June 1988 Volume 7, Number 6

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MONITORING TIMES

A Publication Of Grove Enterprises

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Eavesdrop on the 'House of the Mouse'

Vacation Scanning in Orlando

Meet Igor Sannikov, Soviet DXer

(An MT Exclusive)

Homebrew Radio In Guatemala

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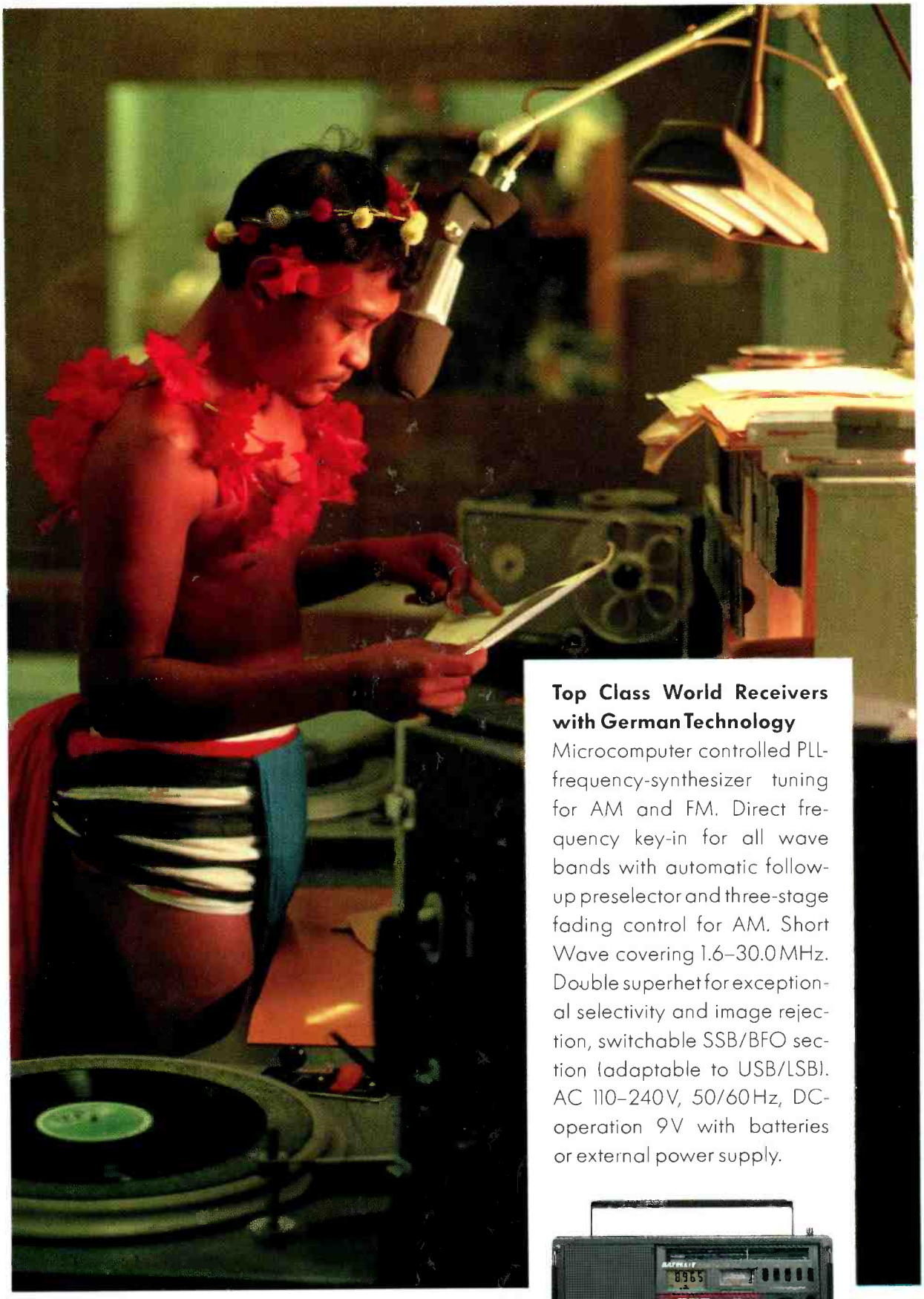
SATELLIT 650 INTERNATIONAL – THE EAR TO THE WORLD



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DEPARTMENTS

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ON THE COVER: Radio helps maintain the illusion at Disneyworld's Fantasyland (photo by Harry Baughn). Insets: A ruined Mayan pyramid at Tikal in northern Guatemala (photo by Don Moore); Soviet DXer Igor Sannikov reports first-hand from Russia.

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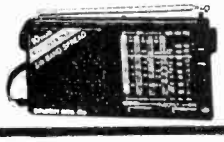

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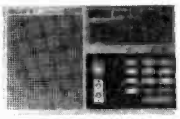

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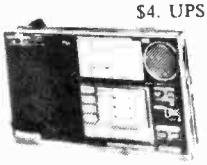

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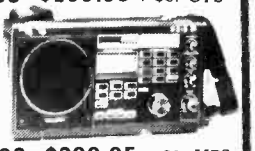

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LETTERS

The Programming Debate

No matter how bad the programs are on shortwave, they're still better than what's on TV. So stop whining!

Ken Matthews
Reading, Pennsylvania

Your comments on shortwave programming were thought-provoking. They remind me of the development of public television in the United States. Originally, PBS programming was something akin to a bad high school lecture. It embraced the idea that in order to be "educational," it had to be dry.

And then somebody got the bright idea that public television could attract more listeners (and more dollars at pledge time) by being entertaining, too. Today, PBS remains educational but you'll also see everything from rock concerts to re-runs of old commercial TV shows. And in some cases, PBS's ratings are quite competitive with the networks. That's a realistic course of action that shortwave broadcasters hoping to catch even the tiniest segment of the North American market should consider following.

Martin Price
Oklahoma City, Oklahoma

I started reading your magazine five years ago, back in 1983, when it was the *Program Guide*. I enjoyed your no-holds-barred commentary on shortwave broadcasting. You said what needed to be said and to hell with what anyone thought. It was refreshing and, best of all, you happened to hit the nail on the head every time! It was just what this tired, old hobby needed: a healthy does of truth.

That's why I was glad to see you picking up the old *jihad* again in response to Harrel Kline's comments on shortwave programming [Letters, May 1988]. Tell it like it is! Anyone who says that the bulk of programming on shortwave *isn't* dull probably *is* dull.

Alex Kalder
Los Angeles, California

Some months ago I read with interest the news that yet another U.S. commercial shortwave station was planning to come on the air with American contemporary (i.e. "rock") music. Anyone who has traveled abroad or who knows anything about worldwide musical tastes knows what a big mistake this is. The form of American music which is craved most around the world, especially in Europe and Japan, is traditional and mainstream jazz.

If anyone needs proof of this, witness the enormous popularity that Willis Connover has enjoyed worldwide with his jazz programs. Some of the most popular jazz festivals in the world are held in Europe each year, notably Montreaux [in France] and the North Sea Jazz Festival [in Holland]. If these new shortwave broadcasters hope to be successful commercially, I feel that they need to take serious consideration of this and adjust their musical formats appropriately.

Larry Weil
Acton, Massachusetts

Your comments, while certainly meritorious, are based on a fatally flawed assumption: that U.S. commercial shortwave stations actually want to reach a foreign market. Ever notice that many of the non-religious ones have as their "official" target our northern neighbor, Canada? That's because it's the easiest way to satisfy the legal requirement that American shortwave stations broadcast to a foreign audience and at the same time put their signal across the greatest amount of U.S. territory. The U.S. market: that's who they're aiming for. These are commercial stations and they well know that they won't sell many goods by beaming advertisements into Peru. -- ed.

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I have always had high praise for *Monitoring Times* but your new, revised format is deluxe. I look forward every month to the number one shortwave magazine.

H.E. Brown
Mt. Pleasant, Iowa

Monitoring Times looks really fine... Keep up the great work and best wishes for many years of continued success.

Ed Janusz
SPEEDX
DX Montage Editor
Bricktown, New Jersey

Always of Interest...

I find your publication not only entertaining but continually useful as well. It contains information one can really use, such as the modification instructions for the PRO-2004 and the ICF-7000. Since both those radios are in our inventory, we had immediate application for this information. Each issue never fails to provide something of interest to me and I always look forward to its arrival.

Dick Dillman
Greenpeace Radio

But Not Always Fair.

A publication dealing with as many different peoples as does a shortwave publication should be more culturally aware, even if its writers are not. I am speaking about Robert Rian's "Mozambique: DXing a Troubled Land" [April, 1988]. Maybe my assumptions are wrong. Is it possible that Mozambique was uninhabited until the arrival of the Portuguese [as the writer implies in column 1, paragraph 5]? No, the non-European world did not wait until the arrival of Europeans to be inhabited. Or do indigenous people not count as people?

That issue was, I believe, settled by the Spanish when they decided that Indians (I use the all-encompassing term for lack of a better one although Indians are really many very divergent groups) did indeed possess souls and were therefore worthy of conversion to the white man's religion.

So please -- no further references to the discovery of already-inhabited areas by Europeans.

Michal Anne Moskow
Wallingford, Connecticut

[More "Letters" on page 92]

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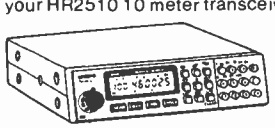

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Bookstore Closes

Imprime, the mail-order book store specializing in communications titles, has closed. The business, which advertised heavily in a number of radio-related publications, left the business due to the poor health of the owner. "We deeply appreciated the support shown us by the radio hobby community," said a spokesman for the business, "and we enjoyed having the opportunity to be of service." All checks sent to the business' address in Pennsylvania have been returned to the senders and orders are no longer being taken on the toll-free number.

Regency Purchase Boosts Uniden Scanner Share

The decision by Regency Electronics to sell its consumer electronics division to Uniden will, according to *Autosound and Communications* magazine, give Uniden a commanding 65 percent share of the scanner market. That 65 percent translates into an estimated $85 million wholesale.

Regency's share of the scanner market is estimated at 15 to 20 percent, but last year the company made virtually no profits on $75 million in sales.

Along with Regency's share of the market, Uniden gains access to patented technology that it can now use in its own scanner line. These include TurboScan, which permits channel scanning at a rate of 70 to 80 channels per second, and the Informant technology, which permits scanner owners to program their radios by state and service.

Production of Uniden equipment has already been shifted out of Taiwan and into the Philippines with some subassembly work being completed in mainland China. The first new Uniden-produced scanner models carrying the Regency logo will be introduced by the end of this year.

VOA Prayer Rug May be Pulled

It may only be a 4-by-7-foot spot at the Voice of America, but to the people who broadcast in the Hausa language of Africa, it is important because they are Moslems. And as Moslems, it is essential that they conform to the religion's demands for daily prayer. This small, partitioned space on the first floor of the VOA meets their needs. The problem is, however, that the VOA is a government program housed on government property and to some people, having the small prayer room places the government in the position of "promoting" religion.

"We don't want to be insensitive," says Dr. Robert L. Maddox, executive director of Americans United for Separation of Church and State, "but we're always concerned when the government begins to provide chaplains and prayer rooms.

AM Band Expansion Meeting

The second session of the International Telecommunications Union (ITU) Regional Administrative Radio Conference continues this month in Rio de Janeiro. The session, headed by FCC Commissioner Patricia Diaz Dennis, will be used to plan the use of the 10-channel (100 kHz) expansion of the AM broadcast band. The AM band currently ends at 1605 kHz. The new plan will allow the US additional space for full-time commercial and public service broadcast stations, such as Traveler Information Services. (*ARRL Letter*)

Hijackers Now Using SW?

Investigators reviewing hijacking of a Kuwaiti airliner in April have marveled at the professionalism of the hijackers. According to *Christian Science Monitor* reporter Jim Muir, the commandos were an extremely well-organized, well-trained and highly educated team of specialists. At least one of them was apparently quite versed in radio communications and that was, say investigators, one of the things that made the hijacking so effective. The hijackers apparently had some kind of communications link with their leaders outside of the plane, probably in Beirut.

Several times, when the negotiators went to the plane to inform the commandos of some development, they found that they were already aware of it, although it was not publicly known. Said one of the negotiators, "Some of them were even monitoring and analyzing all the press and radio stations and they frequently quoted back media reports to us. It was as if they had a real operations room going on in there."

Radio for Mountain Climbers

An electronic signal system designed to find lost climbers was unveiled recently in Timberline, Oregon. The system, called the Mount Hood Locator Unit, consists of a small, 8-ounce transmitter that is worn on a harness over the climber's torso. When the climber is lost, he or she pulls a cord to activate a continuous beep over a VHF radio frequency. Rescue teams then tune in the signal to locate the climber.

The signal is audible over a 200 mile radius and can be picked up under 6 feet of snow and as deep as 75 feet in an open crevasse. Although similar devices have been used to track wildlife, it was not developed for human use because manufacturers feared possible liability should one of the devices fail.

One-Man Radio Station Goes Under

After 24 years as the disc jockey, technician and owner of WVCA-FM in Gloucester, Massachusetts, Simon Geller is hanging up the headphones. Geller sold the station, located in his cluttered, two-room apartment, to Boston businessman Doug Tanger for a reported $1 million.

"I'm 68 years old, and I don't know how much longer I'll live, so I want to get things straightened out in case I drop dead next week," said Geller. Indeed, Geller's health was deteriorating. Once, while on the air, the classical music DJ fell in his apartment-studio and was unable to get up again. Friends and listeners were alerted to the dilemma when a tape unwound on the air for five hours.

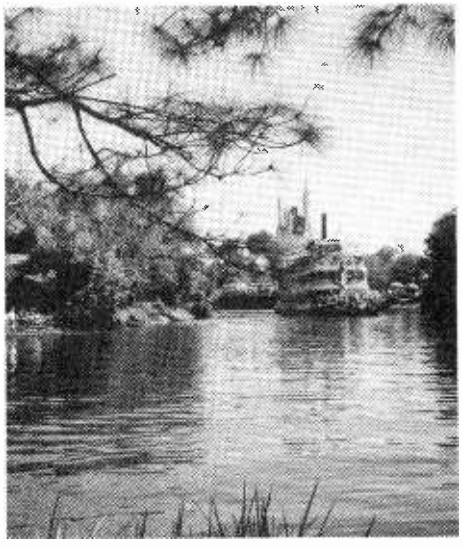
Geller gained national attention for his 11-year battle with the FCC and a powerful group of New England station owners who wanted to take over the station's license -- a battle he eventually won. When asked about his decision to sell after mounting so successful a fight, Geller says, "I've had 46 years in this miserable business and it's time to get out."

Eavesdrop on the "House of the Mouse"

Vacation Scanning in Orlando

by John F. Combs

In 1928, a dejected young animator considered leaving the cartoon business. He had lost the rights to his main character, Oswald the Lucky Rabbit, and was struggling to come up with another on which to base a series. One day, his main artist showed him some sketches of a comical little rodent. The young animator bestowed on him the name "Mortimer Mouse."



The name did not stick, but that little mouse (re-christened "Mickey") became, in a few short years, the world's most beloved cartoon character. Little did young Walt Disney know that Mickey would be the catalyst for a vast empire that would still be alive sixty years later. And he had not even begun to dream of the theme park carved out of the central Florida countryside -- the attraction that was destined to become the country's number one tourist destination!

Tourist Mecca

Contrary to popular belief, Walt Disney World is not "in" Orlando. It is situated about forty minutes to the southwest on the Orange-Osceola county line. The Disney domain comprises the original theme park (the Magic Kingdom), EPCOT center, a shopping village, many first-class motels, and two incorporated cities: Bay Lake and Lake Buena Vista. (Needless to say, the majority of the population of these cities is transient; i.e. tourists!)

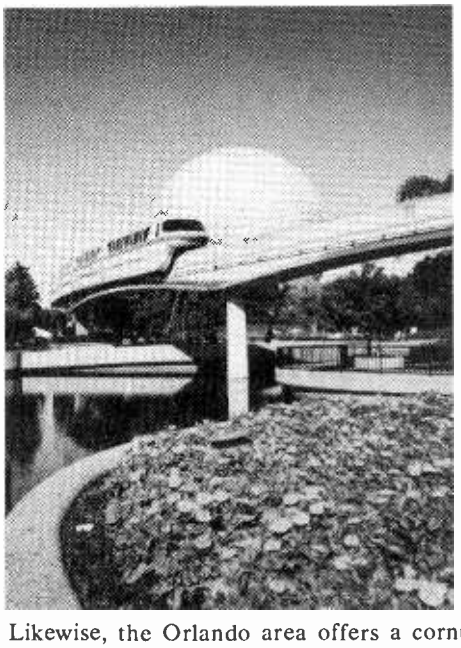
Walt Disney World is more than just an attraction or amusement park. If you and your family are making Walt Disney World your destination this summer, be sure to pack that scanner! Radio is used extensively for transportation, security, and operations. Table 1 will give you a lot of frequencies that will let you hear what's happening behind the scenes (or under them, since most unseen operations take place in a labyrinth-like network of underground tunnels!).

Many rumors have circulated through the listening hobby about Disney's policy concerning the use of hand-held scanners in the theme parks. Some have even contended that amateur "handi-talkies" are banned, which would be a strange policy since there are amateur repeaters on Disney property! To set the record straight, a spokesman for Disney's security office told me that both hand-held scanners and amateur transceivers are allowed in the parks, as long as they don't cause interference to their own radio operations. He admitted that "there's really nothing we can do if people want to listen to our transmissions," but gave the distinct impression that they weren't crazy about the idea. Maybe they're worried that someone will dig up some poop on Mickey, Donald, or Goofy that will wind up in the *National Enquirer*!

Nevertheless, you may still have reason to feel uncomfortable about carrying in your scanner. Thieves prey on tourists at attractions like Walt Disney World, so keep your eye on that scanner at all times! Even chaining it to your belt would be a wise idea. If the prospect still worries you, there are a multitude of nearby motels where you should still be able to hear the action while soaking your feet at day's end!

There's More Than Disney!

While visiting Mickey's playground, don't neglect the other Orlando-area attractions! Sea World, Gatorland, the new Boardwalk, Baseball and others have their own special charms. And don't forget the city of Orlando itself, with its multitude of pristine lakes and abundance of parks. Visit the revitalized downtown, where top-draw entertainers head the bill at the Bob Carr Auditorium, and where the Orlando Magic expansion team will begin NBA action next year! You can tour the Naval Training Center or historical Rollins College, watch the horses trot at Ben White Raceway, or commune with nature at lovely Leu Gardens.



Likewise, the Orlando area offers a cornucopia of action to the scanner enthusiast! Table 2 is an extensive list of what can be heard on your scanner in the three counties that comprise the Orlando metropolitan area.

Don't Take a Vacation...

. . . from monitoring, that is! Make sure the checklist for your central Florida vacation includes not only suntan lotion, maps, and games for the kids, but your scanner as well.

■

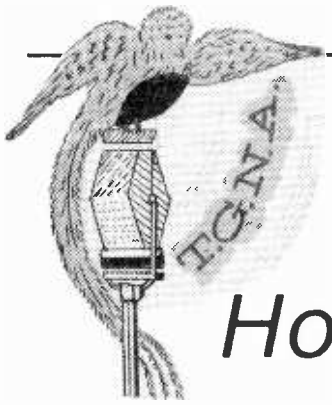
Table 1
Walt Disney World

147.3	WA4ABQ Repeater
151.625	Construction
151.655	Construction
151.655	Travelodge Hotel
151.865	Royal Plaza Hotel
151.895	20,000 Leagues
154.43	Fire Intercity
154.625	Hilton Hotel (Paging)
157.74	Paging
158.46	Buena Vista Palace (Paging)
442.0	WA4ABQ Repeater
453.475	Reedy Creek Improvement
453.825	Fire Mutual Aid
453.875	Fire F1
453.925	Fire F2
461.3	—
461.6	Fort Wilderness
461.7	Construction
461.875	Grosh Studios
461.9	Double Decker Lines
461.9	Hilton Hotel (South)
462.475	Utilities
462.55	Operations F1 (Paging)
462.575	Operations F2 (Monorails)
462.625	Operations F3 (Transportation)
462.65	Maintenance F1
462.675	Maintenance F2
462.775	Paging
462.85	Paging
463.575	Ramada Inn
463.75	—
463.975	Entertainment
464.1	Cypress Walk
464.125	Security F2
464.375	Cypress Walk
464.4	Security F1
464.425	Buena Vista Palace
464.525	Hilton Hotel
464.625	Utilities
464.8	Transportation

Table 2:
Selected Orlando Area Frequencies

118.7	Orlando Exec Tower
118.7	Orlando Exec Ctaf
119.4	Orlando Int'l App/Departure
120.15	Orlando Int'l App/Departure
120.15	Orlando Exec App/Departure
120.65	Orlando Int'l Flight Plan
121.1	Orlando Int'l App/Departure
121.25	Orlando Int'l Atis
121.7	Orlando Exec Ground Cntrl/ Clearance
121.8	Orlando Int'l Ground Control
122.1	Orlando Exec Flight Service
122.2	Orlando Exec Flight Service
122.65	Orlando Exec Flight Service
122.95	Orlando Exec Unicom
122.95	Orlando Int'l Unicom
123.65	Orlando Exec Flight Service
124.3	Orlando Int'l Tower
124.8	Orlando Int'l App/Departure
124.8	Orlando Exec App/Departure
125.55	Orlando Int'l App/Departure
127.25	Orlando Exec Atis
127.75	Orlando Int'l App/Departure
134.7	Orlando Int'l Clearance
143.9	CAP
143.99	MARS
145.11	WO4P Repeater
145.35	AI4U Repeater
146.64	WB4TCW Repeater
146.7	W4OHL Repeater
146.73	WB4CGW Repeater
146.76	KD4JL Repeater
146.79	W4SIE Repeater
146.82	W4JTK Repeater
146.925	N4KIC Repeater
146.955	KD4QZ Repeater
147.015	KA4WMZ Repeater
147.09	N4GG Repeater
147.12	KC4CB Repeater
147.225	W4PI Repeater
147.285	WD4NVJ Repeater
147.345	WA4LUM Repeater
147.39	W4STR Repeater
148.15	CAP
149.075	Orlando NTC Security
149.375	Orlando NTC Security
150.075	Orlando NTC Fire
151.415	Fish and Game
151.805	Sea World
151.865	Yogi Bear's Campground
153.77	Orange Co Fire F1
153.95	Orange Co Fire F2
154.01	Orange Co Fire F3
154.07	Apopka Fire
154.145	Kissimmee Fire
154.175	Kissimmee Fire
154.19	Orlavista Fire
154.205	Fire Mutual Aid
154.235	Seminole Co Fire
154.25	Pine Hills Fire
154.31	Sanford Fire
154.325	Ocoee Fire
154.37	Osceola Co Fire F1
154.37	Orange Co Fire F4
154.385	Winter Park Fire
154.415	Kissimmee Fire
154.415	Altamonte Springs Fire
154.43	Fire Mutual Aid
154.43	Orange Co Fire F5
154.43	Osceola Co Fire F2
154.445	St Cloud Fire
154.6	Sea World
154.665	FL Highway Patrol (Orlando North)
154.68	FL Highway Patrol (Orlando South)
154.695	FL Highway Patrol (Kissimmee)
154.755	Kissimmee Police
154.77	Longwood Police
154.77	Altamonte Springs Police
154.8	Seminole Co Sheriff F1
154.875	St Cloud Police
154.92	FL Highway Patrol (Airplanes)
154.95	Seminole Co Sheriff
154.95	Ocoee Police
155.01	Apopka Police
155.13	Seminole Co Sheriff
155.25	Altamonte Springs Police
155.37	Statewide Intersystem
155.91	Winter Garden Police
158.865	Altamonte Springs Police
160.14	Fish and Game
161.64	WHOO-AM
161.67	WKIS-AM
161.73	WBJW-FM
161.76	WDBO-AM
162.475	Orlando NWS (KIH63)
162.825	US Marshals
163.2	US Marshals
163.4125	Army Corp of Engineers
163.625	Border Patrol
163.835	FBI
163.9125	FBI
163.9875	FBI
165.2375	Customs
165.2875	DEA
173.325	Orlando Sentinel
35.96	Wrestling
408.825	FAA
418.55	DEA
442.925	N4EAV Repeater
443.1	WD4IXD Repeater
443.2	KC4CT Repeater
443.275	N4IPX Repeater
443.325	AA4NA Repeater
443.375	WA2KWO Repeater
443.45	WB4HZQ Repeater
443.475	AA4MM Repeater
443.7	KD4JL Repeater
444.025	KC4CI Repeater
444.275	WY4A Repeater
444.85	KC4CB Repeater
449.5	WB4FSV Repeater
450.0875	WESH-TV F1
450.1875	WESH-TV F2
450.55	WDBO-AM
450.5875	Metro Traffic
450.65	WWKA-FM/WCPX-TV
450.75	WDBO-AM/WFTV-TV
453.0	Orlando Sentinel
453.05	Orlando Fire F1 (Dispatch)
453.1	Orlando Int'l Airport Police F2
453.15	Orlando Fire F2 (Fireground)
453.25	Orlando Fire F3 (Administration)
453.3	Orlando Int'l Airport Police F1
453.35	Orlando Fire F4 (Fireground)
453.375	Winter Park Police
453.55	Maitland Police
453.575	FL Turnpike F1 (Dispatch)
453.625	FL Turnpike F2 (Dispatch)
453.675	FL Turnpike F3 (Maintenance)
453.725	FL Turnpike F4 (Maintenance)
453.775	Orlando Int'l Airport Security
453.8	Casselberry Police
453.85	Orlando INt'l Airport Police F3
455.2125	WCPX-TV
455.65	WFTV-TV
46.6	Army Reserve
460.025	Orange Co Sheriff F1 (Administration)
460.05	Orlando Police F1 (Information)
460.075	Orlando Police F6 (Car-to-car)
460.1	Orlando Police F2 (West)
460.125	Orange Co Sheriff F2 (West)
460.175	Orange Co Sheriff (Car-to-car)
460.2	Osceola Co Sheriff
460.275	Orange Co Sheriff F4 (East)
460.325	Osceola Co Sheriff
460.375	Osceola Co Sheriff
460.4	Orlando Police F3 (East)
460.425	Orlando Police F5 (Tact)
460.475	Orange Co Sheriff F5 (Investigations)
460.5	Sanford Police
460.6	Orlando Int'l Airport Fire/Rescue
460.675	Ozark Airlines
460.7	Piedmont Airlines
460.725	United Airlines
460.75	Eastern Airlines
460.825	Delta Airlines
460.875	Republic Airlines
460.0	Sea World
462.175	Orlando Tour Lines
462.7	Orlando Int'l Airport Operations
463.325	Sea World
463.975	Orlando Transit
464.05	Comfort Inn Kissimmee
464.325	Sheraton Lakeside
464.375	Holiday Inn East
464.375	Holiday Inn Kissimmee
464.3875	Sea World
464.425	Colonial Plaza
464.425	Stars Hall of Fame
464.45	Colonial Plaza
464.575	Orlando Hyatt House
464.575	Page Airways
464.675	Hyatt Orlando Hotel
464.775	Sea World
464.825	Altamonte Mall
464.825	Sea World
464.975	Sea World
465.0	Sea World
47.14	DOT District 2
47.66	Orange Co School Board
53.45	N4HTU Repeater

Photos by Harry Baughn



TGN:

Homebrew Radio in Guatemala

by Don Moore

It's a rare day when visitors to most radio stations get to see the director welding the back door on, but at Guatemala's TGN, there's not much director Wayne Berger hasn't done. Maintaining the transmitters and studio equipment is just another of Berger's jobs. Anything that needs fixing ends up in his shop.

