

Monitoring Times

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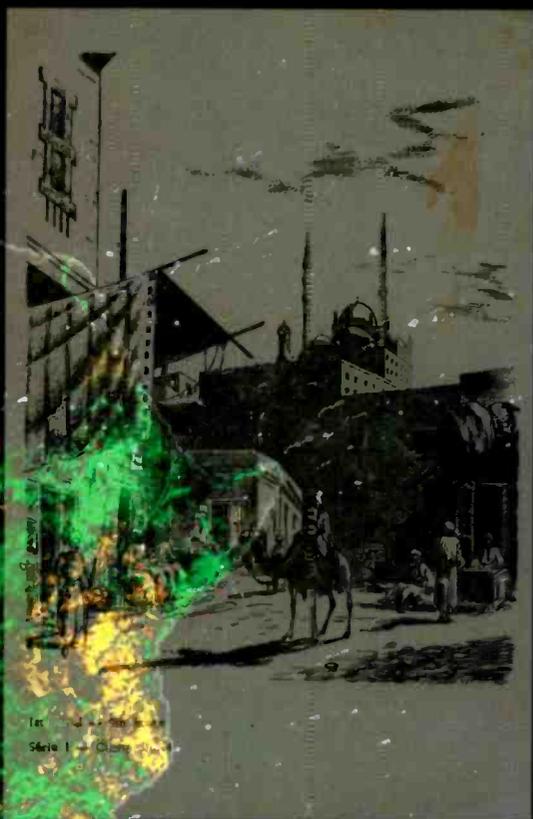
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Cover Story

Listening In On Africa

By Dave White

Shortwave radio listeners have a unique opportunity to go beyond Hollywood and discover the complexity that is Africa today. Varied geography, cultures, religions, languages, politics, and economic conditions have been exacerbated by disease, drought, famine, and manmade disasters to splinter an already-divided continent.

Radio can help shed some light on the Dark Continent, though there are few stations with the power to broadcast an external service. The author conducts a survey of African countries with a presence on shortwave radio and divides them into the easiest catches and the more challenging domestic broadcasts. Story starts on page 10.

Cover design by Bill Grove; demographic map of Africa courtesy NASA; QSL cards courtesy Gayle Van Horn.

C O N T E N T S

Guide to QSL Addresses: Africa 14

By Gayle Van Horn

Okay, so you've met the challenge and you have managed to snag some African stations. How can you verify your reception? The patience required to pick up an African station is nothing compared to the persistence you may need to obtain the QSL, but this list of addresses and advice will get you started.

Leo Sarkisian: Music Man of Africa 18

By Mark B Lewis

The man who created one of the longest-running and most popular programs at the Voice of America is 79-year-old Leo Sarkisian, "Music Man of Africa." Through music and art, this Renaissance man has been invaluable to the VOA and to Africa itself.

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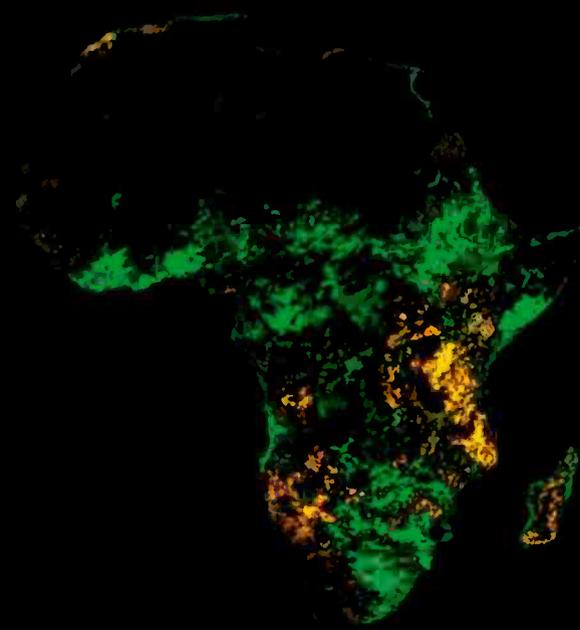
By Marc Ellis

Have you ever wondered – if you got up the courage to actually restore an ancient receiver, what signals would it pick up today and what would they sound like? Marc Ellis gives it a try on a circa-1929 Pilot A.C. Super Wasp which he restored some years ago.

Scanning Profile of Chicago 26

CARMA

Chicago is a major hub for travelers and for business conventions, as well as being a major metropolis. Ted Moran has contributed a comprehensive look at communications systems around Chicago, compiled by the Chicago Area Radio Monitoring Association.





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

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Periodicals postage paid at Brasstown, NC,
and additional mailing offices. Short excerpts
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Address: P.O. Box 98,
7540 Highway 64 West,
Brasstown, NC 28902-0098

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Editorial e-mail: mteditor@grove-ent.com
Subscriptions: order@grove-ent.com

Subscription Rates: \$25.95 in US; \$38.50
Canada; and \$57.50 foreign elsewhere, US
funds. Label indicates last issue of subscrip-
tion. See page 106 for subscription
information.

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

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Reviews:

Readers have expressed much interest in ICOM's forthcoming IC-R3 wide coverage receiver. The main attraction, of course, is in the R3's ability to pick up and display video signals despite its small size (see p.100).

Getting rid of undesirable signals can be just as important to good



reception as picking up the desired signal. The Grove tunable notch filter can be invaluable for reducing interference when the noise source is changing and varied (p.105).

Our mini-series on understanding receiver specifications continues this month with a look at receiver sensitivity – what is it and how is it measured? (See p.98)

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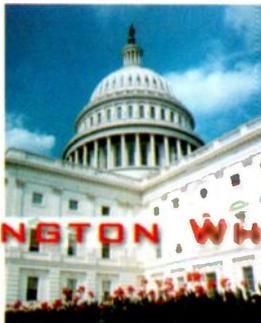
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WASHINGTON WHISPERS

Fred Mala, W5YI

One-Stop Shopping at Firstgov

One-stop shopping for government services coming this fall! President Clinton made his first Saturday Webcast on June 24th. Clinton used the occasion to announce the formation of a new website that permits rapid access to government information and public services. The new site basically lashes the government's 20 thousand different websites together. Citizens will be able to search any of the half a billion documents offered by the federal government in less than one-quarter of a second from a single free web site called "Firstgov, Your First Click to Digital Government" – a slogan the administration has trademarked.

"I'm pleased to announce several major steps in our efforts to go forward in creating a high-speed, high-tech, user-friendly government," Clinton said. "When it's complete, Firstgov will serve as a single point of entry to one of the largest, perhaps the most useful collection of web pages in the entire world. Whether you want crucial information in starting a small business, or you want to track your Social Security benefits, you can do it all in one place, 24 hours a day, 7 days a week."

www.firstgov.gov will start operation this fall. Clinton said the website will be interactive, permitting the public to send and receive information and to conduct sophisticated transactions on-line. It will be able to handle at least 100 million searches a day. The site will not collect any personal information from citizens.

In addition the White House announced "...a major competition to spur new innovative ideas for how government can serve and connect with our citizens electronically." Awards of up to \$50,000 are being made available to citizens who present the most creative suggestions for advancing e-government.

- An FCC investigation led to the arrest of unlicensed amateur radio operator Mr. William Flippo of Jupiter, Florida, on July 20th. The Enforcement Bureau had previously warned Mr. Flippo and had issued him a \$20,000 fine. Despite the penalty, Mr. Flippo did not stop his illegal activity. The United States Attorney's Office for the Southern District of Florida charged Mr. Flippo with four counts of unlicensed radio operation and four counts of interfering with licensed radio stations. The United

States Marshals Service arrested Mr. Flippo at his Jupiter, Florida, home, from which it also seized his radio transmitting equipment.

The FCC's Enforcement Bureau commended the members of the amateur radio community, who provided information leading to Mr. Flippo's arrest, and thanked the United States Attorney's Office for the Southern District of Florida and the United States Marshals Service for their efforts in prosecuting the case.

- The FCC has arrested Vladimir Petit-Fere for operating an unlicensed FM radio station on 88.5 MHz in Brooklyn, New York, and seized his transmitting equipment. The Commission had previously issued letters of warning to him directing him to cease operation of the unlicensed station which were ignored.

Since January 2000, investigations of unlicensed broadcast operations by the FCC's Enforcement Bureau have resulted in the shut down of 44 unlicensed stations, one Notice of Apparent Liability for a forfeiture, seven court-ordered seizures of radio equipment, three court orders ceasing operation of an unlicensed station and one arrest.

- The FCC has fined Leslie D. Brewer and his company Brewer's Two-Way Radio of Tampa, Florida, \$10,000 for selling an unauthorized FM broadcast radio transmitter. Mr. Brewer had previously been involved in the operation of an unauthorized "pirate" FM radio station which operated as "Tampa's Party Pirate" on 102.1 MHz in the Tampa, Florida, area.

- The FCC's Enforcement Bureau has issued enforcement actions against Neftali Zea (Union Park, FL), Ana Rodriguez-Rolon (Cayey, PR) and Samuel Romero (San Juan, PR) for using illegal power amplifiers in the CB band.

- The FCC has socked Carolina Liquidators of Irving, Texas, with a \$230,000 fine for sending out unsolicited "Junk Fax" advertisements to the public promoting a furniture auction. The Telephone Consumer Protection Act (TCPA) prohibits any person from using a telephone facsimile machine, computer or other device to send an unsolicited advertisement to a FAX machine. The FCC also issued citations to many other

vendors who have sent consumers faxed advertisements.

- On July 3rd, the House passed a spending bill that would reduce the FCC's budget by some \$2 billion. The Republican-led Congress wants to limit the FCC's ability to tamper with telecommunications policy. Salaries and expenses in the FCC's Legislative Affairs Office were particularly hard hit. On July 5th, the House passed still more anti-FCC legislation.

The strain on the Commission (appointed by the Democratic administration) from Congress is not new. Responding to opposition and pressure from the powerful National Association of Broadcasters, Congress is particularly infuriated by the FCC's intent to create up to 1,000 low power community FM stations. Their response is to slash Commission funding.

- The FCC has released an easy-to-understand guide on radio frequency (RF) emissions. The objective is to assist local governments and individual citizens in better understanding the origin and application of FCC safety rules to safeguard public health from RF exposure. The guide, entitled "A Local Government Official's Guide to RF Emission Antenna Safety: Rules, Procedures, and Practical Guidance," is available on the FCC's RF safety web page at www.fcc.gov/oet/rfsafety.

The guide is designed to provide local communities with a greater understanding of RF emission issues, and comprehensive information and guidance in devising efficient procedures for assuring that local antenna facilities comply with the FCC's limits for human exposure to RF electromagnetic fields. It answers in clear, understandable language the questions of elected officials and local residents alike on the impact of antenna towers on community health.

The guide explains the process whereby federal, state and local agencies with expertise in health and safety issues, including the EPA and FDA, assisted the FCC in establishing consensus limits for human exposure to RF emissions. It says the limits themselves are set many times below levels generally accepted as having the potential to cause adverse health effects. A list of transmitters, facilities and operations subject to routine environmental evaluation is included.

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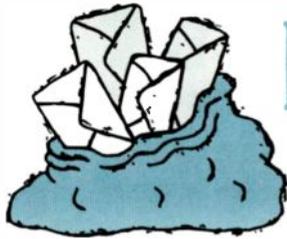
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LETTERS TO THE EDITOR

"Easy Access" kudos and Sabbatical

Paul F. Koepke of Goshen, IN, sent the following letter to reviewer Jock Elliott. "Greetings! I'm writing to commend you on your GE's Sedona Family Radio Service (FRS) article in the Aug 2K issue of *Monitoring Times*! Informative and helpful! You have a way of putting things together in understandable terms for the new and less experienced to the hobby. Though I've been interested in radio for years – and involved in the hobby as much our little as free time allows – I always check the basic entry level information because I glean so many things which other writers take for granted.

"Among my other hobbies is part-time charter tour coach driving. My first experience with FRS was in an area shuttle. I was working with another driver transporting VIP guests from an exclusive downtown South Bend Indiana motel to the Notre Dame Campus for a football game. At the start of the experience last fall, the other and more seasoned driver opened his drivers bag, handed me a Motorola FR 50 and said: 'Here...this is what we're going to use to communicate while we shuttle guests through the city to/from the campus!' My initial response was: 'This has GOT to be a joke!'

"Wrong! At the close in distances we worked, the FR50s proved to be excellent equipment! In fact, I appreciated them so much that I went out and bought myself a set – and now I've added a third FR50 to my stable for those times which demand something just a little extra. For the two I paid \$79.95. For the single, \$49.95.

"When coach drivers travel cross country we basically use the CB system for greater range and we can also communicate with truckers and other travel related personnel and infrastructures. However, when coaches travel with larger groups and in tandem or triplex, members of the tour party will often communicate from bus to bus via the FRS frequencies. Hence, the drivers are in tune with 'road events' while the group is in sync regarding intergroup matters. Obviously they also use their FRS devices with mixed reviews in larger cities like Washington, DC, Philadelphia and New York.

"Recently a friend moved his son from Indiana University, Bloomington, Indiana, to Phoenix, Arizona. I encouraged Rich to buy the FR50s for the two-vehicle saga cross country. On his return he thanked me profusely and said: 'The FR50s are just what we needed to coordinate fuel, rest and food stops!' 'Besides' he added, 'We didn't have to listen to all that CB chatter!'

"We also used the FR50s to coordinate activities at a large outdoor church picnic. I guess the point is that uses are limited only by our creativity.

"I would agree with your evaluation – up to a quarter mile distant they are just the thing. Beyond that – particularly in vehicles where one is surrounded by lots of metal – the little radios lose their value. Thanks for allowing me to share these experiences with you and I encourage you to keep up the good work!"

Thanks, Paul. Jock will be keeping up his good work reviewing consumer-grade 2-way radios and other entry-level equipment. For the time being, he's on a short sabbatical and we'll be filling in with a couple of home-brew projects. Look for his column to return around the first of the year.

Tolerance for religious broadcasters

The following letter is from Richard Lam of Singapore concerning the August edition of the Global Forum column by Glenn Hauser. Hauser reported on reactions to the proposed acquisition of the former Radio Australia transmitter in Darwin by the religious group that operates Christian Voice.

"Before I begin, I would like to present my credentials. I have been DXing for the last 10 years and am proud to say that I am probably the most active DXer in Singapore. I am also a degree holder majoring in political science and Southeast Asian studies. Bahasa Indonesia happens to be one of the languages that I speak. Besides *MT* and other Western SWL media, I also have access to some SWL media published in Indonesia for Indonesian SWLs.

"The comments by you and other Australian SWLs have to do with the loss of control by Radio Australia of what was its transmitter. There was also some unhappiness over the fact that the same transmitter would be sold to a 'fundamentalist' religious group which would use said transmitters to broadcast programs into Asia which would presumably offend Australia's Asian neighbours.

"Some SWLs also thought that listeners to the proposed Christian Voice broadcast would not be able to distinguish between Christian Voice as a private project and Radio Australia programming which Christian Voice may be obligated to carry. John Figliozzi feels especially that it would not be in the best interest for the Australian government to lease the transmitters to a Christian organisation especially now that the region (read Indonesia) is rocked by religious violence. The *Canberra Times* was also quoted as saying that the allegations made about Australia's agenda in East Timor shows the need for balanced and unbiased coverage of regional affairs, broadcast to the region.

"Certain presumptions follow according to this view:

1. Christian religious broadcasting would offend Asian governments and people.
2. There are no Christian broadcasts in the same Asian countries.
3. Listeners in Asia cannot distinguish between a lease program and a program from the transmitter owner like SWLs can.
4. A religious broadcaster is incapable of carrying unbiased viewpoint.
5. Without its Darwin site, Radio Australia would not be heard by Asia.
6. Radio Australia as a broadcaster carry balanced and unbiased comment.

"It's time to debunk these presumptions.

"Indonesia may be the country with the largest Muslim population; however, there are also a large number of people belonging to other religions including Christianity, Roman Catholicism, Buddhism and Hinduism. In fact, if you do not have a religion, Indonesians may very well think that you are a communist and for that you would have dif-

ficulty looking for employment. One of the former armed forces commanders, General Benny Murdani, is a Roman Catholic.

"Christian radio stations are a fact of life in many parts of Indonesia, and even RRI stations carry Christian programming at times. On Sundays and Christian religious holidays such as Ascension Day and Christmas, private and government TV stations also carry programs for Christians and Catholics featuring local preachers. I have never believed that the majority of Indonesians are offended by these broadcasts. The TV and radio audience are well aware that religious broadcasts are produced by religious organisations. It would be naive to think that they cannot distinguish between paid programs and what the station itself (mostly Muslim owned) stood for.

"In fact, Radio Australia itself is carried by local affiliates using FM outlets in many Indonesian cities. Radio listeners in these cities can certainly distinguish between the local music station and a foreign broadcast. Contrary to what your correspondents like to think, many (by no means all) Indonesians do not view broadcasts from Asian countries favorably. Radio Australia, for example, has been criticised by some of the SWL newsletters here as being unresponsive to listeners' requests.

"There is also this issue of Radio Australia being used to further the agenda of its government. Many Indonesians feel that the independence of East Timor can only be achieved by foreign intervention. The active promotion by western countries throughout the years have only served to strengthen these feelings. In my view, it is precisely because Indonesians have a good grasp of the realities of international and regional issues that they can tell that Australia's agenda in East Timor is not truly altruistic. (No amount of western propaganda will change that view.)

"For these reasons, Radio Australia's absence is not as sorely missed in Indonesia as it is by western SWLs. On the other hand, Christian radio stations tend mostly to stay away from politics and concentrate more on spiritual issues.

"By the comments carried in your column, I feel that the SWLs quoted do not have a clear understanding of the content of religious broadcasters. They tend to equate people like Gene Scott and Brother Stair with the rest of the religious broadcasters, which I think is simply unfortunate. SWLs also seem to have no idea of the message carried in international broadcasts from Third World countries. For now, the message seems to flow one way – from north to south. Unless there is a fair exchange of views, SWLs cannot claim that they have a better understanding of world affairs. I would urge *MT's* writers on shortwave broadcast topics to be more tolerant of religious broadcasters. I do not think all of us want to see what has happened in some fascist states to also happen in SW media.

"I offer my apologies to those who feel offended. I hope that I have cleared the air for all of you."

– Richard Lam, Singapore

Tubes CAN be quiet

Bob Grove received some of letters regarding a comment he made about vacuum tubes in his article "What do the specs mean anyway?" in the August MT. Here are a couple of points about quieter tube sets which Bob agrees are well taken.

Les Locklear of Gulfport, MS, begins by quoting from the article section regarding Sensitivity: *Years ago, less sensitive vacuum-tube receivers required significantly larger antennas to capture enough signal energy to overcome their own noisy circuitry, the result of the hot filaments and cathodes producing electrical noise ('thermionic emission'). Modern solid-state electronics makes high sensitivity practical, with halfmicrovolt (0.5 uv ratings, and smaller antennas commonplace.*

"Bob, you must have been expounding about Hallicrafters S-38 models and their equivalents. My R-390A/URR has 0.07 uv sensitivity and hears stations that my Drake R8B doesn't hear. And, that's using the same antenna, a 60 ft. Alpha-Delta Sloper, and other various longwires I have strung up. It appears to my old tired ears that the R-390A with all of its thermionic emissions is quieter than its modern counterpart. Shame on you for not telling the "whole story" on thermionic emissions.

"Certain tube designs are inherently noisy, of course. I'm sure that you were referring to these simple receivers and not the good stuff. My tired old worn-out Hammarlund SP-600JX-6/R-274B/FRR Super Pro also is quite quiet, 0.09 uv sensitivity. Imagine that. Of course, I have replaced the

first rf amplifier tube in that particular receiver with a 6GU5 instead of the dual 6BA6 rf amplifier tubes in the stock design.

"The R-390A/URR with a 6DC6 as the rf amplifier tube is extremely quiet. I have used this type of equipment for many, many years in conjunction with the best of the modern type receivers, R8 series, NRD 515, 525, 535D, AOR7030 and many others. My R-390A has ears like a 'Bat' unlike its noisy modern predecessors."

Walt Novinger also wrote, "Hear, hear, Les! Bob, the real problem with modern receivers (including the WJ HF-1000 which I have owned but since dumped) is the great amounts of internal noise they produce. Whether it's a switching power supply used in place of an 'old' transformer design, a voltage-multiplier used to power fluorescent displays, or multiple CPUs with noisy clock circuits used for all sorts of purposes, modern digital receivers are just plain noisier than their tube predecessors.

"Of all the modern receivers I use, the R8-B is, without a doubt, the quietest; of the vacuum tube receivers, the Racal RA-17 is my favorite."

"Letters" is compiled by the editor, Rachel Baughn. We welcome your comments, criticisms, and kudos to Letters to the Editor, PO Box 98, Brasstown, NC 28902, or at mteditor@grove-int.com

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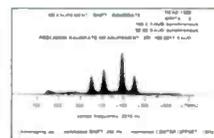
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RADIO HONOR ROLL

A Class Act

Kudos to Carl Magouirk, a 62-year-old amateur radio operator who is teaching a class in scanner and shortwave listening to senior citizens at the Grapevine, Texas, senior center. "I meant for the class to be an introduction to ham radio operation, but listening is a hobby of its own and it's exciting," Magouirk said.

Using shortwave radios and scanners is a particularly attractive pastime for senior citizens because neither device requires mobility and both connect people to the outside community. Listening can provide an antidote to the loneliness that can plague seniors, said Magouirk and Center Director Linda Gregory.

Gregory recalled one Grapevine senior who was sold on the technology.

"It gave her hours of entertainment," Gregory said. "I think it's a matter of having something to do, something to occupy the mind."

The class has four participants so far. Class members visited Magouirk's radio station at the first meeting, and future field trips are planned to area police and fire departments' communications centers and to radio and television stations.

❖ Fighting fire with fire department

The federal government is quietly recruiting hackers to battle the increased threat of cyber terrorism and PC spies. The eighth annual computer hacker convention, "DefCon8" was held the last weekend in July in Las Vegas. More than 5,000 showed up ...most underground attendees dressed in their trademark solid black.

Government computers get hit more than 20 thousand times annually. Many of these hacks show an increased level of intricacy that proves the threat of cyberterrorism is growing. Security experts believe that there is a new generation of skilled hackers emerging. They have been attending DefCon for years.

Federal officials have attended the gathering before, but mostly in secret. This year they were very open about it. The CIA, the Department of Defense, FBI and the National Security Agency want to hire skilled hackers who don't have criminal records. Uniformed military personnel were openly accepting employment applications in the back of the convention hall.

❖ Fighting Fire with 2-way radios

Relm Wireless Corp. said it shipped 500 of its Bendix-King two-way radios last summer to help fight fires in several West Coast states. David Storey, Relm's president and

chief executive, said employees put in overtime to make and ship the radios within a 24-hour period to meet the urgent demand.

The \$400,000 worth of equipment was sold to the National Interagency Fire Center in Boise, Idaho, which supplies emergency radio equipment to emergency response agencies throughout the West Coast, Storey said.

❖ Ham gear cleared for takeoff

The Amateur Radio gear destined for use in the International Space Station (ISS) was scheduled to hitch a ride in September aboard the shuttle *Atlantis*. As part of the multinational Amateur Radio on the International Space Station project (ARISS), the gear will be stowed aboard the ISS for use by the Expedition 1 crew, set to come aboard in late October.

It has been a challenge, requiring international agreements, testing, and completion of other phases of the project, such as the launch and docking of the Russian-built Zvezda Service Module that eventually will house the ARISS gear, said Administrative Chairman Frank Bauer, KA3HDO.

The Expedition 1 crew will consist of three amateurs: US astronaut Bill Shepherd, KD5GSL, and Russian Cosmonauts Sergei Krikalev, U5MIR, and the recently licensed Yuri Gaidzenko. The ARISS initial station gear will be installed temporarily aboard the ISS Functional Cargo Block. It will use an existing antenna that's being adapted to support FM voice and packet on 2 meters but not on 70 cm. Eventually, the ARISS gear will find a more permanent home aboard the Zvezda Service Module. A Russian call sign, RZ3DZR, has been issued for the ISS ham radio station.

ARRL Field and Educational Services Manager Rosalie White, K1STO – a member of the Space Amateur Radio EXperiment (SAREX) Working Group – says "All of the hard work from the many volunteers is starting to pay off ...seeing the youth of the United States and other countries benefit is our reward."

Bauer says the astronauts and cosmonauts plan to take some time off for educational outreach contacts with schools, even during the busy years of ISS construction that lie ahead. Bauer says access to Amateur Radio also is considered a morale booster for ISS crew members who will be in space many weeks at a time.

❖ FCC Adopts the Multi-User Radio Service

The FCC has adopted a new Report and Order creating another Citizens Band type of service called the Multi-User Radio Service (MURS). According to the tentative Rules for

the MURS, the deregulated frequencies include 151.820, 151.880, and 151.940 (11.25 kHz bandwidth), and 154.570 and 154.600 MHz (12.5 kHz bandwidth) – a substantial change from the originally proposed frequencies of 154.570, 154.600, 467.850, 467.875 MHz, 467.900 MHz, and 467.925 MHz.

Maximum radiated power permitted is 2 Watts. MURS stations may transmit voice, data or image signals, including remote control and telemetering.

No license will be required to operate the radios. The FCC's initial Notice of Proposed Rulemaking pointed out that requiring a license for operation on these frequencies for the purpose of frequency coordination was meaningless, since these frequencies are used by mobile radios, and consumers purchasing these two-way radios were often unaware that a license was required.

MURS joins the Personal Radio Service which is comprised of the General Mobile Radio Service (GMRS), the Family Radio Service (FRS), Radio Control Radio Service (R/C), Citizens Band (CB), Low Power Radio Service (LPRS), Wireless Medical Telemetry Service (WMTS), and Medical Implants Communications Service (MICS).

❖ South Florida pirate radio capital no more?

Of the more than 500 stations that have been closed down by the FCC for illegal operation in the past three years, more than 100 of them have been in South Florida. One of the most recent shut-downs came about when



Oct 8: Wallingford, CT

Nutmeg Hamfest & Computer Show at Mountainside Special Event Facility (High Hill Road, Exit 15 Rte 91 N or S, follow signs), 9a.m.-3p.m., Gen Adm \$6. Seminars, demonstrations, speakers (including Wayne Green W2NSD) VE info call N1JEO 203-235-6932. For more info visit www.qsl.net/nutmeghamfest or email nutmeghamfest@qsl.net

Oct 22: Sellersville, PA

RH Hill ARC hamfest at the Sellersville Fire House (Rt 152, 5 mi. S of Quakertown); Talk-in 145.31, Gen Adm \$5. VE testing 10a.m.-1p.m., all classes, bring documents. For more info call Linda Erdman 215-679-5764 (2220 Hill Road, Perkiomenville, PA 18074) or visit www.rhhill.ampr.org

Club Information

New address for MONIX (Cincinnati/Dayton Area Monitoring Exchange) and ANARC (Association of North American Radio Clubs) president Mark Meece: 529 Sandy Lane, Franklin, Ohio 45005-2065, (513) 743-8089.

All Ohio Scanner Club website - www.aosc.org

police discovered that a gangster rap station was orchestrating huge, rowdy parties which would then dissolve and reform elsewhere when police were sighted. The FCC located the equipment – but not the deejays.

The inexperienced amateur stations have not only interfered with licensed broadcasters, but have also plagued air traffic control. Even though the interference is often inadvertent, the FCC is pursuing a rigorous enforcement policy – with apparent success.

“As of yesterday, we didn’t hear a single one on the air,” one federal source told the Miami *Herald* last summer. “Word is getting out that we can pinpoint a signal right to your stovepipe.”

❖ Radiation figures to be published

In a major policy shift, the Cellular Telecommunications Industry Association will require cellular telephone manufacturers to submit data on the amount of radiation emitted by each model if they want to be certified by the CTIA. It is not yet clear how to interpret the SAR – Specific Absorbed Radiation – number, and the CTIA has long resisted publishing the number, calling it meaningless and confusing to the public. However, the industry may be learning from the experience of cigarette manufacturers: not being up front with the public can backfire.

Watch for the SAR to be available on new phones around the end of the year.

❖ Public Safety Gets Priority

The FCC has stated that public safety personnel at the Federal, State and local levels will be given Priority Access Service from the Commercial Mobile Radio Service during national security or emergency situations.

What’s the CMRS? Contrary to popular opinion, it’s not cellular phones, but it does include Nextel, Southern Linc, and other mostly digital systems which sometimes do interface with the phone system. These nets are very popular with government users.

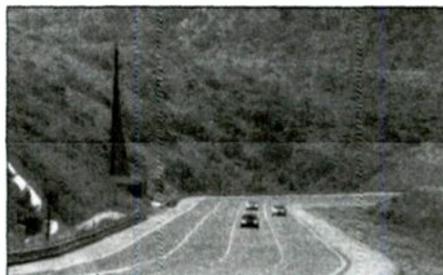
By the way, if HR 514 or S 2369 (identical Bills) were to become law, it would likely prohibit monitoring such private, digital, CMRS communications, public safety or not. Is this the real motivation for these bills?

Write your Senator today to be sure he or she understands that the bills are redundant. Congress should support the enforcement of existing law, not “reinforce” it with more legislation. The good news: Any bills not acted upon by the end of this session must be reintroduced when the new Congress convenes.

❖ The Evolution of Cellular Communications

MT prints only a tiny portion of the news we receive on cellular issues, but cellular technology has left an indelible mark on American culture. And the evolution isn’t over yet: Communities, courts, and Congress are still dealing with these issues:

- privacy (Congress made it illegal to listen to private cellcomms on your radio)
- etiquette (the public is tired of being forced to listen to private cellcomms in elevators, restaurants, theaters...)
- public safety (using a cellphone while operating a car is a proven hazard, but bans against it are being contested in court)
- technology (now the phone even has a screen so you can take your eyes off the road to check your directions or your stock prices)
- public health (the FDA, CTIA, Congress and FCC finally say more study is needed regarding the effects of micro radio waves on the brain)
- mental health (no, the man walking down the sidewalk talking to the air and waving his arms isn’t crazy ... but he may be disconnected from life around him)
- community values (the influx of towers has neighborhoods up in arms, and not all attempts to disguise them meet with approval)



Orange County’s proposed cell towers rejected as orange monstrosities.

“Communications” is compiled and written by Rachel Baughn, from news sent in or emailed by our readers. Thanks to this month’s reporters: Anonymous, Albany, NY; CF Ebert, Miami, FL; Sterling Marcher, La Mirada, CA; Ira Paul, Royal Oak, MI; Doug Robertson, Oxnard, CA; Al Stern, Satellite Beach, FL; Robert Thomas, Bridgeport, CT; Sue Wilden, Noblesville, IN. Via email: Pete, Chet Copeland, Maryanne Kehoe, Larry Magne, Laura Quarantiello, Bill Siedsma, Allan Stern, Jon Van Allen, Larry Van Horn, Peter Vieth, Robert Wyman, Dave Zantow; *ARRL Bulletin* via Larry Van Horn; *EDXP* list, Fred Maia, *W5YI Report*

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CHANNEL AFRICA

RADIO + TELEVISION SERVICES



Gayle Van Horn

Listening In On Africa

By Dave White



Like many “baby boomers,” my earliest impressions of Africa were those created in Hollywood and represented by the likes of Tarzan and Jungle Jim – entertaining, yes, but hardly the most accurate picture. Because so little was known about Africa until well into the 20th century, it was long referred to as the Dark Continent. Even in the 21st century, much of this huge continent still presents a challenge to the shortwave listener (SWL) who is interested in listening in.

Africa’s geography ranges from dense jungles to parched deserts to snowcapped mountains. Its inhabitants include desert nomads, tribal villagers, and cosmopolitan city dwellers. There is no unified central government. Civil wars, conflicts with neighboring countries, and frequent changes of country names and political leaders are all part of life in modern day Africa. Add famine, flooding, droughts, and other natural disasters, and you can begin to get a feel for the degree to which Africa is a continent of extremes.

Listening Tips

Relative to the number of countries on the continent, there aren’t large numbers of established SW broadcasters. Relatively few of the 50+ countries on the continent, or the islands near it, have external shortwave services. Most stations only cover a single country or region, so their power levels are low compared to “big gun” international broadcasters, and programming and transmission schedules can range from unpredictable to nonexistent. Technical quality can range from the acceptable to the nearly unreadable.

European countries colonized Africa, and that

is still reflected in the variety of languages spoken there today. You don’t have to be multi-lingual to catch African DX, but it helps if you can recognize the language that’s being spoken. You’ll encounter Arabic languages in North Africa. French is dominant in the Central and Western regions. Spanish and Portuguese will pop up in various places. There are a few former British colonies where English is the primary language.

While it can be challenging, logging African DX is far from impossible. A good portable or modest tabletop receiver with minimal antenna will enable you to hear most of the stations that have high power external services. You’ll need a rig with excellent sensitivity and selectivity, and a good outdoor antenna, in order to catch many of the weaker domestic stations. In either case, SSB capability is a virtual necessity. Some domestic stations broadcast in sideband, and even if a station is in AM mode, you can often use USB or LSB to reduce or eliminate interference from other signals.

The good news is that the fall/winter DX season is an excellent time to listen for African signals, especially the more elusive ones in the 90- and 60-meter tropical bands where many of the domestics are concentrated. With the days getting shorter, twilight comes earlier and darkness lasts longer, which means more hours each day during which signal paths between North America and Africa are open.

Local time zones on the African continent range from UTC -1 in the east to UTC +3 in the west. By mid-October, at 0000 UTC all of Africa and most of North America are in darkness, which is important for signal propagation between the two, especially on the tropical bands.

That means that the most favorable listening conditions in North America will begin in the early evening and last for several hours. At this time of year, decent reception is also possible during daytime hours on 11 MHz and higher frequencies.

Easiest Catches

(Times in UTC. Frequencies in kHz.)

“Easy” is a relative term. For the purposes of listening in on Africa, let’s say that the easiest signals are those from stations with external services beamed outside their home country’s borders with at least 50,000 watts, regularly broadcasting in English and frequently heard in North America during the past year. In other words, this will be the short list!

EGYPT

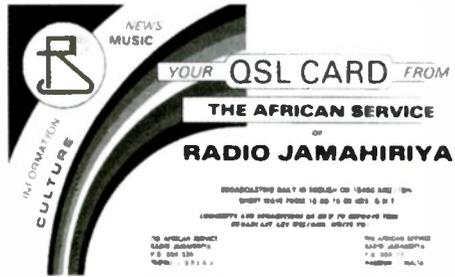
Radio Cairo’s English broadcasts are beamed to the Americas daily from 2300-0030 on 9900 and from 0200-0330 on 9475. Broadcasts to Europe from 2200-2245 on 9990 are also frequently heard in North America. The signals are usually strong, but audio quality is usually muddy. The station is generally consistent about verifying English signal reports, but it usually takes them a long time to respond.

ALGERIA

Radio Algiers beams English to Europe and the Mideast each day on 11715 and 15160 from 1600-1700 and 2000-2100. Although Algeria is

an Islamic nation, many of its residents speak French. In fact, while English reception reports are accepted, French is preferred. It often takes several follow-up reports to get a verification.

LIBYA



Times of English language broadcasts from Voice of Africa in Libya seem to fluctuate somewhat, but recently its signal has most often been heard from 0100-0200 and 2000-2100 on 15435. The station has also been known to use 15235 and 15415.

SOUTH AFRICA

Channel Africa's English broadcasts are beamed to various parts of Africa, but the signals are regularly heard in North America. Try weekdays 0500-0530 on 11720, 0600-0630 on 15215, 1500-1530 on 17770, 1600-1630 on 9525, 1700-1730 on 17860, and 1800-1830 on 17870. An additional two hours of English is aired on Saturdays and Sundays from 1300-1500 on 11720, 17780, and 21725. Adventist World Radio (AWR) broadcasts religious programming to the rest of the continent from South Africa. Its English broadcast daily from 2030-2100 on 9745 is frequently logged in North America and it is a good verifier.

NIGERIA

Voice of Nigeria is heard often and well with several hours of English programming each day. Listen on 7265.5 and 15120 daily at 0500-0700, 1000-1100, 1500-1700, and 1900-2100. Verifying this station is not impossible, but it will be extremely challenging, as Nigeria's mail service is very unreliable.

ETHIOPIA

English broadcasts on both the domestic and external services of Radio Ethiopia have been recently logged, and verified, on 5990, 7110, 7165, 9560 and 9704. Best times to listen are 1030-1100 and 1600-1700.

SAO TOMÉ

The island lies off the western African coast in the Gulf of Guinea. A Voice of America (VOA) transmitter broadcasts two hours of English each day, 0300-0500 on 7290. You'll need to catch

this station in order to get São Tomé in your logbook.

BOTSWANA



Marc Visser

Olivia Laine

Another VOA relay is your best hope for this logging. English language broadcasts are heard in North America with some regularity. Between 0300 and 0700, check 6115, 7265, 7340, 9885, 12080, and 13670. At 1100-1130, there's English on 17650 and 17780. Between 1600 and 2230, visit 7340, 7415, 13710, 15445, and 15525.

MOROCCO

Another major VOA relay site is located in northern Morocco, and beams several English broadcasts to Africa. Check for broadcasts of *VOA Africa* from 0500-0700 on 7195 and 1700-2200 on 15410, 15445 and 17895. *VOA News Now* airs 0600-0700 on 9680 and 1700-2100 on 9760. Try 17895 at 1600-1700 for *VOA Special English*.

SEYCHELLES

Off the eastern coast, in the Indian Ocean, Seychelles is home to one of the major facilities of religious broadcaster FEBA. The most often logged English broadcast is heard daily from 1500-1600 on 11600. The BBC's Indian Ocean Relay station is also located here. Listen most any time for World Service and African Service broadcasts in English on 9610, 9630, 11730, 11860, 15420, 17885, and 21470.

MADAGASCAR

Radio Netherlands has an extensive presence on this large island off the southeast coast of the continent, and is the North American listener's best chance at logging Madagascar. Check for English programs at 1430 on 9890 and 15590, and at 1730 on 6020 and 7120. Deutsche Welle uses RN's facilities for an English broadcast from 0900-0945 on 15210, beamed to East Africa.

RWANDA

Deutsche Welle provides the best chance for this otherwise rare country, with its African Service relay. Broadcasts in English from Kigali are

as follows:

0400-0445 7225, 9565, 9765
0900-0945 11785, 12035, 15410, 21775
1100-1145 15410, 17860
1900-1945 11805, 15390
2100-2145 9875, 15135

Raising the Bar

Next in level of difficulty are stations that either operate at high power but not in English, or operate at lower power, mostly in the tropical bands. Hearing most of these signals is within the realm of possibility, but it takes the right propagation, the right equipment, and a large dose of patience.

ANGOLA



Colin Miller

Radio Nacional de Angola broadcasts an hour of English each day from 2000-2100, on 3375 and on 7245. The rest of the station's broadcasts are in Portuguese and local vernacular.

BENIN

Radio Benin has been logged on 7210.2 around 2200, but at only 30 kW, and being in a U.S. ham band, it's tough at best. The station operates 24 hours a day in French and local dialects.

BOTSWANA

Much harder to hear than the aforementioned VOA Botswana relay, Radio Botswana uses English and the native language, Setswana, between 0300 and 1800 on 3350, 4820 and 7255. Competition from Latin American stations and amateur radio operators makes this one rare.

BURKINA FASO

Most of Radio Burkina's programming is in French and local dialects. The government operated station is on 4815 from 0530-0800 and 1700-2400, and on 7230 from 0800-1700, with 10 minutes of English at 1930.

BURUNDI

Radio Bujumbura is on 6140 from 0200-2100 in French, local dialects and a smattering of English. It is very rarely heard in the U.S.,

mostly obliterated by Deutsche Welle's signal on the same frequency.

CAMEROON

RTV Cameroon's signal on 4850 is logged occasionally and verifies slowly. Programs are in French and English between 0400 and 2400 each day.

CENTRAL AFRICAN REPUBLIC



Radio Centrafrique has been reported in recent months at 2100-2200 on 5035 in French, playing African music.

CONGO REPUBLIC / DEMOCRATIC CONGO

Democratic Republic of Congo has been called the most unstable country in Africa. Democratic Congo and adjacent Congo Republic are home to a number of mostly clandestine stations. The government-controlled Radio Lubumbashi reappeared during the summer, after a period of inactivity, on 7205 with programming in French between 2000 and 2130. RTV Congolaise has been reported on 5985 between 1800 and 1930 in French and between 2100 and 2200 in Spanish.

Clandestine Radio Liberté has been widely reported on 15275 between 1800 and 2300 in USB in French and the native language, Lingala. Rebel-controlled Radio Bukavu has been logged recently after a lengthy absence, on 6713 from 1545-1700, in French and Swahili with African music. Yet another rebel group is reportedly operating Radio Candip on 3390 and 5066, but it has not been widely reported.

EQUATORIAL GUINEA

Radio Africa operates from 0600-1100 and 1700-2300 on 15185 in English, and is occasionally heard in North America with religious programming.

ERITREA

The state run shortwave service, Voice of the Broad Masses (aka Radio Asmara) broadcasts in Arabic and native languages on 7100 and 7175, which is sometimes jammed by the state run radio service in Ethiopia, from which it be-

came independent in 1993. Between low power, jamming, and being located in a ham band, hearing this station in North America would be a minor miracle.

ETHIOPIA

In addition to the state run shortwave services mentioned earlier, Radio Fana operates a domestic service on 6210 and 6940 in various native languages and dialects. An alternate frequency of 9335 has also been reported.

GABON



Africa #1 (Afrique Numero Un) has been heard on 9580 (0500-2300) and 15475 (1600-2100) in French, with African pop music. The station runs high power, but competes with other powerhouse broadcasters, notably Australia, China, Korea Russia and Saudi Arabia on 9580.

GHANA

Most often logged on 4915 around 2200, Radio Ghana also uses 3366 and 6130. A mixture of English, French and native languages can be heard, along with native music.

GUINEA

RTV Guineene's French language broadcasts have been logged, and verified, on 4900 and. Both frequencies are used 0600-2400 daily.

KENYA

KBC operates a domestic service only, using Hindi and local languages on 4915 and in English on 4935. Reception in the U.S. is possible, but fairly rare.

LESOTHO

Radio Lesotho operates on 4800 from 0200-2200 daily from its location within South Africa. Programs are in English and the country's native language, SeSotho.

LIBERIA

Radio Liberia International broadcasts in English from 0600-0300 each day, at relatively

low power, on 5100 and 6100. The station has also been reported on 5000, where the competition from WWV in the U.S. would render it all but impossible to hear. Religious broadcaster ELWA recently returned to 4760 after a long absence, and has been logged stateside at various times between 2200 and 0600.

MADAGASCAR

In addition to the RN and DW relays mentioned previously, Adventist World Radio broadcasts in French and local languages to South Africa on 3215 from 0230-0330 and 1530-1630. At 50 kW, this is not an easy catch in North America. A Radio Vlaanderen International relay in Dutch has been heard on 13645 around 1900. Radio Madagascar has been heard in the U.S. on 5010 in French and Malagasy between 2230 and 0330.

MALAWI

MBC broadcasts in English and ChiChewa on 3380 (0257-0810 and 1515-2210) and 5995 (0357-0810). If you can manage to log it, the station is a good verifier, as Africans go.

MALI

The China Radio International relay station located here has been logged between 1900-2100 on 11735 and 15500 in French, Portuguese and English. Radio Mali (RTV Malienne) has been heard in French on 4835 at 0600.

MAURITANIA



Most often heard is Radio Mauritania with French and Arabic programs on 4845, around 2300. The government-operated station also broadcasts on 7245 and 9610.

MOROCCO

Your best chance of hearing English from here is the VOA relay mentioned earlier. RTV Marocaine's broadcasts are in Arabic and French on 11920, 15335, and 15345, beamed to Europe, Scandinavia and the Middle East. The government's Radio Mediterranée Internationale beams Arabic and French to Europe and Africa daily from 0500-0100 on 9575. This station verifies, but not quickly.

NAMIBIA

The domestic service of NBC (Namibia Broadcasting Corporation) is occasionally heard on 3270 and 3290 with German, English and Afrikaans programming between 1600 and 0800.

NIGER



La Voix du Sahel reportedly returned to the air recently after an absence of several months. Broadcasts in French and Arabic on 5050 between 2100 and 2200 have been logged and verified.

RWANDA

Besides the DW relay mentioned in the "easier" targets, there's Radio Rwanda, which operates on 6055 in French, local languages and an occasional smattering of English. They are on the air from 0400-2100.

SIERRA LEONE

SLBS, like many African stations, operates somewhat erratically, and may or may not be on the air at any given time. Its English broadcast on 3316 has been tentatively reported around 1800, and it has been reported that the station may reactivate its signal on 5980. Try these frequencies between 0600 and 2200, but don't expect too much. The station reportedly has to use a generator for electricity because it can't rely on the local power grid.

SOMALIA

Hans Johnson's recent *MT* article, "Somalia On Shortwave" (June 2000) identified no fewer than 10 shortwave outlets that are the result of political upheaval in that country. Please refer to that article for potential times and frequencies, and keep in mind that all of these stations operate with very low power levels on very erratic schedules, and qualify as very rare DX.

SUDAN

This country's chief claim to radio fame

lately has been serving as the home of several clandestine broadcasts aimed to neighboring Eritrea and/or Ethiopia. Sudan's own Radio Omdurman is reportedly in English at 1700-1800 on 7200, but hasn't been logged recently.

SWAZILAND

Trans World Radio English programs on 3200 are occasionally logged in Europe at 1800-2000, but rarely in the U.S. Other TWR religious programs in English are on 4775, 6100, 9500, and 11640, but likewise are not widely heard off the continent. Domestic shortwave broadcasts on 6155 from Swazi Radio are rarely logged in the rest of the world.

TANZANIA / ZANZIBAR

Radio Tanzania Dar es Salaam has been reported on 5985 around 1400. On the nearby island of Zanzibar, Radio Tanzania Zanzibar has recently been logged on 6015 at 2300-2330 and on 11734 from 1830-1930. Both stations target East Africa with broadcasts in Swahili.

TOGO



French language Radio Lomè has most recently been heard on 5047 around 0000. The station airs snippets of English in five-minute segments at varying times.

TUNISIA

Arabic and French dominate the schedule of Radio Tunisienne, beaming to North Africa and the Mideast. The station has several published frequencies, but has most recently been logged in North America on 12005, on the air

0500-0600 and 1710-2330.

UGANDA

Government owned Radio Uganda's low power signals on 4976 and 5026 are heard fairly often in Europe around 1900. Reception in North America is much more challenging.

ZAMBIA

Radio Zambia has been frequently logged on 6265 between 1800-200 and 0230-0330, with native language and music. Christian Voice has been heard on 4965, 0300-0600.

Gone But Not Forgotten

Listeners used to anxiously look forward to the month of October and the one day each year when the shortwave station on the tiny island of St. Helena was activated. Sadly, the station says last year's Radio St. Helena broadcast was its last. The even tinier island of Tristan de Cunha once offered the very rarest of African DX, with a shortwave signal that was only on the air three days a week, with 40 watts of power! Today, even that small signal is silent.

There are African nations that either have no shortwave facilities, or have such small domestic facilities that they are rarely if ever heard across the ocean. Others are served only by flea power clandestine stations, which are often based in countries neighboring their own. Still others are home to stations that come on and go unpredictably. So, if you can manage to log Cote D'Ivoire, Djibouti, Mauritius, Mozambique, Guinea Bissau, Senegal, Western Sahara or Zimbabwe, you'll be virtually assured a spot in the DX Hall of Fame!

Whether your interest is in current events, indigenous music, or logging new countries, chasing African DX is a challenging but enjoyable pursuit. Should you ever become frustrated in that pursuit, just remember the tribal proverb which says, "Hunger makes the big fish come out of hiding in the great river." If you want to hear it badly enough, the signal will come out of hiding if you wait long enough!

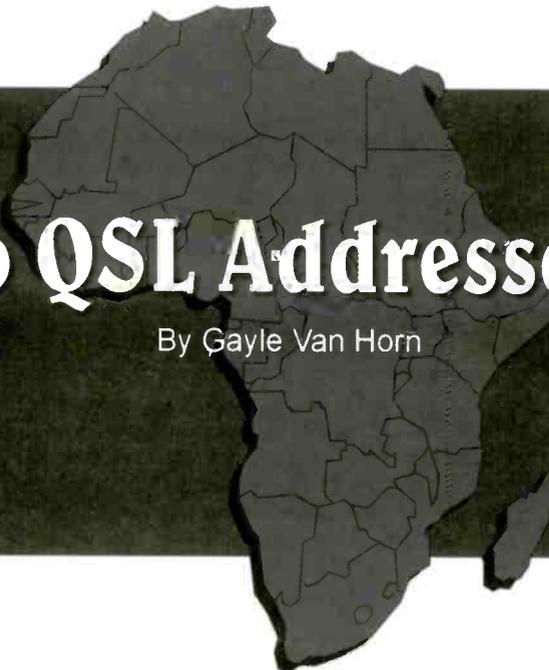
About the author and acknowledgments:

Dave White (k4cc@k4cc.net) started monitoring distant signals at the age of nine, with a BCB transistor radio. 40 years later, he's still chasing DX to the extent that his work as a freelance writer and web designer allows.

The author gratefully acknowledges the contributors to the Hard Core DX mail reflector and the monthly compilations by Glenn Hauser and Gayle Van Horn in *MT*, for sharing reports of African loggings and verifications.

Also, the QSL cards are all courtesy of the SWL QSL Card Museum at www.anticque-corner.com/SWLQSL.

Mikko Laine



Guide to QSL Addresses: Africa

By Gayle Van Horn

Spend some time at the radio dials, and you will eventually hear a unique blend of stations from Africa.

A continent of over 50 countries, Africa provides a diversity of world cultures, languages, and religions that hold the fascination of many a listener. It is also a continent of civil wars and social unrest. Perhaps it is this fascination that works wonders on our imagination – one fueled by tales of explorers and portrayed in the movie industry.

There is no question that to many DXers and tropical band listeners Africa provides “the ultimate DX.” While the powerhouse signals from South Africa and the international relays broadcast to a world audience, the lower-powered domestic stations provide local programming targeted to their respective countries. Where else can you experience such a broad spectrum of music, ranging from Morocco’s traditional Arabic music of the Rebad Andaluz, to the traditional Atumpan drums of Ghana, Mozambiques’ Balo xylophones or the plunking melody of South Africa’s Mbira?

Verifying African stations remains a popular, if challenging aspect to the radio hobby. The easiest method is to verify transmitter sites (except for the BBC, which replies with a preprinted, no data, form card). Normally, your report should be directed to the station’s main office, rather than to the site. Should you opt for the “direct approach,” it’s a good idea to enclose a prepared QSL card. If you receive your card with your requested site ignored, a few DXers have returned their cards! The shock value alone may be enough to produce the corrected verification.

Remember the days when Radio Botswana had a stated “no-QSL” policy? Apparently, the station’s chief engineer wasn’t interested in QSL demands from listeners beyond their borders. Shortly after our feature (*Radio Botswana-The Elusive QSL Comes Within Reach, Monitoring Times Oct. 1986*), an abrupt change in policy occurred. Perhaps as a result of sending the station a sample copy, or the new chief engineer (we like to think the former), this elusive station began to verify regularly with colorful full data cards! In

recent years, their return rate has decreased but hopefully will not cease completely. Maybe another feature is in order!

Egypt’s Radio Cairo continues to baffle the hobby. Once a fairly easy station to hear and verify, it is certainly not the case today. Poor audio (with proposed plans to upgrade their transmitters) and slow or rare replies may require determination. As with many African countries, do not enclose currency due to mail theft.

Don’t be surprised if you receive a letter from someone who obviously has no connection with the station you have written. Usually the writer appeals for money, clothes or sponsorship to a university. Unfortunately, Ghana immediately comes to mind. My personal encounter with a “pen friend,” involved a young man with a heart wrenching letter of poverty pleading to come to America to be my “houseboy.” The enclosed color photo of himself, wearing a gold Rolex watch didn’t help his plea!

The unbelievable, however, gets better! Niger gained a curious reputation that spread like wildfire in the hobby. Yes, they would gladly verify your report...! If you first sent them pornographic magazines, photographs and sex toys. Fortunately, I was one that did not receive that request and received two full data cards.

Beware of the perils and schemes of Nigeria. Several unsuspecting DXers not only received their verifications, but under separate letter received invitations to invest in secure Nigerian financial businesses, requesting first (naturally) your bank account and credit card numbers. This ploy continues to this day, and should be reported to the Diplomatic Security Section of the State Department or an American embassy or consulate.

An equally challenging verification involved Radio Tanzania-Zanzibar. For decades, the manager replied to letters stating the QSLs “were being worked on,” but they never arrived! Finally, several enterprising hobbyists designed and supplied the station with a supply of QSL cards, which continue to be received intermittently. Recently,

one DXer received his prepared card verified, along with a note regarding his request for information on Zanzibar. It shouldn’t surprise you to hear the staffer would gladly send the information, but “it would be nice if you would send me a camera first, I will wait for your reply.”

Liberia of West Africa once was a country easy to hear and verify, prior to the outbreak of civil war in 1996. Recent reports indicate that because of the war the post office in Monrovia is not operating to its full capacity, resulting in mail barely trickling into the country. Because of this, the SIM Mission in Abidjan, Cote d’Ivoire, sends mail to station ELWA once a week in a bulk package. Other war torn countries of Angola, Mozambique and now Sierra Leone, have experienced delays in mail delivery.

Being mindful of a few precautions may save you time, money and patience. Verifications from Africa will vary from the easy to the impossible. Our address directory as well as enclosure suggestions are provided to assist you in your quest, and are current at this time. Corrections and additions are always welcomed. The debate over the use of International Reply Coupons, currency or mint postage stamps continue. (See tips in the September *QSL Address Directory, Monitoring Times*) As a DXer, you will discover by experience the methods that work to your advantage.

Don’t let your lack of linguistic skills deter you from seeking that elusive verification. Language translation software and online services are a boost for reporting. (*QSL Report, Monitoring Times, August 2000*). As a rule, a station that has an English language program, albeit a brief news report, will accept an English report. Obviously, someone comprehends English, and I have used this method with overwhelming results.

Africa offers the DXer a fascinating look into a continent unmatched by others, for better or worse. The radio hobbyist is in a unique position to go beyond the cliches of Hollywood and get to know the real Africa of today.

All reports may be sent in English unless otherwise indicated.

Algeria

(Irregular, 2 IRCs or mint stamps, English accepted, French or Arabic preferred)
Radio Algiers International/ Radio Algerienne
21 Boulevard des Martyrs
Algiers 16000, Algeria

Angola

(Very irregular, 2 IRCs or \$1, Portuguese reports)
Emissora Provincial de Benguela
(when active)
Caixa Postal 19
Benguela, Angola

Emissora Provincial de Bie
(when active)
Caixa Postal 33
Kuito, Bie, Angola

Emissora Provincial de Moxico
(when active)
Caixa Postal 74
Luanda, Angola

Radio Nacional de Angola
Caixa Postal 1329
Luanda, Angola

Ascension Island

(Good. 1-2 IRCs, BBC does not note relay transmitter sites)
(technical only)
BBC World Service/Atlantic relay
English Bay
Ascension Islands, South Atlantic Ocean

Radio Roma/RAI International relay
P.O. Box 320
Correspondence Sector
00100 Rome, Italy

(or) External/Foreign Service
Centro RAI
Saxa Rubra
00188 Rome, Italy

Radio Japan relay
Radio Japan/NHK World
2-2-1 Jinnan
Shibuya-ku
Tokyo 150-8001, Japan

Radio Telefis Eireann/RTE relay
Broadcasting Developments
Dublin 4, Ireland

Voice of America relay
QSL Desk-Irene Green
Room G-759 C
500 Independence Ave., S.W.
Washington, DC 20547 USA

(or) 330 Independence Ave., S.W.
Washington, DC 20547 USA

Benin



(Irregular-fair, 1-2 IRCs, \$1 or mint stamps, French report)
Office de Radiodiffusion et Television du Benin
La Voix de la Revolution
Radio Benin/Radio Parakou
Boite Postal 366
Cotonou, Benin

(or) Radio Parakou
Boite Postal 128
Parakou, Benin

Botswana

(Good, VOA notes transmitter site, mint stamps.
Radio Botswana irregular-fair, 2 IRCs, \$1 or mint stamps)
Radio Botswana
Private Bag 0060
Gaborone, Botswana

Voice of America relay
(see Ascension Island VOA relay USA address)

(technical only)
Voice of America/Botswana relay station
Moepeng Hill
Selebi-Phikwe, Botswana

Burkina Faso

(Irregular, 1-2 IRCs or mint stamps, French report)
Radiodiffusion-Television Burkina/Radio Burkina
Baite Postal 7029
Ouagadougou, Burkina Faso

Cameroon

(Irregular-slow, active CRTV outlets may be verified via registered mail, with \$2 or 2-3 IRCs. English accepted, French report preferred, or by contacting: Mr. James Achanyi-Fontem-Head of Programming-CRTV, Boite Postal 986, Douala, Cameroon)

Cameroon Radio Television Corporation/CRTV
CRTV/Bafoussam
(when active)
Boite Postal 970
Bafoussam, Cameroon

CRTV/Bertoua
(when active)
Boite Postal 230
Bertoua, Cameroon

CRTV/Buea
Private Mail Bag
Buea, Cameroon

CRTV/Douala
(when active)
Boite Postal 986
Douala, Cameroon

CRTV/Garoua
(when active)
Boite Postal 103
Garoua, Cameroon

CRTV/Yoounde
Boite Postal 1634
Yoounde, Cameroon

Central African Republic

(Irregular-rare, mint stamps, French report)
Radio Centriatrique/Radiodiffusion-Television
Centrafrique
Boite Postal 940
Banqui, Central African Republic

Chad



(Irregular-fair, 2 IRCs, or mint stamps, French report)
Radiodiffusion Nationale Tchadienne
Boite Postal 892
N'djamena, Chad

Radio Moudou
(when active)
Boite Postal 122
Moundou, Logone, Chad

Congo/Democratic Republic of

(formerly Zaire)
(Irregular-poor, 2-3 IRCs, \$1 or mint stamps, French report, registered letter may assist reply)

Radio Bukavu
(when active)
Boite Postal 475
Bukavu, Democratic Republic of the Congo

Radio CANDIP Bunia
(formerly Radio La Voix du Peuple & Radio CANDIP)
Boite Postal 373
Bunia, Democratic Republic of the Congo

Radio Kisangani
(when active)
Boite Postal 1745
Kisangani, Democratic Republic of the Congo

Radio Lubumbashi
(when active)
Boite Postal 7296
Lubumbashi, Democratic Republic of the Congo

Radio Television Nationale Congolaise
Boite Postal 3171
Kinshasa-Gombe, Democratic Republic of the Congo

Congo/Republic

(Irregular-poor, \$1, French report, registered letter may assist reply)
Radiodiffusion Nationale Congolaise/Radio Congo
Boite Postal 2241
Brazzaville, Congo

Cote D'Ivoire

(Irregular, 2 IRCs, English accepted, French report preferred)
(when active)
Boite Postal 191
Abidjan 1, Cote d'Ivoire

Egypt (Arab Republic of)

(Irregular-slow reply, 2 IRÉs or mint stamps, no currency)
Egyptian Radio
P.O. Box 1186
11511 Cairo, Egypt

Radio Cairo/Voice of the Arabs
P.O. Box 566
Cairo, 11511 Egypt

(technical only)
Broadcasting Engineering & Propagation Department

Egyptian Radio & Television Union
24 Floor, TV Building (Maspero)
Egyptian Radio & Television Union
P.O. Box 1186
Cairo 11511, Egypt

Equatorial Guinea

(Fair, 1-2 IRCs, \$1 or two USA mint stamps. Spanish preferred for Radio Bata & Radio Malabo with \$1 or mint stamps)
Radio Africa/Radio East Africa
Pan American Broadcasting
20410 Town Center Lane - Suite 200
Cupertino, CA 95014 USA

(technical only)
Apartado 851
Malabo, Isla Biaka, Equatorial Guinea

Radio Nacional de Guinea Ecuatorial/Bata
Apartado 749
Bata, Rio Muni, Equatorial Guinea

Radio Nacional de Guinea Ecuatorial/Malabo
Apartado 195
Malabo, Isla Bioko, Equatorial Guinea

Eritrea (State of)

(Fair, S1 or mint stamps)
Voice of the Broad Masses of Eritrea
Ministry of Information, Radio Division
P.O. Box 872
Asmara, Eritrea

(or) Ministry of Information
Technical Branch
P.O. Box 243
Asmara, Eritrea

Ethiopia

(Poor, S1 or mint stamps)
Radio Ethiopia/Domestic Service
P.O. Box 1020
Addis Ababa, Ethiopia

Radio Ethiopia/External Service
P.O. Box 654
Addis Ababa, Ethiopia

Radio Fana/Radio Torch
P.O. Box 30702
Addis Ababa, Ethiopia

Voice of Peace
Inter-Africa Group
P.O. Box 1631
Addis Ababa, Ethiopia

Voice of the Tigray Revolution
P.O. Box 450
Mek'ele, Tigray, Ethiopia

Gabon

(Fair-slow, 2 IRCs, S1 or mint stamps, French preferred for Afrique Numero Un)
Radio France International relay
116 Avenue du President Kennedy
Boite Postal 9516
F-75016 Paris, France

Afrique Numero Un
Boite Postal 1
Libreville, Gabon

RTV Gabonaise
Boite Postal 10150
Libreville, Gabon

Ghana

(Fair-irregular, mail theft reported, best to send registered, with 1-2 IRCs or mint stamps, no currency)
Ghana Broadcasting Corporation
Broadcasting House

P.O. Box 1633
Accra, Ghana

Guinea (Republic)

(Irregular-fair, S1 or mint stamps, French report)
Radiodiffusion-Television Guineenne
Boite Postal 391
Conakry, Guinea

(or)
D.G.R./ P.T.T.
Boite Postal 33-22
Conakry, Guinea

Kenya

(Good, 1-2 IRCs, S1 or mint stamps, souvenirs available)
(or) Adventist World Radio/Voice of Hope
AWR Africa
P.O. Box 42276
Nairobi, Kenya

Kenya Broadcasting Corporation
P.O. Box 30456
Harry Thuku Road

Lesotho

(Irregular, 1-2 IRCs or mint stamps)
Radio Lesotho
P.O. Box 552
Maseru 100, Lesotho

Liberia

(Irregular, mail may be returned as undeliverable, mint stamps, no currency)
Radio ELBC
(when active)
Liberian Broadcasting System
P.O. Box 10-594
1000 Monrovia 10, Liberia

Radio ELWA
c/o SIM Liberia
08 Boite Postal 886
Abidjan 08, Cote d'Ivoire

Radio Liberia International
Liberian Communications Network/KISS
P.O. Box 1103
1000 Monrovia 10, Liberia

Libya

(Irregular-fair, 1-2 IRCs, no mint stamps or currency)
Libyan Jamahiriyyah Broadcasting
(domestic service)
Box 9333
Soug al Jama, Tripoli, Libya

Voice of Africa/Voice of Libya
P.O. Box 4677
Tripoli, Libya

Madagascar

(Democratic Republic)
(Good for relays, with 1-2 IRCs, souvenirs available. Irregular-slow, Radio Madagasikara, with S1 or mint stamps for French reports)
Adventist World Radio/The Voice of Hope
c/o AWR Europe Region
P.O. Box 383
1-47100 Forli, Italy

Radio Madagasikara
Boite Postal 442
Antananarivo 101, Madagascar

Radio Netherlands relay
P.O. Box 222
1200 JG Hilversum, The Netherlands

(technical only)
Boite Postal 404
Antananarivo, Madagascar

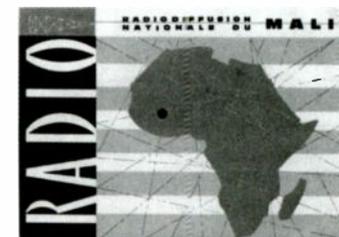
Radio Vlaanderen International relay
B-1043 Brussels
Belgium

Malawi

(Good-fair, mint stamps)
Malawi Broadcasting Corporation
P.O. Box 30133
Chichiri
Blantyre 3, Malawi

Mali

(Republic of)



(Good for relay, no enclosures necessary. Irregular-slow for RTM, with 1-2 IRCs or S1, English or French accepted)
Radiodiffusion Television Malienne
Boite Postal 171
Bamako, Mali

Radio China International relay/Non-Chinese Service
16A Shijingshan Street
Beijing 100040, China

Mauritania



(Islamic Republic of)
(Poor to rare, mint stamps, no currency, French or Arabic reports)
Office de Radiodiffusion Television de Mauritanie
Boite Postal 200
Nauakchott, Republic Islamique de Mauritanie

Morocco

(Good for VOA. Good-fair, 2-3 IRCs or mint stamps, French or Arabic reports, souvenirs available)
Radio Medi Un
Boite Postal 2055
Tanger, Morocco

(or)
3, et 5 rue Emsallah
90000 Tanger, Morocco

(non technical)
78 Avenue Raymond Poincare
F-75016 Paris, France

RDTV Marocaine
RTM
1 Rue Brihi
P.O. Box 1042
Rabat, Morocco

Voice of America relay
(see VOA Ascension Island USA relay address)

Mozambique

(Good, 2 IRCs, or mint stamps for English or Portuguese reports, souvenirs available)
Radio Mocambique/Radio Maputo
(when active)
Rua da Radio no.2
Caixa Postal 2000
Maputo, Mozambique

Namibia

(Irregular, 2 IRCs, souvenirs available)
Radio Namibia/Namibian Broadcasting Corporation
P.O. Box 321
Windhoek 9000, Namibia

Niger

(Irregular, mint stamps for French reports)
La Voix de Sahel
O.R.T.N.

