While the individual consumer may first notice its effects by the flurry of long-distance companies making just-at-dinnertime sales calls, many, many other changes are on the way.

The Jones Telecommunications and Multimedia Encyclopedia is a CD reference that documents each industry comprising the emerging digital world, including comprehensive information on broadcasting, computer, satellite, software, and telephony.

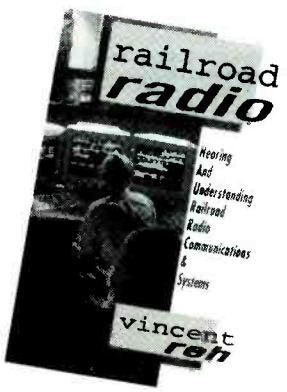
There are more than 1,000 entries, 350 topical articles, 75 video clips and hundreds of photos and drawings. A powerful search-by-word function makes access quick and easy.

You can get more information or you can order by calling 1-800-JONES. The price is $39.95 plus $4.95 shipping. Jones is located at 9697 East Mineral Ave., Englewood, CO 80155-3309.



Railroad Radio

While several frequency directories have been published in the past for railroad buffs, *Railroad Radio*, by Vincent Reh WA2AUY, takes a fresh perspective. Subtitled *Hearing and Understanding Railroad Radio Communications and Systems*, this 200 page volume concentrates on networks themselves, with seldom-seen photos of historic railroad radio dispatch positions, photos of modern railroad radio gear, illustrations of railroad networking, hotbox and end-of-train detectors, and many other elusive gadgets that railroad buffs have wondered about for years.



But Reh doesn't leave the listening enthusiast out in the cold—far from it. He also includes lists of commonly used frequencies for the nation's railways, as well as a complete channelization plan for railroad VHF frequencies. Listening equipment, techniques, and accessories are also presented to enable the curious monitor to optimize his reception of railway communications.

Railroad Radio, published by Byron Hill Publishing Co, is $19.95 plus $6 shipping from Grove Enterprises.

— *BG*

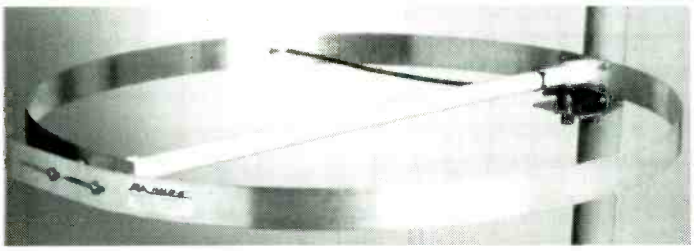
New York Fire Department Monitoring

Scanner listeners in the Big Apple now have a fire alarm assignment and reference guide to help them make sense of what they're hearing. Sal DellaCroce, himself a member of the NYCFD, has produced a monster 300+ page book packed with info. The book includes every NYC fire alarm box and address along with first and second due engine, first due battallion chief, address of every fire house, police precinct and EMS station, fire-police-EMS 10-codes, a full list of NYCFD apparatus, and more.

Make your check or money order payable to Eagle Enterprises, P.O. Box 286, Staten Island, NY 10302 or use your Visa or Mastercard. The price is $28.95 plus $3.95 shipping. New York State residents must add sales tax. Mention *MT*'s "What's New" column when you order.

Heavenly Reception

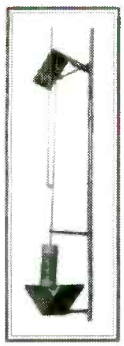
Advanced Electronic Applications (AEA) has introduced a new six meter antenna called the Halo. The Halo is designed for



the new no-code Technician who wants the experience of working real ionospheric skip DX on six meters. It's also appealing to the grizzled vet who might want to sample the mysterious 6-meter band on his new multi-band transceiver at the lowest possible cost.

The Halo comes in kit form, but assembly takes only about 30 minutes, the antenna measures only 27 inches and is flexible, so it can fit just about anywhere. The Halo antenna from AEA is $69.00: to get more information see your local ham radio store or call 800-432-8873.

Small-space HF Antenna

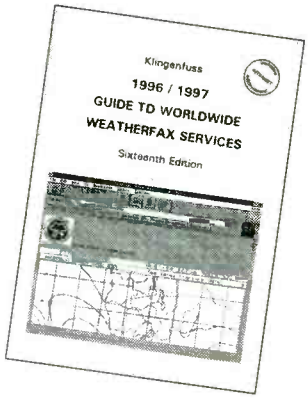


If you're a ham, you know that much HF activity remains on the lower frequency bands, despite the predictions of increasing sun-spot counts. And everyone knows that HF antennas take up lots of space.

Ralph Bilal, WDOEJA, has produced an HF antenna for 160 meters that he says "does not need a Texas-size ranch to use." The Isotron 160C is 9.5 feet tall and mounts on a conventional mast. A resonant antenna, it needs no radials and is directly fed with coax.

You can get more information on Ralph's Isotron antennas by giving him a call at 719-687-0650 or by writing the Bilal Company, 137 Manchester Dr., Florissant, CO 80816. Tell him that *MT* sent you.

Guide to Weatherfax



Everybody talks about the weather, but Joerg Klingenfuss does something about it. One of the most popular targets for utility enthusiasts is meteorological weather maps, and the most exhaustive directory of these stations is his *Guide to Worldwide Weatherfax Services*, 16th Edition, with its more than 400 pages of sample weather charts, transmission schedules and frequencies, callsigns, and locations.