"Equipment is born, repaired, and meets its end here," laughs Wayne. "That doesn't mean we're not willing to own a nice, new piece of commercial equipment," he says, "it's just that it's cheaper to buy junk from the US and rebuild it." If anyone wants to make a donation, the station's biggest need is for a jeep for going up the mountain and a new FM transmitter.

The road up to the transmitter is so bad that the twenty mile trip takes six hours. And a jeep without shock absorbers doesn't make for a comfortable ride. Sometimes he has to go out at least once a week; sometimes once a day. TGN's big problem right now is the FM transmitter. Every time the power goes off, however briefly, Wayne has to go up the mountain to readjust it. "It keeps us jumping," he notes. And if that's not enough, after returning he has to weld the jeep's muffler back on!

Market day in Chichicastenango (above) and Antigua (right). Photos by the author.

A Lifetime of Electronics

Wayne Berger has a gift for electronics. Growing up just north of Baltimore, Maryland, he started out repairing radio and television sets in grade school. Later he spent time working for FM station WADC in Lancaster, Pennsylvania, during what he calls the "early days of FM." He spent a summer in Guatemala with TGN, then returned to the US to attend college in Georgia.

He earned his way through school by working as engineer for six small rural radio stations. Every morning he would wake up at 6 a.m. to drive around and take readings on the various transmitters. His classes started at 8 a.m., so he would do whatever repairs were needed after school. His degree was in theology. Electronics came from experience.

Transmitters Rebuilt

When Wayne went to work for TGN in 1967, the semi-commercial AM transmitter frequently broke down. The station was only on the air for eight to ten hours a day. To make matters worse, the transmitter would suddenly and unpredictably go off the air, forcing Wayne to once again fire up the jeep and put it back on. Sometimes, before he even got back to the city, the transmitter would shut off again. "You can't hold listeners that way," he adds.

Permission received from the government allowed the station to close two weeks for repairs. In just two days Wayne had completely stripped and rebuilt the transmitter using army surplus and other miscellaneous parts. "And it never gave me any more trouble," he says proudly.

Also using surplus parts, he built the shortwave transmitters from scratch. The 3300 kHz transmitter is a "homemade clunker" made out of the very worst parts, he says. Furthermore each transmitter was built in a metal clothes cabinet -- a cheaper option than commercial transmitter cabinets. When new tubes and other parts are bought, there is a pecking order determining which transmitter gets the best equipment. New parts go into the AM transmitter and those they replace are put into the 3300 kHz transmitter. From 3300 kHz, parts are passed down to the 5955 kHz transmitter, and finally to the backup AM transmitter.

The much maligned FM transmitter is, if nothing else, a collector's item. It is one of only five made in the 1950s by a small company in Lancaster, Pennsylvania. In 1968, the FCC said these were unstable, and had to be taken off the air. Deported, one ended up at TGN where it's "now more or less stable," according to Wayne.

Aside from the cost, which TGN simply cannot afford, Wayne says that commercial equipment doesn't take kindly to the frequent electric power outages or the intense use it gets at TGN. Computers, televisions, tape recorders, medical sterilizers, and heating equipment have all passed through the shop. On a typical afternoon an engineer from a local TV station may come by to test some parts while a Guatemalan missionary from Barillas pops in to say that their X-ray machine needs fixing.

One thing he hasn't fixed is the sign by the front door. Huge wooden letters "TGN" were mounted on the wall, lighted with a spotlight, until they were machine-gunned to

pieces five years ago. They "weren't out to get us. Our sign just happened to be a nice, lighted target," comments Wayne. During those troubled years it was no telling what soldiers driving around town in a jeep might do. Wayne plans to put up some back-lighted aluminum letters that he hopes will withstand bullets. "[I] don't want to put another target up," he says.

Popular Antenna Site

Although the antenna site is difficult to reach, it is an excellent location, possibly the best in the country. At 7,200 feet, it overlooks several major valleys. The FM signals can be received as far away as Puerto Barrios on the Caribbean coast, and even into Mexico, El Salvador and Honduras with an ERP of just eleven kilowatts. Once, while on top of the antenna installing a repeater, company workers talked to people all over the country just using a walkie-talkie. Therefore the tower is much in demand for repeaters. Several are mounted on it, including those of the local ham radio club, the Guatemala City fire department, and several commercial firms. Wayne guesses that the fee charged commercial firms is below market value. The ham club and fire department use the tower for free.

Although not the tallest, the antenna tower is the most massive in combined width and height in Guatemala. Constructed of heavy steel, it weighs nine tons, and is 330 feet high. "Shunt fed" and grounded, there is no RF in the tower itself. Thus it can be climbed even when the station is on the air.

Frequencies Not Chosen

As to frequency management, Wayne explains that the government "doesn't let us choose where we want to be in the band," but instead assigns frequencies. Officially the main shortwave frequency is 5955 kHz but its usefulness is limited "because Radio Canada knocks me out on 49 meters." TGN's ten kilowatts just can't compete with two hundred and fifty kilowatts, five kilohertz away.

He says that 31 meters is worse than 49. Their assigned 31 MB frequency is 9505 kHz, also used by Radio Japan. "No way I can fight them," laughs Wayne. Raising power is out of the question as Guatemalan law prohibits nongovernment stations from using more than 10 kilowatts. Wayne has thought about applying for a 60 meter band frequency, but that band is already overpopulated.

Because of interference on the higher bands, 3300 kHz is TGN's primary SW frequency. On 90 meters their ten kilowatts is a powerhouse, not a pipsqueak. How and why they ended up on 3300 kHz is probably one of the most bizarre cases of frequency selection in the history of shortwave. Actually they are not even licensed for 3300 kHz -- it is a substitute frequency added to their 49 meter license.

When they applied for the 90 meter band in the early 1970s, government officials didn't want to give it to them. However, at the time, the Guatemalan government was pushing its never-ending claim that Belize is really Guatemalan territory and was trying to make Belizeans believe they were Guatemalans. The Guatemalan "government wanted more programming from Guatemala to be heard in Belize," explains Wayne. TGN claimed they would be heard in Belize on 90 meters.

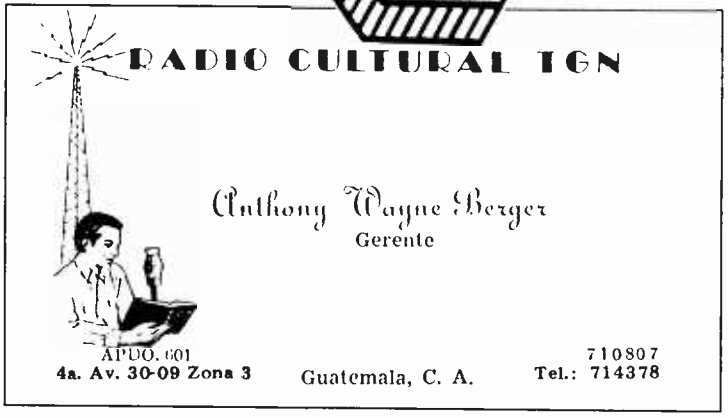
Although convinced that TGN couldn't do it, the government did assign them a 90 meter band frequency. The frequency was 3300 kHz, which just happened to be Radio Belize's shortwave frequency at the time. "For two years we battled it out and after a long enough time, they moved."

Programming Varies

TGN actually operates two different radio stations: the AM, which is always parallel to the shortwave, and the FM. Wayne says that there are are "two audiences and they don't like each other." The FM station attracts upper middle class listeners because its programming is the more neutral, that is, less religious, of the two. It plays a lot of classical music, for example. The programming on the AM station is predominately Christian Evangelist and includes more lower-middle to lower class audiences.

Located just inside TGN's front entrance, both stations have separate studios and control rooms. Additionally there are facilities for playing prerecorded programs because very little of the programming is done live. Most is recorded for later re-broadcast. Up to six hours of programming can be played without changing the tape.

Equipment is born, repaired and meets its end here



Some programs are re-broadcast several times over the years. TGN has what Wayne believes to be the largest record and tape library in Central America. The collection is mostly reel to reel tapes of programs made here in the past. Included are seasonal programs broadcast annually and others which are re-broadcast less often. A section for compact discs was recently added.

'Live' English Broadcasts

Shortwave listeners in North America are probably most interested in the English programs from TGN. Most of these are not produced locally, but rather are transcription programs from US ministries which pay the station to run them. Monday through Saturday, English is from 9:00-10:30 pm (0300-0430 UTC) and includes programs such as *Back to the Bible*, *Through the Bible*, and *Insight for Living*.

On Sunday some of the English programs are locally produced. Sunday's schedule is longer, from 6:45-10:00 pm (0045-0400 UTC). Aside from an airing of *Unshackled* and a few short features, most of Sunday's broadcast is a program called *Music in the Post Meridian*. Since Wayne is presently the only English announcer at the station, naturally the honors fall to him.

Music in the Post Meridian is designed to be a live program with soft music and responses to

listener's mail. But Wayne's schedule usually makes live programming impossible, so he set it up to be automated. He recorded a variety of generic announcements such as "Well, I hope you liked that song. Let's see what else we have here to play. Here's a favorite of mine," so that the non-English speaking technician can play an announcement after every two or three songs to give the impression of a live program. "I fool a lot of people that way," Wayne jokes.

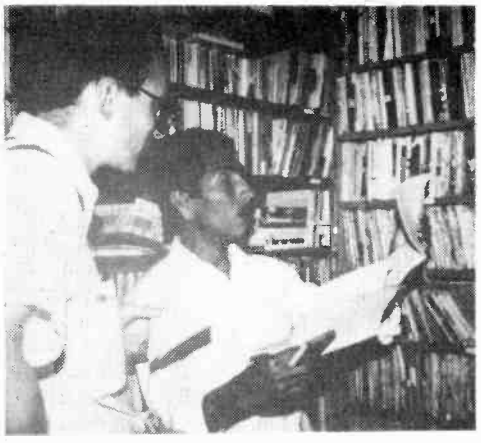
In addition to the English program, there are also daily broadcasts from 0430-0600 local time (1030-1200 UTC) in the four major Indian languages of Guatemala; Quiche, Mam, Cakchiquel, and Kekchi, with a different language each day. Broadcasting in native languages was begun a few years ago.

After the 1976 earthquake many rural people whose homes were destroyed moved to the capital. Immigration continued through the early 1980s as the guerilla war heated up in some parts of the country. Typical woven wall hangings made by listeners for the station's anniversaries demonstrate their appreciation.

Station Funding and a Valuable Wall

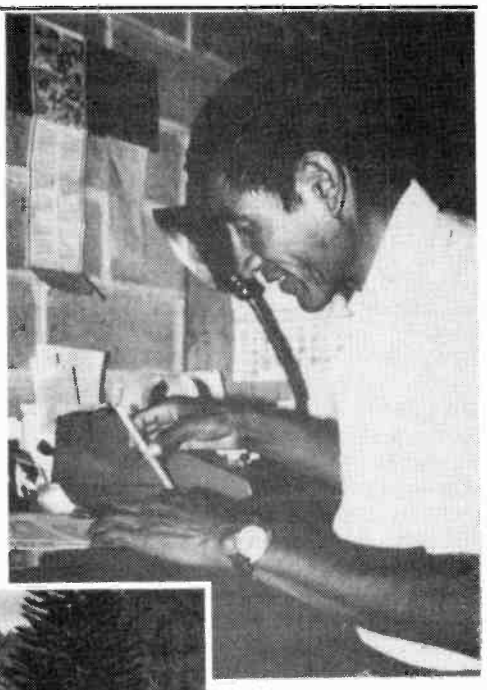
TGN is owned and operated by the Central American Mission of Dallas, Texas, also called CAM International. It is only a small part of CAM. The mission directory lists 285 couples working with CAM, but only two are assigned to TGN, notes Wayne. The station is funded from several sources. About 40 percent is raised locally from offerings and special collections while an additional 40 percent comes from CAM. The remaining 20 percent is raised by selling air time to American evangelists.

However, if money ever gets really tight at TGN, taking out a wall and selling it might solve the problem. In a second story conference room (called the Sala Atitlan) one entire wall is a beautiful colorful landscape painting done by a now famous artist. The painting of Lake Atitlan was the work of Guatemalan artist Deleon Campos, who started out working at TGN in the 1950s and painting in his spare time. Now famous, his paintings sell for hundreds of dollars. Campos estimates TGN's painted wall is worth $30,000.



Gonzalo Lopez Ramirez showing RBN tape library to the author.

Announcer Andre Maldonado Lopez checks reception reports for RBN, located in San Sebastian Huehuetenango, below (see sidebar story).



Another interesting room in the TGN building is the recital hall, with a baby grand piano. Students from a nearby music school practice on it and in exchange help record music for different programs. It was originally set up for live radio broadcasts or to record TV programs. TGN used to make TV programs and then buy time on local TV stations, but the practice was discontinued due to its high cost. In the adjoining control room, Wayne points to the console which he built in 1967. "Haven't even changed a fuse in it," he remarks.

Writing to TGN

TGN's shortwave outlet is the easiest way to verify Guatemala. The station receives about 4,000 letters a month, mainly from listeners in Guatemala and neighboring countries. The mailing list of local listeners' addresses is computerized. Actual SWL/DX reports number about 80-90 a month.

Wayne checks the accuracy of every report and notes that TGN is probably one of the few radio stations that still do. Each correct report is answered with a QSL card, and if the report can't be verified Wayne writes to tell the reporter why. Sometimes angry hobbyists write back complaining about their unverified report. Wayne then responds with a QSL card with "SAMPLE" written across it and explains that if he receives a correct report he'll send a real QSL.

The QSL card, which pictures a Quetzal bird--the national symbol of Guatemala-- has been used for years. However, it seems every new batch that comes back from the printers looks a little fainter and sloppier, notes Wayne. Presently TGN is also sending small pennants to DXers. If writing, DXers should include two IRCs or a US dollar to pay for return postage. Their address is: TGN, Radio Cultural, Apartado 601, Guatemala City, Guatemala.

The Other Evangelist Stations

TGN is not the only Evangelist radio station in Guatemala -- it's just the easiest to hear. The two others, while tougher to pick up, are certainly not impossible. Neither station is actually owned by TGN and the Central American Mission, but both are affiliated with it and receive technical help from Wayne Berger, TGN's chief engineer.

A New Station with a Long History

Radio Buenas Nuevas, 4800 kHz, which began broadcasting July 25, 1987, is the newest of the two. It is located in San Sebastian Huehuetenango, about thirty kilometers west of the departmental capital of Huehuetenango in western Guatemala. Missionary Bob Rice and his wife, Donna, moved there in December to take charge of the local mission complex on behalf of the Central American Mission.

Radio Buenas Nuevas may be new, but the station has a long history. It started out more than twenty years ago as a recording studio for Mam language programs on TGN and Radio Maya de Barillas. Descendents of the Mayas, the Mams are one of Guatemala's four main Indian groups. Five years ago the Iglesia Evangelica Nacional Mam (the Mam Evangelist Church) decided to apply for a station license because they believe radio broadcasting is a successful method of evangelization. With only 15,000 members among the half-million Mam living in western Guatemala, the church is looking for converts. After a four year wait, the license was granted.

TGN Helps Out

To put the new station on the air, TGN loaned out its 250 watt back-up shortwave transmitter and helped erect a temporary dipole antenna on the side of a hill behind the station.

Once on the air, TGN's chief engineer Wayne Berger drove to Oklahoma and bought a junk one kilowatt Gates transmitter. Finding a well-used pickup truck at a bargain price, he used it to carry the transmitter south through Mexico. He made Radio Buenas Nuevas one of the cheapest radio stations in history by selling the pickup truck in Guatemala City at a large enough profit to pay for both the transmitter and needed repair parts. After spending much of December rebuilding the transmitter at TGN's shop in Guatemala City, Wayne and Bob trucked it out to San Sebastian for installation in late January. At the same time a new antenna tower was erected.

The station is only a small part of the mission, which also includes a health clinic and community education projects. More than a dozen buildings and houses cluster around the mission's compound. Station manager Israel Rodas Merida and announcers Gonzalo Lopez Ramirez and Andres Maldonado Lopez are the only three employees. They work in the recording studio in one of the compound's smaller buildings but are planning to add a new "live" studio in an adjacent building soon. The recording studio is so heavily booked with producing programs for Radio Cultural and Radio Maya that it can only be used two hours a day for Radio Buenas Nuevas. Once the "live" studio is finished, Radio Buenas Nuevas programming can be extended.

The compound is also home to seven families, including those of the station manager, the two announcers, and missionary Bob Rice.

Central America's Remotest Station

The other, smaller, Evangelist station, Radio Maya de Barillas, in Barillas, is well established. In August, 1987, they celebrated their twenty-fifth anniversary with a marathon live eighteen hour music broadcast. It wasn't a "drop in to say hello party." "People came and stayed the whole time" according to Wayne Berger. Long time DXers may remember missionary Loran Veith of Harmony, Pennsylvania, who ran Radio Maya and issued those all-important QSL cards in the early 1970s. Several years ago he moved to a job in a missionary school in Queretaro, Mexico, and from there to missionary work in the states.

Since Loran left, the station has been run by the Canjobel Evangelist church. Descendents of the Mayas, the Canjobels are one of the approximately twenty smaller tribes in Guatemala. Radio Maya's programs are mainly in Canjobel, but some programs in other regional languages are broadcast as well. Radio Maya uses 3325 kHz with one kilowatt during morning and evening hours, and 2360 kHz with 250 kilowatts in the mornings only. While 3325 kHz is reported regularly in North America, reports of 2360 kHz are few and far between, although it was heard more frequently in the early 1970s.

Located in northern Huehuetenango department, Barillas is in one of the most remote areas of Guatemala. Maps show it as being at the very end of the road going into that region. Although only 120 kilometers from Huehuetenango, the road is so bad that the trip to Barillas takes twelve hours by fourwheel drive jeep or eighteen hours by local bus. There are stations located in places harder to reach overland, e.g. Puerto Lempira, Honduras, but those places have regularly scheduled air service.

QRM from 'I Love Lucy'

Although out of the way, cable television with WTBS and other satellite stations from the US has arrived in Barillas. An enterprising, wealthy individual bought a satellite dish and a large roll of coaxial cable to hook up a local cable system. Installing the system, he ran one of his cables across the street from, and parallel to, the Radio Maya antenna feedline. Now Radio Maya can be heard on local TVs mixing with the "I Love Lucy" reruns. The cable company and some of its nonevangelist subscribers are complaining. The end result is anyone's guess!

Getting QSLs

Radio Buenas Nuevas is currently well heard in North America from 1130-1230 and 0030-0130. Radio Maya de Barillas is best heard in the mornings just after its 1030 sign-on on 3325, and can occasionally be picked up in the evenings as well.

Both these stations verify reception reports by letter, although Radio Buenas Nuevas is planning to have QSL cards printed. Both stations are very interested in mail from overseas DXers, but between the poor local mail service and demands of day-to-day work at the stations it may take a follow-up or two to get a reply. Be sure to write your report in Spanish as no one at either station speaks English. Even though Bob Rice at Radio Buenas Nuevas is American, he does not directly work with the station and won't normally see the mail.

The *Spanish Language Lab*, available from many shortwave dealers, makes Spanish reception reports a breeze even for people who don't speak a word of the language. If including return postage, make it unused Guatemalan stamps because IRCs are impossible to redeem in the outlying towns. For addresses: Radio Buenas Nuevas, San Sebastian, Huehuetenango, Huehuetenango, Guatemala, and Radio Maya de Barillas, Barillas, Huehuetenango, Guatemala, will do the job.

New Station Coming!

If you've already heard all these stations, Wayne Berger has good news. A new evangelist station has come on the air. It is located in San Cristobal Verapaz near Coban (home of the Catholic Church's Radio Tezulutlan). The San Cristobal station is operated by the Kekchi Evangelist church and except for a few announcements in Spanish, broadcasts exclusively in Kekchi. The station is called Radio Kekchi and transmit on 4845 kHz. The power is 5,000 watts. If you hear them, drop them a line. Radio Kekchi, San Cristobal Verapaz, Alta Verapaz, Guatemala, is probably all the address needed since it is not a very big town!

Adventures in the Clarke Belt

DXing Satellite Television

by Ken Reitz

If you're a typical monitoring enthusiast your rooftop bristles with UHF and VHF antennae. You've got amplified, stacked Yagis for FM and TV DX and you've strung a Beverage antenna through your neighborhood. You've monitored ships in dry-dock and kids on walkie-talkies. You've QSLed the wireless mikes of NFL referees and all the McDonald's drive-up windows in a tri-state area. You figure you've heard it all. Well, not quite.

Maybe you're ready for something else. Maybe you're ready for the ultimate experience in DXing: satellite television.

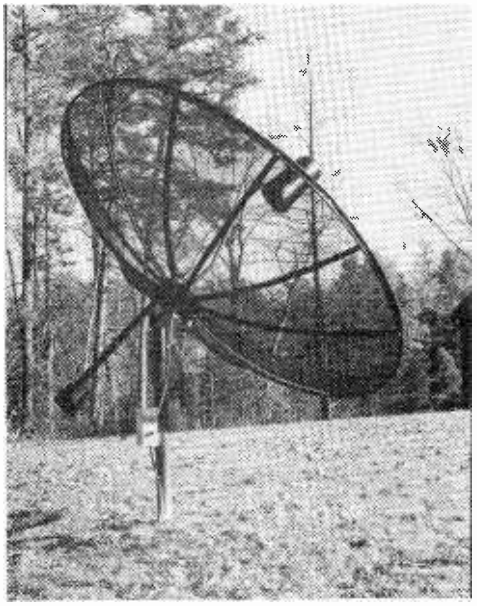
Mention satellite television and most people will think of HBO/Cinemax, ESPN, the "Super Stations" and all other services found on your local cable TV system. What most people don't know is that the home satellite TV industry has its roots in the amateur community (A TVRO net for amateurs still meets every Sunday afternoon at 1800 UTC on 14.309 MHz).

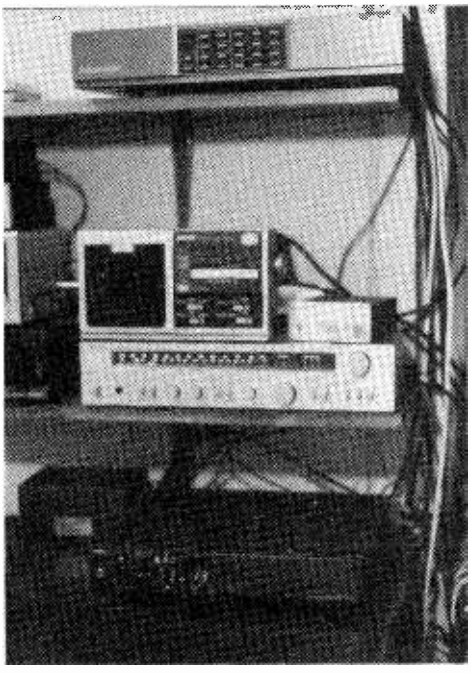
In the mid 1970s a handful of itinerant hams using homebrew equipment realized the possibility of receiving the weak microwave signals from geostationary satellites used to transmit programs from network headquarters to cable companies across the country.

Back then, a typical home dish system featured a massive 16' solid steel dish on a fixed mount (there was no moving these monsters!). The entire feedhorn was rotated by a TV antenna rotor taking 30 seconds or more to change polarity (a job now done by tiny servo motors similar to ones used in R/C airplanes in less than a second) and the signal rode thick cables to wired remote receivers which featured click stop manual tuning knobs.

They were called Television Receive Only Earth Terminals (TVRO) and by today's standards those early efforts seem pretty crude. With a price tag starting at $10,000.00, they certainly were expensive. But it was the state of the art in home satellite systems.

Unsophisticated though it might seem today, it did one thing that captured the hobbyist's imagination: it brought in a crystal-clear picture from a satellite 23,000 miles away.





Author's dish: 9 1/2 foot Kaul-Tronics antenna with 75 degree LNB and Hammerblow 18" actuator. (Right) Author's STV gear (bottom to top): Uniden UST-7000 Satellite Receiver (Actuator DC power supply to left); Technics AM/FM Tuner-amp for satellite audio; Heil SCPC receiver (Phantom IFP1X Terrestrial Interference filter to right); Channel Master Videocipher II satellite descrambler (all photos by author)

Lightweight, Affordable Systems

Now ten years later, the state of the art system picks up the same signal on a lightweight 10' see-through dish which scans the sky on smooth motor driven mounts. The signal at the feed horn is processed through smaller, more efficient electronic components and delivered to a receiver which can tune both C and Ku band satellites (including more than a hundred audio subcarriers in two modes of stereo). Tuning is by keyboard on an infrared or UHF remote control. Today's systems are nearly half the size and perform twice the functions at one-fifth the price. Now that's what you call a bargain!