Boite Postal 309
Niamey, Niger

Nigeria

(Federal Republic of)
(Irregular-poor, mail theft reported, 2 IRCs or mint stamps, no currency)
Radio Nigeria/Enugu
Private Mail Bag 1051
Enugu (Anambra)
Nigeria

Radio Nigeria/Ibadan
Broadcasting House
Private Mail Bag 5003
Ibadan, Oyo State, Nigeria

Radio Nigeria/Kaduna
P.O. Box 250
Kaduna (Kaduna), Nigeria

Radio Nigeria/Lagos
Private Mail Bag 12504
Ikoyi, Lagos, Nigeria

Voice of Nigeria
Private Mail Bag 40003 Falomo Post Office
Ikoyi, Lagos, Nigeria

Rwanda

(Republic of)
(Good for relay, 1 IRC, souvenirs available. Radio Rwanda rare - poor, mint stamps, French report.)
Deutsche Welle relay
Raderbergquertel 50
D-50968 Cologne, Germany

Radio Rwanda
Boite Postal 63
Kigali, Rwanda

Sao Tome e Principe

(Good, VOA notes transmitter site)
Voice of America relay
(technical only)
P.O. Box 522
Sao Tome, Sao Tome e Principe

(or)
(see VOA Ascension Island relay USA address)

Senegal

(Irregular-fair, 2 IRCs or mint stamps, French reports)
(when active)
Radiodiffusion Television Senegalaise
Boite Postal 1765
Dakar, Senegal

Seychelles

(Good for relays & FEBA, 1-2 IRCs or S1)
(technical only)
BBC World Service/Indian Ocean relay
P.O. Box 448
Victoria, Mahe, Seychelles

(non technical)
BBC World Service
Strand, London WC2B 4PH, United Kingdom

FEBA Radio/Far East Broadcasting Association
P.O. Box 234
Mahe, Seychelles, Indian Ocean

(or)
FEBA Radio
Ivy Road, Worthing BN14 8BX United Kingdom

IBRA Radio via FEBA
IBRA Radio
S-10536 Stockholm, Sweden

Sierra Leone

(Irregular-fair, mail theft reported, 1-2 IRCs or mint stamps, no currency)
SIBS/Sierra Leone Broadcasting Service
New England, Freetown, Sierra Leone

Somalia

(Very poor. Somali stations are not known to reply. Mail to Somalia is very irregular. Correspondence via non-governmental organizations may be required)
Radio Mogadishu/Voice of the People (Masses)
Radio Hargeisa
Radio Gaalkayco

South Africa

(Republic of)
(Good for all stations, 1-2 IRCs, souvenirs available)
BBC World Service relay
(non technical)
(see BBC World Service address)

Channel Africa
P.O. Box 91313
Auckland Park 2006, Republic of South Africa

Radio Sonder Grense
Posbus 91312
Auckland Park 2006, Republic of South Africa

Sentech/PTY Ltd.
Shortwave Services
Private Bag X06
Honeydew 2040, South Africa

South African Broadcasting Corporation/SABC
Private X1
Auckland Park 2006, Republic of South Africa

Trans World Radio Africa
(non technical)
Private Bag 987
Pretoria 0001, South Africa

(technical only)
(or) Sentech/PTY Ltd. Address
(or) Trans World Radio
International Headquarters
P.O. Box 8700
Cary, NC 27512-8700 USA

World Beacon relay
P.O. Box 651525
Benmore 2010, South Africa

Sudan

(Very irregular-poor, 2 IRCs, no currency, French or Arabic reports)
Sudan National Radio Corporation
P.O. Box 572
Omdurman, Sudan

Swaziland

(Irregular, 2-3 IRCs, mint stamps, souvenirs available)
Swaziland Commercial Radio
(non technical)
P.O. Box 5569
Rivonia 2128, Transvaal, Republic of South Africa

(technical)
P.O. Box 99
Amsterdam 2375, Republic of South Africa

Trans World Radio
P.O. Box 64
Manzini, Switzerland

(or) Private Bag 987, Pretoria 0001, South Africa

Tanzania

(Irregular-fair, 2 IRCs, S1 or mint stamps)
Radio Tanzania
Nyerere Road
P.O. Box 9191
Dar es Salaam, Tanzania

Voice of Tanzania Zanzibar
Department of Broadcasting
Radio Tanzania Zanzibar
P.O. Box 2503
(or) P.O. Box 1178
Zanzibar, Tanzania

Togo

(Fair, 2 IRCs, S1 or mint stamps, English accepted, French preferred)
Radiodiffusion Togalaise
Boite Postal 434
Lome, Togo

Radio Kara
Boite Postal 21
Kara, Togo

Tunisia

(Irregular-fair, 2 IRCs or S1, French or Arabic)
Le Chef de Service du Controle de la Reception de l'Office Nationale de la Television
O.N.T., Cite Ennassim 1
Bourjel
Boite Postal 399
TN-1080 Tunis, Tunisia

(or) Radiodiffusion Television Tunisienne
71 Avenue de la Liberte
TN-1070 Tunis, Tunisia

Uganda

(Poor, mail theft reported, 4 IRCs or S2 (not recommended) self-addressed envelope may assist reply)
Radio Uganda
P.O. Box 2038
Kampala, Uganda

(or) P.O. Box 7142
Kampala, Uganda

Zambia

(Republic)
(Irregular for ZBC, S1-2, recommend registered mail)
Good for Christian Voice, S1 or 1-2 IRCs, souvenirs available)
Zambia National Broadcasting Corporation
ZNBC Broadcasting House
P.O. Box 50015
Lusaka 10101, Zambia

Radio Christian Voice
Private Bag E606
Lusaka, Zambia

(or) Christian Voice USA
15485 Eagles Nest Lane, Suite 220
Miami Lakes, FL 33014 USA

Zimbabwe

(Fair, S1 or mint stamps)
Zimbabwe Broadcasting Corporation
Broadcasting Centre
Packets Hill
P.O. Box HG 444
Highlands, Harare, Zimbabwe

(or) P.O. Box 2271
Highlands, Harare, Zimbabwe

Leo Sarkisian: Music Man of Africa

By Mark B. Lewis

"Listening to VOA Music Man Leo Sarkisian shows that he is a true friend of Africa."

-L'Essor Daily, Bamako, Mali

He is also a man of many parts: broadcaster, artist, illustrator, musician, ethnomusicologist, linguist, lecturer, sound engineer, public relations expert, raconteur.

Multi-talented Leo Sarkisian, 79, one of the oldest broadcasters on the air, is a renowned name on the African continent today. His weekly program on the Voice of America, *Music Time in Africa*, has been on the air 35 years, one of VOA's longest running programs and one of its most popular.

The Voice of America has an estimated worldwide weekly audience of 91 million, according to latest VOA surveys. "Forty percent of VOA's regular listeners are in Africa," survey findings of 1999 reveal – the largest VOA audience in the world. Nigeria, with an estimated 14 million listeners, heads the list of the top 120 countries with the biggest audiences. How many in Africa listen to Sarkisian's program is not known, but it must be in the millions, VOA estimates. What is certain is that his audience mail is one of the largest of any VOA program. He and his wife, Mary, spend Sundays in his office answering stacks of fan mail, always providing promotional material and his photograph.

VOA taps a talent

The son of Armenian immigrants who settled



Sarkisian's audience mail is one of the largest at the VOA

in Lawrence, MA, where he was born and raised. Sarkisian was discovered one day in 1963 by the late legendary CBS broadcaster Edward R. Murrow. It was Murrow's first trip to Africa as director of the U.S. Information Agency, which included Voice of America. Murrow had heard about Sarkisian from USIA's African area director, Edward Roberts.

Sarkisian was happily painting pictures of African faces while standing on a muddy street in Conakry, Guinea. He was there to record indigenous music for a commercial American recording company. Invited to a social event for

Murrow, Sarkisian played recordings of Guinean music, identifying not only each tune but also the instruments used and the villages from where the music came.

Murrow turned to Roberts and said, "We ought to hire him." Roberts agreed to propose the hiring. "Hurry up about it," Murrow commanded. Sarkisian accepted Murrow's job offer immediately because, he said, "I like my country and I knew I could make a contribution."

Soon Sarkisian became the music director of VOA's African Program Center in Monrovia, Liberia, and he began collecting more African music on trips around the continent. Two years later, in 1965, he started writing and producing his *Music Time in Africa* as

a component of VOA's young English-to-Africa Service. In 1969, with the closing of the program center in Liberia because of budget cuts, he came to VOA headquarters in Washington where he continues to produce *Music Time in Africa*.

With European colonization in Africa ending, Murrow had wanted to increase African listenership to VOA and to other VOA programs such as news, by showing America's interest in and respect for African culture. The unique format of Sarkisian's show fit that objective. Sarkisian played only African music, traditional and contemporary. The same format is followed today, a

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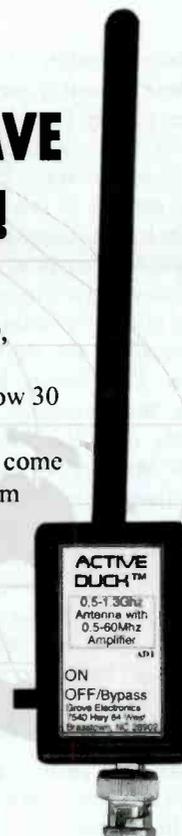
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half-hour of traditional music first and another half-hour of contemporary music 90 minutes later – every Sunday. The original impulse behind this formula remains and it's worked.

"Your interest in African culture is an inspiration and lets us know you have feelings for the black race," said a recent letter from Ghana to Sarkisian – a typical reaction.

Today, Sarkisian is perhaps the most admired goodwill ambassador for the Voice of America and the United States throughout Africa. You can see his photograph in villages, marketplaces, government offices, schools, radio stations and on buses. "VOA's Music Man for Africa," many of them say. Or "Simply the Best," with a picture of Sarkisian and the host and announcer of his program since 1978, Rita Rochelle, a beautiful African-American broadcast professional whose personality matches her friendly voice. She calls Sarkisian a "hard taskmaster but a true Renaissance man."

Cultural ambassador to two continents

Sarkisian didn't begin his career as a broadcaster. He was an artist first, attending the Vesper George School of Art in Boston as a young student. He won a scholarship to the school when his sketches and drawings were examined. Then he became a successful freelance illustrator for magazine and advertising campaigns.

He switched to music as his primary field when a Hollywood recording company, Tempo International, offered him a steady job and trained him to be a sound engineer. "One of the best engineers and record producers in the business and master linguist to boot!" according to an assessment by former Tempo President Irving Fogel after Sarkisian showed what he could do overseas.

In the 1950s, Tempo sent Leo and wife Mary to record music in Asia and Africa. Bouncing around in jeeps, they spent 10 years in cities and remote villages of India, Pakistan, Afghanistan and West Africa and brought back recordings of authentic music for American films and TV such as few Americans had ever heard.

"Close scrapes? I remember the city of Peshawar, the old bazaar," said Irving Fogel. "We taped the cries of beggars and the babble of the crowd, and only the miracle of our Polaroid saved up from a gang of knife-wielders who had us backed against a wall – and while Leo tried to stall them in Hindustani, I snapped their picture, pulled a print and handed it to the leader who then requested that 'we work more magic'!" Sarkisian also speaks Turkish, Armenian, Arabic, French, and Persian.

The work abroad with Tempo launched Sarkisian as an ethnomusicologist. Over the years, he has collected and helped to preserve Africa's musical heritage by adding to his collection of recorded ethnic music – now one of the most valuable in the world. He has shared this music with African radio stations and with American organizations seeking authentic African music, such as the Smithsonian Institution.

His later travels in Africa for VOA had still another impact. Impressed by the variety of expressions on the many faces he saw, Sarkisian resumed painting, drawing on his artistic training. He created a series of portraits of Africans for an exhibition called "Faces of Africa," and they have traveled to national museums and universities across the



Program announcer Rita Rochelle. Photo credit: Leo Sarkisian

continent, as well as being exhibited in U.S. arts centers. These days, he continues painting African faces during his trips to Africa to record music for his VOA program.

On his travels to Africa, past and present, Sarkisian also lectures in schools and universities about African music and black American music. The American Embassy in Addis Ababa, Ethiopia, in a message to Washington, said "Sarkisian's impact on the local scene was so great that even after his departure the media continue to feature material on his visit. Local radio broadcast for the second time his lectures on African music and black American music."

He is also an accomplished musician; he played the clarinet in his high school band. He performs regularly today in Washington, DC, on the Kanun, a 74-string horizontal harp known throughout North and East Africa. He plays frequently at ethnic folk festivals in the United States.

Transcending all his talents, Sarkisian has two overarching characteristics: (1) the ability to touch people and to relate to all peoples, and (2) contagious enthusiasm. Whether on the air interviewing visiting African poets, scholars, musicians or cabinet ministers as part of his regular music program, or when lecturing in educational settings, or when traveling in Africa, these two traits are the essence of Leo Sarkisian. He simply loves what he does and shows it. During recording sessions in his VOA studio, as the engineer plays the African tunes Sarkisian has chosen, he is jumping and dancing to the music, waving his arms, humming loudly to the music.

Rita Rochelle begins the program like this every week: "It's Music Time in Africa! A very good Sunday evening to you. I'm Rita Rochelle and this is *Music Time in Africa* on VOA's Africa service. This is today's first edition of our program featuring the best in African music on recordings, specially selected and prepared for us by my colleague, your VOA Music man for Africa, Leo Sarkisian." Then, introducing each tune, Rita identifies the origin, the musicians and the instruments, based on Sarkisian's meticulous research. Other than music with an anti-apartheid message that Sarkisian used before Nelson Mandela's Presidency in South Africa, Sarkisian's program avoids African politics.

Although beamed primarily to Africa, *Music Time in Africa* is heard around the world in English; fan letters come from Russia, Scandinavia, Cuba, India and New Zealand. Sarkisian defines his program as "the practice of cultural diplomacy."

Edward R. Murrow surely made an important discovery when he found and hired this short, bald, mustached, unpretentious Armenian-American bundle of uncommon energy with gleaming dark eyes and a Boston accent. The newspaper in Mali that called Sarkisian "a true friend of Africa" had it right, too. He turned 79 on January 4th, 2000 – the dawn of the new millennium. His inspirational beat goes on.

Footnotes:

A portion of this article first appeared in the Feb 2000 edition of *The Beat* magazine.

Mark Lewis is a retired Foreign Service Officer who served in the Middle East, India and Africa, and was Assistant Director of USIA in charge of African Programs.

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Monitoring with Vintage Ears – Putting a Pilot A.C. Super Wasp Through its Paces

By Marc Ellis

Even though the column I regularly write for *MT* is about restoring vintage radios, this is, after all, a magazine about *monitoring*. So I queried the editorial powers that be to see if an article about monitoring with a vintage radio might be of interest. They were enthusiastic and I decided that my receiver of choice would be a Pilot A.C. *Super Wasp*. This is a set that dates back to the late 20s, which was the era when interest in the shortwave bands was heightening among both radio amateurs and shortwave listeners.

I've had the receiver since the mid 1980s, and I documented the serious restoration I performed on it in a series of articles for my old "Antique Radio" column in *Popular Electronics* magazine. (July through November 1989; July and May, 1990.) One thing I never did, beyond an initial test, was to use it for some serious listening. This set is a true curio, and I think you'll enjoy being introduced to it.

Some Historical Background

The Pilot radio kits were products of the prolific Pilot Electrical Manufacturing Company (later the Pilot Radio and Tube Corporation), first organized in 1922. The firm manufactured almost every part used in its products, and was known for the careful engineering and fine workmanship of its components. Pilot produced a variety of models during the early broadcast boom era, but the first product aimed at the amateur radio and shortwave listener was the *Wasp*, introduced in 1928.

The *Wasp* was of conventional design, in-

corporating a regenerative detector followed by two stages of audio, using the ubiquitous 01-A tubes. But it was also one of the first "allwave" (broadcast band plus short wave) kits on the market. Using a set of five plug-in coils, it covered a range of 17 to 500 meters (600 kHz to

about 18 MHz). The *Wasp* doesn't seem to have made much of a splash. It isn't mentioned a lot in the early literature and, since few units seem to have been sold, the set is fairly rare today.

It was quite a different story with the later *Super Wasp* and its almost immediate successor, the A.C. *Super Wasp*, both of which hit the market in 1929. These sets eliminated a couple of the most aggravating problems associated with the sensitive, yet-cranky, regenerative detector: (1) interaction between the detector and the antenna, causing unexpected dead spots in the tuning as well as instability as the antenna swayed in the wind and (2) radiation of a signal that interfered with neighboring receivers whenever the detector was placed into oscillation.

Both of these effects could be minimized by the introduction of a stage of r.f. amplification ahead of the detector. This was a strategy often used with

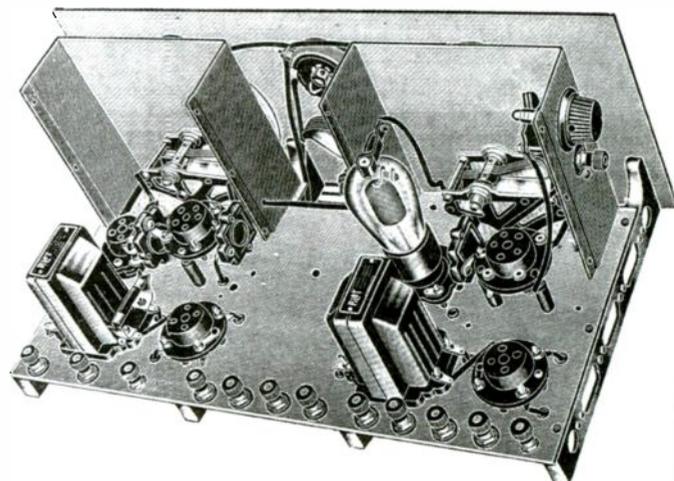
broadcast receivers, but the common triode tubes of the era would not work well at shortwave frequencies. When the first screen grid tube (the battery-operated type 22) became available, radio manufacturers were quick to take advantage of its excellent shortwave performance. The tube began to appear as a broadband r.f. amplifier in sets with regenerative detectors.

The Pilot *Super Wasp* had a type 22 r.f. amplifier – but with a difference. Its r.f. stage was not broadbanded but *tuned*, significantly enhancing selectivity and sensitivity. According to the hype in a 1929 Pilot ad, this was "The only Short-Wave Receiver having a stage of Tuned R.F. with Screen-Grid Tube, giving greatest Sensitivity and Selectivity." Whether or not Pilot had an exclusive here, the set caught on quickly and began selling very well. Its tuning range (using two sets of five plug-in coils) was 14 to 500 meters.

But almost as soon as the *Super Wasp* appeared, RCA released some new tube types designed to be lit from an a.c. source rather than batteries. This made it possible to produce ra-



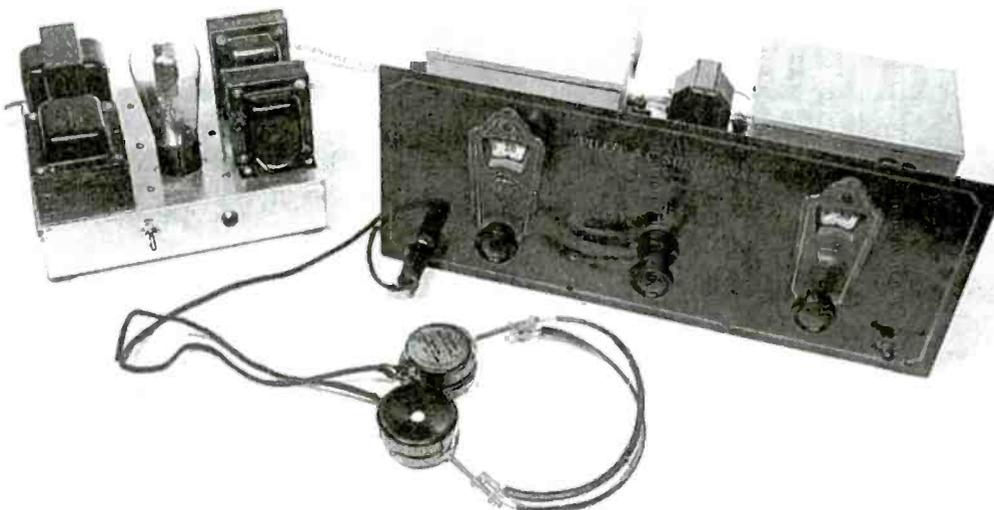
The A.C. Super Wasp's trim metal front panel has illuminated dials, simulated wood-grain finish. Cabinet was not included with set.



Isometric view of chassis shows that many components were surface mounted "breadboard" style. Antenna post is mounted on side of right-hand shield, with antenna trimmer knob directly above.

dios that could be powered from a household wall socket. Pilot immediately jumped on the a.c. bandwagon with the release of the *A.C. Super Wasp*, which used the newly-introduced tubes. It incorporated a type 24 screen-grid tube as r.f. amplifier and type 27 triodes as regenerative detector and audio amplifiers. Pilot offered a proprietary power pack, the K-111, to provide operating voltages for this set, but of course the radio amateur/experimenter was free to build his own.

The *Super Wasp* and *A.C. Super Wasp* were certainly among the most beloved and widely used shortwave receivers of their era. They turn up frequently in vintage photographs of ham shacks and listening posts. Though the *Universal Super Wasp* of 1931 incorporated many improvements, including a bandswitching arrange-



Shot from my original Popular Electronics restoration article shows set as it was set up for testing. Power supply is home built, but based on Pilot K111 circuitry.

ment that eliminated the plug-in coils, it never achieved the popularity of its predecessors. Probably because of its much higher cost.

A Look Inside the A.C. Super Wasp

Luckily, the Pilot firm and various publications of the time left us with some excellent drawings of the *Wasp* products. I'm including a cut of the *A.C. Super Wasp* front panel as well as a

kind of isometric view of the partially assembled chassis. These are reproduced from Alan Douglas' *Radio Manufacturers of the 1920s*, Volume 2 (Sonoran Publishing, 116 N. Roosevelt Suite 121, Chandler, AZ 85226). As you can see, the construction style might be called "transitional." Though a chassis and panel is used, most of the components are surface-mounted on the chassis much as they would be on a

wooden breadboard.

In the isometric view, the backs of the two shielded enclosures are not yet installed. The enclosure at left is for the regenerative detector; the one at right for the tuned r.f. amplifier. Each enclosure has two sockets: one for the tube and the other for the coil. The 24-A tube (note grid cap) is seen installed in the amplifier enclosure.

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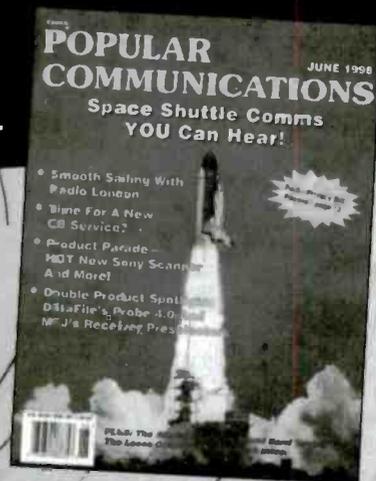
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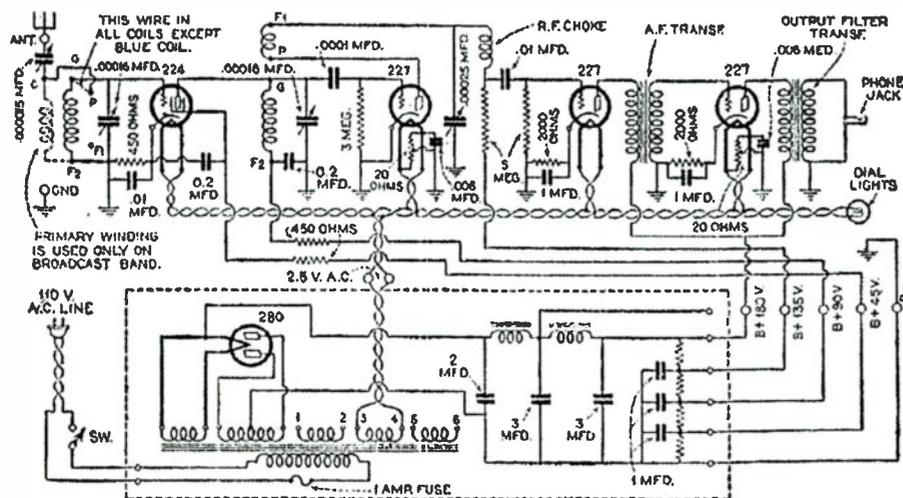
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The set's circuitry was fairly conventional. See text for key details.

the schematic diagram for this receiver. The version I have here also includes the K111 power pack (lower half of the drawing). The K111 is not part of the receiver, but is shown connected to it via a set of binding posts. These are the same posts you see lined up along the back of the chassis in the isometric view.

Looking at the receiver circuit proper, from left to right, you see the r.f. amplifier stage with its type 24 (224 in vintage parlance) screen grid tube followed by the regenerative detector and two stages of audio amplification – all using type 27 triodes. Notice the “tickler” coil (just under the designation “F1”) in the detector stage.

The tickler feeds back part of the energy from the plate circuit of the detector tube back into the grid circuit via the grid coil (seen just below the tickler). This creates a feedback loop that amplifies the received signal manyfold, the process we call regeneration. The amount of feedback is regulated by the regeneration control, a variable capacitor you’ll see connected between one side of the tickler and ground. Too much feedback and the detector breaks into oscillation and out-of-control feedback analogous to the howl of an improperly adjusted PA system.

The audio output of the radio, fed to the phone jack shown, doesn’t have quite enough “kick” to operate a speaker. However, experience shows that the signal can be uncomfortably loud in the phones!

The Listening Test

I set up the test in a new garden shed/radio shack now under construction in my back yard. The shack is on the second floor of this building, which is still in an unfinished and cluttered state. However, I was able to set up a card table with the Pilot, its power supply and a set of phones. Though I don’t have a permanent antenna and ground installed yet, I did run a 30-foot antenna wire straight up into a convenient tree, using a pulley and rope I had installed for

the permanent antenna installation to come. For the ground, I used the shed’s electric wiring, which fortunately has been completed to the point where that is possible.

Rather than take the time to drag my Polaroid-back view camera up a ladder to get the picture and then find a good angle amidst the construction clutter, I decided to include a shot from the old *Popular Electronics* restoration series (May 1990 issue). The present test setup looked *exactly* like that (see page 23).

Tuning a vintage regenerative receiver is something of a tricky business. And since this one has a tuned r.f. amplifier, there are two knobs, not one, that must be adjusted to capture the station. Then there are the antenna trimmer, whose setting occasionally needs to be peaked as the tuning changes, and the regeneration control which, for maximum sensitivity, needs to be adjusted just below the point at which the detector breaks into oscillation. All four of these controls can interact, requiring constant tweaking for best reception as the set is tuned.

I started with the broadcast-band coils (220 to 500 meters) in place just to begin with something easy. But I heard very little at first. Quickly checking the several power-supply voltages (an easy job with the exposed binding post connections), I found everything ok. The problem turned out to be nothing more than corrosion that had formed on the phone jack during the Pilot’s 10-year period of disuse. An accidental twist of the phone plug brought a broadcast station booming in with ear-splitting volume.

I began listening in earnest about 0130 UTC and conducted the test for about two and a half hours. This is probably a laughably short time for a serious SWLer. But if you keep in mind that I’m really a restoration technician checking out the results of my work, maybe you will be less disposed to snicker at what might seem to be a perfunctory approach!

I had thought of trying for some BCB DX,

but the stations were not separating well – and some of them were strong enough to choke and distort the ultra-sensitive regenerative circuitry. Weak signals would be better. I spent about 20 minutes with the next set of coils (99.3 to 202 meters, or about 1500 kHz to 3 MHz), but couldn’t hear much of anything. There was quite a bit more action with the following set (51.2 to 101 meters, or about 3 to 6 MHz) – primarily amateur radio stations on the 75- and 80-meter bands. The CW signals came through nicely with the regeneration control set just at the point of oscillation. It was also possible to make the “Donald Duck” chatter of the single sideband voice signals intelligible through judicious manipulation of the regeneration and tuning controls. I was surprised that this could be done!

Moving up to the 27.1 to 53 meter set (about 5.75 to 11 MHz), I heard quite a number of strong English speaking stations near the lower end of the range. There seemed to be a lot of religious bombast and some political talk shows. Several of the voices sounded Canadian, but though I listened long I heard no station IDs. If the IDs were going to come only on the hour or the half-hour, it wasn’t going to be practical to listen for them, so I decided to move on.

By the way, it’s really easy to overlook signals when tuning a regenerative set like this. Often signals that are hardly a whisper in the headphones will come booming in loud and clear with small adjustments of tuning or regeneration. It takes a lot of concentration to catch everything. And, the process certainly makes one appreciate the automatic volume control in later receivers! When straining to hear a whisper through the earphones, it’s just a little disorienting to have a small movement of the regen control or tuning dial bring in a great big signal!

The top tuning range (14.2 to 28 meters or about 10.75 to 21 MHz) was most interesting to me because I got a couple of solid IDs. I was able to identify the English speaking broadcasts from Radio Deutsche Welle and Radio New Zealand. Though the *A.C. Super Wasp’s* dials are not directly calibrated in frequency, the dial positions were certainly consistent with the published frequencies (13720 kHz and 17675 kHz, respectively) in *MT’s* “Shortwave Guide.” I’m sure no expert SWL would consider these strong signals to be prime catches – but I really enjoyed being able to pull them in with the old set and being able to verify them with *MT’s* documentation.

Thus ends my adventures in listening with the *A.C. Super Wasp*. And a fascinating experience it was. But all in all, though I love bringing vintage radios back to life, I believe I’d prefer something a little more modern for any serious SWLing!

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ATS-818	RCV 7	\$149.95
ATS-818ACS	RCV 9	\$219.95
ATS-909	RCV 8	\$245.95
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KAITO

KA-007 Free-Power	RCV 36	\$35.00
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WINRADIO

WR-1550 (External)	RCV 47-E	\$549.95
WR-1550 (Internal)	RCV 47-I	\$499.95
WR-3150 (External)	RCV 48-E	\$1849.95
WR-3150 (Internal)	RCV 48-I	\$1849.95

Shipping/Handling Charges

Total Order	Shipping Charges
\$1-\$99	\$5.95
\$100-\$399	\$7.95
\$400-\$899	\$11.95
\$900-\$1500	\$15.95

*price includes shipping within the US

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Satellit 800 Millennium	RCV 33	\$514.95*
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TENTEC

RX340	RCV23	\$3950.00
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R8-B	RCV 3	\$1159.95*
SW-8A	RCV 19	\$759.95

FREEPLAY (BAYGEN)

FPR2S GSW	RCV 35	\$79.95
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JAPAN RADIO COMPANY

NRD-545	RCV 21	\$1799.95
NRD-345	RCV 1	\$579.95

GE

SUPERADIO III	RCV 5	\$59.95
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PALSTAR

R30	RCV 18	\$495.95
R30 w/ Collins filter	RCV18C	\$549.95

REALISTIC

Weather Alert	RCV 26	\$57.95
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ANTENNAS

Active Duck	ANT 36	\$49.95
Grove Min-Skywire	ANT 3	\$19.95
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H800 Skymatch	ANT 15	\$129.95*
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Super Select-A-Tenna	ANT 40	\$189.95
Sony AN-LP1	ANT 26	\$89.95
Stoner-Dymek DA100E	ANT 24	\$184.95
Universal Reel	ANT 16	\$14.95

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Chicago Area Frequency Profile

Courtesy of Chicago Area Radio Monitoring Association (CARMA)
via Ted and Kim Moran

www.theramp.net/shabec/carma.htm

Chicago Police Department Radio Communications Systems

CITYWIDE RADIO CHANNELS

CW#	FREQ	ZONE	USE
CW1	460.125	(173.8)	AUTO ACCDNT, TRAFFIC, GANGS, HOUSING, CTA
CW2	460.175	(123.0)	DETECTIVES, CANINE, MOUNTED, DEPUTIES, IAD, VICE, ET'S
CW3	460.275	(141.3)	WANTED FLASHES, MAINTENANCE, FILMS, ADMIN
CW4	460.325	(192.8)	HUMAN RELATIONS, SCHOOLS, YOUTH, MARINE
CW5	460.350	(097.4)	SUBWAY COMM SYSTEM / EMER OR EVENT SECONDARY
CW6	460.250	(162.3)	EMER OR EVENT PRIMARY / ALTERNATE ZONE DISPATCH
CW7	460.300	(131.8)	COMMAND, PHONE PATCH, PAGERS, BEEPERS
CW8	460.525	(179.9)	CHANNEL "FIVE" SIMPLEX UNIT TO UNIT SHORT RANGE

ZONE DISPATCH CHANNELS

ZONE	FREQ	ZONE	DISTRICTS
Z01	460.475	(107.2)	16TH / 17TH
Z02	460.050	(127.3)	19TH / 23RD
Z03	460.225	(110.9)	13TH / 14TH
Z04	460.150	(114.8)	1ST / 18TH
Z05	460.500	(167.9)	2ND / 21ST
Z06	460.400	(156.7)	7TH / 8TH
Z07	460.075	(146.2)	3RD
Z08	460.200	(136.5)	4TH / 6TH
Z09	460.025	(091.5)	5TH / 22ND
Z10	460.100	(151.4)	10TH / 11TH
Z11	460.375	(186.2)	20TH / 24TH
Z12	460.425	(094.8)	15TH / 25TH
Z13	460.450	(103.5)	9TH / 12TH

SPECIALIZED UNITS

472.9375	MASS TRANSIT (127.3)
155.370	POINT AID (000.0)
155.475	ISPERN RADIOS F1 (000.0)
154.650	ISPERN RADIOS F2 (000.0)
156.000	AID WITH METRO ENFORCEMENT GROUPS (000.0) (DEFUNCT?)

TRUNKED SYSTEM

OUTPUTS:	856.9375	857.9375	858.9375	859.9375	860.9375	865.8875
	865.9125					
INPUTS:	811.9375	812.9375	813.9375	814.9375	815.9375	820.8875
	820.9125					

DATA SYSTEM

865.9375	865.9625	866.1875	866.2125	866.3375	866.5625	866.5875
866.6750	866.8125	867.1000	867.1750	867.5375	867.6375	867.6500
867.7375	867.7625	868.1000	868.2250	868.3000	868.3250	868.3500
868.5750	868.6750	868.7250	868.8000	868.8250		

CPD SERVICE CODES

1	PUBLIC DISTURBANCE	A	NOT BONAFIDE
2	TEEN DISTURBANCE	B	NO PERSON FOUND
3	DRUNK DISTURBANCE	C	NO SUCH ADDRESS
4	NOISE DISTURBANCE	D	GONE ON ARRIVAL
5	STREET DISTURBANCE	E	OFFENDER GONE
6	ILLEGAL PARKING	F	PEACE RESTORED
7	SICK REMOVAL	G	ADVISED WARRANT
8	INJURED PERSON	H	ADVISED RECONTACT
9	PERSON DOWN	I	TO HOSPITAL
10	DOG BITE	J	RETURNED TO HOME
11	SUSPICIOUS PERSON	K	TAKEN TO DISTRICT
12	CALL FOR HELP	L	INFO REPORT
13	LOST PERSON FOUND	M	TRAFFIC CITATION
14	ALARM	N	SUMMONS
15	AMBULANCE	O	ADVISED LEGAL HELP
16	FIRE CALL	P	OTHER SERVICE

17	ESCORT	R	ARREST
18	TRAFFIC ACCIDENT	X	MISC INCIDENT
19	OTHER MISC INCIDENT	Y	ANIMAL BITE INFO

Chicago Fire Department Radio Systems:

CH	OUTPUT	INPUT	CTCSS	COMMENTS
F1	154.130	153.950	(156.7)	MAIN - NORTHSIDE DISPATCH REPEATER
F2	153.770	154.010	(156.7)	ENGLEWOOD - SOUTHSIDE DISPATCH REPEATER
F3	154.220	154.220	(156.7)	ADMINISTRATIVE SIMPLEX
F4	153.830	153.830	(156.7)	FIREGROUND PRIMARY SIMPLEX
F5	154.385	154.385	(156.7)	COMMAND CHANNEL SIMPLEX
F6	154.295	154.295	(156.7)	ALT. FIREGROUND / EXECUTIVE CHANNEL SIMPLEX
F7	154.265	154.265	(156.7)	NIFERN / MABAS FIRE AID SIMPLEX
F8	154.280	154.280	(156.7)	SOUTH SUBURBAN FIRE AID NETWORK SIMPLEX
F1	119.250	119.250	(AM)	OHARE CRASH TRUCKS TO TOWER (EMERGENCY)
F2	121.900	121.900	(AM)	OHARE CRASH TRUCKS TO TOWER (GROUND)
F3	121.750	121.750	(AM)	OHARE CRASH TRUCKS TO TOWER (GROUND)
F4	132.700	132.700	(AM)	OHARE CRASH TRUCKS TO TOWER (TOWER ALT.)
F1	121.300	121.300	(AM)	MEIGS CRASH TRUCKS TO TOWER (TOWER)
F2	121.800	121.800	(AM)	MEIGS CRASH TRUCKS TO TOWER (GROUND)
F1	121.650	121.650	(AM)	MIDWAY CRASH TRUCKS TO TOWER (GROUND)
	155.025	155.025	000.0	ESDA/TEMA ESMARN CIVIL DEFENSE / AID
	158.895	158.895	203.5	SHOPS
	460.575	465.575	107.2	AMERICAN RED CROSS DISASTER SERVICES
	461.500	466.500	146.2	SALVATION ARMY FIRE CANTEN SERVICE REPEATER
	851.9125	806.9125	D703	BECMA / AID / PHONE PATCH
F1	851.9125	806.9125	000.0	COMMUNICATIONS RELAYS / LINKS
F2	851.9375	806.9375	000.0	COMMUNICATIONS RELAYS / LINKS
F3	852.8625	807.8625	000.0	COMMUNICATIONS RELAYS / LINKS
F4	852.9125	807.9125	000.0	COMMUNICATIONS RELAYS / LINKS
F5	852.9375	807.9375	000.0	COMMUNICATIONS RELAYS / LINKS

EMS Services

F1	460.600	465.600	156.7	EMS NORTH DISPATCH
F2	460.625	465.625	156.7	EMS SOUTH DISPATCH
F3	462.950	467.950	156.7	EMS PRIMARY ALTERNATE REPEATER "DATA"
F4	462.975	467.975	156.7	EMS SECONDARY ALTERNATE REPEATER "COMMAND"
F5	458.025	458.025	203.5	SPECIAL EVENTS CHANNEL 5
F6	458.075	458.075	210.7	SPECIAL EVENTS CHANNEL 6
F7	458.125	458.125	218.1	SPECIAL EVENTS CHANNEL 7
F8	458.175	458.175	225.7	SPECIAL EVENTS CHANNEL 8

(Note: not all EMS rigs/portables have channels 5-8 installed)

EMS -TO-	HOSPITALS:			
MED1	463.000	468.000	VARIES	ALS HOSPITAL WORKING CHANNEL (DUPLX)



Harry Baughn

MED2	463.025	468.025	VARIES	ALS HOSPITAL WORKING CHANNEL (DUPLX)
MED3	463.050	468.050	VARIES	ALS HOSPITAL WORKING CHANNEL (DUPLX)
MED4	463.075	468.075	VARIES	ALS HOSPITAL WORKING CHANNEL (DUPLX)
MED5	463.100	468.100	VARIES	ALS HOSPITAL WORKING CHANNEL (DUPLX)
MED6	463.125	468.125	VARIES	ALS HOSPITAL WORKING CHANNEL (DUPLX)
ME07	463.150	468.150	VARIES	ALS HOSPITAL WORKING CHANNEL (DUPLX)
ME08	463.175	468.175	VARIES	COORDINATION / ASSIGNING CHANNEL / CALLING / ALT.
MERCI	155.400	155.400	VARIES	MERCI400 NORTH BLS TRANSPORTS
MERCI	155.340	155.340	VARIES	MERCI340 SOUTH BLS TRANSPORTS

City of Chicago Local Government Services

DEPT OF TRANSPORTATION / STREETS AND SANITATION:

453.650	(107.2)	F1	Streets & Sanitation / Snow Command North
453.725	(107.2)	F2	Streets & Sanitation / Forestry / Animal Control
453.775	(107.2)	F3	Streets & Sanitation / Police Towing
453.825	(107.2)	F4	Streets & Sanitation / Human Service / Parking Enforcement Teams /

BUILDING INSPECTORS / ENVIRONMENTAL CONTROL / MISC. AGENCIES

453.975	(107.2)	F5	Streets & Sanitation / Bureau of Electricity / Fire Alarm Repairs / Snow
453.675	(107.2)	F6	Streets & Sanitation / Sewer Crews / Traffic Signals / Heating Compliance
453.500	(000.0)	F7	Streets & Sanitation / City Pagers
453.550	(107.2)	F8	Streets & Sanitation / Snow Command South / Rodent Control
453.750	(107.2)	F9	Streets & Sanitation / Human Resources
853.2125	Unkn	F10	Streets & Sanitation Radio Technicians
453.625	(107.2)		City Pagers
158.250	(D412)		Water Department South
158.880	(D411)		Water Department North
453.9625			Water Department Plant Ops
453.050	(127.3)		McCormick Place Operations, Other Agencies
453.100	(107.2)		City Supervisors & Telephone Technicians

STREETS & SANITATION / SNOW COMMAND IDENTIFIERS:

District 1	Northwest, District 4, South & Southwest
District 2	North & Near North, District 5, Southeast, some Southwest
District 3	North & South Central

R1	Wacker Drive Parking Area
R2	First Ward (Downtown)
R3	Snow Command
Q1	Dispatchers
Q2	Commissioners
Q3	Engineers
Q4	Tire Shop
Q5	Motor Pool
Q6	Motor Truck Drivers West
Q7	Motor Truck Drivers North
Q8	Motor Truck Drivers South
Q9	Chaffeurs
Q10	Security

CHICAGO PARK DISTRICT:

F1	151.190 out / 159.360 in	(127.3)	Operations North
F2	151.295 out / 159.400 in	(127.3)	Operations South
	151.295 Simplex	(173.8)	Soldiers Field
	45.92 Simplex	(000.0)	Lakefront Lifeguard Supervisors
	458.1125 Simplex		PA Systems Techs / Relays - Grant Park
	458.3125 Simplex		PA Systems Techs / Relays - Grant Park

LINCOLN PARK ZOO EVENT RADIOS:

F1	151.190 out / 159.360 in	(114.8)	Security / Maint / Engr / Show Coord / Night Capt / Zone Capt
F2	151.295 out / 159.400 in	(114.8)	Lion House / Night Keeper
F3	151.655 Simplex		Zoo Programs
F4	151.715 Simplex		Zoo Foods / Concessions
F5	151.755 Simplex		Retail Outlets
F6	151.835 Simplex		Zoo Parking
F7	151.955 Simplex		Zoo H.O.T. Events
F8	154.540 Simplex		Zoo Ice Carving
F9	151.895 Simplex		Zoo Aux. Channel

CHICAGO BOARD OF EDUCATION:

Trunked:	861.5375, 861.9375, 862.4375, 862.8375, 863.3375, 863.7375, 864.2375, 864.6375, 865.1375, 865.5375
Misc. Use:	471.6625, 472.8875, 461.050, 457.600, 154.100, 153.110, 465.000
City Colleges:	860.2375, 860.9875, 151.625
Univ of Chgo:	464.525 Campus Police (131.8)

METROPOLITAN FAIR AND EXPOSITION AUTHORITY:

(Manages Chicago's new "Museum Campus Area" on the Lakefront Downtown - Navy Pier, McCormick Place, etc.)

AGENCY RADIOS:

01	452.5375	Rptr	D621	Mechanics
01	452.5375	Smx	D261	Alternate F1 (Some Radios)
02	461.1125	Rptr	D261	Entertainment / Ferris Wheel
03	451.9875	Rptr	D261	Housekeeping, Grounds
04	453.0500	Rptr	107.2	East Central - MFEA Security
04	453.0500	Smx	127.3	Alternate F4 (Some Radios)
05	462.0500	Rptr	D331	Food Services & Bars
05	461.8250	Rptr	110.9	Alternate F5 (Some Radios) - Pier Management
06	464.9250	Rptr	D251	McCormick Property Management / Navy Pier Trolleys / Pier Security
07	462.1625	Rptr	D261	Building Engineers and Electricians
08	Scan	Scan	Scan List	
09	453.0500	Smx	127.3	Simplex on Channel 4 (Some Radios may be Rptr)
10	453.8500	Rptr	127.3	North Central
11	452.5375	Smx	D261	Simplex on Channel 1 (Some Radios may be Rptr)
12	Unknown			
13	464.2875	Rptr	D261	South Central Control

Other Area Frequencies

121.3000	Smx	(AM)	Meigs Field Tower
151.9550	Smx	Unkn	Former use by Spirit of Chicago cruise ship at Navy Pier
154.6000	Smx	Unkn	Metropolitan Fair & Exposition Authority licensed here
154.6500	Smx	Unkn	Odyssey Cruise Ship, former use
156.4250	Smx	000.0	Marine Channel 68 - Monroe Harbor Tenders / Columbia Yacht Club
156.4500	Smx	000.0	Marine Channel 9 - Great Lakes Calling Channel
156.6000	Smx	000.0	Marine Channel 12 - Chgo Dept of Transportation Bridge Operations
156.6500	Smx	000.0	Marine Channel 13 - Chicago Locks Calling Channel / Navigation
156.7000	Smx	000.0	Marine Channel 14 - Chicago Locks Working Channel
156.8000	Smx	000.0	Marine Channel 16 - Emergency Calling / USCG
157.0250	Smx	000.0	Marine Channel 80A - Wendella & Skyline Boat Tours
453.9625	Rptr	Unkn	Water Filtration/Navy Pier
462.1125	Unkn	Unkn	Contractors at Navy Pier
462.5625	Smx	Unkn	Reported use at Yacht Club
462.6750	Unkn	Unkn	Reported use aboard Yacht
464.2250	Smx	Unkn	Shedd Aquarium
464.3250	Smx	Unkn	Shedd Aquarium
464.4250	Smx	Unkn	Shedd Aquarium
464.4750	Rptr	Unkn	Field Museum Security
464.5000	Smx	Unkn	Former use at Navy Pier for Laser Shows / Taste of Chgo operations
464.5500	Smx	Unkn	Widow Newton's Tavern at Navy Pier
464.0250	Unkn	Unkn	Dock Operations at Navy Pier
464.9250	Smx	Unkn	Field Museum Maintenance
464.9500	Unkn	Unkn	Former Use at Skyline Stage at Navy Pier
465.5250	Smx	Unkn	Chgo Fire Dept EMS Supervisors at Taste of Chicago
467.7625	Smx	Unkn	Spirit of Chicago Cruise Ship at Navy Pier
467.8125	Smx	Unkn	Former use by Fireworks Techs on barges
467.8500	Smx	Unkn	Food Concessions at Navy Pier
468.1125	Smx	Unkn	Plumbers at Navy Pier
468.7125	Smx	Unkn	Active, use undetermined, Navy Pier
469.0125	Smx	Unkn	Security Operations, site not determined
469.3875	Smx	Unkn	Skyline Stage Information Booth Navy Pier
469.5500	Smx	Unkn	Taste of Chicago operations
469.8750	Smx	74.4	Adler Planetarium Security
471.9375	Rptr	Unkn	Art Institute
472.2125	Rptr	Unkn	Art Institute
472.9375	Rptr	127.3	Transportation Department (CPD Mass Transit Bus Detail)

CTA Rapid Transit

470.9875	CTA RAIL CONTROL AND EMERGENCY
471.0375	BLUE LINE EL - OHARE-FOREST PARK-CERMACK
471.0625	GREEN LINE EL - LAKE / ORANGE LINE EL - MIDWAY
471.0875	PURPLE LINE EL - EVANSTON / BROWN LINE EL - RAVENSWOOD / YELLOW LINE EL - SKOKIE
471.1125	RED LINE EL - HOWARD-DAN RYAN

CTA BUS OPERATIONS

153.740	BUS SIGNPOSTS
453.225	CITYWIDE CALLING & EMER
453.275	VOICE PAGING
453.325	VOICE PAGERS
453.375	SOUTH BUS GARAGES
453.425	SOUTHWEST BUS GARAGES
453.475	WEST BUS GARAGES
453.525	NORTHWEST BUS GARAGES
453.575	NORTH BUS GARAGES
470.5375	NORTH SUPERVISORS
470.6375	SOUTH SUPERVISORS

Illinois State Police By District:

DISTRICT	#	CALL	LF1	LF3	HF2
STERLING	01	KSAT774	42.528 / 42.72M		
ELGIN	02	KS8233	42.628 / 42.68M		154.695
JOLIET	05	KS8230	42.608 / 42.80M		154.920
PONTIAC	06	KSAT776	42.528 / 42.72M	44.66	
ROCK ISLAND	07	KS8229	42.348 / 42.84M	42.66	154.845
PEORIA	08	KS8228	42.368 / 42.36M		155.520
SPRINGFIELD	09	KSAT213	42.668 / 42.66M		154.935
PESOTUM	10	KSAA64	42.548 / 42.54M		154.695
COLLINSVILLE	11	KS8235	42.568 / 42.70M	44.70	154.665
EFFINGHAM	12	KS8236	42.528 / 42.72M	44.66	154.680
DUQUOIN	13	KS8234	42.608 / 42.68M		154.935
MACOMB	14	KSAT775	42.608 / 42.88M		154.680
ROCKFORD	16	KS8237	42.448 / 42.70M		155.520
LASALLE	17	KE0371	42.468 / 44.70M	44.70	
LITCHFIELD	18	KS8995	42.348 / 42.34M		
CARMI	19	KS1983	42.468 / 42.46M		
PITTSFIELD	20	KG3335	42.628 / 42.68M		154.680
ASHKUM	21	KLM608	42.448 / 42.84M	45.06	
ULLIN	22	KSG291	42.908 / 42.90M		

STATEWIDE CHANNEL PLAN:

LF1	LOWBAND DISP PAIR	HF1	ISPERN - 155.475
LF2	STATEWIDE 42.50	HF2	DISTRICT UTILITY
LF3	ALTERNATE DISPATCH	HF3	IREACH - 155.055
LF4	VARIES	HF4	STATEWIDE - 155.460
LF5	VARIES	HF5	UNIT-UNIT - 155.505

DIST CHICAGO (FORMERLY DIST 3 & 4)

DIST 3	CHICAGO	42.568 / 42.56M	42.88	154.935
DIST 4	CRESTWOOD	42.348 / 42.34M	42.66	154.680

DISTRICT CHICAGO GE-EDACS TRUNKED SYSTEM:

NORTH AND NW TRUNKED GROUP:	SOUTH TRUNKED GROUP:
LCN 01 - 866.8875R / 821.8875M	LCN 01 - 866.4125R / 821.4125M
LCN 02 - 866.4625R / 821.4625M	LCN 02 - 866.4375R / 821.4375M
LCN 03 - 867.3875R / 862.3875M	LCN 03 - 866.9375R / 821.9375M
LCN 04 - 866.9625R / 821.9625M	LCN 04 - 867.4125R / 822.4125M
LCN 05 - 867.4625R / 822.4625M	LCN 05 - 867.9375R / 822.9375M
LCN 06 - 867.8875R / 822.8875M	LCN 06 - 867.9125R / 822.9125M
LCN 07 - 868.3875R / 823.3875M	LCN 07 - 868.4375R / 823.4375M
LCN 08 - 868.4625R / 823.4625M	LCN 08 - 868.4125R / 823.4125M
LCN 09 - 868.8875R / 823.8875M	LCN 09 - 868.9375R / 823.9375M
LCN 10 - 868.9625R / 823.9625M	LCN 10 - 868.9125R / 823.9125M

MUTUAL AID GROUP:

866.0125R / 821.0125M	CALLING
866.5125R / 821.5125M	TAC-1
867.0125R / 822.0125M	TAC-2
867.5125R / 822.5125M	TAC-3
868.0125R / 823.0125M	TAC-4

OTHER DISTRICT CHICAGO FREQUENCIES:

154.935	DETAILS
155.505	MOB. EXTENDERS
155.460	AIR ONE
42.50	LF2

TOLLROADS ISP DIST 15:

PATROL:	
F1	854.9875 (0043) / 809.9875 (D114) 1-294 NORTH & NORTHWEST

F2 855.2375 (D043) / 809.2375 (D114) I-294 NORTH & NORTHWEST
 F3 855.4875 (D165) / 810.4875 (D174) I-294 SOUTH & EAST-WEST
 F4 855.7375 (D165) / 810.4875 (D174) I-294 SOUTH & EAST-WEST
 F5 855.9625 (D263) / 810.4875 (D174) NORTH-SOUTH
 F6 855.9625 (D245) / 810.9625 (D306) AUX CHANNEL
 F7 855.9625 (D263) / 810.9625 (D331) AUX CHANNEL
 F8 855.9625 (D251) / 855.9625 (D251) REPEATER TALKAROUND

MAINTENANCE:

F1 855.9875 (D364) / 810.9875 (D412) I-294 NORTH & NORTHWEST
 F2 856.2375 (D364) / 810.9875 (D412) I-294 NORTH & NORTHWEST
 F3 856.4875 (D423) / 811.2375 (D465) I-294 SOUTH & EAST-WEST
 F4 856.7375 (D423) / 811.2375 (D465) I-294 SOUTH & EAST-WEST
 F5 856.9875 (D364) / 811.9875 (D703) NORTH-SOUTH

FUTURE USE:

866.1625R / 821.1625M (D023) SIMULCASTS PATROL
 866.7125R / 821.7125M FUTURE EXPANSION
 867.0750R / 822.0750M FUTURE EXPANSION
 868.5125R / 823.5125M (D031) SIMULCASTS MAINTENANCE

DISTRICT 15 POLICE VHF MOBILE RADIOS:

A1 155.475 ISPERN	B1 155.475 ISPERN
A2 154.695 DIST 2	B2 154.950 CAR-CAR
A3 154.935 DIST 3	B3 154.665 CAR-CAR
A4 154.680 DIST 4	B4 154.650 CAR-CAR
A5 154.920 DIST 5	B5 155.055 IREACH
A6 155.520 DIST 16	B6 155.445 CAR-CAR
A7 155.460 HF4	B7 155.460 HF4
A8 155.925 CAR-CAR	B8 155.925 CAR-CAR

Misc and Statewide Frequencies:

27.065 CB CHNL 09
 27.185 CB CHNL 19
 39.46 COUNTY AID
 39.50 SHERIFFS NET
 39.80 SOS MOBILES
 42.50 LF2 STATEWIDE
 42.76 SOS BASES
 45.16 IEMA MOBS
 45.28 IEMA LOCAL
 45.36 LESIRN ESDA
 45.40 IEMA LOCAL
 45.44 IEMA S/W
 121.500 AERO EMER
 122.975 ISP AERO
 123.050 COPTER CTAF
 145.770 CARMA SMPX
 146.520 HAM SIMPLEX
 151.160 DCI & EPU M/X
 151.250 SOS / DNR
 151.280 SOS / DNR
 151.445 SOS / DNR
 153.755 FIRE MARSHAL

154.650 DCI LOCAL/D15
 154.710 EXECUTIVE
 154.905 DCI DISPATCH
 154.950 DCI CAR TO CAR
 155.025 ESMARN / ESDA
 155.055 IREACH
 155.160 MERCY 160 MEDICAL
 155.220 MERCY 220 MEDICAL
 155.280 MERCY 280 MEDICAL
 155.340 MERCY 340 MEDICAL
 155.370 POINT AID INTERSYSTEMS (POLICE)
 155.400 MERCY 400 MEDICAL (NORTHERN IL)
 155.445 ISP COMMAND CENTER / SPRINGFIELD
 155.460 ISP HF4 ALTERNATE VHF AND CAR TO CAR
 155.475 IL STATE POLICE EMERGENCY RADIO NETWORK (ISPERN)
 155.505 IL STATE POLICE MOBILE EXTENDERS AND UNIT TO UNIT
 155.925 DEPT NUCLEAR SAFETY / SECTY STATE / STATE REVENUE / MISC
 156.000 DCI LOCAL ENFORCEMENT SIMPLEX
 158.955 IL STATE POLICE PAGING
 161.205 RAILROAD POLICE COMMON AID CHANNEL
 446.000 AMATEUR RADIO SIMPLEX CALLING UHF
 453.875 STATE AGENCY REPEATERS STATEWIDE (MENTAL HEALTH, CORRECTIONS, CMS, ETC)
 453.900 IL STATE COLLEGE CAMPUS POLICE DEPTS STATEWIDE
 462.675 REACT STATEWIDE

Illinois Department Of Transportation:

Dist	Location	Base	Mobile	Tone
1	Schaumburg	47.30	47.38	110.9
2	Dixon	47.34	47.14	123.0
3	Ottawa	47.02	47.10	123.0
4	Peoria	47.06	47.18	123.0
5	Paris	47.34	47.14	110.9
6	Springfield	47.38	47.30	110.9
7	Efingham	47.06	47.18	110.9
8	Fairview Hts	47.02	47.10	110.9
9	Carbondale	47.38	47.30	123.0

(mobile lowband frequencies also used simplex to communicate w/IDOT yards facilities)

IDOT DISTRICT 1 (UHF Repeaters employ 151.4 Hz PL Tone)

F4 453.700 Emergency Traffic Patrol
 F5 453.250 Unassigned
 F6 453.150 Traffic & Executive Personnel
 F7 453.300 Expressway Maintenance Yards
 F8 453.400 Kane County Maintenance
 F9 453.200 Unassigned

F1 150.995 Central Maintenance, repeats 156.120 (131.8 Hz PL Tone)
 F2 151.070 South Maintenance, repeats 156.060 (131.8 Hz PL Tone)
 F3 151.100 North Maintenance, repeats 156.045 (D023 Hz PL Tone)
 F4 154.220 Chicago FD Administrative (links and oid)
 F5 154.665 Projects Channel, mobiles (simplex)
 F11 150.995 Mobile to Mobile direct

F12 151.070 Mobile to Mobile direct
 F13 151.100 Mobile to Mobile direct
 F16 162.550 NOAA Weather Station

F1 42.34 State Police District 4, Crestwood, former lowband dispatch
 F2 42.50 State Police LF2 Car to Car Statewide
 F3 42.66 State Police District 4, Crestwood, Chicago Expressways, former use
 F4 42.56 State Police District 3, Chicago, former lowband dispatch
 F5 42.88 State Police District 3, Chicago Expressways, former use

10-1 Unable to Copy
 10-2 Signal Good
 10-4 Acknowledgment
 10-6 Busy, standby unless urgent
 10-7 Out of service (give 10-20)
 10-8 In service
 10-9 Repeat
 10-13 Weather & Road report
 10-20 Location
 10-21 Call by telephone
 10-22 Disregard
 10-30 Improper use of radio
 10-45 Animal carcass
 10-46 Assist motorist
 10-50 Accident
 10-52 Ambulance needed

Cook County Sheriff:

BAND 1 155.595 OUT / 153.965 IN (107.2) NORTH PATROL
 BAND 2 155.535 OUT / 153.995 IN (107.2) SOUTH PATROL
 BAND 3 154.995 OUT / 153.785 IN (107.2) WARRANTS
 BAND 4 155.475 OUT / 155.475 IN (000.0) ISPERN
 BAND 5 155.640 OUT / 153.935 IN (107.2) ALTERNATE REPEATER
 BAND 6 153.905 OUT / 153.905 IN (107.2) CAR TO CAR SIMPLEX
 TAC: 153.815, 153.845, 154.025, 155.985, 158.865, 158.895, 158.925, 159.090

CORRECTIONS, BUILDINGS AND TRANSPORTATION DIVISIONS:

F1 153.815 Simplex Jail/Surveillance
 F2 154.025 Simplex Jail
 F3 153.845 Simplex Jail
 F4 158.865 Simplex Corrections Vans

COOK COUNTY CRIMINAL COURTS AND CORRECTIONS FACILITY 800 MHZ TRUNKED SYSTEM:

866.1375 866.3125 866.5375 866.7875 867.7125 868.8375 867.2250 868.1250 868.5000

COOK COUNTY HIGHWAY DEPARTMENT

(453.750 / 453.950) ALL CALLSIGNS ARE KSF360 :

District 1 - Schaumburg - 325 Meacham Rd
 453.950 (127.3) Output / 458.950 (156.7) Input
 District 2 - Des Plaines - 9801 Ballard Rd
 453.750 (127.3) Output / 458.750 (141.3) Input
 District 3 - La Grange Park - 26th Street & Beach Avenue
 453.950 (127.3) Output / 458.950 (167.9) Input
 District 4 - Orland Park - 135th Street & 89th Avenue
 453.750 (127.3) Output / 458.750 (156.7) Input
 District 5 - Blue Island - 135th Street & Roll Avenue
 453.950 (127.3) Output / 458.950 (141.3) Input

AERO-MEDICAL OPERATIONS:

45.44 103.5 CARE FORCE HELICOPTER CHAMPAIGN
 45.58 FLIGHT FOR LIFE MCHENRY BASE OPS
 123.050 AM COPTER COMMON TRAFFIC ADVISORY FREQUENCY CHICAGO
 129.275 AM FLIGHT FOR LIFE MCHENRY BASE AT VICTORY MEMORIAL WAUKEGAN
 129.475 AM UNIV CHGO AEROMEDICAL NETWORK (UCAN)
 129.550 AM AIR ANGEL BASE AT DUPAGE
 155.160 91.5 LOYOLA LIFESTAR AUX COMMS
 155.160 131.8 INDIANAPOLIS METHODIST HOSPITAL LIFELINE COPTER
 155.220 123.0 MCHENRY COUNTY FLIGHT FOR LIFE
 155.220 127.3 FLIGHT FOR LIFE MED OPS (UNKN)
 155.220 167.9 MILWAUKEE FLIGHT FOR LIFE
 155.400 77.0 MCHENRY FLIGHT FOR LIFE W/NIMC BASE MCHENRY
 472.0125 127.3 LOYOLA LIFESTAR
 472.4375 88.5 UNIV CHGO AEROMEDICAL NETWORK (UCAN)



Harry Baughn

GLOSSARY

A Glossary of radio related terms used in *Monitoring Times*. (See www.grove-ent.com/mtglossary.html for a much more comprehensive list.)