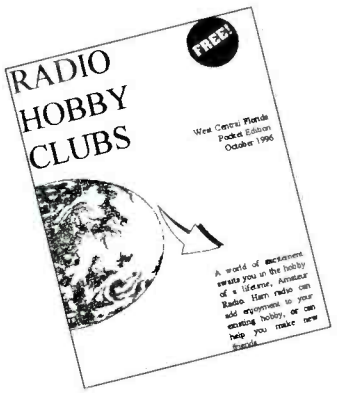
Other lists explain abbreviations, satellite positions, equipment suppliers and other pertinent reference information. Additionally, this volume includes an excellent tutorial chapter on weather satellites. The book is 60 DM plus 7 DM overseas airmail (Fax +49 7071 600849, email

101550.514@compuserve.com) or contact Universal Radio, a U.S. distributor for many of Klingenfuss' books (800-431-3939)

— *BG*

Florida Freebie

Here's a freebie for folks with an interest in the Sunshine State. The Public Information Office of the Florida Gulf Coast Amateur Radio Council has put together a free 48-page booklet that lists over 50 clubs for scanner, CB, ham radio, and radio-related computer bulletin boards. You'll find club addresses, contact phone numbers, meeting places and times, and even some hot frequencies.

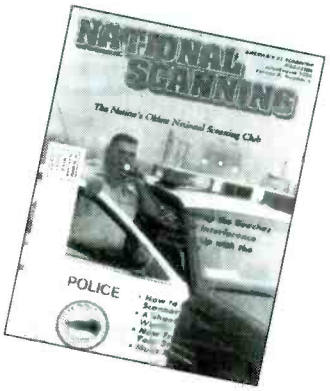


If you're interested, send your name, address, and two first-class stamps to Radio Club Guide, P.O. Box 103, Largo, FL 33779-0103.

National Freebie

With the demise of RCMA, one continuously published national scanning magazine is left: *National Scanning*. It's gone through a lot of changes since its beginning seven years ago: Each issue includes new license grants (courtesy of Gene Hughes and *Police Call Plus*), profiles of top scannists, equipment reviews, articles, and more. It's all orchestrated by former *North East Scanning News* editor, Joe Nooney.

If you haven't seen a copy of *NatScan* in a while, here's your chance. Send two quarters to help cover postage—50 cents in coin, no checks—to P.O. Box 360, Wagontown, PA 19376, and a free copy of the mag in the mail will go out to you in the next monthly bulk mailing. (Sample available by first class mail for $3.)



Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Hwy 64 West, Brasstown, NC 28902 Press releases may be faxed to 704-837-2216 or e-mailed to mteditor@grove.net.

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

Drake's Little Secret: The "SW8A" Receiver

You see it every fall. One car might be "new for 1997," but have only an additional airbag and different trim color—old tea in new bags. Yet another model, equally billed as "new for 1997," might have a new body and drivetrain. In other words, *really* new.

So it is with shortwave receivers, including those from the same manufacturer. The venerable Drake R7, introduced in 1979, was "upgraded" into the R7A, with differences you needed a microscope to detect. On the other hand, the upgrade from the more recent R8 to the current R8A is real and substantial.

But what's going on when something's significantly upgraded, but the manufacturer insists on calling it the same old model? In the Nineties culture of brazen braggadocio, how can this happen?

Modest labeling hides real change

It certainly has hidden real change in the electronic persona of the Drake SW8. This receiver started off life over two years back as the SW8. Today, it continues to labor quietly in shortwave vineyards under the same humble rubric, as though nothing has changed. Yet, what we've found is that it's now much different under the hood. The receiver actually amounts to an "SW8A," even if the manufacturer is keeping this news among its Great Corporate Secrets.

Unbeatable as a portatop

The SW8 was conceived as a high-quality alternative to the discontinued Philips/Magnavox D2999 portatop. A portatop is basically a tabletop model with enough added features to make it a portable candidate for Weight Watchers. Portatops are ideal for backyard or room-to-room listening and DXing, as well as for use on car trips or RV excursions.

Drake's SW8 succeeds brilliantly as a portatop, incorporating FM, battery power, a telescopic antenna, and a full-length carrying handle that also angles the receiver for comfortable operation—all features normally associated with portables, not tabletops. While it lacks a couple of the handy pushbutton tuning features of the D2999, it more than makes up for this with other tuning features, as well as a level of communications-receiver performance that was clearly lacking in the

Improvements to the SW8 actually make it worthy to be called an "SW8A," according to Magne, who believes this little receiver is a wise investment.

D2999. Also, being a Drake product, it comes with factory service second to none.

The SW8 boasts three well-chosen bandwidths, most of the advanced tuning features found on tabletop supersets, and overall performance reminiscent of a good tabletop receiver. Its audio quality is commendably superior, too, as is its reception of single-sideband signals used by hams and utility stations. What it originally lacked, and continues not to have, are some special controls, such as passband tuning, that serious DXers find helpful for extracting the last erg of readability from an obdurate signal.

Although the original SW8 was quite worthy, it disappointed in a number of ways. It incorporated synchronous detection, for example, but this functioned only on both sidebands, not one sideband at a time. There was some hum, too, and sensitivity to weak signals was ho-hum with the built-in telescopic antenna. Also, FM selectivity was not all it could have been, and there was no longwave coverage. No carrying case, either.

Nicely improved in stages

Perhaps the reason Drake hasn't designated the current SW8 as the SW8A is that they undertook, wittingly or otherwise, what turned out to be a two-year project of improvement. Now completed, this has brought the receiver, step by careful step, to its present state of excellence.

First, as we reported last year, they greatly improved the SW8's sensitivity to weak signals with the telescopic antenna. It's still not all you might wish for, because the receiver tends to generate audible white noise unless you use a length of wire to supplement that antenna. But it is much, much better than it used to be, to the point where the SW8 is now a serious DX machine at home or in the bush.

Over time, Drake also reduced the receiver's hum, making it more attractive for listening to quality-reception programs. For the same reason, FM selectivity was tightened up, allowing already-good FM reception to be even better. And while longwave broadcasting is nonexistent in the Americas and much of the rest of the world, and hardly a go-go band elsewhere, Drake apparently felt it was important enough to include it in all revised SW8s—not just those destined for, say, Europe. For some *MT* readers, even in North America, this is welcome news, as it allows the enhanced SW8 to cover a whole new band for utility DXing and even trans-Atlantic broadcast DXing.

