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Global Rhapsody .................................................. 14
By John Figliozzi

The scope of music available on shortwave is vastly superior to that offered by domestic broadcasting. The editor of The Worldwide Shortwave Listening Guide offers MT readers a compendium of music programs that will broaden your musical horizons.

The Multi-band, Multi-resonant Antenna ................. 18
By Peter Barker

Unlike other multiple frequency resonant antennas, this design does not require the tedious construction of coils and capacitors, but simply calls for measuring out lengths of wire of almost any gauge and making a few solder connections. Squeeze the best out of low propagation conditions whether you are receiving or transmitting.

Monitoring Montauk ............................................. 22
By Ed Hesse

An enjoyable vacation spot year-round, Montauk is located on the tip of Long Island — next stop is Europe! Montauk is a great place for the all-band monitor, from longwave to VHF. Bring the family, too; they’ll enjoy the historic lighthouse, the beaches, and the shopping.

Racing Freqs: Cool Running ................................. 26
By Mike Bryson

It’s Cool Running at Charlotte as our Racing Freq takes us to North Carolina’s Charlotte Motor Speedway for the Coca-Cola 600 on May 25th. Cool races for the budget-minded are also found at the Busch Grand Nationals. Preprogram your radio with these Charlotte area frequencies.
Reviews:

Among the many kits put together by Ramsey Electronics is an active loop antenna called the Signal Magnet SM100. Our reviewer this month put the project together and found it an excellent shortwave performer and an exceptional value (see p. 88).

Occasionally, Magne finds a Chinese portable receiver that performs surprisingly well for a amazingly low price (how's $40 sound?). The trick is to find it and know what brand name to look for. Take a peek at our picture of the International MT-718 — if you can find a receiver that looks like that, it may be one and the same. Buy it: it could make a great gift or travel receiver. (See p. 92.)

Parnass picks up some loose ends in the Scanner Equipment column this month (p. 94), with additional notes on the Icom RS500, Uniden BC200XLT, BCT-7, BC9000XLT, BC3000XLT, Radio Shack PRO-2005, PRO-2036!

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The Grove/RCMA Agreement

A Warm Welcome to RCMA

As editor, I would like to take this opportunity to welcome RCMA members to the ranks of Monitoring Times subscribers. Many of you are already friends and/or subscribers, and you know MT covers radio, dc to daylight. It's a different focus from the dedicated scanner coverage at which the RCMA Journal excelled, but we welcome your input and information and will put it to good use for all to enjoy.

This agreement with the RCMA Board of Directors is a nostalgic one for Bob Grove, whose early contributions to the monitoring hobby were as an editor for the club's newsletter. In exchange for honoring the RCMA unfulfilled subscriptions, Grove Enterprises receives the final RCMA membership/mailing list and all rights to the RCMA logo. Grove is not responsible for any outstanding debts of RCMA.

At this time, Monitoring Times has no plans to make use of the respected RCMA logo. According to Bob Grove, "Should there ever be a revival of the RCMA club, we will be happy to return the logo to its official board, but we have no intent to use or to sell the logo to any other body."

Bill Mauldin forwarded one response from the RCMA member, Ray Hill, who said, "Somewhere, it does not surprise me that Bob Grove would help out. Things like this make me glad I am a subscriber to Monitoring Times. For those former RCMA subscribers, who do not yet have a subscription to MT, they will be pleasantly surprised."

Thanks, Ray; we do our best!

Gifer Gone?

Another pioneering radio entity in which Bob Grove played a part is Gifer Enterprises, which seems to have fallen on hard times. Although no official statement has been made, Gifer's phone is no longer being answered and its Web page has been removed. Bob Grove, Larry Miller, Larry Van Horn, Gerry Dexter—all long-time DXers—are unanimous in their reactions to its apparent demise: "It's the end of an era."

Gifer, owned by Jean and Perry Ferrell, published the Confidential Frequency List. Bob edited at least two editions of the book before he began his own company. More recently, the business has been run by Paul Lannuier (following Perry Ferrell's death in an auto accident), while Jean Ferrell retained rights to the book.

With special issues that needed to be addressed over the past two issues, we've not had room to run your letters. I want you to know that they are read and are much appreciated. We'll get back to sharing some of them in the coming months. Meanwhile, let us know what you're thinking by writing to "Letters," PO Box 98, Brasstown, NC 28902, or e-mail to meditor@grove.net.

—Rachel Baughn, Editor
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While the name RELM Communications (formerly Regency Electronics) may not make you think of scanners, it soon will. We're re-entering the scanner market with top-quality, professional scanners. With that goal in mind, we're excited to introduce the HS 200 portable scanner. The HS 200 covers 13 bands including aircraft and 800 MHz. Other features include:

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Pictured Right:
The HX 1000 was a popular scanner under the Regency Electronics name.
Amateur Obsession

There are thousands of ham radio operators in the United States. Their level of enthusiasm for the hobby varies. Some get their license but never go on the air; others begin a single-minded pursuit of all things amateur, including vanity call signs and license plates with their call letters. Few, however, come close to Richard Burton. Burton has even gone to federal prison over ham radio.

According to the W5YI Report, the story begins in 1981 when Burton, then licensed as WB6JAC, got in trouble with the federal government by cursing on the air. His license was revoked and he was ordered off the air. That didn’t stop the 51 year old who kept on talking and that landed him in federal prison for 6-1/2 months.

When his probation ended in 1989, Burton took a test for a new license. But before the license could be granted, government investigators caught him illegally on the air again. This cost him $2,000 and another year’s probation. In 1993, he was again caught on the air and sentenced to another seven months in jail.

Last fall, after being denied a ham radio license for 15 years, Burton slipped into a testing center and passed the test to get a ham radio license. Before government officials realized who he was, an FCC computer spied on a license, KB6GKS. Red-faced officials quickly revoked the license. But did that stop Burton from going on the air? Rumor has it that Richard Burton, ex-WB6JAC, ex-KB6GKS, is now back on the air again—illegally.

More Bad Car Phone News

Using a car phone while driving quadruples your chance of getting in an accident. In fact, according to researchers in Canada, talking on a car phone behind the wheel is about as risky as driving while close to legally drunk—even if you are using a “hands-free” system. The risk drops to normal as soon as the driver hangs up.

The study was based on 699 Toronto-area drivers who had cell phones who were involved in crashes that resulted in substantial damages but no injuries. The number of cell phones grew 1,685 percent from 1986 to 1995 with 34 million people who now drive and talk.

Political Grandstanding or Cell Phone Crisis?

Could the recent congressional subcommittee hearings on cell phones and scanners have been nothing more than political grandstanding? It could be, if one newspaper report is to be believed. According to the Seattle Post-Intelligencer, cell phone companies are “rushing to introduce digital (un-scannable) service.” The primary reason for the “rush” isn’t to avoid scanner listeners and it wasn’t prompted by the hearings.

U.S. West, for example, had already been testing their digital cellular telephone network for three years before the hearings. And the prompt came from market forces, not politicians and lobbyists, performing before the cameras like trained dogs. Reporter Jim Erickson says that the move to digital was “in advance of a wave of competition from companies that have won licenses to provide wireless communications services [through recent FCC frequency auctions].”

What makes the story odder still is that despite the advantages of digital, customers have not been “rushing” to get digital cell phones. In fact, says Erickson, AT&T Wireless Services introduced the digital phones back in 1993 but “customer acceptance was low.”

More Industry Woes

Grundig makes a decent shortwave radio but it apparently isn’t doing all that well in the world of business. Chief executive officer Pieter van de Wal, who took charge of the company last year at the behest of Philips Electronics — which owns 32 percent of the struggling company— is stepping down. Philips has been exercising management control over Grundig for twelve years but announced last month that it, too, is pulling out.

Analysts estimate that Grundig, based in Fuert, Germany, had a loss of about 300 million marks ($185.5 million) on sales of three billion marks 1996. This would be Grundig’s sixth straight annual loss. Van de Wal had hoped that he could turn the company around by slashing Grundig’s work force by half, from 12,000 a year ago to about 6,000. He also announced the sell-off of Grundig’s security systems business and shifted television set production outside of Germany.

Like other makers of consumer electronics in Europe, Grundig has been clobbered by brutal price wars, declining demand, and stiff competition from Asian producers. “It seems,” says Anita Farreol, a technology-industry analyst at Merrill Lynch, “there’s a little bit of panic at Grundig.”

Alleged Phone Eavesdropping

A Kirtland, Washington, police dispatcher and her mother are being sued for $10,000 after being accused of using a scanner to listen in on their neighbors’ cordless telephone calls. Callie, Gregory, and Linda Burkhart claim that the Denise and Linda Starrs secretly listened to their phone calls and used the information “for personal gain.” The papers were filed in U.S. District Court.

The lawyer for the plaintiffs said that he could not disclose details of the suit but that “if you listen in on a phone call and disclose the information, it’s a felony.” He added that the Starrs had a large antenna on their house “to get more power to their scanner.” Several other people, including “John/Jane Doe and John/Jane Roe” are also listed as plaintiffs “in case there are others who were either victimized or listening in.”

Phone Foils Robbers

Four teenagers are under arrest after a Lake County, Ohio, sheriff overheard a friend of the suspect boast that his friends had
committed a robbery. The conversation “fit like a piece in a puzzle.”

Police said that one teen robbed the cashier while another waited inside the store. Two others were in a stolen getaway car. The plan was foiled when the vehicle got stuck in a drainage ditch and bailed out to avoid Ohio Highway Patrol troopers.

“I think they fancy themselves as modern-day desperados,” said Detective Lt. Loomie Sparkman. “They’re just goofs.” The robbery netted the four $360.

**Tower Tales**

You may remember the date: August 18, 1991 — in fact you may have heard the noise. On that summer day, the world’s tallest structure — a 2,120 foot radio tower in Poland — came crashing down. The antenna belonged to Radio One, a longwave station. Today, Radio One’s tower has still not been rebuilt, despite a large and loyal audience that once ranged from London to Libya.

The project has been blocked by one woman, Teresa Skorzynska. Skorzynska’s husband died of cancer, an illness she attributes to radio waves from the tower. And in the intervening six years, she has waged a one-woman war against its rebuilding.

“We have exact data,” says Mrs. Skorzynska. “People who worked near the antenna have gone mad. Guards have died of bone cancer. Babies were born with birth defects. Children fainted at school. They keep telling us that radio wave don’t hurt us. We know they do.”

Krzysztof Michalski, Chairman of Polish Radio, calls the furor “Chernobyl syndrome.” Health in the antenna zone is poor, he says. Fuming trucks roar past; a chemical plant seethes nearby. “They drink their own sewage,” says Michalski undiplomatically.

Last September, a Warsaw judge finally rejected Mrs. Skorzynska’s case against the antenna. Polish Radio’s win was short-lived. Within two months, another Polish judge noted that Radio One’s building permit was filed under an old building. The whole thing was thrown out and must now start over again. It will take years.

**Digital Michigan**

State Police in Michigan have announced that they are “leapfrogging toward the future” with the unveiling of a $187-million 800 MHz digital radio system. The system is up and running in parts of Grafton, Clinton, Shiawassee, Eaton, Ingham, Jackson, and Hillsdale counties.

So far, 22 towers have been constructed: when the system is fully operational statewide in 1999, there will be 181 towers. The system will also be available to county and local departments as well. Even conservation officers, park rangers and highway workers will be unsuccinnable.

**Salt Lake Scanning**

Salt Lake patrol officers won’t be asking the dispatcher for stolen car checks or getting outstanding warrants — at least you won’t hear them on your scanner. Portable laptop computers are now being installed in 75 police cars. Says Tom Zoellner of the Salt Lake Tribune, “the blips on the screen are supposed to replace the babble on the radio.” Salt Lake police hope to have all non-emergency traffic going through computers by the fall of this year.

**WGY Birthday Ad Stirks Racial Flames**

African-American leaders are in an uproar over a newspaper ad run by radio station WGY in Schenectady, New York. The ad, which touts the station’s 75th anniversary, depicts an aboriginal warrior, spear in hand and dancing. The accompanying caption says that staying young in radio requires “an almost primal disregard for dignity or civilization.”

“The ad was despicable, and the wording was insensitive and offensive to a person of color,” says Anne Pope, president of the Albany branch of the NAACP. Other black leaders went further, saying that the ad was “a deliberate attempt to stir racial tensions.”

They demanded an apology from WGY and the firing of talk show host Mark Williams, who they believe is “part of the racist nature of some of WGY’s programming.” Williams responded on the air, saying that the black leaders were racists and were “twisting [the ad around] to fulfill their own racist agenda.” WGY apologized, saying that “we never intended to offend anyone.”

“Communications” is edited by Larry Miller. We also thank the following members of the Communications Monitoring Team who look for, clip and send in copies of radio-related stories from their local newspapers: Anonymous; Chet Copeland, Washington, DC; Kenneth Dowst, Hartford, CT; Leslie Edwards, Doylestown, PA; Peter Greene, Eastlake, OH; Richard Johnson, White Deer, PA; Maryanne Kehoe, Atlanta, GA; Robert Kissel, Swartz Creek, MI; Hue Miller; Ira Paul, Royal Oak, MI; Brian Oakley, Ft. Worth, TX; Edward Schwartz, Chicago, IL; Richard Sklar, Seattle, WA and Dennis Taschner, Trenton, NJ. We also consulted the following publications: National Scanning, Wall Street Journal and WSYI Report.

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**101 WAYS HOW NOT TO CONDUCT AN ADVERTISING CAMPAIGN**

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How firm a foundation?
Headquartered in the Bush House in London, the BBC is facing major changes to its worldwide operations.

Shaking the Foundations of the BBC

By Jeff Chanowitz

As regularly as the traditional hourly chimes of Big Ben and the announcer proclaiming “This is London,” generations of listeners have relied on the BBC World Service for high-quality news and programming and comprehensive coverage of breaking news events around the globe. However, the development of new broadcasting technologies, tighter budgets, and a new geopolitical landscape has caused the BBC to implement dramatic changes to its World Service operations, signalling a new direction for one of the most respected voices in international broadcasting.

From his office at the World Service’s headquarters located at Bush House in London, Graham Mytton, Controller, Marketing, World Service, talked to Monitoring Times about the BBC’s restructuring and other new initiatives the World Service is implementing as it heads into the 21st century.

Graham Mytton
Restructuring

For the most part, restructuring of the World Service operations has come about as a result of the financial constraints that are currently afflicting the BBC. Tony Hall, the Chief Executive for the BBC, put it candidly, “The broadcasting world is changing dramatically. Costs are rising, funding is flat or being reduced. We need to make sure that now and in the future we can afford those things that make the BBC’s journalism as a whole unique.”

With a 12 million pound budget deficit this year at the World Service and a need to make investments in digital technology, top management at the BBC proposed a merger of the BBC’s World Service and its domestic service in a move to economize.

Described as a “world disservice” and criticized throughout the British press, the proposed changes to the World Service caused an uproar over fears that the golden reputation the international service has built up over the last 60 years would be tarnished by the lower standards of its domestic operations. In response to the criticism, a “working group,” which was composed of members of the BBC and the British Foreign Office, was established to study the possible effects a consolidation would have on the BBC’s World Service news operations.

After several months of studying the matter, on October 12, 1996, the “working group” proposed 20 new measures designed to safeguard the quality of the World Service’s news operations. Instead of merging with the BBC’s domestic news service, the World Service’s news and live programming will be produced by a “dedicated unit” that will operate within the BBC’s news gathering operations. Also, using a trend in broadcasting called “Bi-media,” the “dedicated unit” will provide news coverage for both the BBC World Service radio and the BBC’s commercial international television service. While the English Service will feel the brunt of the consolidation measures, the overall impact of the consolidation will result in a reduction of 90 members at the World Service, reduce the output of the World Service’s Czech broadcasts to Europe, and eliminate 30 minutes of Portuguese and French programming for Sub-Saharan Africa. Also, the Cantonese service will reduce its transmissions by 30 minutes; however, this will be offset by placing the programming on the BBC’s internet site, www.bbc.co.uk/worldservice.

Sounding optimistic about the new proposal, Mytton indicated that “clear guides and requirements have been put in place so that the World Service’s programs will be of high-quality and range and meet the requirements of audiences world wide.” He remarked, “There are all sorts of ways in which this will work to the advantage of the listeners.” Mytton cited the advantages the World Service will have now that it can use the BBC’s domestic service as a resource and added that the old system was inefficient “as both domestic service and world service reporters would cover the same story.”

However, critics of the restructuring in the British press have pointed out that the BBC’s world television operation is run on a shoestring budget and the quality of its news service is commonly thought of as falling far short of the BBC World Service. It is feared that a consolidation of the BBC’s international television operations could jeopardize the World Service’s quality. The United Kingdom based magazine The Economist quoted an unnamed correspondent in a recent story, who worked for the BBC World Service and BBC’s World Television Operations, as giving a candid comparison of the two services. He remarked, “The World Service radio has far higher editorial standards and a far better ability to respond intelligently to breaking news than the BBC World Service.”

From a listener’s prospective, it will be hard to discern any immediate effect of the consolidation in the World Service’s broadcasts. While down-sizing is never a happy task, the ultimate success of the changes will be measured by the World Service’s ability to continue to provide listeners with the quality of news that has made it a yardstick of excellence for international broadcasting.

The BBC’s Diverse Programming

Despite the restructuring, the BBC remains committed toward producing high-quality programming. Mytton commented, “we are going to put a greater emphasis than
in the past on our news and current affairs programs.” Perhaps the best example of this programming is News Hour, an award winning program that consists of world news, headlines, in-depth reports, business updates and features. Contrary to its name, News Hour consists of three hour-long programs which are aired in separate time zones. Mytton describes the five year old program as a “great success” that has attracted many listeners to the World Service.

In addition to News Hour, the BBC offers top notch news coverage that is guaranteed to satisfy the most information hungry listener. These current affairs programs include Britain Today, News Day, News Desk, The World Today, and specialized reports targeted at Africa, Asia, Europe, and the Caribbean.

The BBC’s English service also continues to provide an impressive variety of programs ranging from The World Business Report and World Business Brief for financial news to Development 97, which provides the latest information about the economic and social situations of countries in the third world to Global Concerns, a program that informs listeners about the state of the world’s environment.

Music oriented programming also continues to be a strong aspect of the BBC’s output. Listeners’ can hear a diverse mix of programs that provide offerings in Classic, Jazz, Pop, Reggae, and Folk music in its programs MegaMix, Jazz Score, and Concert Hall, Folk Routes, World Ranking, Multi-Trak, and Country Style.

While little noticed by its listeners in the developed world, the BBC has also put a new emphasis on providing “education” programming in order to fulfill the informational needs of listeners in their daily lives. Mytton remarked, “The education programs are not of the typical instructional English language variety.” Listeners in the developing world can hear programs in languages ranging from Pashto to Arabic to Hindi that provide information about health issues, sex education, and drug addiction—information often unobtainable in their own media.

Another example concerns the unexploded land mines that remain a constant hazard as a result of the many conflicts that continue to affect Cambodia, Vietnam, Angola, and Afghanistan. The mines account for thousands of amputations and deaths yearly. To help prevent this on-going tragedy, the BBC ran two series of programs to help listeners identify and avoid land mines. One series, in Pashto, was directed to refugees returning to Afghanistan a few years ago; the other ran as part of the English stream just last year.

Mytton expressed the BBC’s commitment to its educational programs remarking, “These types of programs will be a very important part of the programming the BBC will do in the future.”

Perhaps the biggest change in the BBC World Service programming is its new drive to attract a bigger female audience. Mytton commented, “It’s a little known fact that the BBC’s audience is overwhelmingly male.” He added, “In some countries the BBC’s male audience outnumbers its female audience by as much as 19 to one...this is not an inevitable fact and reflects some of the kind of programming we are broadcasting.”

At present, the BBC is at work developing new types of programs aimed at tapping into this huge audience. To start this initiative, during 1997 the English service will launch a weekly news magazine, which is solely devoted to providing comprehensive coverage of women’s issues.

To obtain detailed information about the World Service’s English programming, listeners can refer to this month’s MT’s short-wave guide. A complete listing of the World Service’s programming (subscription price is $30 a year) is available in its magazine BBC On Air. The address to write to is: Dept. Sub. Room 207 NW, Bush House, Strand, London WC2B 4PH, United Kingdom.

Crisis Broadcasting

The true test of the changes at the BBC World Service will be its continued ability to provide high-quality news coverage of an international crisis, and to make an impact during the event. Mytton commented, “The BBC plays a very important role in conflict areas of the world.”

In Somalia, where a civil war has cost over one hundred thousand lives, the BBC has
responded by providing programming that gives listeners vital information, which is heard by at least 41% of the population. The World Service's programming is so popular that a British anthropologist reported that while she was on a bus on route to Mogadishu, the Somali capital, the driver pulled off the road and turned off the engine so that all the passengers could listen to the BBC.

One of the most popular programs on the Somali service is Missing Persons, a program that puts listeners in touch with relatives who have gone abroad. On the program, desperate appeals from individuals are aired on a regular basis. Not uncommon are heart-rending pleas such as this one: "Since my mother's house was destroyed, I do not know where she is. Tell my wife I'm alive ... I do not know if my children have been killed." Mytton asserted, "Our programs in Somalia are important to link up families."

The BBC, in conjunction with the United Nations, has also been instrumental in helping reunite families during the civil war and resulting conflicts in the East African countries of Rwanda, Zaire, and Burundi. Mytton commented, "The BBC is now providing special programs in Kinyarwanda and Kirundi languages for Rwanda and Burundi." At present, the limited research that can be conducted in the region indicates that the programs are very popular and have been a humanitarian life line for the families it has helped to reunite.

In the former Yugoslavia, the BBC has also played an instrumental role in helping reunite families in Bosnia. In addition to inaugurating the Macedonia service in 1995, the BBC's Croatian, Serbian, Slovene, and Albanian services have provided vital information to counter the government controlled media in the region. Often, the BBC has been the primary news source for listeners wanting accurate and unbiased news coverage of the Yugoslav civil war during the early 1990s and of the current pro-democracy demonstrations that are rocking Serbia's government today.

At present, the BBC's World Service's network of 250 correspondents, backed up by 50 news bureaus and the information obtained by the BBC Monitoring Service from radio, television, and news agency sources, continues to provide listeners with the latest information during a global crisis. It is little wonder that during the short-lived pro-democracy movement in China in 1989, students thought the World Service's programming to be so important that they publicly demonstrated their appreciation, Mytton commented, "We are growing in our programming in the former Soviet Central Asia." As Uzbekistan has been plunged into a civil war and strife continues between Armenia and Azerbaijan over the disputed enclave of Nagorno-Karabakh, the BBC has added broadcasts in Kazakh and

While jamming was also attempted by the former Soviet Union during the Cold War and in Iraq during the Gulf War, the BBC's programming was clearly being received by listeners, as witnessed by hostages coming out of Lebanon in the 1980s, by Mikhail Gorbachev during the attempted coup in 1991, and by one Russian listener who wrote, "I have listened to the BBC for the last 40 years, and I have been punished for that as have many Soviet citizens during a period of our history...I am writing for the last time to thank you for the moral support all these years."

Time for a New Focus

It is these external geopolitical and technological factors, in addition to internal restructuring, that have resulted in a number of the changes at World Service. First of all, with the breakup of the Soviet Union and the development of a bipolar political landscape, the BBC has refocused its broadcasts toward the newly independent countries that have emerged in the Caucasus and Asia regions. Mytton commented, "We are growing in our programming in the former Soviet Central Asia." As Uzbekistan has been plunged into a civil war and strife continues between Armenia and Azerbaijan over the disputed enclave of Nagorno-Karabakh, the BBC has added broadcasts in Kazakh and

Although the BBC is deeply interested in alternative methods of delivery, it remains committed to shortwave broadcasting. Shown is the BBC's Asia relay station in Thailand.
Krgyz to the languages of Azeri, Uzbek, and Russian, which are already broadcast to the region.

While there are no other plans for additional languages, Mytton did indicate that the BBC was currently examining “an expansion of its Arabic transmissions.”

**Relaying the BBC’s Signal**

As part of the BBC’s strategy of seeking alternative avenues to relay its signal globally, “We will continue to look for additional placement of the BBC on FM transmitters in various parts of the world,” said Mytton. One example of this strategy has been the recent opening of the BBC’s FM transmitter in Kampala, Uganda.

BBC program placement has also been quite successful in the United States. Currently, the BBC’s news and programming is carried on more than 120 radio stations throughout the country, making it the most listened-to international broadcaster in the United States.

Additionally, the C-Span Audio Networks in the (U.S.) and the World Radio Network (London, U.K.) currently provide listeners with the opportunity to hear the BBC via satellite with a digital quality signal. According to C-Span audience surveys, the sole reason for many in its audience to subscribe to the audio service was to receive the BBC with a high-fidelity signal. This strategy has been equally successful in Europe. In Finland, where the Service only counted 50,000 listeners via short and mediumwave broadcasts, the use of rebroadcasting via local radio stations has increased the BBC’s audience tenfold.

In response to its success of placing its programs on FM stations, Mytton announced that the BBC would “explore the possibilities of launching a second English service which would be available via satellite to rebroadcasters around the world.” In addition, the World Service is also seeking to fund research to develop a digital audio broadcasting service that will enable international listeners to hear the BBC with a CD-quality reception on a new generation of radio receivers.

**Shortwave Broadcast Plans**

By no means does this mean that the World Service is abandoning its commitment to shortwave. Mytton commented, “People say that shortwave is dead or dying ... this is rubbish because the overwhelming majority of our listeners continue to listen to the BBC via shortwave.”

As if to reinforce this message, Mytton announced that one of the top priorities of the World Service is to replace its shortwave transmitter in Misira Island, Oman. He asserted that, “more listeners receive the BBC via Misira than any other transmitter, including the BBC’s transmitters located in the United Kingdom!”

With the addition of its new 250 kW relay station in Nakhon Sawan, Thailand, the BBC continues to reaffirm its commitment toward shortwave broadcasting through the use of its 40 transmitters, which are located at Rampisham, Woolferton, and Daventry in the United Kingdom, and a network 95 relay stations located globally in Antigua, Ascension, Berlin, Cyprus, Singapore, Lesotho, Seychelles, and in North America at Sackville, Canada. It should be no surprise that the BBC “came in the best” when Gorbachev was reported to have listened to several shortwave broadcasters during the failed Soviet coup in 1989.

The BBC is also relayed 24 hours a day via satellite on AsiaSat 2 for coverage of Central Asia, South Asia, and the Asia-Pacific region, and to Europe and the Western CIS via Eutelsat F4.

**The BBC’s Future Role**

Beyond new technology that is transforming international broadcasting, Mytton indicated that the BBC’s core mission continues as always, “playing a role (in countries) where information is in short supply ... and to provide information that is free from political interference and commercial pressures.”

With the explosion of information globally as a result of new technologies such as the internet and the fax machine, the BBC’s role in the 21st century might evolve into a kind of information gatekeeper.

**Last Bastion of Civilization?**

BBC radio received a bizarre tribute when a historian said the end of British civilization in a nuclear war would be official when the BBC ceased broadcasting.

In the preface to a book called *Muddling Through*, Peter Hennessy said the final check by commanders of Britain’s nuclear submarine fleet in the north Atlantic after a pre-empive nuclear strike would be to turn on the BBC. A deadly hush on the airwaves would be the signal for submarine commanders to open envelopes containing their final instructions for retaliation from the prime minister.

“If the Trident commander could not pick up *Today* (a BBC news programme), that would be that,” he told *The Independent* newspaper. He would then have to decide whether to launch the missiles, or go off to New Zealand. He would know there was no point in going back to base,” Hennessy said.

The professor of contemporary history at London’s Queen Mary and Westfield College described the procedure as “a final if macabre tribute to a broadcasting service sans pareil.”

*Based on a Reuters news story submitted by David R. Alpert, KB2LUM*
Radio technology is about 100 years old. Personal computers are about 20 years old. Two significant technologies that changed the world. Now united in WINRADIO. The world's most surprising communications receiver.

The WiNRADiO card: plug it in and transform your PC.

The WiNRADiO software: enjoy the virtual control panel.

The optional WiNRADiO World Station Database Manager: includes over 300,000 frequencies, fully integrated with WiNRADiO.

"The sensitivity seems to be pretty good across the whole range... unique and useful monitoring product...worth a serious look."
Monitoring Times, October 1996

"...high quality workmanship, good reception and easy usage."
Chip, November 1996

"WiNRADiO has enticing possibilities... The manual is an exciting book not only because of its beautiful cover, high quality paper, and easy instructions, but also because it contains a mix of operating and technical informations about various aspects of radio you might have forgotten or never knew."
World Scanner Report, Volume 6, No. 7
Ah, Music and Shortwave Radio ...

Where, surprisingly, the variety of available music surpasses that of any other domestic medium, providing listeners with a kind of ...

To an audiophile, the mere thought of listening to music on shortwave radio might be enough to set teeth on edge. But the true lover of music has to take a more open-minded point of view.

The simple fact is this: The scope of music available on shortwave is vastly superior to that offered by conventional domestic media. And given decent signal levels and even minimal efforts to improve the audio output of one's receiver—even if only by use of a quality set of headphones or a powered accessory speaker—the sound quality can be made truly acceptable to all but the most sensitive ears.

Music programs represent a fraction more than 11% of the titles found in The Worldwide Shortwave Listening Guide database, which I compile. That number, even without considering programs in languages other than English, exceeds the space available in this column. So, inasmuch as some types of music are readily accessible from domestic broadcasters as well, as shortwave, we will concentrate here on the genres and programs that offer shortwave listeners a clear alternative.

The listings presented are intended to provide a useful compendium of music programs that will broaden your musical horizons. To find the frequencies and parts of the world to which these programs are transmitted, consult the Shortwave Guide section of this magazine. Times and days are in UTC. While the programs and times noted were correct at deadline and efforts have been made to reflect regular seasonal changes, stations of course can make changes at any time. An asterisk (*) denotes a time listing that will likely become one hour later with the change from summer to standard time in the autumn.

**Folk and Non-Western Indigenous Music**

**Radio Australia**
- *Blacktracker* (Aboriginal music and performances hosted by Mal Honess) on Wed. at 0531 and 1731.
- *Music Deli* (music from a variety of cultures—primarily Asia and the Pacific) on Fri. at 0531 and 1731.

**All India Radio**
- The schedule of All India Radio relies heavily on the presentation of Indian and subcontinental music in all its forms, usually in five to fifteen minute blocks inserted between informational programming. I won’t pretend to know the intricacies involved in distinguishing devotional music from light Karnataka or Hindustani classical music. The Indian cinema is wildly

By John Figliozzi
popular and this is reflected in many of the music programs on All India Radio which regularly present popular film songs. My personal preference happens to run toward the classical instrumental genre.

- Rather than list each of the programs (there are at least 27 named music programs on the air on 99 different occasions during the week), be assured that you can hear Indian music on All India Radio virtually any time you choose to tune in.

**BBC**
- *Andy Kershaw’s World of Music* (a cosmopolitan mix of sounds) on the America/Europe stream Sat. at 0830 and 2330; the Africa stream Fri. at 1130 and Sat. at 1830; the Asia stream Mon. at 1830, Thu. at 1030 and Fri. at 0730.
- *Jive Zone* (showcasing African contemporary music) on the Africa stream Sat. at 1130 and Thu. at 1615.

**CBC Northern Quebec Service**
- *A Propos* (the only program available to listeners outside Quebec that showcases both traditional and contemporary music of Quebec) on Sun. at 0205.*
- *Music in Nunavik* (featuring Inuit musical performances) on Fri. at 0105.*

**Channel Africa**
- *Sounds of Soweto* (today's vanguard of South African popular music) on Mon. at 0438 and Sat. at 0335.

**China Radio International**
- *Music From China* (Chinese traditional music and folk songs) on Sat. at approximately 1240, 1340, 1440, 1540, 1640, 1740, 1940, 2040, 2140 and 2240; Sun. at approximately 0040, 0340, 0440, 0540, 0940 and 1040.
- *Song of the Week* (a selection from Chinese traditional to contemporary music) on Sun. at approximately 1245, 1345, 1445, 1545, 1645, 1745, 1945, 2045, 2145 and 2245; Mon. at approximately 0045, 0345, 0445, 0545, 0945 and 1045.

**HCJB**
- *Musica del Ecuador* (Andean folk music hosted by Jorge Zambrano) on Mon. at 0630; Fri. at 0800, 0930 and 1930; Sat. at 0130, 0430 and 0830.

**Radio Korea International**
- *Echoes of Korean Music* (selections of traditional Korean music) on Sun. at 1210, 1610, 1910 and 2110; Mon. at 0210 and 0810.
- *Notes of Nostalgia* (more Korean traditional music) on Fri. at 1045*, 1245, 1645, 1845*, 1945 and 2145; and Sat. at 0245.

**Radio Canada International**
- *Global Village* is a unique program presenting on-site reports (many from listeners) and music from cultural events around the world. It has an eclectic schedule arriving for six or eight weeks at a time and just as quickly disappearing. Most recently, it was carried Mon. at 1210* and prior to that Sun. at 2230*.
- *Radio Portugal International* (Portuguese music-folk to modern) on Tue. at 1345* and 2015* and Wed. at 0345*.
- *Spanish Foreign Radio* (REE) (today’s vanguard of Spanish folk music series on Sun. at 2122* and Mon. at 0022, 0122 and 0522.
- *Radio Netherlands* (music 52/15) on Tue. at 0531 and 1400; Wed. at 0132, 1132, 2132, 0432*, 1815* and Sun. at 2200*.
- *Radio New Zealand International* (He Waita) (traditional and contemporary Pacific Island and Maori music and musicians) on Wed. at 0405, 0717 and 2115.
- *Swiss Radio International* (Sounds Good) (Swiss music) at 0115, 0415 and 1345* on the Sun. after 3rd Sat. of each month; 0445 on the Mon. after third Sat. of each month; and at 0615, 0915, 1115, 1315, 1515, 1715*, 1815 and 2015.

**Voice of America**
- *Music Time in Africa* (traditional and modern African music hosted by Rita Rochelle) on Sun. at 1730 and 1930 on the VOA’s Africa Service only.

**Voice of Free China**
- *Jade Bells & Bamboo Pipes* (traditional Chinese music hosted by Carson Wong) on Mon. and Fri. at 0215, 0715, 1215 and 2215; Tue. at 0315.

**QSL from Radio Egypt showing the Cairo broadcasting facility.**

**Voice of Russia**
- *Folk Box* (traditional music from Russia and its nationalities) on Sun. and Fri. at 2332*; Mon. at 1432*, Tue. at 0132*, Tue. and Wed. at 1132*; Wed. and Sat. at 0832*; Thu. at 0432* and 2032*; Fri. at 1732*.
- *La Voix de la Louisiana* (Cajun/Zydeco music with a French announcer) on Mon., Wed. and Fri. at 2200*; Sat. at 2130* and Sun. at 2100*.
- *Louisiana Jake Box* (Louisiana music) on Wed. at 1900*.

**WWCR**
- *American Polka Show* (polka music) on Mon. at 2100* and Sat. at 1400*.

**Jazz**

Even though jazz is so quintessentially American in its origins, it curiously is the least represented music format on North American domestic radio stations. Fortunately for you and me, shortwave radio offers a nice selection of programs devoted to this art.

**Radio Australia**
- *Jazz Notes* (the best of Australian jazz hosted by Ivan Lloyd) on Tue. at 0531 and 1731.

**BBC**
- *Jazzmatazz*, a new BBC approach to jazz programming, begins in June and will pre-
sumably run during the same time frames and be hosted by Malcolm Laycock, as is the eight part Jazz Expo anthology series which began in April. Listen on the America/Europe stream Sun. at 0730 and Mon. at 1130; on the Africa stream Tue. at 1130 and Thu. at 0830; and on the Asia stream Mon. at 0630 and Tue. at 1030.

**CBC Northern Quebec Service**
- **Jazz Beat** (studio sessions and concert recordings) on Mon. at 0305*; (This program can also be heard at 11:05pm local time in each North American time zone on CBC Radio network medium wave frequencies.)

**Channel Africa**
- **Africa: All That’s Jazz** on Sun. at 1530 and Tue. at 1730.

**Deutsche Welle**
- **Jazz!** on Fri. at 2140 and 2340, Sat. at 0240 and 1640.
- **Saturday Special** on Sat. at 0940 and 1140.

**Radio Habana Cuba**
- **The Jazz Place** (the best of Cuban jazz) heard every other Sun. at 2130 and Mon. at 0130, 0330 and 0530.

**Radio New Zealand International**
- **Change of Pace** on Sat. at 0530.
- **In the Mood** (late night jazz) on Sat. at 1130.

**Voice of America**
- **Music USA Jazz** (archival selections of the late Willis Conover’s historic and long-running program) on Sat. at 1410 and 2010.
- **Music USA Standards** (American vocalists and big bands) on Sun. at 1930 on frequencies directed to the Middle East and the Pacific.

**Voice of Russia**
- **Jazz Show** (jazz from Russia) on Mon. at 0432*; Tue. at 1732*; Wed. at 1432*; Thu. at 1132* and 2332*; Thu. and Sat. at 0132*; Fri. at 0832* and 2032*.

**WRNO**
- **Jazz :30** (Dixieland jazz) on Mon., Wed. and Fri. at 2130*; Sat. at 1530* and Sun. at 2330*.

- **New Orleans Jazz Club** on Sun. at 2130*; Tue. and Thu. at 2200*; Sat. at 2000*.

**Music Request Programs**

- **At Your Request** (Dick Patterson plays listener requests) on Sun. at 0330 and 0730.

**All India Radio**
- **Listeners’ Choice** on Thu. at 1346.

**BBC**
- **A Jolly Good Show** (records, requests and dedications hosted by Dave Lee Travis) on the America/Europe stream Sat. at 1215 and Sun. at 0630; on the Africa stream Sat. at 0830 and Sun. at 1830; on the Asia stream Sat. at 1715 and Sun. at 0730.
- **Anything Goes** (listener requests of music and other types of sound recordings with Bob Holness) on the America/Europe stream Sun. at 1130; on the Africa stream Tue. at 0830 and Thu. at 1130; on the Asia stream Sat. at 1030 and Sun. at 2330.
- **Greenfield Collection** (listeners request classical music selections from host Edward Greenfield’s extensive collection) on the America/Europe stream Sun. at 0830 and Tue. at 1530; on the Africa stream Sun. at 0830; and on the Asia stream Sat. at 2130 and Sun. at 0830.

**Channel Africa**
- **Yours for the Asking** on Sat. at 1508.

**Deutsche Welle**
- **Hallo Africa** (musical requests and greetings) Mon. thru Fri. at 0930.

**Polish Radio Warsaw**
- **Request Concert** (classical music requested by listeners—mainly Chopin pieces) on Mon. at 1730 and 2000; Tue. at 1230.

**Radio Budapest**
- **As You Please** (listener requests for Hungarian music and performers) on the 4th Sun. of the month at approximately 1915* and 2115*; on the 4th Mon. of the month at 0115* and 0245*. (Radio Budapest’s schedule is somewhat quirky, and they’ll fill the bill for you. Listen in for instructions on how and where to send.)
- **Radio Jordan**
  - **Listeners’ Choice** (Western popular music requested by listeners) on Sun. starting just after the 1500 newscast.

**Radio New Zealand International**
- **Pacific Requests** on Sat. at 0512.

**Radio Singapore International**
- **To Each His Own** (listener dedications and song requests) on Tue. at 1305.

**Voice of America**
- **Border Crossings** (listeners from outside the USA may request selections from any form of American music) Mon. thru Fri. at 2010 on frequencies directed to Europe and the Middle East only.

**Voice of Russia**
- **Music At Your Request** (normally a place for listeners to request classical music by Russian composers and performers, folk music on occasion) on Mon. and Sat. at 1132*; Tue. at 0832*; Wed. at 0432*, 2032* and 2332*; Wed. and Fri. at 0132*; Thu. at 1732*; Fri. at 1432*.
- **Your Top Tune** (contests and popular music requests for and by listeners) on Sun. at 0832* and 1332*; Sun. and Wed. at 0232*; Mon. at 2032*; Tue. at 0732* and 2332*; Thu. at 2232*; Fri. at 1632*; Sat. at 1232* and 1732*.
- **Yours for the Asking** (classical music requests) on Mon. at 0832* and 2332*; Tues. at 0432* and 2032*; Tue. and Thu. at 1432*; Wed. at 1732*; Fri. at 1132*.

**Other Notable Programs**

This is admittedly a subjective list, but do give these selections a try. Until next time, pleasant listening!

**BBC**
- **Composer of the Month** (monthly-long weekly series combining the biography and music of a great classical composer) on the America/Europe stream Thu. at 0730; on the Africa stream Tue. at 0800; and on the Asia stream Mon. at 1930, Tue. at 0630 and Thu. at 1530.
- **John Peel** (presenting the cutting edge of contemporary “alternative” music with a sardonic wit) on the America/Europe stream Thu. at 1530 and 1930, Fri. at 0830; on the Africa stream Sat. at 0230 and Mon. at 1130; on the Asia stream Tue. at 0730 and Fri. at 0430.

**HCJB**
- **Inspirational Classics** (classical music inspired by religious themes) on Thu. at 2030; Fri. at 0230, 0530 and 0830.
Radio Austria International
- *Music From Austria* (ach, those waltzes and other Austrian performances as well) at approximately fifteen minutes into each broadcast starting with the 1330 transmission on Sat. and ending with the 0830 broadcast on Sun.

Radio Habana Cuba
- *From Havana* (a program showcasing contemporary Cuban performers) on Sun. at 2235, Mon. at 0235, 0435 and 0635.
- *Top Tens* (featuring current Cuban top hits) heard every other Sun. at 2130 and Mon. at 0130, 0330 and 0530.

Radio New Zealand International
- *Cadenza* (a daily concert of light classics) Mon. thru Fri. at 0130.
- *On the March* (a one of a kind program of military band and parade music) on Tue. at 1130 and Thu. at 0915.

Radio Prague
- *Encore!!! or Life in Prague or Magic Carpet*. Radio Prague presents a weekly musical feature that sometimes is an interview or profile, and other times a concert of folk, popular or classical music. It begins approximately five minutes into all Sat. broadcasts except the 0000, 0100 and 0300 broadcasts to North America, when the program is heard on Sun. (UTC).

Radio Sweden
- *Sounds Nordic* (a program of Swedish and Scandinavian rock music including interviews with artists and performers) on the second and fourth Sun. of the month in all broadcasts, except those to the Americas at 0030, 0230 and 0330 when the program is heard on Mon. (UTC).

Radio Vlaanderen International
- *Music From Flanders* (featuring Belgian performances and artists) on Sat. at approximately 0637*, 0937*, 1307*, 1807*, 2107* and 2337*. RVI also presents notably pleasant musical selections in the five minute periods between language service changes.

Swiss Radio International
- *Rendezvous with Switzerland* (a very pleasant and wide variety of musical selections interspersed with informational items about Switzerland) Mon. thru Sat. at 1330* and Tue. thru Sun. at 0430.

**Voice of America**
- *Concert Hall* (classical music composed or performed by American artists) on Sun. at 1410 and 2010.
- *World of Music* (popular music with African roots hosted by Rita Rochelle) Mon. thru Fri. at 1934.

**Voice of Russia**
- *Music and Musicians* (showcasing Russian compositions and performers—usually classical) on Sun. at 1211*, Sun. and Mon. at 0111* and 0711*, Sat. at 1611* and 2111*.

John Figliozzi is editor of The Worldwide Shortwave Listening Guide, now published and sold by Radio Shack. Watch for his next spotlight on featured programming coming in August.
The Multi-Band Multi-Layered Antenna

Multi-Band Resonant Stubs of Specific Length, Bound Together

To Feed Point

Main Section

Stubs Soldered to Main Section at Prescribed Intervals

By Peter L. Barker XF1/KB6ASH

Unless you are an inveterate knob twiddler (but perhaps that’s a requirement to be a radioist) you probably do not want to go to the expense and bother of using an antenna tuner between your communications receiver and a random wire antenna. We commonly call these black boxes antenna tuners, but they are really not tuning the antenna but trying to match the impedance of the antenna/feedline combination to that of the receiver. They do nothing to “tune” the antenna to resonance at the frequency in use.

It is possible to do away with the cost and bother of a tuner by building this simple multi-band resonant antenna that does not use coils, capacitors, or traps, but just wire and some cable ties! The antenna is automatically “trimmed” to the resonant length of selected bands by the use of 1/4 wavelength stubs.

What is a stub? It is simply a length of wire cut to be a specific fraction of a wavelength to perform an impedance matching or switching function on an antenna or other tuned circuit.

Unlike other multiple frequency resonant antennas, this design does not require the tedious construction of coils and capacitors to form “traps,” but simply calls for measuring out lengths of wire of almost any gauge strong enough to support its own weight plus the ability to solder a few connections. For reception purposes, the dimensions given will need no adjustment. If you build the transmitting version, some minor trimming may be needed for optimum SWR.

Although the antenna described is intended to be used as a “long wire,” if you construct two identical sections and hook up as also described, they will form an excellent dipole.