THE RADIO SPECTRUM

ULF - Ultra Low Frequency (3-30 Hz)
ELF - Extremely Low Frequency (30-300 Hz)
VF - Voice Frequencies (300 Hz-3 kHz)
VLF - Very Low Frequency (3-30 kHz)
LF - Low Frequency (30-300 kHz)
MF - Medium Frequency (300 kHz-3 MHz)
HF - High Frequency (3-30 MHz)
VHF - Very High Frequency (30-300 MHz)
UHF - Ultra High Frequency (300 MHz-3 GHz)
SHF - Super High Frequency (3-30 GHz)
EHF - Extremely High Frequency (30 GHz and above)

// - Indicates a Parallel Frequency
 μ F - Microfarad
 μ H - MicroHenry
AC/ac - Alternating Current
AGC - Automatic Gain Control
AM - Amplitude Modulation
ARRL - American Radio Relay League
BCB - Broadcast Band (530-1705 kHz AM)
Bd - Baud
BFO - Beat Frequency Oscillator
BNC - Coax connector commonly used with VHF/UHF equipment
CB - Citizen Band
C-band - 3.7-4.2 GHz
Comm - Communications
CQ - General call to all stations
CTCSS - Continuous Tone Controlled Squelch System
CW - Continuous Wave (Morse code)
DAB - Digital Audio Broadcast
dB - Decibel; dBi- decibels over isotropic
DBS - Direct Broadcast Satellite
DC/dc - Direct Current
de - Morse code prosign meaning "from"
DSP - Digital Signal Processing
DTMF - Dual Tone Multi Frequency
DTRS - Digital Trunk Radio System
DX - Distant Station Reception
DXer - A person who engages in the hobby of distant radio/television reception
DXing - The hobby of listening to distant radio or television signals
DXpeditions - DX Expeditions (trips to the boonies by radio listeners)
ECPA - Electronic Communications Privacy Act
ECSS - Exalted Carrier Selectable Sideband
E-skip - Sporadic E-layer ionospheric propagation
FCC - Federal Communications Commission
FD - Fire Department
FM - Frequency Modulation
Freq - Frequency
FRS - Family Radio Service
GHFS - Global High Frequency System
GHz - Gigahertz
GMDSS - Global Maritime Distress and Safety System
GMRS - General Mobile Radio Service
GMT - Greenwich Mean Time (replaced in most applications by UTC)
GPS - Global Positioning Satellites
GSM - Global System for Mobiles (900 MHz)
HT - Handi Talkie/Handheld Transceiver
Hz - Hertz
ID - Identification
IF - Intermediate Frequency
IRC - International Reply Coupon
ISB - Independent Sideband
kHz - Kilohertz
km - Kilometer
Ku-band - 11.7-12.2 GHz (plus 12.2-12.7 GHz in North America)
kW - Kilowatt
LCD - Liquid Crystal Display
LED - Light Emitting Diode
LNA - Low Noise Amplifier
LNB - Low Noise Block Downconverter
LNBF - Low Noise Block Downconverter Feedhorns
LSB - Lower Sideband
LT - Local time
LW - Longwave (150-300 kHz)
mb/MB - meter band/Megabyte
MDT - Mobile Data Terminal
MF - Medium Frequency
MHz - Megahertz

ms - milliseconds
MT - Monitoring Times
MUF - Maximum Usable Frequency
mW - Milliwatt
MW - Medium Wave (typically 530-1710 kHz)
MW - Megawatts
NCS - National Communications System/Net Control Station
NDB - Non-Directional Beacon
NFM - Narrowband Frequency Modulation
NiCd - Nickel Cadmium Battery
NiMH - Nickel Metal Hydride battery
No Joy - Station did not answer call
NWR-SAME - National Weather Radio Specific Area Message Encoding
Ops - Operations
Packet - Amateur radio error correcting mode
PC - Personal Computer/Printed Circuit
PCS - Personal Communication System/Satellite
PD - Police Department/Primary Data
PFC - Prepared Form Card
PL - Private Line
Q - Performance rating regarding selectivity or bandwidth
QRM - Interference from another station
QRN - Interference from natural or man-made sources
QRP - Low power operation
QSL - A card or letter confirming reception of a radio station
QSO - Communications between two or more stations
QTH - Location
RDF - Radio Direction Finding
RF - Radio Frequency
Rptr - Repeater
RTTY - Radioteletype
SASE - Self Addressed Stamped Envelope
S-band - Microwave frequencies above UHF
SCA - Subsidiary Carrier Authorization (now known as SCS)
SCPC - Single Channel Per Carrier
SCS - Subsidiary Carrier Service
SELCAL - Selective Calling
Sesqui - A "Hauserism" meaning one and one-half
SINAD - Signal to noise and distortion ratio
SINPO - A code system used by radio hobbyists to indicate how well a station was received: S=Strength, I=Interference, N=Noise, P=Propagation, O=Over-all (sometimes shortened to SIO)
SITOR-A(B) - Simplex teleprinting over radio system, mode A (B)
S-Meter - Signal Strength Meter
SMR - Specialized Mobile Radio
S/N Ratio - Signal-to-Noise Ratio
SSB - Single Sideband
SSN - Sunspot Number
SW - Shortwave (high frequency - HF)
SWBC - Shortwave Broadcast
SWL - Shortwave Listener
SWR - Standing Wave Ratio
Tac - Tactical
Tent - Tentative
TIS - Traveler Information Service
TVRO - TV Receive Only
Tx - Transmit
UHF - Ultra High Frequency
UKoGBaNI - United Kingdom of Great Britain and Northern Ireland
ULS - Universal License System
Unid - Unidentified
USB - Upper Sideband
UT - Universal Time
UTC - Universal Time Coordinated
Vac/VAC - Volts Alternating Current
Vdc/VDC - Volts Direct Current
VFO - Variable Frequency Oscillator
VOLMET - Aviation Weather Broadcasts (on HF)
VOX - Voice Operated Relay
VSWR - Voltage Standing Wave Ratio
WAM - Wideband Amplitude Modulation
WEFAX - Weather Facsimile
WFM - Wideband Frequency Modulation
wpm - Words Per Minute
WWV - National Bureau of Standards Time Station, Ft. Collins, CO
WWVH - National Bureau of Standards Time Station in Hawaii
Wx - Weather
WXSAT - Weather Satellite
X-band - Expanded AM broadcast band (1610-1700 kHz)
Zulu - Military time zone (same as UTC)

The Only SWL Antenna You'll Ever Need

I know what some of you are thinking: "Right, and I'll get a QSL back for every request I send out!" Still, there are others of you thinking to yourselves, "Wow, it's the Holy Grail of antennas, it's the Golden Fleece of signal catchers! Can this really be true?" This is no idle boast. For the money, for the space, and for the coverage this antenna could be the best thing since insulated wires!

❖ Some Sage Advice

It all started one late summer afternoon twelve years ago. My daughter and I had just spent the summer studying for our Novice licenses. We read the ARRL's *Now You're Talking* Novice study guide until it was tattered, listened like religious fanatics to the code practice bulletins from WIAW, and cranked out shaky CW on an MFJ code practice oscillator until we were sick of the sound.

Miracle of miracles, we both passed! There was only one moment of panic after passing when one of the examiners warned me that my score would be printed on my license. Most amusing. Anyway, we went home light-hearted and started immediately thinking about putting together a station. It seemed to me that the heart of the station was the antenna and I talked to seasoned hams, savvy amateur operators and anyone else I could corner on the subject. I sent away for the ARRL's *Antenna Handbook*, a phonebook sized authority on the subject, and, when it arrived, spent days pouring over it.

It was clear that my Novice education needed even more help, so I called the only person who might be able to provide it: the Sage of Brasstown, the Antenna Guru, the Wizard of the Electromagnetic Waves. Yes, I put in a call to Bob Grove.

Even though he was busy at the time putting a genie back in a bottle, he took the time to let me in on one of his best ideas: a tunerless all-band antenna. At the time, grateful as I was, I had no idea of the enormous worth of this antenna design. Bob knew this instinctively and without going into any long winded spiel about the theory behind this antenna instructed me to sketch the essentials as he explained them over the phone.

I did exactly as he said. The hardest part to the whole project was hoisting the thing into the big oak trees in the front yard. With a little luck

I was able to get the antenna to 50 ft. A new Kenwood TS-140S had arrived several days before and, though our licenses still had not come in the mail, we eagerly set up the station and tuned the bands as earnest Short Wave Listeners.

❖ Threshold of the Spectrum

I had been a shortwave listener (SWL) for many years, tuning a succession of better and better receivers, trying out all manner of makeshift antennas, using passive antenna tuners for better results and all the rest. And, while the receiver in the Kenwood was more sensitive than any I had ever used, the antenna was truly incredible. I had the feeling, as I spun the big tuning knob on the 140, that if there was a signal out there on a frequency from 50 kHz to 30 MHz I would be able to hear it. I was standing at the threshold of the electromagnetic spectrum and the door was ajar!

The Grove Tunerless All-band antenna, as I dubbed it, stayed in the trees for ten full years. I took it down in '98 to send to my daughter, who by this time was in the Peace Corps, stationed in Nicaragua and operating as YN9MJR. With the help of some local priests who had the only ham gear in the region (an old Drake TR4), she put the antenna up and we worked a daily schedule on 20 meter CW until the rig cratered for the last time. The antenna is still there.

I made a new antenna exactly as I had the previous one and it works just as well. While I've built and used a number of HF antennas throughout the years, nothing else even comes close to the Grove. This antenna has four important things going for it: it's easy to build, it's relatively cheap, it operates in every band direct without any external tuning aids, and it's extremely quiet. What more could anyone ask?

❖ The Details

Enough teasing! Here's how you can make your own Grove Tunerless All-Band antenna. You'll need about 150 feet of antenna wire, 50 feet of foam filled 300 Ohm TVM wire, a 4:1 Balun, a center connector, two end insulators, and enough RG/8 coax cable to get from the balun to your radio (see list for parts sources).

The antenna is technically called an off-center fed dipole and there are several similar de-

signs that are very popular with hams. Here's how you build it:

One leg of the antenna is 44-ft. long (see diagram) and the other leg is 90-ft. long. Since the two parts are not equal, the center connector where the antenna is fed is offset from the center, hence the term *off-center fed dipole*. The connector is fed with exactly 48-1/2 feet of 300 Ohm TVM twin lead. Connect one end of the TVM wire to the "center" connector and the other to the terminals on a 4:1 balun. Now, simply run however much 50 Ohm RG/8m coax you need to get from the balun to the back of your receiver. I found I needed about 100 feet. At HF frequencies, distance isn't going to make a big difference in the performance. Is that easy enough or what!?

Since the TVM wire is nearly 50 feet it would be ideal to put the antenna at least 50 feet in the air. Generally, the higher you can put any antenna, the better it will perform. Use ceramic end insulators to separate the antenna from the lines you'll use to attach it to a tree. I used a Hy-gain center connector which has an eyelet on the top of the connector with which you can put another support line to keep the antenna from sagging in the middle, if you happen to have a third tree near the center connector.

This is a serious antenna. You can attach it, as I have, to virtually any shortwave radio and have it perform tuning miracles you thought beyond the capabilities of whatever receiver you're using. This is also a very low noise antenna. I've used it for all manner of sensitive digital imaging and messaging reception modes on all bands. The low noise really helps capture digital data even from distant stations.

❖ The Final Results

Well, I can only think of one drawback to this antenna. At 134 feet overall, this antenna is not going to fit on some suburban lots. It's going to be pretty hard to stuff it in an attic. And, as with all wire antennas, you can't rotate it. You're going to have to figure out the optimum location for the antenna and do the best you can. However, I find that propagation has more to do with the direction from which signals seem to come in better. Without being able to move the antenna one inch, I've heard stations as far south as the South Pole, as far north west as Siberia, as far southwest as Australia, and as far east as the Mideast with this antenna.

With your new antenna in place, flip this magazine open to the "Shortwave Guide" section, find the current time and just start tuning in stations. You will be amazed. The added bonus to this antenna is that it's also a terrific transmitting antenna. And, while it's not designed to work 160 meters, it presents a VSWR (Voltage Standing Wave Ratio) of 2:1 or better on 80, 40, 20, 15 and 10 meters. Though the antenna was designed before the advent of the WARC (World Administrative Radio Conference) bands (30, 17 and 12 meters) I've found it works just fine on all of those as well. So how about it, would you pay \$100 for the only antenna you'll ever need? You bet!

❖ Sources for the Grove Tunerless All-band Antenna

Hy-Gain Center Connector (\$15)
 150 feet 14 AWG Stranded Copperweld antenna wire (\$22.50):
 Surplus Sales of Nebraska
 1502 Jones Street
 Omaha, NE 68102-3112
 Phone: [??]
www.surplussales.com

50 feet 300 Ohm TVM wire (\$6.00)
 RG/8 mini coax:
 Radio Shack
 800-THE SHACK
www.radioshack.com

Van Gorden 4:1 Balun (\$15):
 Amateur Electronic Supply
 800-558-1411
www.aesham.com

There are dozens of antenna designs to be explored, and in doing so, you'll learn some interesting things about this much-talked-about subject and have a little fun at the same time. There's nothing like the satisfaction of doing it yourself, and antenna construction provides one of the few opportunities for old hands and newcomers alike to build from scratch with nearly guaranteed results.

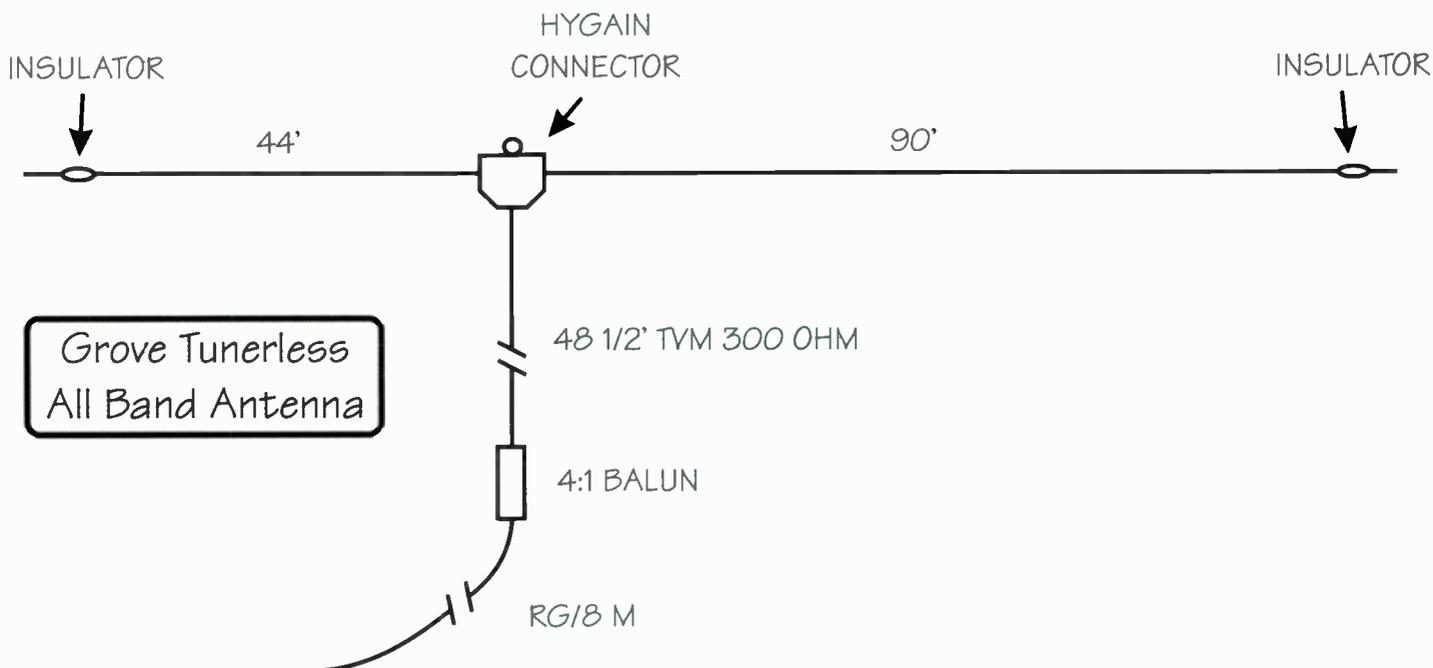
You can start your own lifelong antenna odyssey at a wide variety of locations ranging from Radio Shack's low-cost *Antennas - Selection and Installation* (\$7) to the ARRL's authoritative 728 page *The ARRL Antenna Book* (\$30). There are many others written by some of the most noted experts in this field. Here are just a few:

- W1FB's Antenna Notebook* by Doug DeMaw, W1FB, 122 pages (\$10)
- W6SAI HF Antenna Handbook* By W. Orr, W6SAI, 190 pages (\$20)
- Lew McCoy On Antennas* By Lew McCoy W1ICP, 107 pages (\$16)
- The Easy Wire Antenna Handbook* By Dave Ingram K4TW, 105 pages ((\$10)
- Joe Carr's Receiving Antenna Handbook* By Joe Carr 189 pages (\$20)
- Practical Wire Antennas* J. Heys 100 pages (\$14)
- Simple, Low-Cost Wire Antennas for Amateurs* By W. Orr & S. Cowan 188pages (\$14)

But, pound for pound, page for page, and dollar for dollar the clear winner is *The ARRL Antenna Book*. Not only is it the biggest book on the subject but it has the widest variety of antenna topics as well as the depth you'd expect from a League publication. This book is sold with a 3.5" PC floppy disc loaded with antenna related software. And, if you don't want to shell out the \$30 cover price, it's also the one book most likely to be found in a public library.

After studying the book at the library you can Xerox® the pages of interest and take them home. Previous editions of this book can also be found at hamfests at a fraction of the cover price. Because this information is essentially timeless, old editions are just as valuable today as they were when they were published. In fact, some antenna aficionados look for older editions in order to learn about antennas no longer in vogue.

Check out the following locations for these and other titles of interest to antenna builders:
 Amateur Electronic Supply www.aesham.com
 800-321-3594
 Amateur Radio Relay League www.arrl.org
 888-277-5289
 Grove Catalog www.grove-ent.com 800-438-8155
 Universal Radio, Inc. www.universal-radio.com 800-431-3939



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More on Car Battery Storage

In our April 2000 column we discussed the caveat regarding car battery storage on a cold cement floor. Charles "Chip" McCoy of Kokomo, Indiana, has even more on the subject. According to Chip:

"The cement issue regarding wet electrolyte batteries actually goes back many years (when) lead acid cells were housed in heavily-shellacked wooden-cased batteries. After a while the inner shellac would age, and wood, being what it is, would have a tendency to weep. Couple this action with the wicking affect that concrete can produce and it could lead to zero electrolyte left in the battery after a period of time."

And with the temperature gradients we discussed earlier, the battery could fail in relatively short time. Thanks, Chip, for this interesting insight.

Update on Filing for a Ham License

In our June issue we gave one method of renewing a ham radio license. Ken Brown, N4SO, suggested a simpler method: Call (800) 418-3676 and follow this Touch-Tone sequence: press 1, then 2, then 1, then press 2. The recording will ask for your name, complete mailing address, phone number, and FCC form number (605). Your form should arrive in four or five days.

Q. I often hear our medical dispatcher call an ambulance, but no reply is heard. Why is this? (Name withheld by request)

A. Are you sure you are monitoring all MED channels? There's a host of new ones, so you may not have the correct frequencies in your scanner's memory. Is it possible they are using digital scrambling on some calls? If they do, all you will hear will be an open channel with background hiss. Finally, is it possible that they are using hand-held radios, and your antenna system is either too far away or inadequate? A good antenna is necessary for weak signal or distant reception.

Q. Our local NBC TV affiliate today said that there is a 12 mile runway at Groom Lake, Nevada's mysterious Area 51; a later broadcast

Q. I have installed ground fault circuit interrupters (GFCIs) at several locations around my house to provide electric shock protection. What is actually in these devices? (Mark Burns, Terre Haute, IN)

A. For an answer to this we contacted Chris Reilly, GFCI product line manager for Eagle Electric, a leading manufacturer of residential, commercial, and industrial wiring devices. He had this to tell us:

"A GFCI receptacle contains electronics that constantly monitor the level of current flowing between the two poles of the receptacle – hot and neutral. Under normal conditions, the amount of current flow between both of these sides is equal. For example, if an electric drill was using 2 amps of current supplied through a GFCI, the electronics would read 2 amps across the hot and 2 amps returning through the neutral.

Reilly noted that, "Should the balance between the two suddenly differ by anything greater than 4-6 mA (as would occur if there was current "leakage" to ground), a change in the "flux" (magnetic field) would be picked up by the GFCI's differential core. The electronic sensor reads this change and triggers the line contacts to open, disconnecting power to the receptacle's contacts and all receptacles which may be wired downstream off its load terminals."

So shouldn't this protect anyone from electric shock? Not necessarily! Reilly goes to add:

of the news story deleted that statement. Why do they need a runway that long? (S. Marcher, La Mirada, CA).

A. They don't, and there isn't. That's probably why the station deleted the item from the next broadcast. Quite likely such a story originated from an aerial photo which could well be a roadway, not a runway. Such photos are now available on the Internet at www.teraserver.com/area51.asp.

"Because a GFCI is designed to detect a ground fault variance between the level of current across line hot and load neutral, an instance where someone may come into contact with both the hot and neutral simultaneously would not necessarily trip the GFCI. Remember, if the flow of current doesn't vary at least 4-6 mA (milliamperes) between them, these two opposing flows of current that are now terminating at one junction are not a ground fault. They are a short circuit (or 'dead short'), and this can happen as easily when either an inanimate object or a person has formed this junction."

In other words, don't go sticking something into both slots of a GFCI outlet that isn't properly grounded on at least one side! The only protection you have then is at the breaker or fuse panel. And at 15 amps, you'd be long gone before that breaker or fuse ever opened!

"GFCI's are meant to protect people from the kinds of things that may happen with old or damaged appliances and tools. Perhaps a stray strand of the hot wire becomes frayed and has come into contact with a metal part of the appliance and now has the potential of seeking ground through you," Reilly states. He concludes, "Even with some of the most obvious things, such as hairdryers, mixers, light-duty drills, etc. now having plastic housings, there's always the potential for a fault. There is the cord and plug condition to consider, as well. If a GFCI is 'tripping' whenever you use a particular appliance or tool, stop using it and have it checked by a qualified person immediately."

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

Gary Webbenhurst
ab7ni@arrl.net

Every month I check my lengthy list of ideas to make sure that I have not repeated an idea or used one that appeared elsewhere. I have been pleased with all the e-mail responses, including tips and ideas from readers. I find it strange that there has not been a single response via the regular US Postal Service. Nothing but e-mails.

Very interesting. I think this is an indication that in the new millennium most readers have access to e-mail services. It is quick, easy, and cheap... In fact, that sounds like a great idea! Send me your comments or ideas via email, and I promise a quick reply. In the December column, I will reflect back on some of those comments and the ideas that seem to produce the most responses. Well, on to the list for October.

Every October, the Fire Service promotes Fire Prevention Awareness Week. Most fire departments hold an open house. Stop by your local firehouse and inquire about the date and time. Arrive early. This is your chance. C'mon, be brave, ask about their frequencies. Fire dispatchers are friendlier about radio questions than their counterparts at the PD.



Getting ready for open house at the fire station

Look for someone that has a hand held radio. Ask if you can look at it. Often, the back of the radio will have a list of what is programmed into which channel. You can also look in the truck near the radio console. It helps if you know that Channel one is dispatch, channel two is Tac 1, or channel five is the Orange tactical and so on.

Most volunteer Fire Departments have daily or weekly pager tests. Find out their magic hour, and you can check for repeater inputs, PL tones, and links. If they have gone to trunked 800 MHz, ask for their talkgroup list. Again, it may be on the back of the radio.

64 Another October happening is the ham radio nationwide Simulated Emergency Test (SET). This is where the local ARES volunteers practice their skills. ARES is the Amateur Radio Emergency Service. If you are listening in the Northwest, I promise the Spokane hams will be active.

65 Time to improve your listening skills. Try this. Spend a night listening to the scanner wearing headphones. Not an earphone, but a headset. (You can get a cheap set at Radio Shack for a few bucks.) Lean back, close your eyes and listen intently. You are looking for the little sounds that will make you a better listener. Occasionally, I learn to identify an agency by the particular "hum" I hear in the background. Concentrate on what you are hearing. With practice, this experience helps you pick out the otherwise hard to understand weak, and mumbled voices. Hams are used to this because of their use of long distance radio traffic and its weak signals.

After a couple of evenings practicing this hearing skill, give yourself a new challenge. Listen to two scanners at once. Can you differentiate the important stuff from the routine? OK, hotshot, now try three. For most of us, this is the max. In effect, our brain will "scan" the three audio inputs and decide which one is important. Don't cheat. After the first night, don't look at the display. Do you know what agency you are listening to? Can you tell by the dispatcher's voice the hot calls from the barking dog complaints? Do you understand all the codes? Just what is "Log me?" (Answer next month.)

66 In preparing for winter, I decided to change my wiper blades on the van. As I removed the old ones, two metal rods fell out. They are used to form guides for the rubber blades. As soon as I saw the rods, I said to myself, "experimental antenna." These rods were flat, not round, but made of stainless steel.

As I was throwing the old rubber blade in the apartment dumpster, I heard that little voice say, "But Gary, you might need these some day to finish off a project such as gluing them onto a radio to prevent slippage." I sprayed some Armorall on them to keep them from drying out any further. I will let you know when I concoct a special use for these items.

I must sound like a pack rat. But it is amaz-

ing how often I can look in my tool box, and find what I need to complete a project. I am too old for dumpster diving, but I have rescued some throw away items. All you need is a long arm. Keep your eyes open.

67 Here is another scrounger suggestion. As you drive around town, do you see any commercial buildings under construction? If you do, stop and find the electrical contractor. Tell him/her that you are radio hobbyist and often use small wire for various projects. Ask if you can have the telephone wire scraps in his dumpster. If the answer is yes, you will be rewarded with handfuls of color coded, brand new copper wire. Length will vary from a few inches to a few feet. You can make up antenna counterpoises, run speaker wire, antenna projects... well the uses of such wire are endless. All for free. And you saved the wire from the land fill!

I hope you are making use of "Bright Ideas." See you next month.

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Airport Scanning

One of the great enjoyments of scanning is monitoring the communications at an airport. An airport, of course, simply couldn't function without radio communications. *MT's* August issue just scratched the surface of what there is to hear. It's not just the AM air traffic control frequencies which are critical, but it's also the standard FM channels of the airport police, airport fire department, and various airport operations crews. Beyond that there's a wealth of additional radio activity that's a great challenge to both monitor and log. Here's a quick list (because it's an entire article in itself, we're going to skip over the AM aircraft control channels):

Primary Public Service Operations:

- Airport Police
- Airport Fire
- Airport Operations
 - taxi starters (the people who request cabs be brought up from their holding area to the various terminals)
 - airport buses
 - building maintenance
 - parking operations (towing, jump starting, etc.)
 - air field operations (maintenance of the runways)
 - construction
 - numerous other services

At any given airport the functions above could be handled by a single overarching agency or by a multitude of agencies. In Boston, for example, police functions are provided by the Massachusetts State Police, Troop F. Emergency Medical Services are provided by the fire department and by Boston EMS. Fire operations are handled by the Massport Fire Department. Massport oversees the airport, major shipping ports in Boston Harbor, and one of the harbor bridges. Bus, parking, and all other listed airport operational functions are handled by Massport at Logan airport.

Other Governmental Agencies:

- United States Customs
- United States Department of Immigration

Airport in-building and on-field operations:

- Airline company operations (ticket counter, gates, red-coats, baggage handlers, supervisors, and the like for various airlines)
- Private security (the companies which staff the metal detector units)
- Wheelchair and battery-powered cart unit staff (usually handled by a contractor)

Airplane Service Units:

- Caterers
- Waste disposal
- Fuel

Airport outside-building operations (not directly affiliated with the airport):

- Mass transit (public transportation such as subways, city buses)
- Taxis
- Limousines
- Private bus companies
- Hotel shuttle service
- Rental car shuttle service
- Hotels (on airport grounds)
- Package delivery

This by no means is a complete list. As you can see, though, an airport is a great aggregator of agencies, all of whom use radio communications. Certain levels of airport tower buildings are usually open for public observation and it's a great take to go up to one of these towers with a scanner and monitor the operations as they happen in front of you. Readers should also check out Jean Baker's September "Plane Talk" column on monitoring ground crew communications at Baltimore Washington International Airport (BWI).

For years the frequencies everyone knew were the 460.675 through 460.925 aircraft ground crew "ramp" channels used at airports. Airlines use these frequencies for all the operations listed above (gates, red-coats, baggage handlers). Generally these are 5-watt (at most) simplex radios that can't be heard too far off airport grounds. If you make a monitoring trip to the airport, or if you're taking a trip yourself, these channels still provide great listening.

ARINC has long been associated with radio communications in the airline industry and it has always held a great fascination for scanner hobbyists. (Go to www.arinc.com for some terrific information on this very impressive organization.) ARINC is involved in the coordination of AM airline company channels (and, we believe, supports the infrastructure for these systems), and they also provide FM ground crew radio systems.

Since the early 90s, the company has been installing shared trunked systems at airports for ground crew operations. Interestingly, these systems are almost always on 856-860.8875 at every location in the country. They are Motorola

Type 1 radio systems in each known case. Other trunked systems in use may be federal 400 MHz systems that can be either Ericsson or Motorola. Finally, you'll of course see many companies using Nextel radios.

Aero Monitoring in Michigan

Speaking of which, Ron Wilbanks, a great contributor from the state of Michigan, wrote recently: "Is there a Nextel Radio system out there for set up for law enforcement use or is it just the same old system everybody uses? Reason why I ask is the Jacksonville, Florida, International Airport police, fire and operations has switched to Nextel for dispatch. Will this system set a priority for airport units in case of an emergency or will they have to wait for Bubba to finish his call about his last outing!"

This is a good question, Ron. Nextel has recently started an initiative to attract public safety business. Whether or not they have modified their system to account for the needs of police and fire priority (overriding non-priority communications) as well as quick-entry (no delay time to access a channel) is not known (*See Communications page 9 -ed.*). Ron continues:

"The Wayne County trunked radio system at Metro Airport is being converted into a Type Iii. Starting next year, the entire system is going to be overhauled with new sites added to upgrade the entire TRS, to Project 25 standards. This system replacement will be completed by late 2001. The new Wayne County Project 25 TRS, will have additional sites throughout the county, and use around 19 frequency pairs for its operations. In addition the City of Detroit TRS, and both Oakland County TRS, will also become Project 25 compliant by 2002 at the latest."

Once again we hear reports of agencies switching to APCO-25. The future is definitely upon us. Here are some of the IDs Ron has collected for the new Type II radios on the Metro Airport TRS:

Wayne County Airport Public Safety (Metro & Willow Run Airports):

Airport Police Dispatch	57456
Airport Police Tac-1	57488
Airport Police Tac-2	57520
Airport Police Detectives	57552

Airport Police Teletype 18928
 Airport Fire Dispatch 200-2
 Airport Fire to HEMS 200-12

More Airport Trunking

Bob Eisner wrote with some interesting comments on a United trunked radio system in the San Francisco Bay Area:

"Hi all. It appears that United Airlines is getting ready to go live with a Motorola Trunking System at Oakland International Airport. I remember seeing a posting somewhere a few months ago (could have been SCAN-L or rec.radio.scanner) about someone finding a couple of Motorola Control channels on two ramp frequencies at Baltimore International Airport. Has anyone else discovered this at other United Airlines hubs? The following information was sent to me yesterday by another member of the Bayscan list:

"FCC lists the callsign WPMV365 for United Airlines and specifies the following frequencies

460/465.6750 MHz
 460/465.7000 MHz Control channel heard on Saturday
 460/465.7750 MHz Control channel heard on Friday
 460/465.8000 MHz Control channel heard on Sunday (today)
 460/465.8750 MHz

"I have no idea what the current Base and Offset are for this system. Does anyone know how to determine the Base and Offset for a Motorola System in the 460 MHz band?"

Bob, a good start would be to try the lowest frequency in the group, in this case 460.675, and use an offset that divides evenly into the gap between frequencies - in this case 25 kHz (or perhaps 12.5). Please let us know how you make out. We'll try to have a more complete report on this topic soon. Also, note that the input frequencies (465.775 for example) do not figure into the calculation or your programming. Just disregard them. You'll hear all the communications on the repeater output side (the 460 MHz frequencies).

Also, take a look at the following information at trunked systems at Newark International Airport. This may provide clues as to how 400 MHz Motorola trunked systems are set up (note that the base frequency is lower than the lowest frequency):

U.S. Government - Newark
 Frequencies: 413.700, 415.150, 415.950, 418.350
 Base: 412.000 MHz
 Offset: 25 kHz
 Users: U.S. Customs and U.S. Postal Service at Newark International Airport

The primary trunked system at Newark is the Port Authority Ericsson radio system:

Port Authority of New York and New Jersey

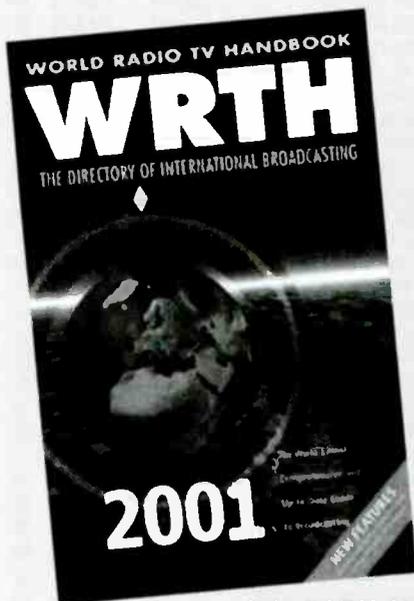
Ericsson Trunking
 Logical Channel Numbering
 01 866.2125
 02 866.8125
 03 867.3750
 04 867.8750
 05 868.5500
 06 868.6000
 07 868.9125

Talkgroups

00-081 Police operations - Newark International Airport
 00-104 Lincoln Tunnel
 00-121 Police operations - JFK Airport
 00-122 ARFF - fire/crash - JFK Airport
 00-123 JFK Airport

Ramp Frequencies

Bob also writes, "I forgot to mention that I have a whole list of various ramp airline frequencies that I've found over the past six months. A lot of them are outside of the 460.650 - 460.825 MHz range. I have also determined that most of them use the same PL or DPL on all of their frequencies. For example United Airlines use PL 203.5 for all of their ramp and se-



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curity frequencies at SFO (San Francisco International). Southwest Airlines use DPL 074 for all of their ramp frequencies at OAK. American Airlines use PL 127.3 for all of their ramp frequencies at SJC."

Bob did not have a chance to include this information in his report so we decided to re-print California data from the new "Aircraft Ground Crew" section of the *Police Call CD-ROM*, 2nd edition, which should now be available. This data is not included in the *Police Call* books (due to space considerations), but we were able to include it on the CD.

Note that when the transmitter city column is blank, then the license will be used for mobile operations. Many of these licenses are for paging or data. Licenses with a transmitter type of FB2 are repeaters and FBMO are base/mobile systems.

California Aircraft Ground Crew (FM) Licenses

COMPANY NAME	TRANSMITTER CITY	FREQ.	TX TYPE
AERONAUTICAL RADIO INC		451.3125	MO
AERONAUTICAL RADIO INC		451.4875	MO
AERONAUTICAL RADIO INC		451.5125	MO
AERONAUTICAL RADIO INC		451.5375	MO
AERONAUTICAL RADIO INC		451.5625	MO
AERONAUTICAL RADIO INC		451.5875	MO
AERONAUTICAL RADIO INC		451.6125	MO
AERONAUTICAL RADIO INC		451.6375	MO
AERONAUTICAL RADIO INC		451.6625	MO
AERONAUTICAL RADIO INC		451.6875	MO
AERONAUTICAL RADIO INC		451.7125	MO
AERONAUTICAL RADIO INC		451.7625	MO
AERONAUTICAL RADIO INC		452.0625	MO
AERONAUTICAL RADIO INC		452.1125	MO
AERONAUTICAL RADIO INC		452.1625	MO
AERONAUTICAL RADIO INC		452.2875	MO
AERONAUTICAL RADIO INC		452.4125	MO
AERONAUTICAL RADIO INC		452.5125	MO
AERONAUTICAL RADIO INC		452.6875	MO
AERONAUTICAL RADIO INC		463.6875	MO
AERONAUTICAL RADIO INC	LOS ANGELE	460.8000	FB2
AERONAUTICAL RADIO INC	LOS ANGELE	460.8750	FB
AIR NEW ZEALAND LTD	LOS ANGELE	151.9550	FBMO
AIR RESORTS AIRLINES		463.9375	MO
AIR RESORTS AIRLINES		463.9625	MO
AIR RESORTS AIRLINES		464.0125	MO
AIRCRAFT SERVICES LAX FUEL	LOS ANGELE	463.7250	MO
ALASKA AIRLINES INC	SAN DIEGO	460.8750	FB2
ALASKA AIRLINES INC		460.8250	MO
ALASKA AIRLINES INC	BURBANK	460.8250	FB
ALASKA AIRLINES INC	LONG BEACH	460.8250	FB2
ALASKA AIRLINES INC	OAKLAND	460.6500	FB2
ALASKA AIRLINES INC	OAKLAND	460.6750	FB2
ALASKA AIRLINES INC	OAKLAND	460.8250	FB2
ALASKA AIRLINES INC	PALM SPRIN	460.8250	FB2
ALASKA AIRLINES INC	SAN DIEGO	460.7750	FB2
ALASKA AIRLINES INC	SAN JOSE	460.8250	FB2
ALASKA AIRLINES INC	SAN MATEO	460.8250	FB
ALASKA AIRLINES INC	SANTA ANA	460.8000	FB2
AMERICA WEST AIRLINES INC		460.6500	MO
AMERICA WEST AIRLINES INC		461.8125	MO
AMERICA WEST AIRLINES INC		462.8125	MO
AMERICA WEST AIRLINES INC		463.8125	MO
AMERICA WEST AIRLINES INC		464.6000	MO
AMERICA WEST AIRLINES INC		464.8125	MO
AMERICA WEST AIRLINES INC	BURBANK	464.6000	MO
AMERICA WEST AIRLINES INC	LONG BEACH	460.6500	MO
AMERICA WEST AIRLINES INC	OAKLAND	464.6000	MO

AMERICA WEST AIRLINES INC	SAN DIEGO	464.6000	FB2
AMERICA WEST AIRLINES INC	SAN FRANCI	461.8125	MO
AMERICA WEST AIRLINES INC	SAN JOSE	464.6000	FB2
AMERICA WEST AIRLINES INC	SANTA ANA	464.6000	FBMO
AMERICAN AIRLINES		460.7000	MO
AMERICAN AIRLINES		460.7750	MO
AMERICAN AIRLINES		460.9375	MO
AMERICAN AIRLINES		461.3875	MO
AMERICAN AIRLINES		461.4875	MO
AMERICAN AIRLINES		461.5125	MO
AMERICAN AIRLINES		461.7375	MO
AMERICAN AIRLINES		461.7625	MO
AMERICAN AIRLINES		461.8125	MO
AMERICAN AIRLINES		462.0875	MO
AMERICAN AIRLINES		463.5875	MO
AMERICAN AIRLINES		463.8875	MO
AMERICAN AIRLINES		463.9125	MO
AMERICAN AIRLINES		464.2375	MO
AMERICAN AIRLINES		464.5125	MO
AMERICAN AIRLINES		464.6875	MO
AMERICAN AIRLINES		464.8625	MO
AMERICAN AIRLINES		464.8875	MO
AMERICAN AIRLINES	BURBANK	460.6500	FB2
AMERICAN AIRLINES	LOS ANGELE	451.3625	MO
AMERICAN AIRLINES	LOS ANGELE	452.3125	MO
AMERICAN AIRLINES	LOS ANGELE	452.4125	FB2
AMERICAN AIRLINES	LOS ANGELE	452.4625	FB2
AMERICAN AIRLINES	LOS ANGELE	462.8500	FB
AMERICAN AIRLINES	OAKLAND	460.6500	FB2
AMERICAN AIRLINES	ONTARIO	460.6500	FB2
AMERICAN AIRLINES	ONTARIO	460.7750	FB2
AMERICAN AIRLINES	PALM SPRIN	460.6500	FB2
AMERICAN AIRLINES	SACRAMENTO	460.6500	FB2
AMERICAN AIRLINES	SAN DIEGO	460.7000	FB2
AMERICAN AIRLINES	SAN DIEGO	460.7750	FB2
AMERICAN AIRLINES	SAN DIEGO	461.9375	MO
AMERICAN AIRLINES	SAN DIEGO	462.0375	MO
AMERICAN AIRLINES	SAN DIEGO	463.3875	MO
AMERICAN AIRLINES	SAN DIEGO	463.6125	MO
AMERICAN AIRLINES	SAN DIEGO	463.8625	MO
AMERICAN AIRLINES	SAN DIEGO	464.3125	MO
AMERICAN AIRLINES	SAN FRANCI	460.7750	FB2
AMERICAN AIRLINES	SAN JOSE	460.6500	FB2
AMERICAN AIRLINES	SAN JOSE	460.6750	FB
AMERICAN AIRLINES	SAN JOSE	460.7750	FB2
AMERICAN AIRLINES	SAN JOSE	460.8500	MO
AMERICAN AIRLINES	SAN JOSE	460.8750	FBMO
AMERICAN AIRLINES	SAN JOSE	464.9125	MO
AMERICAN AIRLINES	SANTA ANA	460.6500	FB2
AMERICAN AIRLINES	SOUTH LAKE	460.6500	FB2
AMERICAN TRANS AIR		452.4125	MO
AMERICAN TRANS AIR		452.4625	MO
AMERICAN TRANS AIR INC	SAN FRANCI	460.7500	FB2
AMERICAN WEST AIRLINES INC	LOS ANGELE	464.7000	FB2
AMERIFLIGHT INC		464.5000	MOI
AMR AMERICAN AIRLINES	LOS ANGELE	507.9375	FB2
AMR EAGLE AIRLINES		460.7000	MO
AMR EAGLE AIRLINES		460.7750	MO
ART SCHOLL AVIATION		464.9500	MO
ASIANA AIRLINES		461.3375	MO
ASIANA AIRLINES		464.3250	MO
ASIANA AIRLINES		464.8250	MO
BRIDGEFORD FLYING SERVICE		154.6000	MO
BRITISH AIRWAYS	SAN DIEGO	460.6500	FB2
BUTLER AVIATION INC	SAN FRANCI	151.8050	FBMO
CHINA AIRLINES	SAN FRANCI	460.7750	FB2
CHINA AIRLINES	SAN FRANCI	460.7750	FB2
CONTINENTAL AIRLINES		460.7000	MO
CONTINENTAL AIRLINES		460.8000	MO
CONTINENTAL AIRLINES		462.0125	MO
CONTINENTAL AIRLINES		464.7875	MO
CONTINENTAL AIRLINES	LONG BEACH	460.8500	FB2
CONTINENTAL AIRLINES	LOS ANGELE	460.7000	FB2
CONTINENTAL AIRLINES	LOS ANGELE	460.8500	FB2
CONTINENTAL AIRLINES	LOS ANGELE	464.4750	FB2
CONTINENTAL AIRLINES	LOS ANGELE	464.8750	FB2

CONTINENTAL AIRLINES	ONTARIO	460.8500	FB2
CONTINENTAL AIRLINES	SACRAMENTO	464.6250	FB2
CONTINENTAL AIRLINES	SAN DIEGO	460.7500	MO
CONTINENTAL AIRLINES	SAN DIEGO	460.8000	FB2
CONTINENTAL AIRLINES	SAN FRANCI	460.7250	FB2
CONTINENTAL AIRLINES	SAN FRANCI	460.8500	FB2
CONTINENTAL AIRLINES	SAN FRANCI	464.7750	FB2
CONTINENTAL AIRLINES	SAN JOSE	460.7000	FB2
CONTINENTAL AIRLINES	SAN JOSE	461.2500	FBMO
CONTINENTAL AIRLINES	SANTA ANA	460.8500	FB2
CONTINENTAL AIRLINES	SOUTH SAN	460.7000	FB2
CONTINENTAL AIRLINES		464.5000	MOI
CONTINENTAL AIRLINES		464.5500	MOI
CONTINENTAL AIRLINES	SAN DIEGO	460.8250	FBMO
CROWN AIR	SAN DIEGO	151.8050	FBMO
DELTA AIR LINES INC		460.7500	MO
DELTA AIR LINES INC	BURBANK	460.7500	FBMO
DELTA AIR LINES INC	LOS ANGELE	460.6500	FB2
DELTA AIR LINES INC	LOS ANGELE	460.7500	FB2
DELTA AIR LINES INC	LOS ANGELE	460.7750	FB2
DELTA AIR LINES INC	LOS ANGELE	460.8250	FB2
DELTA AIR LINES INC	LOS ANGELE	460.8500	FB2
DELTA AIR LINES INC	LOS ANGELE	461.7000	FB2
DELTA AIR LINES INC	LOS ANGELE	464.5750	FB2
DELTA AIR LINES INC	OAKLAND	460.7500	FB2
DELTA AIR LINES INC	ONTARIO	460.8750	FB2
DELTA AIR LINES INC	SACRAMENTO	460.7500	FB2
DELTA AIR LINES INC	SAN DIEGO	460.7500	FB2
DELTA AIR LINES INC	SAN FRANCI	460.7500	FB2
DELTA AIR LINES INC	SAN FRANCI	460.8000	FB2
DELTA AIR LINES INC	SAN FRANCI	460.8250	FB2
DELTA AIR LINES INC	SAN JOSE	460.8000	FB2
DELTA AIR LINES INC	SANTA ANA	460.7500	FB2
DHL AIRWAYS INC	EL TORO	939.9625	FB2
DHL AIRWAYS INC	MCKITTRICK	461.0250	FB4
DHL AIRWAYS INC	MONTROSE	939.9625	FB2
DHL AIRWAYS INC	BERKLEY	854.2125	FB2
DHL AIRWAYS INC	BERKLEY	854.4125	FB2
DHL AIRWAYS INC	SAN JOSE	854.2125	FB2
DHL AIRWAYS INC	SAN JOSE	854.4125	FB2
DHL AIRWAYS INC	WALNUT CRE	854.2125	FB2
DHL AIRWAYS INC	WALNUT CRE	854.4125	FB2
FARMERS AERIAL SERVICE INC	BLTYHE	463.3500	FB4
FLYING TIGER LINE INC	SAN FRANCI	460.8250	FBMO
FRONTIER AIRLINES INC		464.4375	MO
FRONTIER AIRLINES INC	SAN DIEGO	460.7250	MO
FRONTIER AIRLINES INC	SAN DIEGO	460.8250	MO
GM AIR	INDIO	461.3250	FB4
HORIZON AIR		469.5375	MO
HOST MARRIOTT SERVICES CORP	SAN DIEGO	464.9000	FB2
HOST MARRIOTT SERVICE CORP		451.7125	MO
HOST MARRIOTT SERVICE CORP	LOS ANGELE	464.8250	FB2
LONG BEACH MILLION AIR	LONG BEACH	464.7500	FB2
MARCONI FLIGHT SYSTEMS INC	MOJAVE	464.9750	FB2
MARRIOTT IN FLIGHT SERVICES		461.6375	MO
MARRIOTT IN FLIGHT SERVICES		464.1125	MO
MGM GRAND AIR INC		461.9125	MO
MGM GRAND AIR INC		467.1625	MO
MIDWAY AIRLINES INC		460.7750	MO
MILLION AIR INC		464.2375	MO
NORTHWEST AIRLINES INC		460.6750	MO
NORTHWEST AIRLINES INC		460.8875	MO
NORTHWEST AIRLINES INC		461.3625	MO
NORTHWEST AIRLINES INC		465.8875	MO
NORTHWEST AIRLINES INC	LOS ANGELE	460.7000	FB2
NORTHWEST AIRLINES INC	LOS ANGELE	461.4125	FB2
NORTHWEST AIRLINES INC	OAKLAND	460.8500	FB2
NORTHWEST AIRLINES INC	ONTARIO	460.7250	FB2
NORTHWEST AIRLINES INC	SAN DIEGO	460.8500	FB2
NORTHWEST AIRLINES INC	SAN FRANCI	460.8250	FB2
NORTHWEST AIRLINES INC	SANTA ANA	460.7000	FB
NORTHWEST AIRLINES INC		451.9250	MO
NORTHWEST AIRLINES INC		451.9750	MO
NORTHWEST AIRLINES INC		464.3250	MO
NORTHWEST AIRLINES INC		464.5750	MO
NORTHWEST AIRLINES INC		464.6750	MO

NORTHWEST AIRLINES INC		464.7750	MO
NORTHWEST AIRLINES INC		464.8250	MO
NORTHWEST AIRLINES INC	SAN DIEGO	460.8500	FB2
NORTHWEST AIRLINES INC	SANTA CLAR	460.7000	MO
OGDEN GROUND SERVICES	LOS ANGELE	464.0750	FB2
ONTARIO AIRPORT SERVICE	ONTARIO	153.1400	MO
ONTARIO AIRPORT SERVICE	ONTARIO	158.2800	MO
PACIFIC SOUTHWEST AIRLINES	SAN DIEGO	31.2400	FB
PATTERSON FLYING SERVICE	WESTLEY	464.0750	FB4
PHILIPPINE AIRLINES	SAN FRANCI	464.4250	FB2
PHILIPPINE AIRLINES INC	LOS ANGELE	464.8750	FB2
PHILIPPINE AIRLINES INC	SAN FRANCI	464.4250	FB2
QANTAS AIRWAY LTD	LOS ANGELE	460.8250	FB2
QANTAS AIRWAY LTD	LOS ANGELE	460.8500	FB2
QANTAS AIRWAY LTD	LOS ANGELE	463.8625	MO
QANTAS AIRWAY LTD	SAN FRANCI	460.8000	FB2
ROSS FLYING SERVICE INC	BRAWLEY	460.7000	FB
SAN JOSE JET CENTER INC		461.4875	MO
SAN JOSE JET CENTER INC		464.4875	MO
SIGNATURE FLIGHT SUPPORT	GOLETA	152.2850	FB2
SIGNATURE FLIGHT SUPPORT	GOLETA	157.5450	MO
SINGAPORE AIRLINES		154.5700	MO
SINGAPORE AIRLINES		154.6000	MO
SINGAPORE AIRLINES	LOS ANGELE	461.5000	FB2
SKY CHEFS INC	LOS ANGELE	464.8250	FB2
SKY WEST AIRLINES INC		464.1625	MO
SKY WEST AIRLINES INC		460.8000	MO
SKY WEST AIRLINES INC		461.4625	MO
SKY WEST AIRLINES INC		461.5500	MO
SKY WEST AIRLINES INC		461.5875	MO
SKY WEST AIRLINES INC		461.7750	MO
SKY WEST AIRLINES INC		461.8500	MO
SKY WEST AIRLINES INC		461.9375	MO
SKY WEST AIRLINES INC		463.2125	MO
SKY WEST AIRLINES INC		463.3250	MO
SKY WEST AIRLINES INC		463.8625	MO
SKY WEST AIRLINES INC		464.8625	MO
SKY WEST AIRLINES INC		469.2375	MO
SKY WEST AIRLINES INC		469.5000	MO
SKY WEST AIRLINES INC		469.8325	MO
SKY WEST AIRLINES INC	SAN FRANCI	460.6500	FB2
SKY WEST AIRLINES INC	SAN FRANCI	460.7750	FB2
SKYWEST AIRLINES INC	CHICO	460.6500	FB2
SKYWEST AIRLINES INC	MERCED	460.6500	FB2
SKYWEST AIRLINES INC	MODESTO	460.6500	FB2
SKYWEST AIRLINES INC	REDDING	460.6500	FB2
SKYWEST AIRLINES INC	SAN FRANCI	460.6500	FB2
SKYWEST AIRLINES INC	SAN FRANCI	460.7750	MO
SKYWEST AIRLINES INC	SANTA ROSA	460.6500	FB2
SKYWEST AIRLINES INC		463.2125	MO
SOUTHWEST AIRLINES COMPANY		452.2625	MO
SOUTHWEST AIRLINES COMPANY		453.0125	MO
SOUTHWEST AIRLINES COMPANY		458.0125	MO
SOUTHWEST AIRLINES COMPANY		460.8250	MO
SOUTHWEST AIRLINES COMPANY		461.9875	MO
SOUTHWEST AIRLINES COMPANY		462.9375	MO
SOUTHWEST AIRLINES COMPANY		463.7125	MO
SOUTHWEST AIRLINES COMPANY	ONTARIO	460.7000	FB2
SOUTHWEST AIRLINES COMPANY	SANTA ANA	460.8750	FB2
SOUTHWEST AIRLINES COMPANY	LOS ANGELE	464.9750	FB2
SOUTHWEST AIRLINES COMPANY		460.7500	MO
TRANS STATES AIRLINES	LOS ANGELE	452.7750	FB2
TRANS WORLD AIRLINES		151.7750	MO
TRANS WORLD AIRLINES		463.6375	MOC
TRANS WORLD AIRLINES		464.7875	MO
TRANS WORLD AIRLINES	BURBANK	460.6750	FB2
TRANS WORLD AIRLINES	LONG BEACH	460.6750	FB2
TRANS WORLD AIRLINES	LOS ANGELE	151.7750	FB
TRANS WORLD AIRLINES	LOS ANGELE	460.6750	FB2
TRANS WORLD AIRLINES	LOS ANGELE	464.5250	FB2
TRANS WORLD AIRLINES	ONTARIO	151.7750	FB
TRANS WORLD AIRLINES	ONTARIO	460.6750	FB
TRANS WORLD AIRLINES	PALM SPRIN	460.6750	FBMO
TRANS WORLD AIRLINES	SAN DIEGO	460.6750	FB2
TRANS WORLD AIRLINES	SAN FRANCI	460.8500	FB2
TRANS WORLD AIRLINES	SAN JOSE	151.7750	FB

TRANS WORLD AIRLINES	SAN JOSE	151.7750	FBMO
TRANS WORLD AIRLINES	SANTA ANA	460.6750	FBMO
UNITED AIR LINES	SACRAMENTO	460.7250	FB2
UNITED AIR LINES	SAN JOSE	460.7250	FB2
UNITED AIR LINES		461.1375	MO
UNITED AIR LINES		461.2875	MO
UNITED AIR LINES		461.3125	MO
UNITED AIR LINES		461.4375	MO
UNITED AIR LINES		461.5125	MO
UNITED AIR LINES		461.5875	MO
UNITED AIR LINES		461.6375	MO
UNITED AIR LINES		461.6875	MO
UNITED AIR LINES		464.5375	MO
UNITED AIR LINES		466.1375	MO
UNITED AIR LINES		466.2875	MO
UNITED AIR LINES		466.3125	MO
UNITED AIR LINES		466.4375	MO
UNITED AIR LINES		466.5125	MO
UNITED AIR LINES		466.5875	MO
UNITED AIR LINES		466.6375	MO
UNITED AIR LINES		466.6875	MO
UNITED AIR LINES		467.0625	MO
UNITED AIR LINES		467.8750	MO
UNITED AIR LINES	BURBANK	460.8000	FB2
UNITED AIR LINES	LOS ANGELE	460.6625	FB2
UNITED AIR LINES	LOS ANGELE	460.6875	FB2
UNITED AIR LINES	LOS ANGELE	460.7125	FB2
UNITED AIR LINES	LOS ANGELE	460.7250	FB2S
UNITED AIR LINES	LOS ANGELE	460.7375	FB2
UNITED AIR LINES	LOS ANGELE	460.7625	FB2
UNITED AIR LINES	LOS ANGELE	460.7875	FB2
UNITED AIR LINES	LOS ANGELE	460.8125	FB2
UNITED AIR LINES	LOS ANGELE	460.8375	FB2
UNITED AIR LINES	LOS ANGELE	460.8625	FB2
UNITED AIR LINES	LOS ANGELE	460.8750	FB2S
UNITED AIR LINES	LOS ANGELE	460.8875	FB2
UNITED AIR LINES	SAN DIEGO	460.7250	FB2
UNITED AIR LINES	SAN FRANCI	460.6625	FB2
UNITED AIR LINES	SAN FRANCI	460.6875	FB2
UNITED AIR LINES	SAN FRANCI	460.7125	FB2
UNITED AIR LINES	SAN FRANCI	460.7250	FB5
UNITED AIR LINES	SAN FRANCI	460.7375	FB2
UNITED AIR LINES	SAN FRANCI	460.7625	FB2
UNITED AIR LINES	SAN FRANCI	460.7875	FB2
UNITED AIR LINES	SAN FRANCI	460.8125	FB2
UNITED AIR LINES	SAN FRANCI	460.8375	FB2
UNITED AIR LINES	SAN FRANCI	460.8625	FB2
UNITED AIR LINES	SAN FRANCI	460.8875	FB2
UNITED AIR LINES	SAN FRANCI	462.7750	FB
UNITED AIR LINES	SANTA ANA	460.7250	FB2
UNITED AIR LINES	CORONA	935.2375	FB2T
UNITED AIR LINES	CORONA	938.2500	FB2
UNITED AIR LINES	CORONA	938.6500	FB2T
UNITED AIR LINES	CORONA	938.6625	FB2T
UNITED AIR LINES	CORONA	938.6750	FB2T
UNITED AIR LINES	LA CRESCEN	938.2500	FB2
UNITED AIR LINES	LA CRESCEN	938.6625	FB2T
UNITED AIR LINES	LOS ANGELE	935.2375	MO
UNITED AIR LINES	LOS ANGELE	938.2500	FB2T
UNITED AIR LINES	LOS ANGELE	938.6375	FB2T
UNITED AIR LINES	LOS ANGELE	938.6500	FB2T
UNITED AIR LINES	LOS ANGELE	938.6750	FB2
UNITED AIR LINES	SAN FRANCI	460.8000	FB2
UNITED AIR LINES	SAN FRANCI	460.8750	FB2
UNITED AIR LINES	LOS ANGELE	451.1750	FB2
UNITED AIR LINES	LOS ANGELE	452.1500	MO
UNITED AIR LINES	LOS ANGELE	452.4000	FB2
UNITED AIR LINES	LOS ANGELE	452.5000	MO
UNITED AIR LINES	LOS ANGELE	462.3000	FB2
UNITED AIR LINES	SAN FRANCI	451.4750	FB2
UNITED AIR LINES	SAN FRANCI	452.3000	MO
UNITED AIR LINES	SAN FRANCI	452.8000	MO
UNITED AIR LINES	SAN FRANCI	452.8250	MO
UNITED AIR LINES	SAN FRANCI	452.8750	FB2
UNITED AIR LINES	OAKLAND	460.6750	FB2

UNITED AIRLINES	OAKLAND	460.7000	FB2
UNITED AIRLINES	OAKLAND	460.7750	FB2
UNITED AIRLINES	OAKLAND	460.8000	FB2
UNITED AIRLINES	OAKLAND	460.8750	FB2
UNITED AIRLINES		460.7250	MO
UNITED AIRLINES		461.6375	MO
UNITED AIRLINES	BURBANK	460.7250	FB2
UNITED AIRLINES	FRESNO	460.7250	FB2
UNITED AIRLINES	LOS ANGELE	460.7250	FB2
UNITED AIRLINES	LOS ANGELE	460.8750	FB2
UNITED AIRLINES	MONTEREY	460.7250	FB2
UNITED AIRLINES	OAKLAND	460.7250	FB2
UNITED AIRLINES	ONTARIO	460.7250	FB2
UNITED AIRLINES	PALM SPRIN	460.7250	FB2
UNITED AIRLINES	SACRAMENTO	460.7250	FB2S
UNITED AIRLINES	SAN DIEGO	460.7250	FB2S
UNITED AIRLINES	SAN FRANCI	460.8750	FB2
UNITED AIRLINES	SAN JOSE	460.7250	FB2S
UNITED AIRLINES		461.0625	MO
UNITED EXPRESS	SAN FRANCI	460.6500	FB2
UNITED EXPRESS	SAN FRANCI	460.7750	FB2
US AIRWAYS INC	SAN DIEGO	460.8000	FB2
USAIR INC	SAN JOSE	460.8000	FBMO
USAIR INC	LOS ANGELE	463.9875	MO
USAIR INC	LOS ANGELE	464.4250	FB2
USAIR INC	LOS ANGELE	464.4750	FB2
USAIR INC	RAMONA	461.2250	FB4
USAIR INC	SAN DIEGO	460.8000	FB2
USAIR INC		460.8000	MO
USAIR INC	SANTA ANA	460.8250	MO
VIRGIN ATLANTIC		463.5625	MO
WESTAIR COMMUTER			
AIRLINES INC		461.0250	MO
WESTAIR INC	CRESTLINE	463.3750	FB4
WESTAIR INC		460.8000	MO
WESTAIR INC	FRESNO	460.7000	FBMO
WESTAIR INC	FRESNO	460.8000	FBMO
WESTAIR INC	SACRAMENTO	460.8000	FBMO
WESTAIR INC	SAN MATEO	460.6500	FBMO
WESTAIR INC	SAN MATEO	460.7750	FBMO
WESTAIR INC	SANTA ROSA	460.8000	FB2
WESTAIR INC	STOCKTON	460.8000	FB2
WESTAIR INC	MOJAVE	460.8000	FB
WESTAR AIR AMBULANCE		460.7000	MO
WINGS WEST AIRLINES		460.7750	MO
WINGS WEST AIRLINES		460.8000	MO
WINGS WEST AIRLINES	SACRAMENTO	460.7000	FBMO
WINGS WEST AIRLINES	SAN LUIS O	460.7000	FB
WOODLAND AVIATION INC		463.6375	MO
WOODLAND AVIATION INC		463.8875	MO

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To Catch a Spy: Tracking XPH

When you first hear XPH, the reaction is disbelief. This can't be shortwave. It sounds more like 1960s electronic music by Stockhausen or Hiller. Even the name, XPH, sounds more like some sci-fi TV show.

XPH, however, stands for High-Pitched Polytone. It's the station's official designation on the list used by "numbers" fans to keep track of all the different spooks, goblins, and haunts out there. This list is updated twice a year by ENIGMA, the authoritative European Numbers Information Gathering and Monitoring Association.

XPH is heard all over Europe and in the eastern United States. It always starts off with semi-musical tones lasting exactly one second. After a couple of minutes, this changes to an odd audio sweep, then a rapid-fire message using seven tones per second. This bleating lasts a minute or two, then it's all over. That's it. No voices, no identification, no Morse code, nothing.