Where are the satellites and how did they come to be there? Unlike the many weather and spy-type satellites in low orbit around the earth, telecommunications satellites are in a high geosynchronous orbit. This means that to a dish on the earth peering up into the sky, the satellites appear to be fixed or unmoving in their location.

Getting Started with Arthur C. Clarke

It all started with a theory put forth in an article in the British publication *Wireless World* in 1945 by the writer/scientist Arthur C. Clarke.

He speculated that if three objects were launched into orbit around the earth equidistant apart and at an altitude of roughly 22,300 miles, communications signals sent from any point on the globe could be relayed to the rest of the planet. (Keep in mind that this idea came *before* there was a capability to launch such an object to such a height let alone keep it there and uplink and downlink data on it!)

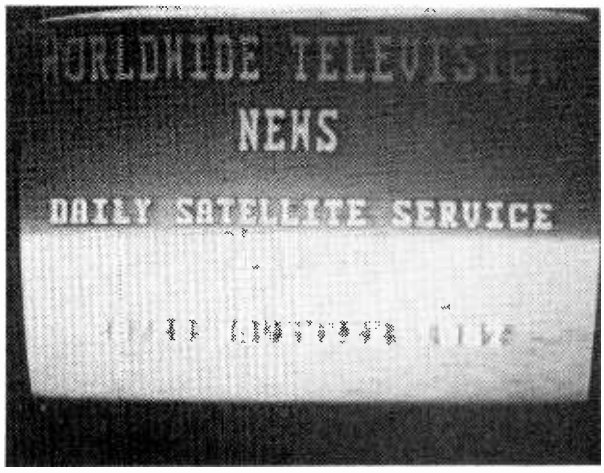
As a result of Clarke's prescience, the band around the earth into which all the geosynchronous satellites are inserted is

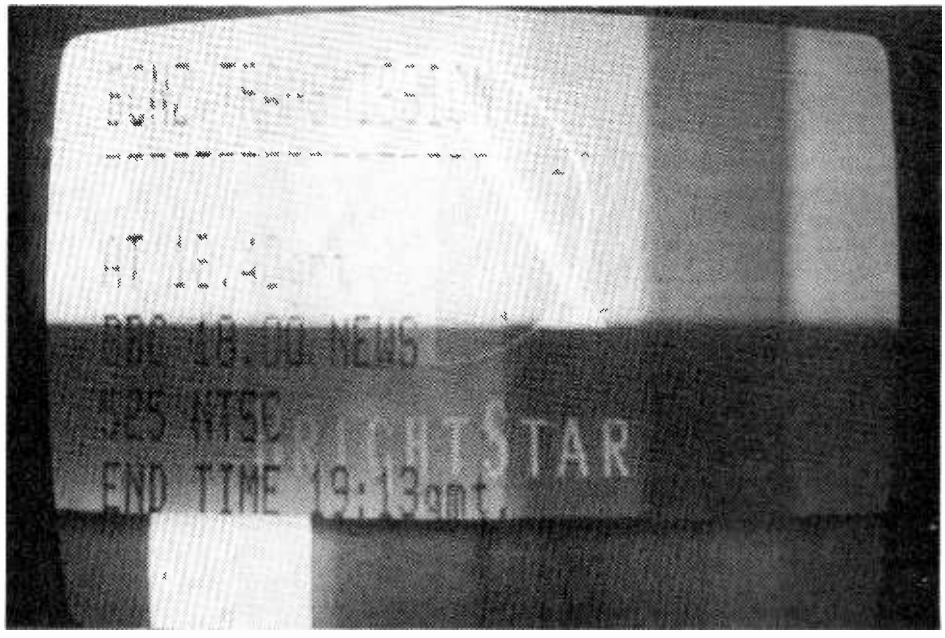
referred to today as the Clarke Belt.

There are two types of satellites in the Clarke Belt over North America. They are known as *C* band and *Ku* band satellites. The essential difference between the two are that the C band birds (as they are known colloquially) operate in the 3.7 GHz band and the Ku birds cover 11.7 to 12.7 GHz.

The area of the earth saturated by the satellite's beam with a signal strong enough to be received by a nominal TVRO installation is called the *footprint*. In general, the C band satellites have footprints which cover most of North America. Ku satellites, on the other hand, utilize a method of broadcasting called *spot beaming*. In spot beaming, the microwave beam is focused on specifically targeted regions. The result is that what may be a strong Ku signal in Canada may be totally unreceivable south of the border.

At present there are six Ku band birds receivable in parts of North America with relatively few active transponders (channels). This compares to twenty-one C band birds with well over a hundred active transponders. As a result, we'll concentrate on the C band satellites in this article.





The WTN Billboard is typical of news feeds. Below, Brightstar Billboard's color bars alert stations to an upcoming news feed.

Illegal?

But aren't home dishes illegal? And anyway, aren't all the channels scrambled? The answer is "no" on both counts.

First, Congress enacted the "Cable Communications Policy Act of 1984" which legalized the manufacture, sale, distribution and use of home satellite systems.

Secondly, since January, 1986, a lot of the entertainment channels have been scrambled (twenty-five as of this writing). They were not scrambled to prevent home dish-owners from viewing them but rather to prevent home dish owners from viewing them for free. This is still a controversial point and the issue of scrambling remains a hotly debated topic among many dish owners.

Virtually all American programmers use the same scrambling system which can be decoded by the General Instruments VideoCipherII Descrambler. In fact, the hottest item now in satellite TV dealer showrooms, is the Integrated Receiver Decoders (IRDs). These units have the satellite receiver, dish actuator (motor drive) and VideoCipherII (VCII) descrambler all in one unit.

So, What's Up There?

First, let's look at the entertainment channels. If you ignored all of the esoteric side features which TVRO hobbyists enjoy and used your system solely for entertainment, you would still get more than your money's worth. While the average cable company in the U.S. offers 36 channels to its customers, dish owners have over 100 channels of regular program feeds and anywhere from 50 to 100 more channels of special feeds, occasional video, as well as news and sports backhauls.

Aside from the superior video and audio to which dish owners have become accustomed, they have the ability to take control of what they want to see and when they want to see it. Your cable company probably doesn't offer it but with a dish you can see such exotic fare as Armed Forces Radio and Television Service (AFRTS), The Caribbean Super Station (CSS), C-SPAN II, NASA Select, Galavision, and CBC North just to name a few.

FM Subcarriers from Outer Space

Having gorged on seemingly endless video, let's examine what there is to hear starting with the FM subcarriers. Uplinked with the video will be several audio subcarriers. Usually, the standard frequencies for program audio will be 6.80 and 6.20 MHz (except in the case of VCII encrypted audio which is sent digitally along with the video).

Even with the video and two channels of audio there is still plenty of room on the transponder to uplink additional material. Therefore, common carriers (the company that actually leases the transponder and does all the uplinking) will often feed unrelated audio broadcasts on different frequencies on the transponder. For example, the Cable Jazz Network can be found at 5.94 and 6.12 MHz on Galaxy 1 transponder 11 which is the Christian Broadcasting Network (CBN). There are two other unrelated audio services on that same transponder.

Most satellite receivers built today have stereo capability which means that they have two separate tuning controls, one for each channel of stereo. There are also more than one type or format of stereo used by programmers: Matrix, and Discreet. Fortunately, most receivers have "mode" switches which allow one to tune the proper stereo format. There is also a mono switch since many broadcasts are

Intro graphics to BBC 1 "Six-o'clock' news on G2 transponder 11

not in stereo. In addition many subcarriers are "narrowcast," which means you'll have to switch in or out your wide/narrow audio control for proper reception.

You can monitor the FM subcarriers through your TV speaker but it won't be long before you've patched your satellite receiver audio into the "aux" input of your tuner/amp and routing that great high fidelity stereo signal into those tower speakers you bought. Watching a movie and listening to the audio that way is as close to the movie theater as you can get without paying for over-priced popcorn.

Easy to Find

All satellite TV guides list the most common audio subcarriers. These lists, however, may not be complete as services come and go with surprising frequency and such lists may be months old by the time it gets to you. Just as with any DX situation, one simply has to do the leg work of going from transponder to transponder and satellite to satellite. The results of such DXing can be equally thrilling. In October of last year, six new stereo services were brought on line on Galaxy 3 transponder 11, alone.

The major radio networks (ABC, NBC, and CBS) send their programming to affiliates via digital audio and cannot be tuned by home TVRO receivers. However, CNN radio news, Satellite News Network, CBC radio news and others are available on FM subcarriers. In addition, Mutual Radio and National Public Radio are sent via Single Channel Per Carrier (SCPC) which will be discussed later.

Some of the more interesting FM subcarriers are found on the Canadian satellite Anik D. While many of their channels are scrambled (using an Oak/Orion encryption system) they have several stereo subcarriers on most transponders. For years, satellite dish owners have been tuning in to CBC Radio's "Sunday Morning," a three hour public affairs program which was sent via shortwave to North America and the Caribbean. Tune in the shortwave version and you'll suffer through all kind of noise, fading and interference. On satellite, it's flawless.

Elevator Music from Space

Ever wonder where "elevator music" comes from? Try Westar 5 transponder 18. A half dozen ceiling speakers is all you need to magically transform your home into a dentist's office!

How about the "golden age of radio"? Ever wonder where it went? It's now in outer space. You can find the old shows rebroadcast daily on Spacenet 1 transponder 21, 6.2 monaural on a service called Yesterday USA. You can also hear these programs occasionally on North America 1 (Satcom F2 transponder 4, 6.2 monaural).

On the FM subcarriers you'll hear easy listening, big band, contemporary rock, 50s and 60s rock, country, religious, Greek, Spanish, French, Italian, comedy and my favorite: CKMN from Yellowknife, Northwest Territories, on Anik D transponder 21, 5.4 monaural which plays it all.

Not all Receivers are Created Equal

There are a few caveats to receiving good quality signals on the FM subcarrier frequencies. First: Not all audio sections of satellite receivers are created equal. Some have narrower bandwidth capabilities, easier tuning design and better audio related controls. For instance, the serious audio fan will want to avoid receivers which have audio controls in a difficult to access position on the receiver or that don't have a digital audio tuning readout. There's no point in saving money on a cheaper receiver that won't give you what you want.

Secondly: If you are unlucky enough to have a terrestrial point-to-point microwave tower within a few miles of your dish or are near some other source of high power 4 GHz radiation you will suffer terrestrial interference (TI). In its milder forms TI will manifest itself as a hail of "sparklies" (little white or dark spots dancing about the screen). Or it can virtually wipe out the picture in a sort of pulsing manner in which the picture can go from nearly perfect to nearly gone in seconds. As you might expect your audio quality will be similarly affected.

Not all is lost, however. There are add-on stereo processors which can greatly improve your subcarrier reception and there are various TI filters and techniques of site installation which will help reduce interference.

The Good Stuff

Now, let's get to the good stuff. We've seen hundreds of video channels and located over a hundred audio subcarriers. But if you tune to some transponders there may be no video and yet your signal strength meter shows a strong signal present. You tune the audio frequencies and there appears to be nothing on the transponder. What gives? This probably means that the transponder is active with some other type of transmission which the home satellite receiver is not equipped to pick up.

Let's say you've set your dish on Westar 4 transponder 3. You can shut off your TV set because there's no video here. Using the 70 MHz loop out of the back of your receiver attach a 75 ohm cable to your SCPC receiver's antenna input and tune across the band. If an SCPC signal is present you will hear it through the speaker on the SCPC receiver (which can be something as simple as a portable TV band radio).

Great! What will you hear? You may hear interviews, live remote broadcasts, musical programs for network distribution, the *In Touch* reading service, U.S. Naval Observatory's Master Clock, BBC feeds, RSA feeds, jazz from Denmark and Pacifica Radio, just to name a few on this one transponder.

Unlike the FM subcarriers, SCPC is the method used by radio networks such as National Public Radio or Mutual to broadcast to their affiliate stations. There are a number of other smaller networks which specialize in particular programming and feed their affiliates (or backhaul) to the networks' center via SCPC.

These transmissions come and go unannounced so you may be advised to keep a log of what you find and when so that you can find it again.

And here come the caveats. You should know that not all SCPC signals are equal. This will mean that once again some signals will not be listenable while others will come in like the local FM powerhouse. The nature of SCPC broadcasting is such that through a process known as companding. Through companding, the signals of many services can be jammed into a very narrow space. This makes homebrew tuning difficult but nothing that most DXers aren't used to.

One of the more critical links in your SCPC hook-up will be the satellite system's downconverter. In SCPC reception we're trying to do technical things which the designers of your electronic components never envisioned. SCPC reception requires stability and so the best quality downconverter is recommended. Otherwise you will end up constantly

adjusting the tuning on the SCPC receiver.

Filtering Power is Critical

Perhaps the most critical problem you may face is inadequate filtering in your satellite receiver's power supply. If not properly filtered you will have a constant hum in the audio along with your SCPC signal. It will drive you to distraction. It's just another reason to stay with the top quality components.

On the shortwave bands, listeners quickly become aware of strange noises that sound like burbling brooks on high speed or machines run amuck. The seasoned SWLer easily recognizes those sounds as radioteletype (RTTY), the "Russian Woodpecker", or simply local AC line noise. The vets know to hook up their RTTY-readers, fax machines or computers and sit back to "read the mail" when they encounter these noises.

While data transmissions abound on the satellites they do not make themselves quite as obvious. Our study of SCPC signals have shown us exactly that.

Sometimes we'll run across a transponder which has no video but the signal strength meter is pegged and the audio sounds like hundreds of hams on SSB all trying to make the same contact. What we have here are telephone calls, up to a thousand of them on one transponder (one side of the conversation only).

Occasionally we'll tune the "blank channel" with the SCPC receiver and come across a buzz saw-like sound which are many RTTY signals crammed into one spot. You've heard of narrowcasting? Well, this has got to be the limit.

In addition there are great numbers of specialty data transmissions using esoteric systems specifically designed for certain customers such as stock and commodity brokers. These feeds are data only and use little eighteen inch dishes for reception.

There is another type of data signal which is promoted to cable and home dish owners. That is videotext. The signals are sent via the Vertical Blanking Interval (VBI) of a few cable satellite delivered channels such as WTBS, WGN and the Discovery Channel. Stand-alone videotext receivers are available for sale and the services which are advertiser supported are free. These services, such as Electra/Tempo text and Infotext/DataVision, have up-to-the-minute news, sports, and features which the user "pages" through using an infra-red remote control unit.

Coming Up

On the horizon is a new text source which will be introduced soon, called Infocipher. It's from the same company which makes the Videocipher II. Reportedly, the Infocipher will read a data stream sent via any VCII scrambled satellite channel. By using General Instruments-produced software for the consumer's own personal computer, one will have a substantial amount of text available, including daily newspapers from around the world.

The last two years have seen extraordinary changes in the world of home satellite television. Many new video channels and quite a few new audio services have come on line and technological advances have provided consumers with higher quality products at significantly reduced prices.

But there has been a downside as well. The advent of scrambling dealt a crushing blow to the fledgling home dish industry forcing thousands of dealers to go out of business and causing tens of thousands of dish owners to be "orphaned". Indeed, even a few equipment manufacturers have gone under. It doesn't take much to imagine the frustration of consumers who own systems built by companies no longer in business and installed by a dealer who is no longer around.

What this tells us is that after the first ten years of satellite television, the industry is still in its infancy. And if there is any certainty here it is that there will be big changes happening all the time. So, keep your downconverter warm and stay tuned!

Sources:

There are many books and periodicals on the subject of satellite television. However, information on the subject changes almost daily. Therefore books (with few exceptions) become out of date quickly and periodicals will be current only for a period of a few weeks. If you have a dish the best source for current information is found on the birds. Try:

KSAT on W4 transponder 16 6.2 narrow M-F 7-12 p.m. ET

America 1 on F2 transponder 4 6.2 9-12 p.m. ET

The Sky Store on S1 transponder 1 Video Tuesdays 9-12 Et (The Sky Store features technical topics and sells new and used TVRO gear.)

Recent news and information in the form of periodicals can be found in *STV* magazine (a monthly) and *Satellite Times* (a bi-monthly). Both are from Triple D Publications, P.O. Box 2384 Shelby, NC 28150-2384. Triple D Publications also have the STV Bookstore which is a broad collection of satellite television related books.

Keep in mind that this is not intended as a complete list and that there are many other sources of information on the subject. These are just a few to get you started.

Sources used in writing this article include:

The Home Satellite TV Book (How to put the world in your back yard) by Anthony T. Easton. 381 pages, 1982 Perigree Books.

The Hidden Signals on Satellite Television by Thomas P. Harrington W8OMV and Bob Cooper, Jr. VP5D. 179 pages, 1984 Universal Electronics Inc.

The Satellite Broadcasting and Communications Association of America (SBCA). A trade and lobbying organization. 300 N Washington Street, Suite 208, Alexandria, VA 22314.

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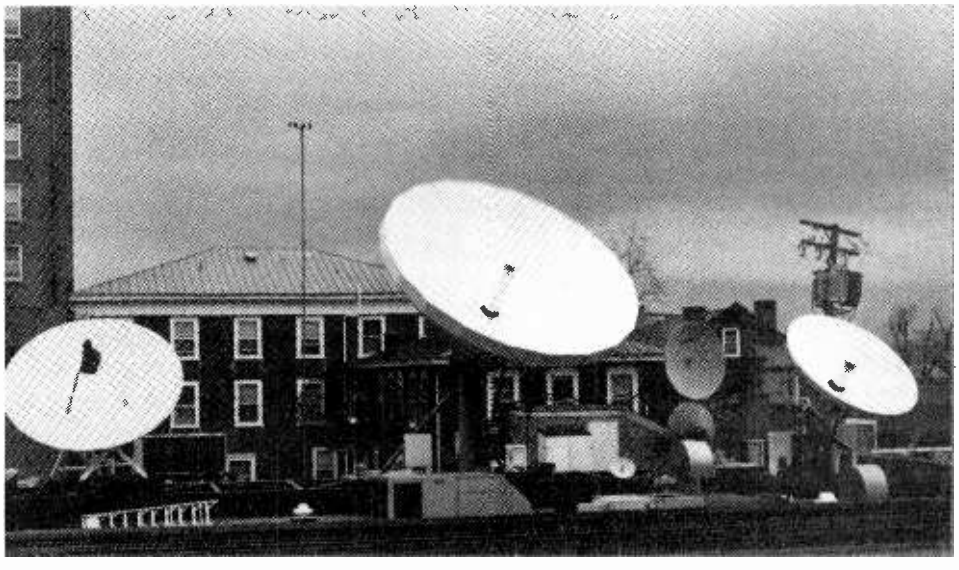


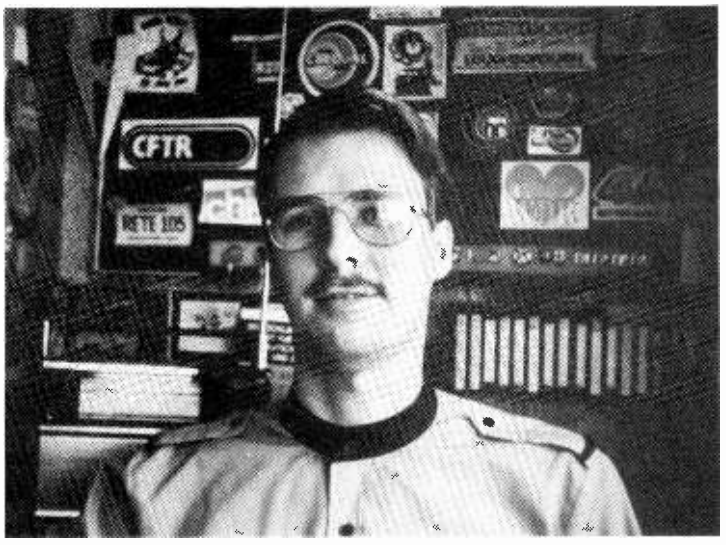
Dish farm for WVIR-TV Channel 29, Charlottesville, Virginia, shows a variety of C and Ku band, point-to point microwave and data receive only dishes.

The Hobby and the People

DXING IN THE USSR:

An intimate look at the state of the hobby in Russia by Soviet DXer, Igor Sannikov.

by Igor Sannikov



Igor Sannikov is a 26 year old teacher of English at the Kirov Polytechnical Institute. A DXer since 1975, he is a member of the Soviet DX Club, Radio Budapest SW Club and the DSWCI. He currently lives in Novoviatsk.

Right now, we are in a period of rather low sunspot activity. And it doesn't seem to be increasing all that rapidly. What does show a more dramatic change, however, is activity of a different kind. Extensive steps are being taken to improve relations between the two great nations of the world: the Soviet Union and the United States. Our leaders shake hands, exchange smiles and -- what is most important -- cement deeds aimed at reaching global peace and understanding between all nations. Why shouldn't we, common folks, do the same?

I guess that everyone knows that the best way to start a friendship -- or at least not to be aliens -- is to learn more about each other, and learn the truth, not the biased stereotypes that journalists in both countries are so used to. That's why, being well aware of American's current interest towards everything concerning this country and hoping to make a modest contribution to the policy of "glastnost," I am very happy to acquaint you with the Russians -- as well as Ukrainians, Lithuanians, and representatives of other nationalities of the USSR -- who share the same hobby as many *Monitoring Times* readers: DXing.

This is a story about Soviet DXers related by just one of them. And it may well be the first to be published in North America.

An Obscure Hobby

We DXers in the Soviet Union are not so numerous as might be supposed. There are less than a hundred enthusiasts known to me, plus an obscure number of unknown beginners. But we are talking about DXers proper. If we want to talk of common world band radio listeners, the number should be much greater.

Quite a lot of people here have shortwave radios (estimated 162,000,000 sets, of them only a comparitively small percentage lack SW coverage). That's because shortwave, especially the 75 and 60 meter Tropical Bands, is widely used for domestic broadcasting in the more scarcely populated areas, like Siberia and Kazakhstan.

On the other hand, the Soviet Union has a well-developed system of cable radio, reaching even the most remote villages. So, in truth, there's no real reason to buy a world band radio unless one is a hiking enthusiast or living in a forest warden's hut.

All of this makes me think that shortwave radios are used mainly for tuning in foreign broadcasters; for listening to "the other side of a story." There are several very powerful transmitters that broadcast programs to us in Russian and other languages spoken in the Soviet Union. Not all of them have been jammed in the past, and only a very few -- namely, Radio Liberty and Kol Israel (partially, also Deutsche Welle) -- are still jammed now. Anyway, it's possible to receive Russian language broadcasts from abroad around the clock.

Since listening to Western programs is not prohibited by any Soviet law -- contrary to what is sometimes alleged in the West -- they have a large audience. It is a pity, however, that major Western broadcasters still prefer to program "dissident"-type news and comments on Soviet politics rather than stories of life in their own country.

Most of the common World Band radio listeners haven't got the least idea of DXing as a hobby. This is mainly due to the lack of any relevant information in our mass media.

It was only recently, for example, that local newspapers in Lithuania and Latvia published anything at all on the hobby. And even if an ordinary listener happens to learn about it by stumbling across a broadcast of Sweden Calling DXers (the only DX program currently broadcast in Russian), he may not know foreign languages well enough to take the trouble of identifying various stations.

He may also not feel much like rummaging through the sea of whistles, chirps and other noises. Those who find pleasure in the latter, however, may already be members of clubs belonging to the Radio Sport Federation of the USSR (AURU member), which recognizes nothing but amateur radio and which is more or less widely publicized.

Profile of a Soviet DXer

So, these are the possible reasons why we, real DXers, are so few in number. And here is our collective portrait: Age: from 12 to 60 but mainly between 22 and 35. Sex: male, except for two young ladies known. occupation: students, engineers, workers, clerks, or teachers; very few are experts in foreign languages. Strange at it might seem, I don't know any pensioners among us.

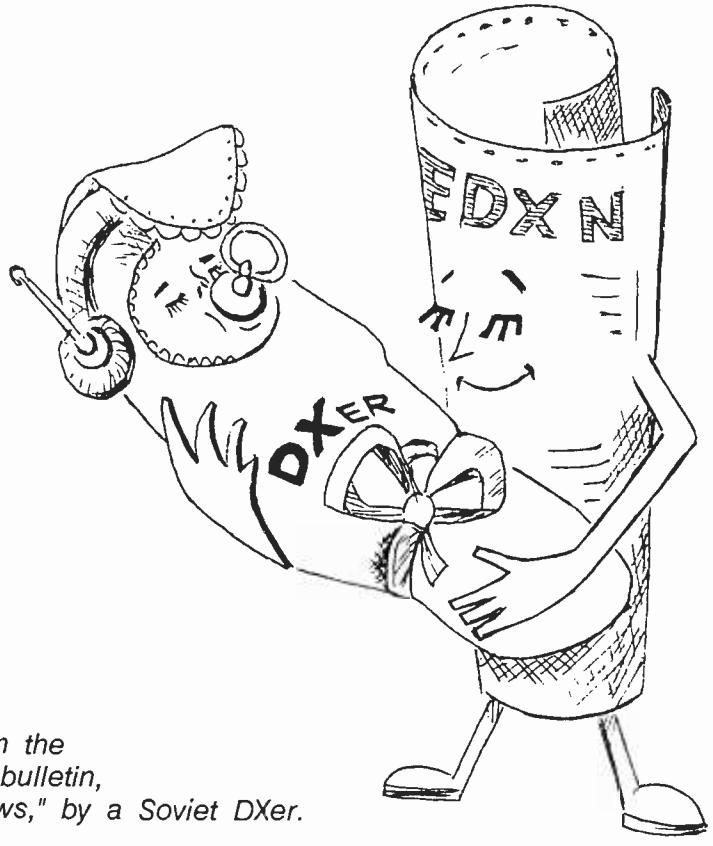
Most DXers in the Soviet Union are single. Married people with families don't have the time to prowl the bands. There are, of course, a few. DXers, too, live chiefly in the European part of the USSR, especially Moscow, Leningrad, Lithuania and the Ukraine. There are at least two living in Kazakhstan and nothing certain about anybody living in Siberia of the far east. Interests apart from DXing include everything from stamp collecting to playing guitar in a rock band, writing verses or making computer programs.