For broadcast reception the antenna, as described, will operate on all bands from 90 meters (3 MHz) to 13 meters (22 MHz). (You can include the CB band and the amateur 10 meter band if you so desire with the addition of one stub.) Like all longwire antennas, this one should be operated with a good earth ground. The connection between the radio and the ground rod should be as short as possible using braid or heavy gauge stranded wire.

If your operating position does not allow this because of its location, a “counterpoise” ground will work very well even for transmitting. In this case, make two identical section of the antenna and connect one to the ground post on your radio and deploy it around the perimeter of the operating room. It does not
need to be in a straight line to work. Just do not form a small coil or bundle out of it.

**Construction**

How do we make this wonder? You will need about 220 feet of insulated wire. The gauge is not important but it should be strong enough to support its own weight and the stress placed on it by wind and ice if you live in areas where that can be a problem. Sixteen or even 18 gauge will usually be strong enough for the base antenna; the stubs can be almost any gauge you have handy as long as it is insulated.

If you must use thin wire for the base section, bind it together with a length of dacron line to carry the weight. Remember that it must be insulated wire.

Diagram one shows diagrammatically the construction of the antenna. The stubs are shown away from the main antenna for the sake of this diagram only; they will be all bundled together and held with tape or preferably cable ties when the antenna is finished. If you use cable ties and want the antenna to be as durable as possible, use the black ultraviolet light resistant type. They cost a little more but will last many years in normal use.

The construction of the antenna is very simple. Measure off the length of the main section — 85 feet 1 inch — allowing a little extra at each end to form a loop to attach the suspension cord that will fasten the antenna to your supports. Carefully measure off the distances to the solder points and strip 1/2 inch or so of the insulation at each point; take care not to nick the conductor. Now measure the stubs and cut to length. Strip about 1/2 inch of insulation at one end of each stub.

Bend the bare end into a “hook.” Hook it over the correct solder point and solder into place. Check that you have the right stub on the solder point before soldering. Remember the old carpenter’s adage: “measure twice, cut once.” All that remains is to fold all the stubs back along the main dipole with their free ends toward the feed point.

The whole bundle should now be tightly secured with cable ties or exterior quality tape. The center conductor of the feedline (50 or 75 ohm coaxial cable) should now be attached to the feed point. The shield is not connected at this end. Seal the end of the coax with silicone sealant and hoist the antenna up as high and in the clear as you can get it. Connect the feedline to your radio and you are in business.

**Customizing the Design**

If you wish to use this technique as a dipole rather than an end fed wire, construct two identical sections and connect the shield of the coax to one and the center to the other. This will now be the center of your antenna. A piece of plywood or plastic should be used as a support to the junction of the feedline and elements as the wire joint should not carry the train. The assembly can be used as a conventional antenna with both ends supported as high as possible, or as an inverted “V” configuration with only the center elevated.

If you wish to try the antenna on other bands for ham use or utility monitoring, the distances of the solder points and lengths of the stubs can be easily calculated. I would recommend using metric units for the measurements as this makes for less errors in calculation.

The base section must be 1/4 wavelength at the lowest frequency on which you wish to operate. This is calculated by the simple formula: $71.5/freq$ (in MHz) for an answer in metric units, or $234/freq$ (in MHz) for an

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**TABLE 1: Length of Stubs and Solder Points for Selected SW Broadcast Bands**

<table>
<thead>
<tr>
<th>Stub</th>
<th>Band</th>
<th>Length in Ft</th>
<th>Length in Cms</th>
<th>Solder Point</th>
<th>Dist. from Feed Pt. in Ft</th>
<th>Dist. from Feed Pt. in Cms</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>13 (21 MHz)</td>
<td>10'5&quot;</td>
<td>317</td>
<td>1</td>
<td>20'10&quot;</td>
<td>634</td>
</tr>
<tr>
<td>B</td>
<td>19 (15 MHz)</td>
<td>15'1&quot;</td>
<td>230</td>
<td>2</td>
<td>30'2&quot;</td>
<td>460</td>
</tr>
<tr>
<td>C</td>
<td>25 (11.5 MHz)</td>
<td>10'2&quot;</td>
<td>310</td>
<td>3</td>
<td>20'8&quot;</td>
<td>750</td>
</tr>
<tr>
<td>D</td>
<td>31 (9.5 MHz)</td>
<td>20'4&quot;</td>
<td>620</td>
<td>4</td>
<td>40'8&quot;</td>
<td>1,240</td>
</tr>
<tr>
<td>E</td>
<td>41 (7.2 MHz)</td>
<td>32'11&quot;</td>
<td>1,064</td>
<td>5</td>
<td>65'11&quot;</td>
<td>2,009</td>
</tr>
<tr>
<td>F</td>
<td>49 (6 MHz)</td>
<td>38'4&quot;</td>
<td>1,169</td>
<td>6</td>
<td>76'9&quot;</td>
<td>2,339</td>
</tr>
</tbody>
</table>

The base length of 85 ft. 1 in. covers the 90 meter (3.2-3.4 MHz) band.
answer in feet. The stub for the next higher frequency is attached to a solder point 1/2 wavelength from the feed point. It will be obvious from this that the lowest frequency to be covered must be at least equal to twice the frequency of the next higher frequency. If this seems complicated, look at the diagram given and it should become clear.

Here is an example of the calculation, should you want to add the 10m ham band to the design shown here. The calculation would go as follows:

Length of stub:
71.5/28.4 - 2.54 meters, or 254 cms.
(or)
243/284 - 8.56 feet, or 8 ft. 6-3/4 inches

The attachment point for this would be 1/2 wavelength from the feed point or twice the stub length. In this case, 2 x 8 ft. 6-3/4 in. = 17 ft. 2-1/2 in.

If you wish to design an antenna for utility frequencies, for example, just remember that the base section must be at least as long as 1/2 wavelength of the next lower frequency on which you wish to operate. If not, there will not be enough length to accommodate the stub and its attachment point!

A table is provided in Table 2 for the 40 meter (7 MHz) through 10 meter (29 MHz) ham bands. As the relationship of the 20 (14 MHz) and 40 meter (7 MHz) bands is harmonic, the full length of the base section is the same as the distance to the first solder point. This will be the exception rather than the rule for other services.

This antenna is much simpler to build than describe, will give you a resonant antenna on several bands, and does not require a tuner. The wire size is not critical and, in fact, you can use different gauge wire for each section if that is what you have on hand. Like most any antenna, the higher in the clear that it can be mounted, the better it will perform. And, like all end fed antennas, it will work most effectively against a good earth ground.

Always remember when mounting antennas to keep personal safety in mind and look out for high voltage cable.

Whether you're an amateur radio operator or a shortwave listener, half the fun is using something you built yourself. Break out of the "appliance operator" mode and try this simple and inexpensive project.

<p>| Table 2: Length of stubs and solder point distances for selected ham bands |
|-------------------|---------|--------|--------|-------|---------|--------|</p>
<table>
<thead>
<tr>
<th>Stub</th>
<th>Band (MHz)</th>
<th>Length in Ft</th>
<th>Length in Cms</th>
<th>Solder Point</th>
<th>Dist. from Feed Pt. in Ft</th>
<th>Dist. from Feed Pt. in Cms</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10 (29)</td>
<td>8' 4-1/2&quot;</td>
<td>255</td>
<td>1</td>
<td>18'9&quot;</td>
<td>510</td>
</tr>
<tr>
<td>B</td>
<td>12 (24)</td>
<td>9'5&quot;</td>
<td>287</td>
<td>2</td>
<td>18'120&quot;</td>
<td>573</td>
</tr>
<tr>
<td>C</td>
<td>15 (21)</td>
<td>11'1-1/2&quot;</td>
<td>340</td>
<td>3</td>
<td>22'3&quot;</td>
<td>679</td>
</tr>
<tr>
<td>D</td>
<td>17 (18)</td>
<td>12'11-1/2&quot;</td>
<td>395</td>
<td>4</td>
<td>25'11&quot;</td>
<td>788</td>
</tr>
<tr>
<td>E</td>
<td>20 (14)</td>
<td>16'8-1/2&quot;</td>
<td>510</td>
<td>5</td>
<td>32'5&quot;</td>
<td>1,109</td>
</tr>
</tbody>
</table>

Basic antenna length is 32 ft. 5 in. Note: In this special case the solder point E is at the end of the basic section due to the exact harmonic relationship of the 40 (7 MHz) and 20 meter (14 MHz) bands.
AR5000 CyberScan

The ultimate answer to your receiver needs. Prior to the AR5000, it took two, three, or even four receivers to cover the 10kHz - 2600MHz range. The small size and low power demands make the AR5000 ideal for field use, remote control radio, and local computer control. State of the art components, surface mount technology & low noise circuits and devices assures the widest dynamic range and greatest sensitivity.

Specifications:
Freq. Range: 10kHz - 2.600MHz
Modes: FM, AM, LSB, USB, CW, Special
IF Bandwidth: 3.6, 15, 40, 110, 220, 0.5kHz (Opt.)
Memory: 1000 channels (10 banks/100 ch.)
Triple Conversion: IF 6222.10, 10.7 & 455kHz
Programmable Step: 1 Hz to 999.99kHz
Search Speed: 50 step/sec. (less than 100kHz steps)
Scan Speed: 50 ch/sec.

AR8000...STILL THE BEST!

The Ultimate Handheld Receiver! "WELCOME TO THE WORLD OF THE AR8000". It incorporates the latest PLL technology and offers a multitude of features including true carrier reinsertion 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. Internal ferrite antenna offers high performance reception below 2MHz.
- Frequency Coverage 500 kHz - 1900 MHz
- All mode reception AM, NFM, WFM, USB, LSB & CW

AR7030..."Superior by Design"

The introduction of the all new AOR AR7030 shortwave receiver is offered to the discerning and dedicated listener. The AR7030 is the result of a combined project between AOR and a UK designer. The AR7030 represents the very latest and best design, featuring exceptionally strong signal handling and bristling with enhanced features.

Key Features:
- Frequency coverage 0 - 32 MHz
- Mode reception: USB, LSB, CW, AM, Synchronous AM, NFM, DATA
- Very high dynamic range
- Standard fitted filters - 4 standard and two optional

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The new SRX100 is an economy communications receiver intended for the newcomer to shortwave listening, or as a second receiver for the more experienced enthusiast. It sells for well under half the cost of our most popular receiver, the HF150, but has an excellent specification for the price.
- Frequency range 30kHz to 30MHz
- 1kHz tuning steps
- 1µ sensitivity
- Modes available: USB, LSB, AM
- Liquid crystal display
- Dimensions: 7.3" W x 7.5"D x 2.5"H

HF150 RECEIVER

Don't let the size fool you! This is one of the finest Shortwave Receivers on the Market today!

Specifications
Frequency coverage: 30kHz to 30MHz cont.
Reception modes: LSB, USB, AM, Synchronous AM (USB, LSB, DSB)
Receiver system: Microprocessor controlled PLL tuning, dual conversion superheterodyne receiver. Intermediate Frequency: First IF 44.999MHz to 45.000MHz; second IF 455kHz
Display: 5 digit LCD showing frequency to nearest 1kHz, receiver mode, and memory number
Tuning: By spin-wheel, and direct entry keypad (opt.)
Tuning steps: 8Hz in LSB & USB, 10kHz in AM
Memory: 60 memories holding frequency and mode.
IF Filters: Wide: 7kHz, Narrow: 2.5kHz

HF250

The Lowe HF250 is set to become the new world standard for mid-priced receivers. Building on the worldwide success of Lowe's HF225 and HF150 models, the new HF250 combines Lowe's traditional high standards for performance and quality of construction together with the advanced facilities and control features required by today's discerning listener.

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- Tuning step size 8Hz
- Backlit display
- 255 memory ch
- Computer control is standard via built-in RS232 port

Lowe SRX100

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www.elecdist.com
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If you answered "yes" to any or all of the above, try Montauk. Montauk is in the shadow of the historic Montauk Point Lighthouse, the easternmost tip of New York State. After Montauk, the "next stop" is Europe.

Montauk is a village in the Town of East Hampton, an area of Long Island in which the famous "Hamptons" are found. The Hamptons are a lure for the affluent, upbeat, upscale (and, frequently, famous) people who escape New York City and its environs during the summer months in search of sun, leisure, pleasure, relaxation, and entertainment.

**Interference-Free Monitoring**

For radio monitors, Montauk — in its off-the-beaten-track location — offers an RFI-free zone. Bring your radios (AM, FM, shortwave, and scanners), and literally listen to the world, free from radio-frequency interference. Your author, using Radio Shack's DX 440 and its "scan" feature during daytime hours, clearly monitored 35 FM stations, with programs ranging from classical music at Southampton College to easy-to-listen-to musical standards from WBAB in Babylon. Fifteen AM stations from the tri-state (New York, Connecticut, and Rhode Island) area were heard clearly in the daytime.

At night, the shortwave stations rolled in. For example, at 0000 UTC in April, it was child's play to pull in China (9710 kHz), Madrid (6055 kHz), England (5975 kHz), and the USA (13740 kHz). Be sure to bring the current copy of Monitoring Times to guarantee that you'll hear all the shortwave stations that are out there.

Scanner monitoring offers a number of challenges. Montauk isn't a metropolitan area, clock-full of public service frequencies. You have to know where to look. Police activity was heard on 158.94, 155.91, 155.37, 156.03, and 159.21 MHz (during the summer months, police activity increases substantially, especially on weekends). A ham radio "weather net" from New London, Connecticut, was heard on 147.06 MHz.

Since Montauk is popular for its fishing, try searching the Marine frequencies between 156 MHz and 162 MHz. You'll hear marine band users ranging from commercial fishermen to the Coast Guard operating out of its Montauk Station.

And speaking of searching, look over the tips I gave in my article, "Try Searching,"..
in the May 1995 issue of MT. You'll never know what you can uncover at Montauk!

More than Monitoring

Of course, radio is only part of the fun of Montauk. Montauk offers a number of attractions. Its public sandy beaches run for miles, offering you ocean swimming, surfing, and just plain lounging in the sun, acquiring a great tan. No trip to Montauk is complete without a trip to "the Point." The lighthouse at Montauk — the oldest in New York State — was commissioned by President George Washington over 200 years ago. Drive to the Point, park in its ample parking lot, and climb the 137 steps to the top of the Lighthouse for an unparalleled view. After that, stop in the restaurant for a snack and souvenirs, and then walk the pristine beaches. Be sure to bring your camera and plenty of film.

Back in your car, drive to the north edge of the "south fork" and see Montauk Airport, the eastern-most airport in New York State, and only 12 air minutes away from Block Island. If time permits, take the charter service over to Block Island on New England Airlines, and see an island which can give you an appreciation of the area's geologic history. On the island, you'll meet vacationers who took the ferry from New London, Connecticut. (Tune to 156.015 MHz to monitor the ferry.)

Following along the north edge, you'll circumnavigate Lake Montauk and arrive at Gosman's Dock, a popular tourist stop. Then drive over to Star Island for a view of the Coast Guard Station. Would you like to take a "whale watch cruise"? The boat's right here, waiting for you. Don't worry about getting off the beaten track as you drive through the byways of Montauk. You can't get lost, and you'll see a Montauk most tourists never see.

If you want to spend a few days in Montauk, there's a wide variety of accommodations available, ranging from a one-bedroom cottage to a lush suite at Montauk Manor, a hotel known locally as "an American castle." The Montauk Chamber of Commerce offers a free Vacation Guide (call 516-668-2428) to help you select a place that's just right for you.

If you're a camper, don't overlook the Camp Grounds at Hither Hills State Park. You can "camp out" with a beautiful view of the Atlantic Ocean, and the price can't be beat. Reservations are a must! Be sure to book early in the season. Call 516-668-2554 for more information.

Don't Miss East Hampton

Part of the Montauk experience includes a visit to East Hampton, possibly the most beautiful village in the United States. It's several miles to the west of Montauk, a scenic drive that is well worth the time. Its main street is Route 25 — Montauk Highway — and you'll
find hundreds of stores that will give you the feeling that you’re shopping on Fifth Avenue. The pace is leisurely, and the dress code politely informal. Bring your credit cards, and don’t forget your camera. East Hampton is a reminder of a more genteel era of classic, historic homes. A tip to drivers: those “20 miles an hour” zones around the town’s schools are strictly enforced by a no-nonsense police force.

### So When Do I Monitor?

There’s so much to do at Montauk that you’ll have to budget your time. Use early morning hours to monitor the marine frequencies and hear the fishing boats going out. Program your car radio with locally-heard AM and FM stations (see Table 1 for suggested frequencies) as you drive about, seeing the sights.

Since New York State law prohibits the use of a scanner in an automobile (even if you’re a licensed radio amateur), you’ll be scanning at the beach or in your housing accommodations. A portable scanner — with a power supply — will let you tune in to all the local action. And when the day is over and the sun sinks into the western sky, what better time to listen to the shortwave stations that roll in like waves on the shore?

### All Roads Lead to Montauk

Yes, all roads do lead to Montauk, including the Long Island Railroad (LIRR). Montauk is the last stop on this world-famous commuter railroad. If you’d like to bypass the inevitable “Hamptons traffic jams” of Friday evening and Sunday afternoon, consider the LIRR. The railroad will take you to Montauk all the way from Pennsylvania Station, located in the heart of midtown Manhattan in New York City. Table 2 gives you all the frequencies of the LIRR, letting you tune in to the action all the way from Penn Station to Montauk.

If you’d like a faster trip than the railroad but don’t want to get involved with traffic (especially on weekends), leave the driving to the Hampton Jitney, a fleet of comfortable buses that will pick you up in midtown Manhattan — or near selected airports (such as LaGuardia). The Jitney offers amenities such as beverages and reclining seats with reading lights. Call 516-283-4600 for information. Its toll-free number is 800-936-0440 (from area codes 212, 718, 914, and 201). If you’re taking the Jitney, bring your portable scanner and monitor 152.435 and 157.695, and then search between 935 and 939 MHz.

### When Do I Start?

When should you visit Montauk? That’s up to you: Montauk is a year-round resort, even though “the season” runs from Memorial Day to Labor Day. During this time, prices are higher, the crowds are bigger, and the traffic is heavier. Hey, that’s why some people go to Montauk — to be where the action is!

However, if you like a better selection of accommodations, no lines for restaurants, plenty of parking spaces, and lower prices, consider autumn and spring as two excellent times to monitor Montauk. These two seasons are beautiful on the “East End.” You’ll still be able to take in all the attractions of Montauk, and you’ll do it in a more comfortable pace. No matter when you visit Montauk, you’ll enjoy it.

### Table 1

<table>
<thead>
<tr>
<th>AM Stations</th>
<th>550 kHz</th>
<th>630</th>
<th>760</th>
<th>790</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>960</td>
<td>980</td>
<td>1010</td>
<td>1030</td>
</tr>
<tr>
<td></td>
<td>1080</td>
<td>1230</td>
<td>1300</td>
<td>1310</td>
</tr>
<tr>
<td></td>
<td>1420</td>
<td>1510</td>
<td>1540</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FM Stations to Monitor</th>
<th>87.9 MHz</th>
<th>88.3</th>
<th>88.5</th>
<th>89.1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>90.3</td>
<td>91.1</td>
<td>92.3</td>
<td>93.7</td>
</tr>
<tr>
<td></td>
<td>95.3</td>
<td>95.7</td>
<td>96.7</td>
<td>97.3</td>
</tr>
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<td></td>
<td>97.5</td>
<td>96.7</td>
<td>97.3</td>
<td>97.5</td>
</tr>
<tr>
<td></td>
<td>97.7</td>
<td>98.1</td>
<td>98.3</td>
<td>98.7</td>
</tr>
<tr>
<td></td>
<td>99.1</td>
<td>98.3</td>
<td>99.0</td>
<td>100.9</td>
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<tr>
<td></td>
<td>101.3</td>
<td>101.7</td>
<td>101.9</td>
<td>102.3</td>
</tr>
<tr>
<td></td>
<td>102.9</td>
<td>103.3</td>
<td>103.7</td>
<td>104.1</td>
</tr>
<tr>
<td></td>
<td>104.7</td>
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<td>105.5</td>
<td>105.9</td>
</tr>
<tr>
<td></td>
<td>106.5</td>
<td>106.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 2

| Long Island Railroad Frequencies (MHz) | 160.38 | Train channel one |
|                                       | 161.445 | Train channel two (dispatcher) |
|                                       | 161.265 | Train channel three (yardmaster) |
|                                       | 161.535 | Train channel four (car inspectors) |
|                                       | 161.385 | Maintenance of way |
|                                       | 160.385 | Maintenance of way |
|                                       | 160.785 | Maintenance of way |
|                                       | 161.455 | Police (HQ and system-wide) |
|                                       | 161.49  | Police repeater output - NY terminals |
|                                       | 160.605 | Police car-to-car |
|                                       | 452.9125 | Police mobile repeaters |
|                                       | 452.7625 | Police hand-holds |
|                                       | 452.86325 | Police hand-holds |
|                                       | 154.115 | Train repeater, Penn Station (output is on 160.38) |
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✓ Coverage: 25 to 1300 MHz.
✓ Comes complete with 4 metres of RG58 coax cable and BNC connector fitted.
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By Mike Bryson

Holy Hot Wheels! The month of May is already here and I'm still not used to writing 1997 on my checks yet! Speaking of checks, I just wrote a doozy to Charlotte Motor Speedway. I am going to take my trusty scanner and head down to the “Mecca of Motorsports,” Charlotte Motor Speedway in Charlotte, North Carolina has one of the coolest NASCAR Winston Cup races of the summer on the 25th of this month.

What makes it so cool? It could be the fact that the Speedway is host to the Coca-Cola 600, one of the biggest races of the season. This race is considered one of the “Big Four” races in the NASCAR million dollar sweep. If a Winston Cup driver wins three of the “Big Four” races, he collects a “cool” million bucks.

Another cool fact about this race is that it starts later in the evening and finishes in the dark. Yep, this track has an elaborate lighting system that allows a spectator to see the race after dark. In fact, it’s the only track on the Winston Cup circuit that continues the races after the sun goes down. In order to keep the lights from blinding the drivers, there is an ingenious lighting system that uses mirrors and ground lighting to illuminate the track without the glare normally associated with outside overhead lighting. It’s sort of like a backlit racetrack. It also makes for great pictures. Given the fact that Charlotte can be pretty darn hot this time of year, this cool idea makes it a cool race indeed.

I tried to locate frequencies for the track via Internet but didn’t discover anything unexpected or unusual. I did, however, glean some frequencies from my Grove Enterprises FCC Database. See table 1 on the following page for the Charlotte Motor Speedway frequencies. Be forewarned: a couple of these are 100 watts.

Some other frequencies of interest might be the local police, fire, and rescue frequencies. Unfortunately, since Mecklenburg County uses an analog trunked system, your ability to monitor a specific agency will be limited (see table 2). Also, don’t forget TV and radio coverage of the race—their audio may be more coherent on your scanner than the local loudspeaker. The roar of race cars has a tendency to overwhelm any public address system; add more horsepower to it and you have fried speakers.

For the scanner I plan to take a stubby UHF scanner antenna tuned to the 460 to 470 MHz range. Remember, this is the band in which almost all of the NASCAR teams transmit. You should still be able to pick up the NASCAR officials and safety crews in the 150 MHz range, just slightly attenuated. This antenna should also help you squash those irritating pager and cellular intermod monsters. (This is Charlotte, after all.)

The stubby UHF antenna is easily available from Grove Enterprises for $9.95 (just ask for ANT 18) or from any other racing scanner supplier.

**Busch — a Cool Bargain**

The Coca-Cola 600 is not the only race scheduled for the Charlotte Motor Speedway. On the same weekend as the 600, the NASCAR Busch Grand National Series is in town for the Charlotte 300 (May 24th). The Busch series is the division below the Winston Cup Series (NASCAR has more divisions than Motorola).

This does not make it less exciting. Chances are very good that you may see some of your favorite Winston Cup drivers banning doors with the rest of the Busch regulars. Winston Cup drivers such as Mark Martin, Dale Jarrett, Michael Waltrip, and even 1996 Winston Cup Champion Terry Labonte have regular Busch rides. There are more. Of course Winston Cup drivers are not allowed to collect any points for the races they run, just prize money...

Why go to a Busch Grand National event? For starters, the races are usually not as long and the cost of tickets is usually about half of a Winston Cup Event. These Grand National cars are identical in appearance (except for paint schemes) to the Winston Cup cars but the rules place greater restrictions on their engines. Horsepower is down from around 700 for Winston Cup to about 500.
horsepower for the Busch cars (I could live with that). The competition level is just as intense because the rules are enforced with the same militant mindset that has made the NASCAR Winston Cup Series so successful. In short, you get a lot of “bang for your buck” (ouch).

You can find the Busch series frequencies the same way we found the Winston Cup freqs in our April feature. The Internet is the first place I look, and then I double check the frequencies with the Grove FCC Database. I found a good site for the Busch freqs at www.northtex.com. See table 3 on the following page for the Busch Grand National Series frequencies. Notice that all of these frequencies are in the 450 to 470 MHz range just like the Winston Cup freqs. Don’t forget to program your scanner ahead of time!

If you can’t find your way to Charlotte in May, check out some of the races and racing organizations in your area. You can snarf the team frequencies in the same manner as we did the Winston Cup and Busch freqs. We will be covering some of these in future issues of MT. For regional freqs wherever you go, good references are Police Call and Monitor America (both widely available from dealers, including Grove Enterprises). But to monitor some of the coolest races this month, Charlotte Motor Speedway is the place you ought to be, if you are a Racing Freq like me.

### TABLE 3: 1997 NASCAR BUSCH SERIES FREQUENCIES

<table>
<thead>
<tr>
<th># Driver</th>
<th>Primary</th>
<th>2nd</th>
<th>3rd</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hermie Sadler</td>
<td>461.0875</td>
<td>463.7875</td>
</tr>
<tr>
<td>2</td>
<td>Ricky Craven</td>
<td>466.9750</td>
<td>463.8875</td>
</tr>
<tr>
<td>3</td>
<td>Steve Park</td>
<td>466.9250</td>
<td>464.4250</td>
</tr>
<tr>
<td>4</td>
<td>Jeff Pruivre</td>
<td>463.5875</td>
<td>464.3000</td>
</tr>
<tr>
<td>5</td>
<td>Terry Labonte</td>
<td>460.3125</td>
<td>461.2375</td>
</tr>
<tr>
<td>6</td>
<td>Tommy Houston</td>
<td>464.5750</td>
<td>464.5250</td>
</tr>
<tr>
<td>7</td>
<td>D. Johnson</td>
<td>461.8375</td>
<td>463.3125</td>
</tr>
<tr>
<td>8</td>
<td>Kiny Wallace</td>
<td>459.6875</td>
<td>469.2875</td>
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<tr>
<td>9</td>
<td>Phil Parsons</td>
<td>466.7875</td>
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<tr>
<td>10</td>
<td>J. F.</td>
<td>464.2500</td>
<td>466.2750</td>
</tr>
<tr>
<td>11</td>
<td>Michael Waltrip</td>
<td>463.2375</td>
<td>461.4875</td>
</tr>
<tr>
<td>12</td>
<td>Patty Moise</td>
<td>466.3875</td>
<td>461.7875</td>
</tr>
<tr>
<td>13</td>
<td>Tony Stewart</td>
<td>461.8875</td>
<td>461.7875</td>
</tr>
<tr>
<td>14</td>
<td>D. Sage</td>
<td>467.2875</td>
<td>460.2125</td>
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Local Service Scramble

It is often said that history repeats itself. In 1903 more than half of all cities and towns in the United States were served by at least two telephone companies, each offering local service. Now, due to the Telecommunications Act of 1996, competition in the local telephone service market will no longer be a thing of the past. The difference this time will be that much of the service will probably be wireless.

**I Rural Radiotelephone Service**

In some extremely remote rural areas home telephone service is already wireless, and has been for more than a quarter of a century. Where it is not economically feasible for the local telephone company to run wire for basic service they have often chosen to operate what the FCC calls Rural Radiotelephone Service.

Customers use paired channels in the 150 MHz and 450 MHz bands with equipment and quality almost identical to the pre-cellular mobile telephone service. In fact the VHF and UHF allocations continue to be shared between rural radiotelephone service and one-way or two-way public land mobile service (the old Improved Mobile Telephone Service).

These analog channels provide a full-duplex (both parties can speak and hear at the same time) radio link for remote households to reach the public switched telephone network (PSTN). The channels are often shared by several customers, so that, just as with a party line, callers have to wait until others are finished before placing a call. When a channel is available the sound quality may be poor, making conversations and modem calls difficult.

As with most technologies, cost is the driving factor. The average cost for rural telephone service exceeds $3000 per household, while the total cost for a suburban wired local loop averages between $1200 and $1800. In order to see what comprises these figures, let's take a look at what makes up a local loop.

**Some Jargon**

In a traditional wired environment, the pair of wires connecting your telephones to the outside world is called a local loop. All the wires inside your house are termed "premise wiring" and connect to the "drop wire" (named from the image of drooping the wires from the telephone pole into your house) at a Network Interface Point (NIP), also known as the "demarc" or demarcation point. This point separates your responsibility from the phone company's — everything from the NIP to inside your house (the premise wiring) is your problem, and everything from the NIP outside your house is their problem.

A number of drop wires from your neighborhood all run to a junction box or wiring block and are combined into a distribution cable. Several distribution cables join up to form a feeder cable, which may have more than 2500 drop wires in it. This huge bundle of wires runs into your local central office, which provides your telephone service. Inside the central office, of which there are about 20,000 in the United States, is a device called a switch that directs incoming and outgoing calls to the proper place. Central offices connect to each other over interoffice trunks, which can take the form of wires, microwave links, and (more commonly now) fiber optic links.

Telephone companies that serve urban and suburban areas average over 300 subscribers per square mile, whereas rural telephone companies average less than five subscribers per square mile. The typical cost for the switch and associated equipment is between $100 and $200 per customer, whether urban or rural. Maintenance, planning, and other network costs can add another hundred or two (or more) to that number.

A copper telephone line in an urban or suburban area will cost the telephone company somewhere between $500 and $1000, depending on how densely the population is situated. In rural areas this is much higher, since distances are greater and the high labor and material costs are spread across a much smaller number of users. In the interest of providing telephone service to everyone (often referred to as "universal service") the government provides subsidies to rural telephone companies to keep the rates they charge their customers affordable.

The bottom line here is that unless suppliers can provide local loop service for less than $1200 to $1800 per user there will be little interest from the telephone industry. Before 1996 there was another reason for little interest in domestic wireless loop technology — regulatory history.

**Some Background**

The Modified Final Judgment (MFJ) that broke up the monopolistic Bell System in 1984 created rules that have just recently changed under the Telecommunications Act. The MFJ split the nation into more than 160 local access and transport areas (LATA's) and allocated the former Bell System local telephone service to seven new Regional Bell Holding Companies (RBOCs). These holding companies were built up out of smaller organizations called Bell Operating Companies, who actually provided local telephone service.

In exchange for the grant of local monopoly power, the RBOCs were prohibited from pro-
Local dialtone service and connections between two points lying entirely within a single LATA were provided by a single Local Exchange Carrier (LEC). These RBOCs plus more than 1300 independent telephone companies still provide more than 95% of the nation's local phone service. However, under the MFJ, almost all service between two points that were not within the same LATA had to be provided by one of many Inter-Exchange Carriers (IXCs), or long distance companies, even if the two LATAs were both within the service area of the LEC. Long distance providers became fiercely competitive and drove prices down, but LECs remained the only source for local phone service.

The Telecommunications Act did open up the $100 billion local telephone service business to competition. Small companies and RBOCs from other areas are now allowed to compete with the incumbent LECs, who must share their networks with competitors, including everything from facilities to rights-of-way and telephone poles. LECs, in exchange, can now provide long distance service outside of their service area, and will be allowed to do so within their area after proving how well they've allowed access to competitors. It's not much of an exaggeration to say that everyone will be able to compete everywhere.

Wireless loop technology has been sold in developing countries for some time now, allowing the government (in most countries the telephone system is controlled by the government) to quickly provide phone service in selected areas without the expense and other difficulties that come with running wires to each customer. Motorola, Ericsson, and Hughes Network Systems, as well some smaller firms, all market fixed wireless loop products for use in undeveloped or remote areas. Most of them are basically repackaged radio equipment with a single analog telephone line interface operating over traditionally mobile frequencies.

Wireless Loop Redux

A recent announcement by AT&T Wireless Services and AT&T Laboratories takes local loop bypass to the next level. Field tests will begin in the Chicago area later this year of their fixed wireless loop technology operating at PCS frequencies. Customers will continue to use the same wired telephones and answering machines they use now, except that instead of copper wires running out to the street, each house or small business would have a pizza box-shaped transceiver connected at the NIP. Each of these transceivers would communicate with a neighborhood antenna mounted on a light pole or other structure.

The antenna, which could serve upwards of 2,000 homes, would be directly connected to AT&T digital switches, completely bypassing the underground or overhead wires that make up most existing telephone service.

This is more than just a replacement for standard analog telephone service. The transceivers will initially provide a 128 kilobits per second (kbps) digital connection, comparable to Integrated Services Digital Network (ISDN) services being offered by some LECs. Customers will have the flexibility to use that connection as they see fit on an on-demand basis. For instance, the customer could connect to the Internet using the full 128 kbps capacity, then downshift to 64 kbps in order to make a voice call, then resume web surfing at 128 kbps or terminate the data connection and set up a second voice call while the first one is still open.

Computer connections will not be hampered by the current speed limitations of traditional modems since the data will be digital from end to end without ever being converted to analog. If 128 kbps isn't fast enough, AT&T promises that the transceivers will be software-upgradable (no hardware changes necessary) for even higher bandwidth. AT&T claims their internal cost will be less than $1,200 per household, which puts them beneath the cost threshold discussed above.

For an additional $300, customers will be able to purchase a "personal base station," which will allow them to use their digital cellular or PCS handset as a cordless phone while at home. Calls made using the personal base station will be charged at the lower wired telephone rates instead of the traditional per-minute air-time rates.

Will it come to your neighborhood? AT&T says it depends on the outcome of the Chicago trials, but they've spent a lot of money to put this kind of technology in the hands of consumers. Their transceivers have been designed operate in a 10 MHz block of broadband PCS spectrum, and in the recent FCC auctions AT&T won 21 licenses in the 30-MHz A and B blocks and 222 licenses in the 10-MHz D, E, and F blocks.

This gives them access to 93% of the U.S. population, but with up to half a dozen wireless providers competing in large markets, several wireless loop solutions may be available. Other companies, including Siemens Stromberg-Carlson, Lucent Technologies, and Motorola have expressed interest in manufacturing wireless local exchange equipment, so this may become a large market indeed.

If all this telephone jargon has you confused or you're looking for more information, check the PCS Front Line homepage at http://www.grove.net/~dan. Comments, criticisms, and questions are always welcome at dan@decode.com. Happy monitoring!
In Our Dreams: Things Scanner Listeners Wish For

Over the last few months we’ve asked our scanner column readers to tell us what features they would most like to see on a new scanner. We also asked you what scanner is your favorite of all time. Below are some of the responses to these questions, along with comments by this editor.

The mail and e-mail of late has been pouring in like never before. This is a hopeful sign that interest in the hobby is back on the upswing. Let’s continue the momentum! Please keep the mail coming on these subjects. Who knows? You may just help influence a scanner manufacturer in the design of a new radio. (Note: please use the ScanMaster@aol.com address above.)

- Roy Boland sent us two e-mails with his thoughts:

“Scanner features I’d like to see:
1. Trunking System-compatible scanner. The BC235 & BC895 are probably only the beginning. Multiple system capability will be a must!
2. APCO Project 25-compatible scanners, should this indeed become the national digital standard.
3. Channel shown by name, not simply frequency. Some of the newer ham stuff does this.
4. CTCSS & DCS operation. My BC760 features this and I love it.” (Editor’s note: Actually, Roy, the Bearcat 760 handles only CTCSS, unless you’ve got a unique mod for the radio. If so, we would love to hear about it.)

“My favorite scanner was the BC250. I really liked the COUNT feature which recorded the number of ‘hits’ (unfortunately only up to 50) on the frequencies entered. I also liked the built-in tape recorder activator. I’d really like to see these features on base/mobile radios of the future.

“My current favorite base/mobile is the BC760. I use the CTCSS feature almost all the time, as I live in the Chicago area. My favorite handheld, bar none, is the BC3000. The 800 MHz/military aircraft/federal government coverage, combined with the scanning speed, can’t be beat! I wish my ham HT had this kind of coverage/scan speed. Now if that darn DATA Skip feature only worked on trunked systems…” (Editor’s note: As we’ve mentioned in previous issues, the G/WIZ modification will eliminate the beeps, buzzing, and jingles of Ericsson/GE analog trunked radio systems.)

In a later posting Mr. Boland adds, “I did leave one thing out...New scanners will have to be much more computer friendly, i.e. they’ll have to be ready to plug into the things! This is particularly true if scanner makers intend to stop the flow of former and would-be radio hobbyists from fleeing to the Internet. I’d also like to see better shielding.”

(I agree with you wholeheartedly, Roy. People are becoming more interested in computers and the Internet and the ability to work with computers will be a necessary feature of almost any police scanner priced over $250.00 to $300.00. And this price will eventually drop. Also, regarding shielding, see our discussion below about the RELM radio.)

- John Comstock chips in with a very interesting angle on a new scanner feature:

“I work for a television station as a news photographer, and I have several scanners in my news car. That way, while the police are talking on one, I don’t miss fire dispatches on another. But when I have to step out of the vehicle, I’m back to one ‘scanner.’ My choice: an Alinco DJ-580T! My reason is that it has two receivers in it, so I can still monitor two transmissions at the same time.

“I would love to see a handheld scanner with an extra receiver. You could either use it to scan two scan lists, or have a dedicated priority that was a true priority; i.e. it wouldn’t take two seconds for the priority function to check for transmissions.

“The other thing that I wanted to mention: there are a lot of great features out there, but they usually don’t show up in the same scanner. Things like: count on search frequencies, lockout during search for birds or other known frequencies, search bank link so you could search several frequency ranges at the same time (by the way, that’s where a dual-channel receiver would really come in handy—you could scan known frequencies on one receiver while searching for others on the other receiver.) I realize all the great features don’t show up in the same scanner because of cost, but we can wish!”

(John, this is an idea whose time has come. Dual-receiver technology has already been brought up for discussion at certain manufacturers.)

- Let’s “lock-in” to what Maury Midlo was kind enough to add:

“I’d like to have a temporary lockout feature that would let me skip noisy-but-unused channels for the duration of any one scanning session. Ideally, the channels would return to active status the next time the receiver was turned (off and) on. This would eliminate the need to permanently change the noisy channels’ status to ‘Skip’ or ‘Lockout’ and eliminate the need to make a paper record of the channel in that status.

“I find that otherwise-active channels will sometimes have temporary ‘unmodulated carrier,’ ‘open mike,’ or other ‘no voice’ conditions that interrupt the scan. A temporary lockout would skip those channels and allow uninterrupted scanning of the other channels in that bank (sometimes few in number). I’ve had an ICOM
R7100 for the past several years, and it is superb!

(Maury, I also use an R7100 and have loved it since the day I took it out of the box. And I thought the R7000 was a great radio! Hopefully, one day, I'll lay my hands on an 8500.)

Anyway, the temporary lockout feature was another idea that was discussed in manufacturing circles. The problem, though, was determining how long to keep the channel locked-out. Meanwhile, many scanners have a "Lockout Review" mode which allows for an easy check of which channels are locked-out. We still believe it's a valuable idea worth re-considering. Many people find that they enter an area, either by car or by foot, where intermod kills a few channels on a temporary basis. You want to lock these channels out for that particular period you're in this RF saturated area, but you want the channels back for normal scanning later. Some very good thoughts, Maury. Thanks.

One reader wrote to us with the following take: "My favorite scanner so far is the Radio Shack PRO-2006. It still seems to outperform even the newer RS models in sensitivity and intermod rejection. My favorite feature is the ability to select NFM, WFM, and AM. The built-in attenuator assists in limiting intermod in my area (L.A./Orange County).

"As far as what I consider missing features would be a variable tuning dial, an IF bandpass switch to allow reception of weather satellite data, a signal level meter, and tone squelch capabilities.

"My first scanner was a Regency MR-10 VHF model that got me started in the hobby. My next unit was a Bearcat 220, which I still use in the mobile. It needs some alignment, and possibly some work on the RF front end. I am attempting to locate a service manual for this unit so I can bring it back to original performance specs. I recently replaced the keyboard on the unit, and one of the voltage regulator pass transistors. I hope you get a good response to your survey this time around!"

(I wrote this person back asking if he knew where I could get my 2006 tweaked-up. My 2006 has always been desperately lacking in sensitivity, specifically when compared with both Uniden and ICOM scanners. We've heard too many good things about the 2006 to think anything other than the fact that this radio needs an alignment, if not some new components. Below is the anonymous e-mailer's response to my query.)

"Seems that the sensitivity of the 2006 varied with each unit. I have heard several owners say the same thing, also I have heard others say the opposite!

"Possibly the problem was due to alignment or parts lot quality control at the factory. I imagine that some careful alignment would help clear the problem. I have heard some tweaks to the 2006 and other scanners that involve the installation of better semiconductors, such as precision GASFETs in the front end, and the addition of crystal filters in the IF stages.

"About 10 years ago, I worked on a project in the aerospace industry that contained a Watkins Johnson wideband ESM receiver that covered 30 MHz to 2 GHz. I was able to play with this receiver during long breaks while testing the system in the middle of the Nevada desert. It out-performed any scanner I have played with by a factor of 10! The scanning speed was better than 150 channels per second. Reception of the NWS receiver was almost full-quieting at a distance of over 90 miles from Las Vegas. I was unable to hear anything on my Bearcat 220 connected to the same antenna system at the same location!

Most of the VHF/UHF comm links used corner reflector antenna systems to keep the signals from straying off the test range towards the rear of the antenna. F/B ratios of these antennas were around 50 dB with a gain of around 12 dB! I was also amazed at the performance of the Sunair GSB-900 HF transceiver that was part of the same project. I was able to do some nice DX contacts during long breaks. I was able to purchase one of the Sunair units from the distributor at a fraction of the cost that the military paid. I have been using it since as my HF ham station.

"Presently I am employed as a system engineer by a local large CATV company. We have recently begun large scale testing and deployment of high-speed internet access, PCS, landline telephone, digital compression (6 to 1), and SONET/ATM technology."

An RDW writes: "With regard to your question about scanner features, I have a feature that I would like to see included in scanners. Both the Motorola MaxTrac transceiver and the Bendix/King portable that I was issued at one time had extremely fast (250ms) priority channel sampling rates. Briefly sampling the priority channel four times per second, the interruption of the audio during sampling was barely noticeable and traffic on the priority channel was detected virtually instantaneously.

"Bearing in mind that my most recently purchased scanner is a BC205XLT and that my others were purchased when the dinosaurs roamed the earth, I don't know whether or not the newest offerings include this feature. I have reserved a BC895XLT "Trunk Tracker" from Grove so I guess sometime before Christmas, I'll find out. The Motorola also had a two-level priority feature much like the system used on the 205XLT that I really liked.

"My favorite scanner was a Regency HX1000 portable. I bought it on impulse at a railroad hobby shop many years ago to replace my aging Bearcat 100. The Regency was encased in one of their marine radio cases. It had incredible sensitivity and intermod rejection,
superb audio, a BNC antenna connector, and a somewhat inaccurate clock display that was enabled by depressing the push-to-talk switch. The only drawback was that the AC adapter/charger was wired conversely from my other scanners and I blew it up with reverse polarity once and had it fixed and then I did it a second time and decided to order a portable with 800 MHz capability.

“The Uniden ‘Trunk Tracker’ sounds almost too good to be true, and although the only public safety agency in my immediate area that is trunked at the moment is the Oklahoma Highway Patrol. I was due for a new scanner, so why not?”

Chris Arndt, KD6DSI, contributes some interesting scanner thoughts and experiences:

“Well, let’s see. I guess my favorite scanners were the pair of Regency ACT R 10s (?), and my Bearcat 250. The Regencies were my first ones, and the first that I tinkered with. I sped up the scan rate quite a bit on these. They, a Motorola CB, and my under-dash car stereo at the time were all equipped with Radio Shack slide mounts top and bottom (except for one scanner). When I locked up my car for the night, I slid everything together in a stack. On top, I had a car half-mount with a handle. All of the power connections were looped through, and in the house I had a power supply that would run the stack. I liked the 250 because it was programmable, and had an auxiliary connection that could be used to turn on a tape recorder when a channel was active. I used that a lot.

“Hard to say what feature I like the most. I’m really partial to the combination of an Optoelectronics Scout and a programmable radio like an ICOM R7100. I don’t use it much, but it’s fun when we go on a trip to hear what’s going on around us. A couple of things I would like to see: I used the channel activity counter on the BC 250 a lot to see if a channel was active; I also like having lots of channels, but the banks these days are too big. Instead of, say, 400 channels in 10 banks of 40, I’d rather have 40 banks of 10, or 20 of 20. When I want to channelize frequencies, I’d like more flexibility.”