The rub is that all this came at a price. Formerly $599, the SW8's price was raised to $699.

Finally—synchronous selectable sideband!

With all these improvements and added features, though, there remained one vexing issue: no selectable sideband with the synchronous detector in use. Some much-cheaper portables, such as the excellent under-$400 Sony ICF-2010 and the newer $200 ICF-SW7600G, offer a basic form of synchronous selectable sideband, as this feature is called. This made the SW8's $700 price tag increasingly hard to justify.

But no more. The SW8 now has synchronous selectable sideband, and it works well. So well, in fact, that because of its superior ability to stay locked onto a signal it compares favorably with that on Drake's costlier R8A tabletop model.

What this means is that the SW8 now has much-improved ability to reject interference from an adjacent channel, albeit only when the other adjacent channel is not also causing heavy interference. That, plus synchronous detection's inherent ability to virtually eliminate fading distortion, underscore that the SW8's improved synchronous circuitry is a major listening plus.

The downside? If you own an older version of the SW8, you can't have it retrofitted for synchronous selectable sideband. This isn't

mean-spiritedness on Drake's part—they're one of the most customer-friendly manufacturers around. It's just that the circuitry is completely different, making a retrofit economically impractical. However, some of the other SW8 improvements can be retrofitted if you happen to own a very early version; contact Drake's service department at (513) 746-6990 for specifics.

As icing on the cake, Drake has begun offering an optional carrying case for the SW8. For travelers trying to keep their beloved receiver free from scratches and scuffs, as well as away from the prying eyes of security personnel and thieves, this is welcome news.

Bottom Line: Now one of the very best

The bottom line is that today's Drake enhanced SW8 is a much better offering than before, to the point where it now functions as an excellent tabletop receiver, as well as—beefiness aside—an unbeatable portable. In the new 1997 edition of *Passport to World Band Radio*, the "SW8A" has been graced with four-and-a-half stars—just a half-star under the handful of $1,000-$4,000 tabletop supersets that get its ultimate blessing of five stars.

Dealer scuttlebutt suggests that the SW8 has not been the hottest-selling receiver around, apparently because its reputation was established at the outset, when it lacked the performance it has today. Too, perhaps Drake's reluctance to trumpet its hot new SW8 results from a feeling that they may be robbing Peter to pay Paul by encouraging customers buy the cheaper SW8 instead of their top-end, and still-top-performing, R8A. But whatever the psychology of Drake's apparent marketing strategy, the new SW8 is clearly an "SW8A," no matter what the label says.

How can you tell which is the new, enhanced version? In North America, it's a virtual certainty that any SW8 being sold as new is the latest and final version. But to be sure, check to see if it has a serial number beginning with "6," indicating 1966 production. If it does, give your new receiver a welcoming pat, and congratulate yourself on knowing how to spend your money wisely.

If money is no object, the tabletop Watkins-Johnson HF-1000, Drake R8A, and AOR AR7030 remain my top choices for serious DXing and program listening, with the attractively priced Lowe HF-150 portatop being at least as good for high-quality program listening and casual DXing. But for all-around DX and listening performance at a fair price, with portability and first-rate FM reception thrown in, Drake's delightful little secret, the enhanced SW8 just can't be beat.

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.

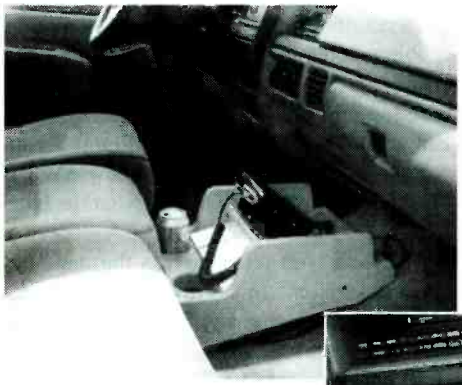
Bob Parnass, AJ9S

Build a Mobile Mount for Your Radio

I bought my first truck in 1974, a Jeep CJ5. It was constructed like an Erector Set: lots of steel parts bolted together making it easy to service and modify. Mounting mobile radio equipment in the CJ5 was straightforward, too, thanks to the steel dashboard and small diameter steering column. I recall placing a large U-bolt around the steering column to position an old, Motorola Power Voice™ amplified mobile speaker for easy listening.

Truck interiors became more civilized in the 1980s, with less steel and more foam padding, making radio installations more challenging. I bolted radios vertically to the front of the plastic center consoles in a Chevy Blazer and a succession of bucket seat-equipped Ford Broncos.

Installing a radio in a 1991 Ford F-250 pickup truck called for a new approach. The truck was equipped with a bench seat and no center console. The bottom lip of the dashboard provided few bolts which could support the weight of a radio while driving on bumpy roads. After studying the aftermarket wooden consoles sold in local auto supply stores, I designed and built my own console from pine scraps (see photograph).



Photos by Pam Parnass N9HRZ

sized Ford trucks from the 1980s through 1996, but you can alter the design to suit other trucks and cars as well. The mount currently holds a small dual band ham transceiver, but I originally used it for my large scanners, like the Radio Shack PRO-2004.

I've omitted detailed dimensions for the fancy curves on the side panels because none of them are critical and dimensions will vary with each installation. You can adjust the shelf's tilting angle if you use only one screw to fasten each side of the radio shelf. As the photograph shows, the area underneath the radio shelf can keep oher things handy such as a box of facial tissues.

It's a good idea to bolt the metal mobile mounting brackets of smaller radios to the wooden radio shelf. Bolts are unnecessary with a larger radio like the PRO-2004, as gravity plus the wooden end panels work to hold it in place.

My design includes a simple holder for two soft drink cans. Make the two holes large enough to hold a can, plastic bottle, or large paper cup. Feel free to add extras like a pen holder. You can bolt or screw an external mobile speaker to the passenger side end panel, so long as it doesn't interfere with leg room.