As for our interests in DXing itself, these are mainly world band. Those who have put in some time with the hobby and who have good communications receivers with sufficient antenna facilities are crazy about the Tropical Bands -- which can be picked up even with a portable. Other spheres of interest include MW/LW, utilities, clandestines, FM and TV. That is, we have no specialization among us, though some DXers may be more successful in this or that field.

For instance, I know a guy in Lithuania who got quite a number of QSLs from European TV stations, and there's an official TV DXer's club said to be functioning in Riga, Latvia. Two Soviet DXers have even made a continuously updated Clandestines Station Survey of their own. And an owner of a personal computer in the Ukraine is keenly interested in programs that can be applied to DXing. Satellite TV and VHF/UHF communications monitoring is simply not possible here due to the absence of industrially-made receivers.

Equipment

Now, a few words about our "hardware." As has already been mentioned, there are millions of shortwave sets in this country. The older domestic models are sometimes still in use and operate on tubes and are



A cartoon from the Leningrad DX bulletin, "Exotic DX News," by a Soviet DXer.

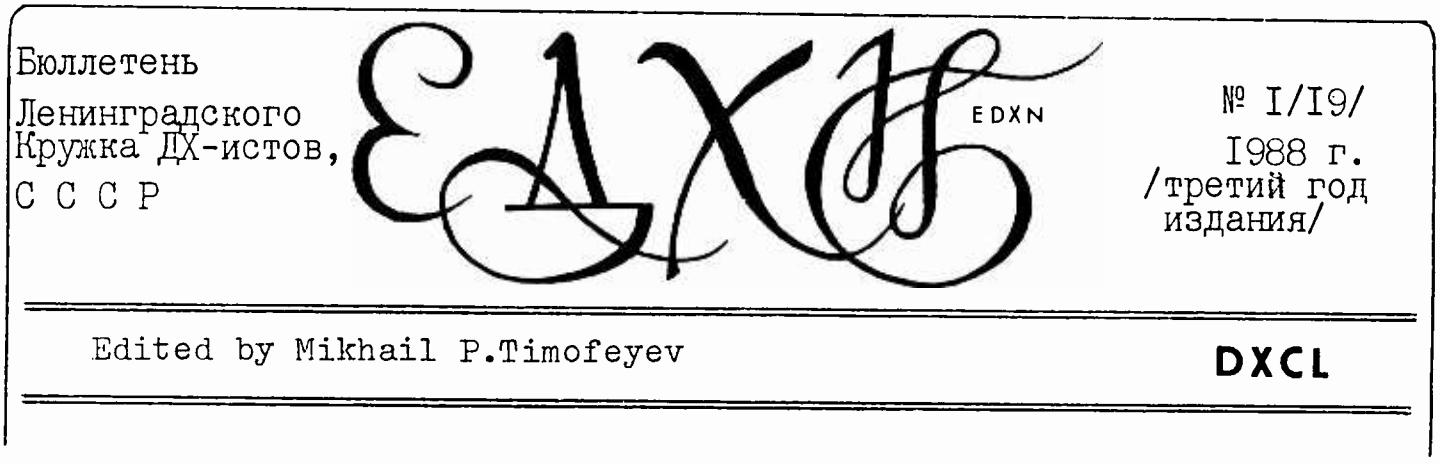
parts of competent systems. All receivers manufactured here nowadays, however, are transistor and IC portables priced at the the equivalent of US$100 to 800. Or they're just tuners within stationary stereo systems. There is even a shortwave model designed for the car. All, however, have two principal drawbacks: the analogue scale and the limited number of shortwave bands. There are no 120, 90, 19, 16 or 13 meter bands, though the latter three appear on export models which can sometimes be bought on the home market. There's simply not a single model designed for DXing.

So we try to get "written-off" professional receivers like the old "Kazakhstan" or the current "Ishim, used for cable radio networks. They have more continuous world band coverage and higher sensitivity, though still very vague analogue dials.

Much better and more difficult to obtain are the tube operated "Volna-M" and R-250(M). The former is a communications receiver used in navigation and the latter is an out-of-date military communications set. The R-250(M), though rather bulky, is considered number one among the Soviet DXers since its extreme sensitivity allows very fine tuning -- up to 1/10 of a Hertz on shortwave -- and the reception of SSB signals. It is said to outperform many foreign portables that can be occasionally found in second-hand shops. Japanese radio-recorders are more accessible, and they often compensate for the lack of higher shortwave bands in ordinary Soviet receivers.

Naturally, the best results in DXing are achieved by the lucky owners of R-250(M) or Volna-M. And these are sometimes fantastic results: A DXer in Leningrad using a R-250M and a 400 meter rhombic antenna managed to get the Falkland Islands and Vanuatu on the Tropical Bands. Some minor South Pacific stations have been heard in Moscow. This is to say nothing of the numerous Latin American and Indonesian transmitters that can be received even with a portable.

As for the general DX scene here, it varies greatly because of the vast territory of our country. While in Vladivostok, for example, we can tune to Hawaii. In Kazakhstan, South Korean stations are received on AM and Leningrad DXers have no problem listening to European pirates. It should be mentioned that the U.S. has become "nearer" in recent years with the advent of its commercial shortwave stations. These, too, are heard in the Soviet Union.



The masthead of the current issue of the Soviet DX magazine, Exotic DX News, published by DX Circle of Leningrad.

ПРИВЕТ, DXИСТЫ!

The masthead of one of the Soviet DX bulletins of the 1970s. Translated from Russian the title reads, "Hello DXers!"

DXing is still considered an individual hobby. But no one will deny the need to exchange observations, experiences and idea between DXers. So we do, corresponding with each other and with foreign DXers. We also meet occasionally (but not at organized conventions or DX camps so far). And many Soviet DXers belong to clubs.

The Radio Budapest shortwave club is the most popular of the foreign ones. It boasts about one hundred members from the USSR. Many are members of other DX clubs supported by stations in socialist countries -- including our own Radio Kiev DX Club and Radio Tallin DX Club. But problems in being able to pay -- including the unavailability of International Reply Coupons (once upon a time, someone reported seeing a few sold at the international post office in Moscow) -- prevents us from joining any self-supporting foreign clubs. Only the famous DSWCI can boast of having a couple of members from the Soviet Union!

We do have our own club, though. Its predecessor was the "Baltika DX Club, which operated from June of 1974 until March of 1979. There was much publicity about it and it even accepted a member from the States. Eventually, it disbanded because of the passiveness of its members. Apart from that club and its bulletin, "DX-Echo," a number of primitive, home-made information bulletins were published and distributed among DXers in the USSR.

Now we are experiencing a new wave of DX activity roused by the "perestroika." So, back in the summer of last year, a guy from Donetsk, the Ukraine, founded the "Soviet DX Club." Today, it has about thirty members, publishes "World DX News" bulletin (in Russian) and has already arranged a campaign of collective reporting to Radio Budapest. There's also another group of Soviet DXers -- the DX-Circle in Leningrad (and they are in parallel members of the SDXC) who publish their bulletin, "Exotic DX News." You can guess how really exotic the DX is, if I tell you that the editor is the one who heard Vanuatu and the Falklands!

We are rather optimistic about the development of DXing hobby in this country, especially now, in the period of renovation of genuine public activities -- all despite the fact that the Radio Sport Federation of the USSR, nor other bodies, still haven't recognized DXing for the exciting hobby it is.

■

Scanning with Style

by Bob Kay

Developing a scanning "style" does not imply that the scanner buff must invest thousands of dollars in "state of the art" equipment. A twenty year old crystal controlled Bearcat, when used wisely, can become an "electronic can opener", capable of lifting the communications "lid" off your community. Likewise, a novice, sitting behind an expensive ICOM-7000, is still a novice.

There are, however, a few tricks of the trade that, if applied, can even make the old timers "green with envy." Here are a few of my personal favorites.

Scanning Blindfolded

Turn on your scanner and listen to a random sampling of at least five local services. They can be police, fire, utility companies or any combination of your choosing. Now close your eyes and each time the squelch breaks, immediately identify the source of the transmission by the strength of the signal and by the sound of the carrier.

Can't do it? Then you're not spending enough time enjoying the hobby of scanning. Dedicated scanner buffs will experience little difficulty in rapidly IDing the more common transmissions blindfolded!

Catching the UnIDs

When a newly discovered frequency defies positive identification, the scanner could be left unattended and the transmission recorded by a voice activated recorder. This can, of course, cause some problems during the current thunderstorm season if you've got an outside antenna. So why not ask a retired senior citizen to personally monitor and record the action?

A senior citizen friend of mine was introduced to scanning when I gave him an old crystal controlled Bearcat. After his enthusiasm grew beyond the limitations of such a set, I loaned him a Bearcat XLT with 40 programmed frequencies to monitor and record. This practice has proven to be a reliable way to identify unknown frequencies and to promote the hobby of scanning.

To obtain volunteers, visit a senior citizen's center. You may even want to consider asking the Director of the center for permission to give a "scanning demonstration."

Join a Local Club

Joining a local scanning club is another way to improve your style. In addition to local frequency listings, a scanner club is an exciting place to meet other people that share the same interests. Most club members would be delighted to show their listening posts to a new member.

In the northeastern United States, the *North East Scanning News*, (NESN), 212 West Broad Street, Paulsboro, New Jersey 08066, is a club publication that covers New Jersey, Pennsylvania, New York, Delaware, Maryland, Virginia, Ohio, West Virginia, District of Columbia, Maine, Rhode Island, Vermont, New Hampshire, Massachusetts and Connecticut.

Under the editorial direction of Les Mattson, *NESN* has gone a step further and started a two way radio service. Operating on a business frequency between 463.00 and 464.00 MHz, the "Notification Net Work" provides club members with a very handy communications net during emergencies.

Members no longer have to guess what frequencies are in use during a major event. "On the spot" reporting by fellow scanner members provides all the information necessary to successfully monitor local interests.

The All Ohio Scanner Club, P.O. Box 2496, Springfield, Ohio, 45501, is another club that covers Ohio, Indiana, Michigan, Ontario, Canada, Kentucky, Northwestern Pennsylvania and West Virginia. The club publishes a forty page booklet six times a year. For more information contact Dave Marshall, Editor, 50 Villa Road, Springfield, Ohio, 45503-1036.

Stretching the Day

At two o'clock Sunday morning, most people are sleeping. But the serious scanner buff is listening. During this period most FM radio and TV stations have shut down. Interference from other sources is also at a minimum. Of particular interest during this time period is the monitoring of surveillance transmitters. These operations are used by law enforcement, government, industrial spying and private detectives. The most popular bands for such transmissions are 88-115 MHz, 30-50 MHz and 150-174 MHz.

Searching for new frequencies is a time consuming venture. To lean the odds in your favor, step through the band one megahertz at a time. For example, when searching for new frequencies between 410 and 420 MHz (Federal Band), begin at 410 MHz and stop at 411 MHz. Devote an entire day or at least an evening to each of the remaining steps.

As you can see, nine days will be required to search the entire federal band. At first glance, that may seem like an overly drawn-out procedure. Actually, it is the minimum amount of time required to produce reliable results. Individuals that monitor frequencies on a professional basis, are often assigned to a one megahertz step for months!

Scanning with style does not mean spending thousands on equipment.

Isn't it ironic -- satellite dishes legally intercept pay TV signals for free. Yet the scanner buff, merely by monitoring a cellular conversation, is breaking the law.

Using Your Equipment

Very few scanner owners use an attenuator. Attenuators are rated according to how many dB's of signal strength they limit. To the novice, an attenuator seems to be defeating the need to erect a high gain antenna with low loss cable. But the attenuator will often reduce incoming noise and may even help to eliminate out of band signals. Experimenting with several different dB ratings will help determine which attenuator is the best for your particular monitoring needs.

By installing a simple A/B switch, the attenuator can be switched in and out of the antenna line as needed. Best of all, attenuators can be purchased from Radio Shack for just a couple of bucks.

Fanny Scanning

A recent nationwide survey discovered that 98% of Americans are overweight. Do you want to shed a few pounds while still enjoying the hobby of scanning? Then try "Fanny Scanning."

Here's how to do it: take a small note pad and pencil and go for a walk around the block! Along the way, jot down the locations of any communications antennas that can be seen. Gradually increase the distance of your walk until every commercial antenna within a three mile radius of your home has been logged into your notes. After several weeks, your antenna sites will probably include fuel oil delivery trucks, utility repair vehicles, taxi cabs, hospitals, schools and local merchants.

Once the antenna site is found, try to discover the operating frequency by contacting your scanner club or through scanner publications. If the frequency remains evasive, don't be bashful. Politely walk into the establishment and ask for their operating frequency. If your inquiry is not appreciated, simply excuse yourself and search for the frequency on your scanner or use a frequency counter.

After logging all the antenna sites within a three mile radius, expand your coverage to four or five miles. Don't forget to take your hand held unit along with a set of head phones. Most people will just think that you are listening to a Walkman and not to the entire community!

During your walks, don't neglect those odd shaped antennas that are towering over the homes of ham radio operators. Most hams would welcome your visit and will proudly show off their "Shack." In fact, they may even be able to supply some additional frequencies to monitor.

When you do lose a few pounds by "Fanny Scanning", drop me a note stating the amount of weight you lost and I'll send you a small, but very handy scanning aid.

Still Want to Scan? Then Write!

Satellite TV owners have successfully lobbied and won victories that provided them free access to the airwaves. On the other hand, scanner owners did little to stop the passage of the Electronics Communication Privacy Act of 1986. As a result, satellite dishes that intercept pay TV signals are perfectly legal. But the scanner hobbyist, by simply monitoring a cellular car phone conversation, is breaking the law.

If you enjoy the hobby of scanning, develop a writing style as well as a scanning style. Write your congressman, your senator or write directly to the President -- but write. Otherwise, the corporate pen that placed a "lid" on cellular monitoring, may also try to take away your "electronic can opener."

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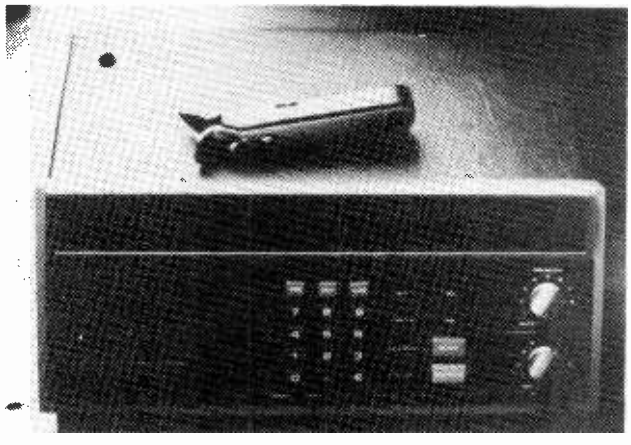
Is your can opener more important than your scanner?



A Monitoring Times Exclusive!

New Four-Digit Number Site Found

"And ye shall know the truth and the truth shall make you free."

John, VIII: 32

by Garganta La Profunda

It has been decades since the first shortwave listener, listening sleepily to his radio late at night, was puzzled awake by one of those mysterious transmissions, now commonly known as "numbers" or "spy" stations.

For some, the eerie, mechanical female voice that speaks strings of seemingly meaningless numbers, has become a nightly companion. Like the smile of an attractive woman across the barroom floor, the transmission beckons seductively but when approached, demurs. It is maddening.

These broadcasts can be found all over the shortwave bands. Like the smiling woman in the bar, they make no effort to hide themselves. Numbers stations have powerful transmitters. Turn your back for a minute, however, and they are gone, faded into the low lights and smokey atmosphere.

"I would say," says well-known 'numbers' authority *Havana Moon* in his book, *Uno, Dos, Cuatro*, "that for one *not* to hear this 'semi-bionic' femme is just about impossible. And she has been [at it] for at least a quarter of a century. You'll have to admit that a quarter of a century is a long time in the life of a mystery..."

Slowly, ever-so-slowly, however, the Spanish-speaking lady with the mechanical voice has been giving up her secrets. Back in 1984, *Monitoring Times* revealed for the first time that at least one of these stations was based in the United States. That transmitter, broadcasting four-digit numbers in Spanish, was discovered in Warrenton, Virginia. (See also *Monitoring Times*, May, 1988, "Utility World.")

Now *Monitoring Times* reveals the location of yet another four-digit, Spanish language numbers station: the state of Florida.

The exact location of this 2100 UTC/4670 kHz number station is 26 degrees, 56 minutes north and 80 degrees 5 minutes west, just to the south of Jupiter Inlet. An aerial examination of the site revealed three circular HF antennas forming a triangle.

Due to the methods used, specific information on how this new numbers station was discovered cannot be disclosed. However, rest assured that the disclosure comes from a very reliable, highly-placed source. The information has been cross-checked and proven accurate and conclusive.

A Federal Connection

A microwave receiving antenna was also noted and transmissions in the 2 GHz range aimed at this antenna were monitored coming from a passive repeater to the south of Jupiter Inlet. These transmissions were eventually traced further south to their source atop the Federal Building in Miami, Florida.

Transmissions on this microwave link appeared to be data that our *MT* source says is then decoded at the numbers station site and synthesized into the voice transmissions for broadcast.

This number station site reportedly is owned and leased to the federal government by RCA communications. RCA also owns and leases to the federal government the HF transmitter communication complex at Malabar, Florida, long believed to be another site for numbers transmissions.

The Spy Connection

In a related development, another anonymous source has forwarded to *MT* an Italian-to-English translation of a very revealing interview concerning four-digit number transmissions.

In the interview which appeared in the October 10, 1987, issue of the respected Italian weekly publication *Europeo*, Mario Casagrande claimed to have spent twelve years working as a double agent loyal to Cuba and the United States.

Here is that portion of the interview concerning American numbers broadcast. *MT* readers will find this interview very enlightening as to the nature of four-digit spy number transmissions.

Q. How did the CIA remedy these difficulties with the microdot?

A. Raphael decided that I would receive radio messages. So, in the middle of August, 1979, I returned to Mexico City for another training class on the use of the radio.

Q. What were the transmissions like?

A. We agreed on two daily transmissions at 7 PM and 8 PM. This schedule coincided with my practice of spending a couple of hours working in my study just before dinner. The CIA was very concerned that I did nothing to alter my daily routine to encourage curiosity and suspicion. The message was transmitted in code on two different shortwave frequencies. The radio that I used was a Sony bought in an electronic appliance store in Panama, which the CIA suggested to me.

Q. What kind of code system was used?

A. Every message was sent with the simulated female voice known to us as Cynthia from Langley. It began with ten minutes of identification, during which a series of three digit numbers was transmitted. If the middle digit was even, it meant that a message would follow. When they didn't have anything to tell me, that digit would be odd. In this case, the message that followed was unintelligible. In any case the transmission took place every day.

Q. How did you decipher it?

A. The message itself consisted of a series of four digit numbers. Normally, there were no more than 250 numbers, the equivalent of three pages of a big pad of graph paper. Once the numbers were transcribed, I took a tiny pad full of numbers, that had been given to me by the CIA, to decipher the radio messages. This also consisted of a series of four digit numbers. There were about 3000 numbers, so that it could last for months and months of transmissions.

To decipher the message, I had to subtract the numbers received by the radio from those written on the tiny pad. The results were numbers between 1 and 26, equalling the number of letters of the English alphabet. The number 1 corresponded to the letter "A", 2 to "B" and so on. This system is absolutely unbreakable by anyone without the tiny pad, and every message is decipherable only by the pad of the agent to whom it is sent. In the case that the pad should fall into the hand of the enemy, it is possible to decipher messages for a limited period of time only.

Q. What were the messages about?

A. They were requests for information, or operational messages, with which meetings in Havana were set up, or plans for trips abroad.

Q. With what frequency were the messages sent?

A. Considering that I was often abroad, I think that in Cuba I was receiving about 35 messages each year.

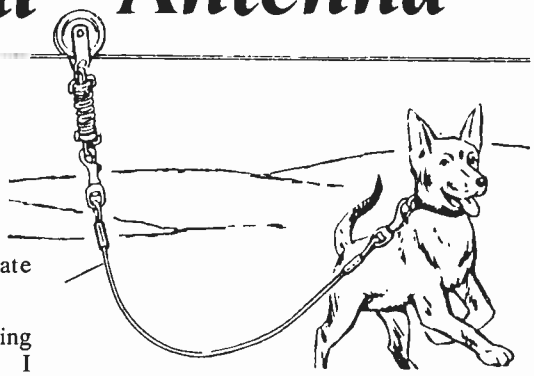
Q. When you travelled, what happened?

A. Transmissions were sent on normal frequencies, and therefore the CIA knew they were intercepted by the Cuban counter-espionage. To avoid any connection to my presence in Cuba, during my trips they would interrupt the transmissions a few weeks earlier, or they would continue even when I wasn't there.

There is no shortage of speculation as to the purpose of the numbers transmissions: instructions for spies in the field (both theirs and ours), disinformation by the CIA, a HF back-up for the Washington-Moscow hot line (both started at about the same time), international banking information, a beacon for extraterrestrials. Or nothing.

MT Reviews:

the Halfwave Dog-Pull Antenna



"This will never do," I thought, "a dog attached to my antenna!"

by R. F. Burns

It all started with an atomic fireball--one of those huge red jawbreaker candies filled with cinnamon, the kind I hadn't seen since I was a kid.

In the middle of my Saturday morning errands, I saw a jar of atomic fireballs in the drugstore. I bought a couple and headed down the street.

As soon as I popped one in my mouth, the snap of the cinnamon brought back my earliest memories of radio: DXing AM stations after being sent to bed. The cheek-stretching atomic fireball was the candy of choice for my under-the-covers operations.

The next item on my errands list was wire from the hardware for a halfwave dipole.

"Ah'd lahk sum wahr fer a heffwave dugpull," I said to the clerk in the hardware, my mouth distorted by the gigantic sphere of confectionary.

The clerk blinked and asked me to repeat myself. With effort, I shifted the atomic fireball to the other cheek and tried again, carefully. "Ah'd like some wah-er fer a half-wave dog-pull," I said, pointing to a hank of lightweight bell wire.

The clerk nodded and disappeared. He reappeared with a plastic bag.

It contained about 75 feet of vinyl-coated aircraft cable, hooks, clamps, screw eyes, and shock-absorbing springs. In the middle of the cable was a curious-looking pulley arrangement with a downlead. (Frequency adjustment, I thought.) Altogether, it looked like a complete kit for a dipole strong enough to withstand a moderate earthquake. I paid for it and left.

I can always use a little extra help putting up an antenna, so when I got home, I whistled up Ralph, an 11-year-old who lives next door. He's just getting into radio and likes to help with these projects. He's a nice kid, and I encourage him to ask questions whenever he doesn't understand something.

Since slopers have been getting such good ratings in the tests, I decided to try installing this antenna as a sloper. We attached one end to a tree at ground level, then I climbed a neighboring tree to make the stretch for the other end.

I had just finished attaching the high end when Ralph said, "Mr. B., what's that pulley for?"

I grabbed it and began to explain: "Ralph, that's so you can slide it back and forth and adjust the resonant frequency of the antennaWHAAAhoOOOOOoooooo!" Suddenly I found myself at the low end of the sloper, in the hyacinth bushes.

"Mr. B., what does 'WHAAAhoOOOOOooooo!' mean?" Ralph asked.

"It's a radio term that means I slipped because the *#@%& branch was wet," I snarled.

"Mr. B., what does '*#@%&' mean?" Ralph inquired.

"It means Larry Miller and Bob Grove run a G-rated publication, and, besides, I think your mother is calling you." Ralph said he didn't hear his mother, but he left anyway.

I reinstalled the antenna as a horizontal dipole, hooked it to my receiver, and got nothing but noise. I tried an end-fed configuration and still got only noise.

I was desperate, trying to figure out what had gone wrong, when suddenly the receiver crackled to life. I spun the dial, Europe, Asia, South America, even the African stations were booming in! "What a great antenna! The tropical bands are mine!" I cackled.

I dashed into the living room exclaiming to my wife how pleased I was with the new antenna.

"Antenna?" she said, looking out the window.

I looked too. There was Spot, our beagle, trotting happily back and forth, attached to the frequency adjustment pulley on my new antenna!

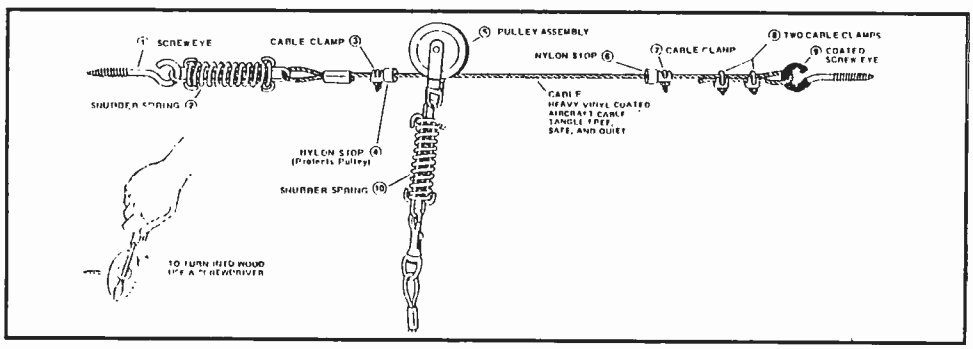
"This will never do," I thought, "a dog attached to my antenna!"

Then my mind flicked back to the scene in the hardware store that morning. I *had* asked for "some wah-er fer a halfwave dog-pull."

I just smiled, popped another atomic fireball into my mouth, and went in to listen to the African stations.

Moral

Although atomic fireballs taste pretty good, avoid them when ordering radio gear. And if you are installing an antenna, make sure it is properly "hounded." ■



International DX Report

Glenn Hauser
Box 1684 - MT
Enid, OK 73702

Consider yourself fortunate you live in a country where shortwave listening is a constitutional right (even though most citizens fail to exercise it). Three depressing examples of the contrary:

Ordinary Iraqis cannot buy shortwave radios because the regime does not want people to hear anything but its carefully censored news. Also banned or controlled: foreign newspapers, magazines, typewriters, photocopiers, cameras, binoculars (Closed Society, Knight-Ridder News, March, via Ernie Behr, World of Radio).