(I know, 10 banks of whatever is popular because there are 10 digits on a keypad, but really, I don’t want 100 channels in 10 banks on a 1000 channel scanner. Surely some manufacturer can figure out a clever way to make more banks of fewer channels.)

We found this mail fascinating and we hope to print more in upcoming issues.

Race Scanning Preview

Recently this editor had the opportunity to learn a bit about the race scanning business. Mike Raley, president of the Frequency Fan Club, perhaps the nation’s largest and most well-respected organization dedicated to race scanning, was kind enough to spend some time with me prior to the Primestar 500 Nascar race in Hampton, Georgia. (You can reach Mike and his organization at 1-800-RACE-FAN.)

Hampton, adjacent to Griffen, Georgia, is some 30 miles south of Atlanta. This is important to race scanning buffs for one very important reason: The intermod coming out of Atlanta, as well as the Air Route Traffic Control Center and AT&T towers across the street from the track, is unbearable. There you are, trying to listen as Dale Earnhardt evades an accident on Turn Three, and all of a sudden you’re blasted with “Beeeeeeeeeep, booo00000.”

As a result of this interference, Frequency Fan Club, and some of the other dealers at the tracks, are now pushing the RELM handheld scanner. As many of you know, the RELM 200-channel portable is CTCSS and DCS capable.
Bearcat intercepts trunked radio

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Trunk Tracking

Conventional scanning is a simple concept. You enter a radio frequency into your scanner that is used by someone you want to monitor. For example, the police may broadcast on 155.370 MHz, the fire department on 154.250 MHz, emergency management on 158.760 MHz, etc. So when your scanner stopped on a frequency, you usually knew who it was and, more importantly, you could stop on the frequency and listen to an entire conversation. This type of conventional scanning was easy and fun.

As the demand for public communications increased, many public radio users didn't have enough frequencies to meet their needs, which created a problem. Trunk systems were the solution to this problem. Since very few, if any, radio users really broadcast on their frequencies all the time, it was possible to use available public service channels for Trunk tracking.

In a trunked radio system, which contains between 3 and 29 different frequencies, radio users are assigned to talk groups, each with a specified THD number. When someone in a talk group uses their radio, subaudible identification information is broadcast along with each transmission. The trunking system computer uses this subaudible information to assign each radio a talk group number. The computer has allocated frequencies that are available to all transmitted programming. If the group using a frequency stops transmitting or pauses for a few seconds, they are removed from the system and another talk group can transmit.

Sharing the available public service channels allowed cities, counties, states and other agencies to accommodate hundreds of radio users. With the following information, you can stop stopped transmission and get a complete conversation. This type of scan was difficult and frustrating.

The Bearcat 235XTL TrunkTracker available from Communications Electronics changes the game. Not only does the Bearcat 235XTL search frequencies like conventional scanners, it can also follow the users of a trunked radio system. Once you know a talk group's ID, you won't have to call the operator today. Call Communications Electronics today with a credit card.

Bearcat® 235XTL-A TrunkTracker Mfg. suggested list price $1299.95 Price $999.95

- Frequency Coverage: 25.000-512.000 MHz, 440.000-470.000 MHz, 530.000-560.000 MHz, 806.000-823.995 MHz, 849.0125-868.995 MHz, 894.0125-1.300.000 MHz.
- 100 Channel - 10 banks - Alpha numeric display - 10-1/2" Wide x 7-1/2" Deep x 3-3/8" High - Frequency Coverage: 25.000-548.995 MHz, 76.000-823.995 MHz, 144.000-144.995 MHz, 440.000-440.995 MHz, 806.000-823.995 MHz, 849.0125-868.995 MHz, 894.0125-1.300.000 MHz. The Bearcat 9000XTL is superb for intercepting communications transmissions with features like TurboSearch™ to search为你 scan more than 500 channels at 300 steps per second. This base and mobile scanner is also ideal for intelligence professionals for whom it's crucial that you achieve the correct decoding mode of the BC3000XTL. For maximum scanning enjoyment, order the following optional accessories: P6001 Cigarette lighter power cord for temporary operation of your vehicle. P6002 Cigarette lighter power cord for permanent operation of your radio. P5001 AC power cord for permanent operation of your radio. Bearcat® 3000XTL-A Radio Scanner Mfg. suggested list price $699.95 Special $329.95

FREE - Get an extra GP3500 battery pack! A $16.51 value when you order the Bearcat 3000XTL-A today. With Bearcat's 3000XTL, you get 400 Channels - 20 banks - Twin Turbo Search/Scan Frequency Transfer - VFO Control - Automatic Store 10 Priority Channels - Selectable Mode - Data Skip - Frequency step resolution 5, 12.5 & 25 KHz. Size: 2-3/4" Wide x 1-1/2" Deep x 7-5/8" High - Frequency Coverage: 25.000-548.995 MHz, 76.000-823.995 MHz, 440.000-444.995 MHz. The Bearcat 3000XTL 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 5000 channels per minute. A selectable attenuator eliminates annoying intermodulation from adjacent frequencies in highly populated areas.

Shortwave Radio

Have fun and use our amateur, CB, GMRS and commercial radios to keep in touch with friends. For even bigger savings, clip and use the coupon on this page. Hurry...offered ends soon. Ranger RC 2970A 10 watt meter transceiver...$599.95 Ranger RC2950A 25 watt meter transceiver...$299.95 Cobra 148GTLSA SSB CB with frequency counter...$179.95 Cobra 297XLWXA CB with weather alert...$109.95 Cobra 290XLWXA CB/SSB Base (no programming)....$299.95 Cobra 297XLWXA CB/SSB Base with weather alert...$299.95

Ham/CB Radios

Sangean ATS999-A Shortwave Receiver Mfg. suggested list price $299.95 Special $249.95

- Size: 8-1/4" Wide x 1-1/2" Deep x 5" High - Frequency Coverage: LW: 153-513 KHz; MW: 520-1710 KHz; SW: 1711-2999 KHz; FM: 87.5-108.0 MHz. The Sangean ATS999 features 36 memories and great reception.

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It's easy to order from us. Mail orders to: Communications Electronics Inc., P.O. Box 1045, Ann Arbor, Michigan 48106 USA. Add $17.00 per weather station or radio product for UPS ground shipping, handling and insurance to the continental U.S. unless otherwise stated. Add $12.00 shipping for all accessories and publications. Add $12.00 shipping per antenna. For Canada, Puerto Rico, Hawaii, Alaska, Guam, P.O. Box or APO/FPO delivery, shipping charges are two times continental U.S. rates. Michigan residents add state sales tax. No COD. Satisfaction guaranteed or return item in unused condition in original packaging within 31 days for refund, less shipping charges. 10% surcharge for net 30 day billing in qualified accounts. All sales are subject to availability, acceptance and verification. Prices, terms and specifications are subject to change without notice. We welcome your Discover, Visa, American Express or MasterCard. Call anytime 1-800-USA-SCAN or 1-800-877-7276 to order toll-free. Call 313-996-8888 if outside Canada or the USA. FAX anytime, 313-663-8888. Dealer and international inquiries invited from Communications Electronics, Inc.

For credit card orders call 1-800-USA-SCAN
Communications Electronics Inc.
Emergency Operations Center
P.O. Box 1045, Ann Arbor, Michigan 48106-1045 USA
For information call 313-996-8888 or FAX 313-663-8888

www.americanradiohistory.com
Who's Where in the Shortwave Spectrum

Where do I find utility activity in the shortwave spectrum? "I want to listen to aircraft and ships. Where do I find them?"

These are just a couple of the many questions I have recently received regarding where to hear various types of radio activity in the utility bands. Without specific guidance, you could wander around for quite a while until you found what you were looking for.

**The Utility World Frequency Guide**

Look at the shortwave spectrum as you would your mother's apple pie: She cuts it into slices, and if you talk real nice, she gives you a bigger slice. The shortwave spectrum, like that pie, is also cut into slices with the most important services getting the biggest slices of radio pie. In the radio world we call these frequency bands.

There are bands for shortwave broadcast stations, amateur radio operators, aircraft, marine communications, and much, much more. Knowing where to find your favorite listening category is crucial to being a successful utility listener.

**Amateur Radio Bands**

The first stop in our tour of the shortwave spectrum is the amateur radio bands. Each ham band is divided into two subbands. The first subband included those frequencies devoted primarily to Morse code (CW) and digital mode (PACTOR, AMTOR, RTTY, etc) transmissions. These subbands are (all frequencies in kHz):

- 1800-2000 (160 meters); 3500-3750 (80 meters); 7000-7150 (40 meters); 10100; 10150 (20 meters); 14000-14150 (20 meters); 18068-18110 (17 meters); 21000-21200 (15 meters); 24890-24930 (12 meters); and 28000-28300 (10 meters)

Voice operations in the amateur radio bands can be found in the following subbands using primarily the upper (USB) and lower (LSB) sideband modes:

- 1800-2000 (160 meters-USB); 3750-4000 (75 meters-USB); 7150-7300 (40 meters-USB); 11175-11400 (30 meters-USB); 14000-14150 (20 meters-USB); 18110-18168 (17 meters-USB); 21200-21450 (15 meters-USB); 24930-24990 (12 meters-USB); 28300-29700 (10 Meters-USB/FM)

**Shortwave Broadcast Frequencies**

Another major user of the HF radio spectrum are the shortwave broadcasters. The main mode you will encounter on these frequencies is AM (amplitude modulation) and the spacing you will normally encounter in these bands is 5 kHz between stations.

- 2300-2495 (120 meters); 3200-3400 (80 meters); 3900-4000 (75 meters); 4750-5060 (60 meters); 5850-6200 (49 meters); 7100-7350 (41 meters); 8400-9900 (31 meters); 11600-12950 (25 meters); 13570-13800 (22 meters); 15100-15800 (19 meters); 17400-17900 (16 meters); 18900-19020 (15 meters); 21450-21850 (13 meters); 25500-26100 (11 meters)

Now that we have shown you where to find the hams and shortwave broadcasters, what is left of the shortwave spectrum (approximately 78 percent) is what we call utility frequencies (the primary coverage area of this column).

**Aeronautical Mobile Service**

Most monitors do not realize that you can monitor aircraft air-to-ground communications from five continents in the shortwave spectrum. You can hear high-flying transatlantic flights or listen in on exciting rescue operations conducted by the U.S. Coast Guard.

Under international agreement, specific band segments have been reserved in the HF spectrum for voice aeronautical communications (the aeronautical mobile service). Almost all the voice transmissions in these aeronautical bands are in USB and English is the primary language used in aero communications. Each frequency is supposed to have 3 kHz separation, but you will find exceptions, especially in the OR (off-route) segments of these aero bands.

The aeronautical bands located in the high frequency spectrum are divided into two distinct subbands. The first subband is the one most familiar to HF aviation buffs—the "R" or routed frequencies. This subband has communications associated with aircraft (civilian and military) that are flying on established national and international civil aeronautical routes. Communications in these frequencies consist of air traffic control, weather information, and private airline company traffic. The "routed" sub band was re-channelized several years ago, and spacing was established at 3 kHz between frequencies at an earlier World Administrative Radio Conference (WARC).

The other aeronautical mobile sub band has been relatively obscure to all but military monitors. Dedicated readers of the yearly Klingenfuss Guide to Utility Stations books will recognize the term "OR," which stands for off-route. Military listeners have prolled the OR sub bands for years listening to the heavy concentration of military aeronautical traffic that occurs in them. The military does a lot more off-route flying than the civilian aviation population.

In the final acts of WARC 92, Appendix 26, the aeronautical mobile OR frequencies were standardized into channels spaced 3 kHz apart in the same manner as the routed frequencies. Administrations have until December 15, 1997, to fully implement this change.

Here is a complete list of routed and off-routed sub bands:

<table>
<thead>
<tr>
<th>Aero bands</th>
<th>Routed sub bands</th>
<th>Off Routed sub bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>2850-3155</td>
<td>2850-3025</td>
<td>3025-3155</td>
</tr>
<tr>
<td>3400-3500</td>
<td>3400-3050</td>
<td></td>
</tr>
<tr>
<td>3900-3950 (ITU Region 1 only)</td>
<td>3800-3950</td>
<td></td>
</tr>
<tr>
<td>4560-4750</td>
<td>4650-4700</td>
<td>4700-4750</td>
</tr>
<tr>
<td>5450-5730</td>
<td>5450-5680</td>
<td>5680-5730</td>
</tr>
<tr>
<td>6525-6765</td>
<td>6525-6685</td>
<td>6685-6765</td>
</tr>
<tr>
<td>8815-9040</td>
<td>8815-8965</td>
<td>8965-9040</td>
</tr>
<tr>
<td>10005-10100</td>
<td>10005-10100</td>
<td></td>
</tr>
<tr>
<td>11175-11400</td>
<td>11275-11400</td>
<td>11175-11275</td>
</tr>
<tr>
<td>13200-13360</td>
<td>13260-13360</td>
<td>13200-13360</td>
</tr>
<tr>
<td>15010-15100</td>
<td>15010-15100</td>
<td>15010-15100</td>
</tr>
<tr>
<td>17900-18030</td>
<td>17900-18030</td>
<td>17970-18030</td>
</tr>
<tr>
<td>21924-22000</td>
<td>21924-22000</td>
<td>23200-23350</td>
</tr>
</tbody>
</table>
Maritime Mobile Service

If you are looking for communications with a nautical flavor, you have even a bigger selection of frequencies and transmission modes to choose from. Like the aero comms, marine frequencies are divided into subbands. These subbands are used to separate the various modes of transmission that are used on marine frequencies. The basic marine band frequency ranges are:

1635-1800 (ITU Region 1-USB); 2045-2194 (ITU Region 1-USB); 2625-2650 (ITU Region 1-USB); 4063-4438; 6200-6225; 6815-6816; 12330-12330; 14640-14640; 18780-19800; 19680-19800; 22000-22720

Most listeners start their monitoring on the marine bands on the ship to shore radiotelephone duplex channels. These stations carry telephonic traffic from commercial ships/fishing vessels, recreational vessels, cruise boats, and some aircraft more than 50 miles off shore from the station’s respective coast line.

Each channel is paired (3 kHz spacing) and stations operate semi-duplex in USB: ships transmit on one frequency and the coastal stations on another. Here are the respective ship to shore frequency ranges:

**Coast / Ships**

<table>
<thead>
<tr>
<th>Ship Frequency</th>
<th>USB Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>4357-4435 / 4065-4143</td>
<td>6501-6522 / 6200-6221</td>
</tr>
<tr>
<td>8719-8812 / 8195-8298</td>
<td>13077-13197 / 12230-12350</td>
</tr>
<tr>
<td>17247-17407 / 16360-16525</td>
<td>19755-19797 / 18780-18822</td>
</tr>
<tr>
<td>22696-22852 / 22000-22156</td>
<td>26145-26172 / 25070-25097</td>
</tr>
</tbody>
</table>

Most maritime monitors agree that some of the best voice communications can be heard on the simplex marine frequencies. Not only will you hear civilian vessels on these USB frequencies, but U.S. navy and U.S. Army and military vessels from other nations are common visitors on these simplex maritime channels. Keep this list handy for some really neat communications.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>4125</td>
<td>6227</td>
</tr>
<tr>
<td>4146</td>
<td>6230</td>
</tr>
<tr>
<td>4149</td>
<td>6516</td>
</tr>
<tr>
<td>4417</td>
<td>8219</td>
</tr>
<tr>
<td>6215</td>
<td>8294</td>
</tr>
<tr>
<td>6224</td>
<td>8297</td>
</tr>
<tr>
<td></td>
<td>12290</td>
</tr>
<tr>
<td></td>
<td>12333</td>
</tr>
<tr>
<td></td>
<td>12356</td>
</tr>
<tr>
<td></td>
<td>12359</td>
</tr>
<tr>
<td></td>
<td>12369</td>
</tr>
<tr>
<td></td>
<td>16420</td>
</tr>
<tr>
<td></td>
<td>16528</td>
</tr>
<tr>
<td></td>
<td>16531</td>
</tr>
<tr>
<td></td>
<td>16534</td>
</tr>
<tr>
<td></td>
<td>22159</td>
</tr>
<tr>
<td></td>
<td>22162</td>
</tr>
<tr>
<td></td>
<td>22165</td>
</tr>
<tr>
<td></td>
<td>22168</td>
</tr>
<tr>
<td></td>
<td>22171</td>
</tr>
</tbody>
</table>

There is a set of frequency ranges in each marine band dedicated to narrow band direct printing modes. The listener will need a demodulator to decode the digital transmissions in these subbands. The most common digital modes you will encounter include SITOR-A, SITOR-B, and radioteletype (RTTY). Here are the respective coast/ship frequency ranges (0.5 kHz spacing between channels):

**Coast / Ship**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>4210.5-4219.0 / 4172.5-4181.5</td>
<td>6314.5-6330.5 / 6263.0-6284.5</td>
</tr>
<tr>
<td>8417-8436 / 8377-8298</td>
<td>12579-12666.5 / 12477.0-12559.5</td>
</tr>
<tr>
<td>16807-16902.5 / 16883.5-16805</td>
<td>19681-19703 / 18870.5-18992.5</td>
</tr>
<tr>
<td>22376.5-22443 / 22284.5-22443.5</td>
<td>26101-26120.5 / 25173-25208.5</td>
</tr>
</tbody>
</table>

For several years now, usage of Morse code on the Marine bands has been on the decline. Morse code subbands continue to lose spectrum space to the more efficient narrow band direct printing modes at international radio conferences. But there are still many Morse code stations to monitor in the following frequency ranges:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>4221-4351; 6320.5-6501; 8438-8707; 12658.5-13077; 16904.5-17242; 19705-19755; 22445.5-22696; 26122.5-26145</td>
<td>4187-4202; 6265-6300; 8341-8376; 12422-12476.5; 16619-16683; 22422-22279; 25161.5-25171</td>
</tr>
</tbody>
</table>

Ships working these stations can be monitored in the following CW working subbands (0.5 kHz channel spacing):

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1705-1800</td>
<td>5730-5950</td>
</tr>
<tr>
<td>2107-2170</td>
<td>6750-7000</td>
</tr>
<tr>
<td>2194-2300</td>
<td>7300-8195</td>
</tr>
<tr>
<td>2505-2650</td>
<td>9040-9590</td>
</tr>
<tr>
<td>3155-3200</td>
<td>9755-9995</td>
</tr>
<tr>
<td>4000-4063</td>
<td>10100-11175</td>
</tr>
<tr>
<td>4438-4650</td>
<td>11400-11650</td>
</tr>
<tr>
<td>5055-5450</td>
<td>12050-12300</td>
</tr>
</tbody>
</table>

There are other specialized subbands in the marine frequencies for simplex Morse code operations, facsimile transmissions, wideband transmission, and digital selective calling frequencies. A complete breakdown can be found in Bob Grove’s Shortwave Directory, 8th edition, which is available from Grove Enterprises.

Some of the best and most exotic listening occurs in the fixed station frequency ranges. You will never know for sure what you are going to hear in the slices of the shortwave spectrum. Military, press services, weather facsimile broadcasts, spy numbers broadcast, point to point operations, and much more can be heard in the fixed subbands. Just about any mode that can be transmitted on shortwave will be heard in these frequency ranges. I normally tune through the fixed bands with the USB mode set on my receiver.

The fixed frequency bands are:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1705-1800</td>
<td>5730-5950</td>
</tr>
<tr>
<td>2107-2170</td>
<td>6750-7000</td>
</tr>
<tr>
<td>2194-2300</td>
<td>7300-8195</td>
</tr>
<tr>
<td>2505-2650</td>
<td>9040-9590</td>
</tr>
<tr>
<td>3155-3200</td>
<td>9755-9995</td>
</tr>
<tr>
<td>4000-4063</td>
<td>10100-11175</td>
</tr>
<tr>
<td>4438-4650</td>
<td>11400-11650</td>
</tr>
<tr>
<td>5055-5450</td>
<td>12050-12300</td>
</tr>
</tbody>
</table>

If you need to set that clock in the shack, you might want to check out some of the time and frequency standard stations such as WWV in Fort Collins, Colorado or CHU in Ottawa, Canada. Look for standard time and frequency stations on the following frequencies:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500; 3330; 4500; 5000; 7335; 8000; 10000; 12000; 14670; 15000; 20000; 25000</td>
<td>25000.0</td>
</tr>
</tbody>
</table>

Finally, in the upper reaches (25 MHz and above) of the shortwave spectrum you will discover some interesting frequency bands authorized here in the United States. The three most common modes you will encounter are AM (CB/shortwave broadcasters), FM, and USB. These allocations include the following:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>25010-25330</td>
<td>Land Mobile Service</td>
</tr>
<tr>
<td>25330-25600</td>
<td>Government Band</td>
</tr>
<tr>
<td>26100-26480</td>
<td>Petroleum Industry</td>
</tr>
<tr>
<td>26480-26960</td>
<td>Government Band</td>
</tr>
<tr>
<td>26960-27410</td>
<td>Citizens’ Band</td>
</tr>
<tr>
<td>27410-27540</td>
<td>Land Mobile Service</td>
</tr>
<tr>
<td>27540-28000</td>
<td>Government Band</td>
</tr>
<tr>
<td>29700-29800</td>
<td>Forestry Service</td>
</tr>
<tr>
<td>29890-29910</td>
<td>Government Band</td>
</tr>
</tbody>
</table>

Normally these frequencies are pretty quiet during sunspot minimum such as we are in now. But as we see an increase in those cute little black spots on the face of the sun over the next few years, some interesting communications can be heard on these frequencies from time to time, as conditions permit.

So there you have it—the Utility World HF frequency guide. It is an interesting world of communications to monitor in between the amateur radio and shortwave broadcasts bands. Why not pick out your favorite slice of the spectrum and give it a try today to see what you can hear on the utility bands?
Utility Loggings

Larry Van Horn

Abbreviations used in this column

<table>
<thead>
<tr>
<th>AFB</th>
<th>Air Force Base</th>
<th>LSB</th>
<th>Lower Sideband</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALE</td>
<td>Automatic Link Establishment</td>
<td>MFA</td>
<td>Ministry of Foreign Affairs</td>
</tr>
<tr>
<td>AM</td>
<td>Amplitude Modulation</td>
<td>NCC</td>
<td>National Communications Center</td>
</tr>
<tr>
<td>ARQ</td>
<td>Synchronous transmission and automatic repetition teleprinter system</td>
<td>NORAD</td>
<td>North American Aerospace Defense Command</td>
</tr>
<tr>
<td>ARQ-E</td>
<td>Single channel ARQ teleprinter system</td>
<td>NTA</td>
<td>National Telecommunications Authority</td>
</tr>
<tr>
<td>ARQ-E3</td>
<td>Single channel ARQ ITAS teleprinter system</td>
<td>PACTOR</td>
<td>Teleprinter system combining certain characteristics of packet radio and SITOR</td>
</tr>
<tr>
<td>AT&amp;T</td>
<td>American Telephone and Telegraph</td>
<td>ROCC</td>
<td>Regional Operations Center</td>
</tr>
<tr>
<td>BBS</td>
<td>bulletin Board System</td>
<td>RTTY</td>
<td>Radioteletype</td>
</tr>
<tr>
<td>Comstar</td>
<td>Communications Station</td>
<td>RUM-FEC</td>
<td>Romanian diplomatic FEC teleprinter system</td>
</tr>
<tr>
<td>CW</td>
<td>Continuous Wave (Morse code)</td>
<td>SAK</td>
<td>Sintex teleprinting over radio system</td>
</tr>
<tr>
<td>FAF</td>
<td>French Air Force</td>
<td>SITOR-A</td>
<td>Simplex teleprinting over radio system, mode A</td>
</tr>
<tr>
<td>Fax</td>
<td>Facsimile</td>
<td>SITOR-B</td>
<td>Simplex teleprinting over radio system, mode B</td>
</tr>
<tr>
<td>FBI</td>
<td>Federal Bureau of Investigation</td>
<td>Unid</td>
<td>Unidentified</td>
</tr>
<tr>
<td>FEC</td>
<td>Forward Error Correction</td>
<td>USB</td>
<td>United States (U.S.)</td>
</tr>
<tr>
<td>FEMA</td>
<td>Federal Emergency Management Agency</td>
<td>USCG</td>
<td>U.S. Coast Guard</td>
</tr>
<tr>
<td>FHWA</td>
<td>Federal Highway Administration</td>
<td>USN</td>
<td>U.S. National Guard</td>
</tr>
<tr>
<td>GHOST</td>
<td>Global HF System</td>
<td>VHF</td>
<td>United States (U.S.)</td>
</tr>
<tr>
<td>HF</td>
<td>High Frequency</td>
<td>WAC</td>
<td>2157. (Dix -NY)</td>
</tr>
<tr>
<td>HQ</td>
<td>Headquarters</td>
<td>WB</td>
<td>1212. (Dix -NY)</td>
</tr>
<tr>
<td>ID</td>
<td>Identification</td>
<td>WMB</td>
<td>1001. (Dix -NY)</td>
</tr>
</tbody>
</table>

All transmissions are USB (upper sideband) unless otherwise indicated.

All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Time Universal).

2201.0 VIM-Melbourne Radio, Australia, with weather for Victorian coast at 0945. (Eddy Waters-Australia)
3116.0 Intiuk Volmet, Russia, with aviation weather reports in Russian at 1245. (Takashi Yamaguchi-Nagasaki, Japan)
3380.0 4XML-Unid station repeating "V BFR7 de 4XML" in CW at 1415. (Yamaguchi-Japan)
3384.0 FDG-FAF Bordeaux, France, with V CW marker at 2309. (Jack Dixin-Yonkers, NY)
3440.0 6PJX-Unid station repeating "V ABYZ de 6PJX" in CW at 1045. (Yamaguchi-Japan)
3446.0 RSSA-Unid station repeating "V PVZS de RSSA" in CW at 1130. (Yamaguchi-Japan)
3455.0 EBZ-Unid station repeating chirpy CW "BNS de EBZ" at 1315. (Yamaguchi-Japan)
3461.0 Khabarovsk aero, Russia, working various Russian aircraft in Russian at 1150. (Yamaguchi-Japan)
3487.0 LLBM-Unid station repeating call in CW at 1140. (Yamaguchi-Japan)
4035.0 Spanish female 5-digit number station at 0429 AM. (Gordon Levine-Ashenkol, CA)
4227.0 SAKA/G26/3G-Unid station with V CW marker at 2312. (Dix -NY) Probably the Greek naval radio at Piraeus-Laroy.
4232.0 FUF-French Forces Martirene, with 75 baud RTTY test tape at D118. (Sue Wilden-Columbus, IN)
4274.0 KSF-Pal "A" Alto Radio, CA, with CW QO marker at 0945. (Waters-Australia)
4360.0 WCC-Chatham Radio, MA, with CW QO marker at 0127. (Wilden-IL)
4363.0 WOM-AT&T high seas Ft. Lauderdale, FL, with weather broadcasts at 7005 and 7222. (Gary Wysocki-South Wales, NY)
4426.0 VIM-Melbourne Radio, Australia, with weather forecast for Victorian coast at 0945. (Waters-Australia)
4439.5 P7X-unid station with 120 letter groups in CW at 2144. Very strong signal. (J.L. Metcalfe-KY)
4557.0 Reach 40061 with a phone patch to the Dover command post and Metro via ACP at 0309. (Anonymous) TB55-Unid station transmitting in CW "VYV TBV de TB55 QP K" at 2157. (Dix -NY)
4593.5 AFA1A checking in to the USAF Region 1 MARS net at 2325. (Wysocki-NY)
4630.0 English female 5-digit number station in AM at 0241. (Anonymous)
4663.0 Khabarovsk Volmet, Russia, with aviation weather report at 1205. (Yamaguchi-Japan)
4721.0 W1N Working Mailplug at 0531. (Anonymous)
4724.0 Reach 50230 (C-141) with a phone patch to Travis AFB via McCielen GHFS at 0835. Reach 67946 (C-141) with a phone patch to McChord Metro via Andrews GHFS at 2113. (Anonymous)
4788.0 FD122-Unid station with a V CW marker at 2240. (Dix -NY)
4891.5 RCWL-Unid station sending "R2 DE RCWL PS 4890 4880" in CW at 1035. (Dix -NY)
5090.0 FDG-FAF Bordeaux Air, France, with a V CW marker at 2250. (Dix -NY)
5220.0 SYN2-Israeli Mosaic number station at 2149. (Yamaguchi-Japan)
5236.0 AACTMS-USN Jackson MS, checking into a SHARES exercise at 1401. Also had KG191-FBI Knoxville, TN, at 1512; WWJ82-FHWA Grand Island, NE, at 1527; WINM867-SBC Communications St. Louis, MO, at 1439; and WGY1924-Mobile EPA Mobileville, NASHV Nashville, TN, at 1650. 292 was operating from a "staging area" in Tennessee. (Metafel-Cleve-
5340.0 L9CC-Unid station repeating "V CF17 de L9CC" in CW at 1425. (Yamaguchi-Japan)
5371.0 LK7-unid station with a V CW marker at 2131. (Dix -NY)
5457.0 Unid station transmitting 5-letter groups in CW at 2309. (Dix -NY)
5530.0 MIW2-Israeli Mosaic number station in AM at 0222. (Dix -NY)
5746.0 Female English 5-digit number station at 2143. (Dix -NY)
5749.5 4XML-Unid station repeating "V BFR7 de 4XML" in CW at 1459. (Yamaguchi-Japan)
5750.0 English female 5-digit number station at 0400 in AM. (Anonymous)
5752.0 Unid station transmitting 5-letter groups in CW at 2147. (Dix -NY)
5813.5 Unid station using 50 baud RTTY transmitting "DE EIAHYHX" at 2153. (Dix -NY)
6395.0 AQP-Karachi Naval Radio, Pakistan, with V CW marker at 2300. (Dix -NY)
6397.0 JMC3-Tokyo Metro, Japan, with CW weather information at 0923. (Waters-Australia)
6445.0 UFLUK-Vladivostok Radio, Russia, with V CW marker at 2110. (Waters-Australia)
6460.0 UKA-Vladivostok Radio, Turkey, with 50 baud RTTY messages in Russian at 1118. (Waters-Australia)
6480.0 TBH3-Izmir Naval Radio, Turkey, with CW broadcast for T438 at 2303. (Dix -NY)
6536.0 3YA-Unid station sending the following in CW at 2259: "CAMY DE 3YA OBE OY11." (Dix -NY)
6658.0 SYN2-Israeli Mosaic number station at 2149. (Yamaguchi-Japan) Heard same at 1358. (Dix -NY)
6683.0 Nightwatch 01 working Andrews AFB at 0154 testing RTTY systems. (Anonymous)
6692.0 Khabarovsk and Magadan working various air carriers along the eastern seaboard of Russia. (Evan Murray-Auckland, New Zealand) This is a North Central Asia (NCA) regional and domestic air route area (RDARA). Other stations that have been monitored on this frequency (in addition to the above) include: Sovetskaya Gavan (Sov Gavan), Russia and Yuzhno-Sakhalins, Russia-Laroy.
6745.0 ELBS-Israeil Mosaic number station at 1410. (Yamaguchi-Japan)
6751.0 Homeate calling 963/964/Boundary Kilo at 2305. Thought this was a Canadian forces frequency but these units are talking about fuel in gallons. What else is there on this frequency? (Wysocki-NY) This is also used by units working with NORAD and the Canadian RCCP (callign Sidecar). Probably US air assets- Lary.
6754.0 CanForce St. Johns military volmet with aviation weather at 2220. (Wysocki-NY)
6761.0 Indy 82 calling Brickyard Control at 1524. (Metafel-Cleve-KY)
6781.0 HMA-Unid station with CW marker in chirpy CW at 0745. (Yamaguchi-Japan)
6786.0 Spanish female 5-digit number station in AM at 0611. (Anonymous)
6802.2 WWJ85-FHWA Ames, IA, accessing the SHARES BBS in VCTOR at 2237. BBS is maintained by KG04-NCC Arlington, VA. KG04 also maintains the BBS at 15242.0 (Metafel-Cleve-KY)
6803.1 WPEH727 Portable-AT&T Bedminster, NJ, with a "phone call via radio" at 2106. (Metafel-Cleve-KY)
6856.0 Spanish female 5-digit number station at 0329 in LSB. (Anonymous)
6933.0 Unid station transmitting 5-letter groups in CW at 1212. (Dix -NY)
6959.0 English female (British accent) number station at 2229. (Kevin Nauta-
Grand Rapids, MI, via email) Heard same at 2101. (Kenny Love- Columbia, SC) This is an English female 5-digit Lincolnshire Poacher number station-Larry.

9114.5 Unit stations 02 working 03 at 0015. (Anonymous)

9143.5 23 Bravo requesting permission from 10 Foxtown to engage target (a vehilce near a creek) at 0154. (Cawby-WA) Looks like a U.S. Marine frequency-Larry.

9263.0 English female 5-digit Lincolnshire Poacher number station at 1135. Also noted on 1446/13566. (Yamaguchi-Japan)

9641.0 Unid station, female with long series of ARQ letters phonetically at 1445. Possible Mssad station. (Yamaguchi-Japan)

9107.0 ATEE60-Delhi Meteo, India, with a fax (120/576) weather map at 1145. (Waters-Australis)

9140.0 Possible UKA-Vladivostok Radio, Russia, with 50 baud RTTY message in Russian at 1125. Mentioned Vladivostok several times. (Waters-Australis)

9104.0 English female 5-digit Lincolnshire Poacher number station at 1035. Also noted at 17499. (Yamaguchi-Japan)

9159.0 English female 3/2-digit number station at 1115, also noted on 8014/8016 and at 1206 on 7547. (Yamaguchi-Japan)

1106.0 Unid station with Quick Brown Fox and counting in 75 baud RTTY at 1339. Very strong signal, but never gave an ID. (Metcalfe-KY)

11175.0 Unid station passing EAM at 0836. (George Talbot via email). BS 900 working unid GHFS station with phone patch to Raymond 9 at 2230. Arrival message. (Steve Clark-Pampa, TX)

11184.0 ZG9D-Unid station with DE CW marker at 1512. (Dix-NY)

1121.0 Unid station transmitting meteorology codes in CW at 1907. (Dix-NY)

11218.4 Gunpost 21 calling Gunpost 21 Alpha on 11218.4 at 0024. (Anonymous)

11417.0 OLX-Prague Radio, Czech Republic, with V CW marker at 1358. (Dix-NY)

11570.0 English female 5-digit Lincolnshire Poacher number station at 1212, also noted on 13866. (Yamaguchi-Japan)

12070.0 WUG (US Army Corp of Engineers) working various stations on channel 10 at 1555. (Anonymous)

12739.0 UAT-Moscow Radio, Russia, with CW CW marker at 1234. (Dix-NY)

12831.0 3BM-Port Saint Louis Mauritius, with CW marker at 1818. (Dix-NY)

13242.0 Albrook GHFS calling SAM 90030 at 901. (Anonymous)

13346.0 CRA-Unid station sending hand sent KWV Test de CRA at 1821. (Dix-NY)

13516.0 Unid station sending "965 965 11" in CW at 1422. (Dix-NY)

13594.0 Spanish female 5-digit number station at 1830. (Dix-NY)

13886.0 English female 5-digit Lincolnshire Poacher number station at 1135, also noted on 1446/9263 and at 1412 on 11570. (Yamaguchi-Japan)

13874.0 Unid station transmitting 5-figure groups in CW at 1422. (Dix-NY)

14469.0 English female 5-digit Lincolnshire Poacher number station at 1135, also noted on 13866/9263. (Yamaguchi-Japan)

14487.0 English female 5-digit Lincolnshire Poacher number station at 1355, also noted on 15682/16084. (Yamaguchi-Japan)

15641.0 Unid station sending continuous "TTS 364 364 364" in CW at 1452. (Dix-NY)

15682.0 English female 5-digit Lincolnshire Poacher number station at 1040, also noted on 16084/14467. (Yamaguchi-Japan)

16084.0 English female 5-digit Lincolnshire Poacher number station at 1040, also noted on 15682/14467. (Yamaguchi-Japan)

16332.0 V5G-MFA Bucharest, Bulgaria, with 164.5 baud RUM-FC transmission of an eight page economic review at 1140. (Robert Hall-Capetown, RSA)

16355.2 OMZ-MFA Prague, Czech Republic, with news bulletins in Czech using 100 baud RTTY at 0934. Also caught on 16257.2 at 1205. (Hall-RSA)

16363.0 RFFT-F-AF Villacoublay, France with ARQ-3 traffic to RVFV-French Navy Le Port, Reunion, at 1126. (Hall-RSA)

16817.0 WCC-Chatham Radio, MA, with SITOR-B high sea forecast and gale warnings at 1240. (Hall-RSA)

16955.0 YLO-Riga Radio, Latvia, with CW ID "YLO Scan" and SITOR-A idler at 1501. (Dix-NY)

17014.0 A-CNicosia Radio, Cyprus, with CW marker at 1533. (Dix-NY)

17499.0 English female 5-digit Lincolnshire Poacher number station at 1035, also noted on 10452. (Yamaguchi-Japan)

18020.0 SAM 90300 working Ascension Island GHFS (off frequency) at 1913. Moved to 18019 at 1918. (Anonymous)

18380.0 RFFBHU-French Forces Versailles, France, with 5-letter groups ARQ-3 traffic to RFVIT-LE Port, Reunion, at 1525. Also caught RFFAAP, Guerre Driterel with admin traffic to RFVIT at 1530. (Hall-RSA)

19048.8 RAFJ-French Forces Dakar, Senegal, with 192 baud ARQ-3 Code de Vole on the LFA circuit at 1600. (Hall-RSA)

20949.9 6XM-BND/Mossad station using 192 baud ARQ-E with crypto traffic at 1309. (Hall-RSA)
France Quits Shortwave To Us; Others Expand

MT's Jacques d'Avignon reports confirmation that Radio France Internationale would cease all shortwave broadcasts to North America at the end of March due to budget reductions, in favor of satellite and cable. Already in mid-March, Joe Hanlon and I noted the 1200 English broadcast on 13625 replaced by music in French, because of yet another strike. RFI is out of touch with its English audience, its shortwave audience, French audience (which likes music not only during strikes), and its own workers. RFI French-only relays may be found in a few cities such as New York and Boston via AM and FM stations.

Also in the negative column: Russia is cutting back even more on shortwave services; Papua New Guinea had to go commercial; the Investment Channel failed to show up; Radio Japan dumped a lot of programming and staff including its DX show as did Radio Portugal. KNLS Alaska also started over with new people.

There's still some growth: Tibet talks about broadcasting in English; Mongolia sneaked in a new shortwave station including some English; Maldives plans a comeback on SW; XERTA has still been working to get on the air. Religious broadcasting expansions are planned in Chile, Hawaii, Zambia, and already in Georgia. Meanwhile, Radio Free Asia has been uniformly denounced by the Asian dictatorship it targets, fearful of free information. And a Cuban Democrat has been put in charge of Radio Marti!

ALBANIA. For 1997, KNLS has all new programs, writers, and announcers. Four new series are planned introducing Albania. Rather than music, each broadcast will feature a single artist, group, or music style. Marcy Bryan presents a new series of tutorials on American idioms. Personal messages to the KNLS audience of no more than 30 seconds can now be offered for airing, recorded on a good recorder and tape. Include your name and location and then say what you wish; cassettes will not be returned. Carl Mann returns with a new daily series "DX Definitions." For 2-97, English hours are at 0800 on 9615, 1300 on 7365 (Alaska Calling via Christopher J. Williams, World DX Club Contact)

ALBANIA. R. Tirana in early March was reporting on unrest and anarchy, 0145 on 7160; also on 7270 0030-0120+ in Albanian, folk music, 0055 news, 0230 English on 7159.3v. but then missing during anarchy (Roger Chambers, NY) Scheduled broadcasts from R. Tirana and TWR were missing (Chris Hamblly, Australia) TWR HD people in Cary, NC, praying next government will allow TWR (AP NC via Mike Cooper)

ANGOLA. R. Nacional, 3374.92, doing well on all-night service, 0255 mostly English-language pop music, bit of Portuguese talk at 0302-0304, magazine show broadcasts more than 30 seconds 200 English-DX

ANTARCTICA. LRA36, 15476, official schedule is "1900-2100"., includes IDs in English, French at odd times; gives coordinates, requests return postage to this address: LRA36, 9411 Esperanza Station, Tierra del Fuego, Antarctica Islas, Atlantico Sur, Argentina. Planned increase to 3 kW soon (Gabriel /Ivan Barrera, BC-DX) Announcer is Mrs. Adriana Figueroa (Barrera, EDXP via The Four Winds) Opening and closing theme is Asi es mi Argentina (Barrera, RN Radio-Enlace)

AUSTRALIA. Comms Minister Richard Alston has indicated to Channel Ten that if Australia, the international service may stay, contrary to Mansfield Review (ABC news via Mike Cooper)

BAHRAIN. USN personnel confirm R. Bahrain is inactive on SW 6010, 9745 (Dan Henderson, DX Ontario via DXKing with Cumbee Gulf News Agency, WAKH has RTTY press in Arabic 0500-1500 daily on 14764v, 9197v (BBCM) Notvoice as implied on RVI Radio World (gh)

BOLIVIA. R. Illimani at 1055-1102 on 5714, strong. 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-9 = Summer season; W-9 = Winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there.

MTA/397-97 English changes: 0700-1058 Spac 9645, 0730-0930 Eu 9865 (via PanV.codehaus) Not mentioned on DX Partline, but Studio Nine reports that a 5-year project building a new hydroelectric dam to power transmitters, in an eco-reserve with treach-
KURDISTAN New in February was Harim Radio, voice of the regional government of Iraqi Kurdistan (Kurdish; Erê Radîyê Harîm, dangi hukumati harîmi Kurdistani Irâq), 1400-1530 on 4070. Also first heard in Feb, Freedom Radio Station appears to share facilities with Voice of the Iraqi People. FRS (Kurdish: Era Ezayê Azadîya, Dengî hizbi Şuyû'ê Kurdistani Irak), 1630-1700 on 7695 3905-3955V. Voice of the Iraqi People, voice of democracy and progress, radio of the Iraqi Communist Party, in Arabic 0400-0530, 1730-1830 on same. All one hour earlier in summer (BBC Monitoring).

MALDIVES V of Maldives plans to return to SW this year with a 1.5 kW 60m transmitter donated by Australia (Ahmed Ibrahim Didi, Maldives, Cumbre DX via BC-DX).

MALI R. Ramako at 0800 on 7283.88, 9634.93, 11960.16 with ID, local language (Thomas Lindenthalen, Germany, HCJB DX Partyline).

MALTA [non] V of Mediterranean, via Russia on new 12060 ex 7390 /7440 at 2000; registered as Almahy site, but may be Samara (Klaus Lieberow, Germany, via Kai Ludwig, Electronic DX Press) Both heard but better on 7440; no DX program (Tom Sundstrom, NJ).

MEXICO In early March we noticed that XERMX, 7905, had replaced the DX and mailbag programs in Spanish and English by music, so we asked the host of those programs, Dr. Julian Santiago Diez de Bonilla, what had happened. A reply came from Hector Bojorge Garcia (gh) at the end of February. Dr. Julian took his leave of those programs, because he and Alejandro Morales had set a goal of promoting DXing on this station and felt they had fulfilled their objectives and expectations. They believe it is time for people at the station to take over the programs. He is taking a six-month break, to return perhaps on another station. It's very likely that R. Mexico Internacional will produce a DX program like Encuentro DX in a few months. Meanwhile we will hear music.

As for XERTA, there were only two days of testing, in February, at midday and only for a few hours on 4800 kHz, since they had lots of problems with the antenna; they are now building and installing a new one. When they are finished and have some testing dates we will let you know immediately. (Bojorge, World of Radio).

MOçAmBiQuE R. Mozambique National Program in Portuguese is irregular on 4855 at 0245-5210, joined by 9619v at 0329. Announcements in English and Swahili are included at 0245-0255. Variable frequencies used in past include 11816, 7242, 6112, 5110, 4867, 3219. Beira A program is heard on 3370v/6025v, Beira B on 3280v/9637v. Fax in Maputo: +258-1-421816 (BBCM).

MONACO TWR Z-97 English 0655-0820 (Sat 0645-0805, Sun 0645-0820) on new 9755 (BC-DX).

Mongolia R. Ulam Bator was renamed Voice of Mongolia on Jan. 1, since a new commercial FM station is called R. Ulam Bator. English: 1330-1400, 12085 Aura/Sas; 1530-1600 9745, 12085 Aura/Eeu; 1930-2000 9745, 12085 Eu (Japan BCL Federation via R. Japan Media Roundup). New SW station is R. Blue Sky, 4850, 1300-1500* including half-hours in English with news from VOM, language lessons (Nagoya DX Circle via Electronic DX Press). Mostly Western pop music, with English lessons at 1300-1330, 5-minute English news after 1400; heard as early as 0900, probably leased frequency.

Korea South R. Korea went live on Internet March 3 with programming from the 7275 channel, including English hours at 0200, 2000 (Bill Matthews, OH). http://www.kbs.co.kr/ Also adding toll-free fax number from 22 countries for reports including from USA 1-888-229-2312; Canada 1-888-221-5864; E-mail addresses for each language service by June (RKI SW Feedback) No change in Z-97 English schedule direct from Korea, only from relays. Skeleton 3970 at 2100 ex 1930.- usual Saeklee 1030 1117 ex 1130 9650 (RKI SW Feedback) KBS-1 still has English news at 1350 on 3390, announced as Mon-Sat (Dave Valko & Hans Johnson, Maui, Cumbre DX via DX Window).