Use common "1-by" pine for all parts except for the top of the drink holder. A handsome hardwood, like mahogany or oak, can be used instead, although at increased cost. I used a router fitted with a 1/4-inch round over bit to soften the edges, but you can sand off the sharp edges instead.

Don't leave the wood raw. Since it will be used in varying temperatures and humidity, be sure to finish your mount with a few coats of polyurethane or similar seal. To deter curious onlookers and discourage theft, I cover the entire installation with a towel when not in use.

This was a fun project, as it combined two of my hobbies: radio and woodworking.

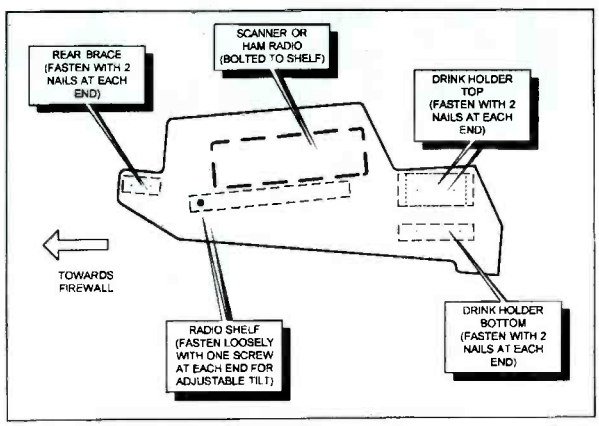


FIGURE 1. MOBILE RADIO TRANSMISSION HUMP MOUNT, SIDE VIEW

Building the Mount

The radio mount described here straddles the transmission hump and permits a no-holes installation. Being held solely by gravity, the mount can be removed easily and has served well in two pickup trucks during the past five years. The dimensions shown in the parts callout (Figure 3) are for installation in full-

Mobile Shortwave Listening with a Scanner?

John T. Wagner, of Pickering, Ohio, classified himself as a "pure SWLer" until he started reading this column and expanded his listening pleasure into the VHF and UHF regions. John wrote that his new AOR AR-8000 portable scanner affords him wideband receive coverage, and he has had great success when using it with both Palomar and Kiwa Pocket Loop antennas for shortwave listening (Kiwa Electronics, 612 South 14th Ave., Yakima, WA 98902; 509-453-5492). John emphasized that these are highly selective antennas and must be tuned to the frequency of interest. Their selectivity pays off by attenuating unwanted out-of-band signals.

For daytime shortwave listening from his car, John dusted off his older Palomar Super Snooper whip antenna (Palomar Engineers, Box 462222, Escondido, CA 92046; 619-747-3343) and adapted its SO-239 connection to fit the BNC connector on a Radio Shack

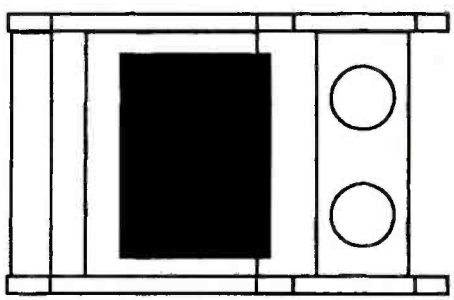


FIGURE 2. MOBILE RADIO MOUNT, SHOWING RADIO, TOP VIEW

window clip mount (catalog #20-023). He proclaims this combination produced the "best SW reception on that AR-8000 that I have ever experienced—mobile or base." The Super Snooper can be easily replaced by a VHF antenna for listening above 30 MHz after rolling down the window.

Coming Up

Two major entries into the general coverage receiver market have finally arrived—the AOR AR-5000 and the ICOM R-8500. Bob Grove takes a first look at them, head-to-head, this month on page 90. Over the next two months, the Scanner Equipment column will then assess each one after having "lived with it" for a while. Stayed tuned!

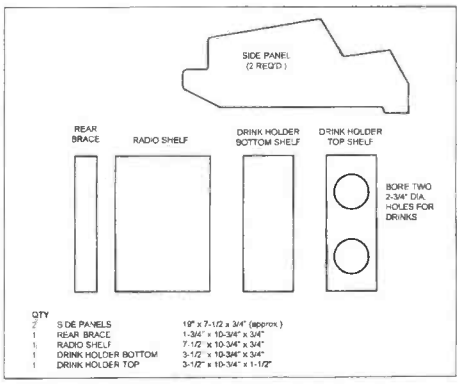


FIGURE 3. WOODEN MOBILE RADIO MOUNT. PARTS CALLOUT

ANTENNA TOPICS

BUYING, BUILDING AND UNDERSTANDING ANTENNAS

Clem Small, KR6A, CET

Is That Really an Antenna?

Have you ever seen a "conformal antenna?" Chances are very good that you have, even if you don't know it. Often they're not that easy to notice, and some are almost impossible to detect.

Many conformal antennas are so different from what we ordinarily expect an antenna to look like, that, if someone were to point one out to you, you might even scoff at the idea that it could really be an antenna.

For instance, figure 1 shows a C-130 Hercules bristling with antennas. Look at it: Where are they? Some antennas are fairly obvious, whereas the nose cone, tail cap, and slot antennas are essentially part of the aircraft's skin, and not obvious at all.

FIGURE 1: *Although this Rivet Rider C-130 Hercules "psychological operations aircraft" is bristling with exotic antennas, some are not so obvious, being hidden in pods or even under the skin of the aircraft. The lower profile antennas are especially desirable in supersonic aircraft, where even an antenna covered by a pod creates wind resistance. (Courtesy Lockheed/Dept of Defense)*

A conformal antenna is made to conform to the environment where it is mounted, and this can be especially important in some situations. For instance, in supersonic flight a conformal antenna such as the nose cone, tailcap, or slot antenna, will experience very little wind shear compared to an antenna which extends out from the plane like the pod.

What's in a Name?

When you think of antennas in general what do you visualize? Probably not the conformal antennas just discussed. Perhaps you think of a length of wire mounted high and in the clear. Maybe you think of a halfwave dipole up 30 feet or so above the ground, or maybe a quarterwave groundplane antenna on a pole fastened to the side of the house.