This is the kind of thing that makes real radio fans crazy to know more. It's out there, but what the heck is it? Well, read on.

❖ XPH Description

The polytone station has been around for at least 25 years. By comparing transmitter malfunctions, periodic buzzes in the audio, and other such data, listeners were able to trace it pretty confidently to a very large network of Russian stations operated by the KGB intelligence department, then by its successor. Transmitters are believed to be near Smolensk and Moscow, both in western Russia.

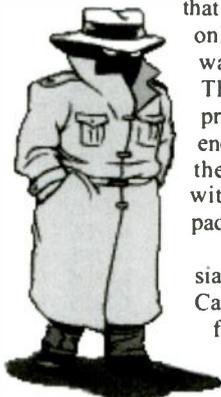
Other stations in this group, such as the "Russian Man" and the "German Lady," use one of several strange, mechanical voices in a number of languages. There is also a Morse code station. All coded messages end with the distinctive "000 000."

Polytone itself has used several formats, with "high pitch" being the latest one. The schedule changes monthly, in an only partially predictable manner. There's no way to know right now, at press time, where XPH will be when anyone sees this. This suggests one good use for the Internet, which is, in fact, where most of us get the schedules.

Regardless of exact time and frequency, there will always be two broadcasts, possibly different services, around twelve hours apart. They're usually made on two successive days of the week for a total of four weekly. Each of these four always breaks down into three short transmissions; the first one on the hour, the second at the

hour plus 20 minutes, the third at the hour plus 40. If the hour and hour-plus-20 transmissions have no message, the hour-plus-40 transmission is omitted.

Presumably the audio tones decode through some kind of "black box" that spies in the field need only plug into a short-wave broadcast radio. The result displays or prints out some kind of encrypted text, which is then further decrypted with the one-time code pad or whatever.



In 1979, a Russian spy was arrested in Canada. News accounts from that period indicate that he was found using some kind of "tone-decoding apparatus" and a simple receiver. Most likely, this was XPH in action.

❖ Closing In

Numbers fans began trading XPH recordings over the Internet, but then two very good ones appeared on the monumental "CONET Project." This was an amazing set of four audio CDs, all numbers tracks, that sold out almost instantly.

At the same time, personal computer software using the Fast Fourier Transform became simple, widespread, and free. In quick, non-calculus English, FFT is a routine that turns digital audio signals, which are amplitude sampled over time, into spectrum plots, which are frequencies expressed over time. This has all sorts of great uses, among them the quick and painless display of what's really happening in a received or recorded utility signal.

I thought I'd gotten pretty advanced with this software, but compared to some of the people who jumped on the CONET recording, I was painting bulls on the cave wall. It didn't take these guys long to nail down Polytone as a modulation scheme using 14 audio tones, each 16 hertz apart. It didn't take them much longer to decode these warbles into letters, and decode the letters into special number triplets. These, in turn, were mapped to single digits 1 through 0, plus some special characters for breaks, repetitions and such.

Within months, there were several handwritten computer programs to decode

polytone signals. It is now possible to instantly compare the actual messages heard on-air. What was seen about the format immediately gave further proof, if any was needed, of the station's Russian origin.

Right now, work is being done on subtle phase shifts which the FFT analyzers have turned up in some of the tones. One listener thinks that further information, perhaps code pad start points, might be hidden here.

I don't think we've heard the last about XPH. Have fun with this one.

❖ Some Useful Internet Addresses:

Polytone schedules change monthly. The latest ones are always posted to the Spooks mailing list. The server at QTH.NET archives all postings to www.qth.net/archive/spooks/. Hard core numbers fans should probably go all the way and subscribe to this list.

Ary Boender has an excellent recording of an XPH transmission at:

<http://home.luna.nl/~ary/download.htm>.

Valeriano Martin's free XPH decoder for the PC (under DOS) is at:

<http://home2.worldonline.es/tarabicu/xperta.htm>.

Multimode, a commercial program for the Mac that will do XPH, is at: www.blackcatsystems.com/software/multimode.html.

Spectrogram, a nice, freeware program for spectrum analysis on the IBM PC, is at: www.monumental.com/rshorne/gram.html.

ENIGMA has a web site now. It's at <http://reachus.at/enigma>. Their official newsletter is still by snail-mail and thus rather expensive overseas, but it's absolutely worth every penny.

And, of course, there's the special "numbers" coverage on my Utility World web site at www.ominous-valve.com/uteworld.html.



Abbreviations used in this column

AFB	Air Force Base
ALE	Automatic Link Establishment
AM	Amplitude Modulation
ARQ	Automatic Repeat Request teleprinting system
AWACS	Airborne Warning And Control System
CAMSLANT	Coast Guard Area Master Station, Atlantic
CG	Coast Guard
CIA	Central Intelligence Agency
CW	Morse code telegraphy ("Continuous Wave")
DEA	Drug Enforcement Agency
FAPSI	Federal Agency for Government Communications and Information
FAX	Radiofacsimile
FEC	Forward Error Correction teleprinting system
GANTSEC	Greater Antilles Section
ID	Identifier
LAPM	Link Access Protocol for Modems
LDOC	Long Distance Operational Control
Meteo	Meteorology
MFA	Ministry of Foreign Affairs
MWARA	Major World Air Route Area
NAS	Naval Air Station
NAVTEX	Navigational Telex
PacTOR	Packet Teleprinting Over Radio
Piccolo	6 or 12-tone multifrequency shift keying teleprinter system
PR	Puerto Rico
RCA	Radio Corporation of America
RSA	Republic of South Africa
RTTY	Radio Teletype
SAM	Special Air Mission
SCOPE	System Capable Of Planned Expansion
SITOR	Simplex Teleprinting Over Radio
UK	United Kingdom
Unid	Unidentified
US	United States
VFT	Voice Frequency Telegraphy
VIP	Very Important Person

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

- 66.67 RBU-Russian CW time signal station, at 2119. (Ary Boender-Netherlands)
- 147.3 DDH47-Hamburg Meteo, Germany, with RTTY weather in plain text at 1543. (Boender-Netherlands)
- 318.0 OZ-Nondirectional beacon, Kardla, Estonia, continuous CW at 2158. (Boender-Netherlands)
- 380.0 KA-Nondirectional beacon, Tirana, Albania, continuous CW at 2132. (Boender-Netherlands)
- 490.0 "U"-NAVTEX ID of GCC, Cullercoats Radio, UK, with SITOR-B bulletin at 1920. (Boender-Netherlands)
- 518.0 "S"-Niton Radio, UK, in SITOR-B, with continuous garbage characters, and modem "no carrier" message once per minute, at 0625. Regular NAVTEX bulletin broadcast correctly at 0700, then same garbage, finally "connect LAPM compressed," at 0733. (Day Watson-UK)
- 2582.0 VAR-Fundy Radio, Canada, working vessel *Atlantic Horizon* at 0200. (Ron Perron-MD)
- 2598.0 VOJ-Canadian Coast Guard, Stephenville, with information bulletin in French and English, at 0213. (Perron-MD)
- 2749.0 VCS-Canadian Coast Guard, Halifax, with information bulletin and fishing net locations, in English at 0126. Fundy Coastal Radio, Canada, with weather forecasts for Maritime Provinces in French, at 0205. (Perron-MD)
- 3557.0 Unid-CW station in the amateur band, repeating "NZ06," nothing else, at 1327. Heard again, different day, on 3557.4, also at 1327. (Takashi Yamaguchi-Japan)
- 4047.7 L9CC-CW station repeating "V CP17 DE L9CC," at 1955. (Yamaguchi-Japan)

- 4214.0 ZSC-Capetown Radio, with weather in SITOR-B, parallel on 12601 and 16816, at 1023. (Bob Hall-RSA)
- 4521.7 PNA-Prefectura Naval Argentina, with many short, Spanish weather messages and calls to ships, at 0335. (Hall-RSA)
- 4739.0 Wafer 755-US Navy P-3C, passing a Spare Group report to Golden Hawk, NAS Brunswick, at 0107. (Perron-MD)
- 4777.5 IMB51-Rome Meteorological, Italy, with fuzzy FAX upper air chart, 120/576, at 1916. (Watson-UK)
- 4796.0 Unid-Weird thumping signal, with downward sweeps over wide band at 0500. (Tom Sevart-KS)
- 4854.9 KGWC-meteo ID of US Air Force Global Weather Center, NE, with fuzzy, 120/576, FAX weather charts for North America, Gulf of Mexico, and Caribbean, transmitter possibly in PR, at 0555. (Watson-UK) *Yup. USAF FAX is back! -Hugh*
- 5277.0 Panther-DEA, Bahamas, in radio check with Coast Guard 20C, at 0526. (Perron-MD)
- 5390.0 CDG206-Alma Radio, Canada, with patches in English and French, first intercept in two years, at 2305. (Mid-Atlantic DX-MD)
- 5841.0 Coast Guard 20C-US Coast Guard, with position for Panther (DEA, Bahamas), called it the "Bravo" frequency, at 0251. Coast Guard 41C, tracking a "go fast" boat with Panther at 2256. (Perron-MD)
- 6477.5 KPH-San Francisco Radio, Point Reyes National Seashore, CA, with CW markers and special broadcasts commemorating the 1 year anniversary of the last US commercial Morse code, at 0525. (Watson-UK)
- 6513.0 VFF-Canadian Coast Guard, Iqualit, with a Marine Information Bulletin in French and English, at 0112. (Perron-MD)
- 6556.0 Calcutta Radio, India, getting position from Singapore Air 352, at 1936. (Gary Cohen-China)
- 6637.0 Cedar Rapids LDOC, taking positions from Gemini 706 and Continental 94, at 0424. (Perron-MD)
- 6646.0 Possible Canadian LDOC, with aircraft making arrival arrangements in French, at 0238. (Perron-MD)
- 6721.0 270045-US Air Force transport, trying an ALE-initiated patch via OFF (Offutt AFB, NE), told by operator to "get a better line," at 0108. (MADX-MD)
- 6730.0 EBFL-Spanish Navy, giving position to coastal station in Spanish, at 0354. SAM 202-US Air Force VIP flight, making radio checks with Andrews at 2142. (Perron-MD)
- 6757.0 Unid-CW alphanumeric code, at 0211. (Camillo Castillo-Panama)
- 6779.0 DRAX-German Navy Sailing Training Ship *Gorch Fock* in the tall ship parade, calling DHJ59, Wilhelmshaven, at 0105. (Perron-MD)
- 6815.6 GANTSEC-US Coast Guard Greater Antilles Section, PR, working Shark 06 in a tracking operation, at 2325. (Perron-MD)
- 6837.0 FDG-French Air Force, Bordeaux, France, testing in RTTY (400/50), in the usual "voyez le brik..." marker, but missing the spaces between characters, at 1803. (Watson-UK)
- 6878.0 Unid-Coded alphanumeric CW, at 0259. (Castillo-Panama)
- 7016.0 The Russian Man-Russian Intelligence (S6), with a weird synthesized AM voice that sounds best in lower sideband. This is a documented 40-meter intruder with "numbers" every Thursday beginning at 1104. Usually ends "00000", sounding like "Noil" in Russian, but this transmission cut off abruptly at 1114. (Yamaguchi-Japan)
- 7066.0 L9CC-CW station repeating "V CP76 DE L9CC," another common 40-meter intruder, possibly Chinese, at 1817. (Yamaguchi-Japan)
- 7397.9 KGWC-US Air Force Global Weather Center, with fuzzy FAX chart of US and Gulf (120/576), parallel on 7869.9, at 0658. (Watson-UK)
- 7710.0 MKK-Royal Air Force, UK, in 2-channel Piccolo mode with orderwire on channel 1 (7710.51), traffic in channel 2 (7710.91), at 1317. (Watson-UK)
- 8122.0 Canberra Control-Australian Navy, in message traffic with vessel "Echo Tango India," at 0806. (Perron-MD)
- 8125.0 KLOB7-US Federal Aviation Administration, Eastern Net Control Station, Martinsburg, WV, taking many check-ins, at 1446. (MADX-MD)



- 8190.5 L9CC-CW station repeating "V CP76 DE L9CC," at 1320. (Yamaguchi-Japan)
- 8375.0 "Beijing Calling"-Female AM "numbers" voice (V22), started with usual "All stations, this is Beijing speaking," in Mandarin Chinese, for 5 minutes at 1430. (Yamaguchi-Japan)
- 8618.0 KPH- San Francisco Radio, Point Reyes, CA, with CW markers and special broadcasts, at 0527. (Watson-UK)
- 8642.2 MGJ-Royal Navy, Faslane, UK, with channel bulletins in VFT at 1234. (Boender-Netherlands)
- 8669.0 IAR-Rome Radio, Italy, with CW marker at 0302. (Castillo-Panama)
- 8903.0 Ndjamena Radio-MWARA Africa/Indian Ocean-4, taking position from Springbok 275, at 2313. (Perron-MD)
- 8921.0 London LDOC, with patch from aircraft Charlie Delta, arranging paramedic equipment on arrival, at 0154. London LDOC, working an in-flight maintenance problem with Speedbird 216, at 0517. (Perron-MD)
- 8965.0 Reach 1152-US Air Force Air Mobility Command, calling Andersen AFB, no joy, also some ALE, at 0756. (Perron-MD)
- 8971.0 Golden Hawk-US Navy, Brunswick, in radio checks with P-3C aircraft Wafer 748, at 2346. (Perron-MD)
- 8980.0 Coast Guard Rescue 1716-US Coast Guard HC-130, FL, with a patch to CG District 5 Miami Ops via CAMSLANT Chesapeake, at 0023. (Perron-MD)
- 8983.0 CAMSLANT Chesapeake-US Coast Guard, in rescue operation with CG 2121, at 2328. (Perron-MD)
- 8992.0 Circus Vert-French Air Force, Villacoublay, taking position from an aircraft at 2342. (Perron-MD)
- 9016.0 Resemble-Probably WAR 46, US military, PA, working Free Land at 0620. (Jeff Haverlah-TX)
- 9023.0 Okie Sam-US Air Force, Tyndall AFB, FL, working "3-Q-T" at 0307. (Perron-MD)
- 9215.0 Unid-Male AM English voice, possibly the CIA "Counting Station" (E5), with 5-figure groups for "823," at 0205. (Castillo-Panama)
- 9255.0 4XZ-Israeli intelligence (M22), with coded CW message for GHIF, at 0214. (Castillo-Panama)
- 9260.0 Cuban "Atencion" station (V2), AM, with only hum, then a long string of numbers, then back to normal 5-figure groups, at 0209. (Castillo-Panama)
- 9263.0 Cuban "Atencion" station (V2), AM, with 5-number groups in progress, at 0215. (Castillo-Panama)
- 10126.0 Cuban "Cut" CW numbers (M8a), in the amateur band, and in progress at 0905. (Yamaguchi-Japan) *As a fixed station, M8a might even be legal here. -Hugh*
- 10345.0 Cuban CW "Cut Numbers Station (M8), messages for 3100?, 33045, and 74847, at 0304. (Castillo-Panama)
- 10355.0 4XZ-Israeli Navy, Haifa (M22), with CW marker at 2137. (Yamaguchi-Japan)
- 10722.0 DHJ59-German Navy, Wilhelmshaven, working DRAX at 2343. (Perron-MD)
- 10993.0 "D-6-B"-US Coast Guard, calling Group Key West, probably a law enforcement mission, at 0108. (Perron-MD)
- 11175.0 Puerto Rico-US Air Force, possible SCOPE Command, also testing on other Global frequencies, in signal check with Thule Air Base, Greenland, at 0430. (Haverlah-TX)
- 11192.9 Miramar-Probably US Navy air training at Miramar NAS, CA, working callsigns sounding like Tac Trainer and Sand Hill, at 0305. (Perron-MD)
- 11214.0 Sentry 63-US Air Force AWACS, passing a formatted report to Raymond 24 (Tinker AFB) via Canadian Forces Trenton Military, at 2340. (Perron-MD)
- 11226.0 Reach 0450-US Air Mobility Command, with an ALE-initiated patch via Hickam to Andersen AFB, at 0800. (Perron-MD)
- 11232.0 Trenton Military-Canadian Forces, patching Sentry 64 (E-3B AWACS) to Raymond 24 (Tinker AFB), then some ALE heard, at 2145. (Perron-MD)
- 11243.0 Unid-Southern Africa Long-Distance Hauliers, with chatter in English, Afrikaans, and Xhosa, at 1500. (Hall-RSA)
- 11440.0 CESYP-Colombian Navy, San Andres and Providencia Islands, with ALE and Clover-2000 (a fast direct-printing mode), at 0133. (MADX-MD)
- 11455.0 "Atlantico"-Colombian Navy to Covenas at 0156. (MADX-MD)
- 12156.0 Polytone Station (XPH), Russian, with tone-coded AM message, Friday at 2040. (Boender-Netherlands)
- 12415.0 DRAX-German Navy sail training ship, calling DHJ59, no joy, at 2145. (Perron-MD)
- 12615.0 USU-Mariupol Radio, with ARQ message in English for UZHD, at 1628. (Hall-RSA)
- 12625.5 UCE-Arkhangelsk Radio, with ARQ message in Russian for vessel *Pioner Muldaavi*, at 1631. (Hall-RSA)
- 12877.5 UIW-Kaliningrad Radio, Russia, working UHEZ and ESHX in RTTY at 1255. (Boender-Netherlands)
- 12921.2 MGJ-Royal Navy, Faslane, UK, with channel bulletins in VFT at 1249. (Boender-Netherlands)
- 13098.0 5BA62-Cyprus Radio, Nicosia, Cyprus, repeating "This is Cyprus Radio, Radiotelephone Monitoring Service" in English and Hebrew, also on 17248, at 2222. (Yamaguchi-Japan)
- 13348.0 Cedar Rapids LDOC, setting 8933 as alternate with Continental 94, at 0427. (Perron-MD)
- 13375.0 Lincolnshire Poacher (E3), British intelligence, Cyprus, with many 5-letter groups in a female voice, at 1730. (Hall-RSA)
- 13438.0 Polytone Station (XPH), Russian, with tone-coded AM message, Friday at 2020. (Boender-Netherlands)
- 13530.0 KAWN-meteo ID of US Air Force Aviation Weather Network, with weather in RTTY (850/75N) at 1828. (Watson-UK)
- 14353.5 S84-Swedish Embassy, Washington, DC, in ALE contact with S12, Bogota, Colombia, at 2055. (MADX-MD)
- 15016.0 Andrews-US Air Force Andrews Global, MD, with Sky King broadcasts at 0315, 0323, 0330, 0340, and 0652. Elmendorf Global, AK, with Fairbanks arrival weather for unheard aircraft, at 0620. (Larry McDermott-CA)
- 15780.9 KGWC, with noisy FAX chart of North America (120/576), parallel on 19362.9, at 1614. (Watson-UK)
- 15930.0 Unid-Probably Brazilian Navy, giving position reports in Portuguese, went to unknown frequency "Xavier," at 0100. (Perron-MD)
- 15962.0 May Time-US military, asking Class Room "How's it going, Bro?" then into long scrambled messages, at 1640. (Haverlah-TX)
- 16402.0 Unid-Spanish news broadcast with male announcer, cut off by female who said, "Stations calling Lima, go ahead please," at 0921. (Cohen-China) *Peruvian diplomatic? -Hugh*
- 16803.0 Unid-SITOR-B traffic in what looked Indonesian, plus dirty jokes in English, at 0750. (Hall-RSA)
- 16806.5 NMC-US Coast Guard, San Francisco, CA, with SITOR-B Pacific weather at 1510. (Hall-RSA)
- 17055.0 MGJ-Royal Navy, Faslane, UK, with channel bulletins in RTTY (350/75), at 1249. (Hall-RSA)
- 17937.0 Lima LDOC, Peru, taking position and weather report from "Flight 961" at 2252. (Perron-MD)
- 18003.0 500322-US Air Force tanker, sounding in ALE, at 1312. (MADX-MD)
- 18192.2 NMC-US Coast Guard Pacific e-mail system, San Francisco, CA, in a slow PacTOR traffic list for vessels NGDF, NLVS, NSTF, NZNE, NAQD, NODT, NLPM, and NMAG, at 1530. (Hall-RSA)
- 18470.0 VKF-Probably Australian military, calling VKC in ALE at 1229. VKF with ALE call to VKM, at 1236. (MADX-MD)
- 19131.0 Atlas-DEA/US Customs contract facility, Cedar Rapids, IA, working Flint 25 at 1504. (MADX-MD)
- 19362.9 KGWC, with FAX chart (120/576) of US and Gulf of Mexico, at 1500. (Watson-UK)
- 19862.0 MGJ-Royal Navy, Faslane, UK, with channel bulletins in RTTY (340/75), at 1610. (Hall-RSA)
- 20975.0 P6Z-French MFA, Paris, with those silly new French codes, in FEC at 1622. (Hall-RSA)
- 21925.0 San Francisco Radio-MWARA Central/East Pacific-1 and 2, taking position at 2159. (Perron-MD)
- 21973.7 TAD-Turkish MFA, Ankara, with FEC news in Turkish, at 1524. (Hall-RSA)
- 22863.0 Unid-FAPSI, Russia (M42?), with 5-letter groups in RTTY (500/100), for link 00099, at 1644. (Hall-RSA)
- 23337.0 280050-US Air Force transport, in an ALE-initiated patch to West Coast/McClellan AFB, CA, at 1813. (MADX-MD)

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ALE Networks Update

Since the release of Charles Brain's PC-ALE software, monitoring the airwaves for Automatic Link Establishment signals has become routine for many folks. The technology may have changed but the game is still the same – there are plenty of mystery networks using ALE and more monitoring and research is needed to identify the organizations behind the signals. This month we cover a few of these networks in the hope that a more few clues may come to light.

❖ Washington Gas & Light Company

First, here's an example of how we busted one particular network. Over the course of a few months, various monitors noted the unusual ALE identifiers SHENGAS, FREDGAS, ROCKVL, GRASSY, GARDINROAD and 11STREET. Frequencies used were (all LSB): 4650, 4700, 5312, 5509, 6780, 7795, 9200 kHz

The frequencies and the identifiers suggested a North American user. We began with a web search, which by entering the ALE identifiers as search terms revealed one hit – www.shengas.com – the website of the Shenandoah Valley Gas company, an affiliate of Washington Gas. Due to geographic proximity, we therefore guessed that the ALE identifier ROCKVL was Rockville, MD. A search at the *US Gazetteer* (see the Resources section) gave us that place's latitude and longitude. Next, a quick click took us to the FCC Frequency Database (see Resources section). The "Lat/Long/Frequency" option allowed us to enter our latitude and longitude coordinates and perform a search for any registered stations between an upper and lower frequency and within a 125 mile radius of the given location.

After about the fourth frequency in our list, we struck gold – callsign WPPY393 registered to a "Washington Gas & Light Company." Once a callsign is known, the FCC database allows you to look it up and then simply click through a series of "drill down" screens that showed us all the other frequencies and locations used by this organization. By checking the address details for the various transmitter locations, it was easy to then determine the origin of our ALE identifiers:

6801 Industrial Rd, Springfield, VA	(ALE = SHENGAS)
1100 H Street, Washington, DC	(ALE = 11STREET)
Westmore Rd, Rockville, MD	(ALE = ROCKVL)
Market Street, Frederick, MD	(ALE = FREDGAS)
Kernstown, VA	(ALE = GARDINROAD)
Grassley Lick Compressor Station, Kirby, WV	(ALE = GRASSY)

It was interesting to note that the station's registered frequencies are: 2194, 3155, 4438, 5005, 6765, 7300, 9201, 10201, 11101, 12101, 13451, 14451, and 15851 kHz. Not only do many of these appear to be unused, but different frequencies are used for the actual transmissions.

❖ Australian Police?

Our next network is very extensive, and can be found on the following frequencies:

8055 9057 10450 11073.5 11164 12226 13375 14471
14675 14710 16270 18470 19060 19120 20420

Identifiers used include:

VBL, VCP, VCR, VJJ, VJZ, VKA, VKB, VKC, VKE, VKF, VKG, VKM, VJP, VKY, VKW, VOC, VOX, VTQ

A number of these identifiers correspond to well-known callsigns of the Australian state police and other affiliated organizations such as the RFDS (Royal Flying Doctor Service). And, they are known to have installed an HF network as backup to their VHF and UHF systems. It appears that only VKF sends probes to other stations and long-term monitoring of this network has not revealed the presence of any voice or data traffic after ALE. It's therefore difficult to confirm that this is indeed Australian in origin.

❖ UK Military, Diplomatic or INTERPOL Network?

This network is a good example of where, even with the best guesses and observations, there may be a few alternative solutions. DD readers will know that UK Army, Navy and Air Force units can sometimes still be heard on HF, but the British diplomatic service has long since moved to satellite communications. Although some INTERPOL stations still exist on HF, the organization has largely vacated shortwave for its own X.25 data network.

Here the network's ALE identifiers suggest place names which correspond closely to locations where UK embassies had active HF stations, where the UK military is currently operating (especially in ex-Yugoslavia), or with INTERPOL stations active on HF a decade or so ago. ALE often triggers data sent with the Racal MSM-1250 (see Resources section) equipment. Frequencies used are as follows:

6845 7992 9306 10392 10662 11008 11096 11523
12144 13149 13456 14580 14776 14814 15877 16640 16934
17490 18277 18974 19464 19977 20602 21867 23822 24268

ALE identifiers and likely locations are:

ABA	Addis Ababa, Ethiopia
AMM	Amman, Jordan
ASI	Asuncion, Paraguay or Ascension Island
AZQ	Azores?
BLE	Belgrade, Serbia
CYP	Nicosia, Cyprus
DEL	New Delhi, India
DKL	Dekhelia, Cyprus
DUB	Dublin, Ireland or Dubai, UAE
FCB	???
FP2	???
HFB	???
HSP	Net Control Station
HS2	Net Control Station
ISL	Islamabad, Pakistan
KIV	Kiev, Ukraine
KUW	Kuwait City, Kuwait
LAG	Lagos, Nigeria
LUA	Luanda, Angola
MOS	Moscow, CIS or Mostar, Bosnia
PRI	Paris, France or Pristina, Kosovo
RIY	Riyadh, Saudi Arabia
RYN	???
SRP	???
VNA	Vienna, Austria or Vicenza, Italy
YQE	???

The net control station identifiers are strongly suggestive of Hanslope Park, once an important Foreign & Commonwealth Office transmitting station.

❖ Algerian Diplomatic Service

With its distinctive Coquelet multitone system, MFA Algiers is well-known to many digital listeners. However, this equipment is now showing its age and is being gradually replaced with the Racal MSM-1250 modem. The Racal gear uses ALE for link setup, and we can therefore find many Algerian embassies now using the new system. Frequencies where ALE has been noted are: 11475 14422 16080 16340 18758

ALE identifiers are, once again, indicative of the embassy location:

BRO	Bcmako, Mali
GAO	Garoua
MAE	MFA Algiers
NKT	Neuakchott, Mauritania
NMY	Neimay, Niger
RBT	Rabat, Morocco
TNS	Tunis, Tunisia
TRP	Tripoli, Libya

❖ Czech Republic Diplomatic Service?

This network, apparently only active during weekdays, has been heard on a number of frequencies with ALE activating a STANAG4285-type burst modem (see Resources section): 10438 11117 14420 18598 kHz

The ALE identifiers again suggest place names, but in Czech:

BRA	Bratislava, Slovak Republic
KAH	Cairo, Egypt
HEC	Helsinki, Finland
LIN	Lisbon, Portugal
PRA	Prague, Czech Republic

❖ PSK31: No Longer Just an Amateur Mode

PSK31, the simple, narrowband and free digital system invented by radio amateur Peter Martinez, has taken the ham community by storm during the last year. Its ease of use, requiring just a simple PC and soundcard, means that it's been quick to penetrate non-ham organizations. Be on the lookout for the characteristic warbling carrier sound outside the amateur bands. The US Military Affiliate (MARS) stations have already been heard using this mode.

Resources

Racal MSM-1250 Audio Clip - rover.wiesbaden.netsurf.de/~signals/WAV/MSM1250.WAV
 STANAG4285 Burst Clip - rover.wiesbaden.netsurf.de/~signals/WAV/RACAL-HSM.WAV
 US Gazetteer - www.camsus.gov/cgi-bin/gazetteer
 FCC Database - gulfoss2.fcc.gov/cgi-bin/ws.exe/gomnen/index.htm
 PSK31 Homepage - www.kender.es/~edu/psk31.html

American Forces Network Expands USB Shortwave

On July 31, 2000, the Armed Forces Satellite Transmitted Radio Service (AFSTRS) went off the International Maritime Satellite (INMARSAT) system. For the past year and a half [actually two years - gh], Navy HF service from Key West Naval Air Station (NAS), Florida, and Roosevelt Roads NAS, Puerto Rico, have been simultaneously transmitting the AFSTRS service via land-based outlets known as the "Voice Line." This has served ships in the Caribbean Sea and the waters around South America quite well since the AFSTRS service was terminated on the INMARSAT Atlantic West satellite in 1998.

AFN is negotiating for cooperative use of the transmitters and assignment of frequencies so the Navy HF service will also be transmitted from U.S. Navy facilities in Guam, Diego Garcia (12579 day, 4319 night -lvh), Sicily, Iceland, and Maine. With over 100 U.S. Navy ships now equipped for Direct to Sailor (DTS) satellite television and radio service it is no longer cost-effective to continue this service on INMARSAT. However, for those ships still to have DTS equipment installed during the next year and a half, and for those few Navy ships that may never have DTS equipment, the HF service will help fill the gap (AFN site www.afrts.osd.mil/afnonradio/satnet.htm via Joe Olig, Larry Van Horn) The notice goes on to list 6458.5 day and 12689.5 night from both Key West and Roosevelt Roads, plus Sigonella, Sicily, 4993 day and 10940.5 USB night, but we know the higher frequencies are also on the air in the daytime, and the lower ones at night (gh)

From the new Sigonella, Sicily, site, AFN Radio on 10940.5 USB faded in to Northeast Ohio beginning around 1920 and listened until 0000 UT (Lee Silvi, Mentor, *DXLD*) Heard as early as 2335 and as late as 0600, but best around 0300 with up to good reception at that time // 6458.5 (Walt Salmaniw, Victoria BC, *DXLD*) Then also heard on 4993 from Sicily, nice signal here in Germany but suffering somewhat from strong RWM (Moscow time signal) on 4996, not // AFN Europe on 873 etc. (Kai Ludwig, Germany, *DXLD*) Was also on 14000 USB for a few days, intruding on 20m (Kurt Brandstetter, Austria; Guido Schotmans, Belgium; Luis Mailló, Spain, *hard-core-dx*) Kept trying new frequencies: 6847.5, and then exactly 10 MHz higher on 16847.5 (gh) And 6350 USB, very strong in morning here, site? (Hans Johnson, WY, *Cumbre*)

Previously a verification letter from AFRTS said: The signal originates from Naval Computer and Telecommunications Area Master Station, Key West, Florida, at 12689.5 kHz and Naval Computer and Telecommunications Station, Puerto Rico at 6458.5 kHz. Key West broadcasts with a 48 foot inverted cone antenna from Boca Chica, Florida, with 8 kW of power. PR broadcasts with a ground-based, omnidirectional wire antenna with a 30 foot diameter with 10 kW from Isabela (v/s Michael Foutch, Broadcast Operations Specialist, Naval Media Center, 2713 Mitscher Road SW, Washington, DC 20373-5819, via Leonard F. Estorge, Metairie LA, *DXLD*).

Radio buffs may request a QSL verification by email to Navy Uplink Reception at QSL@mediacen.nay.mil (lvh).

ALASKA KNLS will add a second 100 kW transmitter and antennas to double its capacity (NASB via Wolfgang Büschel)

ANGOLA [non] Radio Ecclesia transmissions via Radio Netherlands stopped July 26 until further notice. Due to technical problems in Angola, the station was no longer able to feed audio. Radio Ecclesia continues to be audible on the Internet, but the specially produced SW program is not available (Andy Sennitt, RN)

AUSTRALIA Radio Australia is to receive an extra A\$3 million per year for three years to enhance its transmission and online capacities in the Asia Pacific region. In making the announcement 8 August, the Minister for Foreign Affairs and the Minister for Communications cited recent developments in the region, and the importance of maintaining an independent and credible voice that offered an Australian perspective. The additional funding is expected to be used to boost RA's transmission reach in the region, as well as further develop its online services (Matt Francis, Canberra, *Electronic DX Press*) RA head M. Manguy seemed confident RA would now buy time on Darwin and renew time via Taiwan (gh)

BOLIVIA Story about the slow death of Radio Huanuni, 5964.8: times are changing: It was once one of the most important mining stations in Bolivia.

The Agony of Radio Huanuni: It has a debt of 8 kilobolivianos (US\$ 1.288) on its electricity bill. Only 580 workers are contributing half the cost (14 bolivianos or US\$ 2.25) for its operation and the salary for nine employees. Divisions between the same mining workers are a problem. The quixotic director, Rafael Lineo, does what he can. It goes on the air at certain times. The union plans to convert it to FM on the air all day, and put it on AM (SW) at 1000-1100 and 1600-1700 UT. The question is: why do they resist charging for the advertising they broadcast? (*Los Tiempos*, Cochabamba, via Rogildo Fontenelle Aragão, Bolivia, *radioescutas*)

R. Illimani signed an agreement with Canal 7 on May 12, 2000, thanks to which R. Illimani uses the entire infrastructure of Canal 7 and parts of its satellite system to reach the entire world. We are now transmitting on Intelsat NSS-806/319.5. E Transponder 13B 1.230 MHz Banda L/C Canal 8 Polarización Horizontal. We are undoubtedly very glad to

know that we have many listeners in Europe on 6025 SW. Nevertheless, thanks to the satellite we share with Channel 7, our signal is more international. We will be glad to hear from you at Casilla 1042, La Paz, or by E-mail illimani@comunica.gob.bo (Gabriel Astorga Guachalla, Director Radio Illimani, "La Voz De Bolivia," August 8, via Henrik Klemetz, Sweden, *DXLD*)

BRAZIL First-hand news of a station reactivated: 5013 at 0200, R. Copacabana. Rio de Janeiro, religious programs, finally heard ID after 40 minutes (Célio Romais, Pôrto Alegre, Brasil, Associação do DX Clube do Brasil, *DXLD*)

Note from the Brazilian ambassador in Romania, Jerónimo Moscardo, says the Brazilian and Romanian governments signed an agreement in Brasilia for technical and programming cooperation between Radiobrás and RRI. Radiobrás plans to increase the number of hours and languages broadcast on SW to Europe [from zero to what? -gh], and RRI plans to maintain its services in Spanish and Portuguese to Latin America. Starting next January, professionals at both stations are to undertake training at the other (Denis Zoqbi, *radio-escutas*)

CHIAPAS [non] The report in your August column that KIPM is related to La Voz del Zapatista is not true. I do not feature this station in my programming. Perhaps you can alert folks before I get a bunch of QSL requests (Alan Maxwell, KIPM) The program simply appeared after a KIPM broadcast of the same day and Mr Crawford's imagination took over from there. I want nothing to do with this clandestine station which happens to concern blasting a neighboring country which is friendly to the USA. Any mail addressed to VZ showing up at the Lula maildrop is going straight to the trash unopened (RadioBob, Lula)

My apologies if I erred. I went back to my logging of June 3rd. KIPM was on from at least 2112 to 2213* with his excellent program on 13910. At *2214 on 13910 Chiapas programming commenced. Chiapas ended at 2243* and KIPM was back at *2246 until 2340*. At *2344 KIPM was on again until at least 2406. Whoever broadcast the 29 minute Chiapas program fit it in a 32 minute slot very well on the same freq. with consistent signal quality here in western KY. And by the way I have not received a QSL from Chiapas, either. But I have gotten excellent programs and multiple

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; B-00=winter season, October 29-March 31; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

QSLs from both KIPM and Radio Bob (Charlie Crawford, KY)

CHINA [non] Falun Dafa Radio, Falungong clandestine at 1400-1500: while this is not conclusive, 9370 is also used by R. Free Asia from Tajikistan, in Uighur at 1600-1630, //7460 (gh, *DX Listening Digest*)

COLOMBIA FARC page lists schedules for individual front stations; not sure how current this is: www.resistencia nacional.org/radio.htm (Rich Stoller, *DXLD*)

CONGO DR A 1 kW transmitter will go to Radio Kahuzi in Bukavu. Kahuzi was on shortwave previously on 6120 [some sources say 6210], but apparently went off due to unrest in the area. New transmitter will be on tropical bands, frequency not determined yet. Kahuzi is still on FM and their latest schedule in local time is: 9 am-12:30 pm, 2-4 pm, 4:30-8:30 pm. Website, much of which isn't available: www.besi.org (HCJB via Hans Johnson, *Cumbre DX* (C))

COSTA RICA Dr. Gene Scott program on 11184 at 0222, very distorted audio and loud hum, splattering channels almost +/- 19 kHz (Elmer Escoto, San Pedro Sula, Honduras, *World Of Radio*) Also here many hours of day and night, 1459 kHz away from TIDGS on 9725, so we also checked 8266, equal distance on the other side, and twice each further away, 12643 and 6807, upon all of which similar distorted DGS was audible. The transmitter badly in need of adjustment or silencing to avoid such spurs in marine and military aeronautical bands (gh, OK) DGS heard on 4372 at 0135, also "blurred" and spreading over a few kHz up and down (Escoto) This one does not fit in with the above computation; could be from some other Scott site (gh)

RFPI *Mailbag* reported: the antenna for 21815-USB is an 8-element log-periodic not too high above ground, aimed 10 to 15 degrees east of north, with homemade ladder-line feed, made of #10 or #12 wire, low-loss and good for this purpose. *Progressive News Network*: most of the volunteers producing this have left, so shortened to 15 minutes, on Mon and Wed (2200 and 0130); Fri 2200-2230 the new *Freespeech Radio News* produced by Pacifica stringers (gh)

EGYPT Background hash, digital signals, and broadcast spurs invaded the 18 MHz hamband, and beyond up almost to 19 MHz, around 0000 UT in mid-August. Programming audible on 18120, 18155, and many other frequencies at 35 kHz separations, peaking from northeast, noted by George McClintock, TN. Then we tracked them down every 35 kHz into the 17 MHz broadcast band to 17945, 17910, 17875, 17840, 17805, 17770, 17735, 17700, 17665, 17630, 17595 etc. George found strongest signal on 17770, 10 over 9, the only one I could hear, in Arabic, and it went off at 0045"; George found all the other garbage had signed off with it and the hamband was once again clean. I then found these registrations with the Asian Broadcasting Union for the A-00 season until Oct 29: 17770 at 2330-0045 to zones 13, 15 Abis, Egypt 250 kW 241 degrees daily – which fits perfectly; and it could be back in the morning, but a different antenna is used then: 17770 at 1115-1450 to zones 49, 54 Abis, Egypt 250 kW 106 degrees daily (gh, OK)

GABON Africa Number One, 9580, sign-on hits at 0500, always entertaining with rooster crow blended with primitive thumb piano. More than any other station I can think of, ANO is long overdue to join the webcasting movement. 9580 starts fading back in to the US east coast about 2100, often with great African souskous music, until 2300 sign off, midnight Gabon time; usually extended each December 31, as a number of inebriated staff members enjoy themselves in French with all the mics on. Now that's entertainment (Tom Roche, GA, *DXLD*) AF1 comes in like gangbusters here in KY on 15475, 9580 is good also, and even 17630 is audible in the mornings. This is one of my favorites that I tune in every day. I am very glad that WGTG did not settle on 9580! (Michael Kallstrom, *World Of Radio*)

GUATEMALA Printed sked from R. Verdad, 4052.5 is headed Mon-Sat, with "now from 5:00 a.m." written in, but first program labeled Saturday is at 7 a.m. (1300 UT), *Música de los Amigos* which also airs at 6-6:15 pm (0000 UT Sun). 17 educational programs are conveniently underlined to distinguish them from religious ones. Those after sunset are, in UT: 0030-0100 *Desarrollo Urbano*; 0200-0230 *Club de la Amistad y Filatélico*; 0400-0430 *Venga Ud. A Guatemala* [Turismo y Monografías]; 0455-0500 *Momento Cívico de Clausura con el Himno Nacional*. About Domingo it only remarks: *programación especial*. Also reproduced is a pennant including the exact frequency as "4.0525 MHz, 74.03 Mts, Banda SW 1" and shows two satellite dishes (via Masato Ishii, Niigata, Japan, *Radio Nuevo Mundo* interpreted by gh)

INDONESIA I was under the impression that the Indonesian government had financial problems, but they have enough funds to beam their external service in Arabic eastwards on 9525 at 0300-0400. I would guess the audience could probably be counted on the fingers of no hands (Alan Davies, Penang, Malaysia, *Electronic DX Press*)

ISRAËL Kol Israëli Reshet Dalet in Arabic heard regularly here at 1400-2115 on new 15430, ex-registered 15480, //5915 and 9815 in USB (Ivo and Anguel, *Observer*, Bulgaria) The Knesset determined the dates for Daylight Shifting Time over the next four years. This year, Summer Time will end October 6, two days before Yom Kippur (Daniel Rosenzweig, *DXLD*) What about previous report that DST would last until end of October, same as Europe? (gh)

KOREA SOUTH [non] RKI's *Multiwave Feedback* reported that from September 1, RKI would start its first broadcast using hired (as opposed to exchanged) transmitter time, via Merlin Kranji (Singapore), for the Indonesian service at 2200-2300, on 9640. This is because some of the antennas at Kimjae must be dismantled, even though it had not yet been decided to implement the previously announced plan to build new antennas there (gh, *Electronic DX Press*)

KURDISTAN [non] V. of People of Kurdistan, 6995 has a good website, well put-together with lots of news of interest to the Kurdish people [partly in English]. Frequency there is 4060, not the new one. www.aha.ru/~said/dang.htm Heard very well on 6995 with several IDs, internet address, in spite of local language, at 0230 SINPO 45444. I think a powerful transmitter is being used for this. Anyone know address for reception report? (Clube DX da Amazônia, via *radioescutas*) My recent QSL letter has: Patrioticische Union Kurdistan, Postfach 21 02 31, D-10502 Berlin, Germany. E-mail: Pukoffice@pukg.de (Jim Parker, *DXLD*) Same here, and verie signer is Salah Rashid (Björn Fransson, Sweden, *hcdx*)

LUXEMBOURG [non] I can recommend <http://welcome.to/208> Purpose is to preserve memories from the station of the stars. Please contact the editor if you have a contribution. We are looking for: "Listeners who want to share their memories or rare stories connected with the radio station." "People who have been employees on Radio Luxembourg." "People who can contribute pictures of stickers, photos, QSL cards, programme schedules etc.

E-mail: emotland@hotmail.com Postal address: Svaneveien 17, N-4318 SANDNES, NORWAY. December 3, 1933: Radio Luxembourg started transmissions in English from the Grand Duchy of Luxembourg. The listeners loved its style, programmes and formats. December 30, 1992: The station closed down after more than 59 years on the air. The memories live on! (Editor Eivind Motland, Norway, via Mike Terry, *DXLD*)

MALAYSIA Following a serious fire at its radio centre in July, RTM introduced a number of temporary changes: Domestic services generally carry news every two hours rather than on the hour; the English service Radio 4 on 7295 now carries news at the top of odd hours UT. Time signals are no longer being broadcast. The external services Suara Malaysia and Suara Islam have moved to temporary studios in Kajang, usually reflected in opening announcements. The HF transmitting station at Kajang continues to suffer its own problems, with strong harmonics noted recently on 9690 (2x4845), 11930v (2x5965v) and 12050 (2x6025). There have been many long breaks on 4845, and 7295 has also been observed with an intermittent distortion problem (Alan Davies, Malaysia, *Cumbre DX*)

MÉXICO Grupo Rasa station in Mérida is off the air. Manager was at Oaxaca meeting, says he plans to have it back on 6105 by January (Jeff White, FL, *DXLD*)

NETHERLANDS Diana Janssen leaves *Media Network* in mid-September after nine years. Diana's new job will be as a Media Strategy Analyst with the IT company Forrester Research, at their European head office in Amsterdam (RN)

NICARAGUA R. Miskut, 5770 USB-carrier, reactivated in mid-August 2353-0001" pop songs, 0000 ID "Ésta es YNPN," power and mention FM outlet. After national anthem, carrier remained on (George Maroti, NY *Cumbre DX*) Next night it was on later at 0155 (Bill Smith, TX) But not audible in the 1100-1200 period (gh)

NIGERIA Voice of Nigeria is back to 7255 kHz [ex-7265.5]. Noted early August at 2150 in local language, S9+ here in Moscow (Nick Pashkevich, *hard-core-dx*) Sounds stronger than on 7265.5; new transmitter? (Chris Hambly, Australia) 7265.5, used 0500-2300 by VON, clashed with 24-hour Sudwestfunk on 7265.0, and 0530-0630 VOA in French to Af Mon-Fri (*Observer*, Bulgaria)

PAKISTAN Abu Dhabi returned to 17835 and this time from 0700. So, R. Pakistan World Service to West Europe 0800-1105 with less than 5 minutes of English news at 0800 and 1100 is now using 17525 // 21460 (Noël Green, England, *DXLD*)

PAPUA NEW GUINEA R. Central, 3290 had been inactive but came on once in July, then day after day in August, at 2000 and 1200, in vernacular, not //4890 (Chris Hambly, Victoria, *World Of Radio*)

Kundu programming. A new or refurbished transmitter has been put into use, full schedule not known (Bob Padula, Victoria, *Electronic DX Press*)

Based on monitoring observations made during my trip to North Queensland between July 29 and Aug 3: Scheduling for many stations is erratic, and inconsistent from day to day. Some stations remain on air all night during feasts, "sing-sings," and festivals. Weekend evening transmissions are often extended to past the usual 1200 s/oft. There is only very limited activity during the morning period, with most stations preferring to operate during evening hours.

Kundu Network on 5985 from East New Britain – on weekdays only, in period 2230-0700, carrying educational/schools/public information programming, intended for the Gazelle Peninsula. Actual hours of operation and broadcast days are irregular.

EVENING TRANSMISSIONS:

Kundu Service: *0730-1200*v:

2410 [Enga not checked]

3205 W. Sepik

3220 Morobe

3235 W. New Britain

3245 Gulf

3260 Madang

3305 Western

3315 Manus

3325 N. Solomons

3335 E. Sepik

3355 Simbu
3365 Milne Bay
3385 E. New Britain
3395 Eastern Highlands
3905 New Ireland
Karai Service: 4890 Port Moresby *0730-1200*v
(Bob Padula, *Electronic DX Press*)

PERU On 6673.06, R Andina, at 0115 chicha music, ID as "R Andina de Huancabamba." Pretty strong atop thunderstorm QRN. Noted off at 0201 (Jay Novello, NC, *DX Listening Digest*)

RUSSIA *Observer* reported Radio Rossii missing on 9845, 11735, 13705 and 17660. These frequencies had been used from 2 x 250 kW transmitters at Taldom. An immediate check indeed confirmed both daytime frequencies 13705 and 17660 as silent. These transmitters were silenced on July 11th together with the co-located 2.5 megawatt LW on 261 (Kai Ludwig, Germany, *DXLD*)

ST. HELENA [non] Do you have any plans to broadcast as usually done in October, this year? (Baiju Prabhakar, Dubai) No more SW-broadcast, sorry! (John Ekwall, *DXLD*)

SA'UDI ARABIA BSKSA 13mb transmitters put spurs intruding in the 15m hamband, noted on 21205.0, 21284.8, 21399.8, 21410.0 (IARU Monitoring System Newsletter) see www.iarumsrl.cwc.net/news.htm

SOMALIA Radio Mogadishu, Voice of the People of the Somali Republic was first heard on 19th July 1993. It broadcasts in support of the Somali National Alliance (SNA), led by Husayn Muhammad Aydid, who succeeded his father Gen Muhammad Farah Aydid after his death in August 1996. Not to be confused with two other stations calling themselves R. Mogadishu, which may be merging. Daily in Somali on 6750v USB+carrier and FM 100.5: 0300-0500, 0900-1300, 1500-1900 including news at 1700-1715 and 1848-1854 (© BBC Monitoring)

Warlord Husayn Aydid has had a lot of trouble keeping his station on the air. However, he's now made a big effort to reactivate it, appointing a new station manager (Mr Cabduqaadir Daahir Cabdi, nicknamed Xudeyfa), adding the FM channel and getting his shortwave transmitter running on 6750 kHz according to schedule above. Like all the various Mogadishu stations the main evening news is at 1700 GMT, to try and stop people listening to the news on a rival station. Listen for the announcement: "Halka aad warkaasi kala socotaan waa reediyow Muqdisho, Idaacada codka shacabka ee Jamhuuriyada Soomaaliya" ("This is the news from Radio Mogadishu, Voice of the People of the Somali Republic"). (Chris Greenway, UK, *World Of Radio*)

Sam Voron reports: Radio Gaalkayo is down to 80 watts. To avoid interference to hams on 7012, have retuned aerial to 7500-7600 range and testing there. Thanks to generous donation from Ralph Famularo, R. Gaalkayo may soon be back to full power of 1000 watts. 9615 is new frequency for relay of Radio Gaalkacyo in Boosaaso, ex 6012, five watts (Hans Johnson, *Cumbre DX*)

SRI LANKA Gary Wise, Manager of IBB Iranawila gave following info about their QSL-policy. "I'm sorry it has taken us so long to be able to address the QSL card issue. We will respond to every reception report we have received - but until recently it was just not possible. Keeping our new station on the air was our first priority! I have just put in place a system for generating verification cards, and my secretary has started the process of checking reception reports. We will send cards out via the Sri Lanka Post (so you will get some Sri Lankan stamps too!). Please continue to be patient." He also enclosed a jpg image of the card that will be sent out (Stefan Björn, Sweden, *SW Bulletin*)

TAIWAN CBS News Network, 24h in Mandarin on various MW and SW frequencies, and live audio at www.cbs.org.tw also has 5 minute program previews in English Mon-Sat at 1255 on 6180 7250 9630 11725 11775; Sunday 0855 on 11725 (© BBC Monitoring)

TAJIKISTAN At 1645 on 7244 noticed R. Tajikistan from Dushanbé, extremely poor distorted audio, couldn't follow a single word of their news, but only heard ID "This is Dushanbé, the Capital of Tajikistan" (Mr. Baiju Prabhakar, Dubai, *DXLD*)

UAE Abu Dhabi is now carrying two services on SW. 21735 is heard until 0700 and 17835 from 0700 past 1200. What appears the Main Arabic pgm is using 21630 // 15310 until 0700 and then 21630 changes to 21735 (Noël Green, England, *DXLD*) Sorry, R. Pinoy I reported last month as via Dubai was really Kuwait (Jorge Garcia Rangel, Venezuela)

UK As part of the government's three-year spending plans beginning next April, BBC WS is to get an extra 64 million pounds to modernize the shortwave relay stations in Cyprus and Singapore with digitally-capable replacement transmitters. The new investment represents an average 3.8-per-cent increase in funding in real terms a year over the next three years. The new funding will also help BBC WS internet developments in key languages and to develop WS FM presence (Chris Greenway, England, *World Of Radio*)

USA *VOA Communications World* has finally been restored to Africa Saturday at 2130-2200 on 6035, 7375, 7415, 11975, 15410, 15445, 15580 [Greenville], and 17785. Many of these frequencies also reach other parts of the world well.

July 28 was the last day on the air for the majority of broadcasters in the VOA Polish, Hungarian, Czech, Slovene, Latvian, and Lithuanian services. These services are now greatly reduced in staff size and daily output as part

of a reorientation of language priorities ordered by the U.S. Broadcasting Board of Governors.

Unless 51 VOA employees can find jobs elsewhere within the Voice of America or its parent entity, the International Broadcasting Bureau, they will be off the payroll as of October 13th. Three broadcasters will remain in the VOA Polish, Czech, and Hungarian services, and they will produce 15 minutes of feed programming Monday through Friday. Two each will remain in Slovene, Latvian, and Lithuanian, with ten minutes of output per weekday. Multimedia services in these languages are slated for the future.

The U.S. Senate Appropriations Committee called for more policy programming in English on VOA, specifically mentioning *On the Line*, which had not been heard in English since the *News Now* format began in May 1998. This weekly discussion program produced by the International Broadcasting Bureau's Office of Policy, which also writes the daily editorials heard on VOA, was immediately resumed, Saturday at 0633, 1433, and 2233, and Sunday at 0233, 1033, and 1833.

From July 31, the number of editorials broadcast on *VOA News Now* also increased, adding weekdays 0555, 2355; weekends, every four hours, beginning at 0255 (Kim Elliott, *VOA Communications World* via John Norfolk)

This Week in Americana featured covers of Woody Guthrie songs, some set to new tunes, giving them a modern immediacy that is sometimes awesome, on WWCR-3 Sat 1105-1200 on 5070 (Donna Ring) And repeats Mon 0805 on 3210 (gh)

New programs on *The Planet: Greek Radio Waves* Mondays 2000-2200 UT and Tuesdays 2130-2230 on 7415 with Greek news and music. Great music is to be had on the *B Movie Bob Show*, Tuesdays 2230-2300. More music and skits and bits are on the *Pab Sungenis Project* Fridays 2130-2230. Lots of music and alternative stuff on 7415.

We are also looking for a prime sponsor to fund our remote broadcast radioshop project. We have a vessel, the motorsailer "Katie" lying in Boston harbor. We need a sponsor to fund the outfitting of her as a floating studio and a general refit including a repaint with the WBCQ call letters and the sponsor's name on the sides. From her we will do remote broadcasting via WBCQ along the East Coast. Be a wonderful way to promote shortwave radio and a potential sponsor. We would link up to shore via cellphone and remote pickup link. We are also working on a third transmitter and antenna system to go on in 2001 (Allan Weiner, WBCQ, *DXLD*)

WGTC: According to an announcement by Dave Frantz, 9320 is apparent new frequency for third transmitter, instead of 9580 and 3270 (Hans Johnson, *Cumbre DX*) We objected to 9580 because of Australia, and Tom Sundström objected to 3270 because of Namibia. Originally planned to test 9580 toward the NW at 1000-2000 (gh)

WESTERN SAHARA [non] Clandestine R Nacional de la RASD heard on new 7450 at *1803-0003*, the first 60 minutes in Spanish, then Arabic, no more Spanish in the last hour (Robert Petraitis, Lithuania, *BC-DX*) RASD on exactly 7450.00, while RTM Morocco jammer was on v7470.72 //15345 (Wolfgang Büschel, Germany, *DXLD*)

YEMEN [non?] Radio Aden (*Idha'atu Aden*) in Arabic again on SW! July 9 0900-1100 on 9900.0 (Ivo and Anguel, *Observer*, Bulgaria) I am hearing Voice of the Arabs [EGYPT] on 9900 // 11980 instead of Aden at the time mentioned above (Harald Kuhl, Germany, *DXLD*) I've checked this several times and always find Voice of the Arabs 0900-1600 (Dave Kernick, UK, *DXLD*) I think it was something to do with special programming for the Gulf Cooperation Council (Andy Sennitt, *DXLD*)

Yes, several stations in countries members of the GCC take turns originating special programming relayed by all the others (gh, *DXLD*)

Radio Aden in Arabic (not Radio Cairo/Voice of Arabs) again noted on July 23: 0900-1100 on 9900.0 (Ivo and Anguel, *Observer*, Bulgaria) Both dates reported were Sundays, so only on that day? (Wolfgang Büschel, *BC-DX*)

ZIMBABWE [non] RN finally acknowledged that V. of the People is transmitted from Madagascar, as our sleuths had concluded weeks ago:

Former members of ZBC are producing VOP, thanks to grants from the George Soros Foundation [also funded the VOA Zimbabwe Forum which has been cancelled], and Dutch foundation HIVOS. Chose to use 50 kW RN Madagascar transmitter on 7215. The 1700-1730 broadcast is in Shona, 1915-1945 in Ndebele. A spokesperson in Harare, Thandiwe Henson, was interviewed. She said: ZBC has always been a government mouthpiece, so is not entirely to blame for the lack of equitable coverage of the opposition. The VOP service is mainly for rural people who do not have as much access to alternative media as city people. The announcers here are well-known and give their names on the air; not associated with any political party, non-partisan. As a result, SW radios are sold out in [some] towns. VOP planned to announce a P O Box for listener contact (RN *Media Network*) A more complete report, close to verbatim from the broadcast is in *MN's Hot Spots* page: www.rnw.nl/realradio/features/html/zimbabwe000804.html

The VOA English-language program *Zimbabwe Forum*, daily at 1730-1800 was canceled July 28. It began June 19 to focus on the Zimbabwean elections. Funding, which came from the Open Policy Institute of the Soros Foundation, ended. Daily correspondent reports from Zimbabwe will continue on VOA English-to-Africa news programs (Kim Elliott, *VOA Communications World* via John Norfolk)

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

Broadcast Logs



Gayle Van Horn

0001 UTC on 3339.9

PERU: Radio Altura. Male/female announcer's Spanish text to background flute music. Canned station identifications with "buenos noches" greetings including the day's date. Station jingle and evening announcements. SINPO=34333. Peru's **Radio Amistad** from Lima noted 4515.5, 0137-0155. Peruvian flute music to briefs and ID at 0052. Signal only fair, but without interferences. Tentative logging for **La Voz del Campesinos**, 0045-0102, 6956.70, Peruvian music, no ID and very low audio level. (Mark Veldhuis, Borne, Netherlands/*Hard Core DX*) **Radio Libertad** 5039.20, 0050-0101 with Andean music to "Radio Libertad de Junin." (Daniela Canonica, Muggio, Switzerland)

0009 UTC on 4846.34

BRAZIL: Radio Cultura. Good signal including Portuguese music program and text to ID as, "Radio Cultura...mais perto de voce..." (Canonica, SUI)

0030 UTC on 17525

TAJIKISTAN: Radio Free Asia. Burmese service to 0131*. Tibetan service 2300-2359. Both programs closed with English ID as, "Radio Free Asia." (Lee Silvi, Mentor, OH)

0039 UTC on 5470.86

PERU: Radio San Nicolas. (Tentative) Spanish. Romantic ballads with woman announcer's talk between music tunes. Possible identification 0040. Best heard, but extremely weak. Peruvian stations audible; **Radio Difusora Huancabamba** 6857.55, 0052-0106* ; **Radio Andina** 6672.79, 0938-0943 including nine station IDs. (Dave Valko, PA; Schnitzer, Germany/*Cumbre DX*)

0039 UTC on 7265

NIGERIA: Voice of. Political speech segment to drum's signal with canned *My Africa* program, essay contest winners announcement. Station ID followed by Agenda Peace segment. Strong signal; however, a bit distorted audio. (Valko, PA/*Cumbre DX*)

0058 UTC on 4801.1

ECUADOR: Radio Oriental. Spanish. Tentative logging, audible with Peruvian vocals. Station jingle format to regional advertisements, no clear ID noted, fair-poor signal quality. (Veldhuis, NLD/*HCDX*)

0100 UTC on 9695

VIETNAM: Voice of. Station identification and schedule to mentions of European Union. Audible to 0112 with political and economic news. Station ID and report on Korean summit. (McGuire, MD)

0300 UTC on 15400

UNITED ARAB EMIRATES: UAE Radio. Koran recitations to time tips and regional news. English service 0300 to national anthem. Additional logging; 15400, 0325-0335; 11710, 2158-2200. (McGuire, MD)

0500 UTC on 11720

SOUTH AFRICA: Channel Africa. Superb signal quality for English service of national news and features. (Frank Hillton, Charleston, SC)

0503 UTC on 5047

TOGO: RTV Togolaise. French. Tune-in during band scan to choral hymn. Station identification to news items of fair signal quality. (Brian Bagwell, St. Louis, MO) Togo's **Radio Kara** 1600 with interval signal and ID including "abivia Khara." Signal 34323. Nice catch, station not heard often. (Richard T. Harimon, Manchester, England)

1205 UTC on 15330

GUAM: Voice of Hope/KSDA. Religious hymn music to ID: "this is the Voice of Hope KSDA, Agat, Guam." Fair-poor signal quality. (Duane Hadley, Bristol, TN)

1311 UTC on 9565

UNITED STATES: Radio Marti. Spanish. Cuban music program from male/female announcer duo. USA stations audible: **WRMI** 9955, 1400-1406 with *Universal Life* program; **WGTV** 12172, 1715-1732 with *Theological Seminary of the Air*; **WHRI** 13760, 1922-1928 *DXing with Cumbre*; **WEWN** 11875, 2149 with feature on *Sisters of the Most Sacred Hat* in Alhambra, California. (I am not making that up!) (Harold Frodge, Midland, MI) **Radio Marti** 7315, 0000. (Sue Wilden, Noblesville, IN)

1537 UTC on 9750

MALAYSIA: Voice of. Variety of Malay songs to interval signal with time check 1545. Koran recitations 1600 with fair-to good signal

quality. Nice that this program has been separated from the 15295 Arabic service. (Zacharias Liangas, Retziki, Greece/*HCDX*)

1623 UTC on 12015

GABON: Radio France International. English service world news and editorials. (Frodge, MI)

1626 UTC on 9705.8

NIGER: La Voix du Sahel. Tentative logging for French programming of talk and African pop music. Announcer's possible identification to abrupt sign-off 1635. It has been awhile since I heard this station on 9705 kHz. (Veldhuis, NLD/*HCDX*)

1925 UTC on 17660

ECUADOR: HCJB. *Studio 9* show on hiker's guide to Mount Choruakachi. (Fraser, MA)

1948 UTC on 21550

CHILE: Radio Voz Christiana. Contemporary Christian vocals including rap and macarena! Program, *Contacto Explosivo* mentioned several times plus station ID. Fair to good signal quality. (Frodge, MI)

1955 UTC on 3316

SIERRA LEONE: SLBS. Vernacular/English service. Regional news and listener phone-in calls. Signal fair with fading. (Hillton, SC)

2000 UTC on 11750

ALGERIA: RTV Algerienne. English service sign-on to world news-cast. Western jazz music program at 2015, // 11715. (Fraser, MA)

2023 UTC on 7460

CLANDESTINE: National Radio of the Saharan Arab Republic (tentative). Possibly broadcasting from Algeria to Morocco. Arabic instrumental music to female announcer. No discernable identification, however, very good signal quality. SIO=444. (Canonica, SUI)

2030 UTC on 11790

MALI: Radio China International relay. *People in the Know* magazine program with local interview segments. (Fraser, MA)

2045 UTC on 11675

RUSSIA: Voice of. *You Write to Moscow* mailbag show, featuring *The Great Patriotic War*. (Fraser, MA)

2102 UTC on 7250

VATICAN STATE: Vatican Radio. Catholic historical feature to 2109 interval signal, Spanish service commencing at 2110. Fair signal quality. (Frodge, MI)

2141 UTC on 9990

EGYPT: Radio Cairo. English commentary on Israel-Palestine agreement. *Egyptian Contemporary Figures* feature past 2200. Good signal quality. (Frodge, MI) ID to regional news and report on Algeria. (McGuire, MD)

2145 UTC on 5985

CONGO: Radiodiffusion TV Congolaise. French programming including evening greetings and station ID as "Radio Congo." African highlife style music, SIO=433. (Canonica, SUI)

2201 UTC on 4915

GHANA: GBC. African music chants to English identification at 2230 as, "this is GBC One," to African pop music. (Frodge, MI)

2204 UTC on 4925

INDONESIA: Radio Republik-Jambi. Indonesian news relay from Jakarta network, including correspondent's report. Musical tune that closes the news. (This tune replaced former song *Bagimu Negeri* last summer). Announcement at 2208 to regional identification and Islamic recitations. (Veldhuis, NLD/*HCDX*)

2220 UTC on 15230

SAUDI ARABIA: BSKSA. Koran recitations to station identification. Time tips signal to regional news. Noted 9870, 2230-2300*. (McGuire, MD) 0340-0401, Extended Koran to Arabic ID. (Valko, PA/*Cumbre DX*)

2304 UTC on 15048

COSTA RICA: Radio for Peace International. Feature on the doom and gloom of the U.S. school system. Does this station ever have anything positive on it? Give it a rest. (Frodge, MI)

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

Africa A - Z ...Putting It All Together

Now that you have logged a slew of African stations, it's time to organize your report into a concise synopsis of program details. First things first: the station name, frequency logged, UTC date of reception and UTC time. Beware of expressing dates as "5/2/00." In the United States, that's May 2, but in other countries it comes out as February 5th! Even wiser...spell the month out.