DX Listening Digest

More broadcasting information by country compiled by Glenn Hauser

Review of International Broadcasting

SW Programming, opinion, equipment, satellite monitoring. Samples $2.50 each (outside North America US $3 or 6 IRCs) 10 issue subscriptions $26 in USA, or both for $49.

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

May 1997 MONITORING TIMES 39
TIBET. For several evenings last November, they had an English ID, "People's Broadcasting Station of Tibet." Also, "You are tuned to Tibet" and "Radio Tibet, Lhasa. This broadcast is for overseas listeners." Also indicated plans to broadcast in foreign languages such as Japanese. That was at 1500; then since they give the same English ID at the same time every night, but no foreign languages noted as yet. We shall see. They went off 7110 about two years ago. Were on 7195 for a while and now is under VOA. 7195 is an old Xiangjiang spot but they too left it long ago. It is now occupied by V. of Russia in Chinese until 1600.* (Mike Ryan, HSZC2, Bangkok)

TRIKEY Two VOT transmitter at Çakırkalar were off for repairs, causing schedule changes and fewer SSB broadcasts (BC-DX) Tentative 2-97 English: 0300 on 6200, 2720, 15190; 1230 on 13695, 15290; 1830 on 9445, 13659-LB; 2220 on 6135-LB, 7280, 9560, 9655 (TRT via Benno Klink, BC-DX)

U O K O B A N Y Latest audience research puts BBC first in world with an audience of 143 million worldwide at least once a week (Graham Myton, Controller of Marketing, BBCWS, on VOA Communications World)

USA FCC granted WRMI second antenna toward NAm on Feb 26; unknown how long before on air (Marcel Rommers, DSWC DX Window)

Brother Stair heard on new 7445 around 1300, ID for WRNO (gh, OK) WRNO now authorized on 7445 at 0900-1600 (George Jacobs & Associates via George Thurman) Originally on 7445 by mistake.

It was a shock to read the report on KVÖH in Feb Mt. I have an engineer scheduled to take corrective action. Your report on spurious emissions is appreciated and the first complaint I’ve received. Our transmitters are very old and we look forward to modernizing them. In the meantime it is our policy to operate all of our equipment according to FCC regulations (Paul Johnson, General Manager, KVÖH)

WNB good here, but on phone said only 15 kW, not 50 (Hans Johnson, CO, DXing with Cumbré) 15715, 11740, 11950

WVHA continued week to week with its bank balance dipping as low as $200. The loan company agreed to refinance in early March at half the payment, $36.5K, as announced on a Sabbath update with a constant high noise level on frequency and blanketing at least 20 kHz, probably caused by misadjusted satellite link, snow in the dish (gh)

Monitor Radio Intl announced a new address for Letterbox, 49–52 past the hours on weekdays: Box 1524, Boston, MA 02117–1524 (Jim Moats, Dave Jeffery) R. Free Asia added Korean in early March: 2200–2300 on 7495, 7530, 7550, 9455-KHBI, 9650: 1530–1630 on 5855, 7520, 9980, 11600, Vietnamese at 1400–1500 also on 9930 which is KHMR Hawaii. Chinese at 2300–2400 added VOA Delano 11870; 1500–1600 added VOA-Delano 9805 (BC-DX) Extended to 1700 also 9850 (Art Bailey, CA) 9980 is KHBN Palau (BC-DX) Only one audible here at 1530 (gh, OK) Richard Richter, head of RFA said Korean service would be "open format" including reading letters to relatives (source deleted by HCJB DX Partyline) RFA is aimed at spreading the decadent American way of life, and ideology, curing the national consciousness of Asian people, obliterating their national cultures (KCNA, Pyongyang, via BBC) See also SAIPAN

Miami lawyer Hermilio San Román, a Democratic Party activist, has taken over as head of the Office of Cuba Broadcasting, which includes Radio Martí (Karen Branch & Cynthia Corzo, Miami Herald via Mike Cooper)

Voice of America put out a 1997 wall calendar, "State Fairs—An American Tradition" with colorful shots of midways, etc. Unfortunately, Americans are not allowed to have it (gh) Studio One, which was a place for long-form productions, last aired Feb 16, but may come back as specials; replaced by Studio 38 Sun 1230, 1630, 2130 (VOA Communications World) Checked it one week, heard silly little segments-gh.

WORLD OF RADIO Anticipated May schedule on WWCR: Thu 2030 15685, Sat 0530 5070, 1130 7435, 1300 15685, Sun 0730 5070, 0930 2210, 2330 5070, Tue 1230 15685. In June, July and August the 530 airing will be on 1216. After numerous complaints, WWCR agreed to provide its program schedule on website not only in tables but in text format (gh)

MW harmonics noted: 2480, WW2Q, Aberdeen MS at 1115–1125 with 105.3 FM ID; 2680, WLDY, Ladysmith WI, 0328–0400, 1130–1200 very good one day, gone the next (Dor Moore, IA)

ZAIRE V. of the People, Sunia, heard on rebel-controlled 5066 transmitter at 0430–0500, 1500–1530; elsewhere still R. Candio (BBCM)

ZAMBIA HCJB is looking for a site in Africa; application has been pending a long time for a mid-sized SW station here, but progress is slow. Another missionary station, Christian Voice is already on the air; unlike its domestic target, HCJB’s will serve many CIA countries and languages. Would sound like HCJB with general-interest, not just religious programs. Another regional SW has been waiting for 5 years in a secret country. Several other possibilities for an HCJB outlet are pending (Roger Stubbe, HCJB DX Partyline)

Until the Next, Best of DX and 73 the Glenn

http://hudson.id.net/~kercher19/radio/shortwave/guhauser
Broadcast Loggings

Gayle Van Horn

0001 UTC on 5890

0020 UTC on 4419.4

0055 UTC on 11905
THAILAND: Radio Thailand. PGA and related American sports results. Station sign-off to Westminster chimes at 0100 introducing new language service. (Sue Wilden, Columbus, IN)

0140 UTC on 4566.4
PERU: Radio Gotas de Oro. Station ID and greetings to friends, including myself and Henry Klementz in Bogota, Colombia. Additional Peruvians logged as: Radio Quilabamba 5025 at 1120; Radio Tropical 4935 at 1125; Radio Chanchamayo 4895.1 at 1140; Radio Hora 4855.5 at 1158; Radio Universal 5767.2 at 1204; Radio Apurimac 5263.3 at 1207. (Arrunategui, Perú /TWF).

0229 UTC on 6090
ANGUILLA: University Network. Contemporary instrumental stations to station break ID and mailing address: (P.O. Box 1, Los Angeles, CA 90053). Teachings from Romans and Doc's "unique" approach to tithing. "DOCNET" website: -http://www.drcenescoll.org>- 1-800-335-3030. (Sam Wright, Biloxi, MS)

0315 UTC on 3270

0400 UTC on 9745
ECUADOR: HCJQ. News program. No: considered "DX" to the U.S. listener; however, HCJQ had excellent coverage of the presidential and political crises. (Silvi, OH) Spanish service 0200 to 5860. (Wilden, OH)

0400 UTC on 3320

0525 UTC on 7385
COSTA RICA: Radio for Peace Int'l. Easy-listening programming to donation request and address. (Terrry Jones, Plankiton, SD)

0558 UTC on 5070
USA: WWCR. American Worldwide program. (Jones, SD; Bob Fraser, Cohasset, MA)

0600 UTC on 3366
GHANA: GBC. Evening show with lottery numbers, local time checks, commercials with jingles and "Radio 2." ID. (Hewitt, AZ; Jones, SD)

0730 UTC on 3945
VANUATU: Radio Vanuatu. (Tentative). English/French programming including a British/Australian commercial for "healthy smile; healthy teeth." (Silvi, OH) I'd bet this was Vanuatu, thanks for the log, not reported often. Station address: P.M.B. 927, Port Vila, Republic of Vanuatu. -ed.

0816 UTC on 7175
RUSSIA: Radiostantzia Tikhii Okean (Radio Pacific Ocean). This daily Russian-language broadcast for sailors in the Pacific, opens with chimes and "Gavortov Vladivostok," followed by a mix of news, fishery and shipping features, pop music, and telephone calls from listeners. Sign-off occurs at 0900 UTC. Coming as it does from the Russian Far East, this signal is quite strong in central California, and can be easily be found as the carrier is left on with "dead air" between Voice of Russia's English language sign-off at 0800 UTC and the Tikhii Okean sign-on at 0815. (Rick Albright, Merced, CA via email)

0934 UTC on 11635
PHILIPPINES: FEBC/Radio Int'l. English monitored to 1007. Piano and orchestra music to religious sermon to 1005. Music pauses, announcement with address and ID as, "this is FEBC International." Fairpoor signal monitored in USB. (Giovanni Serra, Rome, Italy, TFW)

1004 UTC on 9700
NEW ZEALAND: Radio NZ Int'l. News coverage of the Pacific region.

(Wilden, IN) This frequency monitored to 1130. (Fraser, MA)

1140 UTC on 9860
AUSTRALIA: Radio Australia. Report on Australian/Vietnamese culture exchange //9580. (Fraser, MA; Wilden, IN)

1245 UTC on 11650
SWEDEN: Radio Sweden. Sounds Nordic show focusing on the continued search for the Loch Ness Monster. (Wilden, IN)

1505 UTC on 4925
INDONESIA: RRI-Jambi (Sumatra). Indones. News coverage on Sumatra and Java. Indos logged as; RRI-Ujung Pandang (Sulawesi) 4753.2 at 1510; RRI Bukittingi (Sumatra) 3231.9 at 1655. (Walter Mola, Torino, Italy /TWF)

1700 UTC on 15320
ITALY: RAI. Italian broadcast to Africa. News, sports headlines, cultural program and music. RAI noted in Italian as; daily 1400-1430 on 15250//17780; daily 1830-1905 on 9675//18100; Sunday 1345-1700 on 17780. (Augustine Sabbatino, New York, NY)

1856 UTC on 9955
SWITZERLAND: (Non). Radio Sparks relay via VFMI, Miami, FL. Pop/rock tunes to plenty of station IDs and QSL information/address. (P.O. Box 510, 04010 Basel, Switzerland). Music from pop group singing Walking On A Milky Way and Its a Beautiful Life from Swedish pop group Ace of Base. Great show, look for this one again June 28th. (Gayle Van Horn, Braintree, MA)

2002 UTC on 7155

2035 UTC on 5940
RUSSIA: Voice of Russia. Program Moscow Yesterday and Today featuring story on Ivan the Terrible's ordering the death of Metropolitan Church priest Philip. (Fraser, MA)

2100 UTC on 11715
MALI: China Radio Int'l. News on the return of Hong Kong to China. //1500 poor signal quality. (Fraser, MA; Jones, SD)

2100 UTC on 5970
CZECH REPUBLIC: Radio Free Europe (via Prague). Lithuanian. One hour of international and regional programming. (Pazera, Brazil) RFE heard on this frequency 2304-0000. (Stokes Swartz, Madison, WI, via email)

2100 UTC on 6070
CANADA: CFPRX. Weather and traffic update. Radio Canada Int'l on 9805 at 2107, with national weather forecast to sports headlines and hockey scores. Feature with Jim Craig on //5925, 11945, 17820. (Jones, SD; Wilden, IN)

2117 UTC on 9615
RWANDA: Deutsche Welle relay. Story on waltzing in Vienna. (Wilden, IN) Rwanda DW noted on 15275 at 2100. (Swartz, WI)

2135 UTC on 9620
CUBA: Radio Havana. Spotlight on the Americas program featuring Costa Rica's economic struggles. (Fraser, MA) Programming noted 5180 at 2230. (Jones, SD)

2243 UTC on 7450.2
GREECE: Voice of Greece. Greek pop music vocals to IDs at 2250, 2301 with RTTY station interference. (Schwartz, WI; Wilden, IN)

2320 UTC on 9655
TURKEY: Voice of Turkey. Another Province show with Subah Province profiled. (Fraser, MA)

2340 UTC on 5012
DOMINICAN REPUBLIC: Radio Cristal Internacional. Musical Domini- canprogram to numerous IDs as; "Radio Cristal Internacional la voz de la Republica Dominicana." (Silvi, OH)

2350 UTC on 11795
NETHERLANDS ANTILLES: Deutsche Welle Antigua relay. German service of classical musical program. BBC World Service's Antigua relay noted on 5975 at 0130 discussing supernovas. (Fraser, MA)

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.
Radio Mexico Internacional continues to delight DXers with a brisk QSL return rate. Juan Mort, the station manager, welcomes your correspondence and inquiries about Mexico in Spanish, English, Italian, or French. Send your report with one U.S. dollar, mint stamps of Mexico, or one IRC to: Apartado Postal 21-300. Codigo Postal 04021, Mexico City, DF Mexico. The station is also available via e-mail: imer@mpsnet.com.mx.

COASTAL STATION

IAR Rome Radio, 13011.0 kHz. Full data prepared QSL card stamped with station seal, signed by Pietro Tanganini, plus station schedule, business card and amateur QSL card (IKOOGT). Received in 356 days for an English report and one U.S. dollar. Station address: Telecom Italia, DCP/STD/SQIR, Viale Europa 190, 00139 Roma, Italy. (Richard W. Parker, Rochester, NY)

DOMINICAN REPUBLIC

Radio Amantece Internacional, 6025 kHz. Partial data Certificado de Sinotonia verification card with illegible signature. Received in 300 days for a Spanish report and one U.S. dollar. Station address: Apartado 1500, Santo Domingo, Dominican Republic. (Darren White, Hattiesburg, MS)

FM/MEDIUM WAVE

WRMA-FM 106.7 kHz. Full data letter signed by Haz Montana plus a station sticker. Received in 15 days for a Spanish FM report. Station address: 3191 Coral Way, Suite 100, Miami, FL 33145. (Jose Moura, Washington, DC)

WABC AM 770 kHz. Full data station QSL card signed by Bill Krause. Received in 30 days for an English AM report. Station address: 2 Penn Plaza, New York City, NY 10121. (Moura, DC) Musicradio 770 WABC website: <http://musicradio.computer.net> -ed.

FRENCH POLYNESIA

RFO/Radio Tahiti, 15168 kHz. Full data station logo card unsigned. Plus RFO sticker and coverage map. Received in 7 months for an English report, cassette tape, one U.S. dollar and local station bumper stickers. Station address: Boite Postal 125, Papete, Tahiti. (Michael T. Prindle, New Suffolk, NY via mail) QSL this station while you can...they plan to leave Tahiti in the near future.-ed.

JORDAN

Radio Jordan, 11970 kHz. Full data QSL card stamped with station's seal, signed by Jawad Zada. Program schedule and station decal enclosed. Received in 61 days for an English report and three IRCs. Station address: P.O. Box 909, Amman, Jordan. (White, MS)

MEXICO

Radio Mexico Internacional-XERMX, 9708 kHz. Oversized data station logo card unsigned. Station sticker, program schedule, report form and large felt pennant enclosed. Personal letter in English from Juan Mort-Manager on station letterhead. Received in 26 days for an English report, mint stamps, souvenir postcard and self-addressed envelope (not used for reply). Station address: Apartado Postal 21-300, Codigo Postal 04021, Mexico City, DF Mexico.(Gayle Van Horn, Brassstown, NJ; Prindle, NY)

MOROCCO

Radio Medi Un, 9575 kHz. Full data QSL card with illegible signature. Received in 241 days for a French report and two IRCs. Station address: Boite Postal No. 2655, Tangier, Morocco. (White, MS)

NON DIRECTIONAL BEACONS

ZLS-526 kHz. Stella Maris International Airport, Bahamas. Full data prepared QSL card returned with illegible signature of supervisor. Received in 10 days for an English utility report and mint stamp. Station address: FAA, Enroute SSC (Caribbean), 7500 N.W. 58th St., Miami, FL 33166.(Rand Stewart, Springfield, MO)

PP-513 kHz, Omaha, Nebraska. Full data QSL letter signed by James E. Owens-KQ0QI. Received for a follow-up NDB report of CW beacon identification. Original report sent to Eppeley Airfield. Station address: U.S. Dept. of Transportation, Federal Aviation Administration, Omaha, NE 68110. (Hank Holbrook, Dunkirk, MD)

EEX-309 kHz, Swainsboro, Georgia. Full data prepared QSL card verified with illegible signature. Received for a NDB report of CW beacon identification. Station address: Emanuel County Airport, Swainsboro, GA 30401. (Holbrook, MD)

NORTH KOREA

Radio Pyongyang, 9977 kHz. Full data color scenery card unsigned plus a red and blue cloth pennant. Received in 72 days for an English report mailed while in Stuggart, Germany. Station address: External Service, Korean Central Broadcasting Station, Pyongyang, Democratic People's Republic of Korea. (Frank Hilton, Charleston, SC)

SEYCHELLES

BBC Indian Ocean Relay Station, 11730 kHz. Full data letter on BBC station letterhead, signed by Nigel Bird. Received in 26 days for an English report and two IRCs. Station address: P.O. Box 448, Victoria, Mahe, Seychelles. (White, MS)

SHIP TRAFFIC

MV Stewart J. Cort WY3931, 4077 kHz. Full data prepared QSL card returned as verified, plus photo of vessel. Received for an English utility report. Ship address: c/o Canal Station, Sault Ste. Marie, MI 49783. (Steve McDonald, Wayne Bay, BC Canada)

Sanko Express DSY A, 156.8/156.65 MHz(Tanker). Full data QSL letter received for an English utility report and one U.S. dollar. Ship address: Sanko Steamship Co., Ltd., Skin Yuraku Blg., 9th Flr, 12-1, Yurakucho 1 Chome, Chiyoda-ku, Tokyo 100, Japan. (Holbrook, MD)

SOUTH AFRICA

Channel Africa, 15240 kHz. Full data QSL card signed by Kathy Otto, plus station sticker and frequency schedule. Received in 54 days for an English report. Station address: SENTECH (Pty) Ltd., Shortwave Service, Private Bag X06, Honeydew 2040 South Africa. (Paul Jablonowski, Greenfield, WI) Channel Africa station website: <http://www.sabce.co.za/units/chanafr/index.html>. You may also send a reception report from your browser at: <http://www.sentech.co.za/reception.html> or email your report to: ottos@sentech.co.za. Don't forget to visit Sentech's website: <http://www.sentech.co.za> -ed.

STANDARD FREQUENCY SIGNAL STATIONS

YV50, 5000 kHz. Full data station logo card plus station info sheet. Received in 115 days for a Spanish report and one U.S. dollar. Station address: Observatorio Capigal, Apartado 6745, Armada 84-DHN, Caracas 10, Venezuela. (Albert Lozano, Wilkes-Barre, PA) This station is not listed in the 1997 WRTVH -ed.

CHU, 3330 kHz. Partial data CHU card unsigned. Received in 14 days for an English report. Station address: National Research Council, Ottawa, Ontario, Canada K1A OR6. (Sam Wright, Biloxi, MS)

From the Dallas-Ft. Worth airport comes word of a new Travelers Information Station (TIS) on 1640 and 1680 kHz, broadcasting 24 hours. These low powered radio transmitters broadcast travel information and points of interest. However, this unusual TIS station is transmitting at 60 watts! Send your reception report and return mint stamps to: Mr. Art Blair, P.O. Box 619428, Dallas-Ft. Worth Airport, TX 75261.

www.americanradiohistory.com
### 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 Daylight Savings Time) 4,5,6, or 7 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 (8:30 pm Eastern, 5:30 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  
- W: Wednesday  
- M: Monday  
- Y: Saturday  
- 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 half way point 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 “vf” (various languages).

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

Not all stations can be heard and none of the time are on all frequencies. To help you find the most promising frequency, we’ve included information on the target area of each broadcast. Frequencies beamered 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  
- na: North America  
- ca: Central America  
- sa: South America  
- eu: Europe  
- af: Africa  
- 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

<table>
<thead>
<tr>
<th>Days</th>
<th>Time</th>
<th>Station Name</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sundays</strong></td>
<td>0200</td>
<td>Radio Exterior de España: “DX Partyline”</td>
<td>6900</td>
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<tr>
<td></td>
<td>0210</td>
<td>Radio Exterior de España: “Distance Unknown”</td>
<td>6900</td>
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<tr>
<td></td>
<td>0310</td>
<td>HCJB (am): “DX Partyline”</td>
<td>6900</td>
</tr>
<tr>
<td></td>
<td>0320</td>
<td>WWCR #3 (Tennessee): “World of Radio”</td>
<td>6900</td>
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<tr>
<td></td>
<td>0330</td>
<td>Radio Havana Cuba: “DXing with Cumbre”</td>
<td>6900</td>
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<tr>
<td></td>
<td>0340</td>
<td>WWCR (am): “DXing with Cumbre”</td>
<td>6900</td>
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<tr>
<td></td>
<td>0350</td>
<td>AWR- Europe (Slovakia): “Media Scan”</td>
<td>6900</td>
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<td></td>
<td>0400</td>
<td>Radio Exterior de España: “Distance Unknown”</td>
<td>6900</td>
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<td></td>
<td>0410</td>
<td>HCJB (am): “DX Partyline”</td>
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<td></td>
<td>0430</td>
<td>Radio Havana Cuba: “DXers Unlimited”</td>
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<td>0440</td>
<td>AWR- Europe (Slovakia): “Media Scan”</td>
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<td></td>
<td>0450</td>
<td>Radio Exterior de España: “Distance Unknown”</td>
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<tr>
<td><strong>Mondays</strong></td>
<td>0200</td>
<td>WWCR #3 (Tennessee): “World of Radio”</td>
<td>6900</td>
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<td></td>
<td>0210</td>
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<td>HCJB (am): “DXing with Cumbre”</td>
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<td><strong>Tuesdays</strong></td>
<td>0255</td>
<td>Radio Romania Intl: “For Radio Amateurs”</td>
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<td>0260</td>
<td>WWCR (am): “DXers Unlimited”</td>
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</table>

(Continued on page 102)

**Media Roundup**, Roundup, Japan’s DX/Media program, was discontinued in April. The monthly “Receiver Test Report” heard in that program and hosted by Lawrence Magne and Ian MacFarland will be sorely missed.
### FREQUENCIES

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### INTERNATIONAL CALLSIGN DIRECTORY

**The most exhaustive list of tactical callsigns and callidentifications ever published for shortwave and scanner listeners in a massive 250 page directory!**

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**Shortwave Guide**

0000 UTC

8:00 PM EDT/5:00 PM PDT

0100 UTC

9:00 PM EDT/6:00 PM PDT

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**International Callsign Directory**

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### Macintosh Software

**SHORTWAVE NAVIGATOR**

**FREQUENCY VALET • UTCLOCK**

**SEND $2 for demo disk to:**

**DX Computing • 232 SQUAW CREEK RD, WILLOW PARK, TX 76087**

**HAUSER’S HIGHLIGHTS**

**BULGARIA: R. BULGARIA**

**Summer hours for English UTC**

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**ANALYSIS:**

- **Country/City:** Refers to the country and city where the radio station is located.
- **Frequency:** The frequency at which the radio station broadcasts.
- **Notes:** Additional information or notes about the broadcast.
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**Frequencies**

- **1200-1300 irreg** Anguilla, Caribbean Beacon
- **1200-1300** Australia, Radio
- **1200-1300** Australia, VLB A Alice Sgp
- **1200-1300** Australia, VLB A Alice Sgp
- **1200-1300** Brazil, Radio Bras
- **1200-1300** Bulgaria, Radio
- **1200-1300** Cambodia, VOA Voice of
- **1200-1300** Canada, CBC C Norwich
- **1200-1300** Canada, CHV Montreal
- **1200-1300** Canada, CFXR Toronto
- **1200-1300** Canada, CVPV Calgary
- **1200-1300** Canada, CHXML Halifax
- **1200-1300** Canada, CKXN St John's
- **1200-1300** Canada, CKZU Vancouver
- **1200-1300** Canada, Canada Radio CFL
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- **1200-1300** China, China Radio Intl
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- **1200-1300** Costa Rica, Adv World
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- **1200-1300** Costa Rica, Voice of

**MONITORING TIMES**

- **8:00** AM EDT/5:00 AM PDT
- **9:00** AM EDT/6:00 AM PDT
- **10:00** AM EDT/7:00 AM PDT
- **11:00** AM EDT/8:00 AM PDT
- **12:00** PM EDT/9:00 AM PDT
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**THANK YOU ...**

**ADDITIONAL CONTRIBUTORS TO THIS MONTH'S SHORTWAVE GUIDE:**

John Babbis, Silver Spring, MD; Clyde W. Harmon, Anniston, AL; Rev. Michael G. Mayer, Dover, DE; Jim Moats, Ravenna, OH; Bill Scarborough, Knoxville, TN; Larry van Horn, Brästattown, NC; Alden C. Wires Jr., East Point, GA; BBCMS; BBC Summary of World Broadcasts; BBC On-Air; Internet Shortwave Newsgroups; Cumbre DX; Fine Tuning.

WorldRadioHistory.com - 100 Years of Broadcasting
New NRD-345 From JRC:

It's coming soon and it's hot: the JRC NRD-345 shortwave receiver is brimming with great features — see page 4 and reserve yours today!

Introducing the New and Improved SW8 from Drake!

This combination desktop/portable world band receiver from R.L. Drake—with its recent improvements in sensitivity, selectivity and noise reduction—is now an excellent value for all-around DXing. Not only continuous coverage 500 kHz-30 MHz, but 87-108 MHz FM broadcast (stereo at headphone jack) and 116-136 MHz aircraft as well! Standard and synchronous detection AM, upper and lower sideband on medium and shortwave, direct frequency entry keypad, 0.5 microvolt sensitivity, dual 6/4 kHz selectivity on AM, sharp 2.3 kHz selectivity on SSB. Up-conversion eliminates images, while +10 dB intercept point suppresses intermod. Also, now includes an amplified whip antenna on all frequencies. See specifications on pp. 8-9.

"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."

—Larry Magne
Monitoring Times
November, 1996
**RECEIVERS**

**DRAKE R8-A**

A Classic in the Great Tradition of R.L. Drake

The successor to the famous R8 is here — A new standard-bearer among shortwave receivers!

The Drake R8 has been internationally respected for its excellent audio, frequency agility (100 kHz to 50 MHz, expandable to 35-55 and 108-174 MHz with optional converter), friendly control panel, synchronous detection, noise blanker, pasband tuning, preamp/attenuator selection, universal power supply, dual clock timers, giant display, five filter bandwidths, and six receiving modes. Now Drake has added over a dozen important improvements to their legendary R8 receiver (see bullets below). See specifications on pp. 8-9.

- Single-keypress mode and bandwidth selection
- Alphanumeric display of station identification
- Improved overload immunity
- 440 memory records
- Rapid scanning
- Enhanced tone control
- Tighter frequency stability
- Strong metal tilt bail
- Expanded-function R8232 computer control
- Removable/replaceable line cord

ORDER RCV 3

$1059.95

For improved CW or sideband listening, use your R8-A with the Grove SP-200 Sound Enhancer, sold separately at left (SPK 13). Available 6/97.

**ACCESSORIES**

- ACC 42 VHF converter $219.95 + $20 install
- ACC 5 Metal tilt replacement $34.95
- ANT 2 Grove Skye iva antenna $39.95
- ANT 24 Dynrek active antenna $179.95
- MAN 2 Service manual $39.95
- SPK 2 External speaker $48.95 plus $6 UPS
- SPK 13 Grove Sound Enhancer $199.95

**DRAKE’s New SW2 Receiver!**

Now Drake has introduced a new, affordable receiver featuring the conveniences and simple operation of the popular SW1, but adding single sideband, selectable sideband synchronous detection, bargraph 5-meter, 50 Hz tuning steps, improved RF gain control, enhanced LED display with 100 Hz readout accuracy, and even a remote control option!

Continuous tuning from 100 kHz through 30 MHz, 100 memory channels, dual antenna inputs, double conversion design, compact size (10-7/8" W x 4-3/8" H x 7-5/8" D), lightweight (5.8 lbs), dual power supply (12 VDC, 120 VAC adapter included), high sensitivity, wide dynamic range (100 dB), front-mounted speaker, and more make this receiver an excellent value.

ORDER RCV14

$489.95

**ACCESSORIES**

- BRK12 Carrying/tilt handle $48.95
- ACC09 IR remote control $48.95
- BRK13 Mobile mounting kit $14.95

**GRUNDIG**

**Yacht Boy 400**

With great-sounding AM/FM stereo and continuous shortwave frequency coverage from 1.7-50 MHz in 5 or 1 kHz tuning increments, SSB, infinite fine tuning, FM broadcast reception, and battery or AC power convenience, the compact 400 also offers 40 scannable memories and simple pushbutton tuning.

Requires 6 AA cell batteries. See specifications on pp. 8-9.

ORDER RCV 22

$199.95

**ACCESSORIES**

- ANT 3 Grove Mini-Skywire $39.95
- ANT 21 Select-A-Tenna $65.95
- ANT 32 Kuma Pocket Loop Antenna $119.95
- BAT 3 AA alkaline batteries $7.95
- PWR 18 AC adapter (9V 400) $7.95
- SPK 11 Naval HTS speaker $29.95
- SPK 13 Grove Sound Enhancer $199.95
- Tun 4A Grove Tun AAA Muntiner Plus $99.95

**WiM RADIO**

A wide-frequency-coverage receiver that lives inside your computer!

Imagine — plug a small PC card into your computer, load the simple software, and turn your PC into a potent, wide-coverage monitoring station! User-friendly software allows all the usual receiver controls, plus much more. Rugged shielding resists interference from the host computer. Enjoy continuous 500 kHz through 1.500 MHz (less cellular) frequency coverage, multimode reception of AM, wide and narrow FM, and single-sideband, up to 16 memory banks with a virtually limitless number of channels; display records in memory by frequency, callsign, or comments field; scan by bank, grouping, or mode; and automatically search for activity by entering your choice of frequency limits.

BNC connector allows attachment of your antenna system, while a mini-jack permits connection of speaker or earphones. One-microvolt nominal sensitivity assures weak signal pickup.

Easy installation, full instruction manual included. Can be used with DOS 3.0 and a 286 platform, but this unique receiving laboratory unlocks its power with Windows 3.1, requiring 386 or higher, 1 Meg RAM, 1 Meg hard disk space, VGA monitor, or Windows 95, requiring 486 or Pentium, 4 Megs RAM, and an SVGA monitor. See specifications pp. 8-9.


ORDER RCV 16

$589.95

**ACCESSORIES**

- ANT 1 Grove Scanner Beam Antenna $59.95
- ANT 2 Grove Skywire Antenna $39.95
- ANT 3 Grove Mini Skywire Antenna $29.95
- ANT 7 Scantenna $39.95
- ANT 9 Wideband Discane Antenna $87.95
- ANT 15 Skymatch Active Antenna $99.95
- Tun 4A Grove Tun 4A Muntiner Plus $99.95

UPS Second Day Air at Ground Rates on All Products!

www.americanradiohistory.com
World-Class Receivers from

AR-5000

Super-wide-coverage receiver ranks among the best ever made!

AOR has scooped the market with their new AR5000 extended-frequency coverage receiver, tunable from 10 kHz through 2600 MHz (less cellular) and offering 650 memory channels. For the first time, you can hear VLF time signals and naval communications, international shortwave broadcasting, worldwide single-sideband communications, civilian and military aeronautical transmissions, VHF/UHF public safety radio, ham repeaters, microwave earth satellites, and much, much more all on one receiver!

This triple-conversion luxury receiver offers outstanding sensitivity (0.15 microvolt SSB, 0.3 microvolt VHF/UHF FM, 0.6 microvolt AM), rapid 50-channel-per-second scan/search speed, 1 Hz to 1 MHz programmable tuning steps, all mode reception (AM/FM/LSB/USB/CW), selectable IF bandwidths (3/6/15/40/110/220 kHz), superb frequency stability (+/-1 ppm, 0-50 deg. C.), mobile or fixed power (12 VDC / 120 VAC), and much, much more. See detailed specifications on pp. 8-9.

NEW! AR7030 High Performance Shortwave Receiver is SWL’s Dream

“Arguably the best receiver on the market, regardless of price.”
—Larry Magne
Monitoring Times,
April, 1996

The sleek styling of the English-designed receiver symbolizes its superior performance. Its 105 dB dynamic range, +35 dBm third-order intercept rating, and razor-sharp selectivity guarantee signal overload immunity under conditions that would stagger other high-end receivers, yet its 0.3 microvolt SNR sensitivity snags even the weakest signals.

Continuous 0.5 MHz frequency coverage, high-stability TCXO oscillator, all-mode reception, synchronous detection, superb audio quality, compact portability, 2.6 Hz tuning increments, interference-resistant shielding, passband tuning, noise compressor, 100 scannable memory channels plus dual VFOs, enhanced AGC, programmable attenuator, and numerous other features combine to make this one incredible, affordable receiver. See detailed specifications on pp. 8-9.

Order your AR-5000 or AR7030 today!
**ICOM R8500!**

Now $100 Off Original Price Plus Free GRE Converter & Free 2nd Day Air Shipping! Over $200 Discount in All!

Here’s what you get if you order now:
- The ICOM R8500 at $100 below original price of $1999.95
- A FREE GRE Superconverter ($585 value)!
- FREE 2nd Day UPS shipping ($17 value) from Grove!

Order now, while supplies last, and you will have one of the world’s best tabletop receivers with continuous 100 kHz-1999.99 MHz frequency coverage (less cellular), tunable in precise 10 Hz steps—longwave, shortwave, VHF/HF, all services and modes (wide and narrow FM and AM, USB, LSB, CW).

Add high sensitivity, IF shift, selectable AGC timing, audio peak filter to automatically enhance modes, built-in RS232C and CI-V for direct computer control, 1000 memory channels in 20 banks, multiple scanning selections with priority function and selectable delay, S-meter settable squelch, noise blanker, and 12 VDC / 120 VAC operation.

High-stability crystal oscillators combine with automatic frequency control circuitry for outstanding stability. Multiple tuning speeds optimize signal hunting. Alphanumeric display aids in identifying memorized frequencies. Automatic memorizing of search-discovered active frequencies, skipping of unwanted channels, three antenna connectors for optimal choices for frequency ranges, even voice scan to ignore noisy channels, and even optional voice synthesizer—an incredible array of advanced features! See detailed specifications on pp. 8-9.

**ORDER SCN 1**
**SHIPPING FREE WITH THIS PACKAGE! $1899.95**

See Bob Grove’s comparison of the AR-5000 and the ICOM R8500 on the World Wide Web at [http://www.grove.net/groveview.html](http://www.grove.net/groveview.html). The receivers were also reviewed in the November issue of Monitoring Times.

---

**ACCESSORIES**

**ACC 6** High Stability Crystal Unit $295.95

**ACC 7** FL-52A CW Narrow Filter $189.95

**ACC 8** Voice Synthesizer Unit $279.95

**ACC 72** TV-R7000 Adapter $339.95

**ACC 74** CT-17 Level Converter $134.95

**ANT 2** Grove Skywire Antenna $39.95

**BRK 4** Mobile Mounting Bracket $35.95

**BRK 5** MB-23 Carrying Handle $12.95

**MAN 1** Service Manual $57.95

---

**Want breathtaking performance from a handheld receiver?**

This incredible, new scanning receiver is light years ahead of the competition. Featuring continuous 300 kHz-1300 MHz (less cellular) frequency coverage, multimode (AM/WFM/NFM/SSB) reception, rotary tuning control, programmable tuning steps from 100 Hz-1 MHz, on-screen spectrum display (200 kHz span), 1000 channel non-volatile memory, computer control, and second-radio cloning—and these are just the beginning!

The sleek, compact, lightweight R-10 has large, easy-to-read—and touch—keys. Its resolutionary zero-wait-state scanning seeks and holds in readiness the next active frequency while you are listening to another signal! Wide-dynamic-range triple conversion, tunable bandpass filters, and sharp selectivity assure dramatic improvement in interference-free reception.

Eight alphanumeric characters can be entered to identify any channel, and ten characters can be used identify banks. Voice scan control skips unmodulated carriers. Scan memory channels by bank, mode, or program. High-contrast display and powerful, dual-function keyboard provide incredible options to suit your listening requirements. Noise blanker and automatic noise limiter provide double noise reduction. Sleep timer and programmable attenuator are additional advantages. See detailed specifications on pp. 8-9.

This is the new standard-bearer for handheld radios. Move up to the next generation—order yours now!

**ORDER SCN06**
**SHIPPING $499.95**

---

**New from JRC!**

**NRD-345**

Known for their luxury, high-performance receivers, Japan Radio company (JRC) has just released a high quality, double conversion receiver at a low, competitive price! The new NRD-345 offers wide frequency coverage (100 kHz-30 MHz), multimode reception (AM, synch. AM, SSB), sharp selectivity (2/4 kHz), high sensitivity (0.1 microvolts), wide dynamic range (100 dB), strong audio (1 watt), dual VFOs, scanable memory (100 channels) with channel lockout, computer control (RS232C), dual clock timer (12/24 hour), precision tuning (5kHz, 1/10 kHz steps), and adjustable noise blanker.

Additional features include selectable AGC timing, 20 dB attenuator, adjustable tone control, one-watt audio with internal speaker, backlit 8 character, large backlit LCD display, FAX output, and dual-voltage (12 VDC / 120 VAC) power supply. See specifications on pp. 8-9.

**ORDER RCV 20**
**SHIPPING $999.95**

---

**ICOM R-10!**

- Zero-wait-state scanning
- 500 kHz-1300 MHz less cellular
- On-screen spectrum display
- 1000 memory channels
- second-radio cloning
- tunable passband filters
- dual-function keyboard

**ACCESSORIES**

**ACC 74** CT-17 interface $134.95

**ACC 3** OPC-478 Cloning cable (PC to radio) $44.95

**ACC 4** OPC-474 Cloning cable (radio to radio) $17.95

**ADPK 4** Interface cable and adapter for Opto-22 $8.95

**CAS 1** LC-140 Carrying case $29.95

**DCC 5** CF-12 cigarette lighter cable $29.95

**SFT 1** RS-R10 Cloning software $27.95

---

GROVE
Sony product a remarkable value for beginners or seasoned SWLs.

Frequency range includes 150 kHz-30 MHz, 76-108, and 116-136 MHz. See pp. 8-9 for more detailed specifications. Requires 3D/AA cell batteries.

ORDER RCV 2
$349.95

ACCESSORIES
ANT 3 Grove Mini-Skywire $29.95
ANT 21 Select-A-Tenna $65.95
ANT 32 Kiwa Pocket Loop Antenna $119.95
BAT 1 AA cell alkaline bat. $.79 ea
BAT 2 D cell alkaline bat. $1.19 ea
SPK 13 Grove Sound Enhancer $199.95
TUN 4A Grove TUN4A MinutierPlus $99.95
WP54 RDI WHITE PAPER® $5.95

HIGH SENSITIVITY PLUS
SYNCHRONOUS DETECTION!

SONY ICF-SW7600G

It was inevitable. The early compact models have been replaced by a tiny marvel with synchronous AM detection, SSB, and even FM stereo coverage! Measuring just over 7 inches wide and weighing 22 ounces, the SW7600G is loaded with features! DX/local switch reduces “pumping” on strong SSB signals; power switch lock prevents accidental battery depletion during transport.

Continuous 150 kHz-29.995 MHz frequency coverage plus 87.6-108 MHz FM headphone stereo, pushbutton tuning, tone control, external antenna jack, clock timer with sleep function, tilt bracket, keyboard lock, direct-entry keypad and 22 scannable memory channels keynote the high-tech features of this potent portable! See pp. 8-9 for more details. Requires 4 AA cell batteries.

ORDER RCV 11
$189.95

ACCESSORIES
ANT 3 Grove Mini-Skywire Antenna $29.95
ANT 21 Select-A-Tenna $65.95
ANT 32 Kiwa Pocket Loop Antenna $119.95
BAT 1 AA alkaline bat. $.79
PWR 9 AC adaptor $19.95
SPK 11 Naval HTS speaker $29.95
TUN 4A Grove TUN4A MinutierPlus $69.95

This is a full-featured radio for the serious shortwave listener—with a reputation of distinction among the “powerful portables.” Synchronous detection allows interference-free reception on many stations difficult to hear on other radios. Narrow/wide selectivity switching; clock/timer allows up to 4 automatic on/off cycles per day for frequencies and times of your choice; 10-step LED signal strength meter, audio tone selection for speech or music; and 32 station direct-access keyboard to combine this

SONY ICF-SW100

Incredible! Imagine compressing the popular functions of the mighty Sony ICF2010 into a shirt-pocket radio! This tiny titan offers continuous 150 kHz-30 MHz and 76-108 MHz FM frequency ranges, Sony’s famous synchronous detection, USB/LSB reception, 100 Hz tuning steps, 50 memory presets, 24 hour clock/timer, world time computer, station name display, illuminated LCD, and much, much more. See specs. pp 8-9.

AC adaptor, stereo earphones, active antenna, soft carrying case, station directory, and full instruction manual included at no extra charge! Two AA batteries required.

ORDER RCV24
$359.95

ACCESSORIES
ANT 21 Select-A-Tenna $65.95
BAT 1 AA alkaline batteries $7.99 ea
SPK 14 Naval HTS-3 Amplified Spkr. $29.95
SPK 13 Grove Sound Enhancer $199.95
TUN 4A Grove TUN4A MinuitierPlus $99.95

The GE Superadio III series has been a popular receiver for AM/FM DXers for years. The smooth vernier dial features tuned RF on both AM and FM, while a ceramic IF filter and 7 tuned IF circuits provide outstanding selectivity. The two-way speaker system with separate bass, treble and loudness controls assures solid, clean sound, and the drift-cancelling, automatic frequency control (AFC) circuit can be switched out for weak-signal hunting. The internal AM loop and FM whip antennas provide convenient portability, while external antenna jacks accommodate your long-distance antennas.

Expertly designed and handsomely crafted, the GE Superadio III is powered by 120 VAC or six internal D cells (optional) with over 400 hours battery life!

ORDER RCV 5
$599.95

ACCESSORIES
ANT 3 Grove Mini-Skywire $29.95
ANT 21 Select-A-Tenna $65.95
ANT 31 Kiwa Loop Antenna $199.95
ANT 32 Kiwa Pocket Loop Antenna $119.95
BAT 1 AA cell alkaline bat. $.79 ea
BAT 2 D cell alkaline bat. $1.19 ea
SPK 13 Grove Sound Enhancer $199.95
TUN 4A Grove TUN4A MinutierPlus $99.95

SONY ICF-SW77

Has all the capabilities of the Sony ICF-2010 (except air band) plus more memory and other features. Compare specifications on pp. 8-9 of this booklet.

ORDER RCV10
$469.95

ACCESSORIES
ANT 3 Grove Mini-Skywire $29.95
ANT 21 Select-A-Tenna $65.95
ANT 31 Kiwa Loop Antenna $199.95
ANT 32 Kiwa Pocket Loop Antenna $119.95
BAT 1 AA cell alkaline bat. $.79 ea
BAT 2 D cell alkaline bat. $1.19 ea
SPK 13 Grove Sound Enhancer $199.95
TUN 4A Grove TUN4A MinutierPlus $99.95

Order Line and Product Support Info.: 1-800-438-8155
www.americanradiohistory.com

GROVE SW PRODUCTS • 5
RECEIVERS

Super Value and Performance from SANGEAN

Sangean ATS808

A great low cost radio featuring 150 kHz-30 MHz continuous tuning, 87.5-108 MHz FM reception (stereo earphones included!), dual AM selectivity, direct keyboard frequency entry, continuous tuning dial, scan and search modes, 45 memory channels, 24 hour dual-zone clock/timer, and distance/local sensitivity selection. See specifications on pp. 8-9.

ORDER RCV13 SHIPPING $129.95
ACCESSORIES
ANT 3 Grove Mini Skywire Antenna $29.95
ANT 21 Select-A-Tenna $65.95
ANT 32 Mini Skywire Antenna $21.95
BAT 1 AA Alkaline Batteries $7.95
PWR 10 AC adaptor $9.95
TUN 4A Grove TUN4A MinitunerPlus $99.95

Top-of-the-line Sangeans With or Without Built-In Cassette Recorder

ATS-818
ORDER RCV 7 $149.95
Retail $199

ATS-818 CS w/cassette recorder
ORDER RCV 9 $219.95

Imagine—record your favorite programs automatically with the dual-zone clock timer on any frequency from 150 kHz through 30 MHz, 87.5-108 MHz FM as well! This impressive portable has SSB and CW reception, 45 memory channels, wide/narrow filter selectivity, signal strength indicator, AC wall adaptor and more! See detailed specifications on pp. 8-9. Requires 4 D cells.

Receivers are the same, excluding the tape recorder specifications.