Whatever comes to your mind when you hear the word "antenna" you probably don't think of a piece of Swiss cheese. But there is an antenna whose appearance makes you think of a chunk of Swiss cheese. As a matter of fact, there are many odd and unusual antennas to be found in the pages of some antenna handbooks. Let's have some fun and take a look at a few of them.

Some antennas that we don't need pictures to visualize include the Vee, the inverted-V, the J, the J-pole, the lazy-H, and the inverted-L. If you haven't heard what the "lazy" in "lazy-H" signifies, it means that the H is laying over on its side as if it were lazy, and just resting. "Lazy" seems to be terminology borrowed from the old western ranchers who would sometimes lay certain letters or numerals on their side as they designed their cattle brands, calling those letters or numerals "lazy." (I've heard tell there is a brand which consists of the letters "U" and "R" followed by a numeral "2" resting on its side. This, of course, decodes to say "You are lazy too!")

Other antennas that get their name from their looks include the loop, the zig-zag antenna, the hyperboloidal reflector antenna, and the Archemedian spiral. Of course our old friend the discone is made up of a disk and a cone, and the rhombic antenna is made in the shape of a rhombus. The cubical quad (quadrilateral) antenna has square sides which outline a cube, and the delta quad is a beam antenna similar to the cubical quad except its elements are in the delta, or triangle shape. Of course the monster quad is simply a quad antenna of monstrous proportions (long boom and many elements).

To continue with more antennas whose names betray their appearance we have: the clover leaf, pine tree, beaver tail, ramshorn, ratrace, and hog trough antennas. At the risk of boring you, other antennas named for their looks include the snake, fishbone, batwing, pillbox, hula hoop, whip, top hat, skirt, umbrella, flagpole, blade, fan, bedspring, organ pipe, and cage antennas. We could go on and on, but that's enough for now.

Let's now check out the most cool antenna you'll ever meet. Really.

The Cutting Edge in Antennas

Recently I bought a copy of a small British book called *Experimental Antenna Topics*, by H. C. Wright (Bernard Babani, London, publisher). It is a small book and has very brief discussions of various antenna-related topics. One of the things it reports is that there is research underway with antennas made of conductive ceramic material, and cooled with liquid nitrogen to reduce their ohmic resistance. The efficiency of such superconducting antennas is said to be 100 per cent!

As we know from results with high-Q (low ohmic resistance) small loop antennas, some small antennas can be made to perform quite well if their ohmic resistance is low. Perhaps soon materials can be made that will function as superconductors at room temperature, and then we maybe can have those tiny, high-performance wrist radios that currently exist only in science fiction.

RADIO RIDDLES

Last month:

We asked; " What happens when the (radio) wave actually encounters your antenna? How does it change from being a wave propagated through space to becoming current in the wire of your antenna?"

Well, if your antenna is composed of linear elements, we say that the electric field of the passing electromagnetic (EM) wave induces a current in the antenna. If the antenna is a loop we say that it is a "magnetic" antenna, and the magnetic field of the EM wave induces a current in the loop.

The strength of the induced current depends on such things as the strength of the passing EM wave, its direction of arrival, its polarity with respect to the receiving antenna's polarity, the length of the antenna's linear elements, the number of turns in the loop, the size of the loop, and the ohmic resistance of the antenna's conductors.

Once the received current is flowing in the antenna some of it is lost as heat due to the

antenna's ohmic resistance. Only half the remainder, at most, can be routed to your receiver via the antenna's feedpoint, and, believe it or not, the same amount is re-radiated into space!

#	#	#	#	#	#	4
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Think you can make a better puzzle than this one? Then send me your crossword puzzle based on antenna-related terms, and I'll try to use the best ones I receive in a future column.

You'll find the solution to this month's puzzle, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

This Month:

The riddle for this month is a crossword puzzle in which all of the words are in some way related to antennas. It's an easy one, so why not try your luck?

DOWN:

1. British word for antenna
2. Used with some multiband antennas
3. Directions of low receptivity for an antenna
4. A device that requires an antenna if it is to function.

ACROSS:

1. Skywire
2. One kind of small, tabletop antenna

Real Radios Glow in the Dark

By Ronald Bafetti

Tan, fit, and trim, 74-year-old Jack Hofeld makes his money repairing and restoring radios, some of which are as old as he is.

Hofeld is the founder of Antique Radio Store, a 700-square-foot facility sandwiched between a coffee shop and a health food store in downtown La Mesa, California, just east of San Diego.

"In today's world, if someone's radio breaks, they throw it out and buy a new one," Hofeld said. "The radios we fix are like works of art. They're too valuable to be discarded or to just sit and collect dust."

A quick look around the store's crowded showroom area bears him out. Radios made by Atwater Kent, Fada, Philco, Crosley, RCA, Zenith, and other companies that ushered in the golden age of radio—roughly 1930 to 1950—sport price tags from $50 to $2,400.

Hofeld opened the shop August 1992. He soon took on two partners, both avid antique radio collectors, in an effort to turn what was a hobby into a "hobby business."

"I had a ton of radios and parts at home. I'd been collecting them and fixing them for years. I got to thinking, 'What if something happens to me? Will they just roll up a big garbage can and dump all this wonderful stuff into a hole someplace?'" Hofeld said. "That's when I decided I'd like to start an entity that would survive me, one that would bring pleasure to other people because it would be an ongoing source of repair services for antique radios."

Hofeld comes by his repair skills honestly. He was trained as a radio technician by the Navy and served from 1943 to 1946 repairing shipboard radios in the Philippines at Leyte Gulf. After the war, he completed a degree in electrical engineering at the Armour Institute in Chicago, then embarked on a career as a "corporate nomad" in sales engineering for both RCA and ITT. He also worked for Western Electric in Cicero, Illinois, outside Chicago. He even owned his own mobile telephone and pocket-pager business for 14 years.