Use of satellite monitoring equipment to receive foreign broadcasts has been declared illegal by the Nigerian government. Information Minister Prince Tony Momoh also announced the government's intention to acquire radios that would tune only broadcasts from FRCN and state radio stations. Investigations aimed at apprehending people who monitor foreign broadcasts have begun (African News, April 4, via Al Quaglieri, WOR).

Radio Prague sent several people on a "Tatra expedition" to czech on reception quality in the Americas. No problem in Canada; the FBI tailed them across the U.S.; but in Guatemala they were arrested and detained as spies. The evidence? A van full of high-tech electronics gear, namely a Sony ICF-7600. (Sweden Calling DXers) Whew, glad we made it through Guatemala with a DX-400; if they reached Nicaragua, perhaps a warmer reception awaited them.

Ascension: Another low-power, high-frequency propagation beacon is BBC fourth harmonic 24020, on the air at 2000-2245 UTC, including the otherwise inaudible African Alternative, Sundays 2100-2200 on 6005 kHz.

Australia: Radio Australia's new transmitter site at Brandon, Queensland, may go on the air by the end of this month. Three 10-kilowatt units and a rotatable log-periodic from the recently-closed Lyndhurst, Victoria, site have been installed at the existing 4QN (mediumwave) facility, the better to serve Papua New Guinea, Solomons. By year's end, 100 kilowatt transmitters and 2x2 curtains (best for short hops) should be on line (Ron Place [?], Radio Australia's Controller of Technical Services, on *Communicator*). Disregard the listings for VLH and VLR on page 9 of May *MT*; they have been closed down. VLM and VLQ may be next.

Austria: We now confirm morning English language broadcasts on 15320 kHz which have been retimed to 1130 UTC. This includes *Shortwave Panorama*, Sundays at 1134 UTC. For the summer, evening English is on 9875 kHz at 0030 and 0430.

Belgium: Here's the new program lineup from BRT, Brussels Calling: afternoon programs Monday through Thursday are repeated the next morning. News and Press Review open each broadcast Monday through Friday. Features which follow: Monday; *Europe*, Sports. Tuesday; *The Arts*, *P O Box 26*. Wednesday; *Economics*, *Musical Roundabout*. Thursday; *North-South*, *Economics*. Friday afternoon; *Tourism*, *The Arts*. All Saturday programs: *Radio World*, *Music through the Ages (in Flanders)*. Sunday afternoon; *Fourth Community*, *P O Box 26*, *Cooking*. Monday morning; *P O Box 26*, *Cooking*. Listen daily at 2100 UTC on 9925 kHz, daily except Sunday at 2330 UTC on 9925 kHz and 1330 UTC on 15590 kHz (via Kraig Krist, VA).

Bolivia: The government is trying to move stations inside the 60 meter band. Rogildo F. Aragao suggested 4750 kHz for R.C.V.U., La Voz del Tropico, formerly on 4450, but the engineer fudged it to 4748.4 to avoid China. Comments on whether reception has improved, covering at least 15 minutes, and including 2 IRCs will be answered if sent to Aragao at Casilla 2250, Cochabamba. He also reports a new station, Radioemisoras 17 de Julio, Huanuni, at 1130 UTC on 6326.7 kHz although it announces 6120. Another new one sounded like Radio Paiscauna, Cobija, at 0158 UTC on variable 4404.5; and Radio Sararenda, reactivated 4886 kHz at 1130 UTC, at least temporarily for tests (WOR).

Canada: Radio Canada International's 15325 kHz frequency is synonymous with Sackville, but not this summer. The east European service at 1330-1630, including English at 1445 UTC, pulls a site switcheroo: 15325 is Daventry, England; 15305 is Sackville, and until 1500 UTC, 15160 is Sines, Portugal. After 1630, 15325 kHz is still Sackville.

Newfoundland, which likes to be in step with India and Afghanistan rather than the rest of Canada, is trying double-DST this summer, UTC minus 1-1/2. This should affect the schedule of CKZU, 6160 kHz. Next fall, back to minus 3-1/2. (via Carlos Coimbra, Toronto, WOR). In the meantime, we assume CBC must now say "a sesquihour later in Newfoundland."

Ideas at 9:05 P.M. local time elsewhere in Canada: May 30, *Giving Children the Vote*; June 1, and 8, *Just Desserts: Women and Food*; June 13-14, *East and West Germany Today*; June 20-21, *The Berlin Blockade*; June 27, *Bicycles: Wheels of Change*. (CBC *Radio Guide*)

Canary Islands: Aussie DXers are excited about local programming from Tenerife, but we think it's nothing new. Check 15365 kHz in Spanish from 2205 on Radio Exterior de Espana.

China: *Monitoring Times* editor Larry Miller and I can attest that being the guests of Radio Beijing in the People's Republic of China is a goal well worth pursuing. Your current chance is RB's 1988 competition, on the theme "China in My Mind." Essays up to 2000 words, travel notes or poetry (no length limit) must be posted no later than June 30 to English Department, Radio Beijing, Beijing, China. Include your name, sex, age, nationality, occupation, country, work unit and address. Three prizes are a 5-day tour of Beijing, including free airfare; many lesser prizes and dragon souvenirs for all entrants. Winners will be announced August 1.

A former Radio Beijing producer was the guest of a Canadian shortwave club. He says low wages of C$30-50 a month lead to high turnover in staff; waiters and cabbies earn more.

Typo last month: 9690, not 9590 via Spain at 0500. See also MALI.

The mysterious Chinese numbers often heard on 8300 kHz have also appeared on 15387, at 0716 and 1612 UTC (Bruce MacGibbon, OR, DX-Spread).

Colombia: Radiodifusora Nacional has been quite active on reduced carrier USB, varying 17708.65 to 17708.85 kHz (Ernie Behr, ON.) Heard as early as 1505, as late as 0330 UTC (Mike Harla, NJ, both RCI *SWL Digest*)

Costa Rica: Radio for Peace International moved its weekday 2100-2400 UTC broadcast to 13660 kHz. Interference is lower but as the *MT* propagation charts show, that band is too close to LUF absorption. It's beamed due north, while 7375 at 01-04 goes northwest. We're urging them to move up to 17, 21, or 25 MHz in the afternoons. Transmitter power is soon expected to double, to 2 KW. Friends of RFPI changed to a $25 requested donation, worldwide. Appropriately, hour-long speeches from the Beyond

War movement now air Tuesdays at 22, Wednesdays at 02. Two-minute Earthwatch features on environmental topics can be heard daily at 23 and 03.

France: Another reorganization in English from RFI: 1245-1310 to us on 15365, 17720, 21645; to Europe on 9805, 11670, 15155, 15195; 16-17 on 17795, 17620, 15360, 11705, 9860; 0315-0345 to us on 9800, 11670, 11995, elsewhere on 6175, 7135, 7175, 9550, 9790, 11700, plus a bilingual DJ between 03 and 05. A French lesson appears on the Saturday 1245 and 16 broadcasts; mailbag on Sundays. Latin America Notes airs Sundays after 16, Mondays 0315, Wednesdays 1245 and 16, Thursday 0315.

Germany, West: Another phone number to add to our April column: 49-221-389-4555 for colorful commentator on Deutsche Welle, Larry Wayne. He's usually in his office until 1600 UTC (Ivan Grishin, DX Ontario).

Israel: Summer channels for Israel Radio include 15585, 15485, 13625 and 11605 at 19; the same minus 15485, plus 12077 at 2130; 12077, 11605 and 9435 at 23, 00 and 01 (Bezeq)

Japan: Radio Japan's revised feature pairs, 15 minutes each at 1126 and 1141 UTC on 6120 kHz, next UTC day 0130 and 0145 UTC on 5960 kHz, both via Canada: Monday; *Japan Travelogue, Crosscurrent*. Tuesday; *Asia Now, Let's Learn Japanese*. Wednesday; *Radio Japan Journal, Japan Panorama*. Thursday; *In Business, Asian Crossroads*. Friday; *One in a Hundred Million, Let's Practice Japanese*. Saturdays; the entire hour is called *This Week*. Sundays are different; 1121 *Hullo* [sic] *America*, UTC Mondays 0125 *DX Corner*, both followed around :44 by *Meet the People* (via Bruce MacGibbon, WOR).

Kampuchea: After many years, Phnom Penh has reactivated 4907 kHz, heard at 1230 UTC in parallel with 6090 kHz (Mitch Sams, KS, *SWLD*)

Mali: No one but Baghdad would dream of diffusing in the middle of the night on 13 meters; so it's fortunate that the Radio Beijing relay is so "dirty," transmitting the sum of 9770 and 11715 on 21485, heard by Bob Hill in Massachusetts before and after 0100 UTC. He's also picked up the second harmonic of each, and of Mali itself on 23921 kHz at 1500 UTC (SWLD).

New Zealand: Radio New Zealand's new winter schedule, thru September 3: 1830-2115 on 12045, 15150; 2345-0145 (Saturdays and Sundays to 0330) both transmitters on 15150; 0345-0730 on 15150, 12045; 1030-1215 on 6100, 9540 (SWLD)

Nicaragua: La Voz de Nicaragua has international bilingual Spanish-English programming at 0000 to 0300, English 0300 to 0400 and 0600 to 0700, on 6100 kHz (Lic. Freddy Lopez Quiroz, Dir., SW Dept., March 7, via Mel Thiele, CA)

Norway: Lest you think your receiver selectivity has gone wacko, be advised that Radio Norway has scheduled "blanket" broadcasting at 1400 to 1445 UTC on 15295, 15300, 15305 and 15310 kHz, each to a different target (via Mick Ogrizek, Australian DX News)

The Frederiksted site is no longer in regular use; just for brief special tests (*MT*'s Joe Hanlon, ADXN)

Peru: Radio del Pacifico has shown up on 9949.83 or so, which happens to be twice 4975 but this is so strong it may be a deliberate replacement for 9675, heard as early as 1116 to sign off at 0433 UTC (Ed LaCrosse, CA; Ernie Behr, Ont; Werner Rutsch, Switzerland, *SWLD* and *WOR*) Another occasion around 00 they were on 9944.36 (Rutsch and Dario Monferini, *Play-DX*)

Poland: Seemingly taking a cue from Budapest, Radio Polonia has also retimed its English to us: 2305 to 2355 UTC on 7270, 7145, 6135 and 5995 kHz (David Cole and Ken Kuzenski, LA, *WOR*)

Spain: Rare languages dept.: Ladino (Sephardic) from Spain, Thursdays from 1800 to 1830 UTC is now scheduled on 17890 kHz.

Where will it all end dept.: Another reader, Michael A. Bell in Rota, Spain, hastens to clarify that the costumes have no connection with the KKK -- and sends along a couple of "mud dolls" portraying them. Thanks, Michael, they're real cute little "coneheads."

UKOGBANI: *Brain of Britain*, the superb radio quiz show, is back for a long 1988 season on the BBC World Service, Sundays 1830, Mondays 1215 and Wednesdays 0830 UTC. Other great listening in June: *Radio Active*, the sitcom set in a radio station, Wednesdays from the 22nd at 1530 UTC, Thursday at 0030 and 1030 UTC (except for the monthly satirical review *Two Cheers*, 29th-30th). *The Politics of Laughter* runs six weeks into July, Mondays at 2315, Wednesdays 1515, Fridays 0530.

Already underway in May, *Behind the Wall*, readings of Colin Thubron's account of a journey through China, continues with June chapters: *On the China Sea*; *Eating in Canton*; *In Mao Zedong's Bed*; and *The Journey North* -- Mondays at 0430 and 0815; Fridays at 2145 UTC. The solemn but colorful traditional ceremony *Trooping the Colour* can be heard live on Saturday the 11th at 1001 UTC, with edited repeats of the broadcast at 1830 and Sunday 0230.

There's a two-part behind-the-scenes look at such celebrations, Monday 13 and 20 at 2030 UTC and Tuesday at 0230 and 1030 UTC. *200 Years of Music in Australia*, from Aboriginal to contemporary, starts on the 27th, Monday 1715; Tuesday 0030, 0830. *Music of the Royal Courts* is anything but baroque; three programs feature Burma and Taiwan; India; and Mali -- until the 21st at the same times. (*Review of International Broadcasting*)

Uruguay: CXA3 is again active on 6075.3 but the call has been reassigned to La Voz de Artigas, using a north-south dipole and homemade 400-watt transmitter, soon to be replaced by a 2.5 KW unit (Daniel Munoz Faccioli, Montevideo, DX Club del Uruguay) Heard as early as 1300 UTC and as late as 0200, it may be on from 0900 to 0400 like 1420 kHz (Gabriel Ivan Barrera, Buenos Aires, *SW Bulletin*) Unfortunately for these guys, station only wants to QSL reports beyond 500 km.

USA: Cuban troops in Angola soon will hear Radio Marti urging them to defect, says Jorge Mas Canosa, chairman of the Cuban-American National Foundation (St. Pete *Times*, April 6, via Rusty Serenberg, WOR). Must mean relays via VOA Botswana or Liberia, if not courtesy the South African-based clandestines.

VOA's *Concert Hall*, May 29th at 1410 and 2010 UTC, plays and interviews the Cleveland String Quartet.

Venezuela: YVTO seems bent on becoming not only a time-signal but a standard frequency station, by moving from 6100 to 5000 kHz, noted April 14 around 0500 by Mike Harla in New Jersey. They were still a hefty 5 Hz away from being zero-beat with WWV, with which they are likely to interfere in fringes of the U.S. Their time was off too, lagging slightly behind WWV. However, April 17 at 1024, Don Moore in Ohio found YVTO back on 6100. We know where Freddy Lopez would like them to stay.

☆ ☆ ☆

You can hear Glenn Hauser's DX news every week over Radio Canada International's SWL Digest: Saturday 2021 on 17875, 17820, 15325, 11945, 9555, 6030; 2151 on 17820, 15150, 11880; UTC Sunday 0021 on 9755, 5960; Sunday 2321 on 11730, 9755; Tuesday 1247 on 9625, 11855, 17820. A much broader range of information appears on World of Radio, via WRNO, New Orleans: Thursday 1515 on 11965, UTC Friday 0030 on 7355, Saturday 0300 on 6185, 2330, on 13760, Sunday 1800 on 15420; and via Radio for Peace International, Costa Rica, Tuesday 2300 on 13660, Wednesday 0300 on 7375; Friday 2100 and Saturday 0100 on the same.

Review of International Broadcasting, specializing in shortwave programming and comment, also with Satellite Watch and Radio Equipment Forum columns, can be sampled for $2; 10 issues for $21. Same rates apply to DX Listening Digest, country-by-country loggings, schedules, station news, plus Enjoying Radio section; or both for $40, from Glenn Hauser, Box 1684-MT, Enid, OK 73702. (Rates apply to USA, Canada, Mexico; US funds only on a US bank or postal money order)

Broadcast Loggings

English broadcast unless otherwise indicated

0006 UTC on 11715
Mali: Radio Beijing relay. China's "Year of the Dragon" dicussed in depth. (James Kline, Santa Monica, CA)

0020 UTC on 9962
Clandestine: Radio Caiman. Spanish. IDs between each musical selection. Newscast covering U.S., USSR, and Cuba. (Leslie Edwards, Doylestown, PA)

0023 UTC on 7355
USA: WRNO. Howard Cosell report with gum commercial and ID for WRNO. (George Neff, Tampa, FL) (welcome to FL!-ed)

0030 UTC on 15473.7
Antartica: Radio Nacional Arcangel San Gabriel. Spanish. Closing IDs and station information at 0032 UTC. (Stanley Mayo, Westbrook, ME)

0030 UTC on 5910
Belgium: BRT. Tolling bells interval signal and Radio World shortwave program. (Mike Loran, Azusa, CA)

0032 UTC on 6200
USSR-Ukraine: Radio Kiev. Political editorial, Shortwave Listener's Program, and Ukrainian folk music. (Bruce Gilson, Silver Springs, MD)

0043 UTC on 6210
Pirate: North Sea-Radio Caroline. British and U.S. pop music from the Four Tops and Billy Ocean. IDs with Canadian lottery information. (New address for reports: RSI Communications, 54 Plainfield Ave., East Rockaway, NY 11518-1230. - Thanks, John Tuchscherer! -ed)

0115 UTC on 11490
Clandestine: Voice of Unity. Arabic. Pro-Afghan Rebel radio with Koran recitations and talk about Afghanistan and Algeria. Presumed newscast discussing Iraq, Washington D.C., and Pakistan. (Larry Van Horn, Orange Park, FL)

0120 UTC on 17880
USSR: Radio Moscow-Siberia/Irkutsk. Items on the increase in trade between the USSR and Vietnam. (Garie Halstead, St. Albans, WV)

0120 UTC on 3220
Ecuador: HCJB. Quechua. HCJB regional service with IDs and Ecuadorian guitars with flute music. (J.C. Brownlee, Laurens, SC)

0120 UTC on 6150
Costa Rica: Radio Impacto. Spanish. Canned "Impacto" ID and Latin pop music. (Al Rayment, Nelson, B.C.,Canada)

0130 UTC on 6550
Lebanon: Voice of Lebanon. Arabic. Contemporary American piano music to 0213 UTC, and world newscast. (J.C. Brownlee, Laurens, SC)

0138 UTC on 9575
Italy: RAI. Chirping bird/bell interval signal and "Radio RAI Italy" ID. Italian newscast at 0145 UTC. (Mike Loran, Azusa, CA)

0150 UTC on 4980
Venezuela: Ecos del Torbes. Spanish. Latin pop vocals with "canned" IDs and local ads. (George Neff, Tampa, FL)

0151 UTC on 3927
South Africa-Transkei: Capital Radio. Pop music with usual amateur radio interference at 0200 UTC. Schedules still indicate this as a 0300 sign-on, though logged earlier. (Bruce MacGibbon, Gresham, OR)

0200 UTC on 4970
Venezuela: Radio Rumbos. Spanish. Rapid-fire station IDs with pop and Venezuelan music. (George Neff, Tampa, FL)

0244 UTC on 9695
Sweden: Radio Sweden. Interview and commentary on the benefits of the Swedish health care, compared to North America's. (Mike Loran, Azusa, CA)

0245 UTC on 5040
USSR-Georgian SSR: Radio Tbilisi. Georgian. Musical excerpts from Megrelian by Otar Taktakishivili. Several mentions of Tbilisi. (Martin Peck, Bronx, NY)

0255 UTC on 11825
Tahiti: RFO. French/Tahitian. French love songs and island music. IDs with the mention of "Papeete." (Robert May, Montgomery, IL)

0300 UTC on 4790
Peru: Radio Atlantida. Spanish. Peruvian music with ID at 0310 UTC. (Frank Mierzwinski, Mt. Penn, PA)

0300 UTC on 9475
Egypt: Radio Cairo. Program feature presentation of The Moslem World. (Alan Rayment, Nelson, B.C., Canada)

0320 UTC on 3260.8
Ecuador: La Voz del Rio Carrizal. Spanish. Closing sign-off message with ID, city, and 0330 UTC sign-off. (Rod Pearson, St. Augustine, FL)

0340 UTC on 3395
Ecuador: Radio Zaracay. Spanish. Spanish pop tunes with local commercials and "canned" station IDs. (David Heitzinger, Dover, DE)

0350 UTC on 5955
Malawi: Malawi Broadcasting Corp. African drum music with native chanting. English news on Afghanistan at 0400 UTC followed by the Chichewa language. Dominant VOA interference returns at 0407 UTC peaking by 0417 UTC. (Tom Roach, San Jose, CA) (Good time to catch this station is during this brief "window" while VOA is off.-ed)

0401 UTC on 2360
Guatemala: Radio Maya de Barillas. Spanish. Numerous Spanish music tunes with titles and IDs. (Frank Mierzwinski, Mt. Penn, PA)

0405 UTC on 4679
Ecuador: Radio Nacional Espejo. Latin American music followed by two clear IDs. Station recently reactivated. (Bruce MacGibbon, Gresham, OR)

0432 UTC on 11760
Cook Islands: Cook Islands Broadcasting Corp. Prayers with religious music and sermon until 0435 UTC. Also heard at 0757 UTC with island music and phone-in music request. (Bruce MacGibbon, Gresham, OR)

0502 UTC on 4904
Chad: Radiodiffusion Nationale Tchadienne. French/Vernaculars. Native African music with tribal chanting. Male announcer in both languages with chat and IDs. (Frank Mierzwinski, Mt. Penn, PA)

0520 UTC on 9665
South Africa: Radio Five. Station "5 on 5" promotion for five rock music selections in a row, and local commercials. (Tom Patterson, Wisconsin Rapids, WI)

0530 UTC on 7285
South Africa: SABC-Radio Oranje. Music and news report on severe flooding, with evacuations in the provinces. (Donna Robinson, Willow Springs, IL)

0533 UTC on 4815
Burkina Faso: RTV Burkina. Native African music and accordion instrumentals. Time pips with station ID at 0600 UTC. (Tom Roach, San Jose, CA)

0551 UTC on 7255
Nigeria: Voice of Nigeria. Station ID and national news of Nigeria. Very good signal. (Mike Loran, Asuza, CA)

0635 UTC on 4870
Benin: ORTV Du Benin. French. Indigenous African music with group singing. Station ID including mention of city Cotonou. (David Heitzinger, Dover, DE)

0646 UTC on 3366
Ghana: Ghana Broadcasting Corp. Religious message with music and station address. Drum beat interval signal, and "GBC" ID at 0700 UTC. (Frank Mierzwinski, Mt. Penn, PA)

0704 UTC on 6160
Canada: CKZU-Vancouver. News, sports, regional weather, and classical music. (Donna Robinson, Willow Springs, IL)

0754 UTC on 4850
Venezuela: Radio Capital. Musical mix of U.S. pop tunes and Latin styles. Radio Capital ID. (Cliff Goodlet, Chattanooga, TN)

0844 UTC on 3945
Vanautu: Radio Vanautu. French/Bislama. Music from the Supremes, Marvin Gaye, and the Commodores. Cultural program, Big Band music, and clear stations IDs. Heard past 1000 UTC in north Florida.

0940 UTC on 9540
USSR-Uzbeck: Radio Tashkent. Newscast, station ID and Listener's Opinion program. (James Kline, Santa Monica, CA)

0943 UTC on 2325
Australia: VL8T-Tennant Creek. Classic piano instrumentals with chat and ID. Parallel frequency 2310 very weak!

0955 UTC on 9540
New Zealand: Radio New Zealand. Night and Day musical program with ID break. (James Kline, Santa Monica, CA)

WORLD RADIO NEWS

Let other readers know what you're enjoying.
Send your loggings to ***Gayle Van Horn***
160 Lester Drive, Orange Park, FL 32073

1000 UTC on 4920
Australia: ABC-Brisbane. Introductory comments for opera music program. Weak signal with local interference. (Mark Swarbrick, Thorndale, PA)

1002 UTC on 2485
Australia: VL8K-Katherine. Music appreciation text on the history of opera, with numerous selections from Carmen and Don Giovanni.

1017 UTC on 3375
Brazil: Radio Nacional-Sao Gabriel da Cachoeira. Portuguese. Nacional IDs with frequency and city location. Announcer chat and frequent Brazilian pop tunes.

1020 UTC on 5020
Solomon Islands: Solomon Islands Broadcasting Corp. Friendly talk from man and lady, no commercials noted from very weak signal. Parallel frequency 9545 kHz heard. (Mark Swarbrick, Thorndale, PA)

1035 UTC on 4845.2
Bolivia: Radio Fides. Spanish. Bolivian folk style tunes with "Fides" ID. (Rod Pearson, St. Augustine, FL)

1055 UTC on 6170
Columbia: La Voz de la Selva. Spanish. Local area commercials with station IDs at 1059 and 1110 UTC. (Cliff Goodlet, Chattanooga, TN)

1100 UTC on 9665
China: Radio Beijing. "East is Red" interval signal with station ID. National news of China and press reviews from Chinese newspapers. (Joseph Johnson, Savannah, GA)

1114 UTC on 6575.9
North Korea: Radio Pyongyang. Editorial on the United States, Japan, and 1988 Summer Olympics. Upper side-band interference on 6577 from American Airlines. (Stanley Mayo, Westbrook, ME)

1133 UTC on 4753
Indonesia: Radio Republik Indonesia-Ujung Pandang. Indonesian. Asian flutes and percussion music between news topics. (Tom Roach, San Jose, CA)

1230 UTC on 15525
Bangladesh: Radio Bandladesh. International news with commentaries and Bangalees music. (Stanley Mayo, Westbrook, ME)

1245 UTC on 9700
Philippines: Radio Veritas. Evangelical programming of music and discussion. (Donna Robinson, Willow Springs, IL)

1253 UTC on 5025
Cuba: Radio Rebelde. Spanish. Cuban music of congas and easy-listening. (David Heitzinger, Dover, DE)

1337 UTC on 11900
Saipan: KYOI. English pop/rock music tunes with ID. (Harold Frodge, Midland, MI) Also logged while in Hong Kong.