ACCESSORIES
SHIPPING $9 UPS
$16.50 US Priority Mail
$20.50 Canadian APP
$18 Canadian UPS

ANT 3 Grove Mini Skywire Antenna $29.95
ANT 21 Select-A-Tenna $65.95
ANT 32 Mini Skywire Antenna $21.95
BAT 1 AA Alkaline Batteries $7.95
SPK 11 Naval HTS speaker $29.95
TUN 4A Grove TUN4A MinitunerPlus $99.95

New! ATS909 Multiband Radio

A great new challenger among full-featured SW portables!

This compact, new PLL-synthesized, portable receiver sets a new standard for Sangean. Features include continuous coverage longwave, mediumwave and shortwave reception plus FM (stereo with earphones), alphanumeric display for station identification, 306 channel memory, USB/LSB mode with 40 Hz step tuning, 29 memory banks with automatic search, world time for 42 cities, three independent timers, signal strength indicator, wide/narrow filter selection, RF gain and tone control. See specifications on pp. 8-9.

ORDER RCV 8 SHIPPING $259.95
ACCESSORIES
ANT 3 Grove Mini Skywire Antenna $29.95
ANT 21 Select-A-Tenna $65.95
ANT 32 Mini Skywire Antenna $21.95
BAT 1 AA Alkaline Batteries $7.95
SPK 11 Naval HTS speaker $29.95
TUN 4A Grove TUN4A MinitunerPlus $99.95

A Tiny Marvel: Sangean SR-77

Here's a great little companion for anyone on the go: a tiny FM/AM radio from Sangean that literally could get lost in your shirt pocket. This is a favorite of all of the Grove staff (we're worried that it might somehow "disappear" before we could get the photos done). Not only is it cute, but it somehow pulls in distant stations and delivers high-quality stereo reception to its tiny earphones, included (plug your own headphones into the provided 1/8" stereo miniplug jack, if you prefer). This little dynamo even has Deep Bass Boost which kicks in at the flick of a switch.

Measuring only 3 x 1.5 x .5", it's the perfect answer for recreational listening, emergency news and weather monitoring, or merely keeping your child occupied. Runs on one AA battery included.

ORDER RCV 15 SHIPPING $29.95
SHIPPING $5 UPS
$3.50 US Priority Mail
$4 Canadian APP
$6.50 Canadian UPS

UPC Second Day Air at Ground Rates on ALL PRODUCTS!
**GROVE TUN-4A MINITUNER PLUS**

Here’s the shortwave listener’s dream—a high performance, amplified, frequency-tunable antenna system for general coverage shortwave and medium wave monitoring. For indoor use, connect a short length of wire or the popular Grove ANF-6 Hidden Antenna. Connected to an outdoor antenna like the Grove ANT-2 Skywire or ANT-3 Mini Skywire, the TUN-4A MiniTuner Plus provides knock-out signal strength and allows frequency preselection as well.

Continuous 400 kHz-30 MHz coverage, -20 to +20 dB gain/attenuation control, dual antenna switch, dual receiver output, amplified/unamplified preselection, hand switch, fine tuning, and build-in lightning protection. Full instructions included. Requires 12VDC power (sold separately).

“Now have your TUN-4A in permanent line serving my lovely HFI50 and Drake SW8 and it out-performs any of my other ‘premium’ preselectors. Ounce for ounce and inch for inch, the TUN-4A is the best bargain for signal improvement and receiver front end extension that I have encountered...”

—John L. Wagner

SWL'er

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**The Original Grove SKYWIRE Shortwave Antenna**

High performance and low cost—an unbeatable combination! Why restrict your frequency coverage with the gaps found in expensive trap dipoles or unpredictable random wire when you can get unsurpassed full-frequency reception with the Grove Skywire?

Comes assembled with Budwig center connector ready for your PL-259 (UHF male) equipped coaxial cable (50 or 75 ohm, see page 11); includes two professional porcelain end insulators and complete instructions.

**ATTENTION HOME EXPERIMENTERS:** Build your own SW dipole! Order ACC101 (Budwig center connector) for only $9.95 and add your own wire to construct a SW dipole!

HAMS! Ideal for transmitting when used with a transmatch. (1.8-30 MHz at up to 250 watts)

---

**Limited Space? Try Grove’s new Mini-Skywire**

Similar to above, but 40-foot, dual-dipole design allows full 3-30 MHz frequency coverage and may be used in several configurations. Ready for P-259 coax connector. See cable and adaptors on p. 11.

---

**ACCESSORIES**

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADP 6 (UHF to male 1/8' Mini-Plug)</td>
<td>$5.95</td>
</tr>
<tr>
<td>ADP 11 (UHF to RCA male)</td>
<td>$5.95</td>
</tr>
<tr>
<td>ADP 27 (Banana Plug)</td>
<td>$2.00</td>
</tr>
<tr>
<td>ADPK 15 30' PL259 Interconnect Cable</td>
<td>$2.50</td>
</tr>
<tr>
<td>ANT 2 Skywire</td>
<td>$39.95</td>
</tr>
<tr>
<td>ANT 3 Mini Skywire</td>
<td>$29.95</td>
</tr>
<tr>
<td>ANT 26 Random Wire Antenna</td>
<td>$7.95</td>
</tr>
<tr>
<td>PWR 19 12VDC 200 MA Power Supply</td>
<td>$7.95</td>
</tr>
</tbody>
</table>

**SPECIFICATIONS:**

- **Length:** 66 feet
- **Feedpoint Impedance:** 50 or 75 ohm (nominal)
- **Feedpoint Location:** 22 feet from end
- **Elements:** 18 AWG (16 x 30) bare stranded cooper
- **Connector Housing:** Heavy duty black phenolic

---

**ORDER TUN 4A**

$99.95

**SHIPPING**

$6 UPS

$5.50 US Priority Mail

$7 Canadian APP

$10 Canadian UPS

**ORDER TUN 2**

$39.95

**SHIPPING**

$6 UPS

$5.50 US Priority Mail

$7 Canadian APP

$10 Canadian UPS

**ORDER TUN 3**

$29.95

**SHIPPING**

$6 UPS

$5.50 US Priority Mail

$7 Canadian APP

$10 Canadian UPS
If a large, outside dipole is out of the question, choose the Dynek DA-100E, the bes 50 MHz-30 MHz active receiving antenna available! High sensitivity, low noise, wide dynamic range, step-selectable attenuator, static-discharge-protected, weatherproof remote amplifier/whip assembly.

Includes AC power supply, indoor control unit, 50 feet RG-58/U coax, remote amplifier, 4' stainless-steel whip, receiver-interconnect cable, and full instructions.

ORDER ANT 24 $179.95

$179.95

**Grove's Shortwave Receiver Specification Guide**

<table>
<thead>
<tr>
<th>Model</th>
<th>Antenna Type</th>
<th>Price</th>
<th>Receiver Type</th>
<th>Power Requirement(s)</th>
<th>Frequency Range</th>
<th>Keypad Entry</th>
<th>Tuning Stips</th>
<th>NTSC/NTS/NTSC</th>
<th>Display</th>
<th>Dimmer</th>
<th>Recommended Use</th>
<th>Resolving Modes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reedex 80</td>
<td>Shortwave</td>
<td>$195.95</td>
<td>Receiver</td>
<td>12/23</td>
<td>500 kHz-1 MHz</td>
<td>Yes</td>
<td>Tuning dial</td>
<td>Tuning diode</td>
<td>Yes</td>
<td>Yes</td>
<td>Indoor use only</td>
<td>AM/FM/SSB</td>
</tr>
<tr>
<td>Reedex 800</td>
<td>Longwave</td>
<td>$349.95</td>
<td>Receiver</td>
<td>12/23</td>
<td>10 MHz-30 MHz</td>
<td>Yes</td>
<td>Tuning dial</td>
<td>Tuning diode</td>
<td>Yes</td>
<td>Yes</td>
<td>Indoor use only</td>
<td>AM/FM/SSB</td>
</tr>
</tbody>
</table>

**Top-Rated, High Performance KIWA Loop Antennas**

Are you looking for an antenna that will improve medium wave reception on your communications receiver? Then look no more—this unique 12-inch, circular air-core antenna provides improved weak signal reception of medium wave broadcast signals and electronically balanced circuitry minimizes pickup of electrical interference. Some of the other high performance features of the KIWA loop include:

- Full 530-1705 kHz frequency coverage
- May be precisely rotated and tilted for maximum signal pickup and nulling of interfering stations
- Equipped with local/DX pre-amp switch, variable output attenuator, and dual output amplifiers
- May be powered by a low-noise AC supply, included, or by battery
- Stands 17 inches (43 cm) high and weighs 16 pounds (7.25 kg).

ORDER ANT 31 $349.95

$349.95

**KIWA Medium Wave Air-Core Loop Antenna**

**The New KIWA Pocket-Loop Antenna**

This highly efficient signal grabber is 12" across when deployed, yet collapses to a tiny pocket size for transport! Designed to receive and amplify signals from 530 kHz through 20 MHz in four bands, no antenna jack on your portable radio is needed; it space-couples to your radio's existing whip and internal ferrite rod.

ORDER ANT 32 $119.95

$119.95
# JPS Noise Cancellor/Active Antenna

**New Model**

**ANC-4!**

**JPS Noise Cancellor/Active Antenna**

**Enjoy Crystal Clear Sound!**

Imagine, just connect this simple device between your receiving antenna and shortwave receiver or transceiver, and you'll find locally-generated interference of virtually any kind controlled, gets rid of the hum, hiss, andrf noise, TV synch buzz—they all go away when the ANC-4 is adjusted to your receiver to receive 100 kHz-80 MHz.

Use the attachable whip (provided) or, even better, a second external antenna to sample local noise. A simple adjustment from the front panel reduces or even eliminates virtually any electrical interference noise you are likely to encounter. The new ANC-4 can even be used as a frequency-selective active antenna/RF booster! Whip, random wire antenna, DC plug and full instructions provided. Requires 12 VDC @ 300 mA power.

**ACCESSORIES**

| PWR 13 | Universal power supply | $9.95 |

**Universal Reel Antenna for Shortwave Portables**

Whether you have a Sony, Sangean, Realistic, Grundig, or other whip-portal 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 adapter.

**ORDER ANT 16**

| SHIPPING | $6 UPS | $4.50 US Priority Mail | $6.50 Canadian APP | $10 Canadian UPS | $9.95 |

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| Price List and Reel-Out Support Info | 410-743-1455 | www.americanradiohistory.com |
Select-A-Tenna

"I was able to pull in stations that were absolutely inaudible without it."
— Stephen J. Price
Monitoring Times, April 1995

Apartment dwellers and mobile home owners, boost your 530-1700 kHz AM broadcast reception up to 30 dB with the famous Select-A-Tenna! Improves adjacent channel rejection, reduces signal fading. Tuning knob selects your listening frequency.

No batteries or power required; simply set the Select-A-Tenna next to your radio, peak the tuning knob, and listen to AM broadcast signals soar out of the background noise!

This 11”, high-Q loop antenna directs its captive signals to your radio’s internal ferrite loop without any physical connection! If your receiver requires an external antenna, a convenient 5.5 mm (1/8”) jack and plug are provided. Connect an outside wire to the Select-A-Tenna and receive medium wave signals like you’ve never heard before!

ORDER ANT 21
$65.95

The Stealthy Grove
HIDDEN ANTENNA

The Hidden Antenna may be used alone with your scanner for improved signal reception, over your attachable whip or may be connected to the powerful GRE PRE! for considerably increased signal strength on scanners and shortwave receivers.

This five-foot, thin-profile, flexible wire antenna can be hung in a corner, behind a drapery—just about anywhere out of sight. Comes fully assembled with 20 feet of coax and F male connector, with 3 adapters for PL259 (UHF), Motorola and BNC connections.

ORDER ANT 6
$19.95

Superb Magellan GPS Receivers

Ruggedly built and waterproof, yet barely more than 6” high and weighing only 10 ounces, these pocket precision receivers home in on 1.2-1.5 GHz global positioning satellites, using their signals to establish your exact location to within 100 yards in as little as 2-1/2 minutes from a cold start (65 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 included.

All these features make the GPS 2000 Satellite Navigator (above) an incredible value. Or select the upgraded GPS 3000 (left) and get two additional navigation screens, a data port (RTCM 104 in, NMEA out), OSGR coordinates, 100 additional waypoints, 5 more routes, external antenna capability, celestial calculations, swivel mounting bracket, batteries, manuals, and a carrying case.

ORDER GPS 2000
$149.95

ORDER GPS 3000
$249.95

H800 Skymatch

Compact Active Antenna

Imagine a two-foot antenna that performs like a 100 foot antenna, and what if that compact powerhouse could receive signals from 10 kHz through 50 MHz? That’s VLF, medium wave, shortwave, and even VHF low band all rolled into one! Operates either from 120 VAC or optional 9 volt batteries for portable or emergency use.

Wide dynamic range resists strong-signalovertone problems, while high sensitivity enhances weak signals. Mounts inconspicuously on a porch, outside a window, on a roof, in a tree, or even in the radio room (not recommended because of electrical noise pickup).

Includes integrated active antenna, 50 feet of coax lead-in, control box, and AC adaptor.

Note: This antenna requires a kit that will adapt the RCA female plug on the box to your radio with a piece of coax in between.

ADP 32 RCA female to male miniplug $5.95
ADP 25 RCA female to PL259 male $5.95

ORDER ANT 15
$99.95

The Grove No-Tenna™
Turn Your Car into a
Giant All-Band Antenna!

Imagine: strong, clear, continuous frequency coverage of shortwave and scanner signals without having to mount an antenna anywhere on your car! No invitation to theft, suspicion, breakage, low overhangs, hide drilling, scraped paint, or cables through doors or windows. No visible antenna whatsoever! The 8’ cable mounts in seconds, using your entire car body as a giant, 1-1000 MHz, all-band antenna!

Ideal for city dwellers, travelers, reporters, investigators—anyone who doesn’t want a visible receiving antenna on his vehicle (not for transmitting). Full instructions and universal connectors for RCA, BNC and 1/8” (5.5mm) miniplug included. If you own an ICOM R-100 be sure to specify a PL-259 adaptor.

ORDER ANT 20
$19.95

All Antennas are shipped UPS. Second Day Air at Ground Rates on All Products!
## Frequencies

<table>
<thead>
<tr>
<th>Time Range</th>
<th>Country/Region</th>
<th>Radio Station</th>
<th>Frequency in kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000-1000</td>
<td>World</td>
<td><a href="http://www.americanradiohistory.com">www.americanradiohistory.com</a></td>
<td><a href="http://www.americanradiohistory.com">www.americanradiohistory.com</a></td>
</tr>
</tbody>
</table>

### Shortwave Guide

**FREQUENCIES:**

- **1800-1000:** Anguilla, Caribbean Beacon 11775am
- **0000-1000:** Australia, Radio 17320am, 17360am, 17400am
- **0000-1000:** Brazil, Radio Brasil 17460am, 17500am
- **0000-1000:** Croatia, Radio Zagreb 17540am, 17570am, 17600am
- **0000-1000:** Egypt, Radio Cairo 17550am, 17590am
- **0000-1000:** Equatorial Guinea, Radio Africa 17600am
- **0000-1000:** Fiji, Radio Fiji 17610am, 17625am
- **0000-1000:** India, All India Radio 17630am, 17645am, 17660am
- **0000-1000:** Ireland, World Radio 17675am, 17690am
- **0000-1000:** Netherlands, Radio 17700am
- **0000-1000:** New Zealand, Radio New Zealand 17715am, 17730am
- **0000-1000:** Nigeria, Radio Nigeria 17745am, 17760am
- **0000-1000:** Pakistan, Radio Pakistan 17775am, 17790am
- **0000-1000:** Russia, Russia's Voice of RWR 17800am, 17815am
- **0000-1000:** Saudi Arabia, Radio Riyadh 17825am, 17840am
- **0000-1000:** Soviet Union, Radio Moscow 17855am, 17870am
- **0000-1000:** South Korea, Radio KOR 17885am, 17900am
- **0000-1000:** Turkey, Radio Türkiye 17915am, 17930am
- **0000-1000:** United Kingdom, BBC World Service 17945am, 17960am
- **0000-1000:** United States, National Public Radio 17975am, 17990am
- **0000-1000:** Viet Nam, Vietnam Voice 18005am, 18020am
- **0000-1000:** Yemen, Yemeni Radio 18035am, 18050am
- **0000-1000:** Zambia, Radio Zambia 18065am, 18080am
- **0000-1000:** Zimbabwe, Radio Zimbabwe 18095am, 18110am

### Monitoring Times

**1800 UTC:**

- 20:00 PM EDT/11:00 AM PDT

**1900 UTC:**

- 3:00 PM EDT/12:00 PM PDT

**May 1997**

**MONITORING TIMES:**

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This month, one time only, we are providing you with the complete, 24-hour program schedule for all three streams of the BBC World Service. Instead of our usual hour-by-hour format, this listing is by day of the week, so it will not be coordinated with the frequency section as Selected Programming normally is. We think you will find this special edition handy to keep by your radio over the summer season.

Special feature program descriptions have been replaced with generic names in order to keep the program guide current for as long as possible. Program names like "Classical Music Feature" and "Variable Feature" are used for this purpose.

Did you note there are no longer five streams? The Europe Stream is now combined with the Americas Streams and the South Asia Stream is combined with the Asia Pacific Stream. Within each of the newly designated streams there are still variations of programs for specific targets. For example, at 0330 on Sat, the Americas frequencies get The World Today. Europe then gets World News.

Curiously, transmissions to the Falklands do not appear in their Tue/Fri 2130 slot in the newly designated AE stream. If anyone has any info on the discontinuance of this special BBC service, or comments on MT's Selected Programming, please send email to Jim Frimmel (frimmel@starinet.net).

Stream designations:
AE - For listeners in the Americas, Europe (including parts of FSU), the ME, NAF
AF - For listeners in Africa
AS - For listeners in Asia

Stream program variations:
AE - Variations for Europe, the Americas, the Caribbean
AF - No Variations
AS - Variations for East Asia, South Asia

Sundays
0000 Newsdesk. World news and dispatches from overseas and UK correspondents. (am/eu/as)
0030 Letter from America. Alistair Cooke shares his inimitable view of contemporary American life. (am)
0030 Short Story. Fifteen-minute dramas written by listeners from around the word. (as)
0045 Britain Today. News about Britain. (am/eu/as)
0100 Newsdesk. See S 0000. (am/eu)
0100 World News. Broadcast on the hour of 5, 10, or 15 minutes in length. (as)
0110 Pause for Thought. Spiritual reflection. (as)
0115 Health Matters. Keeps track of new developments in the world of medical science, as well as ways of keeping fit. (as)
0130 Variable Comedy/Guiz Feature. These programs are panel quizzes and other light entertainment in a format heard in America decades ago. (am/eu)
0130 World News. See S 0100. (as)
0145 Sports Roundup. The latest sports news. (am/eu)
0200 Newstex. Coverage of the breaking stories and a background briefing on the main news issues of the day. (am/eu)
0230 In Praise of God. Weekly programme of worship and meditation. (af)
0230 Music Review. News and views from the world of music. (am/eu)
0230 Letter from America. See S 0030. (as)
0245 Popular Music Feature. A variable program featuring the world of popular music. (as)
0300 World News. See S 0100. (am/eu/as)
0305 World Business Review. A look back at the previous week's business and a preview of upcoming events. (am/eu)
0305 Sports Roundup. See S 0145. (as)
0315 Sports Roundup. See S 0145. (am/eu)
0330 African Quiz (I). A monthly test of the listener's knowledge of Africa. (af)
0330 Postmark Africa. Expert answers to any question under the sun. (af)
0330 From Our Correspondent. BBC correspondents comment on the background to the news. (am/eu)
0330 Global Business. NEW! Roger White presents this weekly series of interviews, features and discussions with the movers and shakers of the international business community. (as)
0400 Newsdesk. See S 0000. (af/am/eu/as)
0430 The Art House. No information available. (af)
0430 Global Business. See S 0330. (am/eu)
0430 From Our Own Correspondent. See S 0330. (as)
0500 Newsday. See S 0020. (af/am/eu/as)
0530 Postmark Africa. See S 0330. (af)
0530 Play of the Week. A different radio drama program each week. (am/eu)
0530 Variable Feature. Special features and new series. (as)
0600 World News. See S 0100. (af/as)
0600 Play of the Week (from 0530). See S 0530. (am/eu)
0615 Variable Feature. See S 0330. (af)
0615 Letter from America. See S 0030. (as)
0630 African News. News bulletins with the latest reports from across the continent. (af)
0630 A Jolly Good Show. Dave Lee Travis presents your record requests and dedications in his own unique way. (am/eu)
0630 Meridian. One of the topical programs weekly about the world of the arts. (as)
0631 African Perspective. A considered view of life and issues facing the African continent. (af)
0700 World News. See S 0100. (am/am/eu/as)
0715 Short Story. See S 0030. (af)
0715 Letter from America. See S 0030. (am/eu)
0715 Popular Music Feature. See S 0245. (af)
0730 From Our Own Correspondent. See S 0330. (af)
0730 Variable Music Feature. Different features of 15, 30, and 45 minutes length with a musical theme. (am/eu)
0730 A Jolly Good Show. See S 0630. (as)
0800 Variable Comedy/Guiz Feature. See S 0130. (af)
0800 World News. See S 0100. (am/am/eu/as)
0810 Pause for Thought. See S 0110. (am/am/eu/as)
0815 Short Story. See S 0030. (am/eu)
0815 The Farming World. Reports on new developments from around the world. (as)
0830 The Greenfield Collection. See S 0830. (am/am/eu/as)
0900 World News. See S 0100. (am/am/eu/as)
0905 Write On. See S 0905. (am/am/eu/as)
0915 Global Business. See See S 0330. (af)
0915 From Our Own Correspondent. See S 0330. (am/eu)
0915 Short Story. See S 0030. (as)
0930 Variable Feature. See S 0530. (as)
0945 Sports Roundup. See S 0145. (am/am/eu/as)
1000 Newsdesk. See S 0000. (am/am/eu/as)
1030 Variable Feature. See S 0530. (af)
1030 Global Business. See S 0330. (am/eu)
1030 In Praise of God. See S 0230. (as)
1100 News Summary. One minute news update. (af)
1100 Newsdesk. See S 0000. (am/eu/as)
1101 In Praise of God. See S 0230. (af)
1130 Play of the Week. See S 0530. (af/as)
1130 Anything Goes. A variety of music and much more with Bob Holness. (am/eu)
1130 Popular Music Feature. See S 0245. (as)
1200 Play of the Week (from 1130). See S 0530. (af/as)
1200 World News. See S 0100. (am/am/eu/as)
1205 Write On. See S 0905. (am/am/eu/as)
1215 In Praise of God. See S 0230. (am/am/eu/as)
1215 Britain Today. See S 0045. (as)
1230 Letter from America. See S 0030. (af)
1230 Short Story. See S 0030. (as)
1230 Variable Feature (EAs). See S 0530. (as)
1245 Sports Roundup. See S 0145. (am/am/eu/as)
1300 Newshour. See S 1300. (am/am/eu/as)
1400 News Summary. See S 1100. (am/am/eu/as)
1401 Classical Music Feature. A variable program featuring the world of classical music. (af/as)
1401 Variable Feature. See S 0530. (am/eu)
1445 Health Matters. See S 0115. (as)
1500 News Summary. See S 1100. (af/as)
1500 World News. See S 0100. (am/eu)
1501 Science Feedback. Listeners' questions, comments and queries about World Service science programs are answered. (af/as)
1501 Play of the Week (SAs). See S 0530. (as)
1505 Sports Roundup. See S 0145. (am/eu)
1515 BBC English. For learners of English. (af/as)
1515 Concert Hall. Classical music concerts. (am/am/eu/as)
1530 Popular Music Feature. See S 0245. (am)
1600 World News. See S 0100. (af/as)
1600 Europe Today. All the latest news, analysis and comment. (af/as)
1600 Play of the Week (from 1501) (SAs). See S 0530. (as)
1615 Concert Hall. See S 1515. (af)
1615 Variable Feature. See S 0530. (as)
1630 Sunday Sportsworld. The Sunday sports magazine. (am/eu)
1700 World News. See S 0100. (af/as)
1705 News Summary. See S 1100. (am/am/eu)
1710 Variable Feature. See S 0530. (am/eu)
1705 Focus on Africa. Up-to-the-minute reports on the day's events from all over the continent. (af)
1705 Write On. See S 0905. (af)
1715 Omnibus. Each week a half-hour programme on
practically any topic under the sun. (as)

Weekend. European magazine program co-produced by European broadcasters. (am/eur)

Sports Roundup. See S 0145. (as)

African News. See S 0630. (af)

Sports Roundup. See S 0145. (af/am/eur)

Newsdesk. See S 0030. (af/am/eur/as)

A Jolly Good Show. See S 0630. (af)

Play of the Week. See S 0530. (am/eur)

Global Business. See S 0330. (as)

World News. See S 0100. (af)

Play of the Week (from 1830). See S 0530. (am/eur)

Newspaper. See S 1100. (as)

Postmark Africa. See S 0330. (af)

Concert Hall. See S 1515. (as)

The Art House. See S 0430. (af)

Anything Goes. See S 1130. (am/eur)

Feature. See S 0530. (as)

Newshour. See S 1300. (af/am/eur/as)

World News. See S 0100. (af/am/eur/as)

Global Business. See S 0530. (am/eur)

Write On. See S 0905. (am/eur/as)

Britain Today. See S 0045. (am/eur/as)

Variable Feature. See S 0530. (af)

Europe Today (Eu). See S 1600. (am/eur)

Feature. See S 0530. (am/eur)

Off the Shelf. Daily readings from the best of world literature. (as)

Classical Music Feature. See S 1401. (as)

Newsdesk. See S 0000. (af/am/eur/as)

Network Africa. See M 0330. (af)

Europe Today (Eu). See S 1600. (am/eur)

Feature. See S 0530. (am/eur)

Popular Music Feature. See S 0245. (as)

Newsdesk. See S 0200. (af/am/eur/as)

Network Africa. See S 0330. (af)

Europe Today (Eu). See S 1600. (am/eur)

Europe Today (Eu). See S 1600. (am/eur)

Variable Feature. See S 0530. (af)

World News. See S 0100. (af/am/eur/as)

Sports Roundup. See S 0145. (af/am/eur)

Variable Feature. See S 0530. (am/eur)

World News. See S 0100. (af/am/eur/as)

World News. See S 0100. (af/am/eur/as)

Sports Roundup. See S 0145. (af/am/eur/as)

Network Africa. See S 0730. (am/eur)

BBC English (SAs). See S 1515. (as)

Meridian. See S 0630. (am/eur)

The Works. Alun Lewis looks at the impact of tomorrow's technology. (as)

World News. See S 0100. (af/am/eur/as)

World News. See S 0100. (af/am/eur/as)

World Business Report. See M 0905. (af/am/eur/as/carib)

Caribbean Report (Carib). Weekday coverage of current affairs in the Caribbean region with emphasis on political and economic analysis. (am/eur)

Britain Today. See S 0045. (af/am/eur/as)

Variable Feature. See S 0530. (af)

Seven Days. See M 0615. (am/eur)

Off the Shelf. See M 0330. (as)

Sports Roundup. See S 0145. (af/am/eur/as)

Newshour. See S 1300. (af/am/eur/as)

Summary. See S 1100. (af)

World News. See S 0100. (af/am/eur/as)

East Asia Today (EAs). See S 2310. (as)

Pause for Thought. See S 0110. (af)

Outlook. An up-to-the-minute mix of conversation, controversy and color from around the world. (af/am/eur/as)

Variable Feature. See S 0530. (af)

World News. See S 0100. (af/am/eur/as)

East Asia Today (EAs). See S 2310. (as)

Focus on Africa. See S 1705. (af)

Sports Roundup. See S 0145. (af/am/eur/as)

Variable Feature. See S 0530. (am/eur/as)

Meridian. See S 0630. (as)

Outlook (EAs). See M 1405. (af)

BBC English. See S 1515. (af)

Voicebox (EAs). Experts and ordinary people take a light-hearted look at the English language. (as)

World News. See S 0100. (af/as)

Europe Today. See S 1600. (am/eur)

Fast Track. The latest African sports news and action. (af)

Multitrack Hit-List. The UK Top 20. (as)

World Business Report. See M 0905. (am/eur)

World Today. Examines thoroughly a topical aspect of the international scene. (af)

Britain Today. See S 0045. (am/eur/as)

World News. See S 0100. (af/am/eur/as)

Focus on Africa. See S 1705. (af)

World Business Report. See M 0905. (as)

The World Today. See M 1645. (am/eur)

Seven Days. See M 0615. (am/eur)

Off the Shelf. See M 0330. (as)

African News. See S 0630. (af)

Sports Roundup. See S 0145. (af/as)

Britain Today. See S 0045. (am/eur)

Sports Roundup. See S 0145. (af/as)

Newsdesk. See S 0030. (af/am/eur/as)

Focus on Africa. See S 1705. (af)

Variable Comedy/Quiz Feature. See S 0310. (am/eur)

Andy Kershaw's World of Music. Recordings of diverse music from around the world. (as)

News Summary. See S 1100. (af/am/eur/as)

World News. See S 0100. (as)

Fast Track. See M 1615. (af)

Outlook. See M 1405. (am/eur/as)

Pause for Thought. See S 0110. (am/eur/as)

Meridian On Screen. The latest cinematic offerings are discussed. (af)

Multitrack Hit-List. See M 1615. (am/eur)

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<table>
<thead>
<tr>
<th>Time</th>
<th>Program</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0530</td>
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<td>Money Focus. African business magazine. (af)</td>
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<td>Megamix. A youth magazine series which covers new trends, entertainment, sport and other issues. (af)</td>
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<td>World Business Report. See M 0905. (af/am/eu)</td>
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<td>African News. See S 0630. (af/am/eu/as)</td>
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<td>1830</td>
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**Synthesized FM Stereo Transmitter**

Microprocessor controlled for easy installation, this FM stereo transmitter is excellent for connecting to the line output of any CD player, tape deck or mixer. It's your all-in-one solution for stereo audio output! The FM-25, a 25 Watt FM stereo transmitter, can be used to drive a stereo audio output for a variety of uses, including connecting to a stereo microphone, tape deck or mixer. It's your all-in-one solution for stereo audio output! The FM-25, a 25 Watt FM stereo transmitter, can be used to drive a stereo audio output for a variety of uses, including connecting to a stereo microphone, tape deck or mixer.

FM-25, Synthesized FM Stereo Transmitter Kit $175.95

**Tunable FM Stereo Transmitter**

A lower cost alternative to our high performance transmitters, the FM-10A is tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band.

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 100 MHz! Use it in an AM broadcast or FM stereo system. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band.

CFN-1, Power Booster Amplifier Kit $10.95

CLPA, Matching Case Set for LPA-1 Kit $14.95

LPA-1WT, Fully Wired LPA-1 With Case $99.95

**Microwave Wireless Mike**

World's smallest FM transmitter. Size of a sugar cube! Uses SMT (Surface Mount Technology) components, devices, and pin-electronics. The receiver is included. The receiver is included. The receiver is included. The receiver is included. The receiver is included. The receiver is included. The receiver is included. The receiver is included. The receiver is included. The receiver is included. The receiver is included.

FM-5 Micro Wireless Mike Kit $19.95

**Crystal Controlled Wireless Mike**

Super stable, drift free, not affected by temperature, moisture, or your body. The microwave frequency is 2.4 GHz, with a bandwidth of 100 MHz. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band.

FM-5 Micro Wireless Mike Kit $39.95

FM-SWT Fully Wired FM-5 $69.95

**Speech Decrassifier Scrambler**

Decode all that gibberish! This is the popular descrambler scrambler that you've read about in all the magazines and newspapers. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band.

SS-70A, Speech Decrassifier scrambler Kit $39.95

CSS, Custom Matched Set $14.95

SS-70A/W, Fully Wired SS-70A With Case $79.95

AC/2.5, 12 volt DC Wall Plug Adapter $9.95

**Tone-Grabber Touch Tone Decoder / Reader**

Dialled phone numbers, repeater codes, control tones, anywhere anytime. The TG-1 will decode and store any number it hears. A simple hook-up to any audio speaker or phone line is all that is required. The TG-1 uses a central office quality decoder and microprocessor. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band.

TG-1, Tone Grabber Kit $99.95

TCG, Matching Case Set for TG-1 Kit $14.95

AC/2.5, 12 volt DC Wall Plug Adapter $9.95

**Mini-Peeper Micro Video Camera**

Super small, high quality, fully assembled, 1/4 W CCD TV camera. The size of an ice cube! Provides excellent pictures in low light (2 lux). Use in our IR Infrared light source to illuminate your subject in complete darkness. The Mini-Peeper has a high quality lens, a high performance chip, and a high quality decoder. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band. It's tunable over the entire FM broadcast band.

MP-1, Wide Angle Lens CCD TV Camera Kit $159.95

MP-1PM, Pin-Hole Lens CCD TV Camera Kit $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 be hidden inside a piece of terrain, even a piece of terrain, even a piece of terrain, even a piece of terrain, even a piece of terrain, even a piece of terrain, even a piece of terrain, even a piece of terrain, even a piece of terrain.

MP-7A, Fully Wired 455 MHz $139.95

MTV-7A9, 911.25 MHz $139.95

MTV-7A, 911.25 MHz $159.95

**Radio Immune System**

Order Toll-free: 1-800-464-2295

Sony, no tech info or order status at this number.

Technical Info, Order Status, Call Factory direct: (716) 924-4560

**Ordering Info** Satisfaction Guaranteed. Examine for 10 days. If pleased, return original form for refund. Add $4.95 for shipping, handling, and insurance. Orders under $20 add $3.00. NY residents add 7% sales tax. No returns on credit cards. Foreign orders add 20% for surface mail or use credit card and specify shipping method.

www.americanradiohistory.com
At the top of the optimum working frequency (OWF) table on this page, you will find the following terms: "Flux" and "SSN." By popular demand, over the next two months I will attempt an introductory explanation of what the flux and sunspot numbers (SSN), as well as "A" and "K" indices mean, and how they are used in propagation prediction.

Please remember that the flux and SSN numbers you see above the OWF table are the "forecasted" values that have been used to prepare the table, since it is produced ahead of the magazine date. One such value is the sunspot number, which is based upon event data which have been observed and listed since July of 1749. No, that is not a typo!

Daily observations are made of the face of the sun, and these observations are recorded. This number is not the exact number of dark spots on the face of the sun, but a mathematical approximation, as the spots appear in groups. The number of groups are also included in the calculation. The daily sunspot number (also called the Wolf number) is calculated as follows: 

\[ R = k(10^g + f) \]

In which:
- \( R \) = Wolf's relative sunspot number
- \( k \) = a factor that is used so that all observations are comparable to each other
- \( g \) = the number of groups of sunspots
- \( f \) = the number of spots on the face of the sun

Warning: never look at the sun to try and see the spots—believe me, you exist!

Here are two definitions that have been elaborated by IPS in Australia and might be of some help:

"Sunspots: Relatively cool regions in the solar photosphere that appear dark. They contain intense magnetic fields which provide the energy for solar flares. Sunspots occur in groups.

"Sunspot Number: An index of solar activity related to the number of sunspots and sunspot groups present on the sun.

If you look at the definition of "sunspots" above, you will see that these spots "contain intense magnetic fields which provide the energy for solar flares." These flares and their after-effects cause disruptions in the ionospheric layers upon which long-distance shortwave transmissions depend.

Over the years we have become very sophisticated; looking at the sun every day to see how many pimples it had, became tedious. After WWII, someone realized the sun was an immense radio transmitter and had a strong, steady signal on 10.7 cm (2,800 MHz). So instead of looking at the sun, why not listen to it on its best frequency? This new technique—listening to the solar flux—was implemented in February 1947 in Ottawa, Ontario.

The observatory was eventually moved to Penictun, British Columbia, where every day at 1700 UTC the sun is tuned in and measurements are made to find out how active its transmitter is. The same energy that is heard on 10.7 cm is the same energy that can be visually observed in the sunspots. However, the visual observations are still continuing, to avoid breaking the long sequence of observations spanning nearly 250 years.

Even at times of zero sunspots the sun is not completely quiet. The lowest measurement of the 10.7 cm flux has been 62.6 units; the highest has been 457.0 units. Since I am positive that someone is going to ask, I will tell you that the unit used to measure the sun’s activity is the “solar flux unit” (sfu) and 1 sfu is equivalent to 10,000 jansky.

As we said earlier, the level of activity of the sun and number of flares that ensues from this activity are the major components of instability in the ionosphere. If the activity level is high, we are liable to have shortwave conditions that are unstable and suffer from fading, solar flutter, and similar problems, as the ionospheric layers respond to the sun’s activity.

The solar flux level can be used to predict the level of ionization of the “F” layer of the ionosphere, from which we then derive the Maximum Usable Frequency. Once we know this frequency we can derive the value of the Optimum Working Frequency that is tabulated on this page.

Next month we’ll conclude our overview and give you some resources for further reading.
Mediumwave Moxie

Hearing about the passing of Ken Cornell W2IMB put me in a pensive state of mind. While so many monitoring hobbyists quested for signals in the shortwave range and above in the VHF/UHF regions, Ken showed us for years that a lot of great stuff could be found below 1600 kHz that was worth listening to. He was also a confirmed home-brewer and certified cheap-ske when it came to radio. His skills in these areas helped many of us move forward in our hobby without emptying our wallets.

Ken was best known for his longwave work but he was also no slouch in the medium wave region, all of which brings us to this month’s topic.

You say you don’t have any money to devote to the radio hobby right now? You peruse the catalogs (because they’re free), but the chances of putting a high dollar receiver in your home are as remote as Madonna signing you up as the lead hunk in her next video? No matter, my friend. Radio is all around you! The signals are free, listening to them can be nearly so, and challenging catches can be found on any band.

I confess to being a “DC to daylight” monitor, but even I have my favorite places in the radio spectrum. I have always enjoyed pushing the monitoring envelope on the good old fashioned AM broadcast band. I’ve DXed the medium wave band with everything from a crystal set to a laboratory quality receiver and have had fun both ways. In this frequency range, listening doesn’t depend on the depth of your money pit. Furthermore, AM broadcast band monitoring is a great way for beginners to learn more about radio monitoring as a hobby.

Equipment

But let’s begin at the beginning. First, find an AM receiver. Most houses have at least one radio in them, even if it is in the family car. Look on top of Mom’s refrigerator or root through the closets. Every household should have at least one AM radio (preferably battery powered) just for receiving emergency broadcasts in times of storms or other natural disasters. (That’s my old Civil Defense training coming out). Inexpensive AM radios can be purchased for as little as $5. Once you have found that AM receiver you are well on your way to tons of radio fun.

The AM broadcast band traditionally has covered the 530 through 1610 kHz range. Recently, the FCC has authorized use of 1610 through 1705 kHz, too. We’ll talk more about that in a few moments but, chances are, that AM receiver you found in the back of the closet probably only covers up to 1610 kHz if it’s more than a few years old. Anyway, once you have determined that the receiver does in fact work, grab a pencil and paper and we’ll get started.

Technique

Set the radio in front of you and start tuning up the dial from 530 kHz up to the top of the band—1610 or 1705 kHz depending on your receiver’s age. As you come upon a signal, stop and take some notice of what you are hearing. Is the signal strong or weak? Does it have any static or noise? Do you hear more than one signal competing for the frequency? Don’t try to actually log any stations at this point, just use your ears and pay attention to how things sound.

After you’ve worked your way up the band once or twice you probably have noticed quite a few things. First of all, you have probably figured out that there are stations at radically different power levels on the AM band. There are AM broadcast power authorizations that run from under 100 watts up to 50,000 watts.

Another thing you will have discovered is that it is often possible to find more than one signal on any given frequency. Tune back to one of these multi-stationed frequencies (assuming you ignored my suggestion and took notes anyway) and let’s try something out. As you attentively listen to the two or more stations competing on the frequency, slowly turn the radio so that it is facing 90 degrees from you and then 180 degrees from you (so you are looking at the receiver’s back). In most cases, during the turning process, you will find that one of the station’s will rise out of the noise and become dominant.

Further turning might show another station on top of the heap. Pretty neat, huh? Now you know that these radio signals have directional characteristics. In addition, the standard type of antenna found in most AM broadcast portables is directional in nature. You can point the receiver for improved reception of a particular signal.

One other thing you may have noticed is that the majority of signals are evenly spaced by 10 kHz. This level of separation allows for a lot of great monitoring without the need to resort to expensive receivers with equally expensive filtering circuits. You’ll still find adjacent channel interference if there is a strong station near your home. It’s just less of a hassle than it might be in the shortwave regions.

If you’re really observant you may have discovered that, from time to time, a weak signal might appear between those nice even 10 kHz spaces. Congratulations, compadre; you’ve just logged your first new country on the AM band! Some parts of the world use a 9 kHz spacing. Catching something between the domestic signals is not as hard as you think it might be once you get your ears used to listening in the “cracks.”

Okay, you might be thinking, once or twice through the band and you’ve mined all there is to monitor. Nope, not by a long shot. Now we’ll talk about some of the other phenomena that make AM broadcast band listing such a challenge even though it can be done on the cheap.

DXing with Mother Nature

Let’s assume that your first trip up and down the band occurred during daylight hours. Now you have to return to the receiver at local sunset to see what happens. Without going into too much detail for the scope of this short article, the FCC requires many stations on
certain frequencies to significantly reduce power at the time of local sunset to reduce the chance of interference with other stations in the region. Likewise they can resume higher power broadcasting again at local sunrise. Now think for a moment. The sun doesn’t rise and set at the same time all across the country. So as one station is beginning to operate at a reduced power level, another distant station might still have a stronger signal that is now more easy to catch. Tuning through the band again at local sunset should begin to reveal a very different picture from your daytime trip up the band.

As night falls, the fun really begins. Remember I mentioned that there were some stations that were authorized to operate at 50,000 watts? A portion of these stations are allowed to run this high power 24 hours a day. That’s a lot of power, and the propagation conditions that come into play after the sun goes down over both you and the 50 kW super stations will make it possible for you to hear dozens of signals from distant states.

A few relatively easy long distance catches to keep and ear out for are: WSM, Nashville, TN, 650 kHz; WSB Atlanta, GA, 750 kHz; WJR Detroit, MI, 760 kHz; KOA Denver, CO, 850 kHz; WBZ Boston, MA, 1030 kHz; WHO Des Moines, IA, 1040 kHz; KYW Philadelphia, PA, 1060 kHz; WBT Charlotte, NC, 1110 kHz; KSL Salt Lake City, UT, 1160 kHz. There are lots of other “Clear Channel” stations to log, but I picked these out for you to try for because they are among the stations that still use three-letter call signs that are reminiscent of the earliest days of radio, as opposed to the more common four-letter call signs.

Your after-sunset listening should be enough to fill quite a few pages of that pad of paper we talked about. But there is yet another bandscan you will want to try. Next time you have a Monday off from school or work, make plans to stay up late on Sunday night. At midnight, as Sunday turns into very early Monday morning, this is the time to go hunting for places where stations have gone off the air for routine and special maintenance. It is also the time when stations might conduct tests of their equipment. These are the “DX Tests” you’ll find in a sidebar in the American Bandscan column from September through April.

These tests can turn up a number of rare catches. For instance, being an East Coast dweller, there are several West Coast states that I haven’t shot at unless a couple of mid-country big signal stations shut down for repairs once in awhile. Patience and persistence—rinsed down with a couple of cups of strong coffee—will net some loggings that you will tell your grandchildren about.

The Ultimate Challenge

We’re not finished yet, folks. There’s a handful of frequencies that can turn up all sorts of monitoring action in the AM broadcast band. As a matter of fact, it’s the place where all the serious AM DXers hang out. It’s called “The Graveyard.”

The Graveyard is the name given to the six so-called “local” frequencies. The term graveyard comes from the mistaken belief that these frequencies should be dead after local sunset. Local stations are only allowed to run 1000 watts or less of power.

Because they are designed for local service, each of the channels has as many as 120 stations assigned to them. When you tune into one of these six frequencies—1230, 1240, 1340, 1400, 1450, 1490 kHz—after dark, at first it sounds like an unintelligible mess. But wait, listen in for a bit, and move that radio around from side to side. Every now and again a distinct signal may rise out of the mess and give you a solid ID.

Experienced and patient monitors to the graveyard frequencies have been known to dig out over 20 signals on any one channel. It’s challenging and probably different from any other type of monitoring you have ever done, but the satisfaction of success in digging in the graveyard is like nothing else in radio.

Also, remember the new extended AM band runs up to 1700 kHz. As new stations begin to appear up there—such as WDJM Elizabeth, NJ, 1660 kHz—there will be all the more signals to add to your log.

A Great Start

Medium wave listening is also a terrific way to get a young person interested in the radio hobby. Help them to hear the distant cities and then point them out on a map for effect. You could show them the way to a family activity that will bring rewards throughout their life.

And what’s missing from this article? MONEY! We got all the way through a session of radio monitoring and, in most cases, not a penny was spent—other than maybe a few batteries. Sure you can buy a more expensive receiver, some accessories, a fancy antenna, join a few clubs, whatever. You can still have a lot of fun playing radio without needing to dip into your wallet if you put your mind to it. Ken Cornell would have been proud of you, my friend.
Beacon Basics

Why Beacons?