Fifteen to thirty minutes of programming details tends to be the norm for Africa. Be sure to note the reception conditions and quality; however, don't attempt to boost the ego of the station by giving them a better rating than their signal deserves.

Stations usually welcome programming comments or questions for the letterbox programs, and indeed radio stations appreciate honest compliments.

Whether your report is a standardized fill-in form, or a personal letter, your reception format can be as individual as you, so consider each report with its own format.

This month's *African Address Directory* will save you "look up" time, and, as always, corrections are welcomed. In case you're cyber friendly and on-line reporting appeals to you, our African shortwave stations on the web

may speed a reply. Thanks to feature columnist Dave White for his assistance and confirmation of current websites.



- Algeria, Radio Algiers International <www.algerian-radio.dz>
- Egypt, Radio Cairo <www.sis.gov.eg/front.htm>
- Ethiopia, Radio Ethiopia <www.angelfire.com/biz/radioethiopia>
- Voice of Oromo Liberation <www.oromoliberationfront.org>
- Voice of Ethiopian Unity <www.finate.org>
- Gabon, Afrique Numero Un <www.africa1.com>
- Kenya, KBC <www.africanonline.co.ke/AfricaOnline/netradio.html>
- Liberia, Radio Liberia International <www.afric-network.fr/afric/liberia/liberia.html>
- Marocco: Radio Mediterranee International <www.med1.com>
- Namibia: <www.netradio.imfl.org.na>
- Seychelles: FEBA <www.feba.org.uk>
- South Africa: Channel Africa <www.channelafrica.org>
- Trans World Radio <www.twr.org.za>
- Sudan: Radio Omdurman <www.members.xoom.com/sudonradio>
- Swaziland: Trans World Radio <www.twr.org>
- Tunisia: Radio Tunisienne <www.radiotunis.com>
- Zambia: Christian Voice <www.christian-vision.org>
- Zimbabwe: Zimbabwe Broadcasting Corp. <www.zbc.co.zw>

CHAD

Radiodiffusion Nationale Tchadienne, 4904.5 kHz. Full data card unsigned. Received in 73 days for French follow up report and mint stamps. Station address: Boite Postal 892, N'djamena, Chad. (Duane Hadley, Bristol, TN)

ECUADOR

HCJB, 15115 kHz. Full data QSL card signed by John E. Beck-Station Manager, plus religious brochures and program guide. Prepared QSL card returned and signed by Karen. Received in 43 days for an English report and return postage. Station address: Casilla 17-17-691, Quito, Ecuador. (Robert Carlson, Walpole, MA) *Musician With a Rontador* card signed by Station Manager in 37 days for an English report and three mint stamps. (Charlie F. Washburn, Robbinston, ME)

EQUATORIAL GUINEA

Radio Africa, 15185.5 kHz. Full data station card signed by Terry Kraemer, plus religious brochures. Received in seven weeks for English report and mint stamps. Station address: Pan American Broadcasting, 20410 Town Center Lane-Suite 200, Cupertino, CA 95014 USA. (Morris, Australia/Cumbre DX)

ERITREA

Voice of Broad Masses, 7100 kHz. Full data white card with station seal, signed by Mehreteab Testagiorgis-Technical Director Engineering. Received in 52 days for an English report and one U.S. dollar. Station address: Ministry of Information, Radio Division, P.O. Box 872, Asmara, Eritrea. (Morris, Australia/Cumbre DX)

ETHIOPIA

Radio Fana, 6940 kHz. Small green & white full data card signed by Mulugeta Gessese-General Manager. Received in six weeks after follow up via email. Station address: P.O. Box 30702 Addis Ababa, Ethiopia. (Leigh Morris, Australia/Cumbre DX)

FM/MEDIUM WAVE

WBOG, 94.5 FM. Partial data QSL on station letterhead, signed by Gary R. Johnson-General Sales Manager, plus bumper stickers, business card, coverage map and brochures. Received in 15 days for an AM report and souvenir postcard. My best FM DX! Station address: 1021 N. Superior Ave., Suite 5, Tomah, WI 54660. (Don Dacus, Russellville, AR)

WINS, 1010 kHz AM. Unsigned prepared QSL returned. Received in three years and five months for an AM report. Station address: 888 7th Ave., New York, NY 11209 (Carlson, MA)

INDIA

All India Radio-Panaji, 11740 kHz. Full data photo card of Delhi 16th century tomb, signed by A.K. Bhatnagar-Director of Freq. Assignments. Received in three months on fourth follow up report. Station address: P.O. Box 500, New Delhi-110 001, India. (Marlin A. Field, Hillsdale, MI)

LESOTHO

Lesotho National Broadcasting Service, 4800 kHz. Full data color flag card with illegible initials. Received in 152 days from second English follow up report, mint stamps and 1 IRC. Station address: P.O. Box 552, Maseru, Lesotho. Very pleased, worth the wait! (Tom Banks, Dallas, TX)

LIBERIA

ELWA, 4760 kHz. Full data small photocopied paper QSL, signed by Moses T. Nyantee-Station Manager and Chief Technician's initials. Received for an English report, no enclosures. Station address via Cote d'Ivoire: c/o SIM Liberia, 08 Boite Postal 886, Abidjan 08, Cote d'Ivoire. (Erich Bergmann, Ansbach, Germany/Hard Core DX)

MALAWI

Malawi Broadcasting Corp., 3380 kHz. No data letter signed by Station Engineer. Received in eight months for English report, mint stamps, and a self addressed envelope (unused for reply). Station address: P.O. Box 30133, Chichiri, Blantyre 3, Malawi. (Frank Hillton, Charleston, SC)

MOROCCO

Radio Medi Un, 9575 kHz. Full data station card, plus personal letter, frequency schedule and sticker. Received in six months for a French report and three IRCs, souvenir postcards; and casino coins. Station Address: Boite Postal 2055, Tanger, Morocco. (Sam Wright, Biloxi, MS)

PERU

Radio La Inmaculada, 5305 kHz. Personal verification letter signed by R.P. Jorge Carrasco Fuentes, Parraco, plus DX certificate. Station is now inactive, and seeks assistance to provide new equipment. Station address: Avenida Zarumilla 400, Obispado de Chiclayo, Santa Cruz (via Chiclayo) Peru. (Field, MI)

TUNISIA

Radio Tunisienne, 530 kHz AM. Full data QSL letter and card signed by Abdesselem Slim. Received in five weeks for an AM report. Station address: O.N.T., Cite Ennassim 1, Bou-jel, Boite Postal 399, TN-1080 Tunis, Tunisia. (Ruud Vos, Utrecht, Netherlands/HCDX)

UNITED STATES

NAV, Navy/Marine Corps MARS, 14478.5 kHz USB. Full data 51st Annual Armed Forces Day card signed by Bo. Received in 44 days for an English utility report, picture postcard and a SASE (used for reply). Station address: HQNAV/MARCO/MARS Radio Station, Attn: Bo Lindfors, Nebraska Ave., Complex, 4234 Seminary Dr. N.W., Ste. 19239, Washington, DC 20394-5461 USA. (Bill Wilkins, Springfield, MO)

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BP120 spare battery and charger	BAT 24	\$25.95
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Alinco, car lighter cable w/filter	DCC 14	\$23.95
Alinco DJ-X10T soft case	CAS 19	\$12.95
Icom R2 soft case	CAS 20	\$29.95

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HOW TO USE THE SHORTWAVE GUIDE

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af
 ① ② ⑤ ③ ④ ⑥ ⑦

Convert your time to UTC.

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

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

Find the station you want to hear.

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

If a broadcast is not daily, the days of broadcast \bar{A} will appear in the column following the time of broadcast, using the following codes:

Day Codes

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

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

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

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

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with

confirmations and reports from her monitoring team and *MT* readers to make the Shortwave Guide up-to-date as of one week before publication.

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

Target Areas

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

Consult the propagation charts.

To further help you find a strong signal, we've included a chart on page 64 which takes into account conditions affecting the audibility of shortwave broadcasts. Simply pick out the section of the chart for the region in which you live and find the line for the region in which the station you want to hear is located. The chart indicates the optimum frequencies (in megahertz-MHz) for a given time in UTC. (Users outside North America can use the same procedure in reverse to find best reception from North America.)

Choose a program or station you want to hear.

Some selected programs appear on the lower half of the page for prime listening hours – space does not permit 24-hour listings. Our program manager changes the stations and programming featured each month to reflect the variety available on shortwave, though BBC programs are almost always included.

Occasionally program listings will be followed by "See X 0000." This information indicates that the program is a rerun, and refers to a previous summary of the program's content. The capital letter stands for a day of the week, using the same day codes as in the frequency listing (see above), and the four digits represent a time in UTC.

MT MONITORING TEAM

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PROGRAM HIGHLIGHTS

JOHN FIGLIOZZI

"All Greek to Me"

...is the name of a new weekly feature on the Voice of Greece. The program features an English language announcer playing Greek popular music from the last five decades. It is broadcast Saturdays 1700-1800 UT on 15630 kHz. and twice Sundays 1800-1900 on 17605 kHz. and 2130-2230 on 15650 kHz.

BBC Snubs North America Again

Perhaps the World Service will have adjusted by the time you read this (don't count on it); but at deadline for this column (late August), the BBC announced plans to broadcast live coverage of the Sydney Olympics in September between 0900 and 1100 UT to everywhere but North America! There were shortwave transmissions even for Central and South America, which is surprising given the few English speakers resident there. I wonder if (no live coverage) NBC and the BBC are sharing management personnel.

Seasonal Time Changes

We're at THAT time of the year again. The varied dates countries choose to do this, combined with changing station policies year to year on how to deal with it in their schedules, makes autumn and spring a nightmare for those attempting to track it all. Australia adjusted its clocks early this year to accommodate the Olympics and New Zealand goes to summer time in early October. At deadline, it still was not known what changes (if any) the BBC was planning to its Americas stream and the clock twirling takes place at the end of this month in most places. So we'll work to set things straight in November's Guide. Programs listed this month that are likely to be moved an hour later UTC, based on past experience, are noted with a "+". However, be warned that sometimes the worst thing one can do is to try and be helpful.

This Month's Guide

...keys on international broadcasting programs designed to give listeners a glimpse of a country's everyday domestic life by focusing on its people, places, culture and attitudes. We continue to seek your comments on how well this section works for you and what we can do to improve it.



FREQUENCIES

New abbreviation starting this issue (mon=monthly)

0000	0100	Anguilla, Caribbean Beacon	6090am			
0000	0100	vi Australia, ABC/Tennant Creek	4910da			
0000	0100	vi Australia, ABC/Alice Springs	4835da			
0000	0100	vi Australia, ABC/Katherine	5025da			
0000	0100	Australia, Radio	9660pa	12080va	15240pa	17580pa
			17750as	17795va	21740va	
0000	0015	Cambodia, National Radio Of	11940as			
0000	0100	Canada, CBC Northern Service	9625da			
0000	0100	Canada, CFVP Calgary AB	6030da			
0000	0100	Canada, CFRX Toronto ON	6070da			
0000	0100	Canada, CKZU Vancouver BC	6160da			
0000	0100	Costa Rica, University Network	5030am	6150va	7375na	9725na
			11870va	13749af		
0000	0100	Costa Rica, R for Peace Intl	6970va	15048va	21815va	
0000	0027	Czech Rep, Radio Prague Intl	11615na	13580na		
0000	0100	Ecuador, HCJB	9745na	15115na	21455usb	
0000	0030	Egypt, Radio Cairo	9900am			
0000	0100	a/mon Finland, Scandv Weekend Radio	11690va			
0000	0100	Guyana, Voice of	3289da	5949da		
0000	0045	India, All India Radio	7410as	9705as	9950as	11620as
			13625as			
0000	0015	Japan, Radio	6050eu	6145eu	6155af	13650as
			17810as			
0000	0100	Kenya, Kenya BC Corp	4885da	4915da	4935da	
0000	0100	Malaysia, RTM Sarawak	7160da			
0000	0100	Malaysia, RTM Kota Kinabalu	5980da			
0000	0100	Malaysia, Radio	7295da			
0000	0100	vi Namibia, Namibian BC Corp	3270af	3289af		
0000	0100	Netherlands, Radio	6165na	9845na		
0000	0100	New Zealand, ZLXA	3935da	7290da		
0000	0100	New Zealand, R New Zealand Int	17675va			
0000	0056	North Korea, R Pyongyang	4405va	11460na	11710na	13760na
			15180na			
0000	0100	vi Papua New Guinea, NBC	9675da	11880da		
0000	0030	mtwha Serbia, Radio Yugoslavia	11870na			
0000	0100	Singapore R Corp of Singapore	6150da			
0000	0100	vi/o Solomon Islands, SIBC	9545da			
0000	0100	vi/as Solomon Islands, SIBC	5020da			
0000	0100	Spain, R Exterior Espana	6055na			
0000	0030	Thailand, Radio	9655af	9690af	11905af	
0000	0100	as UK, Global Kitchen/Merlin	3955eu	7325eu		
0000	0030	UK, BBC World Service	3915as	5965as	5975na	6175na
			6195as	7110as	9410me	9590am
			9915sa	11945as	11955as	12095sa
			15280as	15310as	15360as	17615as
			17790as			
0000	0100	Ukraine, R Ukraine International	5905eu	8020eu	9640eu	13590eu

0000	0030	USA, WRMI Miami FL	9955am			
0000	0100	USA, WRNO New Orleans LA	7355na			
0000	0100	USA, WSHB Cypress Crk SC	9430na	15285am		
0000	0100	USA, WHRI Nabl-ssville IN	5745na	7315sa		
0000	0100	USA, WHNB Red Lion PA	12160am			
0000	0100	USA, WHRA Greenbush ME	7580na			
0000	0100	USA, WYFR Okeechabee FL	6085na	9505na		
0000	0100	USA, WWCR Nashville TN	5070na	7435na	9475na	
			13845na			
0000	0100	sm USA, WWBS Macon GA	11910eu			
0000	0100	USA, WPTJC Newport NC	9370na			
0000	0100	USA, WJCR Upton KY	7490va	13595as		
0000	0100	USA, KAJI Dallas TX	13815va			
0000	0100	USA, Armed Forces Radio	4278va	4319va	4993va	
			5765va	6350va	6458va	
			6847va	10320va	10940va	
			12579va	12689va	13362va	
			16847va			
0000	0030	USA, Voice of America	7215as	9770as	11760as	
			15185as	15290as	17735as	
			17820as			
0000	0100	USA, WGTG McCaysville GA	6890va	9320am		
0000	0100	USA, KTBN Salt Lake City UT	15590na			
0000	0100	USA, WEWN Birmingham AL	5825va	13615na		
0000	0100	USA, KWHR Naalehu HI	17510as			
0000	0100	USA, WBCQ Maicicello ME	7415na	9330na		
0000	0100	twhta USA, Voice of America	5995am	6130ca	7405am	
			9455af	9775am	11695co	
			13740am			
0000	0100	vi Vanuatu, Radio	3945da	4960da	7260da	
0000	0100	Zambia, Christian Voice	4965da			
0015	0100	Japan, Radio	6050eu	6145na	6155eu	
0030	0100	Iran, VOIRI	9022am	9835na	11970na	
0030	0100	Lithuania, Radio Vilnius	9855na			
0030	0100	Sri Lanka, Sri Lanka BC Corp	4940da	6005as	6075as	
			9770as	15425as		
0030	0100	Sri Lanka, Sri Lanka BC Corp	4940da	9770		
0030	0100	Thailand, Radio	15395na			
0030	0100	UK, BBC World Service	5965as	5975na	6175na	
			6195as	9410as	9590am	
			9915sa	11955as	12095sa	
			15280as	15310as	15360as	
			17790as			
0030	0100	USA, WOA Special English	7215as	9770as	11760as	
			15185as	15290as	17735po	
			17820as			
0030	0100	sm USA, WRMI Miami FL	3955am			
0030	0100	twhta USA, WRMI Miami FL	7385na			
0050	0100	Italy, RAI International	6010na	9675na	14800na	
0050	0100	UK, International BC Tamil	11570as			

SELECTED PROGRAMS

Daily

0022 USA, Voice of America (News Now): US feature (a report about the US)

Sundays

- 0000+ Finland, YLE/R. Finland: Capital Cafe (Finns and what they're talking about)
- 0000 Netherlands, Radio: Aural Tapestry (the arts/culture/history)
- 0005 India, All India Radio: Indian Cinema (2nd Mon.)
- 0005 Czech Rep., Radio Prague: The Arts (Czech cultural report)
- 0012 Spain, R. Exterior de Espana: Window on Spain (aspects of life in Spain)
- 0018+ Ukraine, R. Ukraine International: Baroque (culture and the arts in Ukraine)
- 0045 USA, Voice of America (Special English): 20th Century Americans (important people of the century)

Mondays

- 0000 Netherlands, Radio: Dutch Horizons (Dutch social affairs/popular culture)
- 0005 Czech Rep., Radio Prague: A Letter from Prague (observations on life/events in the capital)
- 0005 India, All India Radio: Mainly for Tourists (1st/3rd Mon.)
- 0010 Japan, Radio: Weekend Square (topical magazine of Japan w/interviews/music)
- 0022 Spain, R. Exterior de Espana: Entremeses (Spanish food and tourism)

- 0030 Netherlands, Radio: Aural Tapestry (the arts/culture/history)
- 0045 USA, Voice of America (Special English): This Is America (life in the US)

Tuesdays

- 0015 Czech Rep., Radio Prague: Spotlight (current events around the Czech Republic)
- 0030 Netherlands, Radio: EuroQuest (European current events/issues/arts/social trends)
- 0035 Spain, R. Exterior de Espana: Entertainment in Spain (theatre/cinema/music/media)

Wednesdays

- 0035 Spain, R. Exterior de Espana: Kaleidoscope (Spanish science/culture/evowdar life)

Thursdays

- 0005 India, All India Radio: Of Persons/Places & Things (aspects of Indian life) [1st/3rd]
- 0015 Czech Rep., Radio Prague: Czechs in History
- 0030 Netherlands, Radio: Dutch Horizons (Dutch social affairs/popular culture)

Fridays

- 0045 USA, Voice of America (Special English): American Mosaic (student life, popular culture)

Saturdays

- 0035 Spain, R. Exterior de Espana: Arts in Spain (Spanish cultural events)

Hauser's Highlights

LIBYA: V. of Africa

New 17725 (ex-15435) with Arabic except news in English and French monitored at:
0130-0145
1145-1200
1730-1745
2030-2045
If the preceding Arabic news runs long, English and French may be delayed 2-8 minutes
(Robert Petraitis, Lithuania, BC-DX)

FREQUENCIES

0500 0600	Anguilla, Caribbean Beacon	6090am			
0500 0600 vl	Australia, ABC/Tennant Creek	4910do			
0500 0600 vl	Australia, ABC/Alice Springs	4835do			
0500 0600 as	Australia, Radio	17750as			
0500 0600 vl	Australia, ABC/Katherine	5025do			
0500 0600	Australia, Radio	9660pa	12080va	15240pa	15515va
		17580pa	21725pa		
0500 0600 vl	Botswana, Radio	3356do	4820do	7255do	
0500 0600 vl	Cameroon, RTV/Yaounde	4850do			
0500 0529	Canada, R Canada International	5995am	6145va	7290va	9595va
		9755am	11710vo	11830am	13755va
		15330va			
0500 0600	Canada, CKZN St John's NF	6160do			
0500 0515	Canada, CBC Northern Service	9625do			
0500 0600	Canada, CFRX Toronto ON	6070do			
0500 0600	Canada, CKZU Vancouver BC	6160do			
0500 0600	Canada, CFVP Calgary AB	6030do			
0500 0556	China China Radio International	9560na			
0500 0600	Costa Rica, University Network	5030am	6150va	7375na	9725na
		11870va	13749af		
0500 0600	Costa Rica, R for Peace Intl	6970va	15048va	21815va	
0500 0600	Cuba, Radio Havana	9550na	9820na	9830na	
0500 0600	Ecuador, HCJB	9745na	15115na	21455usb	
0500 0600 a/m on	Finland, Scandv Weekend Radio	11720va			
0500 0545	Germany, Deutsche Welle	9670na	9785na	11810na	11985na
0500 0600	Guyana, Voice of	3289do	5949do		
0500 0600	Italy, IRRS	3985va			
0500 0600	Japan, Radio	5975eu	6110na	7230eu	11715as
		11760os	11840as	13630na	15590pa
0500 0600	Kenya, Kenya BC Corp	4885do	4915do	4935do	
0500 0600 vl	Lesotho, Radio	4800do			
0500 0600 vl	Liberia, R Liberia International	5100do			
0500 0600 vl	Malawi, Malawi BC Corp	3380do	5995do		
0500 0600	Malaysia, RTM Sarawak	7160do			
0500 0600	Malaysia, Radio	7295do			
0500 0600	Malaysia, Voice of Islam	6175as	9750as	15295as	
0500 0600	Myanmar, Radio	9730do			
0500 0600	Nambia, Namibian BC Corp	3270af	3289af		
0500 0530	Netherlands, Radio	6165na	9590na	7290do	
0500 0600	New Zealand, ZLXA	3935do			
0500 0600	New Zealand, R New Zealand Int	17675va			
0500 0600 vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
0500 0600 vl	Nigeria, Radio/Ibadan	6050do			
0500 0600 vl	Nigeria, Radio/Enugu	6025do			
0500 0600 vl	Nigeria, Radio/Lagos	3326do	4990do		
0500 0600 vl	Nigeria, Voice of	7255af	15120af		
0500 0504	Pakistan, Radio	15175me	17835me	21460me	
0500 0600 vl	Papua New Guinea, NBC	9675do	11880do		
0500 0600	Russia, Voice of Russia WS	17625au	17665au	21790au	
0500 0600	S Africa, World Beacon	6115af			
0500 0530	S Africa, Channel Africa	11720af			
0500 0530	S Africa, Adventist World Radio	5960af	6015af		
0500 0600	Singapore R Corp of Singapore	6150do			
0500 0600 vl	Solomon Islands, SIBC	5020do	9545do		
0500 0600	Spain, R Exterior Espana	6055na			
0500 0600	Sri Lanka, Sri Lanka BC Corp	6130do			
0500 0600	Swaziland, Trans World Radio	4775af	6100af	9500af	
0500 0530	Switzerland, Swiss R International	9610eu			
0500 0530	Uganda, Radio	4976do	5026do		
0500 0600	UK, BBC World Service	3255af	5975na	6005af	6175am
		6190af	6195eu	7160af	9410eu
		9740as	11760me	11765af	11955pa
		12095eu	15280as	15310as	15360as
		15420af	15575me	17640me	17760as
		17790as	17885af	21660as	
0500 0600	USA, WHRI Noblesville IN	5745na	7315sa		
0500 0600	USA, WHRA Greenbush ME	11565af			
0500 0600	USA, WGTG McCaysville GA	5085va	6890am		
0500 0600	USA, WJCR Upton KY	7490va	13595as		
0500 0600	USA, WSHB Cypress Crk SC	9840eu	11930af		
0500 0600	USA, WWCR Nashville TN	2390na	3210na	5070na	5935na
0500 0600	USA, WTJC Newport NC	9370na			
0500 0600	USA, WEWN Birmingham AL	5825va			
0500 0600	USA, WRNO New Orleans LA	7395na			
0500 0600	USA, Voice of America	5970af	6035af	6080af	7170va
		7195af	11965me	12080af	13670af
		15205va			
0500 0600	USA, KAIJ Dallas TX	5755va			
0500 0600	USA, Armed Forces Radio	4278va	4319va	4993va	5765va
		6350va	6458va	6847va	10320va
		10940va	12579va	12689va	13362va
		16847va			
0500 0530	USA, WRMI Miami FL	7385na			
0500 0600	USA, WBCQ Monticello ME	7415na	9330na		
0500 0600	USA, KTBN Salt Lake City UT	7510na			
0500 0600	USA, WYFR Okeechobee FL	5985na	9985eu	11580eu	
0500 0600	USA, KWHR Naalehu HI	11565pa	17780as		
0500 0600 vl	USA, KVOH Los Angeles CA	9975am			
0500 0600 vl	Vanuatu, Radio	3945do	4960do	7260do	
0500 0520	Vatican City, Vatican Radio	4005eu	5880eu	7250eu	9660af
		11625of	15570af		
0500 0600	Zambia, Christian Voice	6065do			
0500 0600 vl	Zambia, National BC Corp	6165do	6265do		
0500 0530 vl	Zimbabwe, Zimbabwe BC Corp	4828do	6045do		
0505 0510	Croatia, Croatian Radio	9470au	11970af		
0515 0525	Rwanda, Radio	6055do			
0520 0530	Vatican City, Vatican Radio	9660af	11625af	15570af	
0525 0600 vl	Ghana, Ghana BC Corp	3366do	4915do		
0530 0600	Georgia, Georgian Radio	11805eu			
0530 0600	Thailand, Radio	9655eu	11905eu	21795eu	
0530 0600	UAE, Radio Dubai	13675au	15435au	21700au	
0530 0600 mtwhla	USA, WRMI Miami FL	7385na			
0530 0600 vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do		

SELECTED PROGRAMS

Daily

0522 USA, Voice of America (News Now): US feature (a report about the US)

Sundays

0500 Netherlands, Radio: Aural Tapestry (the arts/culture/history)
0512 Spain, R. Exterior de Espana: Window on Spain (aspects of life in Spain)
0530 Australia, Radio: In Conversation (Helen Brown interviews on rural matters)
0530 UK, BBC WS (East Africa): Art Beat (the arts in Africa)
0530 UK, BBC WS (West Africa): Art Beat (the arts in Africa)

Mondays

0500 Netherlands, Radio: Dutch Horizons (Dutch social affindia, All India Radios/popular culture)
0500 Vatican City, Vatican Radio: And So They Came to Rome (visitors past and present)
0505+ Canada, R. Canada International: Arts in Canada (Canadian cultural events/personalities)
0522 Spain, R. Exterior de Espana: Entremeses (Spanish food and tourism)
0532+ Russia, Voice of Russia: This is Russia (about Russia and Russians)

Tuesdays

0500 Vatican City, Vatican Radio: As Romans Don't ("out of the way" persons/events)
0535 Spain, R. Exterior de Espana: Entertainment in Spain (theatre/cinema/music/media)
0554+ Russia, Voice of Russia WS: Russia in Personalities (prominent Russians of the 20th century)

Wednesdays

0505 UK, BBC WS (Americas): Meridian-Ideas (strand examining prominent/emerging cultural ideas)
0530 UK, BBC WS (East Asia): Plain English (quirks/complexities of language)
0535 Spain, R. Exterior de Espana: Kaleidoscope (Spanish science/culture/everyday life)

Thursdays

0515 Vatican City, Vatican Radio: Pilgrim City (everyday visitors to Rome)
0530 Germany, Deutsche Welle: Living in Germany (aspects of German society)
0532+ Russia, Voice of Russia WS: Moscow Yesterday and Today (850 years of history)

Fridays

0500 Vatican City, Vatican Radio: How and When (events of the past in perspective)
0532+ Russia, Voice of Russia WS: This is Russia (about Russia and Russians)

Saturdays

0530 UK, BBC WS (East Asia): Arts in Action
0530 UK, BBC WS (Europe): Arts in Action
0530 UK, BBC WS (Middle East): Arts in Action
0535 Spain, R. Exterior de Espana: Arts in Spain (Spanish cultural events)

PROPAGATION FORECASTING

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Gloucester K1J1A7 Canada

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GRUNDIG Best in Technology



Yacht Boy 400 Professional Edition (YB 400PE)

The most powerful compact Radio AM/FM Shortwave Receiver.

"The Best compact shortwave portable we have tested" Lawrence Magne - Editor in Chief, Passport to World Band Radio.

The Big Breakthrough! Power performance, and design have reached new heights! The Grundig 400 Professional Edition with its sleek titanium look is packed with features like no other compact radio in the world.

Pinpoint Accuracy! The Grundig 400PE does it all: pulls in AM, FM, FM-Stereo, every shortwave band (even aviation and ship-to-shore)-all with lock-on digital precision.

Ultimate Features! Auto tuning! The Grundig 400PE has auto tuning on shortwave and stops at every signal and lets you listen. With the exceptional sensitivity of the 400PE, you can use the auto tune to catch even the weakest of signals.

Incredible timing features! The Grundig 400PE can send you to sleep listening to your favorite music.

You can set the alarm to wake up to music or the morning traffic report, then switch to BBC shortwave for the world news. The choice is yours!

Powerful Memory. Described as a smart radio with 40 memory positions, the Grundig 400PE remembers your favorites-even if you don't!

Never Before Value! Includes deluxe travel pouch, stereo earphones, owner's manual, external antenna and a 9 volt Grundig AC adapter. Uses 6 AA batteries (not included).

Style • Titanium Look

Shortwave, AM and FM • Continuous shortwave from 1.6 - 30 MHz, covering all existing shortwave bands plus FM-stereo, AM and Longwave. • Single sideband (SSB) circuitry allows for reception of two-way communication such as amateur radio, military, commercial, air-to-ground, and ship-to-shore.

Memory Positions • 40 randomly programmable memory positions allow for quick access to favorite stations.

Multi-function Liquid Crystal Display • The LCD simultaneously displays the time, frequency, band, alarm and sleep timer.

Clock, Alarm and Timer • Two alarm modes: Beep and radio.

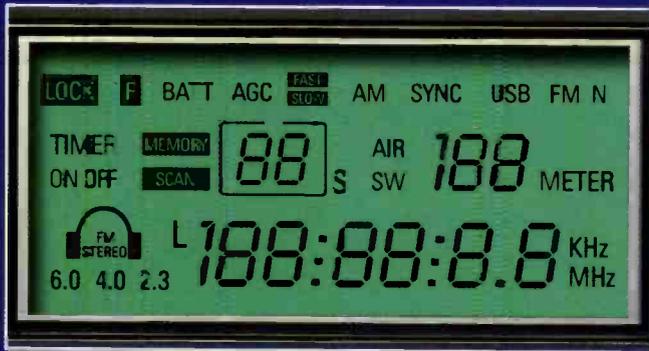
- Dual clocks show time in 24 hour format.
- Sleep timer programmable in 15 minute increments.

Dimensions: 7.75" L x 4.5" H x 1.5" W

Weight: 1 lb. 5 oz.

by **GRUNDIG**

GRUNDIG The Ultimate in



The LCD

Big! Bold! Brightly Illuminated 6" by 3 1/2". Liquid Crystal Display shows all important data: Frequency, Meter band, Memory position, Time, LSB/USB, Synchronous Detector and more.

The Signal Strength Meter

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



The Frequency Coverage

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

The Tuning Controls

• For the traditionalist: a smooth, precise tuning knob, produces no audio muting during use.



Ultra fine-tuning of 50Hz on LSB/USB, 100Hz in SW, AM and Aircraft Band and 20 KHz in FM.

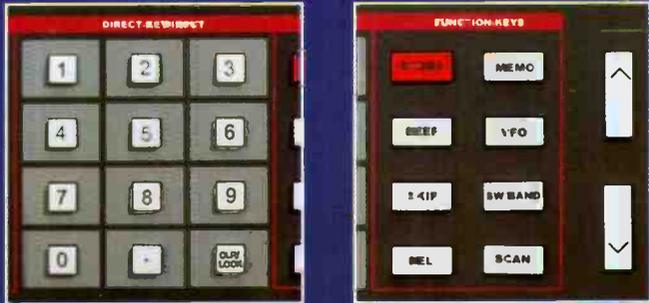
• For Fixed-step Tuning: Big, responsive Up/Down tuning buttons.

• For direct frequency entry: a responsive, intuitive numeric keypad.



THESE ARE THE SATELLIT 800 MILLENNIUM'S MAJOR FEATURES. FOR A DETAILED SPECIFICATION SHEET, CONTACT GRUNDIG.

Digital Technology



The Operational Controls

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

The Sound

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



The Technology

Today's latest engineering:

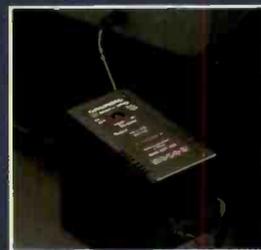
- Dual conversion superheterodyne circuitry.
- PLL synthesized tuner.

The Many Features

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

The Power Supply

A 110V AC adapter is included for North America (a 220V AC adapter is available upon request). Also operates on 6 size D batteries. (not included)



Dimensions: 20.5" L X 9" H X 8" W

Weight: 14.50 lbs.

by **GRUNDIG**

GRUNDIG Best in Technology



Yacht Boy 300 Professional Edition (Y3 300PE)

Power and Performance with the Affordable Yacht Boy 300 Professional.

Designed for the traveller, the titanium look digital radio provides incredible power and performance for an incredibly low price! Packed with features, this radio is an excellent value, accompanied with 3 AA batteries, AC adapter, earphones, supplementary Antenna and carrying case!

State-of-the-art features include:

- Digital tuning with 24 user-programmable memory presets
- 13 SW Bands (2.30-7.80 MHz 9.10-26.10 MHz)
- Illuminated multifunction LCD display screen
- AM/FM stereo via earphones
- Clock, alarm and 10 to 90 minute sleep timer
- Digital tuning display

- Direct frequency entry
- DX/ local selector
- Titanium look finish
- External antenna jack
- Dynamic mic speaker
- Earphone jack
- Telescopic antenna

Dimensions: 5.75" L x 3.5" H x 1.25" W

Weight: 9.92 oz

by **GRUNDIG**



FREQUENCIES

0900	1000	Anguilla, Caribbean Beacon	6090am					
0900	1000	Australia, Radio	13605pc	21820as				
0900	1000	vi Australia, ABC/Tennant Creek	2325do					
0900	1000	as Australia, Radio	11550va	11880va	17750va			
0900	1000	vi Australia, ABC/Alice Springs	2310do					
0900	1000	vi Australia, ABC/Katherine	2485do					
0900	1000	vi Botswana, Radio	7255do	9600do	7255do			
0900	1000	vi Cameroon, RTV/Yaounde	4850do					
0900	1000	Canada, CFVP Calgary AB	6030do					
0900	1000	Canada, CFRX Toronto ON	6070do					
0900	1000	Canada, CKZU Vancouver BC	6160do					
0900	0956	China China Radio International	11730pa	15210pa				
0900	1000	Costa Rica, R for Peace Intl	6970va	15048va	21815va			
0900	1000	Costa Rica, University Network	5030am	6150va	7375na	9725na		
			11870vc	13749af				
0900	0929	Czech Rep, Radio Prague Intl	21745vc					
0900	1000	Ecuador, HCJB	11775pa	21455usb				
0900	1000	mtwhf Eqt Guinea, Radio Africa	15185af					
0900	1000	as/vl Eqt. Guinea, Radio East Africa	15185af					
0900	1000	a/mon Finland, Scandv Weekend Radio	11690vc					
0900	1000	Germany, Voice of Hope	5975seu	21590me				
0900	0945	Germany, Deutsche Welle	6140eu	6160pa	12035af	15105as		
			15410af	15470as	17770as	17800af		
			21560as	21680as	21790af	21775af		
0900	1000	a Germany, Good News World R	5985eu	5995eu				
0900	0915	vi Ghana, Ghana BC Corp	3366do	4915do				
0900	0915	Guam, Trans World Radio	15200as	15330as				
0900	1000	Guyana, Voice of	3289do	5949do				
0900	1000	vi Italy, IRRS	7120vo					
0900	1000	Kenya, Kenya BC Corp	7125do	7150do	7210do			
0900	1000	vi Lesotho, Radio	4800do					
0900	1000	vi Liberia, R Liberia International	6100do					
0900	1000	vi Liberia, ELWA	4760do					
0900	1000	Malaysia, Radio	7295do					
0900	1000	Nambibia, Nambibia BC Corp	7165af	7215af				
0900	1000	New Zealand, R New Zealand Int	11720vc					
0900	1000	New Zealand, ZLXA	3935do	7290do				
0900	1000	vi Nigeria, Radio/Lagos	3326do	4990do				
0900	1000	vi Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do		
0900	1000	vi Nigeria, Radio/Ibadan	6050do					
0900	1000	vi Nigeria, Radio/Enugu	6025do					
0900	1000	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	15725as		
0900	1000	Papua New Guinea, NBC	4890do	9675do				
0900	1000	Sierra Leone, Sierra Leone BS	3316do					
0900	1000	Singapore R Corp of Singapore	6150do					
0900	1000	vi Solomon Islands, SIBC	5020do					
0900	1000	Sri Lanka, Sri Lanka BC Corp	6130do					
0900	1000	Uganda, Radio	5026do	7110do	7196do			
0900	1000	UK, Merlin Network One	6130eu					
0900	0930	mtwhfa UK, BBC World Service	11945as					
0900	0930	UK, BBC World Service	6190af	6195va	9605as	9740as		
			11760me	11765as	11940af	11945af		
			11955pa	12095eu	15190sa	15310as		
			15360as	15400af	15485as	15565eu		
			15575as	17640eu	17760as	17790as		
			17830af	17885af	21470af	21660as		
0900	1000	USA, WJCR Upton KY	7490va	13595as				
0900	1000	USA, WHRA Greenbush ME	11565af					
0900	1000	USA, WRNO New Orleans LA	7395na					
0900	1000	USA, WSHB Cypress Crk SC	9455sa	9860eu				
0900	1000	USA, WWCR Nashville TN	2390na	5070na	5935na	7435na		
0900	1000	USA, WTJC Newport NC	9370na					
0900	1000	USA, WHRI Nablesville IN	5745na	7315sa				
0900	1000	USA, WEWN Birmingham AL	5825na					
0900	1000	USA, Armed Forces Radio	4278va	4319va	4993va	5765va		
			6350va	6458va	6847va	10320va		
			10940va	12579va	12689va	13362va		
			16847va					
0900	1000	USA, KT8N Salt Lake City UT	7510na					
0900	1000	USA, KAIJ Dallas TX	5755va					
0900	1000	USA, Voice of America	11775as	13610as	15150as			
0900	1000	USA, KWHR Naalehu HI	11565pa	17780as				
0900	1000	vi Vanuatu, Radio	3945do	4960do	7260do			
0900	1000	vi Zambia, National BC Corp	6165do					
0900	1000	Zambia, Christian Voice	9865do					
0900	1000	vi Zimbabwe, Zimbabwe BC Corp	5975do	6045do				
0915	1000	vi Ghana, Ghana BC Corp	6130do	4915do				
0915	1000	vi/as Ghana, Ghana BC Corp	4915do	4915do				
0915	0930	mtwhf Guam, Trans World Radio	15330as					
0915	1000	USA, WRMI Miami FL	9955am					
0930	1000	Guam, Trans World Radio	9865as					
0930	1000	Lithuania, Radio Vilnius	9710eu					
0930	1000	Netherlands, Radio	9795as	12065as	13710as			
0930	1000	UK, BBC World Service	6190af	6195as	9740as	11760me		
			11940af	11945as	11955pa	12095eu		
			15190sa	15310as	15400af	15485eu		
			15565eu	15575as	17640eu	17760as		
			17790as	17830af	17885af	21470af		
			21660as					
0945	1000	Germany, Deutsche Welle	6140eu					

1000	1100	Anguilla, Caribbean Beacon	11775am					
1000	1100	vi Australia, ABC/Alice Springs	2310do					
1000	1100	vi Australia, ABC/Katherine	2485do					
1000	1100	vi Australia, ABC/Tennant Creek	2325do					
1000	1100	Australia, Radio	11880va	13605pa	17750as	21820as		
1000	1100	os Bhutan, Bhutan BC Service	6035do					
1000	1100	vi Botswana, Radio	7255do	9600do	7255do			
1000	1100	vi Cameroon, RTV/Yaounde	4850do					
1000	1100	Canada, CFVP Calgary AB	6030do					
1000	1100	Canada, CFRX Toronto ON	6070do					
1000	1100	Canada, CKZN St John's NF	6160do					
1000	1100	Canada, CKZU Vancouver BC	6160do					
1000	1056	China China Radio International	11730pa	15210pa				
1000	1100	Costa Rica, University Network	5030am	6150va	7375na	9725na		
			11870va	13749af				
			6970va	15048va	21815va			
1000	1100	Costa Rica, R for Peace Intl	5030am	6150va	7375na	9725na		
1000	1100	Ecuador, HCJB	11755pa					
1000	1100	mtwhf Eqt Guinea, Radio Africa	15185af					
1000	1100	as/vl Eqt. Guinea, Radio East Africa	15185af					
1000	1100	a/mon Finland, Scandv Weekend Radio	11690va					
1000	1100	Germany, Voice of Hope	5975seu	21590me				
1000	1100	Germany, Deutsche Welle	6140eu	6160pa	12035af	15105as		
1000	1100	vi Ghana, Ghana BC Corp	6130do	4915do				
1000	1100	vi/as Ghana, Ghana BC Corp	4915do	4915do				
1000	1100	Guam, Trans World Radio	9865as					
1000	1100	Guyana, Voice of	5949do					
1000	1100	India, All India Radio	11585as	13700au	15020as	17485au		
			17840as	17895au				
1000	1100	vi/as Italy, IRRS	7120va					
1000	1100	Japan, Radio	9695as	15590as	21570pa			
1000	1100	Jordan, Radio	17680eu					
1000	1100	Kenya, Kenya BC Corp	7125do	7150do	7210do			
1000	1100	vi Lesotho, Radio	4800do					
1000	1100	vi Liberia, R Liberia International	6100do					
1000	1100	vi Liberia, ELWA	4760do					
1000	1100	Malaysia, Radio	7295do					
1000	1100	N Marianas, KHBI Saipan	11870as					
1000	1100	Nambibia, Nambibia BC Corp	7165af	7215af				
1000	1030	Netherlands, Radio	9795as	12065as	13710as			
1000	1100	New Zealand, R New Zealand Int	11720vc					
1000	1100	New Zealand, ZLXA	3935do					
1000	1100	vi Nigeria, Radio/Enugu	6025do					
1000	1100	vi Nigeria, Radio/Ibadan	6050do					
1000	1100	vi Nigeria, Voice of	7255af	15120af				
1000	1100	vi Nigeria, Radio/Lagos	4990do	7285do				
1000	1100	vi Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do		
1000	1100	vi Palau, KHBN/Voice of Hope	9955as	9965as	9985as	15725as		
1000	1100	Papua New Guinea, NBC	4890do	9675do				
1000	1100	vi Sierra Leone, Sierra Leone BS	3316do					
1000	1100	Singapore R Corp of Singapore	6150do					
1000	1100	vi Solomon Islands, SIBC	5020do					
1000	1100	Sri Lanka, Sri Lanka BC Corp	6130do					
1000	1030	Switzerland, Swiss R International	15315eu					
1000	1100	Uganda, Radio	5026do	7110do	7196do			
1000	1100	os UK, BBC World Service	15190sa	15400af	17830af			
1000	1100	UK, BBC World Service	5965na	6190af	6195va	9740as		
			11760me	11940af	11955pa	12095eu		
			15310as	15360as	15485eu	15565eu		
			15575as	17640eu	17760as	17790as		

FREQUENCIES

1600 1700	Algeria, R Algiers International	11715va	15160va	1600 1630	S Africa, Channel Africa	9525af		
1600 1700	Anguilla, Caribbean Beacon	11775am		1600 1700	Sierra Leone, Sierra Leone BS	5980do		
1600 1700 vl	Australia, ABC/Tennant Creek	2325do		1600 1700	South Korea, R Korea Intl	5975om	9515af	9870af
1600 1700 vl	Australia, ABC/Katherine	2485do		1600 1700	Sri Lanka, Sri Lanka EC Corp	4940do		
1600 1700 vl	Australia, ABC/Alice Springs	2310do		1600 1700	Swaziland, Trans World Radio	9500af		
1600 1700	Australia, Radio	5995as	6080va	1600 1615	Switzerland, Swiss International	9575va	17670as	
		11650pa	11660as	1600 1640	UAE, Radio Dubai	13675eu	15395eu	21605eu
		3356do	4820do	1600 1700	Uganda, Radio	4976do		
1600 1700 vl	Botswana, Radio	3356do	4820do	1600 1700	UK, BBC World Service	3195as	5975as	6190af
1600 1700 vl	Cameroon, RTV/Yaounde	4850do				7160as	9515na	9740as
1600 1700	Canada, CKZU Vancouver BC	6160do				12095eu	15310as	15400af
1600 1700	Canada, CKZN St John's NF	6160do				15575eu	17700as	17830am
1600 1700 vl	Canada, CBC Northern Service	9625do				21470af	21660af	
1600 1700	Canada, CFPV Calgary AB	6030do				15525eu	15665na	21515af
1600 1700	Canada, CFRX Toronto ON	6070do		1600 1700	UK, Flat Earth Radio/Aerlin	9750eu	11785eu	15235eu
1600 1656	China, China Radio International	7190af	9565af	1600 1700	UK, Global Kitchen/Aerlin	7490va	13595as	
1600 1700	Costa Rica, University Network	5030am	6150va	1600 1700	USA, WJCR Upton KY	9465eu		
		11870va	13749af	1600 1700	USA, WMLK Bethel PA	9955am		
		15048va	21815va	1600 1700	USA, WRMI Miami FL	13570eu		
1600 1627	Czech Rep., Radio Prague Intl	5930eu	21745af	1600 1700	USA, WINB Red Lion VA	13760na	15105sa	
1600 1630	Ecuador, HCJB	12005am	15115om	1600 1700	USA, WHRI Oklesville IN	11830na	15600na	17750na
1600 1700	Ethiopia, Radio	7165af	9560af	1600 1700	USA, WYFR Noblesville IN	21455eu	21525af	
1600 1700	Finland, Scandy Weekend Radio	11720va				9475na	12160na	13845na
1600 1700	France, R France International	11615af	11995af	1600 1700	USA, WWCR Nashville TN	9370na		
		17605af	17850af	1600 1700	USA, WTJC Newport RI	18910af		
		6110eu	13810af	1600 1700	USA, WSHB Cypress Crk SC	7395na	15420af	
1600 1700	Germany, Overcomer Ministries	15105af		1600 1700	USA, WRNC New Orleans LA	11875na	13615na	15745eu
1600 1700 a	Germany, Good News World R	6140eu	6170as	1600 1700	USA, WEWN Birmingham AL	15590na		
1600 1645	Germany, Deutsche Welle	11665af	17595as	1600 1700	USA, KTBN Salt Lake City UT	17650af		
		15105af	17550af	1600 1700	USA, WHRA Greenbush ME	4278va	4319va	4993va
		15715as	17550af	1600 1700	USA, Armed Forces Radio	6350va	6458va	6847va
1600 1630 s	Germany, Universal Life	15715as	17550af			10940va	12579va	12689va
1600 1630	Germany, Voice of Hope	4915do	6130do			16847va		
1600 1700 vl	Ghana, Ghana BC Corp	9420va	13455va	1600 1700	USA, KWHR Naalehu HI	9930as		
1600 1700 a	Greece, Voice of	9355as		1600 1700	USA, KAUJ Dallas TX	13815va		
1600 1700	Guam, Adventist World Radio	15330as		1600 1700	USA, WGTC McCaysville GA	9400am	12172am	
1600 1630 as	Guam, Trans World Radio	5949do		1600 1700	USA, Voice of America	6035af	6160as	7125as
1600 1700	Guyana, Voice of	9635as	11775as	1600 1700		9700me	9760as	13710af
1600 1630	Iran, VOIRI	7070va		1600 1700		15225af	15255va	15410af
1600 1700 irreg	Iraq, Radio Iraq International	11690eu		1600 1700		13600af	1545af	17895af
1600 1630	Jordan, Radio	4885do	4915do	1600 1610	USA, VOA Special English	12065af	13765ou	17540ou
1600 1700	Kenya, Kenya BC Corp	4800do		1600 1700	Vatican City, Vatican Radio	4965do		
1600 1700 vl	Lesotho, Radio	4760do		1600 1700	Zambia, Christian Voice	6165do	6265do	
1600 1700 vl	Liberia, ELWA	6100do		1600 1700	Zambia, National BC Corp	5975do	6045do	
1600 1700 vl	Liberia, R Liberia International	3380do		1600 1630 vl	Zimbabwe, Zimbabwe BC Corp	11860af	15420af	21490af
1600 1700 vl	Malawi, Malawi BC Corp	7295do		1615 1630	UK, BBC World Service	4005eu	5880eu	7250eu
1600 1700	Malaysia, Radio	7165af	7215af	1615 1630	Vatican City, Vatican Radio	15595eu		
1600 1700	Namibia, Namibian BC Corp	9890as	12065as	1625 1640	Armenia, Trans World Radio	5895me		
1600 1630	Netherlands, Radio	3935do		1625 1640	Monaco, Trans World Radio	6145me		
1600 1700	New Zealand, ZLXA	6095va	15120af	1630 1700	Austria, R Austria International	6155eu	13730vo	15240me
1600 1650	New Zealand, R New Zealand Int	7255af	4990do	1630 1657	Canada, R Canada International	6140as	7150as	
1600 1700 vl	Nigeria, Voice of	3326do	6090do	1630 1700	Egypt, Radio Cairo	15255af		
1600 1700 vl	Nigeria, Radio/Lagos	4770do		1630 1700	Seychelles, FEBA Radio	11605as		
1600 1700 vl	Nigeria, Radio/Kaduna	6025do		1630 1700	Slovakia, R Slovakia International	5920eu	6055eu	7345eu
1600 1700 vl	Nigeria, Radio/Enugu	6050do		1630 1700	UK, BBC World Service	11860af	21490af	
1600 1656	North Korea, R Pyongyang	3560va	6520va	1630 1700	UK, Merlin Network One	12065as		
1600 1615	Pakistan, Radio	11570me	15100af	1630 1657	Vietnam, Voice of	9730eu	13740eu	
		17720af	15725af	1630 1700	Zimbabwe, Zimbabwe BC Corp	4828do	6045do	
1600 1700	Palau, KHBN/Voice of Hope	9955as	9965as	1645 1700	Germany, Deutsche Welle	6140eu		
1600 1700	Russia, Voice of Russia WS	9730eu	9875as	1650 1700	New Zealand, R New Zealand Int	6095va		
		12055me	12015me					
1600 1700	S Africa, World Beacon	6145af	15445eu					

SELECTED PROGRAMS

Daily

- 1615 UAE, Radio Dubai: Feature on Arab life/culture/reigion
- 1622 USA, Voice of America (News Now): US feature (about the US)
- 1622 USA, Voice of America (News Now): US feature (about the US)

Sundays

- 1605 Australia, Radio: The National Interest (issues in Australia)
- 1605 Czech Rep., Radio Prague: A Letter from Prague
- 1615 Germany, Deutsche Welle: Arts on the Air [except 1st wk.]
- 1620 China, China Radio International: In the Spotlight
- 1632 + Russia, Voice of Russia WS: Timelines (Estelle Winters)
- 1640 France, R. France International: Paris Promenade
- 1645 Austria, R. Austria International: Profile of Austria
- 1645 Germany, Deutsche Welle: German History
- 1645 Nigeria, Voice of: Images of Nigeria (tourist destinations)
- 1645 USA, Voice of America (Special English): 20th Century Americans (important people of the century)

Mondays

- 1605 UK, BBC WS (East Africa): Meridian-Ideas (strand examining prominent/emerging cultural ideas)
- 1605 UK, BBC WS (Middle East): Meridian-Ideas
- 1605 UK, BBC WS (West Africa): Meridian-Ideas
- 1615 Czech Rep., Radio Prague: Spotlight
- 1615 Vietnam, Voice of: Vietnam: Land and People
- 1625 Guam, KSDA: Travelogue

- 1632 + Russia, Voice of Russia WS: 20th Century Year after Year (history)
- 1637 France, R. France International: Arts in France (cultural report)
- 1645 Slovakia, R. Slovakia International: Tourism (fortnightly)
- 1645 Slovakia, R. Slovakia International: Slovak Personalities (fortnightly)
- 1645 USA, Voice of America (Special English): This Is America

Mondays-Fridays

- 1655 New Zealand, Radio NZ Intl.: Karanga Opening (traditional greeting)

Tuesdays

- 1605 Australia, Radio: Comfort Zone (Australian homes/gardens/food)
- 1615 Vietnam, Voice of: Culture and Society
- 1632 + Russia, Voice of Russia WS: Russian history/culture
- 1637 France, R. France International: Drumbeat (African culture)
- 1644 France, R. France International: Land of France (French lifestyles)
- 1645 South Korea, R. Korea Intl.: Cultural Promenade (Korean arts)

Wednesdays

- 1605 Australia, Radio: Verbatim (oral history of the century)
- 1615 Czech Rep., Radio Prague: Czechs in History
- 1630 Australia, Radio: Earshot (ordinary citizens discuss Australian issues)
- 1632 + Russia, Voice of Russia WS: 20th Century Year after Year (history)

Thursdays

- 1630 China, China Radio International: Voices from Outer Lands

- 1630 UK, BBC WS (East Africa): Art Beat (the arts in Africa)
- 1630 UK, BBC WS (West Africa): Art Beat (the arts in Africa)
- 1632 + Russia, Voice of Russia WS: Russian history/culture
- 1645 Germany, Deutsche Welle: Living in Germany
- 1645 South Korea, R. Korea Intl.: Korea and its Splendors
- 1645 Slovakia, R. Slovakia International: Culture News (fortnightly)
- 1645 Slovakia, R. Slovakia Intl.: Back Page News (fortnightly)
- 1645 USA, Voice of America (Special English): Making of a Nation
- 1646 France, R. France International: Echoes from Africa

Fridays

- 1605 Australia, Radio: AWAY! (Australian aboriginal affairs)
- 1615 Vietnam, Voice of: Rural Vietnam (Vietnamese countryside)
- 1620 Vietnam, Voice of: Literature and the Arts
- 1630 China, China Radio International: Life in China (everyday life)
- 1632 + Russia, Voice of Russia WS: 20th Century Year after Year
- 1637 France, R. France International: Film Reel (world cinema)
- 1645 USA, Voice of America (Special English): American Mosaic
- 1650 Slovakia, R. Slovakia International: Regional News

Saturdays

- 1605 Netherlands, Radio: Europe Unzipped (news that might not have made the headlines)
- 1610 South Korea, R. Korea Intl.: Seoul Report (events in Korea)
- 1605 Czech Rep., Radio Prague: The Arts (Czech cultural report)
- 1630 Nigeria, Voice of: Nigerian Mosaic (light-hearted mag.)

FREQUENCIES

Table with columns for frequency (1900-2000), call letters, station name, and time slots. Includes stations like Anguilla, Caribbean Beacon; Australia, ABC/Tennant Creek; Botswana, Radio; and many others.

FREQUENCIES

Table with columns for frequency, time, and station names. Includes stations like Anguilla, Caribbean Beacon; Australia, ABC/Alice Springs; Czech Rep, Radio Prague Intl; USA, WJCR Upton KY; etc.

2200



FREQUENCIES

2300 0000	Anguilla, Caribbean Beacon	6090am				2300 0000	UK, BBC World Service	3915as	5965as	5975na	6035as
2300 0000	Australia, Radio	9660pa	12080va	17715pa	17755va			6175na	6195as	7110as	9590na
2300 0000 vl	Australia, ABC/Tennant Creek	4910da				2300 0000	as	11945as	11955as	12095sa	15280as
2300 0000 vl	Australia, ABC/Alice Springs	4835da				2300 0000	UK, Global Kitchen/Merlin	3955eu	6140eu	7325eu	
2300 0000 vl	Australia, ABC/Katherine	5025da				2300 0000	USA, WWCN Nashville TN	7435na	9475na	12160na	13845na
2300 0000 vl	Bulgaria, Radio	9400na	11700na			2300 2345	USA, WYFR Oksechobee FL	11740na			
2300 0000 vl	Cameroon, RTV/Yaounde	4850da				2300 2330	USA, VOA Special English	7190as	7200as	9545as	9795as
2300 0000	Canada, CKZU Vancouver BC	6160da				2300 2359	USA, WTJC Newport NC	9370na			
2300 0000	Canada, CKZN St John's NF	6160da				2300 0000	USA, WEWN Birmingham AL	9385na	9975eu	13615na	
2300 2330	Canada, R Canada International	5960am	9755am	11895am	13670am	2300 0000	USA, WBCQ Monticello ME	7415na			
		15305am	17695am			2300 0000	USA, WBCQ Monticello ME	9330na			
2300 0000	Canada, CFRX Toronto ON	6070da				2300 0000	mtwhf	9320am	12172am		
2300 0000	Canada, CFMP Calgary AB	6030da				2300 0000	USA, WGTG M:Coysville GA	13770eu	15285sa		
2300 0000	Canada, CBC Northern Service	9625da				2300 0000	USA, WSHB Cypress Crk SC	13770eu			
2300 2356	China, China Radio International	5990na				2300 0000	USA, KWHR Naalehu HI	17510as			
2300 0000	Costa Rica, R for Peace Intl	15048va	21815va	21815va		2300 0000	USA, Armed Forces Radio	4278va	4319va	4993va	5765va
2300 0000	Costa Rica, University Network	5030am	6150va	7375na	9725na	2300 0000		6350va	6458va	6847va	10320va
		11870va	13749af			2300 0000		10940va	12579va	12689va	13362va
2300 2330	Cuba, Radio Havana	9550am				2300 0000	USA, KALJ Dallas TX	16847va			
2300 0000	Egypt, Radio Cairo	9900am				2300 0000	USA, KTNB Salt Lake City UT	13815va			
2300 0000	Finland, Scandy Weekend Radio	11690va				2300 0000	USA, WHRA Greenbush MI	15590na			
2300 2345	Germany, Deutsche Welle	9815as	12055as	13610as	21790as	2300 0000	USA, Voice of America	7580na			
2300 0000 vl	Ghana, Ghana BC Corp	3366da				2300 0000		7215as	9770as	11760as	15185as
2300 0000	India, All India Radio	7410as	9705as	9950as	11620as	2300 0000	USA, WRNO New Orleans LA	15290as	15305as	17735as	17820as
		13625as				2300 0000	USA, WRNO New Orleans LA	7355na			
2300 0000	Kenya, Kenya BC Corp	4885da	4915da	4935da		2300 0000	USA, WHRI Nablesville IN	5745na	9495sa		
2300 0000 vl	Liberia, R Liberia International	5100da				2300 0000	USA, WJCR Upton KY	7490va	13595as		
2300 0000	Malaysia, Radio	7295da				2300 0000	USA, WRML Miami FL	9955am			
2300 0000	Malaysia, RTM Kota Kinabalu	5980da				2300 0000	USA, WIN8 Red Lion PA	13570am			
2300 2330	Mexico, R Mexico International	5985am	9705am			2300 0000 vl	Vanuatu, Radio	3945da	4960da	7260da	
2300 0000	Namibia, Namibian BC Corp	3270af	3289af			2300 2315	Vatican City, Vatican Radio	9600as	11830as		
2300 2359	New Zealand, R New Zealand Int	17675va				2300 0000	Zambia, Christian Voice	4965da			
2300 0000	New Zealand, ZLXA	3935da				2300 2359	Canada, R Canada International	5960am	9755am	13670am	
2300 2305 vl	Nigeria, Radio/Enugu	6025da				2300 0000	Canada, R Canada International	11895am	15305am	17695am	
2300 2305 vl	Nigeria, Radio/Ibadan	6050da				2300 0000	Kirgizia, Kirgizia Radio	4010eu			
2300 2305 vl	Nigeria, Radio/Kaduna	4770da	6090da	7275da	9570da	2300 2345 vl	Libya, Voice of Africa	11815af	17725af		
2300 2305 vl	Nigeria, Radio/Lagos	3326da				2300 0000	Malaysia, RTM Larawak	7160da			
2300 0000	Palau, KHBN/Voice of Hope	9965as	9955as	9985as		2300 0000	Netherlands, Radio	6165na	9845na		
2300 2359	Romania, R Romania International	9690eu	11775na	11830eu	15105na	2300 0000	USA, VOA Special English	6060as	7190as	7200as	7225as
2300 0000	Sierra Leone, Sierra Leone BS	3316da				2300 0000		7260as	9545as	9795as	11805as
2300 0000 vl/a	Solomon Islands, SIBC	9545da				2300 0000		11925as	13735as	15205as	
2300 0000 vl/as	Solomon Islands, SIBC	5020da				2330 2357	Vietnam, Voice of	9840as	12019as		
2300 0000	Sri Lanka, Sri Lanka BC Corp	4940da									

SELECTED PROGRAMS

Daily

2322 USA, Voice of America (News Now): US feature (about the US)

Sundays-Thursdays

2335 New Zealand, Radio NZ Intl.: Rural News

Sundays

- 2310 Romania, R. Romania International: Romanian Itineraries
- 2315 Germany, Deutsche Welle: Arts on the Air (German events)
- 2330 + Bulgaria, Radio: Bulgarian Plaza (cultural magazine) [fortnightly]
- 2330 + Bulgaria, Radio: Walks and Talks [fortnightly]
- 2333 USA, Voice of America (News Now): Kaleidoscope (aspects of American culture w/Susan Logue) [exc. 2nd Sun.]
- 2345 Egypt, Radio Cairo: Islamic Civilization (Islam's role in shaping cultures/nations)
- 2345 USA, Voice of America (Special English): 20th Century Americans (important people of the century)

Mondays

- 2300 + Mexico, R. Mexico International: Mosaic of Mexico (life in Mexico)
- 2315 Romania, R. Romania International: Pro Memoria (Romanian history and culture)
- 2325 Egypt, Radio Cairo: Prism of Arts in Egypt (events in Egypt)
- 2345 USA, Voice of America (Special English): This Is America
- 2345 Vietnam, Voice of: Vietnam: Land and People

Mondays-Saturdays

2335 + Bulgaria, Radio: Keyword Bulgaria (things Bulgarian)

Tuesdays

- 2330 Australia, Radio: Arts Talk (cultural current events)
- 2345 + Bulgaria, Radio: Arts and Artists (Bulgarian cultural events)
- 2345 Egypt, Radio Cairo: Close-Up (Egyptian issues/events)
- 2345 UK, BBC WS (Americas): Plain English (quirks/complexities)
- 2345 Vietnam, Voice of: Culture and Society

Wednesdays

- 2300 Vatican City, Vatican Radio: Pilgrim City (visitors to Rome)
- 2305 Egypt, Radio Cairo: Top Figures in the News
- 2315 Romania, R. Romania International: Society Today (daily life)
- 2330 Australia, Radio: Rural Reporter (people/life in Australia)
- 2330 India, All India Radio: Cultural Talk
- 2335 Egypt, Radio Cairo: Tourism in Egypt (travelogue)
- 2345 + Bulgaria, Radio: History Club (Bulgaria's past)
- 2345 USA, Voice of America (Special English): Making of a Nation

Thursdays

- 2300 + Mexico, R. Mexico International: Mirror of Mexico (people/places/things in Mexico)
- 2315 Romania, R. Romania International: Citizens of the Same Country (the Romanian identity)
- 2330 Germany, Deutsche Welle: Living in Germany (German society)
- 2330 India, All India Radio: Times and Lives (Indian history/personalities) (4th Thu.)
- 2345 + Bulgaria, Radio: The Way We Live (everyday life in Bulgaria)

Fridays

- 2300 + Mexico, R. Mexico International: Mosaic of Mexico (life in Mexico)
- 2315 Australia, Radio: Lingua Franca (discussions about language)

- 2325 Romania, R. Romania International: Cultural Survey (current arts activities in Romania)
- 2330 + Canada, CBC Northern Service: C'est La Vie (life in Quebec)
- 2330 + Canada, R. Canada International: C'est La Vie (life in Quebec)
- 2345 USA, Voice of America (Special English): American Mosaic (student life/popular culture)
- 2345 Vietnam, Voice of: Rural Vietnam (Vietnamese countryside)
- 2350 Vietnam, Voice of: Literature and the Arts (writings)

Saturdays

- 2300 + Finland, YLE/R. Finland: Capital Cafe
- 2305 Egypt, Radio Cairo: Tourism News (vacationing in Egypt)
- 2315 Romania, R. Romania International: World of Culture (Romanian cultural events/artists)
- 2325 Romania, R. Romania International: Radio Pictures (places in Romania)
- 2330 UK, BBC WS (East Asia): Arts in Action
- 2335 Netherlands, Radio: Europe Unzipped (news that might not have made the headlines)
- 2335 New Zealand, Radio NZ Intl.: Spectrum (NZ people/places/events)
- 2335 Romania, R. Romania International: Bucharest Along the Centuries (history of Romania's capital)

Thank You ..