With all that technical background, the Chicago native's current business might seem a logical turn, but it was owning a bar in Virginia City, Nevada, that ultimately put Hofeld into the business of antique radio repair.

"When I had the bar, I'd find an old radio, fix it up, and put it on display on the back bar," he said. "Pretty soon people would start asking, 'Hey, what'll you take for that radio?' I began making sales right there."

In our microchip-miracle-a-minute world, it's fair to wonder who buys antique radios. Hofeld says his clientele is as eclectic as the offerings in his store.

"I sell as many antique radios to women as I do to men. Folks buy them as unique gifts for birthdays and anniversaries. It's neat to get something that was made in the same year you were born, or married, or whatever," he said. "Then there are people who want a specific radio to accent a special room decor, or because their family owned one when they were kids, or just because they like the way it looks."

Photo by Bob Smull

Antique Radio Store's founder Jack Hofeld poses with a mirror-faced, Model 506 "Bluebird" radio made in 1936. The radio—now worth $2,400—gained in popularity after it appeared in a Jean Harlow movie.

Hofeld's shop usually displays between 100 and 125 radios. The selection he offers and his knowledge of radios brings him calls from Hollywood set designers who either need a radio as a prop or want to know if a specific radio can be used authentically in a movie set in a given time period. (It wouldn't do, for instance, to have Don Corleone listening to Carmen on a boom box.)

Commercial AM radio established itself during the 1920s. In the '30s, FM arrived, though on a different set of frequencies than today's FM. But Hofeld marks the 1940s as the time when radio really grew up, and it's from that period that most collectibles evolved.

Collecting Savvy

"It's important to understand that a radio can be expensive because it's in good condition, but still not be a collectible," he said. "Radios with cases made of a colored plastic called 'catalin' are very popular with collectors. Catalins will go from about twenty bucks to over $2,000. Some of them were made by the Fada Corporation."

Console radios are very collectible, too, Hofeld said, especially Zenith black-dial consoles. These Zenith units sport a round, black dial with white lettering and numbers. Most could receive AM and FM and had a shortwave capability of from 2 to 20 megahertz ("megacycles").

"We'll put a Zenith black-dial console out the door for $400 or $500, in good condition and guaranteed to work. Those radios sold for about $200 when they were new," Hofeld said.

It was on such a radio that Hofeld listened to fellow amateur radio operators when he became a ham at age 14. He built a one-tube, low-power transmitter for sending Morse code and added a beat frequency oscillator to his family's Zenith console so it could receive code signals.

Old radios come in several distinct cabinet styles: consoles, which sit on the floor, cathedral and tombstone table-top models, and "coffin" radios.

"The sides of cathedral radio cabinets curve inward and meet at a point at the top. They look like little churches. Folks call them 'Depression radios.' They were cheaper to make because they took less material, so they sold well during the Depression," Hofeld said. "The tombstones are shaped like a console, but are small enough to fit on a table."

Coffin radios are low-profile, rectangular affairs with lids that are either hinged or completely removable to allow the user to

change coils and replace tubes. They date from radio's earliest days, and Hofeld's shop has several, an Atwater Kent among them, for sale.

Trying to repair a radio made decades ago is challenging. Components weren't widely standardized, every manufacturer had its own idea of how a radio should be built, and the profusion of models available—many only on the market for a few years—complicates the fix-it business. That's why Antique Radio Store hedges its bets on parts sourcing.

"We have over 25,000 old radio tubes in our inventory. We use them not only to repair radios but we sell them to people who collect radio tubes. We can even supply tubes in their original cardboard boxes," Hofeld said. "We buy old radios and warehouse them so we can cannibalize them for parts later on. We have three outside storage facilities for all this stuff, so sometimes it's more work trying to find a part than it is to fix the customer's radio.

"The most common failure we see is the filter capacitor in the power supply circuit. We cut the old capacitor out of the circuit, but we leave it on the chassis. Then we put in a modern replacement capacitor under the chassis. This gets the radio working again, but leaves it looking just the way it came from the factory," Hofeld said. Replacing most other components, such as smaller capacitors, dial lights, and resistors is easy enough, he added, but where damaged coils are concerned, things can get tricky.

"We use universal replacement coils, then we trim and tune until we're sure the radio will receive the frequencies it's supposed to receive. There really are very few 'impossible' repair jobs, because we have enough experience to work around components that simply cannot be found," he said.

Antique Radio Store ties into a worldwide network of specialty radio—part suppliers and servicemen for such things as knobs, dial bezels, and specialty woods and cloth. A fellow in Los Angeles makes both custom and generic knobs of plastic that have the look and feel of the wood originals. Another in Arkansas makes plastic bezels and faceplates, and a third, in Illinois, provides "you-can't-tell-the-difference" dials. And still another devotes his time to re-coning speakers; that is, replacing the paper speaker cone that vibrates to produce sound.

"There are thousands of people who don't want to see this part of our history disappear. That's why we have specialty manufacturers doing these things," Hofeld said. "We even have replacement speaker grille cloth. It sells for five cents a square inch and it comes in a choice of patterns and colors, all of which were used in the old days."

Photo by Bob Smull.

The operating room is where old radios come to get well when they're sick. Jack Hofeld says that faulty power-supply capacitors are the most common reason old radios stop working.

Repair charges for table-model radios are $35 for units made after 1934 and $45 for those built prior to that year, plus parts. For consoles, the repair charge is $45 for a basic radio, $55 if it has a built-in record player, and $65 if it has FM, plus required parts.

"We figure that it's going to take certain amount of time to find out what's wrong with a radio. We've determined our labor, and the flat-fee servicing makes the most sense for us and our customers," Hofeld said. Cabinet refurbishing runs $50 to $60 for most table-model sets and $100 and up for consoles.

A visit to Antique Radio Store makes a great afternoon no matter what your level of interest in radio is. There are antique radios aplenty, of course, but the shop also stocks a library of tapes of classic radio shows, books (both technical and about radio's history), gramophones, and hundreds of smaller pieces of radio memorabilia.