1340 UTC on 21540
Germany-GDR: Radio Berlin International. GDR national news with sports roundup. (Frank Mierzwinski, Mt. Penn, PA)

1432 UTC on 3905
India: AIR-Delhi. World newscast. Heard on weaker parallel frequency of 4860 kHz. Observed on 11830 at 0233 UTC with news in Hindu and English and a 0250 sign-off. (Bruce MacGibbon, Gresham, OR)

1440 UTC on 3799
Iran: Voice of Islamic Republic Iran. Farsi. Koran recitations to 1458. Farsi announcements with parallel frequency 4990 kHz. Similar format at 0247-0250 on 4990 kHz. (Bruce MacGibbon, Gresham, OR)

1444 UTC on 15160
Mexico: La Voz de America Latina. Commercials, IDs and time tips tone signal at 1459 UTC. (Cliff Goodlet, Chattanooga, TN)

1450 UTC on 4950
Malaysia: Radio Television Malaysia-Sarawak. Newscast and Stock Report for Kuala Lumpur. (Terry Coker, Cucamonga, CA)

1500 UTC on 11790
Indonesia: Voice of Indonesia. Station ID with local area news and OPEC commentary. (James Kline, Santa Monica, CA)

1535 UTC on 9670
Philippines: FEBC. World and national Philippine newscast. ID as "Radio FEBC International." Rick Stevens presents Soundwaves show of contemporary gospel music. (Harold Frodge, Midland, MI) (logged from Hong Kong)

1540 UTC on 15630
Greece: Voice of Greece. News story on United States and Greek relations. (Mike Loran, Azusa, CA)

1600 UTC on 15375
USSR: Radiostansiya Rodina. Russian. "Govorit Moskva" ID, time check, and presumed evening news. Items include a meeting of the Supreme Soviets and the problems in the Nagorno-Karabakh autonomous region. (Garie Halstead, St. Albans, WV)

1603 UTC on 15320
United Arab Emirates: UAE Radio-Dubai. Mailbag program with invitation for listener's letters. Easy-listening music and Arabic recitations. (Errol Urbelis, Kings Park, NY)

1620 UTC on 17620
France: Radio France International. Programs Paris Calling Africa and Focus on France. (Bob Fraser, Cohasset, MA)

1624 UTC on 11850
Norway: Radio Norway. Musical "oldies" from 1940's bandleader Glenn Miller. Station monitored on parallel frequencies 15310 and 9660 kHz. (Tom Roach, San Jose, CA)

1640 UTC on 9625
Canada: CBC. Double Exposure show with parodies on Ronald Reagan, Princess Di, and James Bond. (Tom Patterson, Wisconsin Rapids, WI)

1800 UTC on 9510
Seychelles: FEBA Radio. Amharic. Short musical selections and gospel message. Clear ID with interval signal. (Donna Robinson, Willow Springs, IL)

1834 UTC on 14802
Kiribati: Radio Kiribati. Kiribatese. Island music with deep fades. Audio peaks at 1915 UTC. Announcements and pop music to 1920 UTC. (Check for Kiribati if New Zealand is heard on 15150 kHz.) (Bruce MacGibbon, Gresham, OR)

1912 UTC on 9510
Algeria: Radio Algeria. Closing news headlines with Arabic music and ID. Rock music from Michael Jackson, Def Leppard, and Billy Idol. (Stephen Price, Conemaugh, PA)

2015 UTC on 9435
Israel: KOL. Report on agriculture along the shores of the Dead Sea. (Bob Fraser, Cohasset, MA)

2054 UTC on 12020
Vietnam: Voice of Vietnam. Asian music solos and ID as, "The Voice of Vietnam" at 2057 with sign-off. Morse code interference. (Stanley Mayo, Westbrook, ME)

2130 UTC on 9715
Madagascar: Radio Netherlands. Tom Meyer's Happy Station program. Heard also on parallel frequency 9895 kHz. (Bob Fraser, Cohasset, MA)

2133 UTC on 9950
Syria: Radio Damascus. Cultural feature on the arts and theater of Syria. 2204 UTC sign-off with best wishes to listeners. (Stanley Mayo, Westbrook, ME)

2149 UTC on 11830
Liberia: ELWA. Gospel message and musical instrumentals. Closing IDs and schedules at 2200 with 2205 sign-off. (Leslie Edwards, Doylestown, PA)

2210 UTC on 7475
Tunisia: Radiodiffusion Television Tuniesienne. Arabic. Arabic music with applause. ID as "Tunisiyyka" with newscast and Holy Koran. (Stephen Price, Conemaugh, PA)

2215 UTC on 5980
Yugoslavia: Radio Yugoslavia. World news, national anthem, ID, and editorials. (Errol Urbelis, Kings Park, NY)

2230 UTC on 9490
Armenian SSR: Radio Yerevan. Armenian. Armenian. Armenian folk music in instrumentals and female chorus. Lady announcer with station ID. (Martin Peck, Bronx, NY)

2300 UTC on 9445
Turkey: Voice of Turkey. Piano interval signal and station ID. News of a PLO member visiting Ankara. (Martin Peck, Bronx, NY)

2300 UTC on 5975
Great Britain: BBC. International news and commentary. Station Schedule and "Write On" letterbox program. Monitored parallel frequencies 6175, 9515, and 9590 kHz. (Bruce Gilson, Silver Springs, MD)

2352 UTC on 6200
Albania: Radio Tirana. Feature on Albanian art, national anthem, and 2357 sign-off. (Bruce Gilson, Silver Springs, MD)

Scanning The Nation

Bob Kay
104 Bonsall Avenue
Glenolden, PA 19036

Vanity Phones

Cellular phones have become something of a status symbol. Nearly every BMW or Mercedes sports the small, coiled cellular car phone antenna.

For those of us that can't afford a cellular phone, Faux Systems of Los Altos, California, makes the "Cellular Phoney." Complete with a handset and a fake, stick-on antenna, the company has sold over 40,000 of the phoney phones.

If fifteen bucks still seems a little steep, just the stick-on antenna can be purchased for under ten dollars. (submitted by Jen Phillips, Oceanside, CA)

The Cellular Cab

Twenty taxi cabs in Boston are equipped with credit card cellular phones. All calls, including long distance and international, are billed to a customer credit card. If the cellular cabs become popular, ferries that cross Boston Harbor and commuter buses are next in line to receive cellular telephones. (Submitted by Glen Davis, Boston, MA)

He Who Laughs Last...

In May, 1987, a young West German landed his Cessna 172 in front of the Kremlin. Most of us laughed, thinking that the Soviet defense system was a joke. *MT* has learned that the small, wood and fiberglass plane was intercepted by fighter aircraft on two separate occasions. Why the craft wasn't shot down in true Soviet fashion is still unclear. However, from a technical viewpoint, the Soviet's ability to detect and track such a small aircraft meant that the Soviets had to employ some of the most sophisticated state-of-the-art tracking abilities known to the modern world.

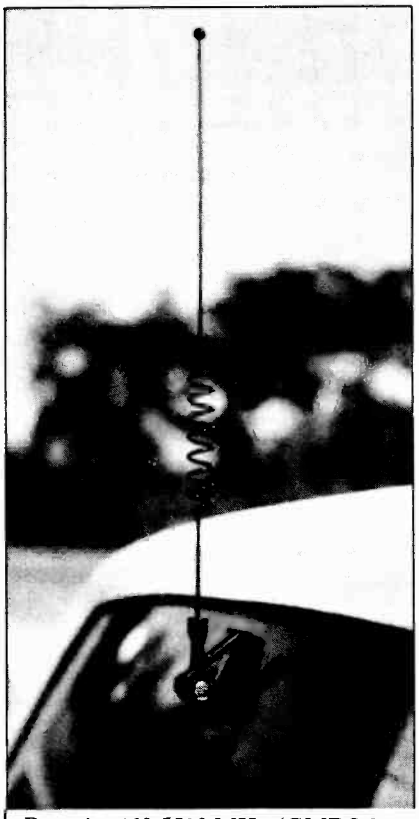
K-Mart and Venture Stores

In his article, "Listening in on the K-Mart Store Radio/Intercom," Bob Parnass found K-Mart's simplex autopatch operating on 154.60 MHz. Now, says Bob, K-Mart sales people were heard one Saturday morning on the same frequency, just before the store opened.

When the doors did open at 9:30 AM, one salesperson was observed using a small, Touch Tone-equipped walkie-talkie to communicate with someone in the stockroom as she checked merchandise on the shelves.

Last fall, K-Mart applied for a license in the Downers Grove, Illinois store for 207 mobile units on 457.5375 and 457.5875 MHz! Perhaps these, speculates Bob, are low power alarm transmitters.

K-Mart's competitor in the area, the Venture store chain, is requesting licenses to operate on 461.6125 and 463.4375 MHz in several Illinois store locations. Here are other Venture frequencies: 151.7150 MHz, KAS719, Orland Park; 154.6750 MHz, KQ5067, Aurora; 461.2750 MHz, KNGL878, Waukegan; 461.6125 MHz, KB93168, Illinois; 461.6750 MHz, WRD549, Batavia; 462.5500 MHz (GMRS frequency), KAD8856, Chicago; 463.4375 MHz, KB93168, Illinois; 464.4750 MHz, KNBE644, Chicago Ridge; 467.8250 MHz (low power, call unknown), Chicago; 467.8750 MHz (low power; call unknown), Chicago. (Bob Parnass, *The Radio Enthusiast)*



Status without the price: Can't afford a cellular phone for your car? Just mount a phoney cellular antenna that looks just like the real thing (like this one from Antenna Specialists)!... But there goes your excuse for why you didn't call!

Boom Year for Thunderstorms

Last year many of southeastern Pennsylvania's television repair shops experienced a record number of lightning damaged television sets. One repair shop owner stated that during one such storm customers were "knocking on his door" ten minutes after the lightning started. "One good storm," the owner continued, "will bring in forty to fifty damaged sets."

In addition to television sets, lightning strikes also damaged as many video cassette recorders. Since most people have cable television, the surge enters through the cable, through the VCR, and then into the television.

Repair costs ranged from $40.00 to $250.00. According to the repair shop, some sets were so badly damaged that repair was impossible!

The staff at *MT* reminds everyone that the summer thunderstorm season is upon us. Remember that lightning usually damages our equipment through the electrical circuit or through a static charge in the coax cable--not from direct strikes.

During a storm, unplug the power cords and disconnect all lead-in cables.

Next Generation Radar to Forecast Weather

Called the "Next Generation Radar, NEXRAD will enable both the Department of Defense and the National Weather Service to detect potentially hazardous weather conditions over the continental United States, The Caribbean, Western Europe and the Pacific.

According to Air Force Major Gerard D. Wittman, acquisition manager for weather systems development at the Pentagon, "Current radar systems cannot detect tornadoes or other hazardous wind events. The NEXRAD system will allow us to better detect and assess a storm's severity, and to improve our warning lead time to the public."

Current radars provide information only when operated manually. When the new radar becomes operational in two years, it will continually sweep an area 150 nautical miles across at six elevations up to 70,000 feet and automatically provide users with updated information every six minutes.

Another NEXRAD unit will be located in Sterling, Virginia, just outside Washington, D.C.. It will provide data to Andrews Air Force Base, Maryland, and also to other Navy, Federal Aviation Administration and National Weather Service facilities in the Washington area. Each installation will have their own remote display to retrieve and analyze information provided by this single NEXRAD system.

Who's Who in War

When monitoring a Navy war exercise, the bad guys are known as "Orange Forces." Other nations that may become involved in the scenario are called "Purple Forces." The U.S. and its allies are the "Blue Forces."

The problem of color identification becomes nearly impossible when friends and foes use the same equipment. For example, in the Persian Gulf; Iran, Bahrain, and Saudi Arabia all fly the F-5 aircraft. Mirage F-1s are flown by several Gulf States as well as Iraq.

To help identify these forces, the McDonnell Douglas DC-8-54 has been converted to the "Fleet Electronic Warfare Support Group" (FEWSG). The DC-8 was selected over the Boeing 707 for the following reasons:

1. The DC-8 has 30 more inches of ground clearance. This was very important due to the large, forward belly of the radar dome.
2. The DC-8 has no flight time limitations on the air frame. The 707 is required to have the wings and fuselage reskinned every 40,000 flight hours.
3. The climate control system on the DC-8 is more efficient.
4. The DC-8 is more stable at slower speeds.

The typical crew aboard the DC-8 consists of a pilot, co-pilot, flight engineer and seven system operators. The plane can lift 3,000 pounds of additional cargo and has twenty seats for maintenance personnel. Equipment on board the jet is as follows:

1. Two radar jamming systems with steerable antennas.
2. Two voice communications jamming systems.
3. Two communications receiver systems with analyzers that provide signal identification capability.
4. Six UHF transceivers.
5. Two VHF transceivers.
6. Four high frequency transceivers.
7. Two individual computer systems.
8. Two direction finding systems.
9. Three secure, encoded communications systems.
10 Two satellite communications systems.

FREQUENCY LIST

Frequencies for Myrtle Beach, South Carolina, are submitted just in time for the tanning season by Billy Estes, South Carolina.

Myrtle Beach

154.31	Fire
154.175	Fire
154.80	Police
154.86	Police
155.16	Rescue
155.295	Rescue

North Myrtle Beach

154.22	Fire
154.40	Fire
155.40	Rescue

City and County of Georgetown

153.77	Fire
154.16	Fire
154.77	Sheriff--county link
155.415	Police
155.715	Local government (repeater)
156.015	Government (simplex)

Horry County

154.01	Rural fire
154.40	Fire
154.725	Sheriff
155.40	Rescue

UHF Aero Band

239.80	Meteorological
269.90	Myrtle Beach AFB
275.80	Myrtle Beach AFB
317.40	Jacksonville ATCC
343.00	Wing Command
343.60	Jacksonville ATCC
381.30	Wing Command
381.40	Jacksonville ATCC

Miscellaneous

151.685	Lake Arrow Head Ind.
151.775	Ponderosa Campground
151.805	Boardwalk Motel
151.865	Ocean Lakes Family Campground
464.865	" " " "
151.925	Brookgreen Gardens
151.955	Cherokee Motel
154.515	Sea Mist Travelodge
157.62	Breezeview Motel
460.80	Piedmont Airlines
461.35	Beach Amusements Inc.
461.40	Lack's Beach Service
461.475	Myrtle Beach Family Farms

What can you hear on your scanner? Let me know! Send all scanner-related information to me at the address, above!

Utility World

Larry Van Horn
160 Lester Drive
Orange Park, FL 32073

Giant's Talk

The Strategic Air Command

"Skyking, skyking, do not answer-alpha, juliette, charlie . . ."

How many times have you heard this type of transmission on shortwave and wondered, "What in the world am I listening to?"

Well, wonder no more. You have managed to successfully tune into the communications of the United States Air Force's Strategic Air Command (SAC).

What is SAC and where can you hear their communications?

The primary mission of SAC is that of nuclear deterence, and if that fails, nuclear retaliation. In fact, the Strategic Air Command makes up two-thirds of the United States' nuclear force triad. Bombers and silo launched intercontinental ballistic missiles (ICBMs) are both SAC contributions to our nation's nuclear forces. The navy fleet ballistic missile submarines make up the last third of the triad.

First organized on March 21, 1946, the Strategic Air Command's purpose was to continue and enhance the strategic bombing superiority the U.S. developed during World War II. SAC began with 100,000 military personnel and 1,300 aircraft, including 300 B-29 bombers. The command's was headquartered at Andrews Air Force Base, Maryland.

120,000 People Strong

Today, SAC is headquartered at Offutt Air Force Base, Nebraska. It involves over 120,000 military and civilian personnel. It is a major command of the Air Force. And it is made up of two numbered air forces: 8th Air Force at Barksdale AFB, LA, and the 15th Air Force at March AFB, CA.

Responsibility for SAC operations in the western Pacific fall under the 3rd Air Division, headquartered at Anderson AFB, Guam. The 7th Air Division, Ramstein Air Base, West Germany, is the operational commander for European SAC forces.

SAC operates 26 air bases and is tenant on 47 more. Upon mobilization, SAC gains command of 20 reserve and Air National Guard units comprising approximately 15,800 members.

Hardware is the backbone of the command and Table one gives the latest figures that comprise the Strategic Air Command's impressive list of assets.

Calling in a Nuclear Strike

Communication systems play an important role in the mission of SAC. The chain of command must be able to communicate with all of the nation's nuclear forces at a moment's notice. At the very top of the chain of command is the president of the United States. He and the Joint Chiefs of Staff make up the National Command Authority (NCA).

In the event that a nuclear strike has to called, the president would issue the order through the NCA to SAC. The Commander-in-chief SAC (CINCSAC) can order the aircraft in the air at any time. Only the president or those in the nuclear weapon line of succession, however, can order a nuclear strike.

Lines of Succession

Most Americans do not realize that there are two different lines of succession. Constitutionally, the progression is the vice-president, speaker of the house, president pro-tem of the senate and cabinet members in order of seniority.

However, the authority to launch nuclear weapons takes a different line of succession entirely: vice-president, secretary of defense, chairman of the joint chiefs of staff and finally the emergency action officer, a general aboard the Looking Glass Airborne Command Post.

Table One

450 Minuteman II LGM-30F ICBMs	550 MINUTEMAN III LGM-30G ICBMs
26 Titan II LGM-25C ICBMs	10 Peace Keeper (MX) LGM-118A
90 B-52H Bombers	2 B-1B Bombers
151 B-52G Bombers (61 now carry AGM-86 ALCM Cruise Missiles)	
56 FB-111 Swept-Wing Strategic Bombers	9 Lockheed SR-71 Recon Aircraft
7 Lockheed U-2 CT/R Recon Aircraft	
6 TR-2B Lockheed Recon Aircraft (on loan to TAC Air)	
2 TR-2B Lockheed Recon Aircraft (used for training)	
4 E-4B Airborne Command Post	21 EC-135 Models A/C/G/L
16 RC-135 Aircraft	487 KC-135 Aircraft
31 KC-10A Aircraft	

Keeping Communications Open

Many different communication mediums are utilized to keep the chain of command in touch with SAC units. Satellites play a large role in SAC communications. The air force satellite communications systems (AFSATCOM) is used by the NCA for command and control of U.S. nuclear capable forces around the world.

AFSATCOM transponders are carried on such spacecraft as the Fleetsatcom, Leasat, and DSCS satellites in geostationary orbit, and the satellite data system in polar orbit. In addition, AFSATCOM transponders are also carried on a variety of other host civilian and military satellites.

Air Force satellite communication messages are usually short, pre-formatted transmissions that require minimal power. They permit reliable and secure two-way communications between ground, airborne forces and command posts. They also provides a conferencing capability between command posts. AFSATCOM transponders operate in the 225-400 MHz military UHF band.

The primary day-to-day method of communications that most *Monitoring Times* readers are familiar with take place on shortwave frequencies. SAC utilizes what it calls the "Giant Talk" network to communicate with different elements of the command.

"Giant Talk" consists of 9 HF stations providing CINCSAC and senior SAC commanders with worldwide two-way voice communications for long range command control of tactical, reconnaissance and special SAC missions. The "Giant Talk" network also supports the ICBM forces. There are three main communication command posts in the "Giant Talk" network. These stations are located at Offutt AFB, McClellan AFB, California, and Andrews AFB, Maryland.

Six additional remote sites associated with the network are located at: Elmendorf AFB, Alaska; Thule AB, Greenland; RAF Croughton, United Kingdom; Incirlik AB, Turkey; Clark AB, Philippines; and Yokota AB, Japan. All of the "Giant Talk" sites are accessible from SAC headquarters, the numbered air force command post and other selected locations.

Same Frequencies; Same Identifiers

The Strategic Air Command has used the same basic frequencies and associated identifiers for many years. Consequently, the more active frequencies are well known and have been published in various sources. *MT's* "Utility World" recently compiled the most comprehensive list of SAC frequencies ever published. These frequencies are listed in Table two.

As noted in Table two, some of the frequencies listed have "No Designator Known." Either there is no designator assigned or one has not been heard on the indicated frequency. Those frequencies listed with "Floating Designators" are indicative of a channel where one or more different designators have been noted on the frequency.

Most SAC aircraft have HF transceivers that can be programmed with twenty preset channels. Recently a MT reader

Table Two

Freq	Channel Designator	Usage
3113	Floating Designators	Airborne Command Post Intercommunication
3292	Floating Designators	
3295	Alpha Mike	
3369	Alpha Sierra	
4492	Floating Designator	
4495	Echo	Airborne Command Post Intercommunication
4725	Victor	Primary Air-to-ground Channel/AF Refuel
4896	Floating Designator	
5020	Foxtrot (See note 1)	Airborne Command Post Intercommunication
*5026	Foxtrot (See note 1)	Airborne Command Post Intercommunication
5110	Floating Designator	
5171	Two Letter Designator --	Changes Every Three Months
5215	Floating Designator	
*5243	No Designator Known	Airborne Command Post Intercommunication
5328	Floating Designator	
5684	Foxtrot Quebec	
*5700	Bravo Quebec	Airborne Command Post Intercommunication
5826	Bravo Uniform	Airborne Command Post Intercommunication
6680	Foxtrot Xray	
#6712	Floating Designators	Also Alpha Two In PACAF
6761	Quebec	Primary Air-to-ground Channel, Pri Night
6826	Golf	
6840	No Designator Known	Note: Popular Number Station Channel!!
6863	Oscar	
6870	Kilo+ (See note 2)	Airborne Command Post Intercommunication
6886	No Known Designators	
7330	Yankee/Xray	Channel uses both designators-alternates
7983	Foxtrot Charlie	
8101	Alpha Papa	Airborne Command Post Intercommunication
*9023	No Known Designators	SAC/NORAD Intercommunications/AWACS A/C
9027	Romeo	Primary Air-to-ground Channel
9057	Papa	Airborne Command Post Intercommunication
9220	Floating Designators	
9234	Floating Designators	Possible NORAD/SAC Intercommunication
#10452	OSCAR (PACAF Designator)	
#10510	No Known Designator	Possible PACAF Channel
11100	Alpha Twenty-one	
*11118	No Designator Known	Airborne Command Post Intercommunication
11220	Bravo	
11243	Alpha One	Primary Air-to-ground Channel, Pri Day
11408	Yankee Quebec	Data Channel
11494	Lima	Training Frequency-Practice Messages
11607	Alpha Zulu	
13205	Called <FAX>	SAC Special Operations Channel
13211	Bravo Whiskey	Airborne Command Post Intercommunication
*13241	Sierra	Primary Air-to-ground Channel
13547	Floating Designator	
13907	Alpha Charlie	
14716	Sierra Echo	
14744	Alpha Tango	
14775	Floating Designators	Also Mike in PACAF
14955	Charlie	
15035	Charlie Quebec	Canadian Forces Channel (shared)
15041	Mike	Primary Air-to-ground Channel
15091	Bravo Xray	Tac-to-SAC Intercommunication?
15544	No Known Designators	Possible AC Point-to-Point Channel
15962	India	
17617	Bravo Hotel	
17975	Tango	Primary Air-to-ground Channel
#18005	Tango (PACAF Designator)	
18046	Juliett	
18594	Zulu One	
20631	Whiskey	Primary Air-to-ground Channel
#20737	No Known Designator	Possible PACAF Channel
#20740	Lima (PACAF Designator)	
20846	Charlie Alpha	SAC-to-CAP Intercommunication
20890	Delta	
21815	Foxtrot Sierra	Possible Floating Designators on this Freq
23337	Uniform	
23419	No Known Designator	Possible SAC-NORAD Intercommunications
27870	Delta Quebec	

* Indicates a Mystic Star Network Channel
\# Indicates a PACAF Channel

Note 1: Foxtrot designator rotates between these two channels. When not designated Foxtrot, the frequency uses two letter channel that end with the letters 'A/B/C or S'.

Note 2: Frequency uses a two letter designator beginning with Kilo + one other letter that rotates periodically.

Note 3: Other previous designators noted on this channel include: November Alpha and India Alpha.

Table Three

Ch	Freq	Usage	Ch	Freq	Usage
1	4725	SAC Victor	11	15091	SAC Bravo Whiskey/
2	6761	SAC Quebec			Scott
3	9027	SAC Romeo	12	11182	USAF GCCS Channel
4	11243	SAC Alpha One	13	9023	Scott/Andrews
5	13241	SAC Sierra			(Mystic)
6	15041	SAC Mike	14	5707	Scott
7	2182	Intl Distress Ch	15	4742	Scott/Andersen
8	8364	Intl Survival Craft	16	4742	Andersen
9	15000	WWV/WWVH	17	13201	USAF GCCS Channel
10	10000	WWV/WWVH	18	11179	USAF GCCS Channel
			19	6738	USAF GCCS Channel
			20	8989	USAF GCCS Channel

forwarded the list in Table three. This table indicates the frequencies programmed into the twenty preset channels of a SAC aircraft HF transceiver. The source that provided this information believes that these HF presets are probably a common setup in most strategic air command aircraft primary HF radios.

First Time SAC Listeners

Newcomers to SAC monitoring should start out on the two primary frequencies of 6761 (night) and 11243 (day). Listening to these two channels will let the beginning SAC monitor hear most of the different types of SAC traffic that are broadcast. Most SAC communications are in upper sideband.

Mailbag

Tom Roach in San Jose, California, has recently purchased an AEA PK-232 demodulator for RTTY monitoring. Tom says he chose the PAKRATT-232 over the Info-tech M6000 because he can copy transliterated cyrillic and store all the messages he receives into a computer file for later review. Tom mentioned the PK-232 represents a great buy at around $250 as compared to the M6000 which sells for closer to $900.

The PK-232 certainly deserves the avid digital mode fan's attention, Tom. I am not sure which version you have but I do know that the newer versions now have six modes of operation. These modes include RTTY, ASCII, TOR, CW, Packet and now Facsimile. The facsimile mode is great and for those of you who do have the older 232s, write to AEA about obtaining an upgrade kit. You won't be sorry.

I Yearn for You Tragically

Tom also mentions that he has been monitoring Russian ship traffic out of Vladivostok and Petropavlovsk Kamchatskiy. He says most of the traffic consists of "Boris, I yearn for you tragically, love and kisses Ludmilla" type messages. Tom says he has managed to catch a few kriptogramma type messages indicative of traffic from Russian military ships and ships involved in the Soviet space program.

Recently Tom has monitored several Russian ship callsigns he could not identify. The callsigns were: UIKN ULKD UPTO UPTV UZET.

Here are the ships and associated callsigns you asked for.

Call	Ship Name	Homeport	Type Ship
UIKN	Konstantin Suhkanov	Vladivostok	Shellfish Factory
ULKD	Slavyansk	Vladivostok	Fish Factory
UPTO	Sulak	Vladivostok	Fish Factory
UPTV	Severouralsk	Vladivostok	Fish Factory
UZET	Korabistr. Klapotov	Vladivostok	Shellfish Factory

Tom also asked about the availability of a book that has Soviet/Warsaw pact ship callsigns. One of the best lists that has been available is the *USSR Merchant Ship List* by Jason Berri. The list, while not all inclusive (there are over 4500 USSR ship callsigns in the ITU list), does reflect those merchant ships that are actively using shortwave equipment. In addition, this list will be considerably cheaper than an ITU list. For more information you should drop a self-addressed, stamped envelope to: Jason E. Berri, 21240 South Western Ave #18, Torrance, CA 90501. Be sure to tell Jason that *Monitoring Times* sent ya!