Why, you ask, would anyone want to listen to navigation beacons? All they do is send the same thing over and over again, right? The attraction to monitoring them comes not from the content of their transmissions (usually a two or three character Morse ID), but rather from the very fact of reception. These unmanned stations run low power (normally less than 50 watts), making them a formidable challenge when compared to the megawatt-class broadcasters found on shortwave.

In many respects, a beacon makes the perfect DXing target. Unlike many types of utility stations, a beacon's location can be precisely determined from charts, its power level and radiation pattern remains constant, and it sends its ID continuously. (This last feature can be a major help when you're trying to sort the "dueling" IDs of several beacons on one frequency.)

Many DXers "collect" beacons. They keep a running total of their loggings and continuously strive to hear more distant stations, or otherwise rare catches. The final goal is usually to obtain a QSL card from the Engineer-in-Charge of a beacon—something that is entirely possible with the right background information.

Location, power level, and QSL data for over 7000 beacons can be found in the Aero/Marine Beacon Guide. This book has become the standard for identifying beacons in the Americas and Pacific regions of the world. The Guide ($15 postpaid) can be ordered direct from Ken Stryker, 2856-G West Touhy Ave., Dept. MT. Chicago, IL 60645.

DXing Resource

Ten years ago Sheldon Remington (N6E) wrote a series of articles entitled "On the Art of NDB DXing" that appeared in the Lowdown journal from January 1987 to April 1988. This was a top-notch treatment of the hobby detailing the challenges, techniques, and rewards to be gained from beacon DXing.

Although extremely popular at the time, the passage of a nearly a decade made this information accessible to only a lucky few who had back issues of the Lowdown. All of that has changed today.

Stephen P. McGreevy, N6NKS (of natural radio fame) has re-published the entire series in a single booklet form and has made it available to the longwave community. The table of contents for the book gives an idea of how deep the coverage is:

Chapter 1—Introduction
(General information about the hobby, purpose of beacons, objectives of the book)

Chapter 2—The Spurious Response Problem
(Covers receiver problems, cures for overload, and filters)

Chapters 3 through 6—Man Made Noise
(Explains powerline interference, the politics of RF pollution, use of tuned & untuned loops, directional antennas and other systems)

Chapters 7 through 9—The Frequency Domain
(Covers noise blankers, natural noise, receiver noise, preamps, modulation and pitch, beacon frequency assignments, calibrated receivers, and beacon defects)

Chapter 10—Beacons on the road
( Discusses portable receivers, mobile setups, and direction finding)

A text version of the book can be found on Stephen McGreevy's web site at http://pwl.netcom.com/~spmcgry/artoftoc.html. To save server space, however, the Internet version omits all photographs and circuit drawings that are printed in the paper-based version. (There are over 30 graphics in the book).

While I enjoyed browsing through the Internet version, I found it almost essential to have all of the information printed out for handy access, including all graphics. The cost for the printed book is $20 postpaid (Check or M.O.) from: S.P. McGreevy Productions, 604 North F Street #1, Dept. MT. Lakeview, OR 97630-1127. When ordering, specify desired binding style—3-hole punch, or stapled.

The Art of NDB DXing makes an excellent addition to any longwave library.

See you next month!
1997 SHORTWAVE FREQUENCY GUIDE

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Finally...a really up-to-date handbook with the latest broadcast schedules compiled for November and available only at this time. Modern layout allows easy and quick information access. User-friendly tables include 1,200 entries with name, band, and international broadcast stations worldwide from our 1997 Super Frequency List on CD-ROM (see below). Another 1,800 frequencies of all utility stations worldwide. A solid introduction to real shortwave monitoring is included as well, plus 1,200 frequencies of all professional monitoring services alike - at a sensational low price!

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Special package prices: CD-ROM + SW Frequency Guide = $70. More package deals available. Please see our Internet Web Page or Phone/FAX us for program features, new product releases and pricing schedule. DELTACOMM is available for ICOM R9000, R7100, R7000, R710, R72, IC-735 (features vary with type of radio). Also check out our DELTATONE 2.0 repeater programmer:

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We don't make SCANNERS or the ICOM IC-R8500 RECEIVER - we make them better - DELTACOMM I-8500 Communication Manager for the ICOM IC-R8500 communication receiver. With speed as a design goal DELTACOMM's QUICK LSX function will log signal level, frequency, mode, date, time and optional Global Positioning System (GPS) coordinates at speeds in excess of 2400 channels per minute. Here are a few examples of the many advanced features DELTACOMM I-8500 has to offer:

- Load 40 channels of information including ALPHA NUMERICs into one of the R8500's memory banks in 3 seconds.
- Separate volume level, repeat scan delay and maximum monitor delay plus 40 character information field for each scan channel.
- Priority channel operation samples at 2.5 second intervals.
- Multi-receiver control will hand off active frequency to next receiver on line. Able to control up to 125 ICOM receivers (optional).
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- Activity log function automatically records and calculates total spectrum usage time.
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Mixed Bag

This month we look at a bunch of short, but interesting items on changes and news in the “regular” domestic bands. Watch for a special report on developments in the expanded band in an upcoming edition of American Bandscan.

• In February 1996, hundreds of DXers heard temporary station “KTRK.” The U.S. Army operated this station as a test of a portable outlet, intended to inform and boost the morale of American soldiers in Bosnia. After a few days of operation, the station was packed up and is now believed to be operating on 1143 kHz in that now relatively peaceful country.

This February, the Army tried again. The 1997 reincarnation of “KTRK” operated on FM only. Unfortunately, there were only a few days warning—a good reason to get on the Internet!. A frequency wasn’t given, but I seem to recall hearing that 90.5MHz was used. If you live in the vicinity of Fort Meade, Maryland, and heard something strange at the bottom of the FM dial in early February, this was probably what you heard.

• San Diego-area radio listeners—and West Coast DXers—face some confusing changes in their area. Long-time classical music station KFSD-94.1 has switched to a rock music format. Their classical music has moved to the weaker signal of KOWF-92.1. At the same time, the operators of Los Angeles classical station KKGO-105.1 have announced plans to launch an AM classical station in the San Diego area. “K-Bach” will take over Mexican station XETIN-540.

I have heard some other confusing reports about this operation. Some suggest that KKGO’s AM station in Costa Mesa, California (also on 540 kHz) will simulcast XETIN. Others suggest that KKGO-AM will also be moving to the expanded band, at 1650 kHz. Stations on 1050 and 1260 kHz, also in Southern California, may also be involved. It would be a good idea to watch all four frequencies.

• Legendary Chicago station WJJD-1160 is no more. CBS has purchased the 1160 kHz facility and moved their successful all-sports operation “The Score” from its old home on 820. The 1160 kHz call letters will change to WSCR. 820 has been sold to a group that (I believe) will run motivational talk. The 1160 frequency briefly rebroadcast sister FM station WJMK-104.3’s oldies.

Incidentally, I also understand the 820 frequency will resume nighttime broadcasting soon. CBS shut down the night operation several years ago, as it required several towers, and the land under the towers was more valuable than the radio station!

• The February 9 deadline for returning long-silent stations to the air has come and gone. As recently as mid-January, the FCC listed over 100 silent stations that would get the axe on that day. Most, however, succeeded in getting at least a temporary signal on the air. I believe fewer than 40 licenses were actually canceled. Some of the stations known to have beat the deadline include WRPT-650 in New Hampshire; WJLT-1060 in Massachusetts; WBRW-1170 in New Jersey; and WHCT-channel 18 in Connecticut.

• Just when Seattle TV viewers thought they had their dial figured out, it changed again...twice... In the massive affiliation changes triggered by the Fox/New World deal, KSTW-11 won a CBS affiliation. Former CBS affiliate KIRO-7 ended up signing with UPN.

In early February, another deal was announced; Fox would trade its stations in Phoenix and Austin to KIRO’s owners in return for the Seattle station. KIRO would switch to Fox, and Fox affiliate KCPQ-13 would presumably become a UPN affiliate.

But that didn’t happen. Instead, the owners of the UPN network bought KSTW-11. KIRO-7 will go back to CBS, and both Fox and KCPQ-13 will stay put. UPN and WB are reported to be looking at possible station purchases in other cities, so you should expect more network changes elsewhere. I guess the moral of the story is to make sure your TV and antenna work properly on every channel, because you never know where your favorite program will show up next!

• Also in TV, this time in Canada, CHCH-11 Hamilton has changed its name to “ON-TV.” This name change reflects the station’s conversion to province-wide status; licenses have been granted for relay stations across Ontario. I believe the relay in Ottawa (also on channel 11) is already on the air.

You may or may not see the CHCH call letters. While U.S. regulations require stations to identify every hour, stations in Canada are only required to give their call letters once a day. DXers in western Canada and the Pacific Northwest also have a new target pending: a permit has been issued for CIYV-TV channel 42 at Vancouver.

• March American Bandscan reported the debut of new KTSN-1340 Elko, Nevada. At the time, I commented “...it’s going to be very difficult to log this one (unless you happen to live in Elko!).” I now regret writing that. The first DX report of KTSN has surfaced, and the DXer was in Finland! That said, it should be noted that the local channels are less crowded in Europe than they are here, and many European stations don’t broadcast 24 hours. I have heard tapes of U.S. AM stations, made in northern Europe, and the strength and clarity of the reception is simply amazing!

• When WYNY-103.5 New York became dance-music WKTU in early 1996, country music fans had to rely on DX reception for
their favorite music. Now, the country sound has returned to the U.S.'s largest city. The technical arrangements are what make this newsworthy. The other NYC stations use one transmitter atop the Empire State Building or World Trade Center.

- Odyssey Communications is trying something different. Their “Y-107” consists of three transmitters spread around the metropolitan area. One holds the call letters WRCX-FM; it’s a former modern rock station in Westchester County. A second is WZVU-FM Long Branch, New Jersey, which used to carry an oldies format. And the third is WWHD on Long Island, which used to rebroadcast WMXW-102.7 NYC. All three stations broadcast on the same frequency, 107.1 MHz.

This is not Odyssey’s first three-way rebroadcast operation. Their other station (ironically also called “Y-107”, and also on 107.1 MHz) is a modern-rock outlet in the Los Angeles area.

### AM DXing Alive and Well

A lot has been written lately about the difficult state of the radio hobbies. Several clubs have folded in the last few years. However, domestic-band DXing seems to remain fairly strong. The National Radio Club (AM) [P.O. Box 5711, Topeka, KS 66605-0711] was one of the few ANARC-member organizations to post an increase in membership in 1996. And it’s since read that membership in the MTDX (FM/TV) [P.O. Box 17333, Asheville, NC 28816] has also increased slightly. See Club Circuit in MT or at www.americanradiohistory.com for more.

With the rapid changes in radio these days, membership in specialist clubs like these can do wonders for your success as a DXer.

While the winter of 1996/1997 was pretty good for AM DX, it was miserable for FM and TV. But as you read this, the sporadic-E season is about to begin. Don’t forget to check your TV for signs of strange signals on channels 2-6. Warm-high-pressure areas may also generate DX on the other channels. If you hear or see anything unusual, let your fellow DXers know. Write: American Bandscan, Box 98, Brassington, NC 28902, or via the Internet at 72777.3143@compuserve.com.

### AM CALL CHANGE

The following AM stations have changed callsigns:

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<thead>
<tr>
<th>Old Call</th>
<th>New Call</th>
<th>Location</th>
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<tr>
<td>KEZC-1400</td>
<td>KJDK</td>
<td>Yuma, AZ</td>
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<td>KNZQ-540</td>
<td>KGQ</td>
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<td>KOB</td>
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<td>KGER-1390</td>
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<td>KGIL</td>
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<tr>
<td>WMAD-1190</td>
<td>WNWC</td>
<td>Sun Prairie, WI</td>
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**Break the Trunking Barrier!**

The Exciting New Uniden BC235XLT

‘TrunkTracker’ Follows Trunking Signals!

“This single product will produce the most dramatic increase in scanning in decades. Vast public safety systems that have eluded scanners for years can now be monitored at the touch of a button.”

—Bob Grove, Publisher, Monitoring Times

Compact and sleek, Uniden’s new, handheld BC235XLT TrunkTracker lets you follow Motorola trunked communications from start to finish! Now you can monitor those elusive 800 MHz public safety communications that have previously escaped scanners by switching channels between transmissions.

And the BC235XLT Trunk Tracker offers other exciting features as well—conventional scanning of the 29-54, 108-174, 406-512, and 806-956 MHz bands (less cellular), 300 channel memory in 10 banks; 10 priority channels, individual channel delay and lockout, and choice of user-programmable search ranges or factory pre-programmed search of police, fire, emergency, marine, aircraft, and weather frequencies. Included at no extra cost are a wall charger and two rechargeable batteries. BNC-base flex whip, frequency guide, belt clip, earphone, and instruction manual. See our site on the world wide web (www.grove.net) for specifications and updated information. Order SCN 10.

Only $299.95!

Plus $8 UPS shipping
Micro Pirate Conference Scheduled

Paul Griffin of the Association of Micro-Power Broadcasters sends word that a Micro-Power Radio Conference has been scheduled for June 20 and 21 in Carson, CA. Several stations expect to be present, notably including Radio Free Berkeley, San Francisco Liberation Radio, and Zoom Black Magic Radio. The event will be at the O.C.A.W. Union Hall, located at 1200 East 220th Street in Carson. Additional information is available via Paul_W_Griffin@bmug.org internet e-mail. Literally hundreds of low power pirates inhabit the FM broadcasting band throughout the United States, so the conference subject matter is extremely timely.

New ACE Web Site

ACE President Pat Murphy of Chesapeake, VA has announced that the Association of Clandestine radio Enthusiasts now operates a page on the world wide web. A URL of http://www.clandjop.com/~jcruzan/ace/ takes you to the site, which features several helpful hints on pirate DXing. It also allows members to electronically send material to the club via the internet. John Cruzan of Cruzan Information Systems in Joplin, MO, is the webmaster of both the ACE site and the longstanding Free Radio Network pirate web page, so you can easily access either source of pirate information via the URL listed here.

Voice of Tibet

Some clandestine stations are really challenging DX targets. A good example of this is the Voice of Tibet, usually audible only with great difficulty on 7400 kHz around 1230 UTC. The Cumbre DX internet shortwave broadcast newsletter notes that this tough catch was logged in March by well known DXers Hans Johnson and Dave Valko. To snag it, Hans and Dave organized a DXpedition in Mahalo, located on the island of Maui, Hawaii! They heard an open carrier prior to a sign-on interval signal at 1222 UTC. Our west coast readers probably don’t have to travel to Hawaii to try for this one. Has anybody been hearing it?

Cumbre DX has established itself as one of the best sources of fresh clandestine DX loggings that you’ll find anywhere. Also covering shortwave broadcast DX, it’s distributed over the internet each week to DXers who send in loggings. More information on the newsletter is available at their http://www.grove.net/~cumbre world wide web site. Yes, this is located on the Grove Enterprises server.

Yoder’s New Books

MT reader Jan Schrader read the article about WJDI’s record breaking 15 kilowatt pirate broadcast in the February Outer Limits. This astonishing feat prompted Jan to ask a couple of questions. He wonders, “How can these guys keep from getting nailed by the Feds? I must be missing something. Can you refer me to a book that will help answer my many questions about pirate radio?” Jan picked an excellent time to ask the questions.

Andrew Yoder has repeatedly demonstrated that he’s probably the most prolific author of pirate books in North American history. We have news of two new ones this month. Along with Earl T. Gray, Andy’s new Pirate Radio Operations takes an in-depth look at the broadcasting side of pirate stations. This interesting book is a “how-to” description of just about everything needed to become a pirate broadcaster, covering equipment, production techniques, public relations, safety, the FCC, and dozens of additional factors. The authors note that the FCC will be reading this book, so its cat and mouse examples of “How to Avoid the FCC” are by no means guaranteed. The illustrated 264 page book lists for $19.95 from Loompanics Unlimited, PO Box 1197, Port Townsend, Washington 98368.

In addition, Tiare Publications announces that the ninth annual 1997 edition of The Pirate Radio Directory is now available. This book is sort of the World Radio and Television Handbook of North American pirate radio. As usual it profiles scores of pirates who were active in 1996, provides tips for pirate DXing and QS ling, and lists hundreds of transmission heard last year by date, time, and frequency. Andy gets help as usual from your Outer Limits editor George Zeller. The book sells for $12.95 plus $2.00 shipping via Tiare at PO Box 493, Lake Geneva, WI 53147. In addition, many Monitoring Times advertisers carry both books.

Numbers in Pirate Band

Kenny Love of Columbia, SC, and Dick Pearce of Brattleboro, VT, both report that they are consistently hearing numbers stations in the pirate bands. One of the most widely noticed examples is a five digit English language station with a female synthesized voice that blasts in on 6959 kHz at times like 2100 UTC. Both Kenny and Dick note that this one sometimes suffers from jamming that can bleed over onto the main pirate frequency of 6955 kHz. Signal strengths during the winter suggested that this one probably comes from a European transmitter site.

We haven’t heard it for over a year, but one of the funniest pirate stations is known as the Numbers Parody. It’s easy to tell the pirate from the real thing, since all of the numbers on the pirate consist of Mexican foods. If you hear “taco, guacamole, enchilada, taco, burrito,” you can rest assured that the transmission is not designed for hungry spies.

Quello Leaves FCC

In an item of interest to pirate stations, FCC Commissioner James H. Quello has resigned his position, reportedly because of disagreements over deregulation with FCC Chairman Reed Hundt. Commissioner Andrew Barrett also left the FCC in March. Thus, President Clinton will be appointing two new commissioners. Fearless Fred of Radio Garbanzo has volunteered to be a nominee, but he reportedly ranks quite low on the White House’s list.

Errata

Mike Layden of Rouseville, PA, writes in to point out an error in the February issue of the Outer Limits, where the pirate band was mentioned repeatedly and incorrectly as “39 meters.” Applying the formula for converting kHz frequencies to meters, Mike finds that 6955 kHz is precisely 43.104529 meters. Thus, the main North American pirate band is often described as the 43 meter band, just below the 40 meter ham band. Mike has proved that Monitoring Times readers have sharp eyes and sound logical minds!

What We Are Hearing

Your pirate loggings are always welcome
via PO 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: PO Box 1, Belfast, NY 14711; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 28413, Providence, RI 02908; PO Box 146, Stoneham, MA 02180; PO Box 11522, Huntsville, Alabama 35814; PO Box 88, Moline, IL 61265; PO Box 5617, Ventura, CA 93005; PO Box 293, Merlin, Ontario N9P 1W0; and PO Box 3103, Napier, New Zealand. For return postage, enclose three 32¢ stamps in the envelope to USA addresses. $2 US or two International Reply Coupons go to foreign maildrops.


Anonymous Radio- 6955 at 0115. Announcer John Doe told his listeners that they didn’t hear his broadcast, so they should make sure not to report it to Monitoring Times. Hmm. Addr: None. (Randy Ruger, North Hollywood, CA; Lee Silvi, Mentor, OH; Barry Williams, Enterprise, AL; Jurrens)

Anteater Radio- 6955 at 1900. A horn interval signal is followed by rock and comedy programming on this one. As we see here, their ant has a big appetite. Addr: Belfast. (Michael Prindle, New Suffolk, NY; Williams; Silvi; Jurrens; direct from the station)

Anteater Radio’s ant devours a truck.

Green Acres Radio- 6955 at 1500. They repeatedly play the theme song from the old Green Acres television show. The Chores! The Chores! Fresh Air! Times Square! Addr: None. (Williams)

K-2000- 6955 at 2030. Since they are unquestionably the most elaborate DX comedy production on the pirate bands, their return has been welcome. Few DXers escape the clever barbs of this station. Addr: Stoneham. (Kenny Love, Columbia, SC; Jerry Coatsworth, Merlin, Ontario; Williams; Silvi)

KAOS- 6955 at 0100. During a recent show, Joe Mama dedicated the rock tune, “The First Cut is the Deepest,” to O. J. Simpson. Addr: Belfast. (Kevin Nauta, Grand Rapids, MI)

KIRK- 6955 at 1900. Some DXers have been fooled by a collage program from the Voice of the Ozarks, which features ID’s of many pirates over clucking chickens. But, if you listen carefully, it’s clear that this show is coming from KIRK. Addr: Still none. (Brandon Artman, West Chester, PA; William Hassig, Mt. Prospect, IL; Coatsworth; Jurrens; Pearce; Silvi; Raven)

KOLD- 6955 at 0010. Allo Batista’s big band music format is currently unique among North American pirates. Addr: Stoneham. (Mike Ryan, Buena Park, CA; Williams)

Mystery Radio- 6955 at 0200. The Shadow specializes in electronic instrumental music that creates an unusual effect. He’s become an excellent verifier. Addr: Stoneham. (Jurrens)

Radio Azteca- 6955 at 1445. Bram Stoker has now produced two dozen different programs, all of which are packed with DX comedy. He’s on rather frequently, and you’ll like this one. Addr: Belfast. (Dick Pearce, Brattleboro, VT; Neil Wolfsch, Toronto, Ontario; Love; Coatsworth; Nauta; Silvi)

Radio DC: 6955 at 1830. There must be another election coming up, since their Morse code renditions of “Don’t Vote Republican” have returned. Addr: None; sometimes QSL’s in The ACE. (Bob Mason, Arlington, VA)

Radio Free Speech- 6955 at 1445. Bill O. Rights stunned his many listeners with a “Farewell” broadcast in March, with the usual novelty tunes and political comedy. But it is possible that if there is sufficient demand from his listeners, he might produce more shows. Bryan’s first pirate QSL arrived from them! Addr: Belfast. (Bryan Wade, Louisville, KY; Nauta)

Radio Tellus- 6955 at 2145. Their main programming format is still rock music, but lately they have plugged right wing resistance groups such as the Republic of Texas. Addr: Providence. (Love; Jurrens)

Radio Three- 6955 at 2115. On the real station, Sal Amoniac plays bland pop oldies, criticizes stations for not QSL’ing, and refuses to use an address or verify reports. A fake “Totally Bogus” version parodies the real station, and actually sends out QSL’s. Confused? Join the club. Addr: None. (Hassig; Pearce; Silvi)

Stereo Sound Radio- 6955 at 2100. Colonel Billy Bob’s rock station verifies electronically via the Free Radio Network web site; see the ACE web page article above. Addr: None; uses the FRN. (Rich D'Angelo, Wyomissing, PA; Pearce; Coatsworth; Jurrens; Silvi; Williams)

Up Your Radio Shortwave- 6955 at 1845. Willy B. Serious specializes in political satire with a leftfist ideology. His shows are well produced and thus are entertaining. Addr: Blue Ridge Summit. (Prindle)

Voice of Hielum- 6955 at 1830. Reliable sources indicate that a “Fake” version of this station has been broadcasting lately, which is responsible for an invalid new maildrop that we mentioned last month. Addr: Blue Ridge Summit. (Wolfsch; Williams; Prindle)

Voice of Indigestion- 6955 at 2230. The rock and rap music on this one is hosted by male and female announcers. Addr: None; says will verify logs in The ACE. (Silvi; Coatsworth)

WARR- 6955 at 0300. Captain Nobeard usually features rock mixed with marijuana advocacy. He complained during a recent show about lack of MT logs, although he’s frequently noted here. He’s announcing an address, but no QSL’s have materialized. Hmm. Addr: Belfast. (Shawn Axelrod, Winnipeg, Manitoba; Artman; Hassig; Silvi; Nauta)

WBIG- 6955 at 2045. Kenny describes the format on Big Mike’s station as “industrial strength” rock and roll. Addr: Belfast. (Love; Artman; direct from the station)

WEED- 6955 at 0500. It’s been a while since we’ve seen a log of this slick rock music and marijuana advocacy pirate. As Rich and Talea’s log shows, they tend to broadcast later at night than many other stations. Addr: Huntsville. (Jurrens)

WLWLS- 6955 at 0000. Using a slogan of “We Love WLIS,” they say that they are a tribute to Jack Boggan’s veteran interval signal pirate. They create their own interval signals using rock riffs and chords. Addr: Providence. (Roy Carmen, Canton, OH; Wolfsch; Nauta; Artman; Pearce)

WMPR- 6955 at 2200. Recent programs from them have been dominated by techno dance music. They’ve gotten out as far as Manitou! Addr: None. (Axelrod; Nauta; Jurrens; Williams)

WREC- 6955 at 0230. P. J. Sparx has an easily recognizable format of rock and novelty music, comedy sketches, and frequent cameo ID’s by other pirate operators. He still uses the Radio Free East Coast slogan. This was George’s first pirate catch; congratulations! Addr: Blue Ridge Summit. (George Knight, Garfield, NJ; Coatsworth, Axelrod; Ryan; Prindle; Silvi; Nauta; Wolfsch; Jurrens; Williams; Love; Pearce)

Big Mike’s big radio at WBIG
Amateur radio in the year 2000 is likely to be quite different from what we have today. A World Administrative Radio Conference (WARC) in 1999 will decide what bands and modes we will be allowed and also set new standards for licensing procedures.

With good luck amateurs will be given additional HF spectrum and perhaps gain some new VHF and UHF bands. At past WARC meetings commercial interests were the main obstacle to amateur radio. In recent years, however, HF usage by commercials has diminished as new technologies allowed UHF and microwaves to provide the communication reliability commercial interests demanded. Of course that same technology is now endangering some of the amateur bands at UHF and above.

The Controversy over Morse Code

At present the major focus is on the Morse requirement for operation below 30 MHz. A recent poll of Amateur Radio Relay League (ARRL) members indicates a majority of members want to retain the Morse requirement but might favor a lowering of code speeds. Of course the individual amateur's standing would still be determined by his ability to copy code.

Under consideration at this time is a basic test requiring no code speed and permitting the same privileges as the present "no code" Technician, plus an intermediate class that would consist of a more thorough technical test (retaining the 5 wpm code test), and allowing operation on some HF bands including Morse, digital and phone modes. Code speed for General and Advanced would be dropped to 10 wpm, and the Extra code test of 20 wpm would be retained.

Do we need Morse code? Morse code is a fun method of communications; I would like to think the mode will always be with us. But in a practical sense, it is simply not necessary. Unfortunately, many amateurs view the Morse requirement as a filter to keep the "undesirable" out of the ham bands. Anyone listening to the HF bands will readily agree that this simply doesn't work. (We have our share of weirdos.)

There are many intelligent people who would love to get on the air and communicate, experiment, and participate in amateur radio! A large percentage of these folks see Morse as an antiquated mode and don't want to make the effort to learn something they will never use.

Amateur radio's biggest problem is lack of growth. The No Code license did increase numbers somewhat, but not nearly enough. If we allow newcomers access to the HF bands, it could be just what is needed to stimulate growth and the continuation of ham radio.

Commercial and military stations are foregoing Morse communications in favor of newer and faster techniques. As more modern modes take over there is little doubt that Morse will fall entirely by the wayside.

If the majority of amateurs see Morse to be necessary, then let's have a Morse license allowing small segments of the HF bands to be set aside for CW just as we now have, but those not wanting to learn code should still be allowed to operate in the existing phone and digital bands.

QSLs Expensive?

When I started in ham radio, you could purchase 100 QSL cards from Walter Ashe or World Radio Labs for a dollar and send them to your contacts for two cents. Boy, have things changed! A hundred cards today is going to cost a minimum of eight dollars; and even if you don't send the card in an envelope mailing costs are just too darn high! The return rate for QSL cards is extremely low, (probably due to mail costs) so just getting cards for WAS (worked all states) can cost a sizable chunk of change. Just think what Worked All USA counties is going to cost in postage!

The ARRL has an outgoing QSL service for overseas contacts, but the local cards are still a problem.

There is an answer, however: it is a Domestic QSL Bureau. All you need do is keep some self-addressed, stamped (one unit of postage) envelopes (four is the maximum) on file with this bureau (the envelopes should be 3-5/8 by 6-1/2 inches). Place your call in the upper left hand corner and your name and address at the address position on the envelope. There is no charge for receiving cards via the bureau! Or if you wish, send five dollars and they will provide 10 SASE's for you.

Mailing cards through the bureau costs five cents each. When sending cards sort them by district and suffix of the call. Put the call of the station the card is going to in the address section of the card.

The address for this great service is: USA QSL Bureau, PO Box 814, Brewer, ME 04412-0814.

Phase 3D

The launch date for AMSAT's Phase 3D satellite has been set back to September. This exciting new bird will provide increased opportunities for all amateurs and we will keep you updated on its progress.

3D will be somewhat different to operate through than the earlier satellites. This column will provide information on how to use the new satellite in the coming months.

That's all for April, see ya next month — 73 de Ike, N3IK

In the old days QSL cards, like these shown above, could be purchased and mailed to contacts for only three cents!
Note on advertisement below: As of 4/26/94 it became unlawful to market cellular capable receivers in the U.S. Atlantic Ham Radio assures us that it will give a full refund and hold customers harmless from shopping expenses if a purchased unit is returned to the vendor by US Customs.

800MHz coverage!
We have scanners with 800MHz coverage!
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Yupiteru MVT-7100, 8000
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Canada M3H 1S9

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THE BEST SELLING RADIO MAGAZINES FROM OVER THERE... ARE NOW AVAILABLE OVER HERE


SUBSCRIBE TODAY!

May 1997 MONITORING TIMES 73
This project may be for you if you’re a traveling person who likes to take a shortwave receiver with you for monitoring the HF bands during those dull nights in motels. An active antenna replaces hanks of wire or dipoles that would normally be erected out of doors. Some apartment dwellers who contend with restrictions on outdoor antennas are also users of active antennas.

An active antenna is small and takes up very little space in the radio room. This inexpensive weekend project may be what you have been looking for, especially if the foregoing attributes appeal to you.

**What is an Active Antenna?**

The electronics term “active” means that the circuit requires an operating voltage of some level. This could be 1 volt, or perhaps 3000 volts. On the other hand, a “passive” circuit requires no operating voltage. Since an active antenna may contain one or more RF amplifier transistors or ICs, it is an active device.

The operating principle is to use a very short receiving antenna, and then amplify the incoming signal to a level comparable to that coming from a full-size antenna. Active antennas may use only a 3-foot telescoping whip, or they may have up to 30 feet of wire. The longer the antenna, the stronger the received signal.

The antenna may be erected vertically or horizontally. Different results can be obtained when changing the polarity. This will depend largely on the time of day and band conditions. Active antennas may be used indoors or out of doors. They should be kept as far from house wiring as possible in order to minimize noise pickup from the power or phone wiring.

---

**The Circuit**

Figure 1 contains a practical circuit for an active antenna with 25 dB of gain. Q1 is an MPF102 junction field-effect transistor. A 2N4416 or J310 FET may be substituted. You may also use a dual-gate MOSFET, such as a 40673 or 3N211, by tying gates 1 and 2 together and using the device as a single-gate MOSFET.

Q1 has a very high input impedance. The normal gate impedance is 1 megohm or greater. The gate resistor establishes the working impedance of the input circuit. For example, if we used a 1000-ohm resistor from gate to ground, the input effective input impedance would be 1000 ohms. A high impedance is desirable for the short pickup antenna. This makes the circuit highly sensitive. Q1 provides approximately 10 dB of gain from the BC band to 30 MHz. It is a broadband amplifier because it uses no tuned circuits.

---

![Schematic diagram of the active antenna. Capacitance is in pF. Decimal value capacitors are in µF. Resistors are 1/4-W carbon or carbon film. RFC1 is a miniature 1 mH or 2.5 mH RF choke (Mouser, see note 1). T1 has 16 turns of no. 25 enam. wire on an Amidon FT-50-43 ferrite toroid (850 permeability). The secondary winding has 8 turns of no. 26 wire. See text for explanation of terminals A and B.](image-url)
Output energy from Q1 is routed to broadband, linear Class A amplifier Q2. This stage adds another 15 dB of signal gain. It has virtually uniform gain from 200 kHz to 40 MHz. A better device for use at Q2 is a 2N5179 CATV transistor, but you may have difficulty locating that transistor. A 2N2222A may also be used at Q2.

Terminals A and B in figure 1 permit inserting the circuit seen in figure 2. (More on this later.) Meanwhile, assume that there is a jumper wire across A and B.

The characteristic input impedance of Q2 is 50 ohms. Therefore, a low-value coupling capacitor is used between Q1 and Q2. This prevents the input of Q2 from loading down the high-impedance output of Q1. The collector impedance of Q2 is 200 ohms. Therefore, we need to use a broadband 4:1 impedance step-down transformer (T1) to match Q2 to the 50-ohm input of our receiver.

### Potential BC-Band Overloading

If you live close to a powerful AM broadcast-band transmitter you may encounter interference to your active antenna. When this occurs you may hear blurs of voice and music throughout the tuning range of your shortwave receiver. Normally, there is only one AM station involved in this form of QRN (interference). The band-reject filter in figure 2 may be inserted between points A and B of figure 1 if you have this type of problem. The same filter may be used independently of any receiver to prevent interference from stations between 550 and 1600 kHz. It has a bilateral impedance of 50 ohms.

The figure 2 filter is not suitable for use between the pickup antenna and Q1, owing to its 50-ohm impedance. Filters do not function properly unless they are terminated by their characteristic impedance. A series-tuned wave trap could, however, be used between the input of Q1 and circuit ground without disturbing the operation of Q1. The trap would need to be tuned to the frequency of the interfering local AM station. Wave traps are described in The ARRL Handbook.1

### Construction Tips

Both of the circuits in this article can be assembled on perf board or on a piece of copper-clad PC board. Square isolated pads can be cut into the copper of the PC board with a hacksaw. Point-to-point wiring with short, direct leads is okay. The completed units should be enclosed in shield boxes in order to prevent stray pickup of unwanted signals. I recommend that you attach an earth ground to the metal enclosure. A small cabinet can be made inexpensively from sections of PC board that are soldered together at the seams.

Quality, high-Q capacitors of close tolerance are required for the figure 2 filter. Dipped silver-mica or polystyrene capacitors are best for Q, stability and marked value. These are available by mail.2 The toroid cores are also available by mail.3

### Checkout and Use

Apply any operating voltage from +9 to +12 to the active antenna. The current drain is less than 10 mA. Therefore, a 9-volt transistor radio battery is suitable. Eight or ten AA cells can be wired in series for use as a long-life power supply. A +9 or +12-volt wall transformer is suitable also.

Connect the active antenna output to the input jack of your receiver. Apply operating voltage and touch the short whip or piece of antenna wire with a metal screwdriver blade. You should hear a loud crackle in your receiver if the circuit is working properly. If no sound is heard, check the drain voltage of Q1. It should be slightly lower than the power supply voltage. Also, there should be a small voltage (less than 1 V) between the Q1 source and ground.

Next, check the collector voltage of Q2. It will also be slightly lower than the supply voltage. Check from the Q2 base to ground. You should find approximately 1 volt at that point. Likewise when you check from the Q2 emitter to ground. A lack of Q1 source or Q2 emitter voltage indicates that the transistor is not conducting. If high voltage appears at those points, or at the Q1 gate or Q2 base, there is an open circuit, or the transistor is shorted internally. Make certain that both transistors are installed as shown in figure 1.

### Closing Comments

This can be a fun project that requires very little skill and time. An active antenna can provide many hours of quality monitoring for those who can’t have an outdoor antenna. Constructing the figure 1 and 2 circuits will provide a valuable learning experience for those of you who rarely heat a soldering iron.

### NOTES

1 — ARRL Handbook, 225 Main St., Newington, CT 06111-1494, (860) 594-0200; or available from Grove (800) 438-8155.

2 — Mouser Electronics, Inc., 2401 Hwy. 287 N., Mansfield, TX 76063-4827. Phone: (800) 346-6873 for catalog or ordering.

3 — Amidon Associates, Inc. (new address), 250 Briggs Ave., Costa Mesa, CA 92626. Phone: (714) 850-4660 for catalog or to order.

---

**FIGURE 2**

**BAND REJECT FILTER**

<table>
<thead>
<tr>
<th>INPUT 50 OHMS</th>
<th>OUTPUT 50 OHMS</th>
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<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>L1</td>
<td>L2</td>
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<tr>
<td>L3</td>
<td></td>
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<tr>
<td>C IS IN µF</td>
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</table>

Schematic diagram of the band-reject filter that notches out signals from 550 to 1600 kHz. Silver-mica or polystyrene capacitors are used. L1 has 26 turns of no. 26 enam. wire on an Amidon T50-2 powdered-iron toroid. L2 uses 32 turns of no. 26 wire on a T50-2 toroid. L3 contains 29 turns of no. 26 wire on a T50-2 toroid.
Welcome aboard! Spring is here and if you’re out taking advantage of the fine weather by fixing that antenna on the roof, please be careful. Maybe you should stay inside with one of the following books:

**Pandora’s Clock**

John J. Nance has done it again! *Pandora’s Clock* ($6.99; St. Martin’s Paperbacks) is another realistic aviation thriller for the veteran pilot and author. The main theme of the book is about a sick passenger, aboard a 747, who might have been exposed to a deadly virus. In addition to the main theme of the book, John Nance has done his usual fine business in keeping communications and aviation-related other topics as technically correct as possible. This is his best yet. The book is available now at newsstands — don’t miss it!

**Air Reports**

John Wible of Texas is the owner of a business dealing in aircraft accident reports called *Aireports*. You may have seen his ads in *Airways and Airliners*. He is offering a catalog and free sample report to readers of *MT*. I received my catalog and sample, and both were extremely interesting, with excellent attention to detail. The catalog and reports are spiral bound and fit nicely into a bookcase. Prices for the reports vary, as some are more voluminous than others. All in all, this writer thinks it’s more than worth your while to pursue this offer — especially if you’re interested in why aviation accidents happen. You can contact John for the catalog and free sample report at *Aireports*, P.O. Box 298, Converse, TX 78109-0298.

**ARTCCs**

Here is a listing of all ARTCCs (Air Traffic Control Centers) on the US mainland:

<table>
<thead>
<tr>
<th>ARTCC</th>
<th>Frequency Request</th>
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<tr>
<td>Cleveland</td>
<td>6900 (Los Angeles Drive, NE 299)</td>
</tr>
<tr>
<td>Albuquerque</td>
<td>3226 E. Linn Street, NM 87113</td>
</tr>
<tr>
<td>Atlanta</td>
<td>299 Webster Road, GA 30325</td>
</tr>
<tr>
<td>Boston</td>
<td>Northeastern Blvd., MA 02110</td>
</tr>
<tr>
<td>Chicago</td>
<td>619 Indian Trail Road, IL 60070</td>
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<tr>
<td>Memphis</td>
<td>3229 Democrat Road, TN 38118</td>
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<tr>
<td>Jacksonville</td>
<td>P.O. Box 98, FL 32249</td>
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<tr>
<td>Minneapolis</td>
<td>512 Division Street, MN 55404</td>
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<tr>
<td>Washington</td>
<td>2555 East Avenue P, DC 20550</td>
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<tr>
<td>Miami</td>
<td>7501 NW 58th Street, FL 33166</td>
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<td>New York</td>
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</tr>
<tr>
<td>San Jose</td>
<td>7501 NW 58th Street, CA 95131</td>
</tr>
</tbody>
</table>

As you may have noticed, the name of the center isn’t always the same as the city in which it’s located. Most of the time, the center is situated in the suburbs or out in the country, away from metropolitan areas. This is done so that, if a major catastrophe should happen in the city, the ATC center would possibly be spared.

If you plan to write to any of the centers, please include return postage and address the letter for all locations to Attn: Air Traffic Manager. Explain that you’re a monitor of aviation communications and would be interested in receiving a sector frequency chart, or whatever information you’re seeking.

**More About TCAS**

Under testing at Boston’s Logan airport is new technology that can automatically alert controllers whenever an aircraft’s Traffic Alert and Collision Avoidance System (TCAS) informs the pilot to initiate a Resolution Advisory (RA) maneuver, and it will identify the aircraft involved.

Pilots are supposed to inform ATC of an RA by voice; however, they may forget to do so or there may be a delay. This can lead to serious problems, as incidents can quickly escalate to unmanageable proportions.

Resolution Advisory Report capability, which uses the Mode-S transponder, was included in the original TCAS design and Mode-S ground terminal, but it has never been implemented. The new 7.0 TCAS software now enhances the capability of the RA report.

The Mode-S ground antenna illuminates and interrogates an aircraft’s transponder, which will report, along with the aircraft’s identity and altitude, whether its TCAS has issued an RA. If so, it will cause the controller’s display to identify the aircraft involved in the conflict. When the aircraft is next illuminated by the ground interrogator several seconds later, the Mode S terminal will request information on the type of RA (Climb, Descend, or Limit Vertical Speed.)

The Boston tests, which began last summer and are nearly completed, are intended to evaluate operating protocol and display format as developed by Mitre Corp.

**New Service for Southwest**

This June will see something new for Southwest Airlines — a nonstop long-haul service which will be initiated from Nashville to the West Coast. This will mark a true expansion of the carrier’s proven, short-haul strategy to include limited, longer flights of more than 700 miles.

Plans call for utilizing Boeing 737-300 and 737-500 aircraft on the California routes. In October, the airline is to receive its first Boeing 737-700. As part of the new nonstop service to California, Southwest plans to begin flying from Nashville to Detroit, Michigan, and to Columbus, Ohio. Service to Detroit is to commence April 6 with three flights daily, and once-daily flights to Columbus will begin on 11 June.

Southwest is converting Nashville’s airport into a hub of its own, following American Airlines’ withdrawal.

**Frequency Request**

Paul Mabrey, California, requested frequency info for Honolulu and Los Angeles. Ask and you shall receive...

<table>
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<th>Hourly Update</th>
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<td>Hawaiian Airlines</td>
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<td>TWA</td>
<td>131.800, 151.775, 460.675, 464.525</td>
</tr>
<tr>
<td>United</td>
<td>129.300, 129.500, 130.225, 460.725, 460.875</td>
</tr>
</tbody>
</table>
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The How-To Guide
T.J. "Skip" Arey
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May 1997
MONITORING TIMES
77
I went a few weeks ago to see Dante’s Peak—a recently released action picture regarding a volcanic eruption. The movie, starring Charles Broslyn, does an excellent job of showing off the capabilities and equipment and the brave men and women of the U.S. Geological Survey (USGS).

Dante’s Peak takes place at the base of what was thought to be a very dormant volcano. It turns out it wasn’t dormant; just doing a little light sleeping. A lot of excellent special effects and stock footage of Mount Saint Helens provided an excellent thriller as the lead characters try to escape the volcanic eruption.

The little things that we look for to make a movie credible were there. For example, the USGS operates in the 160/170 MHz band for its walkie talkie land mobile communications. The radios that were used in the movie were Motorola MT-500 series designed for that frequency range, not 150-162 MHz. How could one tell? The radios had shorter antennas (rubber duckies) on them than would normally be seen on the 155 MHz version. It’s little things like that which make the other technical equipment believable.

The USGS is part of the Department of the Interior, and so will share some of the frequencies with other branches of Interior. For the record, some of the other branches of the Department of the Interior are: Bureau of Indian Affairs, Bureau of Land Management, Bureau of Mines, Bureau of Reclamation, Geological Survey, National Park Service, and U.S. Fish and Wildlife Service.

By definition, the U.S. Geological Survey is empowered to identify the lands of the nation, its water, its energy, and its mineral resources. It classifies federally owned lands for mineral resources and water power potentials; it investigates naturally occurring events such as earthquakes, volcanoes, and landslides; and it also conducts the national civilian mapping program.

One of the more interesting departments within the Geologic Survey is the Bureau of Earthquakes, Volcanoes, and Engineering. These are the people that set up the remote monitoring equipment to give us advance warning of the “big one.” There is an entire network in California and the surrounding states that provide this service. Relying upon remote sensors that report back to central monitoring locations.

Monitors who provided the following information say that you are listening to either a low warbling tone or a continuous tone. Any deviation from the norm indicates that something is happening. Here is a list of the frequencies used for the seismic telemetry network “Tilt Meters” (all frequencies are in MHz):

- 162.59375 162.98625 163.03125 162.80625
- 162.809375 163.390625 163.3975 163.396875
- 163.03125 163.60625 163.609375 163.79375
- 163.796875 164.00625 164.009375 164.840625
- 164.84375 164.846875 165.00625 165.809375
- 165.41875 165.421875 165.60625 166.639375
- 166.19375 167.196875 167.80625 167.809375
- 171.215625 171.21875 171.221875 171.40625
- 171.409375 173.19375 173.1975 173.6375
- 173.7625 173.9625

You will notice that these frequencies do not fit the federal band plan and will not be able to be exactly entered into your scanner, with the exception of the 160.0000 and possibly a couple of others. Do not worry. Scanner selectivity is wide enough so that the closest frequency your scanner picks will be close enough.