The shop offers a wide variety of antique-look-alike radios—modern, solid-state radios housed in faithful plastic-reproduction cabinets that look as if they'd been made 50 years go. Hofeld says the reproductions are very popular with people who want to capture nostalgia, but want the dependability of transistors and integrated circuits.

Those with a technical bent will find electronics kits, components for cat's whisker crystal sets, and older test equipment for sale, including tube testers.

"I've always said that these things are only a half-point more honest that a slot machine," Hofeld laughed, slapping his hand on the large do-it-yourself tube tester that's the first thing you see when you enter the store.

"You used to find these in every drugstore around. They were usually set up so that even a tube delivering 60 percent of its maximum emissions would register 'weak' on the scale. ... What customers didn't know was that such a tube would work perfectly for a long, long time to come. The drugstore got a cut of the tube sale for allowing the machine on the premises. Some of the larger stores saw so much money from the tube sales that they actually purchased their own testers to up the profit margin."

The tube testers Hofeld has for sale are accurately adjusted because they're purchased by radio buffs of every stripe who have tube-based gear at home and who relish the fixing as much as the listening.

"There's an old saying that 'real radios glow in the dark,'" Hofeld said. "We're going to keep doing our best to make sure they continue to glow."

Antique Radio Store, 8376 La Mesa Blvd, La Mesa, CA 91941, (619) 668-5653

ASK BOB

ANSWERS TO YOUR RADIO QUESTIONS

Bob Grove, WA4PYQ
bob@grove.net

Q. Would it be possible to defeat the "house arrest" collars by detecting their frequency, then activating a small transmitter on their frequency? (Tom McCrea, Pocono Lake, PA)

A. It's a little more complicated than that; according to one manufacturer, the signal is digitally encoded. However, it should be possible to decode the complex waveform of the emission, duplicate it, then use the pattern to modulate a small transmitter on the same frequency while the detainee takes off.

Q. I live within two miles of seven FM transmitters. How can I do FM DXing without overload interference? (Pertti Ayras, Kaarina, Finland)

A. This is a problem common to scanner listeners as well. Conventional tuned trap filters are not successful for so many frequencies. (1) Try erecting a high gain, directional, beam antenna on a rotator; (2) inquire of various FM receiver or tuner manufacturers the dynamic range of their radios, choosing the one with the highest number (+30 dBm would be good); (3) move.

Q. After listening to Air Force communications on shortwave, I get the mental image of thousands of military installations and aircraft with noise and static blaring in the background. Is this a valid assumption? (Ed Schwartz, Chicago, IL)

A. Yes, according to our intrepid utilities editor, Larry Van Horn. He says they do what he does in his office: sit next to the receiver with its squelch open, mentally tuning out the static while listening for calls.

Q. I noticed that the case of my scanner gets hot, and when I looked inside the case I found a transistor that is very hot. Is this normal? (Michael Denney, Carrollton, GA)

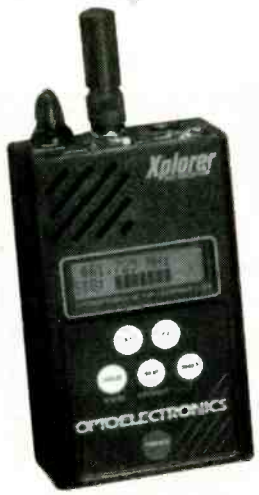
A. Yes. That is the voltage regulator and it dissipates a great deal of heat as it reduces the recified voltage of the power supply to lower working voltages for the radio. It is connected to the radio's cabinet which acts as a heat sink to draw the destructive heat away from the transistor.

Q. The FCC website has FCC forms available as Postscript files which they recommend be downloaded on a laser printer. Could I use another printer, or would special software be required? (Ted Consult)

A. The laser recommendation is for clarity or the print. Any printer working on your computer can be used, just so long as the FCC can read it!

Q. What is the best way to connect an outdoor FM antenna to a por-

Bob's Tip of the Month



Opto Xplorer Cellular Restoration

We would like to thank George Philips of New York for his step-by-step directions which restore cellular frequency coverage to the Optoelectronics Xplorer.

(1) Turn on the Xplorer and set CIV to go into "XPLORER," then "CONFIGURATION."

(2) Set baud rate to 9600 and CI-5 address to B0.

(3) Connect the serial cable between the Xplorer and your computer comm port.

(4) Run the program "CIV.EXE" and enter the following hex codes all on one line, each pair separated by one space: FE FE B0 E0 7F D6 78 19 52 27 96 34 45 88 01 FD, and press ENTER.

The legend should respond with the code: FE FE E0 B0 FA FD. Verify by switching the Xplorer off, then on again; the display should read *XPLORER*. If not, try again.

George advises that the squelch level should be set between 3 and 5 bars for optimum sensitivity.

table radio using a telescoping antenna, but which has no external antenna jack? (Also Ted Consult)

A. I've done it by removing the radio's back, then running a short piece of coax between the whip's base and a jack which I installed on the back. The coax center conductor is attached to the whip's base at one end and to the center pin or tip of the jack at the other. The coax shield should be soldered to the jack's outer barrel connection at one end, and to the radio's ground foil or a chassis-connecting screw lug on the other.

If you are antsy about tinkering with the radio's guts, you can wrap the center conductor of the antenna's coax dowlead around the tip of the fully-compressed whip. This may work without even having to attach the shield braid to cabinet hardware like a jack nut that is connected to the circuitry.

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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KENWOOD R-5000, excellent condition, improved AM filter, box, manual. Only $550—I will pay shipping. Call (413) 549-5537, sageorge@amherst.edu.

YUPITERU MVT 7100. New in box including all accessories. Call Fred (312) 467-9810 daytime or (708) 352-0808 evening.