Utility Loggings

Utility Abbreviations Used in this Column

All times UTC, frequencies in kilohertz
All voice transmissions are English unless otherwise noted

AM	Amplitude Modulation
ARQ	Sitor
CW	Morse Code
FAX	Facsimile
FEC	Forward Error Correction
ID	Identification
ISB	Independent Sideband
LSB	Lower Sideband
RTTY	Radioteletype
UNID	Unidentified
USB	Upper Sideband

2056.0 Possible US Navy channel. Several units in the scrambled voice (green) mode at 0234.

2442.0 UDR-Miami, FL working the vessel Magic Dragon in USB at 0304 with phone patch traffic.

2490.0 WOM-Miami Radio, FL checking channel for possible traffic at 0307 in USB. No reply to frequency check.

2566.0 WOM-Miami Radio, FL working the Sand Dancer at 0315 in USB with phone patch traffic.

2618.5 GFE25-Brackness Meteo, England with a fax signal at 0324. Weak.

2680.0 4XZ-Israeli Navy Radio Haifa, Israel heard with a CW V marker at 0330, then went into traffic.

2691.0 Possible US Navy traffic noted in the green at 0332 in USB.

2700.0 Cyprus Radio, Nicosia, Cyprus heard with a voice marker at 0334 in English and Greek. Mentioned that the station was listening on 2182 4097 kHz.

3040.0 Spanish female five-digit number transmission at 0538. Strong signal seemed undermodulated. (John Combs, Jacksonville, FL) Welcome to Utility World John, Thanks for the loggings.

3090.0 Spanish female five-digit number station at 0508. Noted RTTY station causing interference. (David Heitzinger, Dover, DE) Welcome to the column David, Please report often.

3016.0 Aeroradio ATC-Shannon, Ireland noted at 0511 with aircraft traffic reports in USB.)David Heitzinger, Dover, DE)

3355.0 YN88 working YN01-Nicaragian army units in USB talking about the resupply of ammunition. Noted at various times during the evening hours.)Mark Knowlton, Melbourne, FL) Welcome to Utility World, Mark, ed.

3425.0 Possible Mexican military channel of the same type noted in the May 1988 Utility World column 11401.85. Transmission in LSB at 0605. (John Combs, Jacksonville, FL)

4030.0 Bulgarian (?) four-digit numbers broadcast noted at 0538. Very weak with bad MARS interference. (John Combs, Jacksonville, FL) Noted a strong carrier at 0558 with an electronic interval signal underneath the carrier. At 0600:45 transmission started with "Attencion . . . 258 . . . 235" repeated until 0603:37, then into Spanish five-digit numbers broadcast. (John Combs, Jacksonville,FL)

4251.3 ZLO-Royal New Zealand navy Waiouru heard with an AR DE CE marker at 1140.

4251.1 UFH-Petropavalovak, USSR heard at 0735 with a RTTY RY test tape. 50 baud/170 HZ shift/normal sense. (Patrick Sullivan, La Crescenta, CA) Welcome to Utility World, Patrick. Feel free to report your RTTY loggings often.

4257.5 WLO22-Mobile R, AL noted at 1146 with a CW DE marker.

4271.0 FUJ-French Naval Radio Noumea, New Caledonia at 1149 with a CW V marker. RTTY interference noted from CFH on the same frequency.

4277.0 ZLB-Awarua Radio, New Zealand with a DE CW marker at 1152.

4286.0 VHP-Royal Australian Navy, Canberra, Australia heard at 1155 with a CW V marker.

4310.0 WNU31-Slidell Radio, LA at 1200 with a CW CQ marker.

4313.0 FUG-French Naval Radio, La Regine, France noted with a V CW marker at 0543. (John Combs-Jacksonville, FL)
9VG-Singapore Radio, Singapore heard with a real weak signal at 1201. Station was sending a CW CQ marker transmission.

4315.0 F7Q working N51 discussing radio/generator problems at 0543. This was a simplex frequency in USB. (John Combs, Jacksonville, FL) This is probably a USN tactical channel, John-ed.

4319.0 XSG-Shanghai Radio, China with a real weak ksignal at 1204 with a CW CQ marker transmission.

4328.0 JOS-Nagasaki Radio, Japan at 1204 with a CW CQ marker broadcast. Signal levels weak.

4332.5 JCK-Kobe Radio, Japan with an extremely weak CQ CW marker signal at 1208.

4351.0 KFS-San Francisco, CA monitored with an ARQ telex at 0508. 100 baud/170 HZ shift. (Patrick Sullivan, La Crescenta, CA)

4352.5 VIP-Perth Radio, Australia with a callsign only CW marker plus ARQ idler at 1213.

4355.0 WLO-Moblile Radio, AL at 1215 in CW with a callsign only marker and ARQ idler.

4356.0 KPH-San Francisco Radio, CA with a V CW marker at 1222.

4356.5 VIS-Sydney Radio, Australia heard with a callsign only CW marker and ARQ idler at 1220.

4413.2 High seas operator working the cruise ship "Nordic Prince" in USB at 0352 in USB.(Trevor Stanley, Flagstaff, AZ) Probably WLO-Moblile AL on ship-to-shore channel 419. Ship side of comms on 4118.8. Welcome to the column Trevor, Please report often-ed.

4419.4 Iranian gunboats ordering the vessel "Holland 55" to stop engines and be prepared to be boarded at 0340. All transmissions in USB.

4530.0 Possible Mexican military traffic channel at 0613. Transmissions in LSB. Similar traffic to 3425 but a different operator. (John Combs, Jacksonville, FL)

4558.0 Spanish gents in USB during most evening hours. This is a Spanish drug traffic network. (Mark Knowlton, Melbourne, FL)

4665.0 Missionary aviation fellowship noted at 1530 with check-ins and aircraft traffic in USB. (A.B. Palmarola, Honduras) This for the unique loggings, A.B. and please feel free to report to Utility World often-ed.

5015.0 German female five-digit number transmission noted at 0610. Each group repeated two times before the next group read. At 0616 a long tone was transmitted, no more numbers but the carrier remained for a time. (John Combs, Jacksonville, FL)

5120.0 SAHSA Airlines noted on this frequency in USB at various times. Traffic sent was regarding passenger lists, baggage, fligh departures etc. (A.B. Palmarola, Honduras)

5125.0 RFE Holzkirchen feeder, Germany noted programming at 0550 in ISB. (David Heitzinger, Dover, DE)

5421.6 NMG-US Coast Guard New Orleans, LA with unclassified RTTY traffic at 0500. 75 bacd/170 HZ shift/reversed sense. (Patrick Sullivan, La Crescenta, CA)

5490.0 Missionary aviation fellowship, Siguatepegue, Honduras air-to-ground communications noted with check-ins at 1530 in USB. (A.B. Palmarola, Honduras)

5547.0 Aeroradio ATC-San Francisco, CA working Continental 41 at 0430 in USB. The aircraft was requesting an altitude change. (Trevor Stanley, Flagstaff, AZ)

5550.0 Aeroradio ATC-New York, NY working an Aeroflot flight at 0245 in USB. Aircraft giving a position report to New York. (Trevor Stanley, Flagstaff, AZ)
Aeroradio ATC-SanJuan, Puerto Rico working an Unid aircraft at 39 north, 50 west. Aircraft was heading for Kennedy. (John Combs, Jacksonville, FL)

5574.0 Aeroradio ATC-San Fraaaaancisco, CA working American flight 56 in USB at 0455. ATC was giving 56 clearance to the Santa Barbara sirport via San Marcos. (Trevor Stanley, Flagstaff, AZ)

5616.0 Aeroradio ATC-Santa Maria, Azores working TWA flight 90. Giving ATC an altitude and position report in USB at 0438. Also New York ATC working USAF MAC 60196 at 0343. 60196 was requesting a change in altitude. (Trevor Stanley, Flagstaff, AZ)
Aeroradio ATC-Gander, Newfoundland working Speedbird 450 at 0430 in USB. (Trevor Stanley, Flagstaff, AZ) Speedbird is the on-the-air callsign for BOAC (British Overseas Airline Company)-ed.

5692.0 German female numbers station at 0600. 3-digits repeated 3 times then counted 0-10. (David Heitzinger, Dover, DE)

5690.0 Coast Guard cutter Vigilant, Coast Guard Rescue 1717 and 2118, Coast Guard COMSTA Miami working each other at the scene of the cruise liner Scandinavian Star engine room fire. Units stayed on scene and on this channel most of the morning Eastern. Finally moved up to 8984 kHz later in the day. All transmissions in USB.

5810.0 Spanish female four-digit number groups noted around 0200. Gave a group of about 600 numbers before going off the air abruptly at 0248. (Bill Cantrell, Ft. Worth, TX) Thanks for the logging, Bill, Please report often.-ed.
Spanish female four-digit number station heard at 0618. Signal very strong. (John Combs, Jacksonville, FL)

5920.0 Noted an "X" beacon in CW on this channel at 0637. (John Combs, Jacksonville, FL)

6051.6 WLO-Mobile, AL with ARQ news bulletin at 0312. 100 baud/170 HZ shift. (Patrick Sullivan, La Crescenta, CA)

6344.2 HLF-Seoul Radio, South Korea heard with a weak signal at 1231 with a CW CQ marker broadcast.

6383.0 NMC-US Coast Guard San Francisco, CA at 1237 with a CW CQ marker, strong signal.

6400.5 EAD2-Aranjuez Radio, Spain heard with a DE CW marker at 0640. (John Combs, Jacksonville, FL)

6412.0 9VG-Singapore Radio, Singapore noted at 1243 with a CQ CW marker at 1234.

6416.7 CCS-Chilean Naval Santiago, Chile sending a RTTY RY test tape at 0302 50 baud/850 HZ Shift/normal sense. (Patrick Sullivan, La Crescenta, CA)

6463.5 HKB-Barranquilla Radio, Colombia at 0643 with a CQ CW marker. (John Combs, Jacksonville, FL)
VII Port Kennedy Radio, Thursday Island, Australia heard at 1253 with a V CW marker. Real nice signal. Noted several weaker CW signals underneath VII marker possibly other Australian coastals known to inhabit this frequency.

6465.0 FUM-French Naval RAdio Papeete, Tahiti noted with a V CW marker at 0643. (John Combs, Jacksonville, FL)

6506.4 NOJ-US Coast Guard Kodiak, Alaska working the US Coast Guard cutter Confidence at 0400 in USB. (Trevor Stanley, Flagstaff, AZ)

6577.0 Aeroradio ATC-New York, NY working navy aircraft "Navy JB443" in USB at 0415. Aircraft giving a position and altitude report.

6645.0 NOAA operations working various Gull aircraft in USB at various times.

This frequency is being used by "Operation Gale" which is the project of studying the formation of northeasters along the east coast. (Mark Knowlton, Melbourne, FL)

6745.0 CIO2 number station at 0130 Thursdays UTC. This is an Israeli Mossad numbers outlet.

6761.0 SAC-COHO 99 monitored calling Skybird at 0405 in USB. (Trevor Stanley, Flagstaff, AZ) This is SAC channel Quebec-ed.

6800.0 World Relief. They send benevolent food donations to refugee camps. USB and noted at various times. (A.B. Palmarola, Honduras)

6840.0 This is a very interesting number channel. At 0141 noted a five-digit Spanish number transmission. At 0230 monitored a Spanish four-digit broadcast. Between 0242-0243 time pips were heard on the channel. At 0330 four-digit CW numbers broadcast was transmitted. At 0400 on Thursday UTC I monitored a RTTY transmission but could not get the PK-232 booted up to copy what was being sent. These transmissions are quite strong and could be coming from the Jupiter Inlet site.

6963.1 NMG-US Coast Guard New Orleans, LA with unclassified RTTY traffic at 0325. 75 baud/170 HZ shift/normal sense. (Patrick Sullivan, La Crescenta, CA)

7400.0 SOSA Airlines of La Ceiba, Honduras heard at various times with charter airline traffic in USB. (A.B.Palmarola, Honduras)

7665.0 Monoitored CW station XE4 transmitting a series of Vs at 0646. Who? Where? (John Combs, Jacksonville, FL) Good question John. Any help out there?-ed.

7775.0 Christian mission radio communications from San Luis, Honduras monitored at various times in USB. (A.B. Palmarola, Honduras)

7835.0 U.S. National Guard troops stationed in Yoro, Honduras noted on this channel transmitting at various times in USB. (A.B. Palmarola, Honduras)

8903.0 Aeroradio ATC-Kinshasa, Zaire Unid aircraft at 0250 in USB giving an altitude and position report. Heavy static from storms in the area. (Trevor Stanley, Flagstaff, AZ) Nice catch Trevor-ed.

8984.0 Coast Guard Rescue Helo 6571 working Miami COMSTA at 1253 in USB. Helo Airborne heading for the Grand Bahama Islands.

8993.0 USAF GCCS-MacDill AFB, FL working Bravo 5 Juliett (Navy aircraft-ed.) at 0450 in USB. MacDill requesting altitude and position report.

9072.0 SAC-SIOP Forces aircraft calling Skyking at 0500 in USB. (Trevor Stanley, Flagstaff, AZ) This is SAC channel Romeo-ed.

11070.0 LOR-Argentina naval radio Puerto Belgrano sending telex RTTY traffic at 0115. 75 baud/170 HZ shift/normal sense (Patrick Sullivan, La Crescenta, CA)

11243.0 SAC-Unid station with a coded broadcast at 0400 in USB, "RCOHJKNRIDL" (Trevor Stanley, Flagstaff, AZ) This is SAC channel Alpha One-ed.

11282.0 Aeroradio ATC-Honolulu, HI working United 182 at 0407 in USB. Aircraft passed on position, Temperature, sind speed and an altitude report to Honolulu. (Trevor Stanley, Flagstaff, AZ)

11476.0 HMS79-KCNA Pyongyang,North Korea with RTTY English news transmission at 0330. 50 baud/240 HZ shift/normal sense. (Patrick Sullivan, La Crescenta, CA)

11530.0 Spanish female four-digit numbers station noted at 0135. (David Heitzinger, Dover, DE)

12523.1 UKKI-Unid Meteo sending an RTTY RY test tape at 0315. 50 baud/170 HZ shift/normal sense.)Patrick Sullivan, La Crescenta, CA) Congrads Pat, you snagged the geolog fersman an USSR NIS Research Vessel-ed.

12664.5 French naval Radio-Papeete, Tahiti monitored at 1233 with a CW V marker.

12682.5 PKF-Makassar Radio, Indonesia in with a nice signal at 1241 transmitting a CW CQ marker.

12709.0 8PO-Bridgetown Radio, Barbadoes heard at 1252 with a DE CW marker.

12724.0 9VG-Singapore Radio, Singapore at 1256 with a CW CQ marker, weak with interference.

12735.0 HLX-Seoul Radio, South Korea sending a traffic list at 1300 in CW.

12743.0 JJC-KYODO News Service Tokyo, Japan noted with a FAX signal at 0045. 60 LPM/IOC 576. (Patrick Sullivan, La Crescenta, CA)

12750.1 NIK-US Coast Guard Boston, NA with a FEC weather transmission at 0020. 100 baud/170 HZ shift. (Patrick Sullivan, La Crescenta, CA)

12785.0 XSX-Keelung Radio, Taiwan heard at 1228 with a CQ CW marker.

12856.0 XSG-Shanghai Radio, China with a real weak CQ CW marker.

12889.5 NMO-US Coast Guard Honolulu, HI heard at 1159 with a CW CQ marker.

12906.4 DZJ-Bulacan Radio, Philippines at 1156 with a CW CQ marker.

12936.0 DZN-Navotas Radio, Philippines heard with traffic to an unknown ship at 1145 in CW.

13084.0 NMO-US Coast Guard Honolulu, HI heard at 0030 calling CQ. Mode was FEC 100 baud/170 HZ shift. (Patrick Sullivan, La Crescenta, CA)

13084.5 NMO-US Coast Guard Honolulu, HI monitored calling CQ at 0231. Mode was FEC 100 baud/170 HZ shift. (Patrick Sullivan, La Crescenta, CA)

13580.1 HMK25-KCNA Pyongyang, North Korea with a RTTY news transmission at 0837. 50 Baud/250 HZ shift/reverse sense. (Patrick Sullivan, La Crescenta, CA)

13597.4 IMB56-Rome Meteo, Italy monitored at 1326 with a FAX signal, weak copy made the picture hardly readable. Looked like a weather map of Europe.

13636.2 "P" beacon-Kaliningrad, USSR noted in CW at 1330.

13815.0 KRH50-Department of State Radio, London, England at 1335 with a QRA CW marker.

13995.5 VOA (USIA) Monrovia, Liberia with a news file at 0131 of English news. 75baud/425 HZ shift/reverse sense. (Patrick Sullivan, La Crescenta, CA) This is the USIA African file service-ed.

14410.0 RIZ54-Radio Moscow feeder, USSR heard at 1346 using ISB, noted Russian on both sidebands. (Gayle Van Horn, Orange Park, FL)

14568.2 HMF32-KCNA Pyongyang, North Korea with a RTTY RY test at 0300. 50 baud/500 HZ shift/reverse sense. (Patrick Sullivan, La Crescenta, CA)

14901.7 CLN451-Prensa Latina Havanna, Cuba at 2000 with a RTTY RY test tape. 50 baud/425 HZ shift/normal sense. (Patrick Sullivan, La Crescenta, CA)

14982.5 RBV76-Tashkent Meteo, Uzbeck, USSR monitored with a weak FAX weather map at 1400.

14996.0 RWM-Moscow time stations, USSR noted at 1405 with time ticks.

15644.0 AOK-Spanish Navy/US Navy ROTA, Spain heard at 1515 with a FAX weather map of the Indian Ocean.

15950.0 RBI77-Moscow Meteo, USSR monitored at 1530 with a FAX map of Russia.

15875.0 5LA25-VOA (USIA) Monrovia, Liberia with an English RTTY news file at 0010. 75 baud/425 HZ shift/reverse sense. (Patrick Sullivan, La Crescenta, CA) This is the USIA African file service-ed.

15876.2 CLN-Prensa Latina Havanna at 0239 with a RTTY RY test tape. 50 baud/425 HZ shift/reverse sense. (Patrick Sullivan, La Crescenta, CA) This is CLN 488 I believe-ed.

16005.0 IDR6-Italian naval radio at 1522 with a V CW marker.

16065.0 RFE Holzkirchen feeder, Germany heard at 1524 in ISB. (Gayle Van Horn, Orange Park, FL)

16069.9 JJC-KYODO News Service Tokyo, Japan with a FAX signal at 2245. 60 LPM/IOC 288. (Patrick Sullivan, La Crescenta, CA)

16458.0 Monitored the following transmission at 1530: "VVV BPA BPA BPA." I believe this could be a new Xinhua Beijing, China CW outlet. Heavy interference noted a Unid Tor type station.

16861.7 PKX-Jakarta Radio, Indonesia makes a rare appearance on this frequency, thanks to WNU Slidell being silent. Noted a CW CQ marker at 1314. Nice signal levels.

16903.0 SVM-Athens Radio, Greece at 1325 with a V CW marker.

16910.0 TFA-Reykjavik Radio, Iceland monitored at 1327 with a CW CQ marker transmission.

16922.0 UQA4-Kiev Radio, Ukraine, USSR heard calling a ship. Station has a real wierd CW marker. Monitored at 1603 with a weak signal.

16928.4 LFX-Rogaland Radio, Norway heard at 1331 with a CW CQ marker.

16938.6 GYA-Royal Navy London, England monitored with a FAX weather map of sea/swell forecast at 1530.

16942.8 YUR-Rijeka Radio, Yugoslavia, at 1337 with a V CW marker signal.

17067.1 JJC-KYODO News Service Tokyo, Japan with a FAX signal at 2230. 60 LPM/IOC 288. (Patrick Sullivan, La Crescenta, CA)

17128.5 ZLO-Royal New Zealand Navy Walouru monitored with a AR DE CW marker at 1421.

17162.0 PPO-Olinda Radio, Brazil at 1429 with a CW V marker.

17165.6 CLA-Havanna Radio, Cuba heard with a traffic list in CW at 1430. Nice signal here in north Florida.

17180.0 HWN-French Naval Radio Paris, France transmitting a V CW marker at 1433. Medium strength signal.

17204.8 NMC-US Coast Guard San Francisco, CA heard with a FEC ID/CQ callup at 1800. 100 baud/170 HZ shift. (Patrick Sullivan, La Crescenta, CA)

18191.0 CLN603-Prensa Latina Havanna, Cuba monitored at 2211 with English RTTY news. 50 baud/425 HZ shift/normal sense. (Patrick Sullivan, La Crescenta, CA) This one is beamed to the Far East. You should get pretty good reception on a regular basis Pat-ed.

18240.0 Spanish female five-digit numbers broadcast at 1907. Weak signal strength. (John Combs-Jacksonville, FL)

18241.5 LBQ54-Telam Buenos Aires, Argentina monitored with a 50 baud/650 HZ shift/reverse sense RTTY signal at 1935. (Patrick Sullivan, La Crescenta, CA) Traffic??-ed.

18431.2 Reuters News Service photos monitored at 1750. Mode was FAX 60 LPM/IOC 288. (Patrick Sullivan, La Crescenta, CA) This is probably LRO83 Reuters wire photo service out of Buenos Aires, Argentina, Pat-ed.

18755.9 Interpol-monitored a French bulletin using the ARQ mode at 2255. 100 baud/170 HZ shift. (Patrick Sullivan, La Crescenta, CA)

19063.8 CLP1-Prense Latina Havanna, Cuba heard a RTTY signal at 2030 using 50 baud/1000 HZ shift/normal sense. (Patrick Sullivan, La LCrescenta, CA)

19438.5 LOR-Argentina Naval Radio Puerto Belgrano transmitting a RTTY shipping advisory at 1820. 75 baud/170 HZ shift/normal sense. Also noted at 2156 with a 75 baud/425 HZ shift/normal sense sending 5 llr groups and ID. Frequency noted at 19438.7. (Patrick Sullivan, La Crescenta, CA)

20013.1 NMC-US Coast Guard San Francisco, CA transmitting FAX weather maps at 1945. 120 LPM/IOC 576. (Patrick Sullivan, La Crescenta, CA)

21837.1 NPM-US Navy Pearl Harbor, HI sending FAX weather maps at 1830. 120 LPM/IOC 576. (Patrick Sullivan, La Crescenta, CA)

22461.0 French Naval Radio Noumea, New Caledonia heard at 0039 with a V CW marker.

22479.0 KPH-San Francisco Radio, CA monitored with a V CW marker at 0037.

22574.5 NMO-US Coast Guard Honolulu, HI sending FEC unclassified trffic at 1943. 100 baud/170 HZ shift. Also noted at 1930 calling CQ. (Patrick Sullivan, La Crescenta, CA)

22567.5 KPH-San Francisco Radio, CA at 0033 with a CW V marker.

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I...#$$%?@ CAN'T... $^*^%^^ HEAR...#^%&& YOU!

No matter what portion of the radio spectrum you listen to, interference, or QRM as it is sometimes called, is a problem. In fact, users of the shortwave frequencies are hard pressed to find any signal without interference -- which is a situation vastly different from what listeners of domestic services expect. Newcomers are sometimes so frustrated that they give up the hobby. The truth is, however, that serious listeners on any band are plagued by the same thing whenever they attempt to listen beyond the "power-house" signals.

But all is not lost! There are things you can do to combat QRM. Depending on the strength and type of interference, you may even be able to nearly eliminate it. But before we can talk about how to stop interference, we must learn to identify it -- a task easier said than done in print!

Identifying the Noise

There are two broad categories of interference: Man-made and Natural.

Technically, natural interference (or static) is not "interference", but is classified as "noise." Static is caused by the electromagnetic signals released by lightning, and is characterized by its broadband nature. If you have ever listened to AM radio as a thunderstorm approaches, you know only too well what static sounds like, and will readily be able to identify it, even in its less obnoxious forms.

Because it is caused by lightning, static is more prevalent in the local summer. It is also more bothersome at lower frequencies, and affects AM transmissions much more than FM. As a result, LW and AM listeners are particularly plagued by static during the warmer weather and it is difficult to seriously DX those bands except in the winter.

As for "true" interference, there are a number of different types, each with its own characteristics and cures.

True Interference: Types and Cures

The first broad category of interference is "receiver caused" disturbances.

Especially with older receivers, the primary source of receiver induced QRM are "images." An image is caused by the receiver not properly filtering out the undesired signal generated by its local oscillator. That mouthful means, in essence, that due to a design limitation the receiver is trying to receive two frequencies at the same time. As a result, a station other than the one you are trying to receive is forcing its way through the receiver.

To check if images are a problem with your receiver find a strong signal. Then tune 910 kHz (or two times the Intermediate Frequency, if it is something other than 455 kHz) up and down and check if the same signal is present. If it is at either of those points, your receiver is not completely filtering the unwanted signals in its circuitry, and images will be a problem.

Another receiver problem is "overloading" -- distortion and "bleeding through" of a strong station adjacent to the desired signal. Portables and transistor receivers (as opposed to tube receivers) are particularly plagued by overloading and if you are near a powerful transmitter you will note the problem even in the most excellent receiver.

The last major receiver-caused QRM is the internal noise generated by the receiver itself. This can range from hum due to poor power supply filtering to noise generated by some digital frequency displays or microprocessors. This sort of noise can best be identified by its absence in any but the offending receiver.

The second broad category of QRM is interference from or inherent in the propagation circuit. Any QRM that is not generated by the receiver generally falls into this category, and the major forms are listed below in no particular order.