In watching the movie, there were several scenes of remote telemetry equipment set up on the top of the volcano using 400 MHz beams, horizontally polarized, sending their information back to a command center. Here are some of the known frequencies used for UHF telemetry:

- 408.4250
- 408.7750
- 412.2500
- 417.2750
- 419.8750

The Department of Commerce Environmental Research Laboratory seismic systems were recently transferred over to the Geological Survey. The geological survey got the equipment and use of the following frequencies:

- 163.025 163.125 163.175 163.300
- 163.325 163.350 164.075 164.250
- 164.475 164.675 165.4375 164.4875

Some of the other frequencies used by the USGS are:

<table>
<thead>
<tr>
<th>National Mapping Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>01</td>
</tr>
<tr>
<td>02</td>
</tr>
<tr>
<td>03</td>
</tr>
<tr>
<td>---------</td>
</tr>
</tbody>
</table>

The sub-audible tone used by this agency is 2Z (110.9 Hz)

I am sure that our Pacific northwest readers remember Mount St. Helens and its famed eruption in 1980. If you want to keep track of what is going on there right now, plug in the following seismic telemetry frequencies:

- 163.175 163.39375 163.60625 166.4187
- 167.809375 173.9625 173.19375 173.7625
- 173.9625 406.150 406.26875 408.49375
- 408.56875 173.9625 409.675 (Hydrographic data)
- 409.86875 412.075 416.79375 419.93375

Most experts predict that Mount St Helens will erupt again. According to Volcanoes of the World by Tom Simkin and others (1981), Mount St. Helens erupted 23 times prior to 1831, based on charcoal dates. After that (and before the 1980 eruption) it erupted in 1831, 1835, 1842, 1847, 1848, 1849, 1853, 1854, and 1857. So those of you who live in that part of the world might want to devote a few channels in one of your scanners to some Geologic Survey Mt. St. Helens frequencies.

If you are looking for voice transmissions check out 168.425 (KOD305), the Geological Survey repeater on Mount St. Helens. The repeater in for this system is 167.075 MHz. And for the really esoteric listener who has slow scan TV (SSTV) equipment, you might want to point your beam antennas toward the mountain and watch for TV activity from one of the following repeater output frequencies: 417.775 and 417.675. SSTV has been reported on these two frequencies in the past.

Keep monitoring those telemetry channels. You will be one of the first to know when...
it is time to leave.

**Bureau of Land Management**

The Department of the Interior also operates the Bureau of Land Management. Within this bureau are several divisions. The **Division of Fire, Aviation, and Safety** operates on the following frequencies:

<table>
<thead>
<tr>
<th>Channel</th>
<th>Frequency</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>166.2750</td>
<td>Repeater/Output</td>
</tr>
<tr>
<td>02</td>
<td>166.2750</td>
<td>Repeater/Output</td>
</tr>
<tr>
<td>03</td>
<td>166.2750</td>
<td>Repeater/Output</td>
</tr>
<tr>
<td>04</td>
<td>166.2750</td>
<td>Repeater/Output</td>
</tr>
<tr>
<td>05</td>
<td>166.2750</td>
<td>Repeater/Output</td>
</tr>
<tr>
<td>06</td>
<td>166.2750</td>
<td>Repeater/Output</td>
</tr>
<tr>
<td>07</td>
<td>166.2750</td>
<td>Repeater/Output</td>
</tr>
<tr>
<td>08</td>
<td>166.2750</td>
<td>Repeater/Output</td>
</tr>
<tr>
<td>09</td>
<td>166.2750</td>
<td>Repeater/Output</td>
</tr>
<tr>
<td>10</td>
<td>166.2750</td>
<td>Repeater/Output</td>
</tr>
</tbody>
</table>

The **Division of Law Enforcement** operates on the following channels:

<table>
<thead>
<tr>
<th>Channel</th>
<th>Frequency</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>166.2750</td>
<td>Control/Output</td>
</tr>
<tr>
<td>02</td>
<td>166.2750</td>
<td>Control/Output</td>
</tr>
<tr>
<td>03</td>
<td>166.2750</td>
<td>Control/Output</td>
</tr>
<tr>
<td>04</td>
<td>166.2750</td>
<td>Control/Output</td>
</tr>
<tr>
<td>05</td>
<td>166.2750</td>
<td>Control/Output</td>
</tr>
<tr>
<td>06</td>
<td>166.2750</td>
<td>Control/Output</td>
</tr>
<tr>
<td>07</td>
<td>166.2750</td>
<td>Control/Output</td>
</tr>
</tbody>
</table>

The **National Interagency Incident Management System** operates on these channels:

<table>
<thead>
<tr>
<th>Command Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>01</td>
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<tr>
<td>02</td>
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<td>03</td>
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<td>04</td>
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<tr>
<td>05</td>
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<tr>
<td>06</td>
</tr>
<tr>
<td>07</td>
</tr>
</tbody>
</table>

**Tactical Operations**

<table>
<thead>
<tr>
<th>Channel</th>
<th>Frequency</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tac-1</td>
<td>166.2750</td>
<td>Control/Output</td>
</tr>
<tr>
<td>Tac-2</td>
<td>166.2750</td>
<td>Control/Output</td>
</tr>
<tr>
<td>Tac-3</td>
<td>166.2750</td>
<td>Control/Output</td>
</tr>
<tr>
<td>Tac-4</td>
<td>166.2750</td>
<td>Control/Output</td>
</tr>
<tr>
<td>Tac-5</td>
<td>166.2750</td>
<td>Control/Output</td>
</tr>
<tr>
<td>Tac-6</td>
<td>166.2750</td>
<td>Control/Output</td>
</tr>
<tr>
<td>Tac-7</td>
<td>166.2750</td>
<td>Control/Output</td>
</tr>
<tr>
<td>Tac-8</td>
<td>166.2750</td>
<td>Control/Output</td>
</tr>
</tbody>
</table>

**Logistics Operations—Primary**

<table>
<thead>
<tr>
<th>Channel</th>
<th>Frequency</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log-1</td>
<td>417.3000</td>
<td>Control/Output</td>
</tr>
<tr>
<td>Log-2</td>
<td>417.3500</td>
<td>Control/Output</td>
</tr>
<tr>
<td>Log-3</td>
<td>417.4000</td>
<td>Control/Output</td>
</tr>
<tr>
<td>Log-4</td>
<td>417.5000</td>
<td>Control/Output</td>
</tr>
<tr>
<td>Log-5</td>
<td>417.6000</td>
<td>Control/Output</td>
</tr>
</tbody>
</table>

**Logistics Operations—Secondary**

<table>
<thead>
<tr>
<th>Channel</th>
<th>Frequency</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log-1</td>
<td>417.2750</td>
<td>Simplex</td>
</tr>
</tbody>
</table>

**The Office of Aircraft Services** operates as follows:

<table>
<thead>
<tr>
<th>Channel</th>
<th>Frequency</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>168.5500</td>
<td>Contact/Simplex</td>
</tr>
<tr>
<td>02</td>
<td>168.6750</td>
<td>Tac-1</td>
</tr>
<tr>
<td>03</td>
<td>168.7000</td>
<td>Tac-2</td>
</tr>
<tr>
<td>04</td>
<td>168.9200</td>
<td>Tac-3</td>
</tr>
<tr>
<td>05</td>
<td>167.9500</td>
<td>Tac-4</td>
</tr>
<tr>
<td>06</td>
<td>172.6000</td>
<td>Common Air Safety</td>
</tr>
</tbody>
</table>

**More News Around the Southeastern US**

- One of our readers sent in a bit of information regarding encryption devices used with the National Park Service. I reported several months ago that the NPS had purchased encryption devices for their mobile radios. This monitor out of Charlotte, North Carolina, reports hearing a "warbling, skipping type of sound" on the main channel of the Blue Ridge Parkway—167.1750 MHz. It is unknown what it is. If this is an encryption device, it will be the first known government agency NOT to use a digital type of encryption. Keep us informed...

Also from Charlotte: the FBI repeater was using the frequencies of 167.3875 out/162.6325 in, known as Alpha 5. The new primary repeater is known as Alpha 7 and is using 167.2875 out/162.6325 input. They are also using 167.3375 for simplex.

The FBI in Charlotte has a close working relationship with the local police department, which uses a Motorola 800 MHz trunked system. Our above monitor has been listening very carefully and has on several occasions heard one FBI agent talking to another on their system (167 MHz) telling the other agent to "give him a call on the 800 radio." I have a feeling they were not talking about cellular phones. The 800 MHz trunking mystery deepens.

- I received some e-mail from a Tennessee source who wishes to remain anonymous who gives us a little insight on Tennessee Valley Authority operations. He states that TVA police are using a 408 MHz frequency in the Chattanooga area, but are switching over to a 400 MHz federal trunked system. Looks like the federal trunk systems are showing up in other parts of the country other than just the major metropolitan cities.

- Department of State radio traffic has been picking up in the Houston, Texas, area. The main repeater channel of 409.625 has been yielding some interesting protection details. Code names such as "ABBOT CP, ABBOT ADVANCE, ABBOT FOLLOW" have been heard. For clarification—Abbot is generally the name of the lead agent in charge. ABBOT CP is the command post. ABBOT ADVANCE and FOLLOW are the cars in front of and behind the person being protected. You will also hear info on what hotels are being used, routes, etc. Keep monitoring, but keep your distance!

Let's hear from some of the other parts of the U.S.: what can you tell us about federal monitoring in your neck of the woods?

---

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May 1997 MONITORING TIMES 79
the world of electronic technology is spinning faster than an out-of-control satellite. And, just when you get used to the scenery, someone changes all the props. So, this month we learn how to form a satellite All-Star team of sorts, how a flagging DBS contestant tries to salvage some market share, and peek into the future to find out what you’ll be listening to in your ’99 Town Car.

After an apparently hurried courtship, Rupert Murdoch’s News Corporation (parent of the Fox conglomerate, among others) and Charlie Ergen’s Echostar Corporation (parent of DISH satellite TV) have joined forces. The offspring will operate under the trade name Sky, as in NewsCorp.’s American Sky Broadcasting (“ASkyB”).

So, what’s everybody getting? That’s easy. EchoStar gets cash, and plenty of it. It also gets ASkyB’s satellites and other assets which amount to a tidy $1 billion. And, it turns out that the cash couldn’t come at a better time. With competition among the DBS entertainment providers continuing to heat up, something has to be done to try to sustain the $199 per system price. Joining forces with NewsCorp. is also the easiest way to get more satellites in order to expand the service to try to scoop the competition.

NewsCorp., of course, is a huge winner in this deal. They get an up-and-running American DBS service, just like the ones they already have in Europe and Asia, as well as EchoStar’s extensive manufacturing capability. You should also know that another partner in this deal is MCI Communications Corporation, which will own 20% of NewsCorporation’s 50% interest in EchoStar which amounts to 10%. You follow? Well, the upshot is that this formidable company will have the use of 91 transponders at five orbital slots, which they hope to turn into 500 channels of video.

What’s the point of all those channels? Well, the new Sky service has a plan to deliver your local TV station up to the satellite so that you can watch on your little dish and not have to have one of those annoying outside TV antennas which seem to have served us so well for the last 50 years. This would be done with spot-beams on the satellite. While it’s a great plan, it’s not without its flaws.

First, not everyone will get to receive their local station. The plan is to be in markets which represent around 75% of U.S. TV households. This plan means that 22.8 million household will not get their local stations.

Second, it remains to be seen whether there’s enough market to afford the costs of providing such a service. C-band “superstations” made plenty of money uplinking their signals because they were marketing to the entire country’s cable systems and the 2+ million home dish owners. The Sky plan would make the local TV signals available only in that particular local area.

Third, it is unlikely that Sky will get 100% cooperation with all terrestrial broadcasters in all markets in which they would like to serve. If only one popular station in a given market refuses to play along, local viewers will still need off-air antennas to be able to receive the recalcitrant player. Reasons for reluctance to go along with the gig will include conflict of interest in which local stations already competing with the Fox network affiliates may be owned by other cable interests. Those cable interests already provide local channels on their cable systems and won’t welcome the added competition. In addition, Primestar, a popular DBS player, is owned by a consortium of cable related interests and it’s hard to imagine they’ll be eager to cooperate with NewsCorp.

And, finally, there’s the regulatory hurdle. It’s quite likely that many federal entities will want a hand in painting the details. For instance, regulators such as the FCC, and FTC (Federal Trade Commission), and the Justice Department, among others, will be eager to look into the project. And, of course, Congress will want to step up to the plate on behalf of the many large corporate contributors whose activities might be affected by Sky’s plans. Don’t look for these proposed new channels to be on DISH before the turn of the century.

### AlphaStar’s Big Hope

Coming in dead last in the DBS race since its launch, AlphaStar has been plagued by a series of marketing fiascos. Not the least of which was its main sales plan. Originally, the company had a deal with Amway to use their considerable sales army to march AlphaStar to the kind of success enjoyed by Primestar and DSS. The deal fell through and left AlphaStar with no apparent replacement.

Relying on a network of old C-band satellite TV dealers, whose loyalties were already headed in the direction of the DISH network, made it the slowest growing service in the field. C-band was growing faster! After the first seven months AlphaStar had signed up only 40,000 customers. Primestar averages more than that each month. One reason for slow sales is that AlphaStar is a low power DBS service, which means that it uses Ku band to distribute its programming and that requires a larger dish than used at DirecTV and USSB.

However, Primestar is in essentially the same position yet its sales are robust. For the reason, you only have to look at Primestar’s marketing ploy of “nothing to buy, about a dollar a day” for service. AlphaStar systems sell for $499 when purchased, with an added $300 per year for the basic programming package.

Finally, at the first of March, AlphaStar announced that it had been awarded broadcast and pay-per-view licenses by the Canadian Radio-television Telecommunications Commission (CRTC), Canada’s FCC. The company wasted no time in rushing systems to retail stores. That was easy enough to do since AlphaStar is owned by Tee-Comm, long time
manufacturer of C-band IRDs.

The Canadian DBS situation is a clouded one. When DBS hit in the States, the Canadian counterparts were slow off the mark. Indeed, some participants died in the starting blocks which led to a booming business in “gray market” DBS systems. It’s a gray market because, technically, Canadians can buy the units but can’t legally have them turned on. So, owners go through all kinds of shenanigans to trick U.S. DBS operators into authorizing their units.

For their part, DBS services deauthorize any Canadian subscribers they find. This has led to yet another industry problem: signal theft. While it’s not the focus of a lot of press attention, there is considerable activity in the hacked DSS business. But has this coup for AlphaStar come too late? It’s estimated that there are already some 80,000 to 100,000 gray market DBS systems up and running north of the border. That’s twice AlphaStar’s total current viewership.

The good news for AlphaStar is that they will move their operations to Telstar 5 which is slated for launch in early July. This will allow them to go from 18 transponders to 24 and increase their channel line-up from current 75 (35 video, 30 audio, and 10 pay-per-view) to 120 channels. The best kept part of AlphaStar’s secret is their distribution of CD audio service DMX. Of course, it requires the additional purchase of a DMX receiver and subscription fees, but it is the best audio service available on satellite today. Watch this column for a full review of the DMX service.

Satellite Delivered CD Radio for Your Car

The latest electronic fad on which you will have the opportunity to spend a lot of money is just now in its infancy. The FCC has just recently announced it will auction off two licenses to provide CD quality radio programming. Strangely, since 1992, only four companies have applied for the chance to bid. Now the FCC has decided to limit the auction to those four participants. The interesting part is that none of these companies have any actual equipment or even plans that they’re willing to talk about. Right now it’s all just theoretical.

Here’s how it might work: There is a very narrow band of frequencies in the 1.6 GHz region which the FCC has set aside in the Mobile Satellite Service for the purpose of transmitting digital CD quality radio programming. One company, CD Radio is said to be planning 30 channels of commercial-free music should they win the auction. Stand-alone receivers or AM-FM-Satellite receivers might be available for your car (one imagines this would be optional, like a CD player).

After installation, a phone call is placed to the programmer and the unit is authorized. As long as you continue to pay your monthly bill (reports say it would be about $10 per month), you would remain authorized. Of course, reception could be had with fixed receivers as well. CD Radio plans call for two satellites, CD Radio I (80 degrees W) and CD Radio II (110 degrees W).

Programmers would use geostationary satellites with 1.6 GHz capability. One such company which is already offering voice and data services via L-band to North America is American Mobile Radio Satellite Corporation, parent company of American Mobile Radio Corp.—one of the four auction hopefuls. Using their AMSC-1 satellite launched two years ago, AMSC provides a variety of two-way telephone and data services, including nationwide voice dispatch and mobile messaging services, to fixed or mobile customers.

Critics questioned the FCC’s method in opening the auction to only four hopefuls, reasoning that more money could be raised by getting a bidding war going among a lot of deep pocketed entrepreneurs. Of more interest is the FCC’s decision to open the bidding for LMDS services. Local Multipoint Distribution Services would provide voice, video and data transmissions over high speed local wireless networks which can be connected to the Internet. Reports indicate that the FCC will not allow local cable firms to apply for these licenses except in areas where they have no financial interest.
Radio-to-Computer Data Interface

In this day and age of radio-computer interfaces that offer automated, hands-off monitoring, we can easily lose sight of the more exotic signals to be monitored. This article offers a simple decoder interface for non-voice signals that can be processed and displayed by a computer. Such signals include Morse Code, FAX, RTTY, packet, MDT, and probably many others.

The cool thing is that this simple interface circuit can convert most of these signals into the necessary digital bits required by the computer. While you can get sophisticated and spend a lot of money on specialized interfaces for each kind of non-voice signal, this one covers most with mediocre results, depending on the software and computer that reads and processes the decoded data.

This “analog-to-digital” interface really doesn’t have a name and I’m not going to give it one, because it’s old hat around computerized monitoring circles. My objective is to simplify its construction and to enhance its operation beyond the bare-bones versions that are widely circulated. Let’s just call it the data interface (DI) for the remainder of this article.

Data Signals

Think about it: radio frequency (RF) is an analog function. This means that “modulation,” (the intelligence that’s superimposed on a radio frequency), regardless of its type, pretty much has to be analog, too. It is not possible by any conventional means to directly modulate a radio frequency with a digital signal, though Morse Code comes close in the sense that the RF carrier is either on or off. The pattern of on-off conveys intelligence. Other types of signals, including FAX and RTTY, use an analog pattern of tones to modulate the RF.

This data interface converts most analog (and Morse) signals into a digital bitstream for the computer and software. Plain old receiver audio goes into the input and digital data appears at the output. Software and the computer do the rest. Your job is to read the output on your monitor!

The Computer

Most of the freeware and shareware decoder software with which I am familiar requires an AT/286 class or better computer, and frankly, the faster the computer, the better. Our DI is strictly limited to the IBM/PC world; it will work with Amiga, Macintosh, and perhaps others, depending on available software. I am familiar only with the IBM/PC environment, though, so you’re on your own if you use something else.

The Software

Here it gets sticky: I’ve used only two decoder programs, JVFAX and HAMCOMM. The latest versions are:

- JVFAX71A.EXE 503611 12/07/1995 07:07
- HAMCOM31.EXE 443250 06/10/1996 07:36

Other contenders include:
- MSCAN211.ZIP 437536 11/21/1996 19:21
- PKTMON12.ZIP 22030 12/30/1992 00:23

There may be more. You can look around the archives of the Internet and BBS communities for the latest and the greatest. The above four (or more) decoder programs are available on my BBS and FTP sites if you strike out elsewhere. The key thing here is that most decoder software runs fine with the DI!

The Circuit

This consists of ten common parts and a piece of perfboard, as depicted in Figs 1-3. The schematic is shown in Fig 1 and layout/construction details are shown in Figs 2-3. The circuit uses an op-amp in a comparator arrangement to convert audio sine waves to square waves. Little else needs to be said about it.

Finished Product

Unless you have different needs, it is suggested you build the DI inside a DB-25 or DB-9 female connector shell (see Fig-4) to facilitate direct connection to a serial (COM) port on your computer. PC serial ports are DB-25 or DB-9 male jacks (typically DB-9). Printer (LPT) ports are female DB-25’s, so there is no mistaking the COM ports. If you want to build
yours into a DB-9 connector shell, you will probably have to do it "dead bug" style without a perfboard.

A DB-9 shell is rather cramped inside, so if there is any doubt, build yours into a female DB-25 shell and use a 25-pin male to 9-pin female port adapter to mate with the PC's DB-9 COM port. (Radio Shack #26-209) for maximum flexibility, since computer COM ports can be one or the other. If you build your DI into a DB-9 shell, and later need to connect to a computer's DB-25 serial port, you'll need a 9-pin male to 25-pin female port adapter (Radio Shack's #26-287) to make the fit.

With the DI circuit built inside the connector shell of choice and wired to appropriate pins as in Fig-1, you'll need a cable of sufficient length to go between the radio and the back of the computer. Length is not critical, but use shielded cable, similar to RG-174/u coax or even shielded microphone cable (RS #278-512) with an appropriate phone plug on the end.

![Fig-4: Finished Products](image)

**Radio Connection**

The phone plug (typically 1/8" male, RS #274-286) should be of the type to plug into a jack on the radio. This can be the headphone jack or perhaps even the external speaker jack; either will do for testing and startup purposes. Later, you will want to experiment with enhanced measures.

**Enhanced Operation**

Choose your decoder software and follow its instructions for decoding the various kinds of non-voice data signals. In general, marginal-to-mediocre operation can be expected from the receiver's headphone or external speaker jacks, largely because the audio at these points has been filtered for the voice band, 300-3000 Hz. Trouble is, non-voice computer data can occupy a significantly wider bandwidth of 5 kHz to 15 kHz or more.

Therefore, after you've wet your feet in data decoding, you will want to experiment with tapping the receiver's internal audio at other points before any voice-band filtering takes place. The ideal pickup point for raw, unfiltered "baseband audio" is at the output of the detector for AM signals or the discriminator for NFM signals.

World class radios usually have output jacks specifically for this purpose, so I'll not cover them here. Other radios and scanners are easily modified for baseband audio output by connecting the (+) lead of a 2.2-μF capacitor to the detector or discriminator output, and the (-) lead to the center lug of a phone jack. The shell or outer lug of this baseband audio jack should be grounded to the receiver's chassis.

There are two primary considerations for the enhancement of the DI's capabilities, the first of which is bandwidth. Generally speaking, bandwidth is not a consideration (enhancement not needed) for signals below 30 MHz where there just isn't enough spectrum to afford the luxury of broadband, high-speed data. Therefore, most data signals below 30 MHz are within the receiver's voice band, and it may not be productive to go for the raw unfiltered baseband audio. Headphone or speaker audio may be adequate to decode data in the LF/MF/HF bands.

The VHF/UHF spectrum is eminently suited to broadband signals. Invariably, better performance of the DI will be achieved by taking its input signal from the receiver's discriminator or detector output. Space doesn't allow me to show a Table of the IC's and pin numbers of the baseband audio outputs for all the radios on the market, but I have a large list freely available on my BBS and FTP sites under the filename, IC-PINS.TXT. I also periodically post that list to the Usenet rec.radio.scan newsgroup. I can mail a printed hard copy upon request to those who provide a business-size S.A.S.E. and an additional, loose, first class US postage stamp. (Two IRC's for foreign requests.) Mail requests to me at PO Box 262478, San Diego, CA 92196-2478.

The second consideration for decoding data is **signal-to-noise ratio**. Baseband audio output in most radios is rather weak, so better performance might be obtained with an amplified signal before injecting it into the DI's input. Fig-5 shows an optimized preamp design (based on my March-'97 column) for the DI. Too much gain is undesirable, so an adjustment is provided to set the best output level.

The face and nature of radio are undergoing monumental changes with more and more digital data signals and a lot less voice. The DI and a host of readily available decoder software are great, low-cost tools for exploring the exciting new avenues of radio for the near future. Beware of possible legal issues in monitoring data signals, however: you never can tell anymore........

![Fig-5: Optional Preamplifier](image)

**Performance Upgrades**

<table>
<thead>
<tr>
<th>JRC NRD 525/535</th>
<th>AOR AR-7030</th>
<th>Sony ICF-2010</th>
<th>Yaesu FRG-100</th>
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<tr>
<td>Lowe HF-150 and AP/SP-150</td>
<td>RS DX-394</td>
<td></td>
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</table>

Kiwa offers a variety of performance upgrades for the following receivers which include filter modifications to audio enhancements. Contact Kiwa for details or visit our web site for complete information.

**Kiwa Electronics**

612 South 14th Ave., Yakima WA 98902
509-453-5492 or 1-800-398-1146 (orders)
kiwa@wolf.net (Internet/full catalog)
http://www.wolf.net/~kiwa

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May 1997 MONITORING TIMES 83

www.americanradiohistory.com
Computer Updates and Radio Web Sites

It has been a few months since we last visited a few radio related sites on the Web, so this month we’ll do some catching up. But first, let’s see what’s happening to prices in the world of computer hardware. Is it time to increase your memory? Or, how about an upgrade to your Pentium CPU? Let’s check on the prices, news, and rumors in the computer market.

Word on the street

A friend of mine, who is a marketing exec at a major computer catalog company, put it very well: Wall Street and the US economy are looking to the computer market to tell them their temperature! It seems that as the computer market goes, so does the economy. The computer industry has replaced coal, steel, and cars as the nation’s industry. So, as the Dow Jones heads to 7000, the PC market continues its growth into every facet of our work and home lives.

However, some components are taking a real hit on their price. Memory prices fell for six months, finally leveling off in February. With semiconductor companies getting out of the DRAM memory business and spare manufacturing capacity being used up by other non-memory products, this may be the time to grab that 16 or 32 Meg of memory. I have seen 72 pin (the type used in most Pentium computers) 16 Meg selling for $60 plus shipping. And 32 Meg is selling at $130. The added memory will allow you to run more programs faster and, at the moment, at a great price.

The (floppy) revolution is coming

Strange things continue to happen to floppy disk and drive prices. Two national computer retailers seem to have weekly offers for 3.5 inch 1.4 Meg floppy disks. Would you believe that I have bought 400 preformatted disks for $0.0! That is not a misprint. After I received my mail-in refund the total cost to me was the price of postage — thirty-five cents. Check your Sunday newspaper ads for these giveaways.

Why are they literally giving floppies away? Well, if we check the corresponding floppy drive prices we can see a constant reduction into their current mail order level of $19 to $27. I believe the industry is getting ready for the new dramatically higher density magnetic media which IBM and others were beginning to work on about two years ago. The other direction the industry may be moving is towards writable CD-ROMs.

Zapped by a laser?

The whole industry is waiting and wondering about DVD, Digital Video Disks. While using a similar laser technology to CD-ROMs, DVDs much higher data densities threaten to totally obsolete CD-ROMs! Therefore CD-ROM manufacturers are taking refuge in writable CD-ROMs.

With 100 times the data capacity they may spell the end for floppies. Although these have been available for the last two years at the $1000 level, watch for these prices to plummet if a war breaks out between DVD and CD-ROM. What will actually happen short term is keeping CEO’s of CD-ROM and DVD companies from sleeping at night.

Pentium wins ... but price keeps dropping

For the past few years AMD and other semiconductor companies have tried to compete with the Pentium family of CPUs manufactured by Intel. I think that the contest is over, for the time being, with the Pentium the clear winner in sales and popularity. But, in this crazy business Intel has won the honor of dropping the Pentium family prices a few dollars every month. Last June I looked hard to find a Pentium 100MHz (P100) CPU for $150. Today I have seen prices as low as $92 for a P100 and $110 for a 120 MHz P120. Combined with a Pentium motherboard

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**FIGURE 1**

**COMPUTERS & RADIO RADIO RELATED INTERNET SITES**

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<th>PAGE</th>
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<td>Bob C’s SW &amp; DX</td>
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<td>P</td>
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<tr>
<td>JVFA + Downloads</td>
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</table>
which I picked up on a clearance table at a national retailer for $65, and I have the makings of a second Pentium for under $160; not much more than my Sinclair Spectrum cost in 1984. Add some low-priced memory, case, and keyboard, and you’re on your way. Check out the “barebones” systems offered by the mail order CPU and memory suppliers.

**Even Gutenberg would be impressed**

Prices for all types of printers are at an all time low. Inkjet printer prices continue to fall to $200 and below; but not their ink cartridges. These keep the cost per inkjet page four or more times higher than laser. What price color!

Laser printer prices have leveled off. Hewlett Packard laser printers with 1 Meg of memory begin at $350. This is $150 less expensive than I paid for a basic, non-name brand, 512K memory laser printer two years ago. Dot matrix printers (24 pin) are great buys at around $110. Surprisingly, I found the best printer prices in places like Sans and BJ’s. So check new prices before you buy used equipment.

**One more thing**

Before we look at some radio related Internet sites, remember that a 386 33 MHz DX2 computer, a 14.4 kbs modem, and a VGA-to-TV converter can bring the internet into your living room inexpensively. Check your local newspaper ads and flea markets for a cheap 386. Make sure it is at least a 33 MHz CPU. Then add a $35 modem and $120 VGA-to-TV converter. With an A/B switch on the TV you can go from TV to Internet easily and cheaply. And now what’s new for monitors surfing the net?

**Top ten web sites**

It has been a while since we visited radio related web sites. So let’s look at about ten of the best radio sites around today, in my humble opinion. Some sites we may have already visited in past columns. But if they have maintained their quality, they deserve to be on our top ten list. To make your life a bit easier I’ll list the ones we look at in Figure 1 and indicate whether the site is on our list because of program content (P) or its radio related links (L) list.

A very good place to start surfing is at a radio related links page. This is a page which lists radio related sites for us to explore—Chris Smolinski’s Home Page. Links to propagation forecasts from the Space Environment Center page and hourly generated world maps of the maximum usable frequency (MUF) can be a great value to shortwave listeners. There are lots more radio related links to programs and other link pages on Chris’s page. Give it a try for yourself.

![FIGURE 2 - Maximum usable freq on the Web](image)

Staying with link pages, one that should be bookmarked by all utility enthusiasts is The Worldwide Utility Net. WUN. Their links page is full of military, aero, L.W. VLF and government radio links. This is a must page for UTEs. Everything from ACARS to the Central Intelligence Agency is here.

For the SWLer, Bob’s Shortwave Listeners Bookmarks is the place to jump on your (surf) board. It’s very very comprehensive. Links to shortwave and domestic broadcast stations and web pages are listed. Pirate radio, free radio, numbers stations and clandestine are represented on Bob’s page. Bob has not neglected ham and space. Over 50 links on these topics are here for the taking. UTE are not forgotten. In fact, if you are interested in any facet of broadcasting there is something here for you.

Bob’s Shortwave and DXing Web page will give you frequency and program information of shortwave broadcast stations which are scheduled to be transmitting at the time you access the page. Links to DX and utility news and tips are daily features of this page.

In our discussion of radio mode digital decoders a few issues ago we mentioned HamComm. This program decodes RTTY, Baudot, ASCII, AMTOR, ARQ, SITOR, NAVTEX, CW and more. It requires a very simple hardware decoder which can be built or bought for less than $30. Well, HamComm has its own page on the Pervisell home page where you can download the latest version for a 30-day trial period. The page has lots of good tips on using the program and is nicely presented.

The Pervisell home page allows you to download IVFAX, Navtex station schedules, list of FAX stations, POCSAG decoder software and more. You should visit this site if only for the downloads.

Check out Massachusetts Institute of Technology’s (MIT) Radio List with over 300 stations from around the world, with information available on the Internet. This information ranges from physical station details and programming to Real Audio listening capabilities.

Klingenfuss, a name known for many years for his utility frequency books, has a site that will keep you busy for a good part of an evening. His radio station schedules are very complete and up to date. Links to radio equipment manufacturers and publications include all the names you know in the USA and Europe; yes, even Monitoring Times.

Using the RealAudio program, available for downloading from their home page, you can hear live and pre-recorded audio over the Internet. ShortWWWave’s home page has lots of interesting activities. “Hear Audio Over the Internet” is a page which gives links to shortwave broadcast stations. These are not live, but pre-recorded news broadcasts and can be heard using the Real Audio software. Live audio from US radio stations can be found in Audionet’s Live Radio Guide.

And finally, for the scanner lovers among us, check out policescanner.com for live fire and police audio from Dallas, Texas, and Los Angeles, California. You will also find links on this page to live audio from Dallas air traffic control. This is one of my favorite uses of the Internet. It seems strange to be monitoring VHF from thousands of miles away, as if it were shortwave!

**Hitting reset**

Well that’s it for another session, I hope you’ll find these sites interesting and useful. Don’t forget, use our E-mail address list at the top of this column to send me radio related sites you have discovered and enjoyed. If you have a program you would like us to try in the column, send me an E-mail with the details. Till next time, watch your phone bill.
The Return of the Crystal Set

By Ken Reitz KS4ZR

In 1921 America had never seen the like. It was the first of what was to be the signature of the twentieth century: an electronic entertainment revolution. A radio craze was sweeping the nation and thousands of Americans were tuning in via crystal radio receivers to an increasing array of news and entertainment.

In this era of microchip technology and digital transmissions it's hard to believe that the simplest circuit in radio is still useful today, but it is. As long as there continue to be powerhouse transmitters on the AM band and those transmissions continue in an analog format, there will still be a place for the crystal set. And, what's more, anyone can build one!

If you've been intimidated by modern electronics and thought you could never "homebrew" a piece of gear by yourself, I've got good news: Not only can you do it, but it's cheap and takes less time than watching Ken Burns' Empires of the Air.

There's so much information available on building crystal sets and it's so easy, you'll wonder why you hadn't done this before. And, after you've built your crystal set and logged a night's worth of stations, the real fun begins. Experiment! Wind new coils, using different coil forms to tune the SW bands; take out the diode and substitute some genuine galena (yes, it's still available); build a rotatable loop antenna and null out those nearby AM giants to dig out that DX. So, let's get started!

■ Building Your First Crystal Set

I built my first set following the instructions in the December 1970 Mechanix Illustrated which is available from your local library (pages 74, 75, 120 & 121). If they don't have it on the shelves or on microfiche ask them to get a copy of it for you through Interlibrary Loan.

The first thing you'll need is the Quaker Oats box which is still virtually the same size as it was 75 years ago. You'll need 40-50 feet of No. 22 enameled magnet wire; a 1N34 crystal diode (Radio Shack part #276-1123); 6 Fahnestock clips (Antique Electronic Supply part #SH-11-4034); 1.365 pf variable capacitor (AES part #CV-235); a 5 x 7 inch piece of pine; and a couple feet of hook-up wire. You'll also need a 2000 ohm headset (note that common Walkman-style headsets are 8 ohms and not usable), an outdoor antenna, and a good ground.

■ What To Do

1) Wind thirty turns of the magnet wire around the outside of the oatmeal box. Punching two small holes at the top and bottom of the winding will allow you to slip the ends through the holes and provide tension so the coil doesn't come undone (you'll wind the coil several times before you get the hang of it, be careful not to overlap the winds).
2) Attach the tuning capacitor and the coil-wound box to the pine board. Attach the Fahnestock clips to the board as shown in the diagram.
3) Attach the hook-up wire and the ends of the coil as shown. Remember to bare all wire ends for good connections. The Fahnestock clips make soldering unnecessary and allow for quick experimenting in the future.
4) Slip the diode in place and slip the ends of the headset wire in place as shown.
5) Attach the antenna wire and the ground wire to the clips indicated.
Two young ladies tune in KDKA on a Westinghouse Aeriola, Jr. (Courtesy KDKA)

6) That's it! That's all there is to it; now start tuning the band!

■ Crystal Tips

Remember that this radio is powered only from the energy of the electromagnetic waves which the antenna picks up. There will only be enough energy to power your headphones. But, with more experimenting you may find, as others have, ways to power a speaker. Best reception will be had in the country where there will be less interference from nearby AM transmitters. Make sure all dimmer switches in the house are off as they are a tremendous source of interference. Keep a log of stations heard and don't be afraid to modify the layout; you can't hurt this radio.

After you've caught the "crystal" bug you'll want to subscribe to the one publication that takes crystal set building seriously: The Crystal Set Society Newsletter. This bi-monthly journal reviews books, lists vendors and has lengthy articles on a variety of related topics. Here you'll learn about building your own headphones; how to build an FM crystal set; and what other Society members have been building. You'll be amazed.

There are many books written on the subject of crystal sets, but the best by far is K.E. Edwards' *Radios that Work for Free*. This beautifully produced book is one man's homage to the crystal set era. Eschewing power tools, Edwards takes the reader step by step in the process of building instant crystal set heirlooms. His low key style is a warm invitation to the very basics of modern electronics.

He's an encouraging teacher too. "...You can tune in local broadcast stations or short waves from foreign countries. Play them loud enough for a room full of people...The author can separate twenty stations in the San Francisco Bay Area and not just the one or two loud stations..." What are you waiting for?

■ Sources for crystal radio information and supplies:

Antique Electronic Supply, 6221 S. Maple Avenue, Tempe, AZ 85283 Phone 602-820-5411 FAX 602-820-4643. Has catalog of crystal set related supplies and books.

Antique Wireless Association: Publishes *The Old Timer's Bulletin*—a quarterly journal of early wireless communications and operates the AWA Museum. AWA dues $15/ year to: Joyce Peckham, Sec.; Box E, Breesport, NY 14816 Phone: 607-739-5443 FAX: 607-796-6230. Operates 75 meter phone net on 3867 kHz SSB MWF at 9:30 ET features many interesting discussions of early wireless.

Midco, P.O. Box 2288, Hollywood, FL 33022. Has list of crystal related supplies and books.

The Xtal Set Society: Publishes bi-monthly newsletter about crystal set related topics, sells related books and back issues of the Newsletter. Subscriptions: $9.95/year to: P.O. Box 3026 St. Louis, MO 63130 Phone: 314-725-1172 FAX: 314-725-7062.

The Xtal Set Society Newsletter keeps crystal set enthusiasts entertained and motivated with this well written bi-monthly journal.
Ramsey Electronics SM-100 "Signal Magnet" Antenna

By Mark G. Mulhollon, WB9HBR

Those of us who live in urban areas have a problem—the better the antenna we are able to put up, the more local noise and static is picked up! This situation is especially evident in the AM broadcast band, one of my favorite haunts.

That's why the Ramsey ad featuring the SM-100 caught my eye. It is designed to respond to the magnetic component of a radio wave, instead of the electrostatic field, which is affected most by static and man-made noise.

It also is an active device. The Ramsey SM-100 is a two part system: an amplified antenna section mounted remotely and a power supply/control box for use near the receiver. The only connection needed between the two components is a length of RG-59 (or RG-6) cable.

Assembly of the Kit

The kit arrived neatly packed and all parts were well protected and appeared to be of excellent quality. Assembling the kit took about three hours from start to finish, working carefully. Component placement on the antenna board is a little cramped—you'll need a fine tip on your soldering iron.

When a polarized component, such as a diode or an electrolytic capacitor, is called for, the manual explains how the component should be installed correctly. Component locations are also screened onto the PC board itself. Ramsey has done a fairly good job on the instructions (mine were marked "Second printing, September 1994"), but there were a few problems.

First, a part was supplied and the circuit board is marked for part C2, a .01 uf capacitor, but its installation was not mentioned. I installed the part where it was outlined on the board. According to the schematic in the manual, C2 is a coupling capacitor between the tuning unit and the radio, and the system wouldn't work without it.

Second, on page 14, at step #38, the incorrect color code is given for R15, a 470 ohm resistor (it should be Yellow-Violet-Brown) — a minor gripe, but still an unnecessary complication for a first-time kit builder.

Third, R17, a 5K potentiometer is installed as a calibration control, but no mention of its adjustment is given in the manual. Referring to the schematic, this control seems to be used to adjust the overall range of the front panel Tune control.

Tweaking the System

Ramsey provides coil winding data for four ranges, covering approximately 490 to 1670 kHz, 1.2 to 4 MHz, 1.9 to 6.5 MHz, and 3.8 to 13 MHz. Since I was going to use my unit for AM broadcast reception and I wanted to be ready for the expanded band, I wound my coil for 66 turns instead of the suggested 70 turns. This turned out to be right on the money.

In two other areas I deviated from the instructions. In the first case I used a short length of RG-174 coaxial cable for added strength instead of short wires to connect the antenna board to the type F jack used for the interconnecting cable.

In the construction of the shielded antenna itself, instructions call for several layers of aluminum foil to be wound over a length of PVC pipe forming the shield over the ferrite bar. I found a quicker and less tricky method using a scrap piece of copper tubing. Interested readers can send me an SASE or e-mail for more details on this.

The antenna portion of the system is in an inverted L-shape, with the shielded ferrite coil in the horizontal section and the antenna circuit board in the vertical leg. The instructions didn't give any specifics about assembling and weatherproofing the unit. I used a good quality silicon caulk to "glue" everything together and to seal around the opening for the connector. You will need to provide your own material to attach the antenna portion to an antenna mast or pole. I used strapping material from the hardware store.

Preliminary Test

With everything assembled and visually checked, I connected the control box to the supplied wall-cube power supply. I used a prepared 25 foot length of RG-6 from Radio Shack to go between the antenna and control box, and a short piece of RG-58 to feed the general coverage receiver in my Kenwood TS-450SAT transceiver.

There are only two controls on the front panel, an on-off pushbutton (in the off position, another antenna connected to a back-panel jack can be routed to your receiver, which can eliminate cable swapping) and a Tune control. A red LED serves as a power-on indicator.

I tuned the radio to a known local station, which came through weakly at first. Rotating the control brought the signal level up significantly to a definite peak. Checking at both ends of the BC band showed that I could peak on the background noise with a little to spare at each end.

Using the SM-100

BCB DXers who have never used a rotatable loop antenna are in for a real treat. The main advantage is the ability to rotate the antenna remotely (using a TV rotator), giving the capability to "home in" on a desired signal. This is an enormous help in sorting out stations on local and regional frequencies, where four or five signals may be arriving at your location from all directions with essentially equal strengths.

Just as important is the ability to null out undesired stations, allowing you to hear others on the same or nearby frequency that are masked or covered by the stronger station.

I compared several signals at different frequencies and times, switching between a Palomar loop (indoor) at my listening post, the Ramsey loop temporarily mounted on a tripod...

(Continued on page 89)
Liquid Electrical Tape

Most hobbyists know that using electrical tape on outdoor electrical connections just means you'll have to re-do the connection in a few months; but the alternatives can be messy to apply and hard to store. Now there's a solution as easy to apply as PVC cement. Star brite Liquid Electrical Tape is tailor-made for those hard-to-reach or irregularly-shaped connections.

A liquid vinyl, the product totally seals out moisture and prevents corrosion, while remaining flexible after it dries. UL testing shows it has dielectric properties better than that of conventional electrical tape.

Star brite Liquid Electrical Tape is available in black, red, green, clear, and white, and comes in a squeeze tube or can. For more information, contact Star brite at 800-327-8583 or Grove Enterprises at 800-438-8155 ($6.45, black only).

— RB

New M-450 Universal Decoder

Ever want to decode some of that digital hash you hear on your scanner or HF receiver? With the new M-450 Universal decoder, you can easily decode not only CTCSS (PL) sub-audible tones, DCS (DPL) squelch tones but POCSAG and GOLAY digital paging messages, DTMF (Touch Tone) telephone numbers, even air-to-ground ACARS digital aircraft messages.

Connect this baby to your shortwave receiver and you can read RTTY, SITOR, FES-A, SWED-ARQ, and even FAX pictures (when used with a printer). One final note. The new M-450 also has a serial port so you can connect the decoder to your PC. It even comes complete with a free DOS-based computer program. The M-450 comes with input jacks for either audio or discriminator interconnect, AC wall adaptor, full manual, and a pair of 1/8” inch plugs. The M-450 does not do Morse or packet; a computer is not necessary to operate the decoder. To order, call Grove at 800-438-8155 or send your check or money order to P.O. Box 98, Brasstown, NC 28902. The price is $399.95 plus $9.00 UPS.

Internet Radio Guide


Klingenfuss’ guides are good, no doubt. His utility guide has long been a favorite of serious monitors around the world. His new shortwave broadcast frequency guide is likewise getting some good initial reviews. And no doubt his internet radio

(MT Review .... Continued from page 89)

with an old TV rotator eight feet off the ground, and my thirty-five foot longwire at fifteen feet. These were my findings:

Peaking: Keeping an eye on the S-meter, I was able to rotate the Ramsey antenna easily with the rotator for maximum received strength.

Nulls: The null obtainable with the Ramsey antenna was fairly sharp, though not as deep and narrow as with the Palomar loop. The Palomar was able to make some local stations nearly inaudible, where the Ramsey seemed to give a broader, shallower null which still allowed a bit of signal through. The nulling effect on the Ramsey was still significant and very noticeable, however.

Signal Strength: The loops usually provided about equal signal strengths. In general they were 2 or 3 S-units below the longwire for signals that were optimum for the wire antenna. For signals out of the main receiving lobe of the longwire, the loops gained the advantage quickly.

Noise: Man-made and atmospheric noise were definitely reduced by both loop antennas. They also could be oriented to avoid nearby noise sources. It often made the difference between being able to hear a signal and not. Some noise still affected each antenna, however.

Noise (Internal): During periods when static and atmospheric noise were low, I noted that the SM-100 actually added considerable noise to the signal compared with the long-wire.

Tuning: The frequency response on the Palomar loop is symmetrical and sharp, rejecting signals equally well from above and below the desired frequency. The Ramsey loop peaked well when tuning from the bottom of the band upward, but the peak wasn't as evident when tuning from the top down. I learned to start at the bottom and work my way up.

Conclusion

I feel Ramsey has a real winner here. Selling for $79.95 in kit form, ($119.95 wired and tested) the Signal Magnet allows both the beginning and experienced BCB DXer to take advantage of the directional and noise-reduction properties that only a shielded loop antenna can provide. It also allows someone without the room for an extensive outdoor wire antenna system to enjoy hunting for new stations on the broadcast band. With other amplifiers costing from twice its price to several hundred dollars more, the Ramsey antenna stands out as an exceptional value.