OPTOELECTRONICS Scout Model 40 and R-10 Intereceptor. Mint condition in original boxes. $500 takes both units - (701) 282-0448.

AOR AR3030 General Coverage Professional Receiver, Collins Filter, 100 channels, AM/FM/FAX/SSB/CW modes. $799 new, mint, sacrifice $485. C. Keith (407) 260-6027.

ICOM Radios, R-7000 & R-71A. Call Gary (805) 529-5736.

BEARCAT Handheld BC2500, $350. REALISTIC Pro 2026 Mobile Scanner, $200. BEARCAT BC890 Base, $225. (All new in boxes and cellular capable.) Mike (401) 253-4392.

For Sale: REALISTIC DX-380. Boxed w/ manual. Three-star honey! $75. Delivered. Tom (423) 877-7270. 3107 Elmore, Chattanooga, TN, 37415. E-mail, hammett_tom@al.cps.k12.tn.us I would like to buy, YB-400.

For Sale: AR1000XLT, $200. Wanted: Spectrum Display, TV adapter (IC-R7100). (714) 564-9010.

LETTERS

Continued from page 4

• *"MT* is a thoroughly enjoyable and informative read and generally I agree with your findings and views. However, I do take issue with your comments on the **Ramsey FM-10** in the August 'What's New' column.

"A couple of months ago, I built an FM-10 so that I might listen to my cable TV music service around the house and while working in the yard. The parts were of high quality, the assembly instructions were clear, and the kit went together seamlessly and worked great from the get-go. I set it on vacant 98.7 and after three months of more or less continuous operation, it is still on 98.7!

"Perhaps you might want to take another look at this fine product."

—*Jerry Yares,* Pensacola, FL

• "In the September issue of 'Communications,' a story on **police in Los Angeles** appears under the heading, '800 MHz Scanning News,' which goes on to describe difficulties some officers are allegedly experiencing with the batteries for their portable radios. The radios in question, which may or may not have problems, are indeed Motorola UHF/UHF-T Astros. However, they are *not* 800 MHz.

—*Brian Humphrey,* Santa Susana, CA

BayGen Update

Tracie Carillo, Director of BayGen USA, adds to last month's review of the Freeplay radio: "The factory had originally produced the Freeplay with the 3 - 12 MHz shortwave bands (Model A). We now have available the same radio with the 5.8 - 18 MHz bands (Model B). The price of the radios are the same.

"Both of these radios are also available with a shortwave antenna which fits into a jack at the back of the unit. This replaces the DC jack currently included in the models. These units must be pre-ordered."

Happy Thanksgiving to all from the staff at *Monitoring Times*, your personal source for communications information!

— *Rachel Baughn*, mteditor@grove.net

CLOSING COMMENTS

By Bob Grove, Publisher

Reporting What You Overheard — Is It Ever Legal?

Some correspondence from *MT* reader K. Forsyth of Fresno, California, piqued my consciousness about a dilemma many of us have faced: Are there some things we overhear on the communications channels which really need to be revealed to other parties? As an avid scanner listener, reader Forsyth agreed with an editorial in the September 10, 1996, issue of the *Fresno Bee* which alluded to criminal incidents which either never appear in print, or which are given very brief mention and no follow-up.

The editorial writer specifically cited a drive-by shooting at police officers, an elderly man who died while resisting arrest, and a SWAT team shooting of an elderly woman who barricaded herself into her own house. Is this a matter of too much news in too little space, editorial discretion, or unwillingness by law enforcement to release official information? The spectre of "police coverup" is often charged by citizens concerned with the "big brother" syndrome and police unaccountability.

Many, if not most, scanner listeners have heard incidents involving law enforcement that sounded quite serious, yet never appeared in print. What happened to the news? Certainly, law enforcement agencies want themselves to look good; that's natural. They will release complete details of successful investigations and arrests. But what happens when a bust goes wrong? Do we deserve to know about that, too?

Just how do the media learn about incidents of public interest? Tips, both attributable and anonymous; inquiries of the public affairs officers; direct observation; news releases from the agencies; and lastly, monitoring of police radio communications—and that's where the trouble begins.

The 1934 Communications Act forbids the disclosure or personal use of information overheard on the airwaves. In other words, if you hear a police action in progress, you can't tell a soul; if you overhear two businessmen discussing an impending stock split, you can't call your broker and cash in. Ideally, from a legal standpoint, even if you hear communications directly concerning *you*, you can't react. Perhaps the operative words here should be *may not* rather than *can't*!

News media use scanners to get their scoops, then call the agencies involved for the official, publishable stories. But what if *you* catch a drug deal going down? Or the planning of a heinous—or even low-level—crime? The law is also very specific about that: If you have information relating to a committed crime, you are required to report it to appropriate law enforcement officers. Notice, however that this relates to a crime which has already been committed, not to a crime still in the planning stage, even though it is illegal in many states to plan a crime.

Statutes vary from state to state. A local law enforcement officer whom I contacted said that the tip should be turned in anonymously; a simple phone call from a pay phone, for example, and a follow-up call placed later to see if there is any additional information the tipster could provide. Such hearsay evidence could not be admitted at a trial, but it would be an important lead during an investigation or, if early enough, could prevent the commission of a crime.

A local attorney agrees, while adding that listening in on the radio portion of a private telephone conversation is a violation of state law as well as the Federal Wiretap Act (Title 18), and you could be liable for civil suit as well as criminal prosecution. However, placing an anonymous call from a pay phone would probably provide immunity from any such action. A local district attorney agrees, adding that, in his jurisdiction, anyone who came forward and openly admitted the conditions under which he illegally obtained important information relating to a crime would not be prosecuted.

We encounter many situations in which we must let our conscience be our guide. That usually works well.

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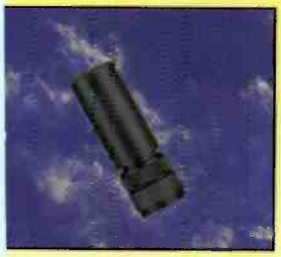
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