Additional Contributors to This Month's Shortwave Guide:

Adrian Sainsbury, Radio New Zealand; Clyde Harmon, Anniston, AL; Glenn Hauser, Enid, OK/World of Radio, DX Report; Hans Johnson, WY/Ulis Fleming, MD/Cumbre DX/DXing With Cumbre; George Woods/Media Scan; BBCM; BBC On-Air; Harold Sellers, DX Ontario, Hard Core DX; Radio Sweden/Media Scan; Usenet Newsgroups; Worldwide DX Club.

How To Use This Table

The *Monitoring Times* propagation table is set up to cover three main areas of the continental US and similar circuits are calculated for each area. If you live in Canada or along the 49th parallel, and have access to the Internet, you can check the following sites for similar tables for the Canadian and northern US users at <http://www.odxa.on.ca/rac2txt99.htm>.

In the *MT* tables and on the Canadian web site, the OWF (Optimum Working Frequency) frequency for a particular circuit is displayed. This frequency should give you the best chance, 90% of the time, to hear a station located at the other end of the circuit. If you feel adventurous, look up higher than the OWF for possible signals.

The tabulated OWF is approximately equivalent to 80% of the MUF (Maximum Usable Frequency) so you could still go up in frequency in your search for a signal. For example, if the tabulated OWF is 8.0 MHz, the MUF would be 10 MHz, so you could go lurking in the upper reaches up to 10 MHz. When you reach the MUF, your chances of hearing a good signal have now decreased to about 10%. When the solar activity is high you might find some of the MUF in the 35 to 45 MHz area; you never know what you can find "up there."

The OWF can, at times, have a calculated value of "0". This value is replaced by an asterisk (*) and the cells are shaded in the *Monitoring Times* chart and on the Web pages. When you see this, do not despair; keep on looking in the vicinity of the last frequency listed for that circuit. The reason why the OWF can have a calculated value of "0" is simply that the ALF (Absorption Frequency) on this circuit, at that particular time of day, is higher than the OWF and, in theory, communication at the OWF should be impossible. But I have been in the radio field long enough to know that theory and practice do not always agree!

As it is relatively safe to assume reciprocity in the forecasts most of the time, the *MT* circuits are labeled "TO/FROM." There are some technical arguments against this assumption, but we know that the *MT* forecasts have been used with success by overseas listeners to listen to North American broadcasts.

A "P" after the name of a circuit indicates that the signal on that particular circuit can be influenced by auroral zone disturbances while traveling over the pole.

Enjoy DXing and use the propagation charts to help you locate unusual signals.

OPTIMUM WORKING FREQUENCIES (MHz)

For October 2000 Flux=181 SSN=142

Predictions prepared using ASAPS for Windows®

UTC	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
TO/FROM US WEST COAST																									
CARIBBEAN	22	19	17	16	14	12	11	11	11	10	10	10	10	11	15	21	23	23	24	24	24	24	25	24	
SOUTH AMERICA	20	21	22	19	17	15	14	13	13	13	12	12	14	23	26	25	24	24	24	24	24	23	21		
WESTERN EUROPE	10	9	9	9	9	9	10	9	9						12	16	18	20	19	17	15	13	11	10	
EASTERN EUROPE (P)	10	9	10	10	11	12	11	10							12	16	18	18	16	14	12				
NORTH AFRICA	16	16	16	16	15	13	12	11							15	19	21	22	24	23	20	18	17	16	
CENTRAL AFRICA	25	23	20	17	15	13	12								16	20	21	23	24	25	25	26	26	26	
SOUTH AFRICA	23	21	20	19	16	15	13								19	24	25	26	27	28	28	29	28		
MIDDLE EAST (P)	14	14	14	17	15	13							10	12	16	19	20	18	16	15	15	14	14		
CENTRAL ASIA (P)	14	19	23	20	17	14						10	10	10	10	13	15	14	13	13	13	13	13		
INDIA (P)	18	26	24	21	17	14							10	10	10	13	16	19	18	18	16	16	15	14	
THAILAND	27	26	25	22	19	15					10	10	10	10	10	11	16	20	22	20	19	16	15	22	
AUSTRALIA	31	31	30	28	23	20	17	15	13	13	13	13	12	12	13	19	20	18	17	18	26	30	30		
CHINA	26	26	24	22	18	15	13			10	9	9	10	10	10	11	14	14	14	14	14	14	15	20	
JAPAN	25	25	23	21	18	15	13	11	10	9	9	9	9	9	10	11	12	12	12	12	15	21	24	25	
SOUTH PACIFIC	25	25	26	24	20	17	15	14	13	12	12	11	11	10	11	16	15	19	26	27	26	26	25	25	
TO/FROM US MIDWEST																									
CARIBBEAN	23	19	17	15	13	13	12	12	12	11	10	12	16	22	27	27	28	28	28	28	28	28	28	28	26
SOUTH AMERICA	25	24	22	19	18	17	16	16	15	15	14	14	19	29	32	30	29	28	28	28	28	27	27	25	
WESTERN EUROPE	12	11	11	11	11	11	11	12	12	12	12	11	13	17	21	23	24	23	22	20	17	15	14	12	
EASTERN EUROPE (P)	9	9	9	9	9	11	11	11	11	10					11	14	18	20	21	19	17	15	13	11	
NORTH AFRICA	16	16	16	15	14	13	12	12	12						14	17	21	22	24	25	25	22	20	19	
CENTRAL AFRICA	24	22	19	17	16	14	14	13	13					17	22	25	27	28	29	29	29	30	30	29	
SOUTH AFRICA	23	21	20	17	16	15	15	14	14					17	23	27	28	29	29	29	29	30	30	29	
MIDDLE EAST	14	14	14	15	14	13	13	13						13	17	20	22	23	21	18	16	15	15	14	
CENTRAL ASIA (P)	13	17	17	15	14	13						12	12	12	13	17	18	16	14	13	13	12	12	12	
INDIA	16	20	17	15	14							11	11	13	16	19	20	20	18	18	17	16	15	14	
THAILAND	25	23	19	16	14							11	11	11	14	18	20	21	21	19	18	16	14	20	
AUSTRALIA	30	29	26	22	19	16	14	13	12	12	12	12	12	13	14	21	22	20	18	17	18	25	29	30	
CHINA (P)	23	23	20	17	14	13				11	11	11	11	11	14	15	14	14	14	14	14	14	13	14	
JAPAN	25	23	21	18	15	13	11	10	10	10	10	10	10	11	13	13	13	13	13	13	15	21	25	26	
SOUTH PACIFIC	27	27	26	21	18	15	14	13	13	13	13	12	12	13	18	17	17	22	29	30	29	28	27	27	
TO/FROM US EAST COAST																									
CARIBBEAN	15	13	12	11	10	10	9	9	8	7	7	11	17	20	21	20	20	20	20	20	20	20	19	17	
SOUTH AMERICA	22	21	20	19	18	17	16	15	13	11	12	17	28	30	28	27	26	25	25	25	24	24	23	22	
WESTERN EUROPE	12	11	11	11	11	11	11	12	13	12	12	17	22	25	25	25	25	24	23	20	18	15	13	12	
EASTERN EUROPE	10	10	10	9	10	10	12	12	12	11	11	14	19	23	23	23	21	20	17	15	13	11	10	10	
NORTH AFRICA	16	16	16	15	14	14	14	13	13	12	13	17	23	25	26	27	27	27	25	22	19	18	17	17	
CENTRAL AFRICA	21	19	17	16	16	15	14	14					14	20	26	28	28	29	29	29	30	30	30	27	
SOUTH AFRICA	23	20	18	18	16	17	16	15					16	25	29	30	31	30	31	30	31	30	28	26	
MIDDLE EAST	15	15	14	15	14	14	13	13					17	22	25	26	29	27	24	21	19	18	17	16	
CENTRAL ASIA (P)	13	14	16	15	14	14	13	13	13	12	12	14	18	21	22	19	17	15	14	13	13	13	13	12	
INDIA (P)	15	17	16	15	14								13	18	21	23	25	24	21	19	18	18	16	14	
THAILAND (P)	21	18	16	15	14							11	12	15	19	22	24	24	21	20	19	17	16	17	
AUSTRALIA	29	25	21	18	16	14	14	13	13	14	13	13	13	17	24	24	22	20	18	17	18	26	31	30	
CHINA (P)	21	18	16	15	14	13				12	12	11	11	14	18	17	15	14	13	13	13	13	13	15	
JAPAN	24	21	18	16	15	13	13	12	12	12	12	12	13	14	13	13	13	13	13	13	13	16	21	26	
SOUTH PACIFIC	29	26	22	19	17	16	15	15	15	14	14	14	16	22	20	18	19	26	32	32	32	31	29	29	

* Unfavorable conditions: Search around the last listed frequency for activity.
(P) denotes circuit across polar auroral zone; reception may be poor during ionospheric disturbances.

So Much For That Firewall...

In a July draft appropriations bill for the 2001 fiscal year, the United States Senate's Appropriations Committee included the following words:

"VOA is charged with (1) providing comprehensive and balanced news; (2) explaining American values, institutions, and thought; and (3) presenting U.S. foreign policy and responsible discussion of it.

"The Committee believes it essential that these three requirements receive equal priority in terms of resource allocation, regularly scheduled programming, and affiliate and placement efforts.

"The introduction of the *News Now* format and concomitant efforts to eliminate American experience and American foreign policy programming calls into question VOA's compliance with its own charter, which has the standing of law and which has been reaffirmed in legislation related to international broadcasting.

"Therefore, the Committee directs the BBG, the Director of the International Broadcasting Bureau, and the Director of VOA to take immediate steps to:

"(1) increase the type and amount of VOA programming, whether radio, TV, or Internet streaming, devoted to fulfilling the American foreign policy requirement of the VOA Charter, including, but not limited to, the daily Editorial, the weekly foreign policy talk show *On the Line*, and the International Crime Alerts (including abducted children alerts), until such programming achieves a proportionate and reasonable share of total VOA programming, and

"(2) establish an American Interests Division, using funds from the current VOA *News Now* budget, the mission of which shall be to produce programming that fulfills the American experience mandate of the VOA Charter."

❖ Cause and Effect

At deadline for this column, the Senate bill containing this language was still to be reconciled with that in the House appropriations bill, which had no such specific directives for VOA. So, these specific instructions to the US international broadcaster may not, in the end, be enacted. Nonetheless, VOA management thought it prudent to respond quickly. This announcement was broadcast during the weekends of July 29/30 and August 5/6:

"We have a schedule change coming up in the next half hour. The *Best of Talk to America*, which has been broadcast at this time in recent months, has been replaced in this timeslot with

the program *On The Line*. The *Best of Talk to America* can still be heard Saturdays at half past 2, 10, and 18 hours Universal Time, and on Sundays at half past 6, 14 and 22 hours Universal Time..."

On the Line was dropped from the VOA schedule in May 1998 when the station initiated its *News Now* service. The program, an in-studio discussion of U.S. foreign policy, continued on *Worldnet*, an international television service which is operated independently of the VOA. With the most recent change, the program is once again broadcast by the VOA on Saturdays at 0633, 1433 and 2233; and Sundays at 0233, 1033 and 1833.

VOA also moved to increase the number of plays for the *VOA Editorial*, adding two slots Monday through Friday at 0555 and 2355 and three slots each day on the weekend to cause the *Editorial* to be broadcast every four hours beginning at 0255.

❖ Public Laws 105-277 and 103-236

The first paragraph on the web page of the Broadcasting Board of Governors reads as follows (text in bold is our emphasis added):

"On October 1, 1999, the Broadcasting Board of Governors (BBG) became the independent, autonomous entity responsible for all U.S. government and government sponsored, non-military, international broadcasting. This was the result of the 1998 Foreign Affairs Reform and Restructuring Act (Public Law 105-277), the single most important legislation affecting U.S. international broadcasting since the early 1950s."

Elsewhere on that web site, these statements are made:

"The bipartisan Broadcasting Board of Governors (BBG) oversees all U.S. government and government-sponsored, non-military, international broadcasting. This includes the activities of the five U.S. international broadcasting services: The Voice of America (VOA), Radio Free Europe/Radio Liberty (RFE/RL), Radio and TV Marti, WORLDNET Television, and Radio Free Asia (RFA) as well as the support and oversight activities of the International Broadcasting Bureau (IBB)."

"The Broadcasting Board of Governors (BBG) was created with the passage of the U.S. International Broadcasting Act of 1994 (Public Law 103-236). The BBG serves as a *firewall* to protect the professional independence and integrity of the BBG broadcasters."

"The BBG is also charged with *evaluating*

the mission and operation of U.S. international broadcasters, in order to ensure compliance with statutory broadcasting standards; to assess quality and effectiveness, to determine the addition and deletion of language services; and to submit annual reports to the President and Congress."

❖ So, Which Is It?

All of which begs the following question. Just what are the respective roles of the Congress and the Broadcasting Board of Governors in the governance of U.S. international broadcasting? Is it the proper role of a partisan and politically controlled Congressional committee to specifically dictate the content of VOA and U.S. international broadcasts?

The Congress, over the years, has not been shy about micromanaging the structure of U.S. international broadcasting. The plethora of Radio Free (fill in the blank)s are direct results of continuous Congressional interventions. It is argued here that every time this happens, the image and integrity of U.S. international broadcasting suffers – not to mention the fact that limited resources are spread ever thinner, hampering the effectiveness of the overall effort. Now it appears that a Congressional committee wants to go a step further and dictate the content of particular broadcasts. If so, then for what purposes did Congress actually pass Public Law 103-236 creating the BBG and, later, pass Public Law 105-277, if not for the Congressionally expressed purposes described above?

These hopeful words were contained in the BBG's 1998 Annual Report:

"On October 1, 1999, U.S. international broadcasting assumes *full independence* under the Broadcasting Board of Governors and becomes separate from the Department of State or its previous parent organization, the United States Information Agency. U.S. international broadcasting is *guaranteed professional independence*, news-gathering authority, and journalistic integrity."

In explaining the role of the BBG, its Chairman, Marc B. Nathanson, is quoted as saying, "It is our responsibility to serve as a *firewall between the international broadcasters and the policy-making institutions in the foreign affairs community*, both in here in Washington and overseas. This is a responsibility we take very seriously. Because, at the end of the day, it is precisely by providing accurate news and information – sought and trusted by people around the world – that we earn and keep our credibility."

Think again.



Single Channel Per Carrier (SCPC) Services

By Robert Smathers, roberts@nmia.com

An SCPC transmitted signal is transmitted with its own carrier, thus eliminating the need for a video carrier to be present. Dozens of SCPC signals can be transmitted on a single transponder. In addition to a standard TVRO satellite system, an additional receiver is required to receive SCPC signals.

The frequency in the first column is the 1st IF (typical LNB frequency) and the second column frequency (in parentheses) is the 2nd IF (commercial receiver readout) for the SCPC listing. Both frequencies are in MHz.

GE-2 Transponder-Vertical 13 (C-band)

1178.70 (81.3) NASA space shuttle audio (missions only)

Galaxy 4R Transponder 1-Horizontal (C-band)

1443.80 (56.2) Voice of Free China (International Shortwave Broadcaster) Taipei, Taiwan
 1443.60 (56.4) KBLA-AM (1580) Santa Monica, CA—Radio Korea
 1438.30 (61.7) WWRV-AM (1330) New York, NY—Spanish religious programming and music, ID—Radio Vision Christiana de Internacional

Galaxy 4R Transponder 3-Horizontal (C-band)

1404.60 (55.4) WGN-AM (720) Chicago, IL—news and talk radio
 1404.40 (55.6) WMVP-AM (1000) Chicago, IL—“ESPN Radio 1000”
 1404.20 (55.8) Tribune Radio Networks/Wisconsin Radio Network
 1402.90 (57.1) USA Radio Network
 1402.00 (58.0) Occasional audio
 1401.80 (58.2) People's Radio Network
 1399.00 (61.0) Sports Byline USA/Sports Byline Weekend/On Computers Radio Show
 1398.80 (61.2) Talk Radio Network (TRN)
 1398.50 (61.5) Occasional audio
 1397.80 (62.2) Occasional audio
 1397.50 (62.5) Minnesota Talking Book Radio Network—reading service for the blind
 1397.10 (62.9) Wisconsin Radio Network
 1396.70 (63.3) Radio America Network
 1395.80 (64.2) WTMJ-AM (620) Milwaukee, WI—talk radio/Packers NFL radio network
 1395.50 (64.5) Michigan News Network—network news feeds
 1395.00 (65.0) Occasional audio
 1394.70 (65.3) WJR-AM (760) Detroit, MI—news and talk radio/Michigan News Network
 1394.30 (65.7) Michigan News Network—network news feeds
 1383.10 (76.9) KIRO-AM (710) Seattle, WA—news and talk radio/Seahawks NFL radio network
 1382.60 (77.4) Soldiers Radio Satellite (SRS) network—U.S. Army information and entertainment radio
 1382.30 (77.7) Motor Racing Network (occasional audio)
 NASCAR racing
 1382.00 (78.0) Occasional audio
 1381.60 (78.4) KEX-AM (1190) Portland, OR—news and talk

radio
 1381.40 (78.6) Occasional audio
 1381.20 (78.8) KJR-AM (950) Seattle, WA—sports talk radio
 1380.90 (79.1) Occasional audio
 1377.10 (82.9) In-Touch—reading service
 1376.00 (84.0) Kansas Audio Reader Network—reading service

Anik E2 Transponder 1-Horizontal (C-band)

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

Anik E2 Transponder 5-Horizontal (C-band)

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

Anik E2 Transponder 7-Horizontal (C-band)

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

Anik E2 Transponder 17-Horizontal (C-band)

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

Anik E2 Transponder 23-Horizontal (C-band)

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

Solidaridad 1 Transponder 1-Vertical (C-band)

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

Anik E1 Transponder 21-Horizontal (C-band)

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

Galaxy 10R Transponder 4 (Ku-band)

1012.75 (87.25) Wal-Mart In-store network
 1013.15 (86.85) Sam's Club In-store network
 1013.50 (86.50) Wal-Mart In-store network
 1013.95 (86.05) Wal-Mart In-store network
 1014.25 (85.75) Sam's Club In-store network
 1014.75 (85.25) Wal-Mart In-store network
 1015.05 (84.95) Wal-Mart In-store network

RCA C5 Transponder 3-Vertical (C-band)

1404.60 (55.4) Wyoming News Network/Northern Ag Network
 1400.60 (59.4) Learfield Communications
 1400.40 (59.6) Learfield Communications/MissouriNet
 1400.20 (59.8) Learfield Communications/Rams NFL radio network
 1400.00 (60.0) Learfield Communications
 1396.60 (63.4) Kansas Information Network/Kansas Agnet—network news feeds
 1396.40 (63.6) Liberty Works Radio Network
 1396.20 (63.8) MissouriNet
 1395.90 (64.1) Western Montana Radio Network/Red River Form Network
 1395.70 (64.3) MissouriNet
 1386.40 (73.6) Learfield Communications
 1386.20 (73.8) Radio Iowa
 1384.00 (76.0) Capitol Radio Network
 1383.80 (76.2) Learfield Communications
 1383.40 (76.6) Capitol Radio Network
 1382.90 (77.1) MissouriNet
 1382.10 (77.9) Learfield Communications/MissouriNet

SATELLITE LOADING REPORT OF THE MONTH

Telesat E2 at 107.3 degrees West longitude

C-band

- 1 CBC-H English Eastern
- 2 Occasional video
- 3 (none)
- 4 (none)
- 5 CBC-C English Pacific
- 6 Occasional video
- 7 CBC-M feeds (occasional)
- 8 Cancom [digital]
- 9 CBC-B English Atlantic
- 10 Data Transmissions

SATELLITE RADIO GUIDE



- 11 CBC-A French [digital]
- 12 Cancom [digital]
- 13 (none)
- 14 Cancom [digital]
- 15 Occasional video
- 16 Global TV [digital]
- 17 CBC-D feeds (occasional)
- 18 Data Transmissions
- 19 Telesat [digital]
- 20 (none)
- 21 Telesat [digital]
- 22 Occasional video
- 23 CBC-E English (occasional)
- 24 CTV [digital]

Ku-band

Tr(Pol) Freq	Service
1(V) 11717	Star Choice DBS [digital]
2(V) 11743	Star Choice DBS [digital]
3(V) 11778	Star Choice DBS [digital]
4(V) 11804	Star Choice DBS [digital]
5(V) 11839	Star Choice DBS [digital]
6(V) 11865	Star Choice DBS [digital]
7(V) 11900	Star Choice DBS [digital]
8(V) 11926	Star Choice DBS [digital]
9(V) 11961	Star Choice DBS [digital]
10(V) 11987	Star Choice DBS [digital]
11(V) 12022	Star Choice DBS [digital]
12(V) 12048	Star Choice DBS [digital]
13(V) 12083	Star Choice DBS [digital]
14(V) 12109	Star Choice DBS [digital]
15(V) 12144	Telesat GLACS [digital]
16(V) 12170	Star Choice DBS [digital]
17(H) 11730	Star Choice DBS [digital]
18(H) 11756	Star Choice DBS [digital]
19(H) 11791	Star Choice DBS [digital]
20(H) 11817	Star Choice DBS [digital]
21(H) 11852	Star Choice DBS [digital]
22(H) 11878	Star Choice DBS [digital]
23(H) 11913	Star Choice DBS [digital]
24(H) 11939	Star Choice DBS [digital]
25(H) 11974	Star Choice DBS [digital]
26(H) 12000	Star Choice DBS [digital]
27(H) 12035	Star Choice DBS [digital]
28(H) 12061	Star Choice DBS [digital]
29(H) 12096	Star Choice DBS [digital]
30(H) 12122	Telesat GLACS [digital]
31(H) 12157	Star Choice DBS [digital]
32(H) 12183	Star Choice DBS [digital]

Solidaridad-1 at 109.2 degrees

West longitude

C-band

1	Data Transmissions
2	Data Transmissions
3	(none)
4	Data Transmissions
5	(none)
6	Data Transmissions
7	(none)
8	Data Transmissions
9	Multivision DBS [digital]
10	Mexican Government Channel
11	Multivision DBS [digital]
12	Data Transmissions
13	(none)
14	Mexican cable services [digital]
15	Data Transmissions
16	Multivision DBS [digital]
17	(none)
18	Occasional video
18	Data Transmissions
19	Occasional video
21	(none)
22	XEIPN-TV 11 "Canal Once"
23	Data Transmissions
24	Claravision

Ku-band

Tr(Pol) Freq	Service
1(H) 11730	Data Transmissions
2(H) 11791	Data Transmissions
3(H) 11852	Data Transmissions
4(H) 11913	Data Transmissions
5(H) 11974	Data Transmissions
6(H) 12035	Data Transmissions

7(H) 12096	Data Transmissions
8(H) 12157	Data Transmissions
9(V) 11744	Data Transmissions
10(V) 11805	Data Transmissions
11(V) 11866	Data Transmissions
12(V) 11927	Data Transmissions
13(V) 11988	Data Transmissions
14(V) 12049	Data Transmissions
15(V) 12110	Data Transmissions
16(V) 12171	Data Transmissions

Telesat E1 at 111 degrees West

longitude

C-band

1	(inactive transponder)
2	(inactive transponder)
3	Data Transmissions
3	Data Transmissions
5	Data Transmissions
6	(inactive transponder)
7	Data Transmissions
8	(inactive transponder)
9	(inactive transponder)
10	(inactive transponder)
11	(inactive transponder)
12	(inactive transponder)
13	(inactive transponder)
14	Occasional video
15	(inactive transponder)
16	Occasional video
17	(inactive transponder)
18	(inactive transponder)
19	Data Transmissions
20	Data Transmissions
21	Data Transmissions
22	(inactive transponder)

- 23 (inactive transponder)
- 24 (inactive transponder)

Ku-band

Tr(Pol) Freq	Service
1(V) 11717	Data Transmissions
2(V) 11743	Data Transmissions
3(V) 11778	Data Transmissions
4(V) 11804	Data Transmissions
5(V) 11839	DirectPC [digital]
6(V) 11865	Data Transmissions
7(V) 11900	(inactive transponder)
8(V) 11926	(inactive transponder)
9(V) 11961	Occasional video
10(V) 11987	Occasional video
11(V) 12022	(inactive transponder)
12(V) 12048	(inactive transponder)
13(V) 12083	(inactive transponder)
14(V) 12109	(inactive transponder)
15(V) 12144	(inactive transponder)
16(V) 12170	(inactive transponder)
17(H) 11730	Woman's TV Network [digital]
18(H) 11756	Data Transmissions
19(H) 11791	Data Transmissions/CBC radio [digital]
20(H) 11817	Data Transmissions
21(H) 11852	(inactive transponder)
22(H) 11878	(inactive transponder)
23(H) 11913	Occasional video
24(H) 11939	Occasional video
25(H) 11974	(inactive transponder)
26(H) 12000	(inactive transponder)
27(H) 12035	Data Transmissions
28(H) 12061	Occasional video
29(H) 12096	(inactive transponder)
30(H) 12122	(inactive transponder)
31(H) 12157	(inactive transponder)
32(H) 12183	(inactive transponder)

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Checking Out The New ST-6600 MPEGII Receiver

One of the more fascinating developments in the satellite TV industry in recent years has been the widespread use of the Digital Video Broadcasting (DVB) standard on C and Ku-bands. Everyone is familiar with the DISH and DSS digital services and a few know about General Instrument's 4DTV digital satellite receiver, but DVB is a third digital service used internationally throughout the industry that's considerably less known by American consumers.

The DVB standard is mostly used in Europe and Asia by programmers seeking several objectives: 1) To provide compressed video programming via satellites which drastically reduces the cost of satellite use. 2) To use a well established standard which is user friendly, widely available and, most of all, inexpensive. 3) To be a standard flexible enough to allow programmers to make the programming available for free or easily encrypted to allow reception via subscription. Because DVB is based on the MPEGII video and audio standard, these receivers are known generically as MPEGII receivers.



VOA's "Talk to America" program live on USIA's DVB channels on GE 2, channel 14. Services include VOA news and music (in English and Spanish) to affiliates in the western hemisphere.

❖ The Booming MPEGII Industry

Throughout the last few years the MPEGII portion of the satellite industry has grown rapidly. With many MPEGII receiver brands on the market, each company tries to get the edge with a few different features. As a result, thousands of MPEGII receivers are sold every month as word of the capabilities of these receivers

spreads. In fact, MPEGII technology has resulted in a mini-boom for the slowly dying big dish industry. But, because most people buy these receivers for the free programming available, no statistics are kept as to how big the MPEGII satellite universe is.

The bulk of MPEGII complete system sales, however, comes from the vast and growing ethnic communities across North America. Tens of thousands of Asians, Indians, Moslems, and Europeans buy these systems each month in an effort to tune in to familiar programs and languages not readily found on DSS, DISH, or local cable systems. Much of the programming is not encrypted but is "Free-To-Air" (FTA), as they say in the industry. This means that simple, stationary, small dish systems can be used to tune in programming at a very small price. Savvy dealers in urban areas are making a good living selling and installing these systems in otherwise underserved markets across North America.

❖ Digital Satellite TV Basics

All digital satellite TV systems work basically the same. Video from as many as 10 different sources are each compressed into a data stream made up of packets (just like the information sent via the Internet). These sources are all uplinked to one transponder on a satellite. (Now you can see why transmission in this mode is so cheap!) The data is downlinked by the satellite and picked up by the antenna (dish), amplified via the Low Noise Block downconverter (LNB), and relayed to the receiver. The receiver reassembles the packets and converts the whole mess into a format which can be seen on your TV.

Virtually all digital satellite services – DSS, DISH, 4DTV, Primestar, etc. – use an MPEGII based system for transmission. The differences allow each service to try to garner market share. Due to these subtle differences, none of the systems are compatible with each other. That's why a DSS receiver hooked up to a DISH system doesn't work. A 4DTV receiver can't pick up anything on a DSS or DISH system. And, like the DSS/DISH systems, MPEGII receivers have no ability to move a dish, though most have polarity switching devices.

Virtually all DVB receivers have the same features. Most have a separate radio and video list; favorite channels list, and a way to make changes in the satellite/channel memory. Among the DVB systems available the top model has

always been the one made by Nokia, because of its ability to scan each satellite and automatically add channels found in MPEGII. Unfortunately, this receiver has also been the most expensive on the market, priced several times more than any other MPEGII receiver.



The ST-6600 program guide is superimposed on the screen. Scrolling up or down the Channel List brings up the highlighted channel.

This one feature has eluded many receiver makers and has been the downfall of a few others who tried to emulate this feature and failed. The new ST-6600 has done the next best thing with a very effective software package. It scans through factory programmed channels for a called satellite; when it finds the signals it enters them into its own memory. It cannot find programming sources it hasn't already been programmed to find.

❖ The ST-6600's Fast Tuning Advantage

With many MPEGII receivers, viewers must laboriously enter data concerning the transmission parameters of each service (frequency, symbol rate, and error correction) by manipulating a number of buttons on the remote control. It's been a necessary and tedious fact of life for MPEGII viewers for years. This one aspect has been enough to turn more than a few hobbyists away from this aspect of satellite TV viewing. The new ST-6600 receiver takes all the drudgery out of MPEGII viewing by having the receiver do the finger work. While it's searching, it displays all TV and radio channels in separate columns and, like loading a program on a computer, advises what percentage of the search has been completed. When I first fired up the receiver and turned the dish to Panamsat 5, I hit

the search button and prepared to wait or be frustrated. Before I could figure out what was happening, the ST-6600 had found all the channels available and had logged them into the memory.

One nice feature is that you can tell the receiver to skip the encrypted channels. The software in this receiver also allows the viewer to customize the channel selections for fast retrieval. This is necessary because as you travel the Clarke Belt and add FTA services they quickly add up. Don't be surprised to find hundreds of channels (the ST-6600 can hold 2,000 entries!). Looking any one of them up on a numbered list would be time consuming. But, pressing the "Guide" button on the remote allows you to scroll through the programming categories News, Sport, Finance, Movies, etc. Pressing the "OK" button on any one of the categories brings up the smaller list of programs you've added to the list, where you can quickly find the channel you're looking for.

❖ Small Footprint, Big Impact

The ST-6600 receiver takes up very little space. Measuring just 13-in. wide, 2-1/2-in. high and only 7-1/4-in. deep, this is the smallest MPEGII receiver I've seen. The front panel layout couldn't be more sparse. Only the LED display and three buttons adorn the front, while the



Sparse layout on the front of the ST-6600 receiver and remote control. All the action is in the well designed software which shows up on your TV as on-screen graphics.

back is equally spare. An LNB loop-through allows you to use the receiver without a splitter. Simply take the LNB cable from the dish, put it in the "F" fitting marked "IF-Input" and take a short piece of coax cable with "F" connectors and plug one end into the "F" connector right below. Plug the other end into your regular satellite receiver and you're set to go.

The output of the ST-6600 is a UHF TV modulator, which means that the video from the ST-6600 can be seen on your TV set on any UHF channel you choose by selecting the output channel with the ST-6600's remote control. Choose a channel away from local UHF broadcasters to minimize interference. You can put the output of the ST-6600 into the extra video input of your VCR.

Among the other features on the ST-6600 are inputs for your local TV antenna and the software in the receiver to switch between up to four separate dishes using an optional DiSEqC



There's not too much to do to get these receivers up and running. An LNB loop-through and video and audio output are all that are needed. There's even room for an outside TV antenna input.

combiner. This feature is not one commonly used by big dish viewers because most big dishes are steerable. However, this option allows a viewer to have access up to four different stationary dishes, each pointed at a different satellite, with the same receiver. This is a great idea, for instance, if you're only interested in looking at a few satellites and use small (under 4 feet) dishes. One place such a scheme would work well is in an area with restrictions on having satellite dishes. A couple of discreetly placed small dishes could make satellite TV DXing a reality.

❖ What the ST-6600 Won't Do

As stated earlier, the ST-6600 has no provision to move a dish. It can be used as a stand alone receiver or as a "slave" receiver in conjunction with your current receiver. The ST-6600 will not receive DSS, DISH Network or 4DTV transmissions. Nor will it pick up analog C or Ku-band signals.

There are many encrypted channels using the MPEGII format which can be received by the ST-6600 but not decoded. That's because there is no decoder module nor is there a provision for one. However, there are several receivers which do have the decoding modules for those wishing to subscribe to such services. For more on these receivers see the smallear.com web site.

Transmissions made in the PAL MPEGII format received on the ST-6600 show up on an NTSC TV as black and white. This is not generally a problem since there are few PAL transmissions found. However, if the service you're looking for is in PAL you should consider investing in a TV which can display the PAL format with proper color and screen resolution.

If you are searching the channels of a given satellite and the search comes up "Not Found" check first to make sure you are on the right satellite and proper polarity. Keep in mind that with analog transmissions it's possible to be slightly off the satellite and still get a watchable picture. Digital transmissions have far less tolerance. This is why it's important to have as big a dish as you can.

❖ Final Say

Now, I admit that I've been playing with dozens of satellite receivers for 15 years and, while virtually every one is different, I've developed an odd sort of expertise in using them. I know that not everyone will find it so easy. But, if you're willing to invest a little time along with your money, you'll find MPEGII viewing a fascinating glimpse into programming services many of which are simply not available anywhere else.

While the ST-6600 comes with most satellites and their digital parameters preprogrammed, when new satellites are launched or new services added to satellites you can still manually program the ST-6600.

The ST-6600 sells for \$229 plus \$15 S&H. For more information on this and other MPEGII systems as well as information on what's available in the skies over your house visit www.smallear.com/

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WXSATS: A World of Change

No two images from weather satellites (WXSATs) are ever the same. Even if two different polar satellites (such as Resurs 01-N4 and NOAA-12) pass over the same region at the same time as a GOES satellite is scanning, we will get three different views. These two polar satellites have different spectral sensors, so their images differ; GOES-8 and GOES-10 provide a different perspective due to their distance in geostationary orbit.

It is these factors that ensure that I (and probably many other people) never get tired of monitoring our planet's weather, and looking for the unusual. Images from readers have captured local events that I am pleased to include this month.

Dick Mobley has previously provided images for inclusion, and this month is no exception: his image – see figure 1 – shows a fairly large fire in northwest Alaska during July. The Yukon River is the major waterway flowing through the center of the picture. Another area of fire is obscured by clouds south-east of this fire, as seen by the brown smoke. Nome, Alaska, is off the left of the image. A jet contrail is visible in the area of the fire. Dick noted that a high pressure system was moving in from the northwest, and hoped that images of Alaska under clear skies might be obtained.

Chuck Vaughn is providing regular images from the Chinese polar orbiter Fengyun-1C via his website (<ftp://shell3.ba.best.com/web2/aa6g/>) – see figure 2.

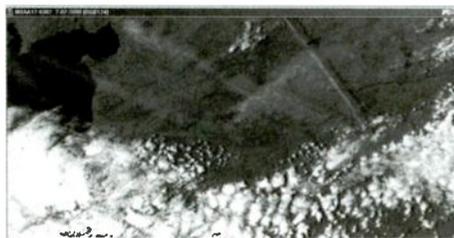


Fig 1: Alaskan fire July 7, NOAA-12

❖ WXSAT activities

Activity is the operative word! NOAA-12 and NOAA-14 have continued nominal operations throughout the period, but NOAA-15 is another story. The satellite was put through a series of tests during July, following problems with scanner synchronization. As in early August, the HRPT/APT transmitters are on and operating normally, but the AVHRR (advanced very high



Fig 2: Fengyun-1C (polar) image July 30 1610 UTC from Chuck Vaughn

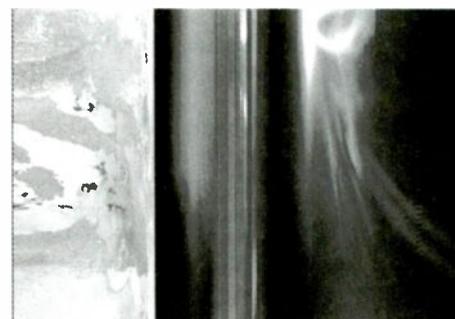


Fig 3: NOAA-15 HRPT image 0756 UTC August 1, 2000

Figure 3 shows the HRPT image that I received during the morning of August 1, and is typical of those received during the last week. The only recognizable feature is the distorted image of Italy seen on the left. By combining the contents of channels 1, 2 and 4 (multi-spectral imaging) a highly colorful, picturesque image results – of no use whatsoever – but very attractive!

During July, Meteor 2-21 was transmitting APT for a few weeks before being switched off. Meteor 3-5 was re-activated early in the month. Resurs 01-N4 provided APT transmissions throughout the period.

resolution radiometer) is operating without any, or irregular, synchronization, so we get images that are broken up. Wayne Winston of NOAA commented that from late July, "We are operating from internal synch on the MIRP which allows NOAA to retrieve and process data from all the other NOAA-15 instruments properly. Barring some unforeseen change for the better with the

AVHRR, we have probably seen the last of usable image data from this satellite."

❖ NOAA-1 launch

By late July, the scheduled launch date for the next NOAA WXSAT had been moved forward to September 11. Past experience indicates that APT/HRPT transmissions will commence within a few hours of launch.

❖ Fengyun-1B

The recently launched Chinese geostationary WXSAT will be put into full operation on January 1, 2001. Meanwhile the first infrared image is shown in figure 4 courtesy China Meteorological Agency.

PY 2 2000年07月20日 02时04分 1R



Fig 4: Fengyun-1B (geostationary) first infrared image July 20 at about 0230 UTC

❖ NOAA-9 – the whispers

On a few recent occasions, I reported the whispers of telemetry still heard sometimes from NOAA-9, the long ago terminated WXSAT. Our NOAA contact Wayne Winston has once more provided some information concerning the mysterious signal.

"The decommissioning of the satellite includes the equivalent of a Ctrl-Alt-Del on the on-board processor that essentially erases all the software out of RAM. The satellite is now 'dead' in a power-off mode. In this state it no longer has the Attitude Determination and Control System (ADACS), and, with time, starts a slow tumble to eventually stabilize around the center of gravity. That's where we find it now, in a stable tumble of about 44 seconds which accounts for the varying signal strength that is heard."

❖ NOAA weather satellites – a glimpse of the future (Part 1)

We are currently receiving WXSAT transmissions from three active NOAA satellites – NOAA-12, -14 and -15. Wayne Winston is the Direct Readout Coordinator at NOAA/NESDIS, and has kindly provided some insights into current thinking.

The planned launch schedule for future NOAA WXSATs includes four more polar orbiters of the current “family” to launch, ranging from NOAA-L in September through NOAA-N’ in early 2008. Given a design life of 2-3 years, NOAA-N’ should continue to operate into 2010 or beyond. All these satellites are similar, and will have the present analog APT and digital HRPT, and everything will be unencrypted. There is no encryption capability built into these satellites.

Before the end-of-life of this series, in 2009 as currently scheduled, NOAA will begin launching the NPOESS (National Polar-orbiting Operational Environmental Satellite System) series of satellites. These will introduce great changes into direct readout as a consequence of all new instruments and much higher data rates. Everything will be digital and packetized to CCSDS standards. NPOESS is still very much in the development stage, but it is taking shape along these lines. High Rate Data (new HRPT) will be transmitted at 20 Mbps and have to be moved to the X-band. Low Rate Data (new digital APT) will carry much more than two channels of imagery.

There will probably be at least three channels at higher resolution, and vertical temperature/humidity profile information from some of the sounding instruments. Data rate will be 230 kbps, and the transmission frequency will be moved to around 400 MHz. This still makes some sort of omni-directional antenna usable.

Normally the data will be unencrypted and available to all. For some exceptions, see below. The NPOESS satellites are the result of the new U.S. joint polar satellite program that combines the civilian NOAA program and the Defense Department DMSP programs. As such, capabilities, instrumentation, and direct readout capabilities (high and low data rates) and content must meet the requirements of both the U.S. civilian and military users.

My understanding (explains Wayne) is that NPOESS will have the ability to encrypt some or all of these data. This falls under the heading of “national security,” given that these are joint civil/military satellites. However, the encryption capability would only be used selectively, for instance in times of national emergency or military conflict, where U.S. forces are involved and it is deemed in the U.S. interest to deny the satellite data to hostile forces over the impacted region. So, encryption would be used sparingly

and regionally, if at all. That is my understanding of how the policy is evolving.

More about encryption: The METOP satellites will be part of a joint EUMETSAT/NOAA program. METOP satellites will now be put into the “morning” orbit, while NOAA will have responsibility for the “afternoon” orbit – where NOAA-L will be launched. NOAA-M will be launched into a “mid/late-morning” next year, not an exact replacement for NOAA-15.

NOAA is supplying the AVHRR and some of the sounder instrumentation for the METOP satellites. They also carry instruments that have been developed by EUMETSAT (IASI, GRAS, ASCAT, etc.). Of course, EUMETSAT will officially put forth their encryption policies at an appropriate time. However, my present understanding is that NOAA and EUMETSAT have reached agreement that the NOAA provided instruments will “carry” the NOAA policy of data access with them. That is, the AVHRR data on METOP LRPT and HRPT will not be encrypted.

Data from EUMETSAT instruments will be encrypted. Since METOP does carry encryption capability, AVHRR data could be encrypted if the U.S. Dept of Defense or State Dept determined it was in the national interest to invoke data denial – very similar to situations I noted in the paragraphs above concerning encryption on NPOESS. Possible, not probable, and not part of any fee-based licensing program.

Returning to the technical aspects of NPOESS, you can see that nothing about the low and high data rate services will resemble what they are today. Totally new hardware and software will be required. I don’t think we can predict what hardware might be available to users a decade from now to be used as the basis of NPOESS LRD receivers. Look where PCs have come in a decade!

But it is quite possible that this could mark the end of the home brew, parts box receiver hobbyist. Commercial receivers may well carry a price tag where they cannot be justified by casual users, hobbyists, and schools for occasional use, and there is no meaningful cost-to-benefit ratio.

The remainder of this insight into the future of NOAA WXSAT operations from Wayne Winston will be published in the next edition of this column.

Frequencies

NOAA-14 transmits APT on 137.62 MHz
NOAA-12 transmits APT on 137.50 MHz
NOAAs transmit beacon data on 137.77 or 136.77 MHz
Metear 3-5 may transmit APT on 137.30 MHz when in sunlight
Resurs 1-4 transmits APT on 137.85 MHz
Okean-0, Okean-4 and Sich-1 sometimes transmit APT briefly on 137.40 MHz
GOES-8 and GOES-10 use 1691 MHz for WEFAX

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A New Millennium, New Federal Bandplans

With the dawn of a new millennium, scanner radio hobbyists will see major changes to the government land mobile VHF/UHF frequency bands, most of which have already gone into effect. Some of these changes have resulted in new bands being used, the doubling of frequencies in the older land mobile bands by changes in channel spacing, and the heavy use of narrowband and APCO 25 digital technology.

In January, the National Telecommunications and Information Administration (NTIA) – the U.S. Government version of the Federal Communication Commission (FCC) – updated its *Manual of Regulations & Procedures for Federal Radio Frequency Management*.

This manual is the basic bible for government spectrum management and within its pages are basic band plans for government land mobile bands. In the January 2000 edition, we get a glimpse at what these VHF/UHF bands look like right now and how they will change over the next 10 years.

Government Itinerant Frequencies Changed

Government itinerant frequencies can provide some of the most interesting listening in the federal spectrum if radio hobbyists watch for activity on these frequencies. Here are the older allocations currently in use:

Wide area itinerants: 163.100, 418.050, 418.575 MHz

Common use itinerants: 168.350, 408.400 and 418.075 MHz

Station assignments made under older procedures on the above frequencies will stop December 31, 2004. In the meantime, the new rules are being used to implement a whole new series of government itinerant frequencies as indicated below.

New Common Use Frequencies

Wide-area, common-use frequencies are allotted for use by all U.S. Government agencies and provide users with frequencies for radio communications that do not justify the assigning of a radio frequency exclusively to that use, (i.e., the frequency can be shared with other users).

The following paired frequencies are for use in wide-area (i.e., county-wide, statewide, continental US, and US plus possessions) operations of a transient nature that require the use of

a repeater station. According to the new government regulations, unpaired, single frequency operations will be authorized on the repeater transmit frequencies and on the repeater receive frequencies below only if all of the other wide-area, common-use frequencies are in use.

Wide-Area, Common-Use Paired Frequencies (MHz)

Repeater Transmit	Repeater Receive
163.1000	168.3500
409.0500	418.0500
409.3375	418.3375



Secret Service protects the Pope during a recent visit. Their comms can be found throughout the federal government VHF/UHF land mobile spectrum. (Photo courtesy of the Secret Service).

The following frequencies are for use in wide-area operations of a transient nature that do not require the use of a repeater station, and will be used in the simplex mode (use of a base station is allowed).

Wide-Area, Common-Use Simplex Frequencies (MHz)

412.825 412.8375 412.850 412.8625

Government users of these frequencies do so on a shared, non-priority basis only; these frequencies are not authorized for, nor intended for, the exclusive use of any one agency.

A new category of government itinerants is now operational. The feds have set aside frequencies for local-area, common use. The following paired frequencies are being used only for local operations requiring the use of a repeater station at a fixed location. Like the wide-area frequencies mentioned above,

these local frequencies can be used for unpaired operations.

Local-Area, Common-Use Paired Frequencies (MHz)

Repeater Transmit	Repeater Receive
173.6250	167.1375
407.5250	416.5250
409.0750	418.0750

The following frequencies are being used only for local area operations that do not require the use of a repeater station and can only be used in the simplex mode (use of base stations is allowed on these frequencies).

Local-Area, Common-Use Simplex Frequencies (MHz)

163.7125 168.6125 412.875 412.8875 412.900 412.9125

New Interagency Law Enforcement Frequencies

The frequencies indicated below are now available for assignment to all U.S. Government agencies to satisfy intermittent law enforcement and public safety incident response requirements. Non-government agencies may use these frequencies only in cooperation with agencies of the Federal Government. These new frequencies are only available on a shared basis and they are not authorized for the exclusive use of any one agency.

Frequencies 167.0875 and 414.0375 MHz are designated as National Calling Channels and are being used for initial contact using the analog FM mode. The agency in control of the incident for which these frequencies are being used will assign specific operational channels as required for incident support operations.

The interoperability frequencies in mobile and portable radios will use a 167.9-Hz Continuous Tone-Controlled Squelch Systems (CTCSS) and/or a network access code (NAC) of \$68F.

Interagency Law Enforcement VHF Interoperability Frequencies

Identifier	Mobile Transmit	Mobile Receive	
Natl Calling	167.0875	167.0875	Simplex
Inop 1	162.0875	167.0875	
Inop 2	162.2625	167.2500	
Inop 3	162.8375	167.7500	
Inop 4	163.2875	168.1125	
Inop 5	163.4250	168.4625	
Inop 6	167.2500	167.2500	Simplex
Inop 7	167.7500	167.7500	Simplex
Inop 8	168.1125	168.1125	Simplex
Inop 9	168.4625	168.4625	Simplex

Interagency Law Enforcement UHF Interoperability Freqs			
Identifier	Mobile Transmit	Mobile Receive	
Natl Calling	414.0375	414.0375	Simplex
Inop 1	418.9875	409.9875	
Inop 2	419.1875	410.1875	
Inop 3	419.6125	410.6125	
Inop 4	414.0625	414.0625	Simplex
Inop 5	414.3125	414.3125	Simplex
Inop 6	414.3375	414.3375	Simplex
Inop 7	409.9875	409.9875	Simplex
Inop 8	410.1875	410.1875	Simplex
Inop 9	410.6125	410.6125	Simplex

A new series of frequencies has also been set aside for interagency incident response. The frequencies 169.5375 paired with 164.7125, and 410.2375 paired with 419.2375 are designated as calling channels for initial contact using analog FM (no CTCSS tones). Here are the new

band including new frequencies, band occupants, channel numbers, etc.

Also starting in the next issue of *Monitoring Times* in the *Service Search* column, we will feature the new 220-222 MHz band plan assignments (both civilian and government). You don't want to miss that column.

Finally, we will start in next month's *Milcom* column a by-frequency profile of the 138-144 and 148-150.775 MHz military land mobile allocations.

These profiles on all the changes in the federal frequency spectrum are the best and most up-to-date you'll find anywhere outside the NTIA. So if you are a newsstand buyer and federal frequencies interest you, don't take the chance of missing a single issue over the next few months. Get your subscription to *Monitoring Times* started today by calling 1-800-438-8155; tell 'em the Chief sent you.

As I mentioned, the new frequencies mentioned above are being used now. So run over to



Secret Service protect the candidate and their comms can be found throughout the VHF/UHF spectrum. (Photo courtesy of the Secret Service)

your scanner, load these new frequencies up in one of your scanner banks and keep an ear out for activity on these new allocations. It could be some of the most exciting listening around. Be sure to let us here at the *Fed Files* know what you are hearing.

Government Hydro Frequencies

Ever tune through the federal bands and hear digital signals you couldn't identify? Well some of these signals could very well be from government hydrological transmitters. There are a handful of exclusive allocations sprinkled throughout the federal VHF/UHF spectrum devoted to recording and passing along hydrological information (see below).

Not only does the U.S. Government operate transmitters on these allocations, but private as well as local and state governments can be found on these frequencies (these folks must be licensed through the FCC).

VHF Hydrologic Operations Frequencies

169.4250 169.4375 169.4500 169.4625 169.4750 169.4875
169.5000 169.5125 169.5250 170.2250 170.2375 170.2500
170.2625 170.2750 170.2875 170.3000 170.3125 170.3250
171.0250 171.0375 171.0500 171.0625 171.0750 171.0875
171.1000 171.1125 171.1250 171.8250 171.8375 171.8500
171.8625 171.8750 171.8875 171.9000 171.9125 171.9250

UHF Hydrologic Operations Frequencies

406.1250 406.1750 412.6625 412.6750 412.6875 412.7125
412.7250 412.7375 412.7625 412.7750 415.1250 415.1750

As we mentioned in our lead story, the VHF/UHF spectrum is changing, and hydrologic communications specifications are as well. Existing systems authorized in the 162-174 MHz band may continue using equipment operating with a bandwidth equal to or greater than 12.5-kHz, using the center frequencies listed above that are spaced 25-kHz apart until December 31, 2004. After this date all hydrologic will be converted to narrowband equipment operating at less than 12.5-kHz bandwidth.

In addition, existing systems operating in the 406.10-420.0 federal land mobile band may, until December 31, 2007, continue using equipment operating with a bandwidth of 12.5-kHz or greater on the following frequencies:

406.125 406.175 409.675 409.725 412.625 412.675 412.725 412.775

After December 31, 2007, all hydrologic systems in the UHF federal band must have transitioned to the frequencies above and send transmissions with a bandwidth of less than 12.5-kHz. New assignments on frequencies 406.1250 and 406.1750 are to be primarily for paired operations with frequencies 415.1250 and 415.1750, respectively.

One final frequency to keep an eye on is 171.175 MHz. This frequency is allocated for meteorological and quasi-hydrologic operations.

Wireless Microphones

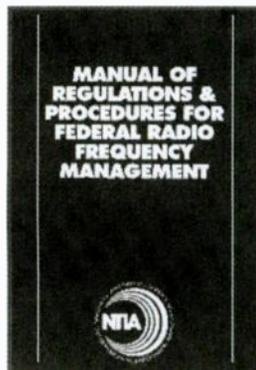
One of those just plain fun things to chase in the RF spectrum are wireless microphones. While there are a variety of wireless microphone frequencies throughout the spectrum, there are some specific wireless microphone frequencies in the VHF federal land mobile band (162-174 MHz).

VHF Wireless Microphone Frequencies

169.445 169.505 170.245 170.305 171.045 171.105 171.845 171.905 MHz

Remember, these microphones run fairly wide bandwidths (up to 54 kHz) and low power (not to exceed 50 mW). But these are fun to chase down, and civilian and government alike will be found on the frequencies above.

That's it for this month. 73 and good hunting.



government incident response VHF/UHF frequency plans.

Interagency VHF Incident Response Frequencies

Identifier	Mobile Transmit	Mobile Receive	CTCSS
VHF Calling	164.7125	169.5375	None
VHF-1	165.2500	170.0125	As Required
VHF-2	165.9625	170.4125	As Required
VHF-3	166.5750	170.6875	As Required
VHF-4	167.3250	173.0375	As Required
VHF-5	169.5375	169.5375	As Required/Simplex
VHF-6	170.0125	170.0125	As Required/Simplex
VHF-7	170.4125	170.4125	As Required/Simplex
VHF-8	170.6875	170.6875	As Required/Simplex
VHF-9	173.0375	173.0375	As Required/Simplex

Interagency UHF Incident Response Frequencies

Identifier	Mobile Transmit	Mobile Receive	CTCSS
UHF Calling	419.2375	410.2375	None
UHF-1	419.4375	410.4375	As Required
UHF-2	419.6375	410.6375	As Required
UHF-3	419.8375	410.8375	As Required
UHF-4	413.1875	413.1875	As Required/Simplex
UHF-5	413.2125	413.2125	As Required/Simplex
UHF-6	410.2375	410.2375	As Required/Simplex
UHF-7	410.4375	410.4375	As Required/Simplex
UHF-8	410.6375	410.6375	As Required/Simplex
UHF-9	410.8375	410.8375	As Required/Simplex

In addition to the listings above, the 406.100-420.0 MHz land mobile band has been completely overhauled. New channel spacing, frequency pairing, and now channel numbers for each frequency in the band are in effect. Starting with next month's *Fed File* column, we will do a detailed analysis of this

Multiple Transmitter Site Solutions

Large trunked radio systems almost always require the use of several transmitter sites in order to provide complete service. Typically, the coverage area is larger than one transmitter site can handle, so a number of sites in different locations are used. Terrain may also dictate multiple transmitter sites. For instance, a mountain ridge dividing a county might require a transmitter site on each side.

Having more than one transmitter site gives the system a number of advantages. Mobile and portable radios will have a wider coverage area. Reception will be better due to stronger signals from closer or better located transmitters. The stronger signals also penetrate buildings more effectively, allowing users to have coverage inside as well as out in the open.

There are some disadvantages to having multiple transmitter sites. Besides the additional cost of installation and maintenance, each transmission must be coordinated among overlapping transmitter sites. Since the number of radio frequencies available is limited, a transmitter site may have to share the same frequency with other sites. Two transmitters located near each other and operating simultaneously on the same radio frequency will interfere with each other.

❖ Transmitter Steering

One of the simpler methods of preventing interference is to allow only one transmitter site to be active at a time. The trick, of course, is to

pick the transmitter site that will provide the best signal to the mobile user.

The simplest method is for the dispatcher to manually select the correct site, but this prone to error and would add another task to an already very busy person. For a small system that is fairly quiet, however, this might be an acceptable solution.

Some systems are equipped with devices that provide this *transmitter steering* function automatically. These devices operate on the theory that the best transmitter site to reach a particular mobile or portable radio is the site that can receive that radio the best.

When a mobile user calls the dispatcher, *voting receivers* at various locations make note of the received signal strength. A *comparator* uses the votes from each receiver to determine the best transmitter to reach that user. On the assumption that the dispatcher will immediately answer the mobile user, the system selects the site that had the best signal for the next transmission.

Transmitter steering is a relatively inexpensive way to have the benefits of multiple transmitter sites, but there are limitations. The comparator could make the wrong decision, leaving the mobile user unable to hear the response. Calls from mobile users in different areas coming one right after another could also cause problems. Regardless of how good the steering is, any individual mobile user will not be able to hear transmissions occurring through far away transmitter sites.

❖ Simulcast

Rather than having to choose a single transmitter for a transmission, it is possible to have more than one transmitter send a signal at the same time. *Simulcast*, short for *simultaneous broadcasting*, is the process of sending the same message on the same radio frequency through more than one transmitter.

Simulcast provides the users with a very simple mode of operation, that is, all transmissions are sent

through all the transmitter sites. In this way all the mobile users are able to hear every message from the dispatcher regardless of their location.

Each transmitter site has a specific geographic area of coverage. *Overlap areas* are those areas where signals from more than one transmitter site are strong enough to provide good reception.

❖ Interference

In locations where multiple simulcast signals are arriving at a receiver, one of two things will happen. If the signal from one transmitter is significantly stronger than the others, the stronger signal will "capture" the receiver and overpower the weaker ones. You may have experienced this with FM radio stations as you're driving between cities. One minute you're listening to a station from the city behind you and suddenly your radio picks up the station from the city ahead of you. This is known as the *capture effect*, and it holds true for trunked radios as well as FM broadcast stations.

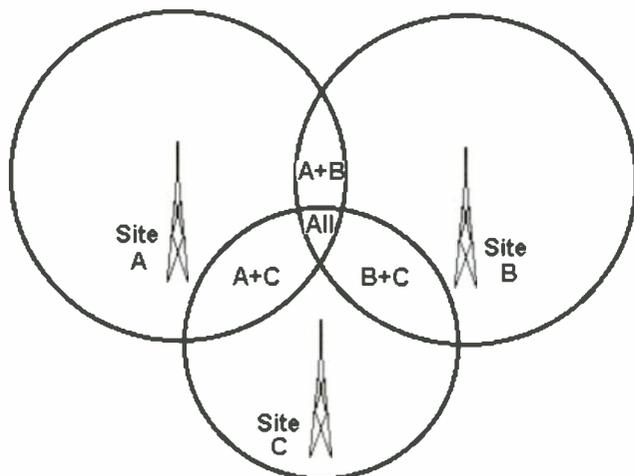
Complications arise when the receiver is in an overlap area and picks up two equally strong signals. Those signals will add together inside the receiver to produce a signal that is the combination of the two transmitted signals.

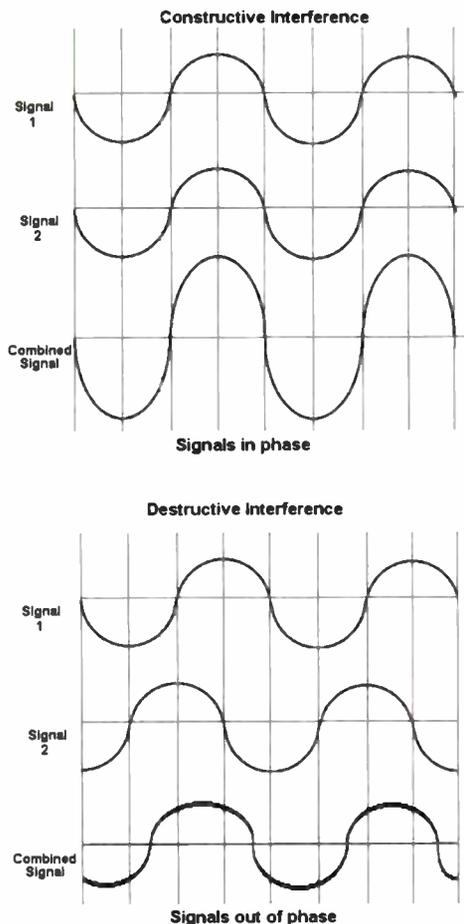
You can think of the two radio signals as waves, with peaks and troughs as they travel from the transmitter to the receiver. If the content of the two signals is the same and the signals arrive at the receiver at exactly the same time, the peaks and troughs will match each other and the two signals will reinforce each other. In this condition the signals are described as *in-phase* and result in *constructive interference*. Most receivers perform very well with this positive type of interference.

However, if the content of the two signals is the same but the signals do not arrive at the receiver at the exact same moment, the peaks and troughs won't match up. This condition is known as *out of phase* and results in *destructive interference*. The resulting combined signal will be distorted to some degree, depending on how far apart in time the two signals arrived at the receiver. If the signals are far enough out of phase the distortion will be so severe that the receiver will be unable to extract the content of the signal.

Destructive interference is useful in the audio world. Signals that are exactly 180 degrees out of phase will have peaks and troughs that exactly cancel each other out. The result is no signal, which is the idea behind active noise-

Simulcast
Overlapping Coverage





canceled headphones. Outside noise is sampled, turned 180 degrees in phase, and when played at the right time exactly cancels the noise.

❖ Alignment

In order to handle the interference problem in overlap areas, simulcast transmitters must be correctly synchronized with each other to transmit the signal at the proper instant. The idea here is to make sure the two signals arrive in the center of the overlap area at the exact same time, or as closely as possible. Since it takes a radio signal about 5.3 microseconds to travel one mile, if the center of an overlap area is 31 miles from transmitter A and 22 miles from transmitter B, it will take a signal 164 microseconds from transmitter A and 117 microseconds from transmitter B to reach the center. If transmitter B waits 47 microseconds before transmitting, the signals will arrive at the center at the same time. This time delay is known as *alignment* and is implemented using special audio or digital delay equipment.

So how do you make sure all of the simulcast transmitter sites are synchronized? In the past some systems were clocked to the National Information Standards and Technology (NIST, formerly the National Bureau of Standards) radio station for time known by the call letters WWV in Ft. Collins, Colorado. Other systems used atomic clocks based on the radioactive decay of cesium or rubidium.

These days it is easier and cheaper to use satellites from the Navstar Global Positioning System, more commonly known as GPS. The United States Department of Defense operates a constellation of 24 active satellites in orbit that provide position location information to both military and civilian users. These satellites also provide precise timekeeping signals with an extremely high level of accuracy. By equipping each transmitter site with a GPS time receiver, all transmissions can be coordinated precisely in time to arrive with a minimum of destructive interference.

There is a slight risk for public safety agencies to rely on GPS, however. The Department of Defense has always retained the option of turning off civilian access to GPS during times of war or crisis in order to deprive the enemy of a free positioning service. Tests conducted over the past few years have also shown that it is relatively easy to jam GPS. Should GPS become unavailable and a simulcast system had no other source of timekeeping data, mobile radios could become unusable in overlap areas.

Simulcast systems also make use of voting receivers and a comparator. Since the signal from a mobile user could be received at more than one location, voting receivers select the best signal and retransmit it throughout the system. In this way the best signal is always repeated regardless of the mobile user's location.