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guide will bloom into another long-running Klingenfuss title.

Right now, however, it's... interesting. The book is broken up by topic. The first is on web pages devoted to aviation radio. The second section is equipment, ranging from the professional to retailers like Grove. Others include geography, intelligence, navigation, organizations and services, press and publications, radio clubs and newsgroups, radio stations, satellites, and solar and geophysical data.

As you can see, things have yet to completely settle out, but all, we suppose, have some connection to radio, though some are more tenuous than others. A print-out of the opening page of each web site is offered as an example, without comment.

This allows you to weed out, in advance, non-English sites, but some weeding out is also done by Klingenfuss, who says that he "intentionally exclude(s)...web sites that are particularly boring...erroneous or misleading" as well as those which are connected with fraud.

The 488-page 1997 Internet Radio Guide can, as the publisher claims, save money on your phone bill and service provider charges by locating desired targets before you go into cyberspace. It's $34, including postage, from Klingenfuss Publications, Hagenloher Str. 14, D-72070 Tuebingen, Germany. You can also get more information at http://ourworld.compuserve.com/homepages/klingenfuss.

**AEE Selling Product Lines**

Past and prospective customers of Advanced Electronic Applications (AEE) products will be interested in the next chapter in the closure and sale of the company. The ARRL Letter reports that AEE has closed deals to sell its product lines to two other companies in a way that will allow the AEE name to live on.

Former AEE Chairman Mike Lamb, N7ML, says AEE's line of antennas, antenna analyzers, and cable-testing equipment was sold, effective March 7, to Tempo Research of Vista, California. Tempo will handle all technical support and warranty service and plans to continue producing the line under the AEE name. Lamb will assume a primary marketing position with the new division.

Timewave Technology of St Paul, Minnesota—already a major name in ham radio gear—is buying the rights to all other AEE products, including its digital line. Timewave president Randy Gawtry, K0CBH, asked hobbyists to give the company a few weeks to set up the new product line before calling. "Watch our Web page," he
Antennas and Transmission Lines

Not for the mathematically faint of heart, the 320-page Antennas and Transmission Lines by John A. Kuecken is actually an engineering course, featuring derivations of vector algebra as well as integral and differential calculus. Rich in diagrams and formulas, the material may be decades old (many illustrations are pre-World War II), but it is still valid.

Chapter topics include traveling and standing waves, Smith chart analysis, reactance and impedance, radiation resistance, balance, wave interference, couplers and junctions, and antenna design.

Antennas and Transmission Lines is $19.95 plus shipping from MFJ Publishing, 300 Industrial Park Rd., Starkville, MS 39759.

—BG

Nearly Free Stuff

It’s spring, and while you’re getting ready to spruce up your antenna system, plunk down $3.00 and get a copy of The Wireman’s Wirebook III. It’s part catalog and part treasure house of information — full of wire and cable information.

The price of Wirebook III is just $3.00 postpaid. The address to order from is 261 Pittman Rd., Landrum, SC 29356. Mention MT when you call.

Books and equipment for announcement or review should be sent to

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May 1997 MONITORING TIMES 91
International MT-718 Portable

In the rarified world of radio monitoring, nothing really beats poring over the latest high-tech digital hardware. Perhaps we can afford it, perhaps not, but it never fails to catch our fancy to see what bright engineers can come up with to make our activities more enjoyable and fruitful.

**The “Little Radios That Can”**

At the other end of the spectrum are the Rodney Dangerfields of radio, the little low-cost analog portables that come out of Asia, usually China. These modest performers tend to get lost in our rush to dissect exotic gear, but it’s these plastic workhorses which keep shortwave listening alive and well in much of the world — in some countries, these multiband el cheapos are as ubiquitous as Levis. Nobody really knows for sure, but of the half billion or so shortwave radios in the world, probably a good three out of four are inexpensive analog portables like these.

But what about here, in prosperous and sassy North America? Of the people who are interested enough in international affairs to listen to shortwave, how many are so strapped for cash that they can’t afford a $100 or $200 digital portable?

To nobody’s surprise, not all that many. In 1991, these Chinese portables sold like ribs at a pig fry during the Gulf War. But that was a flash in the pan, and since then the vast majority of shortwave radios sold in North America have been from such major manufacturers as Sony and Grundig. And most of these are digitally tuned.

**Trips, gifts and fun**

Yet, the modest North American market for low-cost analog portables rumbles on. First, there are still some people who won’t pay more than $40 for a radio. Second, established shortwave listeners sometimes want a second “throwaway” radio for trips, the beach and so on.

Third, they make affordable gifts. You’d be surprised how many shortwave enthusiasts have a touch of the missionary in them. The result is that fortunate relatives and friends receive shiny new world band portables for Christmas, Father’s Day, birthdays, and other special occasions. Sometimes these radios wind up as gifts to entire Boy Scout troops, or even as prizes on public TV’s “Where in the World Is Carmen Sandiego?”

**Decent coverage except tropicales, 41 meters**

With this in mind, we recently plumbed bargain basements on a radio-gathering mission, unearthing *inter alia* the new International MT-718 portable. At $40, it’s eminently affordable, and covers longwave, AM and FM. Shortwave coverage excludes the tropical bands, but embraces everything else: 49, 41, 31, 25, 22, 19, 13 and 11 meters.

Most shortwave bands are generous in their coverage of out-of-band segments. However, 41 meters ends just above 7300 kHz, which is well below the “real-world” band edge of 7550 or 7600 kHz. Obviously, whoever did the band layout for 41 meters doesn’t listen within North America, where as a practical matter the 41 meter band *starts* at 7300 kHz!

**Bare-bones radio**

The compact ‘718 lacks so much as a hint of features, save for a cloth carrying strap. There’s an on-off switch, two bandswitches, a volume control and stiff tuning knob — ¡nada más! The antenna swivels, but doesn’t rotate, which makes it impractical to lay the radio down flat. Perhaps for this reason, there’s no elevation panel to angle the radio. The analog frequency readout is hardly precise, but is adequate — usually within plus or minus 20 kHz or better.

Audio quality is reasonable, although the speaker is smaller than the generously sized speaker grille would suggest. FM performance is okay, too. But AM stops just above 1600 kHz, another sign this radio wasn’t designed for the North American listener. Longwave is a nice extra if you travel to Europe, but is of marginal utility, so to speak, in the Americas.

**Where have all the signals gone?**

But shortwave performance is disappointing, even by the modest standards of this genre of receiver. Sensitivity to weak signals is about as poor as it gets, so it’s hard to rack up much in the way of nifty loggings unless you connect the receiver to an outdoor wire antenna. Selectivity is only slightly less bad, but you don’t notice the poor image rejection all
that much. Why? Because the radio is so incapable of receiving signals in the first place that there are relatively few images to reject!

The ‘718 isn’t the worst radio we’ve ever tested, but it comes close enough to qualify as a Canine Catastrophe. Yet, keep in mind that Chinese portables are like twin sisters. They might look alike, they might sound alike, and they might even dress alike. But they tend to behave differently.

Especially where weak-signal sensitivity is concerned, it’s been our experience that actual performance can vary greatly not only from sample-to-sample within a given production run, but also from one production batch to another. So when you buy a radio like this, be sure to get it on a money-back basis.

**Found: an American dealer (but no cards, please)**

The International MT-718 is available in North America for $40, including shipping, from RGB Enterprises (Box 5367, Old Bridge NJ 08857; 908/679-8026). RGB is friendly enough, but they don’t accept credit cards and thus the consumer protection cards offer. Presumably the ‘718 is found here and there from other vendors, and equally likely this same radio is available worldwide under other brand names. If you find a radio under another name that looks just like the ‘718 and has the exact same band coverage, then you’ve almost certainly uncovered the same radio in *muffi*.

The bottom line with this type of radio is that our experience over recent years indicates that the shortwave performance of Chinese analog portables has little to do with price. We once came across a decent performer selling in Singapore for the equivalent of $13, and we’ve found models selling in the United States for over $40 that are awful.

**Sony ICF-2010 soldiers on**

The Sony ICF-2010 portable is the best shortwave portable on the market, especially with the Grundig Satellit 700 now out of production. But because it has been on the market for 13 years, it’s a real anomaly in the here-and-done world of consumer electronics.

Probably the longest-standing “expected to die, but hasn’t” scenarios revolve around Fidel Castro and the Sony ICF-2010. First a rumor starts, then it quickly takes on the mantle of “fact.” But when the coffin lid is raised, the patient turns out to be alive and kicking, after all.

While we can’t predict where Fidel Castro will be in several months, I can state that Sony of America is adamant that they are keeping the ‘2010 in the product lineup for next year. In fact, you can see it depicted in Sony’s new booklet on world band receivers, “Tune Into the World” — free from Sony of America, item C8159, 3/97. It continues to sell briskly, so this Mother of Portables isn’t about to leave the scene anytime soon.

Footnote: There was a report on the Internet about the non-availability of parts for the ‘2010. It turns out that because the parts chart for the ‘2010 shows “1984” on the screen, some parts advisors at Sony apparently have assumed that any model that ancient must have been discontinued a long time ago, and thus parts wouldn’t be available. I talked with Sony’s world band manager about this, and they’re going to take steps to try to prevent this from happening again.

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.

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**RADIO DATABASE INTERNATIONAL WHITE PAPER** reports contain virtually everything found during exhaustive tests of premium shortwave receivers and outdoor antennas. For a complete list, please send a self-addressed stamped envelope to RDI White Papers, Box 300M, Penn’s Park PA 18943 USA.
ICOM R8500 Update

I reviewed the ICOM R8500 last January and have enjoyed using one ever since. In practice, the VSC voice scan detector in my R8500 is more effective in recognizing non-voice signals than the Data Skip in my Bearcat BC9000XLT and Sound Squelch in my Radio Shack PRO-2006.

The AOR AR5000 provides a way for users to readjust the response characteristics of the front end band pass filters using the front panel controls. The theory is that a user might want to make the receiver more sensitive on one portion of a band, perhaps giving up sensitivity on another. The AR5000 procedure is documented in the user manual.

The R8500 has an adjustable front end, too, but it's documented in the optional service manual instead of the user manual and is part of the bandpass alignment procedure. You can purchase an R8500 service manual directly from ICOM for $46 plus shipping and handling charges. It contains disassembly instructions and diagrams, color illustrations of the printed circuit board layouts, parts lists, schematics, alignment procedures, and a 7 page circuit explanation.

I mistakenly wrote in the R8500 review that "the step sizes were fixed in the earlier R7100A, which would coerce the frequency to the nearest integral multiple of the step size, making it impossible to search interstitial channels in 25 kHz steps (e.g., 460.0125, 460.0375, ... MHz)..." In fact, the R7100A does not coerce the frequency, but the BC9000XLT does.

The R8500 sales literature and instruction manual mention an optional 500 Hz wide FL-52A filter can be plugged in the 455 kHz IF stage for narrow CW reception. What you won’t find in print is that an auxiliary filter can be added in the 10.7 MHz IF, too. The Main circuit board has the space and holes for the undocumented filter. It must be soldered in place and a few surface mount components must be removed from the underside of the main circuit board. Perhaps the same circuit board will be used in other ICOM products.

The R8500 uses a small DPDT relay mounted on the Display printed circuit board to control a remote tape recorder or other device. The relay, designated RL1, is visible near the back of the S-meter when the top cover is removed. RL1 is used only as an SPST and some of the contacts are not connected. You could increase the current handling ability and extend the life of the relay contacts if you wire both poles together, so the current is shared between two poles instead of just one. Alternatively, you can rewire the relay contacts to better suit your application, e.g., open contacts when a signal is received instead of closing them.

The R8500 holds two additional mysteries: There's a small, removable steel panel bolted to the rear apron (see photo). Inside the R8500 is a large space and four mounting holes for an additional circuit board or module. Could these have been designed to accommodate an internal power supply instead of the external supply furnished with current production radios?

BC200XLT Broken?

If you can program frequencies into your BC200XLT, but there is no audio and the green backlight no longer functions, one or more capacitors may have failed, destroying a tiny transistor as a consequence. If you are experienced with surface mount circuitry repair and choose to troubleshoot the problem yourself, purchase a service manual from Uniden parts department, telephone (800) 297-1023. It contains schematics, circuit board layouts, and parts lists.

Then, check for a defective PNP surface mount transistor, Q201 (2SB815B6-YDY). Q201 is used as a switch to furnish 8 VDC to several stages of the BC200XLT. Its main purpose is to switch off power-hungry stages in the BC200XLT when the CPU thinks the NiCd voltage has fallen too low. That's an attempt to limit the current drain on weak NiCds to avoid permanent damage.

Q201 is located on the foil side of the "Micom" board, adjacent to the black multipin connector which mates the Micom and main boards together. Q201 can be destroyed by a number of causes, but usually by something in the scanner drawing too much current through it. In one instance, capacitor C36 shorted. C36 is a 220 uF 10v electrolytic, located on the component side of the main board, connected from pin 8 of the audio IC (IC2 NJM386SL) to ground. C55, another capacitor of the same value, shorted in a different BC200XLT.

In a pinch you can remove and bypass Q201 by soldering a short piece of bare wire between the collector and emitter foil pads, but you must first replace the capacitor or other component which caused Q201 to fail.

Ask (another) Bob

Fellow scanner operators want to know:

Q: Can the BCT-7 Beartracker be modified for expanded 800 and 900 MHz coverage?
A: Yes, it can; whether or not it may remains to be settled. The FCC has determined that large-scale modifications of scanners constitutes "manufacturing" and is prohibited. However, whether an individual can modify his own scanner, whether that negates that unit's FCC type acceptance, whether the unit can be resold after modification, etc., are questions that have not yet been answered. So be forewarned.

The BCT-7 can be upgraded using the "virtual downconverter" technique, which uses a DPDT switch to swap the outputs of transistors Q14 and Q16 (figure 1), and exploits the 6th harmonic of the BCT-7's local oscillator. Alternatively, you could switch the Q14 and Q16 inputs instead of their outputs.

When the added switch is in the virtual downconverter position, the BCT-7 display

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Icom 8500 receiver, rear view (Pam Parnass, N9HRZ)
shows VHF-high band frequencies and it appears the step size is 5 kHz, but the scanner is actually tuning the 800 and 900 MHz ranges in 30 kHz steps. Multiply the display frequency by 6 and subtract 75.6 MHz to calculate the actual signal frequency.

For information about virtual down-converter modifications to other scanners, see Steve Donnell’s article in January 1995 RCMA Scanner Journal and February 1996 Monitoring Times.

Q: My Bearcat BC9000XLT’s liquid crystal display is difficult to read unless I’m looking down at it from an angle. Is there a viewing angle adjustment?
A: I don’t know of an electronic adjustment. The easiest remedy is to prop the rear of the scanner upwards slightly, or you could modify the LCD module. The LCD module is held at an angle to the front panel by two plastic brackets, one on each side of the module. You can reverse the angle of the display by swapping the left and right brackets with each other. This modification will reposition the display for best contrast when looking straight at the display at the same level or slightly below.

First, disconnect any source of power from your BC9000XLT, then carefully remove the top part of the metal cabinet. Unplug the speaker from the main board. Remove one screw from each of the LCD mounting brackets and pull the brackets free of the module. They are held to the module by a few dollops of glue.

Notice that the two brackets are different colors: one black, the other white. Use a wire cutters, knife, or file to remove the tiny key from each bracket which fits into the notch on the side of the module. Swap the brackets so the left one is now holding the right side of the display module and vice-versa. Replace the two screws into the brackets and reattach the module to the front panel, taking care not to pinch the two ribbon cables nearby. Reattach the speaker and replace the metal cabinet.

See March 1995 MT for a BC9000XLT product review and June 1996 MT for other BC9000XLT tips and modifications.

Q: The backlight in my Radio Shack PRO-2005 has grown dim. Is there a fix?
A: The PRO-2005 and PRO-2006 are virtually identical except for scan and search speeds, determined by different CPUs and resonators. They both employ the same EL (electroluminescent) panel for backlighting. Order the $32 replacement EL panel, part #10800050, through your local Radio Shack dealer if you are experienced in electronic repair.

Q: I’m getting 5 hours’ use from my Uniden BC3000XLT portable between charges. Is that normal?
A: Yes. I know three other BC3000XLT owners, including me, who get about 5 hours’ use. See April 1995 MT for a BC3000XLT product review.

Q: Two 1994 vintage PRO-2036 scanners which bear different date codes appear to be different inside. Is this normal?
A: Yes. Manufacturers often make design and production changes within the same model. Schematics show over 100 component changes in the Electra/Bearcat BC300, for example. The 1994 ECPA legislation forced manufacturers to change their designs so scanners could not tune or be “readily altered by the user” to tune the cellular phone frequencies. The rules define “readily altered by the user” as “clipping the leads of, or installing, a simple component such as a diode, resistor and/or jumper wire; replacing a plug-in semiconductor chip; or programming a semiconductor chip using special access codes or an external device, such as a personal computer.”

Q: Police Call Plus contains sketches of antennas. Is there another source to help me identify base and mobile antennas I see?
A: Antenna catalogs are crammed full with antenna pictures and specifications and they are usually free. Contact Antenna Specialists (216-349-8400), Cushcraft (603-627-7877), Tessco (800-472-7373), Maxrad, Larsen Electronics (800-426-1656), and other companies in the land mobile equipment business.

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The Tao of Antennas

As you probably know, in the western world (the United States, Europe, and related countries), we typically look to science to understand the physical world. Science relies heavily on the scientific approach, experimental investigation of natural phenomena, and on logical thought. The most advanced of such knowledge in physics are the ideas of quantum mechanics and relativity theory. Hopefully these areas are the ideas most advanced in our universe, and the cosmos. Surely the ideas of physics and Eastern thought are often much closer than people think. These ideas are found in the things which we shape the cosmos.

On the other hand, the Eastern (India, China, Asian countries) cultures often pursue knowledge about such concepts as existence, reality, and the cosmos. For example, the Eastern philosophers tell us that serious scientists know that the universe, the cosmos is created and destroyed by our thoughts. Every bit of our existence, reality, and the cosmos is the result of our thoughts. The Tao of our existence, reality, and the cosmos is to understand the duality of our existence, reality, and the cosmos.

Due to the dramatic difference in the Eastern and Western ways of knowing, I was quite surprised when I first heard that serious scientific scholars tell us that these two paths to knowledge have arrived at virtually the same conceptualization of reality. Quantum mechanics, relativity theory, and Eastern mysticism all converge as they describe the end result of each discipline’s quest to understand the basic aspect of how the physical world, the universe, and the cosmos work!

Quantum mechanics supports some very remarkable and very counter-intuitive ideas. For example, at the subatomic level, there is no causation to natural phenomena. There, particles seem to be created out of a “void” and to disappear back into that void at random. Every bit of the reality we experience as material objects is thought to be continually created and destroyed at the subatomic level in this manner! Ourselves, our antennas, and so on. These ideas are remarkably similar to those of Eastern mystics concerning the basic nature of our existence.

This startling similarity seen between Eastern and Western thought is not just the thesis of some crank. For instance, Fritjof Capra, the author of a well-known book on this subject titled The Tao of Physics, is a Ph.D. physicist. He has considerable experience in contemporary physics as well as wide experience and knowledge in Eastern mysticism. In addition, many other physicists, including the distinguished Neils Bohr, have been impressed by the commonality of knowledge produced by Western physics and Eastern philosophical practices.

\[ \text{Figure 1: The halfwave elements in some resonant antennas are not obvious. For instance, in the quarterwave groundplane element, vertical quarterwave element, together with any one of its radials, comprises a halfwave resonant element. See radio riddles for more details.} \]

\[ \text{So What?} \]

If you’re wondering why I would include the above concepts in a column on radio antennas, let me begin by saying that the most contemporary theoretical explanation of antenna function available today must include ideas from quantum mechanics and relativity theory. In the 1800s Maxwell derived his famous equations which antenna engineers still utilize in their work. But antennas deal with radio waves which travel at the speed of light, and so relativity theory is sometimes utilized in advanced antenna work. And since electromagnetic radiation—such as light and radio waves—occurs in “packets” of energy, sometimes called “quanta,” contemporary antenna theory must consider quantum mechanics as well.

\[ \text{What Antenna Professionals Say} \]

Radio Engineering, an Indian text by G. K. Mithal, includes a relatively traditional explanation of radiation from a radio antenna. Following this explanation we read that, “The release of energy from an antenna can also be understood on quantum lines.” Mithal then tells how planetary electrons in the atoms of dielectric surrounding an antenna are strained such that they change orbits. This releases quanta of radio-frequency energy.

Consistent with Mithal’s dual description of antenna function, physicists have long understood that electromagnetic radiation has a mysterious dual nature; one way of looking at electromagnetic radiation is waves as quanta, yet another way this radiation seems to be waves, such as light waves and radio waves. Obviously the field of physics is no stranger to strange ideas.

As a further example of the importance of contemporary physics to understanding antennas, let’s note that the recent (second) edition of the classic antenna text Electromagnetic Waves and Radiating Systems, by Jordan and Balmain, devotes an entire chapter to “Electromagnetic Theory and Special Relativity.” Additionally, the second edition of John Kraus’s classic text, Electromagnetics (now Kraus and Carver), mentions the concept of quanta in dealing with electromagnetic radiation as well as including a chapter dealing with relativity.

\[ \text{And So?} \]

What does it mean that physicists tell us that the understanding of reality obtained from relativity theory and quantum mechanics is very similar to that obtained by the Eastern path to knowledge? Does this mean that to
understand our antennas, and how they work, we could meditate instead of studying physics?

Not at the applied level, I think, but considering the commonality of ideas developed by both physics and Eastern mysticism, it is interesting to wonder where these mysteriously converging paths to knowledge may lead in the future. What new insights to the function of antennas could this produce? Maybe entirely new approaches to antenna design, such as has happened in the marriage of fractals and antenna theory. At any rate, we needn’t go to sci-fi stories or Star Trek movies to trip out on such ideas as parallel universes, or matter being created from, and disappearing into the void. We have all that happening right in our own antennas (and in everything else in the cosmos), according to contemporary knowledge in physics and in Eastern philosophy.

In closing this discussion of voids, subatomic particles, antennas, and the like I’ll offer the following quotation which my friend Charlie Stobaugh, WB0IKI, once read somewhere years ago, and passed on to me. “We learn more and more about less and less until we know practically everything about nothing.”

**RADIO RIDDLES**

**Last Month:**

I said, “Speaking of resonant antennas, how many non-resonant antenna designs can you name? Well, let’s name a few. The classics are the non-resonant rhombic, non-resonant Y, and the Beverage or wave antenna. The random-length antenna is another. Two more with which everyone is familiar are the automotive AM-FM whip antenna, and the whip on most active antennas.

By the way, calling an antenna “non-resonant” usually only means that it is not resonant at the frequency of operation being considered. Any antenna is resonant at some frequency or frequencies. It’s just when it is not resonant at the frequency we want to use it on that we call it “non-resonant.” A half-wavelength long conductor resonates like a tuned circuit; in fact it is a tuned circuit. Therefore one clue in determining if an antenna design is resonant is whether or not its element(s) are a half wavelength in length, or some multiple thereof, at the operating frequency desired. As explained below, antennas with inductive loading or capacitive loading don’t fit this rule. See fig. I to avoid another kind of confusion.

We might wonder whether a non-resonant antenna—after it is “tuned” with a so-called “antenna tuner”—might not then be a resonant antenna. The answer is no, for when we utilize an “antenna tuner,” although we can bring the entire antenna system (antenna, feedline, tuner combined) into resonance, the antenna itself is not thereby made resonant. What we call “antenna tuners” should be called “antenna system tuners.”

The so-called antenna tuners which we use are connected in the feedline, not to the antenna itself. However, if appropriate tuning elements are added to the antenna element itself—as in the case of inductive loading and/or capacitive loading—then an otherwise non-resonant antenna can be made resonant. In this case, the antenna element and the loading coil and/or capacitor connect together to form the antenna. The antenna formed by these combined components then resonates at the frequency determined by the combination of element conductor-length, loading capacitance, and loading inductance.

**This Month:**

The “traditional” explanation for radiation of a radio wave from an antenna was mentioned above. What is this explanation?

You’ll find an answer for this month’s riddle, and much more, in next month’s issue of Monitoring Times. ‘Til then Peace, DX and 73.

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### **SCANNERS AND SWL RECEIVERS**

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When it comes to effective multi-band DX antennas for limited space applications, it comes to the world class ALPHA DELTA DX-SWL family of High Performance SLOPERS!

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**Note on advertisement below:** As of 4/26/94 it became unlawful to market cellular-capable receivers in the US. Radio Progressive assures us that it will give a full refund and hold customers harmless from shipping expenses if a purchased unit is returned to the vendor by US Customs.
May 2-3
Fresno, CA
Fresno ARC / John Pritchett, WAGJW, 209-222-6793

May 2-3
Baton Rouge, LA
Baton Rouge ARC / Herb Ramsey, KBAQF, 504-654-6087 or 800-256-2567

May 3
Elko, SC
Sakhet BQE / Andrea Tressler, KC7DQ, 520-378-3018

May 3
Cedarburg, WI
Coche ARA & SEARS / Ron Slominski, KNC7QX, 517-587-7097 or 262-448-1879

May 3
Sierra Vista, AZ
Owensboro, KY
Waxahachie ARC / Dan Schmitt, K6BJU, 615-775-0996

May 3
Cedarburg, WI
PhD ARA / Bob Roske, WA0CRL, 818-436-0069

May 3
Overgo, NY
Brighampton APA / Dick Wilson, KB8YQ, 760-794-2748

May 3
Kalamazoo, MI
Kero ARC / Tom Hamilton, WBDAE, 514-883-2782

May 3
Middleborough, WV
Tyler County AR Organization / Ray Gordon, K6GOH, 304-756-2832

May 3
Cedarburg, WI
Ozaukee Radio Club / Dave Chid, N9QOA, 414-377-2784

May 3-4
Auburn, WA
West Texas Section Convention / Peg Richard, K4AUP, 915-672-8889

May 4
Livermore, CA
Livermore ARC / Noel Anklam, K6GZQ, 510-477-3857

May 4
Decatur, IL
Canons CRC & Macon County ARC / Doug Ellison, N8LUL, 217-423-1013

May 4
Sandwich, IL
Kishwaukee ARC / Bob Yurs, N9QA, 815-895-3219

May 4
Hagerstown, MD
Antietam Radio Association / Matt Redding, N3XCJ, 301-416-0086

May 4
Yorkers, NY
Metro 760 Network / Otto Supplie, K2DZL, 609-546-1903

May 4
Wrightstown, PA
Warminster ARC / John D'Onofrio, N3RIA, 215-675-9165

May 5
Ripley, WV
Jackson County ARC / Joe Pickens, KB3UXE, 304-372-9648

May 9-10
Rhode Island
HOSSTRAERS / Joe Demarco, K2GL, 409-497-5492

May 10
Bakersfield, CA
Blue Ridge ARC / GRSBTS, Box 973, 760-325-4669

May 10
Anderson, SC
Dayton Hamvention / Dick Miller, N8CBU, 937-276-6930 (Box 1082)

May 16-18
Phoenix, AZ
8:30am Bedlam Town Meeting in soft download.

May 16-17
Dayton, OH
Hamvention / Dick Miller, N8CBU, 937-276-6930 (Box 1082)

May 16-18
Cranfield, IL
Cooper's Pits / Dennis King, 815-772-1577

May 16-18
Dayton, OH

May 16-18

May 19
American Eagle Sideband CB Club: Keith Herzig KC5LQO, P.O. Box 751, Chester, MA 01011. Mainly New York/New England area. Sunday evening net at 7:30 pm. Free sample newsletter.

May 19

May 19

May 20
Association of Amateur DXers (AMANDX): Dan Axelrod, 3005 Commetree Rd, Winnipesaukee, NH 03264 ($20 US, $25 Sw.

May 20

May 20
Association of Manitoba DXers (AMANDX): Shawn Axelrod, KD6XHA, 616182 Ballad Lane, Huntington Beach, CA 92646 (714) 846-1655, kd6xha@aim.com, Western US, Pacific, Asia. SWBC, utilities, longwave, clandestine SWL $24 US, $25 Can/Mex, $25 sample. List of Sat Sat 10am address.

May 21

May 21
Association of Manitoba DXers (AMANDX): Shawn Axelrod, KD6XHA, 616182 Ballad Lane, Huntington Beach, CA 92646 (714) 846-1655, kd6xha@aim.com, Western US, Pacific, Asia. SWBC, utilities, longwave, clandestine SWL $24 US, $25 Can/Mex, $25 sample. List of Sat Sat 10am address.

May 22

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Association of Manitoba DXers (AMANDX): Shawn Axelrod, KD6XHA, 616182 Ballad Lane, Huntington Beach, CA 92646 (714) 846-1655, kd6xha@aim.com, Western US, Pacific, Asia. SWBC, utilities, longwave, clandestine SWL $24 US, $25 Can/Mex, $25 sample. List of Sat Sat 10am address.
Known for their luxury, high-performance receivers, Japan Radio company (JRC) has just released a high-quality, double conversion receiver at a low, competitive price! The new NRD-345 offers wide frequency coverage (100 kHz-30 MHz), multimode reception (AM, synch. AM, SSB), sharp selectivity (2/4 kHz), high sensitivity (0.3 microvolts), wide dynamic range (100 dB), strong audio (1 watt), dual VFOs, scannable memory (100 channels) with channel lockout, computer control (RS232C), dual clock timer (12/24 hour), precision tuning (5/100 Hz., 1/10 kHz steps), and adjustable noise blanker.

Additional features include selectable AGC timing, 20 dB attenuator, adjustable tone control, backlit S meter, large backlit LCD display, and dual-voltage (12 VDC/120 VAC) power supply. See specifications at right.

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Designed to compete with shortwave receivers costing much more, the JRC NRD-345 is proof that performance need not cost a fortune. Just look at these great specifications:

- Frequency Range: 100 kHz-30 MHz
- Keypad Entry: Yes
- Tuning Steps: 5/100 Hz, 1/10 kHz
- Display: Backlit LCD
- Recommended use: General purpose SW and utilities
- Receiving modes: AM, AM synch, USB, LSB
- Memory: 100 channels
- Scan: Yes
- Clock: 12/24 hr. clock/timer
- Audio Output Power: 1 Watt
- Record Audio Output: Yes
- Signal Strength Indicator: LCD bargraph
- Computer Interface: RS-232C
- Conversion Scheme: Double up-conversion
- Sensitivity: 0.3 uv
- Selectable Attenuator: 20 dB
- IF Selectivity: (-6/60 db) 4/10 kHz wide
- 2/6 kHz narrow
- Image Rejection: -70 dB
- Selectable AGC: Off/fast/slow
- Dynamic Range: 100 dB
- Noise Blanker/Limiter: Adjustable
- Tone Control: Yes
- Antenna Connector: SO-239 and 600 ohm
- Dimensions: 10"W/4"H/9"D
- Weight: 7.7 lbs.
- Power Requirements: 12 VDC/120 VAC
- Warranty: One year
- Accessories Included: AC adaptor
**Oops!**

A sharp-eyed reader spotted a goof in last month’s issue. “PL” is a registered trademark of Motorola, not GE! Thanks for the correction.

**Never Again**

It “never” fails. Every time I use the word “never,” someone finds an exception! This month’s “Let’s prove Bob wrong” award goes most deservedly to long-time military contributor, Larry Fowler, whose sharp ears and eyes caught a very unusual frequency range in use.

In our March column I said that the 66-88 MHz range is “never” used for air-to-ground communications in the United States. But Larry has actually heard New York Army National Guard aircraft using medium FM transmissions on 69.65, 72.0, 72.65, 73.05, and 81.05 MHz; he even heard two A-10 Warthogs communicating on 75.10 MHz!

Larry went on to list several additional frequencies which proved me wrong; his contributions will appear in the Utility World loggings shortly. It really galls me to have to say this, but thanks for proving me wrong, Larry!

Q. Can I increase the range of my remote control garage door opener? (M. Engel)

A. License-free transmitting devices are regulated by the FCC to be low power, and usually the antenna is part of the package. Garage door openers typically operate in the 200-400 MHz range. You could extend the control radius by adding an external antenna, attached to a high elevation on the house, and connected by coax cable to the motor/receiver unit.

It would be best to mount an antenna connector on the circuit board where the present wire antenna extends; the center of the connector would go to the solder point presently attached to the wire, and the frame of the connector would go to the common frame of the circuit board.

The antenna could be home made; it would be a simple, cut-to-frequency dipole, made of stiff wire soldered to a connector. The total dipole length in inches would be found by dividing 5616 by the frequency in megahertz.

Not much you can do with the remote control; the antenna is usually part of the circuit board. Relocating the remote close to the windshield is about all the improvement you can make.

Q. How can I tell whether my scanner preamplifier is working properly? It has a gain control, but that doesn’t seem to have much effect as I rotate it. (Mark Keefe)

A. At frequencies below approximately 150-200 MHz, typical commercial preamps really don’t help much. The purpose of a preamp is to build up a weak signal so that it is stronger than the noise generated by the radio’s own circuitry. Most scanners have very effective, low-noise, built-in amplifiers of their own at the lower frequencies. It’s at higher frequencies (above 200 MHz) that a good preamp can really shine.

Once a signal is strong enough to overcome the background “hiss” normally associated with a weak signal, no amount of increase will be audible. Choose a very weak signal, preferably in the 450 or 800 MHz range, and try turning the control. That should prove the preamp’s operational status. If the background noise (“hiss”) doesn’t reduce audibly as the

---

**Bob’s Tip of the Month**

Prospective buyers of the new AOR and Icom receivers often ask how they compare with each other and with the long-standing R7100. Recently we performed several lab tests at Grove Enterprises using off-the-air signals and a Hewlett-Packard 8640B signal generator. Results among different samples of each model will probably vary slightly.

All three receivers exhibited approximately equal sensitivity below 1000 MHz, but at a nominal 1090 MHz test frequency, the AR5000 exhibited profoundly better sensitivity than either Icom.

S meter accuracy (59 = 50 uV) at different frequency ranges and signal amplitudes is excellent on the R8500, while the R7100 errs as much as 12 dB (2 S units). S meter measurements were not performed on the AR5000.

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**Comparing the ICOM R8500, R7100, and AOR AR5000 Receivers**

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<tr>
<td>Frq. MHz</td>
<td>R8500</td>
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<tr>
<td>30</td>
<td>-114(90)</td>
</tr>
<tr>
<td>52</td>
<td>-110</td>
</tr>
<tr>
<td>74</td>
<td>-110</td>
</tr>
<tr>
<td>128</td>
<td>-114</td>
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<tr>
<td>155</td>
<td>-115(90)</td>
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<td>172</td>
<td>-115</td>
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<td>222</td>
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<td>455</td>
<td>-116(120)</td>
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<tr>
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<td>-119(110)</td>
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<tr>
<td>1090</td>
<td>-112</td>
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**NOTE:** The larger the number, the better; for example, -118 dBm is better sensitivity than -114 dBm, and 110 dB dynamic range is better than 90 dB. For all practical purposes, specifications within 1-2 dB will result in virtually identical performance.

---

Bob Grove, WA4PYQ
bob@grove.net

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www.americanradiohistory.com
signal comes up, either the preamp isn’t working, or strong, nearby signals are overloading the system.

If overload interference is the problem, filters probably need to be added between the preamp and the antenna.

Q. Will Monitoring Times ever be offered on CD-ROM? (Rob Sabato, Bloomfield, NJ)

A. Probably not, at least in the foreseeable future. *MT* is printed and distributed very quickly, and less expensively than CDs. We have had no other requests that I know of, so quantity pressing is not justified.

We have had requests for past issues on CD-ROM, and we are still discussing that. Nearly all of our writers are agreeable to having their works republished on CD, so that is no problem. Some of the tricky questions are: What about ads? What about timely frequency schedules and lists which become quickly outdated? How about illustrations which require more RAM processing and color monitors? And who will make the decisions as to which articles we use and which we don’t? Should the CD reissues be assembled by topic rather than cover date? There are many other tactical problems as well. Let us know what you would like.

Q. I live on the 40th floor of a high rise. I have no balcony, and the windows rise only about two inches. What can I use for shortwave and scanner antennas? (“Oppressed in the City”)

A. For shortwave, try to find a sympathetic neighbor whose window is at least 20-30 feet from yours. Select a thin wire with insulation approximately the same color as the building and string it from your window to a convenient tie point at the neighbor’s window. No one is likely to notice the wire, and reception will be better than with an indoor antenna.

For scanning, since you can open the window a couple of inches, contrive a bracket that will allow you to stick a good, mobile scanner antenna out the window. Don’t worry about vertical or horizontal polarization since, at your location, signals are getting bounced in every direction anyway.

But with the whip stuck out the window, you have only half an antenna: at the base, where the coax shield is connected, run a couple of 18” wires out from either side to make a ground plane. And if you do much low band (30-50 MHz) listening, you also should run a five-foot wire down toward the floor.

Q. Some friends of mine, in law enforcement, are interested in getting their amateur radio licenses, but, because of the nature of their work, they don’t want their call signs, names, and addresses published in directories. Is there any way this can be done? (Mike Elcisin, Lake Berryessa, CA)

A. None of which I am aware. The ham call books and CD-ROMs come from official FCC records, and unless the FCC has a provision to exempt certain licenses from the records, the information will all be there.

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DEPOT SERVICE CENTER—All prices flat rate labor + parts (includes UPS return). Uniden/Bearcat scanner repair $39.00, Motorola Minitor pages $19.95, 2-way radio repair - GE, Motorola, Regency, most major brands $55.00. Radio programming $14.95 ea. TSC, 12C West Avenue, Atlantic Highlands, NJ 07716. (908) 872-2926.

TEST EQUIPMENT BONANZA! Free shipping! Bird 4411W wattmeter, like new; elements for 2-30, 144-540, 400-1000 Mhz, leather case. Orig. cost $1383 (order TIN75 $699.95). Grove Enterprises, P.O. Box 98, Brastown, SC 29002. 1-800-438-8155.

PRO-46 HANDHELD scanner, 100 channel, 29-956 Mhz, cellular restored. New in box. $325.00. Call or fax Thomas at (513) 661-1234.

"RADIO STUFF SALE!" Magazines, bulletins, books, radio station items, some equipment. All ads must be paid for. $1.00 per word. Commercial line ads printed in bold type.

FOR SALE: AOR AR1500 scanner 500 kHz-1300 Mhz continuous (no gaps), all accessories, excellent condition. $350.00 will ship. Call Rudy (847) 358-1150.

FOR SALE: Sony ICF-SW100S used twice, absolutely mint. $750.00 firm. James Geer, 1013 Overhill, Bedford, TX 76022-7206. (817) 540-4331.

(SCANNING TIMES ... Continued from page 43)

Satdays

0010 Australia, Radio: "Feedback"
0200 WHRI (Hawaii): "DJing with Surfbeat"
0400 Radio for Peace Intl: "World of Radio"
0500 WHRI (Hawaii): "DJing with Cumbre"
0515 WHRI (New York): "DJing with Cumbre"
0530 WWCR #3 (Tenneesee): "World of Radio"
0615 HCB (Tai): "DX Partyline"
0630 HGB (pac): "DX Partyline"
0645 WWCR #3 (Texas): "Ask WWCR"
0745 FEBC (Philippines): "DX Dial"
0750 KMWR (Guam): "Pacific DX Report"
0820 Voice of America" (as pac): "Communications World"
1200 Voice of America" (as pac): "Communications World"
1245 Voice of Turkey: "DX Corner" (beethoven)
1300 WHRI (Angel 2): "DJing with Cumbre"
1350 WWCR #1 (Tennessee): "World of Radio"
1430 Radio Taskert: "Radio Taskert DX Program"
1435 Radio Romania Intl: "DX Mallbag"
1455 FEBC (Philippines): "DX Dial"
1515 Radio Romania Intl: "DX Mallbag"
1730 Voice of America: "afri" in south as): "Communications World"
1745 WHRI (Angel 1): "DJing with Cumbre"
1800 Radio for Peace Intl: "World of Radio"
1910 HGB (eu): "DX Partyline"
1915 Voice of Turkey: "DX Corner" (beethoven)
1940 Radio Romania Intl: "DX Mallbag"
1958 Vatican Radio: "On-the-Air"
2000 WWCR #3 (Tennessee): "Ask WWCR"
2015 WHRI (Florida): "Wavescan"
2100 Voice of America" (as pac): "Communications World"
2134 Radio Havana Cuba: "DXers Unlimited"
2145 Radio Romania Intl: "DX Mallbag"
2215 Voice of Turkey: "DX Corner" (beethoven)
2220 WHRI (Florida): "Wavescan"
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Techno-Terms for the Times

With the fast pace of emerging technologies, technospeak has grown increasingly unintelligible. It is hard to open the newspaper, a magazine, or even watch TV without hearing about web sites, PCS, digital telecommunications, and other buzz words of the information age. For the perplexed, and even for those of us who should know these terms, but don’t, let’s take a tutorial cram course in current technical dialogue in simple terms:

**Analog:** An electrical signal which represents frequency and amplitude of another signal source. For example, a loud voice spoken into a microphone produces a strong electrical signal, and a high pitched sound produces a high frequency electrical signal. The new electrical signal is the analog of the original sound.

Similarly, a loudspeaker or earphone converts the electrical signal into an analogous sound, tracking faithfully the loudness and pitch of the electrical signal which, in turn, was produced by the microphone.

**Baud:** Simply stated, the number of symbols per second in a train of digital data; it is not the same as “bits per second” (bps) unless the code is binary. The baud rate is roughly equivalent to the analog term, frequency. Named for the French engineer, J.M.E. Baudot, who constructed the first successful teleprinter.

**Binary:** A two-level data code, often represented as on or off, 1 or 0, or (+) or (-).

**Bit:** (Binary digit) A data pulse, or absence of a data pulse, in a train of data.

**Byte:** A digital train of eight bits, representing a letter, numeral, or other character.

**Digital:** The use of spaced pulses, rather than amplitude or frequency, to represent information. For example, a tone could be represented by a series of numeric “bits” of information, each calculated to represent a point of amplitude or frequency as a place in time.

Since our human senses respond to an analog environment (e.g., frequency and intensity of light, pressure of touch, loudness and pitch of sound, intensity of taste and smell, etc.), we use A/D (analog to digital) and D/A (digital to analog) converters to interface between us and digital processing equipment.

**Interface:** A circuit intended to provide compatibility between two otherwise-incompatible devices.

**Internet:** Originating in the 1970s to interconnect governmental and educational institutions, the Internet has expanded to include tens of millions of individuals worldwide with no common thread except the desire to acquire and exchange information. Unlike commercially-controlled services like America Online (AOL) and Compuserve, the Internet is the world’s largest public system of intercommunication, in effect a giant network interlinking smaller networks.

**ISO:** The International Organization for Standardization comprises 89 countries’ standards organizations, including the American National Standards Institute (ANSI), to adopt computer standards. “ISO” is from the Greek, meaning “same;” it is not an acronym or abbreviation.

**Parallel:** The transmission of several data streams simultaneously over multiple lines.

**PCS:** The Personal Communications Services (PCS) were established by the Federal Communications Commission (FCC) to accommodate the growing need for radio frequencies in telecommunications. Uses include wireless computer networks, fleet tracking, paging and radiotelephone, information access, inventory control, security, and environmental comfort control.

Most of these services utilize satellites which operate in the VHF, UHF, and microwave frequency ranges and utilize digital transmission modes. PCS is expected to dwarf the conventional cellular telephone industry within a few years, and many “dual mode” cellphones are now being made to accommodate both services.

**RJ11:** Modular telephone/computer jack conventionally used in the U.S.

**RS232C:** The “Recommended Standard” originally published by the Electronics Industry Association (EIA) for a computer’s serial port, for electrical signal levels. DB9 and DB25 connectors, named because of their D shape and having 9 or 25 pins, are commonly used.

**Serial:** The transmission of data one bit at a time as a long string.

**Telecommunications:** A broad reference to the transmission of any information by wire or radio. Computer exchanges, telephone conversations, satellite TV, ham and CB radio, shortwave broadcasting, police dispatching, PCS, and cellular telephones are all forms of telecommunications.

**Web:** The World Wide Web is an enormous collection of documents—“pages” of text—as well as graphics, sound, and video used to facilitate and enhance communications.

These are just a few of the terms that jargonauts throw around in the computer world. And it’s not going to get any better. If you have difficulties traveling through this new time warp, let us know what confuses you, and we will do what we can to make the trip easier!
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You won’t miss a thing with Reaction Tune. The Scout’s CI-V compatible output allows it to interface to the AOR AR2700/AR8000, ICOM R7000, R7100, R8500, R9000 and now the new IC-R10 (shown opposite). The Scout captures the frequency, then sends the serial data to the receiver and tunes the scanner to the frequency for instant monitoring in less than one second. Recorded frequencies can be downloaded to a PC using the optional OptoLinx universal interface.

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- 16 segment RF signal strength bargraph
- Frequencies are automatically saved when unit is turned off
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