❖ Have scanner, will travel

If you're like me, when you travel you take a trunking scanner along to follow the action in large cities and airports. I don't always have time to sit down and preprogram the scanner before I leave, so I often have print-outs of frequency lists and talkgroups stuffed in my luggage with the idea that I'll be able to do it sometime during the trip.

I'd like to hear your methods for organizing and maintaining the many pages of information you keep about different trunked radio systems. Do you use a spiral-bound notebook with handwritten sections for each system, or do you use a Palm Pilot synchronized with a database on your home computer? Do you use a commer-

cial or freeware computer program to organize your listings? Do you have a special interconnect cable that allows you to load frequencies directly from your PC into your scanner? Send me e-mail or write to me in care of *Monitoring Times* with your tips and tricks.

❖ Chicago's Midway Airport

A brief update on Midway airport in Chicago, which served 13 million passengers in 1999: The \$761 million Midway Airport Terminal Development program, the largest public works program in Illinois, is scheduled for completion next year. Part of that program is an upgraded radio system.

The fire department will use 154 MHz. Police and emergency services will share frequencies in the 460 MHz to 468 MHz band, and the Chicago Department of Aviation will have a trunked radio system on frequencies between 476 MHz and 480 MHz.

Thanks to the CARMA group for posting their results on line, including on the *MT* website, and in this issue of *MT*. I'd love to hear from these and other scanner listeners in Chicagoland who have specific frequencies and talkgroups when these new systems come on-line.

That's all for this month. I'm continuing to add more trunking and general radio information to my website at www.signalharbor.com, and as always I welcome electronic mail at dan@signalharbor.com. Until next month, happy monitoring!

Longwave Resources

✓ **Sounds of Longwave** 60-minute Audio Cassette featuring WWVB, Omega, Whistlers, Beacons, European Broadcasters, and more! \$11.95 postpaid

✓ **The BeaconFinder** A 65-page guide listing Frequency, ID and Location for hundreds of LF beacons and utility stations. Covers 0-530 kHz. \$11.95 postpaid

Kevin Carey

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The California Highway Patrol

In the fall, low band skip can sometimes bring almost daily reception of the California Highway Patrol (CHP) to the East Coast. The following information on the CHP low band radio system is courtesy of the VHF Skip internet newsgroup (www.egroups.com) via Ian Julian, CRS Government Radio System's *California State Agencies* by Robert Kely, and the *2000 Police Call Southern California Detail Edition* by Gene Hughes.

CHP Duplex Frequencies by Color

Color	Base	Car
Amber	42.080	42.820
Amber 2	42.080	42.760
Aqua	42.620	42.840
Beige	42.680	42.080
Black	42.460	42.700
Blue	42.340	42.180
Brass	42.920	42.620
Bronze	42.120	42.400
Brown	42.500	42.820
Copper	42.600	42.740
Emerald	42.880	42.200
Gold	42.120	42.200
Grape	42.420	42.660
Gray	42.480	42.680
Green	42.540	42.240
Ivory	45.020	45.020 (Simplex Air-to-Ground)
Maroon	42.920	42.740
Maroon-1	42.920	42.640
Maroon-2	42.920	42.620
Mauve	42.600	42.480
Orange	42.880	42.660
Peach	42.920	42.260
Pink	42.440	42.760
Purple	42.400	42.160
Red	42.440	42.280
Rose	42.080	42.760
Ruby	42.500	42.280
Silver	42.080	42.280
Tan	42.420	42.840
Teal	42.360	42.780
Turquoise	42.600	42.020
Violet	42.160	42.640
White	42.560	42.720
Yellow	42.520	42.300

CHP Repeater Configurations

Beige 1	39.880/42.080	Tactical 42.680
Tan 1	39.800/42.840	Tactical 42.420
Blue-1	39.140/42.180	Tactical 42.340
Copper-1	39.260/42.740	Tactical 42.600
Gold-1	39.600/42.200	Tactical 42.120
Gray-1	39.720/42.680	
Green-1	39.360/42.240	Tactical 42.540
Mauve-1	39.720/42.480	Tactical 42.600
Orange-1	39.400/42.660	Tactical 42.880
Peach-1	39.340/42.260	
Purple-1	39.440/42.160	Tactical 42.400
Red-1	39.920/42.280	Tactical 42.440
Tan-1	39.800/42.840	Tactical 42.420
Turquoise-1	39.680/42.020	Tactical 42.600
BORTAC	39.920/42.640 (107.2 Hz PL tone)	
CLEMARS	39.460/45.860 (156.7 Hz PL tone)	Tactical 39.460

Tactical Channels (per VHF Skip)

I have several different versions of the CHP tac freqs, here is one of them

Tac-1	44.860	44.860
Tac-2	45.940	45.940
Tac-3	44.940	44.940
Tac-4	45.020	45.020
Tac-5	45.060	45.060
Tac-6	39.920	39.920

CHP tactical channels reported in use in Southern California during the August DNC.

Tac 1	45.020	42.260
Tac 2	39.420	42.060
Tac 3	45.940	42.100
Tac 4	39.920	42.280
Tac 5	42.920	42.620
Tac 6	45.060	42.380
Tac 7	45.020	42.080
Tac 8	39.140	42.220

Statewide Channels

Gold-6/7	39.46	45.86	CLEMARS
Gold-12	39.10	Simplex	CLEMARS

CHP Dispatch Centers by Division

(Including Division, Radio Numbers and Radio Frequency Colors)

Northern Division

Humboldt Dispatch Center-Northern		
Crescent City	95	Green (R)
Gorbeville	105	Green (R)
Humboldt	16	Green (R)

Redding Dispatch Center-Northern

Redding	37	Red
Red Bluff	36	Red
Trinity River	90	Red

Susanville Dispatch Center-Northern

Alturas	60	Blue/Amber-2
Dunsmuir Grade Inspection		
Facility	84	Purple
Mt. Shasta	52	Purple
Quincy	20	Amber-2
Susanville	38	Amber-2

Ukiah Dispatch Center-Northern

Clearlake	7	White
Ukiah	18	White

Yreka Dispatch Center-Northern

Yreka	41	Purple
-------	----	--------

Valley Division

Chico Dispatch Center-Valley		
Chico	104	Brown (R)
Oroville	35	Brown (R)
Willows	93	Brown (R)
Williams	39	Brown (R)
Yuba-Sutter	43	Brown (R)

Sacramento Communications Center-Valley

Auburn	45	Green
Gross Valley	42	Green
North		
Sacramento	46	Gold
Placerville	44	Green

South		
Sacramento	112	Black (R)
Woodland	47	Black (R)

Stockton Dispatch Center-Valley

Amador	94	White
San Andreas	49	White
Stockton	62	White
Tracy	103	White

Truckee Dispatch Center-Valley

Donner Pass Inspection Facility	109	Gray
Gold Run	70	Gray
South Lake		
Tahoe	13	Gray
Truckee	80	Gray

Golden Gate Division

Golden Gate Communications Center-Golden Gate		
Contra Costa	19	Maroon
Cardelia Inspection		
Facility	127	Turquoise
Dublin	118	Aqua
Hayward	25	Aqua
Marin	34	Violet

Mission Grade Inspection

Facility	128	Aqua
Napa	21	Grape
Nimitz Inspection		
Facility	126	Aqua
Redwood City	91	Amber
Oakland	96	Bronze
San Francisco	32	Pink
San Jose	24	Ruby
Santa Rosa	17	Emerald
Solano	22	Turquoise (R)

Central Division

Bakersfield Dispatch Center-Central		
Bakersfield	69	Brown
Buttanwillow	117	Turquoise
Fort Tejon	102	Turquoise
Grapevine Inspection		
Facility	129	Turquoise

Fresno Dispatch Center-Central

Chowchilla River Inspection Facility	140	Silver
Coalinga	88	Pink
Fresno	65	Silver
Hanford	68	Pink
Porterville	40	Pink
Visalia	67	Pink

Merced Dispatch Center-Central

Los Banos	30	Orange
Madera	66	Orange
Mariposa	63	Orange
Merced	64	Orange
Modesto	48	Yellow
Sonora	61	Yellow

Southern Division

Los Angeles Communications Center-Southern		
Altadena	98	Brown
Antelope Valley	89	Tan
Baldwin Park	81	Orange
Castaic Inspection		
Facility	130	Tan
Central Los Angeles	15	Black
East Los Angeles	82	Yellow
Newhall	78	Tan
Santa Fe Springs	83	Gold
South Los Angeles	77	White

West Los Angeles	79	Pink
West Valley	56	Brown

Border Division

Border Communications Center-Border		
Oceanside	92	Tan-1 (R)
El Cajon	108	Gold-1 (R)
Rainbow Inspection		
Facility	134	Tan-1 (R)
San Diego	87	Orange-1 (R)
San Onofre Inspection		
Facility	132	Tan-1 (R)
Temecula	115	Tan-1 (R)

El Centro Dispatch Center-Border

Calexico Inspection		
Facility	133	Maroon-1 (R)
E Centro	85	Maroon-1 (R)
Winterhaven	116	Maroon-1 (R)

India Dispatch Center-Border

Blythe	6	Red (R)
Desert Hills Inspection		
Facility	131	Red (R)
India	76	Red (R)
San Geronimo Pass	97	Red (R)

Orange County Communications Center-Border

Santa Ana	86	Purple-1 (R)
Capistrano	113	Green-1
Westminster	55	Gray-1

Coastal Division

Monterey Dispatch Center-Coastal		
Gilroy Inspection		
Facility	135	Green (R)

Hollister-Gilroy	23	Green (R)
King City	8	Black (R)
Monterey	27	Black (R)
Santa Cruz	26	Green (R)

San Luis Obispo Dispatch Center-Coastal

San Luis Obispo	28	Teal (R)
Buellton	3	White (R)
Templeton	9	White (R)
Santa Maria	14	White (R)

Ventura Dispatch Center-Coastal

Conejo Inspection		
Facility	137	Purple
Santa Barbara	29	Green
Ventura	31	Purple

Inland Division

Barstow Dispatch Center-Inland		
Barstow	73	White (R)
Maranga Basin	106	White (R)
Needles	114	White (R)
Victorville	12	White (R)

Bishop Dispatch Center-Inland

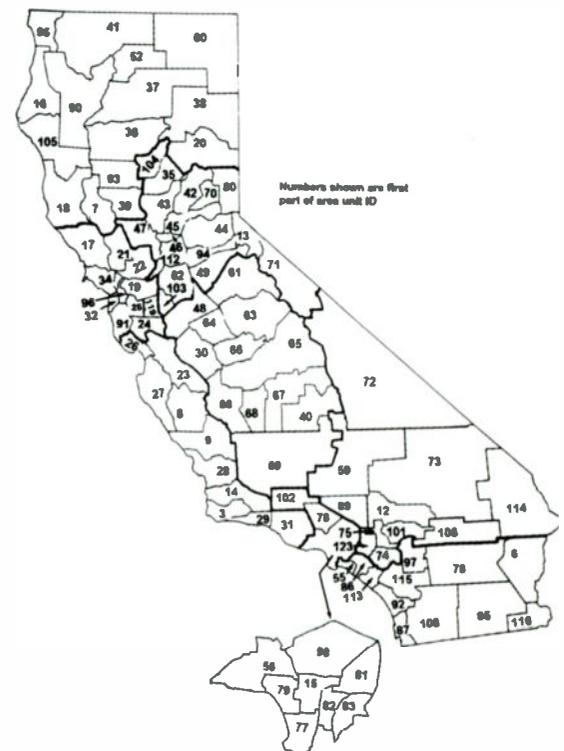
Bishop	72	Gold (R)
Bridgeport	71	Blue (R)
Mojave	59	Gold (R)

Mojave Inspection

Facility	Gold (R)
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Inland Communications Center-Inland

Arrowhead	101	Copper-1 (R)
Rancho Cucamonga	123	Beige-1 (R)
Riverside	74	Turquoise-1 (R)
San Bernardino	75	Copper-1 (R)



Welcome to Bay and JFK

Welcome aboard and fasten your seatbelts. Our first stop today is the Bay Area TRACON. Thanks to Reid Weske, Webmaster and Controller for permission to use this information and for contributing the Operations Room Graphic and frequencies.



Bay Area TRACON History

Bay TRACON (Terminal RADAR Approach Control) was initially opened as a facility in October of

1967 on the second floor of the Oakland Airport terminal building. The concept of this facility was to combine the approach control functions of three existing terminal RADAR facilities located in the Bay Area. Included in this consolidation of facilities were San Francisco, Oakland, and NAS Moffett airports.

The new facility opted for using horizontal displays, which were designed to operate in a lighted room, unlike many of the existing dark RADAR Room environment. Approximately 40 controllers and 18 supervisors/staff comprised the initial personnel complement. The original Bay TRACON opened with eight

RADAR positions providing air traffic services to San Francisco, Oakland, San Jose, NAS Alameda, NAS Moffett, Crissy AAF, Hayward, Palo Alto, Reid Hillview, San Carlos, Half Moon Bay, Livermore, South County, Fremont and Skysailing airports.

In 1974, a new building was constructed for Bay TRACON on the Oakland Airport North Field. The new facility consisted of the new automated RADAR equipment (ARTS IIIA) and utilized a dark control room environment. Horizontal displays were again utilized

for economic and coordination reasons.

Bay TRACON's traffic count has placed Bay in the top five or six facilities in the nation for many years. The airport geographic layout has made Bay one of the most difficult air traffic facilities in the world with regard to complexity in accomplishing the required day to day operations.

Figure 2 is a floor plan of Bay TRACON, along with the frequencies used. Note the Electronic Target Generator at the very top; that is part of the DYSIM (Dynamic Simulation) for training purposes.



Bay TRACON is scheduled to combine with several other Northern California air traffic facilities at a location near Sacramento to form a large combined terminal facility named Northern California TRACON (NCT). This new facility, scheduled to open after 2002, will have terminal approach control responsibilities for a

large portion of Northern California. See figure 3. Some news items from the past year and a half regarding the TRACON include the following:

2/23/99: The ceiling of Bay TRACON was changed to a consistent height of 15,000 feet MSL.

3/3/99: Static maximum speed limit of 250 knots is no longer being issued by Bay Area Towers to departing aircraft. If this speed is needed it will (normally) be issued by the Bay TRACON departure controller.

10/3/99: A new Letter of Agreement was produced between Bay TRACON and Oakland Center (ZOA): Major changes noted by the flying public (have any of you subscribers in the Bay Area noticed these yet?) might be:

- Jet departures routed over Linden to be sent direct (depending on traffic) north of the Oakland airport area.
- Oceanic departures will be climbing to a higher altitude (jets 15,000 and props 13,000).
- San Jose Loop departures will be climbing to a higher altitude.

7/14/00: New SFO (San Francisco operations Class B Airspace) will go into effect some time in late 2000. To see a graphic of this, please go to their website.

Thanks, Reid! Visit the Bay Area TRACON website at www.faa.gov/atsbaytracon

JFK International Airport

Our next destination is the tower at John F. Kennedy International Airport just outside New York City. Dave Schoen, Webmaster, invites everyone to their website at www.jfktower.com. Also, see the NATCA (National Air Traffic Controller's Association) website at www.natca.org. It's chock full of interesting information.

We thank Paul Santos for permission to use the JFK airport ATC frequencies, and he invites everyone to visit his website at www.airnav.com.

JFK - John F. Kennedy International Airport

Location: Lat/Long: 40-38-23.104N / 073-46-44.132W (40.6397511 / 73.7789256 estimated); Elevation: 13 ft / 4.0 m (surveyed); Variation: 13W (1985); From city: 13 miles SE of New York, NY.

Airport Operations: Facility use: Open to the public; Sectional Chart: New York; Control Tower: Yes; ARTCC: New York Center; FSS: New York Flight Service Station; NOTAMS (Notice to Airmen) Facility: JFK (NOTAM-D service available; Attendance: Continuous; Lights: Dusk-Dawn; Beacon: White-Green (lighted land airport); Landing fee: Yes; Fire and Rescue: ARFF index E; Airline Operations: Full FAR Part 139 certification, currently receiving scheduled air carrier service; International Operations: Customs landing rights airport.

Airport Communications:

- UNICOM: 122.950
- ATIS: 115.100 (Dep)
 - 115.400 (ARR-SW)
 - 117.700 (ARR-NE)
 - 128.725 (ARR)
- Kennedy Ground:
 - 121.900
 - 348.600 (North & South)
 - 121.650
- Kennedy Tower:
 - 119.100 (Runways 04R/22L & 13L/31R)
 - 123.900 (Runways 04L/22R & 13R/31L)
 - 258.300 (Runways 04L/22R & 13R/31L)
 - 258.300 (Runways 04R/22L & 13L/31R)
- New York Approach (NY TRACON):
 - 127.400
 - 109.500T
 - 118.400
 - 123.700
 - 126.800
 - 132.400
 - 134.350
- New York Departure (NY TRACON)
 - 135.900
 - 123.700
 - 124.750
 - 134.350
- Clearance Delivery:
 - 135.050
 - 348.600 (North & South)
- Pre-Taxi Clearance:
 - 135.050
 - 348.600 (North & South)
- Class B:
 - 125.25 (Below 2000 ft. within 8 nm)
 - 258.300 (North & South)
- Emergency: 121.500
 - 243.00
- Gate Hold: 125.050

Timesharing and the End of WMAQ

Once upon a time, each of the three major TV networks – ABC, CBS, and NBC – also had a radio network. And each of these radio networks owned powerful, dominant stations in America's largest cities. KGO, KCBS, and KNBR in San Francisco; WBBM, WMAQ, and WLS in Chicago; WABC, WCBS, and WNBC in New York; KABC and KNX in Los Angeles. (Somehow, NBC didn't have an owned-and-operated station in L.A., but independently-owned KFI served as a powerful voice for NBC in that city.)

The importance of network radio declined sharply as TV gained popularity. NBC Radio is essentially gone. Most of the former major NBC Radio affiliates are still reaching a wide audience with their traditional call signs. However, a few years ago WNBC left the air for good, turning over their excellent 660 kHz frequency to all-sports station WFAN.

History is now repeating itself in Chicago. WMAQ-670 was the NBC Radio affiliate there. After NBC got out of the radio business, WMAQ ended up commonly-owned with long-time CBS station WBBM-780. (What irony!) On August 1, WMAQ disappeared, replaced by one of Chicago's all-sports stations, WSCR-1160. The WMAQ call letters will live on on Chicago's NBC TV station on channel 5. DXers across the country can hear this station; be prepared for a change in programming.

WSCR's former frequency of 1160 has also been widely DXed. This signal is going to be sold, but at deadline we don't yet know to whom. There are rumors that WVON-1450 will take over the channel; their African-American talk format would be expected to move to the new frequency. In the short term, 1160 is expected to relay WXRT-FM 93.1 until a final disposal of the frequency can be made.

In the late 1920s and early 1930s, there was a broadcast boom. The U.S. government tried to keep order and avoid interference, but demand was incredible. We ended up with many more stations on the air than the dial could accommodate without interference. Drastic changes were necessary to relieve interference. One of the most popular interference-reduction methods was time-sharing. Several stations in the same city would be assigned the same frequency, with each station assigned certain hours during which it would be allowed to broadcast. By 1928, of the 995 stations on the air, 289 shared time with at least one other station (and sometimes, as many as three other stations).

Time-sharing was always contentious. In the days before television, the "prime-time" evening hours were especially important to radio. Every-

body wanted to broadcast during prime-time. Sharing those hours with three other stations made it difficult to build a loyal audience! Most of the time-sharing arrangements disappeared over the next 30 years, with the more (financially) powerful stations buying out the poorer facilities and taking them off the air. By 1960, only a handful of time-sharing arrangements remained. (Though ironically, a few new arrangements had been generated by the popularity of television. Most of these didn't last long. However, I remember seeing WMSU-TV at Michigan State University sharing time on channel 10 with commercial WILX-TV.)



I have logged nearly 1,000 FM stations and approximately 450 TV stations with these antennas..

If WVON does move to 1160, it will break up the last time-sharing operation in the Chicago area. WVON currently signs on the air at 10pm, remaining on the air until 1pm the next day. (8:30pm Saturday through 5am Sunday). Ethnic station WCEV uses the 1450 kHz channel for the remaining hours. WVON could operate 24 hours on 1160, and WCEV would then receive full-time use of 1450. Chicago was also home of the last three-way time-sharing operation, on 1240 kHz, involving WCRW, WEDC, and WSBC. A couple of years ago, WCRW left the air permanently, and more recently, WSBC bought WEDC, eliminating this historic arrangement.

I'm probably missing something, but to my knowledge there are only two remaining time-sharing arrangements on AM. One is on 580 kHz in eastern Kansas. KKSU at Kansas State University operates 1:30-6:30pm weekdays, with the remaining hours going to commercial station WIBW in Topeka. The other involves Luther College's KWLC-1240 in Decorah, Iowa' (11pm-1:30am weekdays, 8am-1pm weekends) and commercial KDEC, also in Decorah. But while time-sharing is disappearing from the AM dial, new arrangements are being created on FM. Within the last 10 years, two Phoenix stations (KNAI and KPHF) have begun sharing 88.3 MHz; and two Austin, Texas stations (KVRX and KOOP) share 91.7.

❖ Bits and Pieces

- Pat Griffith is acting as "QSL coordinator" for KBJD-1650 Denver. DX reports of this station should be sent to Radio Station KBJD, 3131 S. Vaughn Way, Suite 601, Aurora, Colorado 80014-3510, Attention: Gregg Cassidy (Program Director). Pat promises a beautiful 8-1/2 x 11" QSL for valid reports. Reports have already been received from Europe and New Zealand – so you probably aren't going to get a "most distant listener" award – but the station should be quite "DXable."

- Have you ever wanted to "see" your AM DX? Pat has created a website of transmitting antenna photos. Take a look at <http://community.webtv.net/N0NNK>. (That's the number 0, not the letter o) Quite a few Colorado and Wyoming AM stations are represented. Also present are a few stations in other areas, and some more detail on how an AM tower is constructed.

- I have recently acquired a digital camera, and expect to present more tower photos in the near future. In the meantime, I'm showing a photo of my FM/TV DX antennas. You can see these antennas are nothing exceptional. The gray box hanging from the mast is a UHF TV preamplifier.

- Canadian DXer Barry McLarnon has created a new website for AM DXers. The site on <http://hydra.carleton.ca/ambc/amhelp.html> allows you to search for U.S. and Canadian stations by partial call letters (it even finds phonetically-similar calls) or programming format. A distance calculator is also present.

- Just before deadline, I received word of the passing of *Experimenters Workshop* editor Bill Cheek. I can't say I knew Bill, but I always carefully read his columns and usually learned something. His family will miss him most, but the monitoring world will certainly miss his ability to make sense of the complicated world of electronics.

Let us know what you're hearing. Write: Box 98, Brasstown NC 28902-0098, or by email to w9wi@bellsouth.net. Good DX!

Pirate DX Season Is Here

The cooler days, diminished static, and longer darkness paths of fall are always the herald of a new pirate DX season. This year is no different. Stations know that DXers are listening in larger numbers, both on the North American 6955 kHz 43 meter band and the 6200-6300 kHz 48 meter Europirate band.

As a result, the volume of pirate transmissions increases at this time of year. Particularly around holidays like Columbus Day, Veterans Day, and Thanksgiving, we can anticipate good pirate DX for the rest of 2000. If you're not checking the pirate bands on weekend or holiday evenings, you're missing entertaining shows like the ones that we see here this month from *MT* reader loggings.

WCPE Programs

Deborah S. Proctor, General Manager of WCPE-FM on 89.7 FM in Wake Forest, NC, informs *MT* readers that her public radio station is willing to provide free programming to low power stations. This station's classical music format is available free on a 24 hour basis via the Galaxy 5 satellite. They say that their service can be relayed for free, as long as the copyright fees are paid to ASCAP, BMI, and SESAC.

No pirates have been carrying this station so far, but since they are actively marketing the service to new low power FM stations, you might keep your ears open for relays of this on the pirate bands. Information about WCPE's programming outreach is available via their signal@wcpe.org e-mail address.

New Web Sites

New web sites with free radio coverage include WDRR's station site at www.desperaterockandroll.com and the SRS Europirate club at www.srs.pp.se on the internet.

What We Are Hearing

Our readers added all of the following stations to their logbooks this month:

Blind Faith Radio- Dr. Napalm's classic rock is easy to spot. Sometimes he broadcasts so that the pirate bands avoid "dead air." (Merlin)

Ground Zero Radio- They play rock music, but their political com-

mentary and ads for pornography add spice. (uses gzrsw@usa.net e-mail)

KIPM- For some, this one is an acquired taste. But, their complex original drama programming is among the most creative material on the shortwave bands today. (Lula)

KRMI- Like most pirates, their rock and satire is more likely to appear on the bands during holidays. (None yet)

Radio Azteca- Many feel that Bram Stoker's original comedy is the finest pirate on the air today. Since his comedy always targets radio hobby issues and radio listeners, his popularity is understandable. (Belfast)

Radio Blondengue- The various South American pirates often turn up on 6950 kHz in lower sideband, but some of them have also been using 14565 kHz on the weekends. (Merlin)

Radio Free Speech- Veteran pirate Bill O. Rights often uses AM mode for his tweaking of the FCC, but most pirates still use upper sideband modulation. (Belfast)

Radio Metallica Worldwide- Rumors of the demise of Dr. Tornado and his superpowered 10,000 watt pirate have been greatly exaggerated. His reappearance on the air has been a great boost to the pirate scene, despite his crude attacks on licensed station WBCQ. (Blue Ridge Summit)

Radio Obscura- This new pirate, with eclectic sketches about Little Joey, game show parodies, and Dr. Natural's wildlife adventures, has entertainment potential. (None yet, but promises an e-mail address)

Sin City Station- Marty Sanchez bagged the relatively rare QSL that we see here this month. (Hollywood)

SIN CITY STATION



"I heard that SCS steals it's programming from commercial radio!"

Sycko Radio- Despite periodic hints that they would acquire a maildrop, this rock music station still had none at *MT*'s press time. (None)

Voice of Captain Ron SW- Although rock music dominates Captain Ron's shows, he always salts the tunes with sketches or even poetry. (uses captainronsw@yahoo.com e-mail)

Voice of Prozac- With a slogan of "The Relaxation Station," this pirate's mellow music is designed to calm you down. (uses vap6955@hotmail.com e-mail)

Voice of the Lake Superior Circle Route Network- Their ID is a mouthful, but this new station's format is rock music. (Blue Ridge Summit)

Voice of the Runaway Maharishi- Maharishi Ali Ganja's drug humor is back. He now claims that he is the king of the planet. (Providence)

WHYP- James Brownard's East Indian cousin Ravi Brownard now appears on this northeast Pennsylvania memorial station. (uses whyp1530@yahoo.com e-mail)

WMFQ- Their chanting male chorus appears between rock music selections, always promoting the QSL process. (Providence)

Xanax Radio- A mystery so far, this new one made it clear that it is a different entity from Radio Xanax. (None)

WRX- Jimmy the Weasel, everybody's favorite sarcastic whiner, is still an amusing diversion on the pirate bands. (Milton)

Zappa Radio- This Frank Zappa station's announcer said that he wanted to see his name in *PopComm* in six months, but he'll see it here in less than six weeks. (None)

Reports and QSLs

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign addresses. This finances a souvenir QSL to your mailbox. Send your letters to PO Box 1, Belfast, NY 14711; PO Box 28413, Providence, RI 02908; PO Box 24, Lula, GA 30554; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 29, Milton, ME 04294; PO Box 2526, Hollywood, CA 90078; and PO Box 293, Merlin, Ontario N0P 1W0.

Thanks

Your input is always welcome via PO Box 98, Brasstown, NC 28902, or via my e-mail address atop the column. This month's contributors include John T. Arthur, Belfast, NY; Shawn Axelrod, Winnipeg, Manitoba; Kirk Baxter, North Canton, OH; Jerry Coatsworth, Merlin, Ontario; Ross Comeau, Andover, MA; Bill Finn, Philadelphia, PA; Harold Frogge, Midland, MI; Scott Gentry, Richton Park, IL; Raul Gonzalez, Santiago, Chile; Sheldon Harvey, Montreal, Quebec; William T. Hassig, Mt. Prospect, IL; Vince Havrilko, Beale AFB, CA; Johnny, Ytterby, Sweden; Chris Lobdell, Stoneham, MA; Greg Majewski, Oakdale, CT; Bill McClintock, Minneapolis, MN; Mike Prindle, New Suffolk, NY; Deborah Proctor, Wake Forest, NC; Marty Sanchez, Rio-Rancho, NM; Martin Schoech, Merseburg, Germany; Lee Silvi, Mentor, OH; Bud Stacey, Setsuma, AL; J. G. Tiger, Belfast, NY; and Niel Wolfish, Toronto, Ontario.

Season Opener

Fall is here, and most North American listeners will notice greatly improved conditions on the frequencies below 500 kHz. Natural static (QRN) levels are much lower now than during the summer when thunderstorms can ruin longwave reception. So, are you ready for the upcoming season? This month, we'll look at some things you can do to improve your chances for pulling in "the big ones" this winter.

❖ Antenna Once-over

Antennas take a beating because they are constantly exposed to the wind, rain and sun. They are also the most important part of any receiving setup, so it pays to watch for any problems that might be developing. Antenna troubles will be much easier to fix now than in the middle of a winter storm!

Besides the antenna wire itself, be sure to check the insulators, supports, ropes and feedlines for signs of weather damage or wear. This is also a good time to check all grounding connections to your station. For active whips and loops, look for signs of deterioration that might allow moisture to get inside and harm the amplifying circuitry. Don't like climbing? Try using a good pair of binoculars to inspect your antenna(s).

❖ Receiver Checks

Some LW receivers sit idle through the summer months, and they should be checked for frequency calibration and sensitivity. I keep a list of five local beacons (less than 100 miles distant) to use as "reference stations" for checking the basic performance of my RBL-5 receiver. If two or more of these stations are weaker than normal or appear to be off-frequency, I check my own gear for possible problems.

Modern gear should not present any problems when left idle for extended periods, but vintage gear (common to longwave) is a different story. It might be time to give the switches and variable controls a shot of contact cleaner/lubricant to restore proper operation. My favorite cleaner is DeoxIT™ D5 manufactured by CAIG Laboratories (www.caig.com). Used sparingly, it can correct problems such as "scratchy" gain controls and switches. This chemical is available from many electronics distributors.

❖ Publications

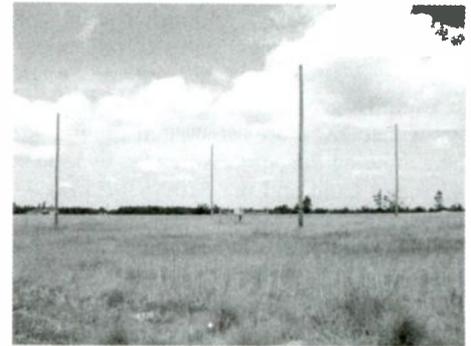
Although there are some excellent resources on the World Wide Web, a well-stocked bookshelf is still important for the serious LW listener. This includes magazines, aero maps, beacon directories, technical books, and recordings. For an extensive listing of longwave-related books and resources, check out Alan Gale's Beacon & Utility Datafile at www.alan.gale.clara.net/datafile.htm and the

Longwave Club of America's site at www.lwca.org. While at the LWCA site, be sure to also read about their excellent publication, *The Lowdown*. It is a must for any serious DXer.

The importance of a logbook cannot be over-emphasized for beacon hunting. It allows you to compare the band to last year's catches and spot any changes right away. You can make up your own logsheets with some ruled paper, or go the "fancy" route and compose it on a computer. Either way, you'll want to have a record of your hard-earned catches. While you're at it, send some of those loggings our way at *Below 500 kHz!*

❖ Loggings

Johnny Knight (NC) came up with an interesting way to combine three of his favorite hobbies – motorcycling, photography and longwave radio. Using a digital camera, he travels to the sites of beacons he can hear from home, and then photographs them for his collection. The photo below shows an image of PYG (270 kHz) in Pageland, SC. Johnny's receiver is a Kenwood R-5000 used with one of two antennas: a longwire or a small homebrew loop. Table 1 lists some recent loggings from his collection.



*PYG (270 kHz) in Pageland, SC
Contributed by Johnny Knight (NC)*

Northern Virginia under the FCC call sign of WA2XTF. So far, transatlantic reception of these stations has been elusive, but with continued persistence, who knows what is possible?

❖ Exciting Video Project

Les Rayburn, N1LF (AL), is a Low Frequency Experimenter (LOWFER) who also happens to direct television commercials for a professional career. He's putting these talents together to produce the first-ever video documentary on LOWFER operations that I am aware of. LOWFER operators have been encouraged to contribute photos, video clips, diagrams and audio recordings of their activities.

The video will be professionally edited, with voice-over, narration, graphics, etc. The cost? Les plans to sell VHS copies of the tape at cost (about \$5) to anyone who's interested. We'll carry more information here, as it becomes available. You can also check Les' web site (www.highnoonfilm.com) for more details.

See you next month.

Table 1. Selected Beacon Loggings

FREQ.	ID	LOCATION
204	TWL	Wesley, NC
216	CLB	Wilmington, NC
220	DCM	Chester, SC
248	FRT	Spartanburg, SC
257	ME	Maxton/Laurinburg, NC
270	PYG	Pageland, SC
283	AFP	Wadesboro, NC
400	LKR	Lancaster, SC
409	CQW	Cherow, SC
432	IZN	Lincanton, NC
375	RCZ	Rockingham, NC
293	GHJ	Gastonia, NC
227	UZ	Rock Hill, SC

❖ New Experimental Station

From our friends at AMRAD (www.amrad.org) comes word of a new LF signal that should be show up next month from a site in Newfoundland. The station VA3LK will operate under special Canadian authority on a frequency of 136 kHz – one of the proposed LF ham bands in North America. The station will use the call sign VA3LK and is expected to operate from November 10-27 during the hours of 2000 to 0700 UTC each day. Two independent receiving teams in Europe will attempt to hear the signals. Reception reports from others are encouraged and may be sent to Larry Kayser, R.R. #2, Westport, ON K0G 1X0 Canada.

East Coast Listeners may also want to try for the AMRAD experimental stations operating in

EYA			357	
BEACON			KHZ	
This will verify your			Reception of our beacon	
Date:	November 14, 1998	Verified by:	B.R. Miller	
Freq:	357 KHZ	Title:	SET Jax SSC	
Time:	0541 UTC	Date:	11/24/98	
Elevation:	40 feet	Location:	3026 N 8136 W	
Power:	25 watts	Antenna Type:	Ham Radio	
Remarks:	Jacksonville, Florida			

*QSL Card Received by Allen Renner (PA).
This beacon was received using the Homespun Loop antenna featured in the September '92 issue of Below 500 kHz.*

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The Courtesy of QSLing

Over last winter, I set about the task of finishing up one of my smaller goals – completing the QRP-WAS (worked all states on low power) award. I had done all the major awards with 100 watts and I am rabid enough in my attitude to want to put myself through this process again at 5 watts. (Then I'll have yet another go with 1 watt.) The Amateur Radio Relay League's 10-Meter Contest was jumping, so I grabbed the last few Western states I needed for QRP-WAS and dutifully sent out QSL cards with return postage.

Time passed, and hams in two states, Utah and Wyoming, had not responded. Figuring things got lost along the way during the Yuletide holidays, I sent each one another card, again with return postage and a note indicating that I was looking forward to hearing from them in order to complete my WAS with a QRP endorsement. As I thought back, I could even recall one of the gentlemen taking time in the "heat of battle" of the contest to compliment me on my QRP signal. But once again, nothing was heard from either operator.

Being a rather tenacious "nudge," I took a few extra steps to track down these two gentlemen – no longer to wrest QSL cards out of them but simply to try and understand why they didn't choose to participate in the time-honored ham tradition of swapping cards.

The first thing I wanted to check on was to make sure that these weren't folks on fixed incomes. I have run across a few hams over the years who find themselves with limited resources when it comes to QSLing. That is one of the reasons I always send return postage when I want to exchange cards. However, both these guys were "Big Guns" – serious contesters who are often high in the points and have stations that most of us only dream about.

Having checked out that the inflated cost of card stock was not an issue, I went about contacting these men directly to try to understand the situation. Interestingly enough, both men responded, but their responses floored me. One stated that he did not QSL with domestic stations and the other stated that he did not QSL AT ALL!

Okay...Okay. I know the drill. Nobody is under any obligation to confirm anybody else, yadda yadda yadda. So why is Uncle Skip stopping just short of getting a plane ticket to go stick a pin in these guy's cox?

❖ Do unto others ...

Do you know how someone becomes a Big

Gun in the ham hobby? It's not just through equipment and power. It's also about all those confirmed contacts and contest check logs dutifully sent along by hundreds of equally dedicated "Little Pistols" out there on the bands. Would either of these guys have achieved their stature in the hobby if their fellow hams took the same attitude toward confirmation as they have chosen? Not very likely!

Please don't get the idea that this is a really big problem: in the thousands of QSOs I have had during my amateur radio career, I have encountered this lack of QSLing camaraderie in

BRASSTOWN, NORTH CAROLINA 28902 USA
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CONFIRMING QSO WITH	DATE	UTC	MHz	RST	MODE
	DAY MONTH YEAR				2-WAY

CLAY COUNTY GRID EM85ab 73, LARRY VAN HORN

less than a handful of cases. I just get really steamed when I hear it from people who have gained prestige and stature in the hobby. Clearly we are dealing here with a couple of blokes who forgot those first fearful QSOs when they were novices and the joys of running to the mailbox to see what wonders awaited them.

❖ A Good Rule of Thumb

So what is proper QSL protocol? Let me offer my personal QSL policy as an example of the spirit of amateur radio, as far as I understand it. First we'll look at domestic QSLing, and then we'll talk a bit about DX QSLs.

1) If I work you... I'm sending you a card

The joy of amateur radio for me is not just the rush of pushing my personal collection of electromagnetic waves through the ether. For me, it has always been about making friends with folks who share a common interest. To this end, budgeting for QSL cards and postage has been just as important as budgeting for new equipment. I should also point out that I am able to do this because I am not a really avid contest. But even if I work fifty or so folks during a contest, they'll find N2EI's card coming their way as soon as I can set aside the time to fill it out.

Further, with the advent of desktop publishing and color personal printers, it is really easy

to make up some great personal cards. Folks who work me during the month of December are likely to get the benefit of a bit of the holiday spirit as I have been known to print up seasonal QSL cards, something I first saw back in 1983 when I got a special "Season's Greetings" card from Jim N1CC.

Now having stated that you're going to get a card from me, that does not mean that I always expect a card in return. I plan to keep this up for as long as I can, because maybe there will come a day when I am limited in my funds and can't QSL every contact. I know when that time comes I'll appreciate hearing from my ham friends.

2) I always include return postage if I'd like a return QSL

Since I spend a lot of time on 40 CW in the early evenings, the majority of my contacts are from the states close to New Jersey. (Someday we'll have to have a talk about Near Vertical Incidence Propagation.) Often my ragchews will be with folks I've worked many times before. I still send out cards, as I mentioned above, but that is just my way of saying hello and thanks for an enjoyable chat.

If I do, in fact, need to confirm our contact in the pursuit of some award or other, I always include return postage. I also let the operator on the other end know I am working toward such and such award. Most hams love to go for the various awards that are available and have a good understanding of the *noblesse oblige* whereby, ultimately, we help each other to get our awards by sharing in the QSL process.

Just to verify my assumptions, I ran an analysis of my last year's domestic QSLs. Given 100 percent outgoing QSLs, I had over 90 percent QSL response from operators where I included return postage. For the best part, I had over 75 percent response from all those other operators to whom I just sent a card without return postage. So, in spite of the attitude of those gentlemen mentioned earlier, it is fairly clear to me that the camaraderie of ham radio remains constant.

3) If you send me card and you're not in my log, I'll let you know

More than a few feathers could be smoothed if folks would just take a few minutes to communicate. I've reached out to hams in the past to ask why they did not confirm a contact only to find out that I was not in their log. Fair enough... If you can't verify the contact I would not want you to make it up. But there is nothing

worse than waiting on a QSL card to complete an award series and not knowing this is the case.

If you send me a card and I cannot confirm the contact based upon my logs I will always write you a few lines to let you know how things stand. When I get something from somebody indicating that I was not in their logs (SRI OM) I am more relieved than upset. At least I now know what I have to do to go forward and work that state or country.

4) DX VIA BURO PSE

As anyone who has gone after one of the major DX awards such as DXCC (100 countries confirmed) can tell you, chasing the award says less about your operating skills and more about your ability to navigate the international postal system. For my DX contacts, even those for awards, I now depend on the ARRL Outgoing Bureau for sending DX cards and my regional Incoming Bureau for return responses.

Yes, the BURO is slow. (I wonder if anyone else ever noticed how similar Bureau and BURO are to the word burro?) However, I find it is sure. In the case of a number of countries, it is even far more dependable than the government's official postal system. It is also an *enormous* cost saver, especially for folks who move a lot of cards such as testers and DXers. With International Reply Coupons running \$1.05 each and

International Air Mail hovering at \$.60, you can't beat the Bureau's few bucks a pound prices. To get the full information on this service, web on over to www.arri.org for all the details.

I do still work my way through the worldwide postal system in some cases. There are those few countries that do not participate in the BURO system. I will also respond to those DX QSLs that come to me directly. My attitude is that, if the DX station thought enough to write me, I can take the time to do the same. I extend this courtesy to DX stations whether or not they enclosed return postage, because their actions have probably saved me six months wait or more through the bureau system.

I'd like to think that those two Western gents had good reasons for not exchanging cards with me. But I'll be darned if I can figure out what they might be. All I can do is maintain my personal QSL policy - one that is based on the good will and camaraderie that makes amateur radio a great hobby.

❖ Uncle Skip's Contest of the Month

CQ Worldwide DX Contest (SSB)
0000 UTC Oct 28 through 2400 UTC October 29

This is one of the Big Ones! It is not unheard of for a person to work DXCC in just this contest. A great opportunity for you recently upgraded HF Ops to fill in your log books.

❖ Uncle Skip's Book of the Month

Golden Classics Of Yesteryear

By Dave Ingram K4TWJ

60 Pages, \$9.95 MFJ Enterprises, Inc.
P.O. Box 494, Mississippi State, MS 39762

If you want to see how hams got on the air in the early days of radio or even try your hand at building some of the classic designs of that time, Dave's book is a great resource and a fun read.

❖ Uncle Skip's Website of the Month

www.tubesandmore.com/

This is the site of Antique Electronics Supply. If the designs in Dave's book get you excited, you'll want to head to this website to get the parts you can't find in your junk box.

❖ Uncle Skip's Product of the Month

QSL Cards by W4MPY

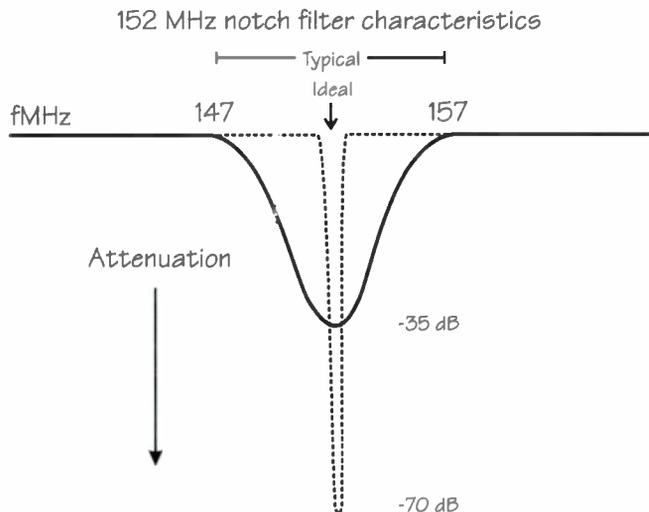
If you need a source for cards, Wayne "Wimpy" Carrol W4MPY is your man. His website is at www.w4mpy.com. E-mail is w4mpy@w4mpy.com or you can reach out the old fashioned way by writing him at 682 Mt. Pleasant Road, Monetta, SC 29105, Phone (803) 685-7117

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A Brief Survey of Antenna Directivity

We've recently discussed dipole antennas and groundplane antennas. These are excellent designs which are good choices for much of our general monitoring, hamming, and DXing. Groundplane designs are nondirectional, and dipoles at the height most of us put them are somewhat nondirectional. But there are times when it is to our advantage to be able to concentrate our antenna's functioning in a specific compass direction; for this, beam antennas are useful. Or, we may want to orient our antenna such that the nulls (directions of low response) in its radiation and reception (R&R) pattern reduce transmission or reception in undesired directions. Antennas whose R&R patterns have useful and reasonably predictable nulls include tabletop loops, and beam antennas and dipoles mounted a halfwave or more above the earth.

It is useful here to recall that antennas produce the same R&R patterns for both receiving and transmitting. This reciprocal action between transmitting and receiving is called "antenna reciprocity." Because of this, a directive antenna's R&R pattern will demonstrate the same directivity for both transmitting and receiving.

❖ Phased Arrays

Some directive antennas are beams, which are designed to shape the way in which their transmitting or receiving functioning is directed. For instance, a grounded quarterwave antenna tends to radiate to, and receive from, all compass directions equally (fig. 1A). But if we put a second grounded quarterwave antenna a certain distance from the first one and feed it with a certain length of feedline, then the R&R pattern with this added element changes to a somewhat directive pattern (fig. 1B). Antennas of this general type are known as "phased arrays." Often the nulls in this type of beam are more useful than are the broad lobes with their relatively low gain.

❖ Parasitic Beams

Antennas such as the Yagi-Uda, cubical-quad, and delta-quad antennas represent a different type of beam design known as "parasitic beams." In these antennas one element is connected to the feedline and is known as the "driven element." If we place a second element, identical to the first element, an appropriate distance from the first element it will act to reflect much of the transmitted energy from the first element and produce a beam R&R pattern. Because the second element is not directly fed by a feedline, but acts only with energy supplied to it by radiation from the first element, the second element is called a "parasitic element."

By appropriate design of the length of parasitic elements and their spacing from the driven element we can produce some elements which act as reflectors, and others that act as directors. With these we can produce a nicely directive beam patterning (fig. C), and useful amounts of gain.

❖ Reflector Antennas

Some antennas produce their directivity by having a reflector with a surface that is fairly large compared to the elements. Satellite dishes are reflectors for this type of antenna. Such a reflector has a small antenna placed out in front of it to receive signals which are focused to that antenna from the reflector. The large area of the reflector allows it to capture more signal energy than the small antenna could capture by itself. Reflector antennas are common at UHF and microwave frequencies, and can be designed to

be very directive with very high gain (fig. D).

Corner-reflector antennas and the so-called bedspring antennas also function by using a reflector which is large in relation to the elements. At VHF and higher frequencies it is practical to make corner-reflector antennas that can produce very good directivity and high gain.

❖ Wire Beams

As a wire antenna is made progressively longer it tends to become a bidirectional beam with its response concentrated more and more toward the directions of its ends. These beams tend to take up a lot of real estate, and are not common.

One of the most respected beams for low HF and MF frequencies is the Beverage beam. Although this antenna has very low gain, its directivity eliminates so much interference from nonbeam directions that it is a terrific directional receiving antenna. The very low gain prevents its being of much use for transmitting, although arrays of Beverages have been used in the past to overcome this limitation. The biggest limitation of the Beverage is that it requires hundreds of feet, or even miles of wire depending on the frequency and design utilized!

❖ Vertical Directivity

We've been talking about antennas that have directivity in the horizontal plane; that is, directivity to the points of the compass. But antennas also have directivity in the vertical dimension, and this is quite as important as their horizontal directivity. At HF and MF, the angle at which a radio signal encounters the ionosphere determines the angle at which it is refracted back to earth. This in turn determines how much distance a signal covers in a single hop from antenna to ionosphere to earth again at some distant point. Thus an antenna which favors low-angle vertical radiation tends to produce long-range ionospheric contacts, and an antenna which favors high vertical-angle radiation tends to produce relatively shorter-distance communication.

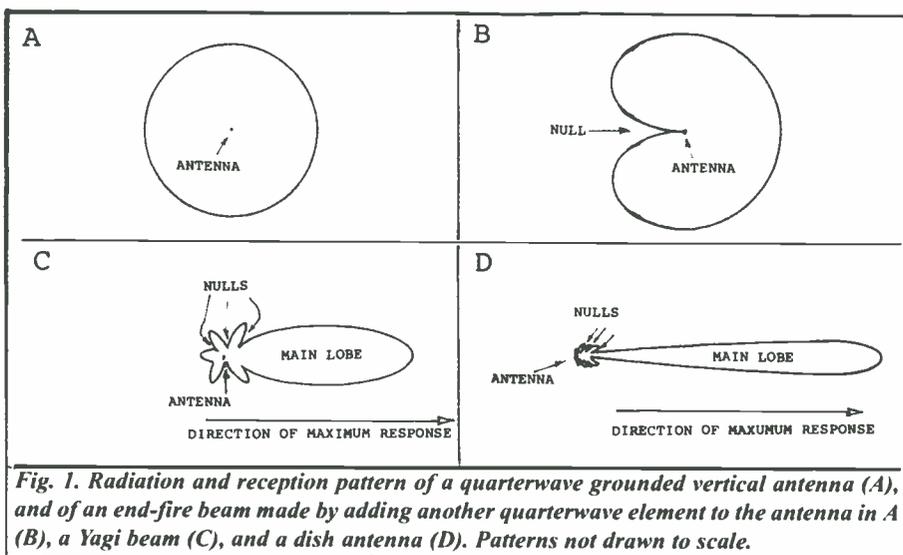


Fig. 1. Radiation and reception pattern of a quarterwave grounded vertical antenna (A), and of an end-fire beam made by adding another quarterwave element to the antenna in A (B), a Yagi beam (C), and a dish antenna (D). Patterns not drawn to scale.

This Month's Interesting Antenna-Related

Web site:

<www.cebik.com/antcom.html>

This site lists a large number of commercial antenna manufacturer's web pages. Some of these sites have good tutorial information.

Send in your suggestions for inclusion here as an interesting antenna-related web site to: <clemsmal@bitterroot.net>.

Ionospheric skipping of signals is relatively uncommon on VHF and higher frequencies, but vertical angle of signal radiation is still important at these frequencies. Very low angle radiation launches the signal toward the horizon, and this produces maximum communication distance at these frequencies.

Note that, by appropriate antenna choice, vertical directivity helps you determine the distance over which you will best communicate (distant vs closer in). During transmission it helps you concentrate your transmitted power toward areas where you want it, and avoids your signal causing unnecessary interference at distances where you don't wish to communicate. Conversely, during reception it can help you avoid interference from close-in stations if you are wanting to hear DX, or vice versa.

❖ In Sum

We haven't covered nearly all there is to say

about directivity in antennas, but we've explored some of the most commonly useful ideas.

RADIO RIDDLES

Last Month:

I said: "In past columns I have mentioned the radio horizon as somewhat beyond the visual horizon. What is this radio horizon? Aren't VHF and UHF signal paths "line of sight" right out to the visual horizon?"

Well, actually, the radio horizon is generally somewhat beyond the visual horizon. The actual distance depends on the height of the viewing point, wavelength of the signals involved, and smoothness of the terrain over which the signals travel.

This Month:

OK, so that's one definition of the radio horizon. Now what is the radio ground? Is it the earth we walk on? Maybe, in a way, maybe.

You'll find an answer for this month's riddle, another interesting, antenna-related web site, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

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Equipping your Restoration Workshop

Left you last month with some important ideas about workbench safety. I know full well that this is the kind of advice that many are tempted to ignore. "Oh sure, Ellis thinks I should have an isolation transformer and a GFI outlet – but if I'm careful I can get started without bothering with those things." Don't be tempted to go down that road! If you are, there'll be an accident, or worse, just waiting for your first inattentive moment. With that said, let's move on to recommending some basic equipment for your beginning restoration workbench.

Right now I'm going to suggest a "starter set" of tools and equipment for the beginning of your career as a restoration technician. With this gear on hand, you'll be able to put quite a few of your antique radio acquisitions back in running order. Set the tougher jobs aside; they'll be waiting for you after you gain a little more experience and visit a few antique radio meets to pick up a bit of additional gear.

❖ An Essential Instrument

The only piece of test equipment on this short list is a good volt-ohmmeter (sometimes called a VOM or a multimeter). It will allow you to measure d.c. plate and screen voltages, a.c. filament or heater voltages, and resistance values. You'll also use it to check continuity across such elements as switch contacts and transformer windings. I prefer an analogue meter for general set testing rather than a digital one. In my opinion, the pointer-and-scale setup is a lot easier to read in situations when one needs to need to look at some part of the radio with one eye and the meter with the other. Get a decent unit with a d.c. sensitivity rating of at least 20,000 ohms per volt and a good selection of ranges.

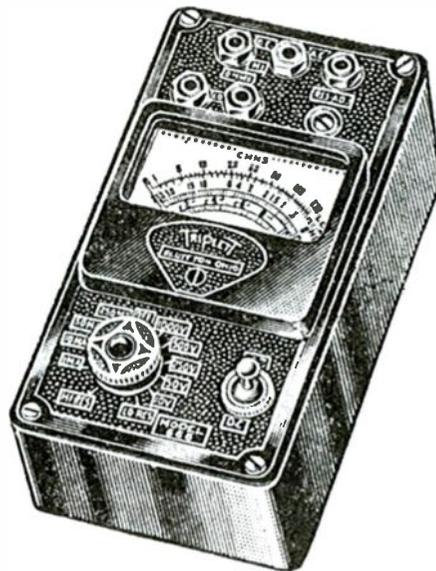
You'll find many "golden oldie" meters having these specs at radio meets. A notable one is the classic Simpson Model 260. But, for starters, I'd suggest an inexpensive new unit because you'll be able to count on its calibration and accuracy. My Radio Shack year 2000 catalogue shows an 18-range, 20,000 ohms-per-volt unit for just \$24.99. That should do just fine.

Later, you'll want to acquire other multimeters. For one think, it's fun and useful to have a 30s- or 40s-vintage VOM. They look very cool and are commonly rated at 1,000 ohms-per-volt d.c. sensitivity. Instruments of that sensitivity are handy because the manufacturer's

service data frequently specifies them for verifying actual set voltages against the provided chart of typical voltages. More modern instruments of higher sensitivity don't load the circuit under test as much and thus will show higher readings than those given in the charts.

Another style of multimeter I'll be recommending later is the VTVM, or vacuum tube voltmeter. This highly sensitive instrument has an input sensitivity of 10 or 11 million ohms per volt on d.c. Hence it is very useful in measuring voltages (such as tube bias voltages) that simply disappear under even the load of a 20,000-ohms-per-volt instrument. It is also useful, as you'll see later, as an output indicator when you begin to do alignment work.

But after you come home from a meet with your "260," VTVM or 40s VOM, be sure to check the readings on every range against the VOM you purchased new! You can't really be sure until you do!



1000 ohms-per-volt multimeter made by Triplet circa 1938. A unit like this can be useful (see text), but check it against a known instrument first!

❖ Your Starter Tool Kit

I'd recommend that you have three sizes of screwdrivers on hand: a very skinny one for loosening set screws on radio knobs, an intermedi-

ate size and a large one for those heavier, tough-to-loosen fasteners. You'll also have occasional use for a small Phillips driver and a set of small hex keys.

While we're in the screwdriver family, look around for a good alignment tool. This is essentially a screwdriver made out of insulating material rather than metal. When you begin aligning radios, you'll find that a metal screwdriver can't be used. For one thing, the influence of the metal will throw off your tuning so that your adjustment will change after you take the tool away. For another, the adjustment screws on i.f. transformers frequently are "hot" with B+ voltage. With a metal screwdriver you might shock yourself or short out the B+ causing serious damage.

The alignment screwdrivers commonly available today come in kits really intended for TV alignment. The screwdrivers are long and spindly and have tips that are really a little small for radio adjustment screws. In the kits you'll also find a number of drivers with male hex heads that have little use in vintage radio restoration. You can buy one of these kits for a few bucks, but keep your eyes open at the meets for a sturdy alignment tool made of heavy plastic. Some have tiny metal inset screwdriver tips that work well but are not bulky enough to interfere with alignment.

In the plier "family," I'd recommend that you have on hand a good slip-joint plier and a set of fine-but-sturdy needle-nose jobs. You'll be using the latter for such things as twisting component leads around solder lugs when replacing capacitors and other components.

Finally, get a sharp set of side cutters. Don't get the big ones favored by electricians for No. 12 or 14 wire! You'll be cutting mostly fine hookup wire, so get a pair sized for electronic work.

You should also have a set of nutdrivers. Be sure you get an "inch" set, not a metric one! I favor the nutdrivers having individual color-coded handles over the sets having one handle and a selection of sockets. It's much easier to spot the size you want and there's no danger of an individual socket (usually the most-used size) rolling off the workbench and getting lost.

To supplement the nutdrivers, get yourself a small set of those double open-ended wrenches – including sizes up to 3/4" or so. The inexpen-



Jeff Weinberg's prized Crosley Model 726 now adorns the family living room.

sive ones stamped out of flat metal (if you can find them around) are really much better for radio work than the more robust cast versions. A major use for this set will be loosening the retaining nuts for such things as volume controls, tone controls and toggle switches. The jaws of the flat wrenches can be placed right up against a chassis or panel to get a good "bite" on one of these nuts. Auto supply stores used to sell such wrenches clipped together in a little nest and you may be lucky enough to find one.

Of course you are going to need a soldering iron. Mostly I use a 40-watt pencil style of the type sold by Radio Shack and find it has more than enough heat for most purposes. I also have a Weller dual-wattage "instant heat" iron. It's handy for those applications where you need to thread the iron tip through a maze of wires to get where it's going. That way you can apply the heat only after you are sure all the wires are clear of the tip. The little prefocused flashlight bulb with which most of these irons are equipped illuminates the work quite nicely.

Radio Shack sells "instant heat" irons with its own brand name. But you'll want to comparison-shop the prices of the Weller units sold through many hardware store chains.

Also keep an eye out at radio meets for one of those hefty American Beauty (or equivalent) 100 or 150-watt irons. The kind with the big wooden handle and the asbestos cord. These are indispensable for soldering or desoldering chassis grounds, as well as for the other occasional heavy-duty jobs that may come up. You won't use it really often, but when the need comes up you'll be glad you have it! Irons like this can be purchased new at hardware stores – but they are a little expensive and most have

really large tips that are inconvenient for use around a radio chassis.

I'd suggest you also get yourself a soldering iron holder (the kind with a heavy base and a wire cylinder into which you drop the business end of the iron). If you try to rely on the flimsy little stand that comes with the iron, you'll soon find yourself burning holes in your workbench, instrument cases, cords, or whatever. As far as the solder itself is concerned, purchase ONLY rosin-core solder intended for electronics work and so marked on the spool. Otherwise, the

connections you make may well corrode and become either high-resistance or nonexistent as the years pass.

I'd also suggest a couple of spools of desoldering braid (copper braid that you heat with your iron while pressing over the connection to be desoldered). This material is inexpensive and works well. To my mind it is much more effective than the patent "solder sucker" devices that are also available on the electronics market.

❖ Radio "Chemicals"

I'd suggest that you equip your workbench with three basic "chemicals." The first is an aerosol can of the dust remover spray made for computers or other electronic equipment. While such spray won't make your radio chassis look mint again, it is very helpful in removing the deposits of grungy dust you frequently find in radios – often between the capacitor plates. The most economical place to buy this material might well be your neighborhood computer outlet or mass market appliance store (CompUSA, BestBuy, etc). Sometimes you'll even find it on sale.

Even more important is your aerosol can of contact cleaner (sometimes called control cleaner or tuner cleaner). This will restore the all-important contacts on your radio switches, volume controls, tone controls, phone jacks, etc., removing corrosion and providing lubrication for smooth, positive operation. Radio Shack is probably your best readily available source.

The third aerosol "chemical" you should have is a small can of WD-40 spray. You'll obviously use this for loosening and lubricating

various mechanical linkages you may run across in your restoration work. Get it at your local hardware store.

❖ From the Readers

Bob Pote writes that he really enjoys the column. Collecting since the early 60s, he has about 75 sets – mainly 30s and 40s Bakelite models. He hopes that when we get into actual restoring and troubleshooting material that I will keep it simple so that even novices can understand it. And I can assure Bob that is indeed the plan – at least for the initial restorations we undertake. Then we hope that novice readers will grow with us as we tackle more ambitious projects.

Joe Yakoski, N3JNX, just wanted me to know that he very much enjoys the column and finds it brings back many good memories of the old days. Thanks for those words of encouragement, Joe! Hank Schultz, W13U, followed me to *MT* from Gernsback Publications and is glad there is still a column for him to read on antique radio subjects.

Jeff Weinberg has been following the column for the last several months with interest. He's a 24-year radio ham, but has been collecting antique sets for only about two years. He'd always wanted an antique console for his living room, and finally had an opportunity to buy a Crosley Model 726 with many interesting features that had been treasured for years by a Northern Illinois farm family. Jeff sent along, and we print here, a pic of the Crosley in his living room. Thanks, Jeff!

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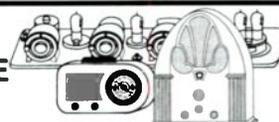
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A Signal Booster Loop for MW DXing

By Richard Q Marris, G2BZQ

Many medium wave and long wave receivers have a built-in loopstick antenna – loopstick being a convenient title for a ferrite rod cored loop. Many also have a multi-range of shortwave and VHF bands, plus most of the usual communications receiver facilities such as BFO, AM/SSB/CW selections, and RF gain control, etc.

For frequencies below 1700 kHz or so, the internal loopstick provides the antenna function; for other bands a telescopic whip is provided. There may even be a connection such as a coaxial socket to accommodate an external antenna.

On the lower frequency bands, the built-in loopstick provides excellent directional nulling facilities, but it is usually quite small and therefore not of much use for serious DXing. The exceptions are those large receivers fitted with long, fat loopsticks.

The seemingly obvious thing to do would be to attach an external wire antenna or maybe a frame loop. However, it's not that simple.

If you plug in an external wire antenna, you will find that this neutralizes the nulling effect of the loopstick on the MW band. Certainly, you may well receive a stronger signal, but also a vast amount of noise. From the DXing point of view, you have taken a retrograde step. So, why not use an external frame loop of maybe 36-inch x 36-inch dimension – or larger or smaller depending on the space available?

Plugging in a tuned frame loop antenna is not a good idea, unless you are prepared to spend a lot of your operating time lining up the directional facilities of the loopstick and the external frame loop. Both are highly direc-

tional. The loopstick receives its maximum signal on the "long" side, with the nulling at the two ends. The frame loop is much more efficient than the usual, very short, thin loopstick used in receivers. The maximum signal is received at the outer circumference where the winding is located. Maximum nulling is at the large flat side. To use both together with a portable receiver, really is an exercise in dexterity and juggling.

Fortunately, there is a simpler answer: Enclose the receiver in a simple tuned loop. No connection to the receiver is required, as the radio's loopstick is inductively coupled to the frame loop (see Figures 1 & 2).

Mode of Operation

The profile (Figure 2) shows a receiver, fitted with an in-built loopstick antenna, resting on a shelf inside the confines of a tuned frame loop. The schematic is shown in Figure 1. The outer frame loop winding consists

of a few turns, of wire, tuned by a variable capacitor (C). The prototype uses a 2-gang variable 365 + 365 pf (in parallel=730 pf). Any available variable will do, providing it has a minimum of 500 pf, depending on the number of wire turns used for the required frequency range. (See later)

The loopstick receiver is represented in Figure 1 by a ferrite rod at 90 degrees to the frame loop, so that the polar diagrams of the two loops coincide. The maximum signal directivity is shown with the arrows marked MAX. The nulling (minimum signal) is marked MIN. The combination of the inner loopstick, and outer frame loop provides acute nulling and excellent signal boost for the receiver. The two loops are inductively coupled together, with no connecting leads, giving a simplicity of construction.

Construction

The construction (Figure 3) uses a simple

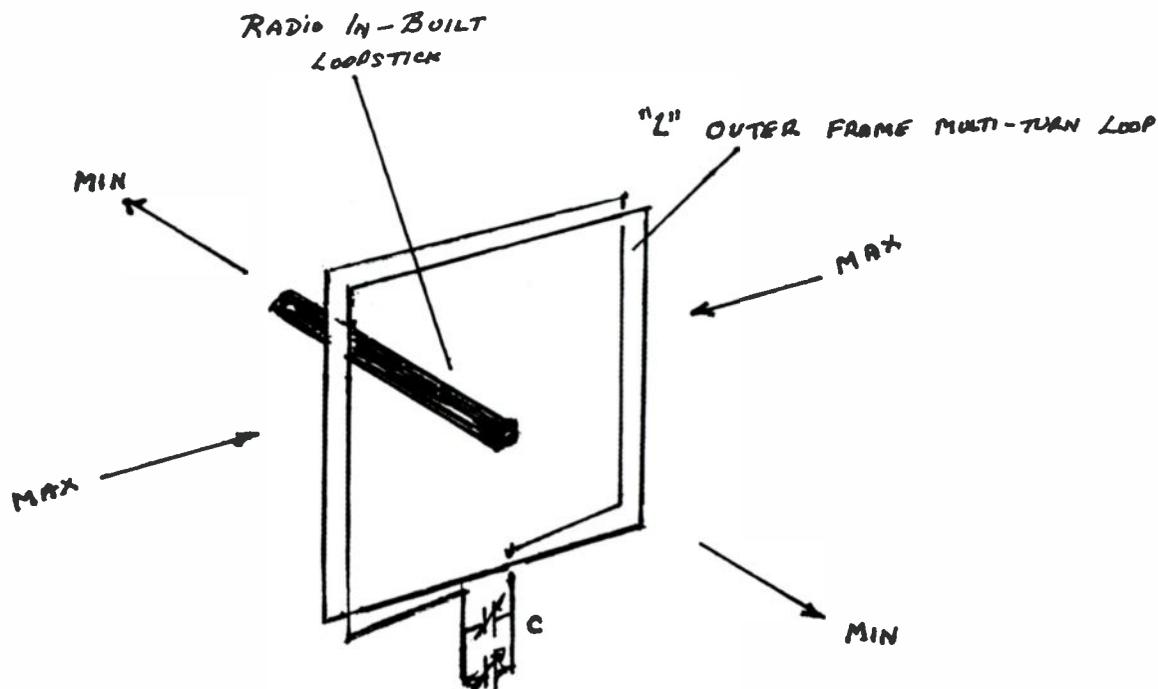


Figure 1 - Schematic

C = 365+365 pf two-gang variable (=730 pf).
(See text for alternatives)

L = Frame Loop - See figures 1 & 2

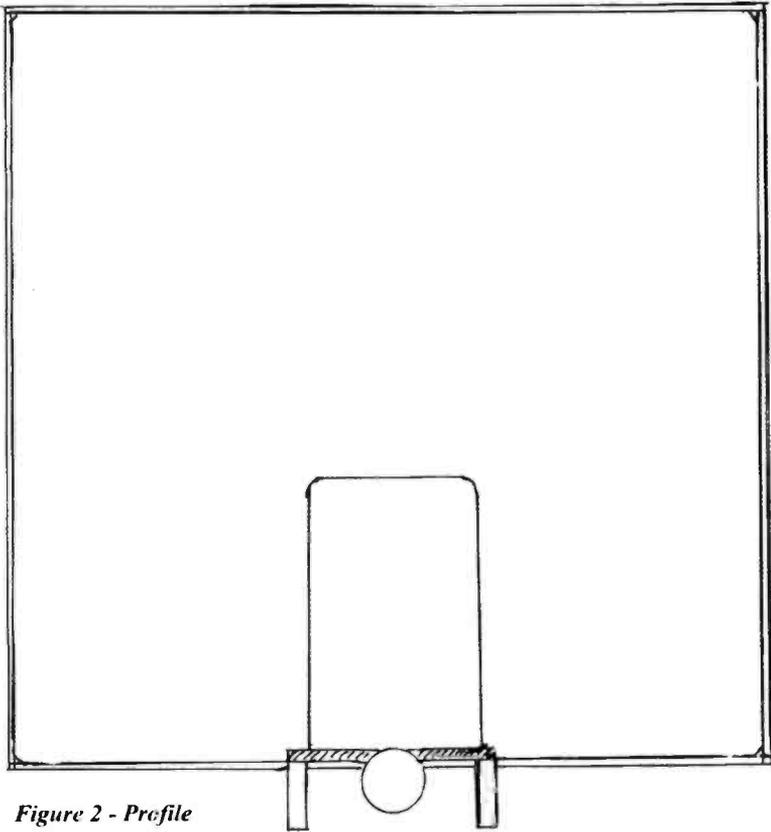
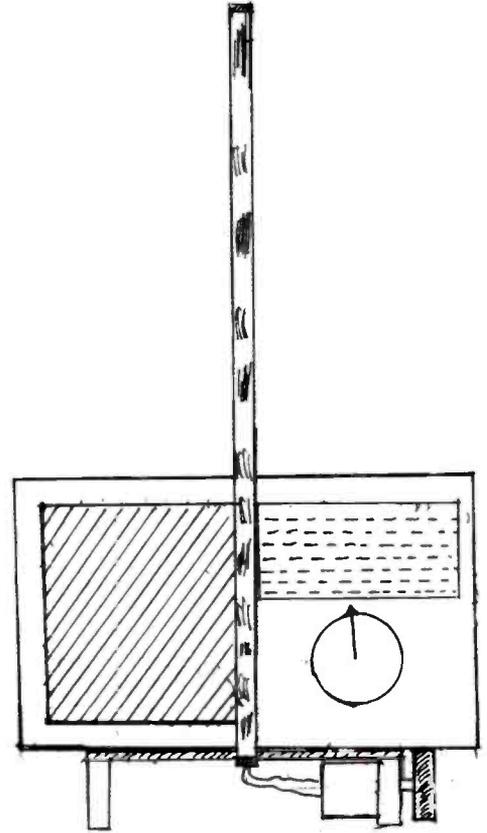


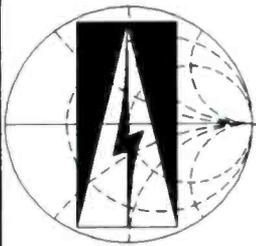
Figure 2 - Profile



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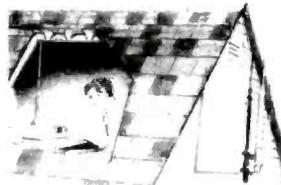
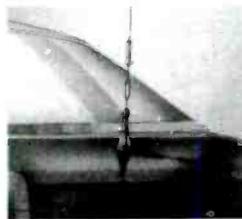
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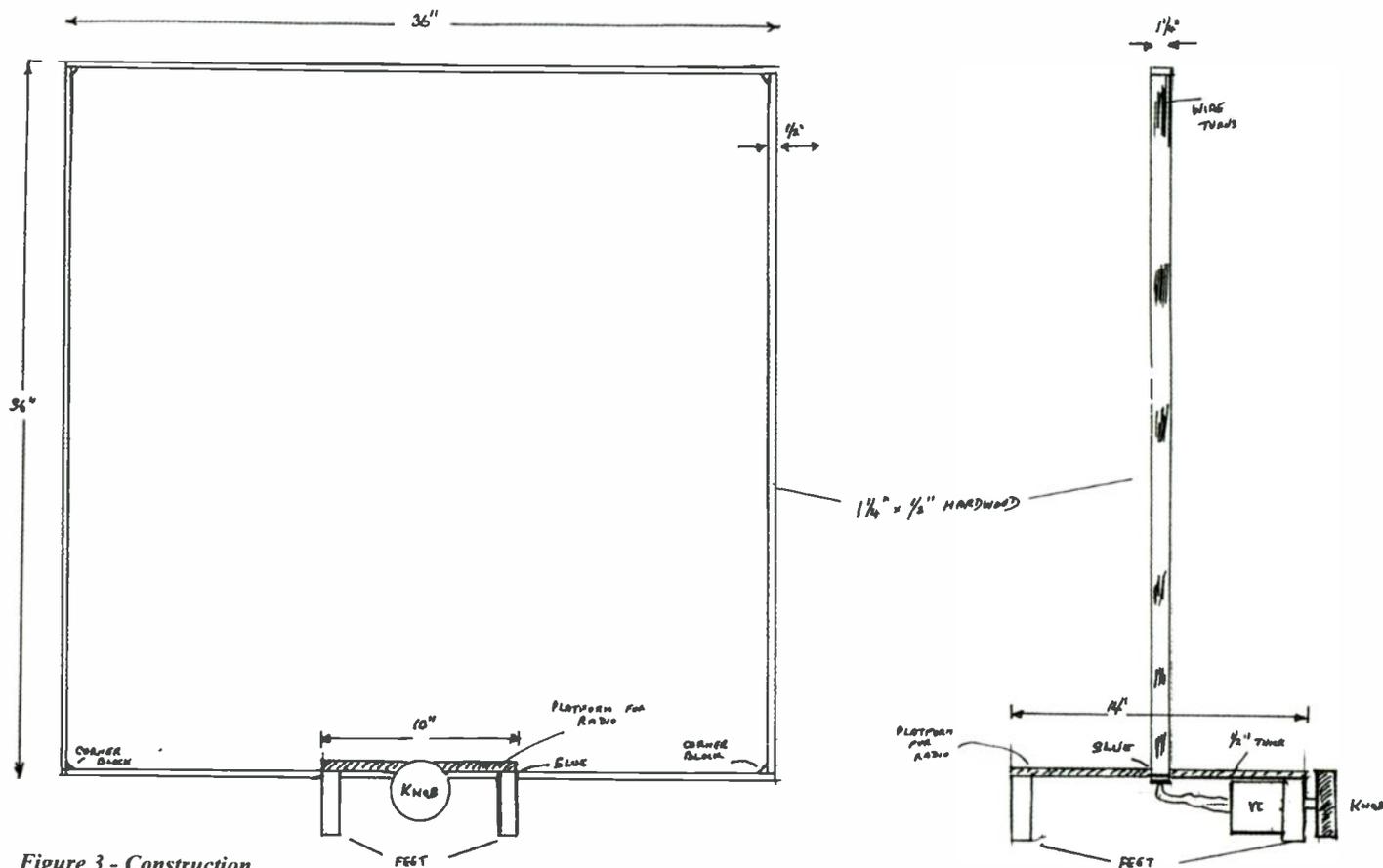


Figure 3 - Construction

wood frame made of 1-1/4-in x 1/2-in hardwood, with a final dimension of 36 x 36 inches outside. The corners should be securely glued, with reinforcing corner blocks, as shown.

In the center bottom, a shelf is glued onto the inside of the frame. The shelf used measured 14 x 10 x 1/2 inches. The variable capacitor is mounted, as shown, under the front of the shelf. At each corner, four 1-inch diameter feet are fitted. 1-inch wooden dowel was used, and the length depends on the physical dimensions of the variable capacitor.

The loop winding is round the circumference of the frame, with the two ends being taken direct to the variable capacitor.

The Winding

22 AWG PVC covered hook-up wire was used for the winding. The number of turns required will depend on the maximum capacity of the variable capacitor. A raid on the junk box produced a 365 + 365 pf variable, which, when wired in parallel gave a capacity of 730 pf, being large enough to cover the whole medium wave band plus part of the area below 500 kHz. A total of 6 wire turns was used. If a smaller capacity is used, then it is suggested that an extra 2 or 3 turns are

wound on initially, and then turns removed as necessary to cover the preferred frequency range. It is also unlikely that a minor change in wire gauge or PVC covering will make much difference.

Testing and Operation

Tune the radio to a convenient strength station around mid-medium wave band. Place the radio, still tuned to that station, on the frame loop shelf at exactly 90 degrees to the frame loop as shown in Figure 2. Rotate the variable capacitor and bring to resonance, which is indicated by a pronounced increase in signal strength. Rotate the whole assembly through 180 degrees. The directivity effects should be pronounced, with very sharp nulling and peaking of the signal.

Next, check the frequency range of the frame loop using the band end calibrations on the receiver. Using a 750 pf variable capacitor for loop tuning is easier than with a 500 pf variable. Note: A single gang can be used for 500 pf. Above this use a 2-gang, wired in parallel, for capacities up to 750 pf. E.g. 350 + 350 pf = 700 pf.

Depending on the capacity used, it may be necessary to remove a turn or two to achieve the required frequency range. Next, check the performance of the assembly, which

should be placed on a table alongside the operator's position and as far as possible from any house electric wiring which may be hidden in an adjacent wall. A simple turntable, between the assembly and table (which must be non-metal) is advantageous.

It will be found that a very weak signal on the radio can be resonated to comfortable listening when the radio is placed in the frame loop. Also it will be found that the directivity and nulling can be very pronounced, thus eliminating interference from manmade or natural sources and interference from other radio station in most cases. A little operating practice makes perfect.

Final Comments.

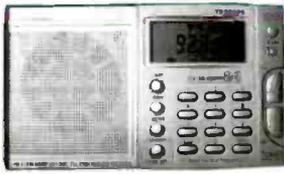
In a perfect world, the frame loop base should have timbered in sides and front, in lieu of the four feet used. It would look neater, and protect the variable capacitor from dust.

What about the long wave band? As a starting point use about four times as many turns. A 2-gang 500 + 500 pf variable, wired in parallel, would be ideal. Then just proceed, as before, with any necessary pruning of turns.

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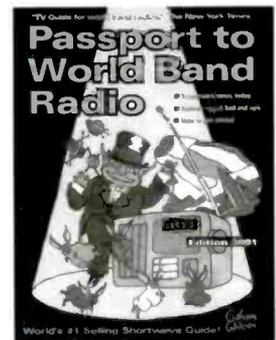


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What to Look for in a Computer for Radio Monitoring

It seems like a hundred years ago when this column and *MT* first introduced to the monitoring community the concept of a Total Monitoring Computing environment. Heck, just the idea of using a computer as an integral tool to monitoring was considered revolutionary. So much so that when I polled the other *MT* columnists to be sure there would be no overlap between our columns, the response from my new colleagues was "... computers don't really fit into monitoring." Today's *MT* columns speak volumes on how far we have come in the last nine years!

But still today, one common question that I am asked is, "What type of computer do I need for radio monitoring?" The answer lies in our definition of "radio monitoring." Exactly what tasks do we want the computer to perform?

Radio monitoring can be broken into three main functions: Radio Control, Frequency Database Maintenance and Signal Decoding. I think these functions are pretty much self-explanatory. Over seven years ago we coined the phrase "Total Monitoring Environment" to describe a set-up in which one, or a number of programs working simultaneously, could perform all three functions.

Let's take each of these three functions separately and determine their computer requirements. We will then put them all together for a final answer to our original question.

❖ Controlling Receivers with Computers

Computers control or "tune" receivers via serial ports. These ports, sometimes called COM ports (short for communications), are commonly found on most computers. COM ports provide connections to the computer for mice, trackballs, digital cameras and modems. The 1996 introduced USB (Universal Serial Bus) ports have now taken over many of the duties of the COM port. However, most receiver control programs still use the older COM port. Therefore, in order to control a receiver, a computer with an unused COM port is required.

What other computer requirements are important? The truth be known, basic receiver control software is very simple. The speed of the COM port is not greatly affected by the speed of a CPU. So a computer using a 386 processor running at 33 MHz would do nicely. However, using a Windows' graphical user interface (point and click), makes life so much easier: No lines to type or commands to remember. But, these graphics screens put a big burden on a 386, slowing it to a snail's pace. Therefore, a computer with a 486 processor, running at 66 MHz and with an unused COM port, is the most basic that should be considered.

If your computer does not have an unused COM port, but does have a spare expansion slot, basic COM cards are available for around \$15. But make sure your computer has either PCI or ISA expansion slots.

Some computers were made with other slot forms. These have disappeared, leaving only PCI and ISA cards on the new equipment market. Common sense dictates that you should look for a computer with as many unused expansion slots as possible. Stay away from computers with only one expansion slot UNLESS all the components we discuss (modem, sound card, free serial port) are already provided without the need for additional expansion cards.

❖ RAM-a-lam-a-ding-dong

As Tolstoy once asked, "How much RAM does a man need?" Or maybe that was land. The minimum amount of RAM required is usually dictated by the operating system you intend to use. I sug-

cific program has its own set of requirements and should be consulted.

❖ Got Database ?

The operational characteristics of a database are affected by many of the things we have discussed. But its operation is also affected by a computer component that we have not yet discussed ...the hard drive. Most frequency database programs will function with the computer we have outlined above. Database frequencies and receiver settings, such as mode and filter, are stored on your hard drive. Therefore, the size of the hard drive will most likely be the factor which determines the maximum number of entries in your database.

Considering operating system requirements, receiver control program needs, and the data-

Table 1 – The Monitoring Computer Profile

Item	Better	Minimum
Processor Type	Pentium or K5/K6	486
Processor Speed*	133 MHz	66 MHz
Unused Expansion Slots	PCI or ISA - Desktop only	PCI or ISA - Desktop only
RAM	32M	16M
Display VGA	256 Colors – 1M memory	Mono (for laptop)
Hard Drive	1G	540M
Sound Card	16 bit	16 bit
Operating System	Windows 98	Windows 95
Estimated Cost - Desktop	\$125	\$50
Estimated Cost - Laptop	\$200	\$100

* *Best performance/cost compromise is 233 MHz AMD or Intel processor.*

gest that you consider Windows 95 as your basic operating system. Win 95 will operate with 8 Meg of RAM. But with the current low cost of RAM, you should be able to get 32 Meg for under \$50. The more RAM, the faster many applications will operate. So adding RAM is a relatively cheap speed enhancement.

❖ What You See Is

Video cards vary wildly today. In my flight simulator computer I am using a video card with 64 Meg of its own memory! But receiver control programs are not as screen operations intensive when compared to a flight simulation.

Just about any VGA card will be useful. For an easy viewing display presentation, I suggest a VGA card that has at least a 256 color capability with 1 Meg of on-board video memory. The more colors, and the more video memory, the better. I've seen these basic video cards on the web and at flea markets going for under \$10.

Now please remember, we are talking about the *most basic* computer requirements. Each spe-

base, a 1G hard drive should do fine. In fact, if the computer is dedicated to only monitoring, a 540M drive may be enough. For price reference, today a *new* 20G hard drive can be found for under \$130. So 540M and 1G drives are quite cheap on the used market.

The amount of RAM may affect the speed of operation of your frequency database. But as the number of records in the database grows, the search and recall speed of the database will begin to be limited by the processor. If you think you might fit into this category, then I suggest you go to a Pentium 133 MHz; a good compromise of performance and economy. By today's standards the P133 is "old." But for our monitoring purposes it will be just fine. If you can find a computer which uses an AMD processor (K6 or K5), and has a speed near 133 MHz, that will also work fine. Usually, the AMD processor computers are lower in cost, relative to the Intel driven computers.

❖ Decoding - Completing the Hat Trick?

Surprisingly, decoder programs can be very

small and compact, having modest RAM and hard drive requirements. Our minimal, flexible computer using a Pentium 133 MHz processor, with 32 Meg of RAM, a 1G Hard drive, 1 Meg VGA card will provide an excellent platform.

Since some decode programs utilize sound cards as the interface from the receiver audio to the computer, adding a sound card to our system is a good idea. Any Windows 95 compatible, plug and play sound card will work. Expansion cards come in at least two forms, ISA or PCI. Match the sound card form (PCI/ISA) to your computer's empty card slot. New sound cards can be purchased for \$10 on sale, after rebate.

❖ Laptop versus Desktop

Since I seem to be forever on airplanes, most of the programs I review start their lives on one of my laptops. Of course, I have to wait till I get back home to hook a radio to the laptop. But the laptop allows me to get familiar with the program's needs and ease of installation.

The flexibility of a good laptop is hard to beat, especially if it has a color display. Now I know I suggested that an Intel Pentium 133 MHz be your minimum computer. However, once you have a desktop P133 workhorse, a 486 66MHz, color screen laptop can add a new portable dimension to monitoring. One of my laptops is an IBM 701C, which I picked up at a flea market for \$150.

With a Radio Shack converter that changes the car's 12 volts into 110 volts AC, a receiver, and the trusty IBM laptop, the road is mine! That is, except for stops at needlework and pottery shops which my co-pilot makes regularly. However, even those stops are made more palatable by catching a few minutes of monitoring while she pays for "our necessities."

To give you the greatest flexibility get a laptop that has provisions for connections to an external keyboard and monitor. Then, in a pinch, you will have another pseudo-desktop computer at your disposal.

❖ The Monitoring Computer Profile

Figure 1 is a summary of the best and the minimum monitoring computer requirements. If you do go the laptop route, use the same guidelines that we have for the desktop.

If you want to spend a bit more, go for a Pentium 233 MHz machine. In my opinion, the 233 MHz computer is still a great all-purpose computer and will perform well with all monitoring programs and most other applications.

Since the Internet is a great source of monitoring programs and frequencies, I'd suggest you spring for a modem. As with all expansion cards, match the card's form (ISA or PCI) to the form of the free expansion slot in your computer. I just bought a 56K PCI modem in Circuit City for \$4.95 after rebate.

❖ Don't Get Auction Crazy!

Remember, what we have talked about here is a basic radio monitoring computer. It's definitely *not* the latest and greatest. As a result, it should cost you very little! The complete desktop that we discussed, sans monitor, should not cost you more than \$100 to \$150, depending on RAM and hard drive. I bought two (yes, *two*) P133 systems, with 16M of RAM and a 540M hard drive for \$90 at the last ham/computer show. Look carefully. What

most people call old computers, you can call your dedicated radio monitoring computers.

I cannot believe the price that some of this "junk" is commanding on auction sites! These buyers are either stupid or crazy. Keep in mind that for around \$400 you can get a very nice, brand new E-Machine at Sam's Club, Best Buy or Costco. These E-Machines will beat or meet all of our minimum needs handily using a Celeron or AMD K2 processor. So don't pay too much.

❖ Now You've Got It

These are just guidelines. Remember that used computers should only be bought *after* you test

them for operation. Be very careful of used hard drives which you do not witness working. In all cases, get the seller's name, address and phone number. If you do assemble a computer system running a Total Monitoring Environment, you will never go back to manual monitoring. A good place to start looking for monitoring software is the Strong Signals site at: www.strongsignals.net/htm/software.htm

Once again, check with the monitoring software you intend to use to determine its exact needs before you reach into your pocket to buy hardware. Then, do that very carefully! "Buyer beware" are my final words ... for this month.

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PR-460: ClearConnect

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\$219.95*



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* NOTE: The prices shown above are estimated street prices. Actual dealer prices may vary.

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What is receiver sensitivity and how is it measured?

Receiver sensitivity is one of the key specifications of any radio. The two main requirements of any set are that it should be able to separate one station from another, i.e. selectivity, and signals should be amplified so that they can be brought to a sufficient level to be heard. As a result receiver designers battle with many elements to make sure that these requirements are fulfilled

❖ Noise

Today technology is such that there is little problem in being able to achieve very large levels of amplification. This is not the limiting factor. In any receiving station the limiting factor is noise – weak signals are not limited by the actual signal level, but by the noise that masks them out. This noise can come from a variety of sources. It can be picked up by the antenna or it can be generated within the receiver.

It is found that the level of noise that is picked up by a receiver falls as the frequency increases. At HF and frequencies below, this combination of galactic, atmospheric and man-made noise is relatively high and this means that there is little point in making a receiver superbly sensitive. Normally receivers are designed such that the internally generated noise is much lower than any received noise, even for the quietest locations.

At frequencies above 30 MHz the levels of noise start to reach a point where the receiver noise becomes far more important. By improving the noise performance of the set, it becomes possible to hear much weaker signals.

In terms of the receiver noise performance it is always the first stages or front end that is most crucial. At the front end the signal levels are at their lowest and even very small amounts of noise can be comparable with the incoming signal. At later stages in the set the signal will have been amplified and will be much larger. The same levels of noise as are present at the front end will be a much smaller proportion of the signal and will not have the same effect. Accordingly it is important that the noise performance of the front end is optimized for its noise performance.

❖ Measuring noise performance

There are a number of ways in which the noise performance, and hence the sensitivity of a receiver can be measured. The most obvious

method is to compare the signal and noise levels for a known signal level. Obviously the greater the difference between the signal and the

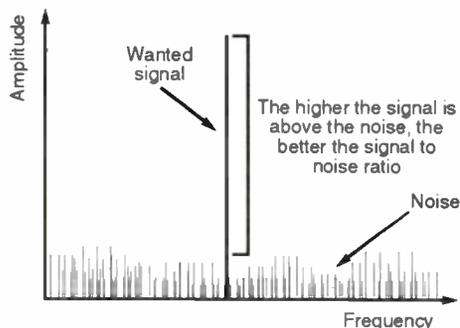


Figure 1 Signal to noise ratio

unwanted noise, the better the sensitivity performance.

The difference is normally shown as a ratio between the signal and the noise (S/N) and it is normally expressed in decibels. As the signal input level obviously has an effect on this ratio, the input signal level must be given. This is usually expressed in microvolts. Typically a certain input level required to give a 10 dB signal to noise ratio is specified.

A number of other factors apart from the basic performance of the set can affect the specification. The first is the actual bandwidth of the receiver. As the noise spreads out over all frequencies it is found that the wider the bandwidth of the receiver, the greater the level of the noise. Accordingly the receiver bandwidth needs to be stated.

Additionally it is found that when using AM the level of modulation has an effect. The greater the level of modulation, the higher the audio output from the receiver. When measuring the noise performance the audio output from the receiver is measured and accordingly the modulation level of the AM has an effect. Usually a modulation level of 30% is chosen for this measurement.

This method of measuring the performance is most commonly used for HF communications receivers. Typically one might expect to see a figure in the region of 0.5 microvolts for a 10 dB S/N in a 3 kHz bandwidth for SSB or Morse. For AM a figure of 1.5 microvolts for a 10 dB S/N in a 6 kHz bandwidth at 30% modulation for AM might be seen.

❖ SINAD

Whilst signal to noise specifications are often seen, another similar specification that is used is the SINAD (signal to noise and distortion) measurement. The measurement is similar to signal to noise ratio, but includes distortion and is a ratio of signal plus noise plus distortion to noise plus distortion.

To make the measurement a signal modulated with an audio tone is entered into the receiver. A measurement of the whole signal, i.e. the signal plus noise plus distortion is made. As the frequency of the tone is known, the regenerated audio is passed into a filter to remove the

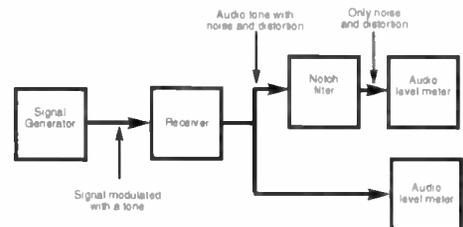


Figure 2 Making a SINAD measurement

tone. The remaining noise and distortion is then measured.

Normally the specification takes the form of a certain input level required to achieve a given SINAD. Typically a SINAD of 12dB is taken because this corresponds to distortion factor of 25%. A typical specification might be that a receiver has a sensitivity of 0.25 uV [microvolts] for a 12 dB SINAD. Obviously the lower the input voltage needed to achieve the given level of SINAD, the better the receiver performance.

Whilst the measurement is most commonly associated with FM equipment there is no reason why it cannot be used for AM, and indeed it often is. It can also be used for SSB, but it is necessary to ensure that the receiver is tuned into exactly the right frequency so that the audio tone is reconstituted with exactly the right pitch so that it can be properly notched out in the measurement.

❖ Noise Figure

For equipment that is used above 30 MHz a system known as Noise Figure is more widely used. However there is no reason why it cannot be used at any frequency and sometimes it is. The system is very versatile and can be used to measure the noise performance

of a whole receiver, or a small part of a system like a preamplifier.

Essentially the measurement assesses the amount of noise each part of the system or the system as a whole introduces. If the system were perfect then no noise would be added to the signal when it passed through the system, and the signal to noise ratio would be the same at the output as at the input. As we all know, this is not the case and some noise is always added. This means that the signal to noise ratio at the output is worse than the signal to noise ratio at the input.

A figure known as the noise factor can be derived simply by taking the signal to noise ratio at the input and dividing it by the signal to noise ratio at the output:

$$\text{Noise factor} = \frac{S1/N1}{S2/N2}$$

Where S1 is the signal at the input, N1 is the noise at the input and S2 is the signal at the output and N2 the noise at the output

As the signal to noise ratio at the output will always be worse, this means that the noise factor is always greater than one.

The noise factor is rarely seen in specifications. Instead the noise figure is always seen.

This is simply the noise factor expressed in decibels.

As an example, if the signal to noise ratio at

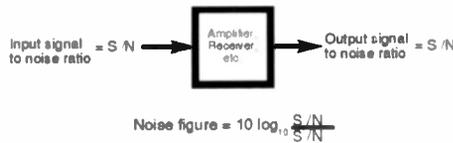


Figure 3 Noise figure

the input was 4:1 and it was 3:1 at the output, then this would give a noise factor of 4/3 and a noise figure of $10 \log(4/3)$ or 1.25 dB. Alternatively, if the signal to noise ratios are expressed in decibels, then it is quite easy to calculate the noise figure simply by subtracting one from another, because two numbers are divided by subtracting their logarithms. In other words, if the signal to noise ratio was 13 dB at the input and only 11 dB at the output, then the circuit would have a noise figure of $13 - 11$ or 2 dB.

❖ Typical examples

The specifications of different pieces of equipment will vary quite widely. A typical HF receiver may have a noise figure of 15 dB or more and function quite satisfactorily. A better level of performance is not necessary because

of the high level of atmospheric noise. However, an amateur receiver used on 2 meters, for example, might have a noise figure of 3 or 4 dB. Preamplifiers for this band often have a noise figure of around 1 dB. However, it is interesting to note that even the best professional wideband VHF/UHF receivers may only have a noise figure of around 8 dB.

❖ Summary

Receiver sensitivity is one of the vital specifications of any receiver. Whether measured as a signal to noise ratio, SINAD, or noise figure, it is essential that any receiver have a sufficient level of sensitivity. However, this is not the complete story, as other specifications are also important, as we shall see next time when we look at dynamic range.

More details of radio and ham radio topics can be found at www.radio-electronics.com

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ICOM IC-R3 Wide Coverage Receiver

The ICOM IC-R3 is a portable, wide coverage scanner with built-in television video.

In addition to a small, monochrome display, a novel color LCD display distinguishes the IC-R3 from previous models. The color LCD can be used for watching television video, displaying operational menus and status, as a bandscope, or to show signal strength over time. During battery operation, the IC-R3 powers up with the color LCD off. A multi-key sequence turns the display on and selects its personality.

The new model inherits the memory organization, CTCSS, and other features from the tiny IC-R2 (April 1999 *MT*). The upper frequency limit has been expanded to 2450 MHz and a new lithium ion battery is utilized to provide the extra voltage and current to power the video circuitry.

The IC-R3 is almost twice the size of the IC-R2. The larger battery and video hardware add another 4 ounces to its weight. Still, the IC-R3 is smaller than most scanners. Instead of the familiar helical antenna, the IC-R3 is furnished with a telescoping antenna, hinged at the bottom, and fitted with a BNC connector.

❖ General Features

The IC-R3 is made in Japan. We borrowed a Canadian IC-R3 (s/n 02190) for evaluation before the FCC certifies a cell frequency inhibited version for the USA.

It tunes the spectrum from 495 kHz to just over 2450 MHz, which affords coverage of the AM/FM broadcast bands, television audio, shortwave, and VHF/UHF. The Canadian version tunes the cellular phone bands, but the USA version will not. Users may choose AM, NFM, and WFM reception modes and 10 selectable tuning step sizes from 5 to 100 kHz. CTCSS decoding and CTCSS search are built in, along with the ability to program duplex frequency offsets.

The IC-R3 is more complicated to operate than the IC-R2, though the color LCD can be used to navigate option menus more easily. Both models contain a single, detent control knob, used for tuning and navigating through menus of options. A side-mounted FUNC key is used in tandem with the knob and other keys, a two-handed task. The IC-R3's joystick key adjusts the volume, selects

the band and display mode, and can be pressed in four directions.

The squelch may be opened fully, set in an automatic mode or nine different thresholds by twisting the selector knob while pressing the SQL key.

A 1/8-inch three-conductor jack atop the radio serves as either earphone or cloning port. Audio is sent to only one side of a pair of stereo headphones. When not in use, the jack is protected from dust by a captive rubber plug.

❖ Memory and VFOs

The IC-R3, like the smaller IC-R2, sports one VFO and 400 channels, organized into eight banks of 50 channels each. The TV memory banks are separate. Lacking a numeric keypad, frequencies must be entered into the VFO using a combination of the Band joystick key and the top mounted tuning knob.

To program a memory channel, you first tune the VFO to the right frequency and use menus to select other parameters. The IC-R3 can store the information in the next empty memory channel or you can choose a specific channel instead. Mode, tuning step size, and CTCSS code can be programmed for each memory channel, but the IC-R3 does not support alpha labels. You can program a duplex frequency offset for listening on repeater inputs, too. The IC-R3 may be cloned via serial connection to a personal computer or another IC-R3.

Like other ICOM models, you can scan one memory bank at a time, not multiple banks.

The limit search lets you search for active signals between two frequency limits of your choosing and provides 25 pairs of search limits. You can skip over frequencies during limit and VFO searches. Ordinary memory channels are used to store the locked out frequencies, so you can inspect them or setup the skip frequencies ahead of time.

There are three choices for when to continue scanning (or searching) in the presence of a signal: Resume, Pause, and Hold. A global rescan delay waits for the signal to drop and is programmable in 6 steps between 0 and 5 seconds.

Instead of a rescan delay, you can choose to pause the scan for 2 to 20 seconds and restart the

scan after that interval even if the station is still transmitting. The Hold setting halts the scan the first time the IC-R3 detects a signal.

The IC-R3 does not include an Auto Store search (a.k.a. auto memory write) as found in more expensive models.

❖ Video Reception

The IC-R3 lets you view two type of television: broadcast television and amateur television (ATV). Broadcast television can be tuned by channel number or by frequency. Our Canadian IC-R3 is configured to use the television channel plan common to the USA and Canada.

The IC-R3 provides 10 separate memories for TV frequency reception and another 10 memories for TV channels. Much like the newer TV sets, the IC-R3 has automatic TV channel programming which hunts for active TV broadcasters and memorizes the channels. You can then use the top mounted knob as a channel selector. You can listen to and view television channels, or you can turn off the video to conserve power (see below).

We live several miles from the closest broadcast TV transmitter. Using the supplied telescoping antenna indoors, our IC-R3's broadcast video reception is as good as, or better than our home television sets. The small screen makes TV viewing a challenge, of course, and LCD picture quality cannot compare with a conventional CRT. Our color LCD display washed out in bright, direct sunlight.

The ATV mode is useful for amateur fast scan television and other video sources, but is limited to the 900 - 1300 and 2250 - 2450.095 MHz ranges. The upper frequency limit precludes the possibility of using the IC-R3 to monitor certain Westinghouse AID video surveillance transmitters which transmit in the 2450 - 2483.5 MHz band. A separate 50-channel bank is dedicated to storing ATV frequencies.

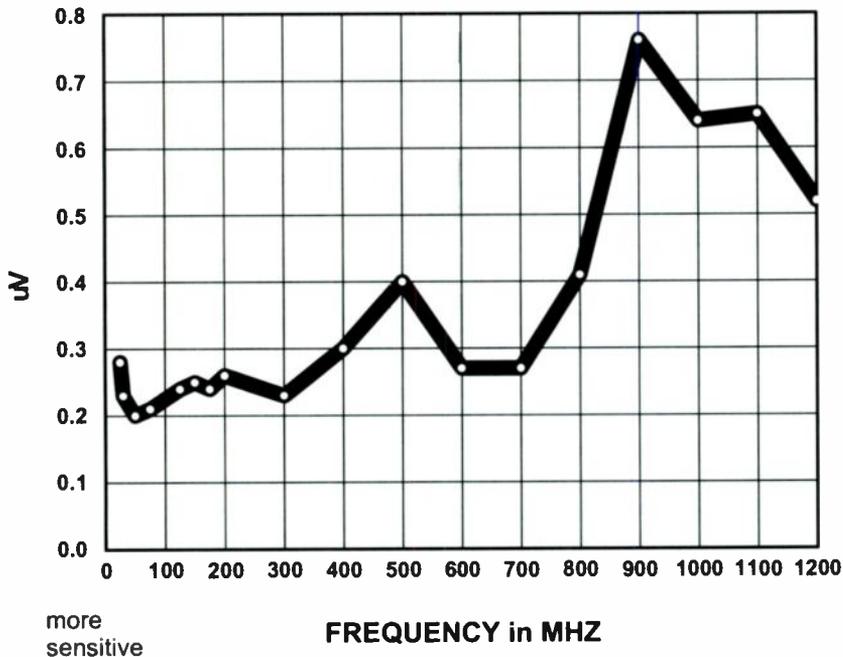
We didn't have an opportunity to test the IC-R3 with the mobile cameras used at auto races. Instead, we experimented with a friend's XCam2 camera/transmitter that is labeled 2.4 GHz (www.x10.com). We tuned the IC-R3 from 2250 to 2450 MHz while standing within a few feet of the transmitter. The IC-R3 displayed a weak video picture on several frequencies, but could not detect audio. The test is inconclusive, because we don't know the transmitter's modulation scheme and the audio may be transmitted on a completely separate frequency.

Audio and composite video output appears at a 3-conductor 1/8" jack only when the IC-R3 is set to broadcast or amateur TV mode, but not when the color LCD is used for menu, frequency display, or band scope.



less sensitive

IC-R3 NFM SENSITIVITY 12 dB SINAD, 3 KHZ DEVIATION, Serial #02190



more sensitive

Measurements

ICOM IC-R3 Wideband Receiver S/N 02190

List price: \$500-\$600 (not yet released)
ICOM America, Inc.
2380 116th Ave. NE
Bellevue, WA 98004
Phone: (425) 454-8155

Frequency coverage (MHz):
0.495 - 2450.095 (Canadian version)

Step sizes (kHz):
5, 6.25, 9, 10, 12.5, 15, 20, 25, 30, 50, 100

FM modulation acceptance: 10 kHz

Intermediate Frequencies:
240.1, 26.05 (AM, NFM), 13.25 (WFM), and 0.45 MHz

Image rejection due to 1st IF:

- 89 dB at 40 MHz
- 67 dB at 155 MHz
- 59 dB at 460 MHz
- 47 dB at 860 MHz

Audio output power, measured at ext. speaker jack:
110 mW @ 10% distortion

Practical memory scan speed: 10 channels/sec.
Practical search speed (12.5 kHz step): 43 steps/sec

Current consumption @ 3.7 VDC
off: < 1mA
scanning: 136 mA
full volume: 175 mA
scanner screen enabled (black & white): additional 535 mA
television video: 880 mA

❖ Power Grab

Our IC-R3 is equipped a BP-206 lithium ion battery pack which furnishes 3.7 volts at a 1650 mAh capacity. It fits tightly inside the battery compartment and removing it is difficult. A supplied plastic spacer permits operation by 3 AA alkaline cells instead. The included wall wart charger will replenish the Li-ion battery in 15 hours but cannot supply enough current to power the IC-R3. The optional BC-135 desktop charger can recharge the Li-ion pack in 2.5 hours. You can power the IC-R3 externally using a 6 VDC, 4 A power supply or via the optional CP-18 cigarette lighter cable.

The video screen requires lots of current. If we use the screen while scanning, current consumption jumps from 136 to a whopping 671 mA. Our IC-R3 draws 880 mA while watching television. The smaller LCD can display battery voltage when the larger screen is enabled.

❖ How Does It Perform?

The IC-R3 produces good audio, on par with the IC-R2. The frequency digits are smaller than those in the IC-R2, but large enough to see without squinting. Two green LEDs light the LCD display for a few seconds each time you press a key to twist the selector knob. You can latch the light so it stays on.

VHF and UHF reception is good, but this IC-R3 is not as sensitive as our IC-R2 (s/n 01385), particularly above 700 MHz. There are a few birdies, including one on 123.45 MHz, the air-to-air chat frequency. We receive pager intermod in the 147 MHz range but the 490 MHz range is free from cellular interference. When searching for NFM signals, our IC-R2 and IC-R3 often stop 5 kHz away from the center frequency of an active transmission.

The squelch threshold is consistent across all frequencies. Our IC-R3 emits an annoying pop a fraction of a second after the squelch closes and disabling the battery saver doesn't eliminate the pop.

The color LCD can display signal strength over time using a scrolling scheme. ICOM euphemistically terms this the "direction finding" function. It may be more aptly named a "signal fade" display.

Our IC-R3 hears well on shortwave using the telescoping antenna, but its AM BCB performance isn't as impressive. The 12 kHz AM bandwidth is comparable to other wide band scanners and is not up to separating signals in a crowded band. Don't expect to use the IC-R3 to monitor shortwave utilities because it has no product detector or fine step size for SSB reception.

❖ Summary

The IC-R3's video capability is unique among portables, though it adds considerably to the current consumption and price. The color LCD makes option setting easier but is too power hungry for use over extended periods. The wide frequency coverage and CTCSS decoding are useful. The tiny IC-R2 is a better choice if you don't require video reception.

The Icom IC-R3 will be available from Grove Enterprises (see ad this issue) for \$500-\$600. Call 800-438-8155 for price and availability.

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WHAT'S NEW?

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SpeakEasy at a bargain price

Midland Consumer Radio has added several new models to their full line of Family Service Radios. One of the most attractive is the 75-509 14-channel successor to their top-selling SpeakEasy™ model. The redesign includes a classy "Platinum" silver color case with black accents. Improved features include eVOX – hands-free use without a headset – water resistance, and in-unit battery charging.



The eVOX feature allows you to set three sensitivity levels and three delay settings, so the voice-activated feature can be used in almost any noise condition. The Stealth Squelch circuit quiets annoying popping noises at the start and end of transmissions. Optional headsets are available for quiet operation when required. The roger and power-on tones can also be disabled for even quieter operation.

Two channels can be monitored under the Dual Watch feature. SpeakEasy runs on three AA batteries (not provided). Ni-Cad or Ni-MH batteries may be charged while in the radio when used with an optional wall charger or drop-in desk charger. A battery save mode conserves power, and an indicator warns of low battery conditions.

The 75-509 measures 2-1/16"W x 3-7/8"H x 1-1/16"D. It retails for \$49.95 and is expected to be available this fall. For more information, check out your favorite dealer, call 1-816-241-8500 or visit <http://www.midlandradio.com>.

New SWR Meter from MFJ

MFJ Enterprises has added UHF capability to one of its most popular meters to create the sophisticated new 269 model SWR meter. There's not much this meter won't do: calculate optimum coax line length for any frequency, determine velocity factor, read standing wave ratio and complex impedance, measure coax loss and the distance to a short or open line, read match efficiency, inductance and capacitance, and much more. It even



contains a built-in frequency counter.

The 269 covers 1.8 to 170 MHz and 415-470 MHz. You can adjust dipoles, verticals, yagis, quads and other antennas and determine their SWR, resonant frequency and bandwidth. You can test and tune stubs and coax lines. The SWR analyzer is fully portable, but it does require ten AA batteries or 110 VAC adapter (not included).

The MFJ-269 is \$359.95; for more information or to order contact MFJ Enterprises, P.O. Box 494, Mississippi State, MS 39762. 1-800-647-1800 in U.S. or (662) 323-5869 elsewhere.

Police Call 2001

The year 2001 edition of *Police Call* ("The scanner users bible") is now available, and it's the largest edition ever with over 500,000 frequency listings. The nine regional volumes have been condensed into seven volumes, and each volume contains an expanded bonus section.

In addition to emergency agency listings, *Police Call* contains frequencies for 18 additional categories of mobile radio users, including aircraft, federal government, public utilities, transportation, sports, entertainment and more. Bonus features in the Beyond Police Call section include trunked system talkgroup IDs, consolidated frequency list, listener's guide, radio codes and signals, FCC allocation tables, maps and a glossary of radio slang.

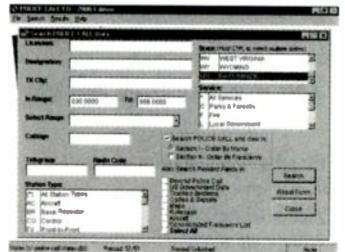
As narrower bandwidths are put into effect, new split frequencies are being licensed, which do appear in the body of the book. However, it is disappointing that these new splits have yet to show up in *Police Call's* exclusive and otherwise very useful consolidated frequency list.

Police Call, published by Gene Hughes, Hollins Radio

Data, is \$14.99 per volume at Radio Shack and other dealers, including Grove Enterprises (800-438-8155)

Police Call on CD

If you travel between a number of states, or if you're interested in identifying distant skip reception, purchasing the CD of the entire *Police Call* database will be more cost-effective than buying multiple volumes. This second edition of the *Police Call CD* includes a number of suggested improvements from users, and is designed by a team that included experts in both CD-ROMs and scanners.



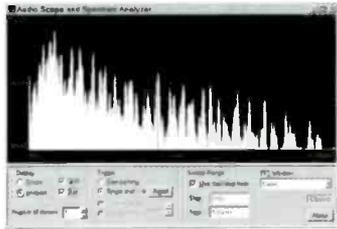
The CD contains all the same features as the books, with the added benefit of "microspeed" search across all volumes. An exclusive bonus not included in the books is a database of one thousand active shortwave broadcast and utility frequencies compiled for this CD by *Monitoring Times'* Assistant Editor and frequency guru, Larry Van Horn.

Police Call on CD-ROM is available for \$34.95 from Grove Enterprises (800-438-8155 or see <http://www.grove-ent.com>)

Two new WinRadio models

The WinRADIo WR-3500 receiver expands the computer-controlled 3000-series by extending the operating frequency (150 kHz to 1.5 GHz) up to 2.6 GHz. (The publicly available US version excludes cellular frequencies 825-849 and 869-894 MHz.) It

also offers an extra IF selectivity bandwidth (50 kHz for reception of weather satellites and military FM communications), and improved AGC control.



This is a high-end receiver, intended for government, military, security, surveillance, media monitoring and industrial applications. It is available in both internal (i) and external (e) models. The WinRADiO WR-3500e hardware/software package consists of the receiver unit, Windows-based software, RS-232 cable, multi-voltage power adaptor, start-up antenna and a user's manual.

The WinRADiO WR-3500i package consists of the receiver card, Windows-based software, a start-up antenna and a user's manual. The ISA card plugs into the motherboard of an IBM-compatible PC. Up to eight independently operating receivers can be controlled by a single PC – an ideal solution for high-performance multi-channel automatic monitoring systems.

Location	Country	Call Sign	Mode	Comments	Priority
Alaska	USA	7A10	FM	141.420 MHz	1
Alaska	USA	7A11	FM	141.420 MHz	1
Alaska	USA	7A12	FM	141.420 MHz	1
Alaska	USA	7A13	FM	141.420 MHz	1
Alaska	USA	7A14	FM	141.420 MHz	1
Alaska	USA	7A15	FM	141.420 MHz	1
Alaska	USA	7A16	FM	141.420 MHz	1
Alaska	USA	7A17	FM	141.420 MHz	1
Alaska	USA	7A18	FM	141.420 MHz	1
Alaska	USA	7A19	FM	141.420 MHz	1
Alaska	USA	7A20	FM	141.420 MHz	1

The external unit connects to an IBM PC compatible computer via a serial interface cable (PCMCIA interface adaptor is optional). At the rear of the unit, there are connectors for the antennas, serial control port, PCMCIA control port, external speaker, power and a data output interface (discriminator output).

Both models contain two antenna connectors (a BNC for frequencies up to 1.5 GHz and an SMA connector for frequencies above 1.5 GHz) and a jack for an external speaker or headphone.

Another new model, the WinRADiO WR-3700i/e receiver, is similar to the WR-3500, but fur-

Alinco DJ-X2T

It's more than just cute – it's elegant and packed with features. The cuteness comes from its size – about the size of a pack of playing cards and half as thick, and weighing only 3 oz. The elegance comes from the brushed-aluminum look of the durable plastic housing and surprisingly sophisticated features from a deceptively simple keypad.

The Alinco DJ-X2T is a multi-mode, wide-band receiver which covers FM, WFM and AM modulation modes from 0.522-999.995 MHz (824-849.995, 869-894.995 MHz blocked in the U.S. "T" version). There is no direct-entry keypad: frequencies are chosen by using up-down arrows or by scanning in one of four methods. 700 memory channels are organized in 10 banks. To pick up the chosen frequency, you select between three antennas: the SMA antenna attached to the DJ-X2, the earphone cord which serves as an antenna, or the internal bar antenna for mediumwave broadcasts (530-1710 kHz in U.S.)

A rather exotic feature is a mode in which the Alinco functions as "bug detector" using preprogrammed frequencies – capitalizing, perhaps, on the "spy-sized" feel of this receiver. Units sold outside the U.S. also possess a voice descrambler. The Alinco is able to clone a second receiver by connecting through the earphone plug.

Power is supplied by a rechargeable lithium-ion battery (included), or by AC adapter, or three AA batteries. The unit comes with manual, earphone, battery pack, charger and power supply. The Alinco DJ-X2 is \$299.95 from Grove Enterprises (800-438-8155 or PO Box 98, Brasstown, NC 28902) Watch for MT's review coming soon.



Swagur

ENTERPRISES

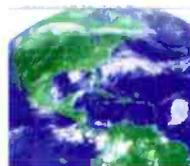


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U.S. GOES/WEFAX IMAGE



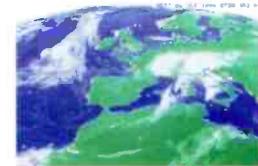
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ther extends coverage to 4.0 GHz.

The features and flexibility built into these radios comes at a price – \$2495 for the 3500 series and \$2995 for the 3700. To learn about additional features, visit <http://www.winradio.com> or contact Grove Enterprises, dealer and only authorized service center for WiNRADiO in the US and Canada. (1-800-438-8155, www.grove-ent.com or write PO Box 98, Brasstown, NC 28902)

Weather Alert on the Go

If your portable radio doesn't have the National Weather Service stations programmed in, you may want to consider Midland Consumer Radio's new NOAA Weather/Hazard alert model 74-250. The bright yellow and black, water resistant, 2-3/8"W x 4"H x 1-1/4"D radio has a rubberized grip and a contour design that fits comfortably in the palm of the hand. It operates on two "AA" batteries and is ready to go with you anywhere.

So that you don't pick up every severe weather warning within a 100-mile radius, the 74-250 can be programmed with Specific Area Message Encoding



(SAME) for 1 to 9 counties. The backlit display reports up to 56 specific types of alerts. It also contains a Fahrenheit and Celsius thermometer which can sound an alert when the temperature drops below freezing, reminding you to take extra precautions when camping or driving. Last but not least, it contains a built-in clock with two alarms, date display, and snooze!

The 74-250 retails for \$69.95 and should be available at your favorite dealer. Contact Midland at <http://www.midlandradio.com> or call 1-816-241-5713 for more information.

Kenwood Communications Moves to Atlanta

Major 2-way radio manufacturer, Kenwood Communications Corp, is moving its headquarters from Long Beach, California, to new offices in the Technology Park in Suwanee, an Atlanta suburb.



"Atlanta has a talented technical work force, proximity to major customers and prospects, a superb transportation hub and an affordable housing market," said Tom Wineland, company president. About 30 staff members will be located at the Atlanta headquarters,



while distribution, order administration, and technical service will remain on the west coast.

Kenwood ranks second to Motorola in fixed, mobile and portable 2-way radios; it makes trunked radio systems, family radio service radios, and is the worldwide market leader in ham radio systems. For more info, visit their web site at <http://www.kenwood.net>

Upgrading the AR8200

The wide coverage AR8200 Mark II brings these additional features to the already-impressive AR8200 it replaces:

Improved operation:

- The temperature-compensated crystal oscillator makes the new model more stable at the upper UHF frequencies for better, no-drift reception.

Functional improvements:

- The keyboard is more brilliantly lighted;
- The battery compartment is easier to switch batteries;
- The rubber duckie antenna has been replaced by a telescopic whip for custom adjustment over wide frequency ranges;
- The "0" on the keypad is repositioned to the conventional telephone-keypad position;
- The squelch level control of the S-meter has been made more conventional for VHF/UHF signals;
- The case is now black instead of green.

AOR is also working on a high-performance, low-cost desktop/mobile receiver based on the top-of-the-line AR8200 MKII handheld scanner. With continuous 500 kHz-2040 MHz (less cellular) frequency coverage, all mode (WFM/NFM/SFM/WAM/AM/NAM/USB/LSB/CW) detection, and 1000 memory channels (twenty 50-channel banks), the powerful, new



AR8600 can interface with your PC, display the spectrum, and scan or search at 37 channels per second. Five sockets receive optional function cards for extended performance. Operates directly from 12 VDC for mobile/portable applications, or from an AC adaptor. The AR8600 is expected to be available in November. Call Grove Enterprises for pricing and availability (800-438-8155) or visit Grove's new "Radio Rumors" page (see following).

Web Sites Worth Noting:

<http://grove-ent.com/radiorumors.com>
- What new equipment is expected and when? (via Grove Enterprise's)

<http://www.lightningstorm.com/lightningstorm/index.htm>

- near real time map showing lightning strikes (via Todd Dokey)

<http://www.worldtime.org>

- shows real time global map showing daylight, darkness, and twilight at YOUR location (via Bob Padula)

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to mtditor@grove-ent.com.

VT REVIEW

Grove FTR-100 Tunable Notch Filter

By Bob Grove

Notch filters are singularly useful for reducing or eliminating a specific, narrow band of frequencies; they can be designed for audio or radio frequency applications. Most often they are built into receivers to reduce annoying tones, but they can also be effectively designed to reduce radio frequency interference (RFI) with its resultant images and intermodulation products ("intermod").

Nearly 20 years ago, Grove Enterprises introduced their "Scanner Filter," a tunable RF notch filter for the VHF, roughly 76-174 MHz. By notching out aircraft frequencies in the 108-137 MHz range, aircraft images would not cause interference to public safety reception 21.6 or 21.7 MHz higher.

Although newer model scanners with their triple-conversion designs have substantially reduced images as heard on the old double-conversion radios, strong-signal overload, especially from high-power pagers in the 152 and 158 MHz range, continue to plague scanner listeners.

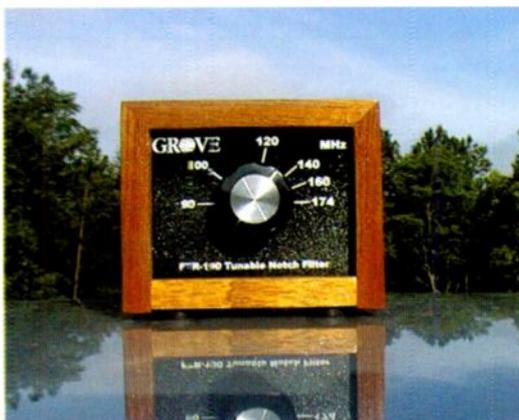
Notch filters are not just for scanners; they are also well suited to wideband receivers and two-way transceivers. They can be used in home or business installations and at repeater sites where nearby transmitters produce intermod and desensitization ("desense").

While professional notch filters like the PAR units are very effective for attenuating these strong signals and are durably constructed, they are factory set for specific frequencies, and thus not user-tunable. The new Grove filter, while not quite as sharp in its attenuation, is fully tunable from 90-174 MHz, allowing the user to experiment with the best settings for his requirements.

So how does it work?

The FTR-100 is a small (3-in.W x 2-1/2-in.H x 2-in.D) wood-encased device with a 1/8-inch-thick aluminum box-channel chassis. Rubber feet prevent scratching the support surface elected to hold the unit. A one-inch tuning knob selects rough frequency calibrations between 90 and 174 MHz.

A rear-panel BNC connector is provided to attach a BNC interconnect cable and a BNC "T" adaptor (both provided) to the radio's antenna connector. Well built for consumer applications, the FTR-100 can be used for either indoor or in-vehicle installations.



Internally, a heavy-gauge coil and stellite-insulated air-variable capacitor can withstand the power levels when used with 100 watt transceivers.

The "Q" or selectivity of the device is sharpest at the high end; sharp notches as deep as 35 dB were readily noted on a spectrum analyzer from roughly 120-174 MHz; below that, in the FM broadcast band, notches were 15-20 dB and were broader.

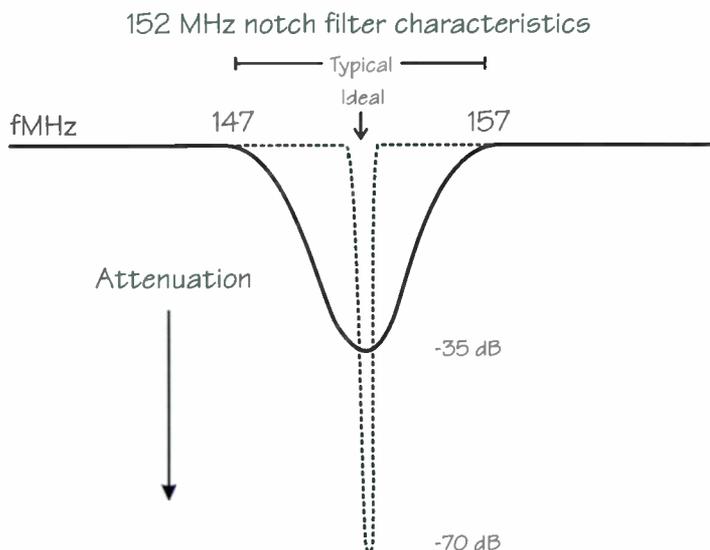
An ICOM R-8500 confirmed the FTR-100's dramatic attenuation of signals as it was adjusted through its range; troublesome local signals were reduced considerably as reflected by the receiver's S-meter.

As with any simple L/C (inductance/capacitance) circuit, however, adjacent frequencies are attenuated right along with the mischievous interference. The spectrum analyzer revealed that signals within 5 MHz above and below the center frequency are attenuated by 6 dB or more. In most cases this is tolerable in strong signal environments, especially when reduction of an interfering signal is at stake.

Insertion loss (distributive losses due to construction, not the intentional tuned circuit) was insignificant up to about 470 MHz (1-2 dB), increasing to 3-4 dB at 900 MHz. In strong-signal environments this is acceptable; under very-weak-signal conditions at 900 MHz, it may be perceptible.

The Bottom Line

The Grove FTR-100 tunable notch filter will prove useful to scanner enthusiasts, hams, and two-way radio users where nearby VHF radio emissions are causing interference to desired signals. The FTR-100 may be ordered for \$49.95 plus \$5.95 shipping from Grove Enterprises (PO Box 98, Brasstown, NC 28902; 800-438-8155 or order@grove-ent.com).



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Keaau, Hawaii

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- Don Nauer

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Is Radio Recovering?

No question about it, the '70s through the early '90s were the heydays of radio reception. But by the mid '90s a number of things were happening to affect the allure of the hobby.

Increasingly restrictive listening laws were legislated against the scanner hobby; news reports characterized listeners as eavesdroppers and "techno creeps"; short-wave propagation conditions were on the downswing again; amateur radio ranks were thinning from natural attrition, infighting among their leadership, obsolete Morse code requirements, abusive language on the airwaves, and virtual absence of public relations; and the Internet was the new kid on the technology block.

Gloom and doom seemed to pervade the entire radio hobby, with dire predictions for radio's extinction within the foreseeable future. *Monitoring Times* took a slightly more conservative approach, forecasting a continued decline, but not the demise of the radio hobby.

Meanwhile, time-honored vendors and fly-by-nighters alike gradually disappeared from the marketplace, their ever-narrowing profit margins no longer providing subsistence. New product introductions became stagnated and attendance and sales at the revered Dayton Hamvention saw annual declines. Clubs disbanded as their membership bases eroded. Radio magazines ceased publication as their subscriptions dwindled while printing and postage costs escalated. Advertisers became harder to find, and pages thinned in the publications that survived.

However, the blood bath seems to have abated, with some stability reappearing. Bold new products with leading-edge tech-

nology are reappearing, resulting in reports of sales increases. Congress has discovered new whipping boys to occupy their time and has let up on the radio hobby.

And some more good signs are becoming apparent. We are hearing from many former hobbyists who abandoned the hobby to explore the Internet and are now coming back to radio. Most surprisingly, we are meeting more newcomers who are discovering radio from the Internet! To both groups, your appearance – or reappearance – is most welcome!

An interesting historical parallel may be drawn which can only strengthen the hobby. During the '70s and '80s there was an artificial caste distinction among shortwave listeners (SWLs), scanner enthusiasts, computer devotees, and hams. *MT* was the first comprehensive hobby radio magazine on the market, and we believe we helped dissolve these class stereotypes by offering integrated coverage and equal respect.

And now the Internet, in turn, is offering worldwide broadcasting, hobby radio sites, and on-line magazines for the radio aficionado. Computers are being used extensively in all aspects of our hobby, and the Internet provides an endless source of frequency lists and other useful, timely information.

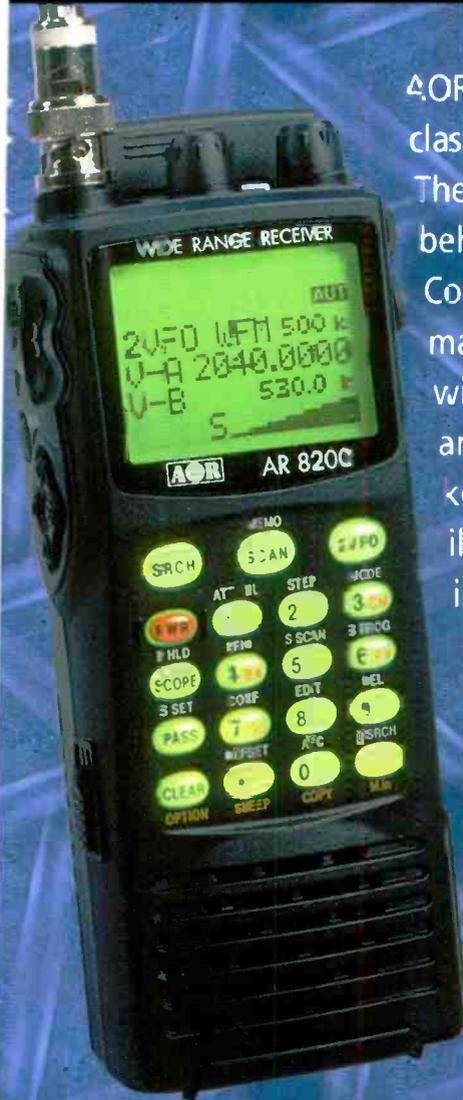
It may be safe to say that what we perceived as a threat has, in fact, rescued the radio hobby. The pervasiveness of the Internet and the computer may have welded the many facets of radio solidly into the fabric of our future. Our numbers may never be large nor will radio technology ever stop evolving to suit all of us. But the radio hobby as a pleasurable pastime seems here to stay, and perhaps it's time to make plans for its permanence.

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