Co-channel Interference and Jamming

First, there is co-channel interference and jamming. This is most common on medium and shortwave signals since there are so many stations trying to share the same frequencies. It results from a station literally transmitting on the same frequency as the one you are trying to receive. While co-channel QRM is caused unintentionally, there are several nations, most notably the USSR and Chile that intentionally broadcast either another program or random noise on a frequency used by a broadcaster they wish to block from being received. Intentionally jammed signals sound unlike any other noise, and once you have heard a jammer in action, it is easy to identify the raspy hash noise they use. Often, jammer transmitters identify themselves with a one or two letter Morse Code signal at regular intervals.

Splatter

One of the most common forms of interference is "splatter," or more formally, adjacent channel interference. Splatter results when two stations transmitting on adjacent frequencies both fall within the bandwidth of your receiver, and both are thus partially audible. This is particularly common on SW frequencies, but obviously can occur anywhere.

A form of interference unique to AM signals (like those broadcast on MW and SW) are "heterodynes." A heterodyne is caused when the "carrier waves" of two adjacent transmissions "beat" against each other, and cause a tone. The situation is analogous to striking two keys on a piano, and in addition to sounding the two notes struck, a third note that is caused by the interaction of the sound waves is heard. In this case, it is the radio waves interacting, but the result is an audible "whistle", the pitch of which is dependent on the how far apart (in frequency) the two stations are.

Heterodynes are broken into two broad categories, based on the audio frequency of the note produced -- thus you will hear of either high frequency or low frequency heterodynes, depending on the pitch of the beat note produced.

Also common in all bands is local noise caused by machinery, light switches, or other electrical devices. Everything from car ignitions, to dimmer switches, to furnaces can and do generate radio signals, and all these modern conveniences can interfere with radio reception if they are close enough to your receiver antenna.

Distortion

The last major source of interference we'll deal with here is distortion in the circuit itself. Although simple fading is not classed as interference, there are a couple of exotic forms of fading that do fall into this category. Best known is the "multi-path" distortion so common in stereo FM reception. This is caused when a building or other large structure reflects a radio wave,

and two slightly out of phase signals reach your antenna. The result is distortion and loss of stereo separation.

Also common is "flutter fading" on SW, which is a rapid, deep fading pattern usually created when a signal passes through the earth's auroral zone. Selective fading is also common in AM signals, and results when the sidebands of a transmission fade at different times, causing a distinctive "talking from the bottom of a well" distortion to the transmission.

Now that we have run down the major types of QRM, we can discuss some ways to help lessen their affects.

Curing the QRM Blahs

There are four basic ways to reduce interference. Depending on the type of interference you are encountering, one or all may eliminate or at least lessen the problem: changing antennae, changing radios, adding something to the radio, or sidestepping the problem altogether.

If your problem is caused by some other station interfering with the signal you want to receive, the best solution deals with your antenna. A directional antenna will do wonders to help you separate stations on the same frequency so long as the stations are coming from different areas.

Similarly, if the problem is with fading of some sort, using a different antenna, or more than one antenna, may help eliminate your problem. Again, directional antenna systems may help if multi-path is the problem since the reflected signal often comes from a different direction than the main signal.

Lastly, if you are having problems with images, a sharply resonant design (like a small tuned loop) will also help greatly by reducing the undesired image frequency before it ever gets to the radio. In essence, even though the radio is still receiving two frequencies at the same time, there is almost no signal on the undesired frequency because the antenna does not let it through.

Using Your Radio to Cut Back QRM

There are a couple of different things you cn do with your radio itself to cut back on QRM's effects. First and foremost, you should tune as carefully as possible. It sounds silly, but a great deal of QRM can be eliminated simply by tuning critically. Also of use, if your radio has such a provision, is to narrow the selectivity bandwidth by switching in an IF filter. This will help with adjacent channel QRM and heterodynes since it will cut back on the portion of the radio spectrum your radio is looking at and thus eliminate interference from nearby transmissions. It may also degrade the audio quality somewhat, but there is no such thing as a free lunch!

The noise limiter, a feature almost all communications receivers have -- and a home-brew project that is easy to construct if your rig is lacking this feature -- are particularly useful in helping save your ears when listening to a static-prone signal. It's a cheap and easy fix for that type of interference.

Lastly, there is a reception technique called Exalted Carrier Single Sideband (ECSS for short) that can help reduce splatter and heterodynes in extreme cases. In essence, this involves turning on the BFO (the device used to listen to Single Sideband transmissions such as used by most hams) when listening to an AM signal, and tuning to one sideband. This effectively removes one sideband and the carrier wave, and allows you to choose to listen only to the sideband that is not badly interfered with. If you have a fairly stable radio, and the ability to listen to SSB transmissions, this technique can be most useful.

Filters and Other Add-Ons

Radio add-ons may also help in some cases. The most common forms of add-on are audio filters and equalizers. Both can "wipe out" heterodynes after the fact by simply cutting out the audio tones that are interfering with your enjoyment of the transmission.

A device that is rarely used today is the Q-multiplier. This is a cheap way to add extra selectivity to a radio that does not have provisions for selectable bandwidths. If your rig is one that fits this category, a Q-multiplier allows you to control both the amplification of the signal and the bandwidth. It can also decrease the sensitivity over a narrow range of frequencies to "notch out" an offending station. The details are beyond the scope of this column, but perhaps Terry Staudt will cover this in some future *Technical Topics* column.

Lastly, pre-selectors and antenna tuners can help reduce images and increase the perceived signal strength of a station to make static, receiver noise and other interference more tolerable.

Of course, for listeners seeking to hear an International Broadcast station there is a "lateral solution" to the interference problem that works better than any of the methods suggested above. Simply change frequencies to one that is not so severely interfered with! That is so obvious, that perhaps it gets overlooked, but as always, the simplest cure is often the best.

That will do it for this month's "Getting Started." As always, if you have a question, feel free to drop me a line at the address above. Include an SASE and I will be happy to help. ■

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Protecting Voice Transmissions

Acronyms and the federal government are almost synonymous terms when it comes to federal and military monitoring (FEDMILMON). Two of the most common in the VHF/UHF spectrum are D.E.S. and D.V.P.

D.E.S. translates to "Digital Encryption Standard." D.V.P. translates to "Digital Voice Protection." Both are often mistakenly interchanged as like terms. D.E.S. and D.V.P. are different methods of digital scrambling. D.E.S. *is* often used in conjunction with D.V.P. systems to provide additional transmission security.

Feds Converting to DES

Federal agencies in various sections of the United States are currently in the process of converting to D.E.S. systems with both the United States Departments of Justice and Treasury slated to adopt the system.

The FBI has the lead responsibility for integrating into one system the voice privacy systems being utilized by the United States Department of Justice (USDJ) agencies. The United States Department of Treasury (USDT) agencies appear also to be directly involved with the USDJ and the D.E.S. conversion. Therefore, a brief tutorial on digital voice protection is in line.

Working Out the Bugs

Digital voice protection will be widely utilized by federal agencies nationwide in the future once the "bugs" can be worked out of the system. A concern that may not be easily overcome is that signal-to-noise conditions must be very good to permit proper operation. The key is, obviously, intelligible recovery of the transmitted voice signal. Problems with D.E.S. appear to be either logistical (within the agencies) or hardware. Logistical problems typically relate to different keying (code) of radios between visiting agents and home field agents or among different groups of the home field agents (i.e. bank robbery squad versus drug enforcement squad).

Digital voice protection (also noted as voice privacy) systems utilize two levels to obtain desired security of the transmitted material. The first level is the digitization of the analog audio into discrete digital values. The discrete digital values are then scrambled based on statistically unrelated (i.e. unique) codes. The data that is present with the RF carrier is hence a digital representation of the analog audio which is scrambled digitally.

The result heard by units not equipped for the digital secure transmission is the sound of random noise, that like when a squelch is in the position where the receiver noise is heard on a frequency not being currently utilized. The D.V.P. system (a Motorola trade name) has over 260 septillion unique codes!

DES: The National Standard

The National Bureau of Standards (NBS) has established D.E.S. as the standard method of protecting digital data transmissions for all federal agencies. The D.E.S. module creates a unique and orthogonal vector encryption key variable that yield 70 quadrillion possibilities when combined with D.V.P.

The result is a more secure transmission when the system is properly performing and, more importantly, a set standard so that several different noncompatible systems are not developed and field deployed. A few key system features of D.V.P./D.E.S.-equipped system will be presented, followed by a profile of the USDJ agencies.

The Motorola based DVP series radios, like their MX hand-held series, offer two modes of operations, clear or coded. The MX series allow clear voice traffic to override the DVP and switch the receiver automatically into a clear reception mode. By this manner a unit is able to receive all traffic, be it in the clear or in coded mode. This override feature would allow coded units on surveillance to receive a general call about a bank robbery, for example.

The MX units can be tailored for multimode operation where clear versus coded status is automatically determined by channel selection. A field agent may be operating in the coded mode on channel one on a surveillance and switch to channel two in the clear to contact the base station.

The Department of Justice

The United States Department of Justice is comprised of several major agencies. The Attorney General of the United States is the person directly in charge. He is assisted by the Deputy Attorney General and Associate Attorney General who oversee the operations of the various agencies under the auspices of the USDJ. The agencies presented this month will be the Bureau of Prisons (BP), the Drug Enforcement Administration (DEA) and the United States Marshal Service (USM). The FBI, Immigration and Naturalization Service, including U.S. Border Patrol, and the U.S. Attorneys will be presented in a second column continuing the coverage of the USDJ in the next issue of *Monitoring Times*.

Table one presents the frequencies and channel designators utilized by Bureau of Prisons and the United States Marshal service. The BP is rumored to be switching to a new set of frequencies with D.E.S. capabilities but the frequencies listed in table one are still active as press time. United States Department of Justice frequencies presented are nationwide assignments.

US Marshals

The US Marshal service operations vary in different sections of the country. For example, USM service operations in the Cleveland area are usually transporting prisoners between local jails and the courts. However, the USM service in Tulsa, Oklahoma, ran its own wanted poster in a local newspaper. The poster had an individual's photograph and description along with a telephone number and address for those wishing to supply information on the whereabouts of the subject. That individual had apparently escaped from federal custody while being charged for conspiracy to import cocaine.

The Drug Enforcement Agency

In today's *Miami Vice*-type world, The Drug Enforcement Administration is probably just as widely known as the FBI. It receives mention in almost every episode of the popular TV show and almost daily in the

national news media.

The DEA operates on a nationwide channel/frequency set listed in table two. In addition to the frequencies listed in table two the DEA has been reported operating on other frequencies in the 417.400 to 419.000 MHz region with the majority reported between 418.625 and 419.000. Also the low power or common federal government frequencies of 418.050, 418.075 and 418.575 should not be overlooked when monitoring DEA activities.

The next Federal File will continue the USDJ profile and present a more technical tutorial on digital voice protection methods. Suggestions and requests for future Federal File columns are solicited. ■

Motorola's versatile MX300-S units allow the user to operate in the clear or coded.

Table One

Bureau of Prisons

170.875	CH 1	Bureau of Prisons Operations
170.925	CH 2	Bureau of Prisons Operations
170.650	CH 3	Bureau of Prisons Emergency Channel

United States Marshall's Service

163.200/163.8125	CH 1	Operations Repeater (out/in) C*
163.200	CH 2	Operations Simplex C*
164.600/163.8125	CH 3	Operations Repeater; Mobile Extenders
164.600	CH 4	Operations Simplex, Mobile
163.8125	CH ?	Aircraft and Mobiles C*
162.7125/170.800	CH ?	Operations Reported

Table Two

DEA Channel/Frequency Pairs

418.625/416.050	CH 1	Operations Repeater (out/in) C*
418.900/416.325	CH 2	Operations Repeater C*
418.750	CH 3	Surveillance/Strike force Simplex C*
418.675	CH 4	Surveillance/Strike force Simplex
418.825/415.600	CH 5	Operations Repeater
418.950/416.200	CH 6	Operations Repeater C*
418.975/417.025	CH 7	Operations Repeater
418.975	CH 8	Operations Simplex

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Following the FCC

AM radio station owners appear to be moving toward some agreement concerning sound quality. And they want the FCC to take stronger stands on other issues facing them, especially that of interference.

The National Association of Broadcasters has called for the FCC to stop granting licenses to new AMers until new technical standards are created to reduce interference to current stations. Several broadcast ownership groups joined the NAB in protesting current standards which have created overlapping broadcast patterns, including skywave (nighttime) signals.

A number of groups with radio interests have gone on record as supporting the NAB's AM preemphasis standard, formulated by the National Radio Systems Committee (NRSC). Filing favorable comments with the FCC have been Capital Cities/ABC, Crawford Broadcasting, Motorola, the SBE, Delta Electronics, Orban, Fisher Broadcasting Susquehanna Radio, the Consumer Electronics Group, WGN Broadcasting, CBS, and Group W. The standard would limit stations to a 10 kHz audio bandwidth instead of the current permitted 15 kHz.

Continuing to oppose the standard was Bonneville International, questioning whether stations could ever move back to a 15 kHz bandwidth standard. Joining Bonneville in opposition were Jacor Communications and Noble Broadcasting. Noble commented that instead of promoting AM improvement the proposed standard could actually impede it, citing the lack of consumer receivers which can now reproduce high-fidelity sound.

Many Daytimers Now On At Night

Following a quiet ruling by the FCC, many regional daytimers now are on the air at greatly reduced powers at night, ranging from 10 to 500 watts. Most are under 100 watts. As a result, many DXers have found that it is now virtually impossible to hear anything unusual on regional channels -- at least at night before midnight. Even the clear-channel frequencies of 940 and 1550 were included in the FCC's action.

About the only formerly daytime-now-nighttime station I have heard has been KLWN-1320, Lawrence, Kansas, which received a hefty 250-watt grant. At a location some 23 miles from my house, KLWN's new nighttime signal seems to be equal in strength to the other signals on 1320. By comparison, graveyarder KVOE-1400 Emporia, Kansas, at 1000 watts and about 50 miles, almost never rises above the nighttime noise.

DXers might be able to bag a few new stations which now stay on all night, but the action by the FCC has, on the whole, merely resulted in more useless noise for the BCB DXer to contend with.

On the other hand, even a station going silent on a frequency does not automatically mean that a DXer will start logging newies. I have not heard anything new on 1250 since WREN left the air last September, probably because nearly all stations within 750 miles or so had protected WREN at night.

New High Quality M-FM Receiver

Richard Sequerra has signed a contract to build a high quality AM-FM receiver for the NAB, but don't expect it to be a DXer's dream. The New York engineer has been asked to come up with a design which will include AM stereo/FM stereo, continuous digital tuning between the two bands, the NRSC standard, FMX decoding, a signal-strength LED, and a rotatable AM antenna. Other refinements will include decoding of both Kahn and C-QUAM stereo signals.

Any such wide-band receiver, however, is unlikely to tune split frequencies or to reject adjacent-channel reception. Even the 10 kHz notch filter will not prevent overmodulated U.S. stations from slopping over a channel or two. No technology presently exists which will both make your local AMer sound better and allow you to tune foreign DX on an adjacent channel.

Pure Sounds from Crystals

It is said that the purest AM sound possible comes from the crystal radio. And Mark Lawson of Lubbock, Texas, is hoping that someone is still offering crystal radio kits so that his Scouts could have fun building them -- just like he did when he was a kid.

Fortunately, several readers have forwarded more information concerning components. Terry Smith of Van Nuys, California, with whom I've spent many pleasant hours talking about radio equipment and DX, sent me a catalog from Antique Electronic Supply (AES), 688 W. 1st Street, Tempe, Arizona 85281 (price $2.00), which included such items as high-impedance headsets and galena crystals but, alas, no kits. Dave White of Cherryfield, Maine, noted that he uses the booklet *Radios that Work for Free* by K.E. Edwards, and *All About Crystal Sets,* by Charles Green. AES offers both in their catalogue.

I'll continue to pass along information concerning crystal sets as I receive it. I may even get enough time this summer to build one myself! If you order the AES catalogue, be sure to mention that you heard about it in *Monitoring Times.*

DX Below 540

For those of you who tune below 540 for DX, you'll find Ken Stryker's *Updater to the Aero/Marine Beacon Guide* very useful. It's a labor of love, obviously, and lowfers would be lost without it. The Updater is $4.00 postpaid for both the U.S. and Canada, overseas $6.00; order from Ken at 2856-G.W. Touhy, Chicago, IL 60645.

Ken has incorporated several new features into the Updater, including known elevations of many beacons and designations of known double sidebands. The original Guide is still available at $10 in North America.

If you're interested in joining a club which is devoted exclusively to longwave, write to the Longwave Club of America, 45 Wildflower Road, Levittown, PA 19057, for information.

Information Needed on Russian 66-73 MHz FM

I've had some interesting correspondence with a Finnish *MT* reader and DXer who is looking for a high-power antenna and rf amplifier to enable him to DX the Russian 66-73 MHz FM broadcast band. Reijo Siivonen, of Rauma, says that no one in Europe appears to manufacture such a combo to enable him to listen to exotic music from the Soviet Union and other Eastern Bloc countries. He can sometimes hear central Europe on FM now via sporadic E skip.

The closest NTSC TV channel would be channel 4, and I've been trying to get in touch with my local cable TV chief engineer for his recommendations, but perhaps *MT*

readers would be able to come up with some addresses of manufacturers whom Reijo could contact. I'd be happy to pass them along.

Passive AM Booster

Speaking of antennas, J. Ken Kuzenski, Jackson, Louisiana, came up with a variation of the passive booster for AM, using coils around a beer can and grounded to a ring that I described last year. He soldered both the ground and lead of a female coax connector (F-type, BNC, or any type will do) to one end of a left-over coil, 77 turns of #22 stranded wire on 1.5 inch PVC (stronger than a toilet tissue tube!). Then he connected the other end of the coil to ground.

He then connected the coax connector to the lead-in of his available shortwave antenna, which happens to be a 55 foot Windom dipole running north-south. After five minutes of work, Ken says that by placing the coil near his BCB receiver, a Sony ICF-2010, signal strength of stations is increased dramatically, although he is unable to null any stations.

I used a similar setup years ago with a ferrite antenna and tuning capacitor scrounged from a dead five-tube AM radio, and as Ken says, the results were dramatic, much more so than by connecting a longwire directly to the receiver's antenna terminal. I'll have to see if I can dig up the plans for it sometime.

If you've discovered a quick and handy project as Ken has, won't you share it with *MT* readers? Include a diagram, please, if possible.

Win a Logbook!

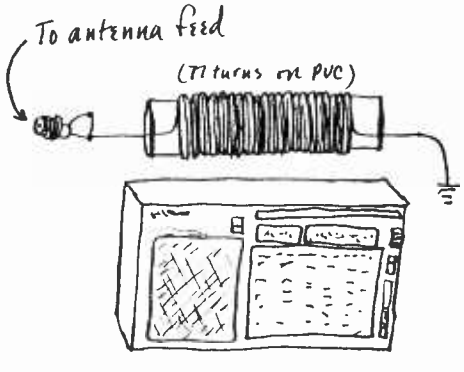
Ken asks if I intend to include plans for a broadcast band loop in the column sometime. Well, why not? But I'm going to let *you* design it. Let's have a little contest, and the winner will receive an NRC Log, complete with Updaters. I'll include the plans in the October column, just in time for the DX season. Postmark deadline for entry will be July 10.

Please send all reader inquiries directly.

Here are the rules: (1) Your design may not have been previously published. (2) Materials must be readily available from any electronic, hardware, and lumber dealer, and a list of all materials must accompany the design. (3) The easiest-constructed and most user-friendly unamplified loop providing a significant signal gain will win the prize. (4) Everyone except my mother is eligible to enter.

I may also name a few honorable mentions, should there be multiple designs worthy of mention, and if so I'll award the designers something of value from around my shack, the exact value commensurate with the design. Let's have fun with it, and let's make it useful. Until next time, 73!

■



The signal from the Caribbean Beacon on 1610 kHz is boosted as the coil around the PVC pipe is brought nearer to the receiver's internal ferrite rod antenna.

Jean Baker, KIN9DD

213 W. Troy Ave. 4C
Indianapolis, IN 46228

A look at how radar is utilized within the modern ATC system

Radar--Radio Detection and Ranging. According to Webster's *New World Dictionary*, it is a system or device that transmits radio waves to a reflecting object, such as an aircraft, to determine its location, speed, etc., by the reflected waves.

As aviation band monitors, we are constantly hearing the word used in almost every transmission between pilots and air traffic controllers at both terminal and enroute air traffic control facilities. Let's examine the various components which make up today's modern radar system, along with its associated terminology.

Today's Modern Radar System

First of all, the National Airspace System (NAS) comprises the common network of U.S. airspace, air navigation facilities, equipment, services, airports or landing areas, aeronautical charts, information and services, rules and regulations, procedures, technical information, manpower and material. Included are system components shared jointly with the military.

Concomitantly, the National Beacon Code Allocation Plan Airspace (NBCAP Airspace) is the airspace over United States territory located within the North American continent between Canada and Mexico. This includes adjacent territorial waters outward to about the boundaries of oceanic control.

Primary and Secondary Radar

Primary Radar is a system in which a minute portion of a radio pulse transmitted from a site is reflected by an object. The reflected signal is then received back at the originating site for processing and display at an air traffic control facility.

Secondary (Surveillance) Radar, the Air Traffic Control Radar Beacon System, (ATCRBS), is a system in which the object to be detected is fitted with cooperative equipment in the form of a radio receiver/transmitter (transponder). Radar pulses transmitted from the searching (interrogator) site trigger a distinctive transmission from the transponder.

This reply transmission, rather than a reflected signal, is then received back at the transmitter/receiver site for processing and display at an air traffic control facility. The replies received are then mixed with the primary radar returns and both are displayed on the same radarscope.

The transponder automatically receives the signals from the interrogator and selectively replies with a specific pulse group (code). These replies are independent of, and much stronger than, a primary radar return.

An integral part of the ATCRBS ground equipment is the decoder which enables the controller to assign discrete transponder codes to each aircraft under his control. In most cases, only one code will be assigned for the entire flight. Assignments are made by the ARTCC (Air Route Traffic Control Center) computer on the basis of the National Beacon Code Allocation Plan. There are 4096 aircraft transponder codes which can be assigned.

When you hear an air traffic controller tell a pilot whose flight he's working to "squawk ident," this means that the pilot should activate the identification feature of the transponder which causes the assigned code number to appear on the controller's radarscope.

The Radarscope

The radarscope used by air traffic controllers displays returns from both the primary radar system and the ATCRBS. These returns, called targets, are what the controller refers to in the control and separation of traffic. Data blocks (alphanumeric display) show the flight number, altitude, ground speed, assigned climb or descent, emergency, handoff, loss of radar contact, and other information of an aircraft.

Radar utilized by air traffic control facilities is divided into two broad general categories; Airport Surveillance Radar (ASR) and Air Route Surveillance Radar (ARSR) -- the enroute or ARTCC function. Both types can scan through 360 degrees of azimuth and present target information on a radar display located in an Air Traffic Control Approach/Departure facility or Air Route Traffic Control Center. This information is used independently or in conjunction with other navigational aids in the control of air traffic.

Short Range Coverage

ASR (Airport Surveillance Radar) is designed to provide short-range (50 miles) coverage in the general vicinity of an airport and to serve as an expeditious means of handling terminal area traffic through observation of precise aircraft locations on a radarscope. Many medium to large radar facilities at airports in the United States utilize some form of the Automated Radar Terminal Systems (ARTS).

In general, an ARTS displays aircraft identification, flight plan data and other flight associated information in conjunction with the radar presentation (see diagram). In addition to enhancing visualization of the air traffic situation, ARTS facilitates intra- and inter-facility transfer and coordination of flight information. Each ARTS level has the capability of communicating with other ARTS types as well as with ARTCCs.

ARSR (Air Route Surveillance Radar) refers to Air Route Traffic Control Center (ARTCCs) radar used primarily to detect and display an aircraft's position while enroute between terminal areas. The ARSA enables controllers to provide radar air traffic control services when aircraft are within 400 miles. In some instances, ARSR may enable an ARTCC to provide terminal radar services similar to, but usually more limited than, those provided by a radar approach control.

National Airspace System Stage A comprises the enroute Air Traffic Control System's radar, computers and computer programs, controller plan view displays (PVDs/Radarscopes), input/output devices, and the related communications equipment which are integrated to form the heart of the automated Instrument Flight Rules (IFR) air traffic control system. This equipment performs Flight Data Processing (FDP) and Radar Data Processing (RDP). It interfaces with automated terminal systems and is used in the control of enroute aircraft.

Radar Data Processed (digitalized) Displays are utilized 75 percent of the time; this is referred to as being in the narrowband mode. During the remaining hours the backup (broadband) system is put into use so that the main systems can undergo "preventive maintenance." Each radar system has several backups.

A number of airport surveillance radars are still two dimensional -- range and azimuth only -- consequently, altitude information must be obtained from the pilot.

At some ATC locations secondary-radar-only gap-filler radar systems are used to give

lower altitude radar coverage between two larger radar systems, each of which provides both primary and secondary radar coverage. In these geographical areas aircraft without transponders cannot be provided with radar service, nor can transponder-equipped aircraft be provided with radar advisories concerning primary targets and weather.

Precision Approach Radar

Precision Approach Radar (PAR) in the United States is mostly utilized by the military, although there is some civilian usage of it. Separate military installations are used to detect and display azimuth, elevation and range of aircraft on the final approach course to a runway. This equipment may be used to monitor certain non-radar approaches, but it is primarily used to conduct a precision instrument approach wherein the controller issues instructions to the pilot based on the aircraft's position in relation to the final approach course (azimuth), the glidepath (elevation) and the distance (range) from the touchdown point on the runway as displayed on the radarscope.

Each scope is divided into two parts. The upper half presents altitude and distance information, and the lower half presents azimuth and distance. Range is limited to 10 miles, azimuth to 20 degrees and elevation to 7 degrees; consequently, only the final approach area is covered.

Looking Back

We've come a long way from the days when all radarscopes were mounted horizontally, and little plastic markers called "shrimp boats," representing flights, were pushed around on the scope to help controllers identify the aircraft. When those shrimp boats were used, one good, explosive sneeze from a controller could wipe away a sector's whole portion of the sky!

The development of advanced hardware, software, and communications equipment for the future of air traffic control is a continuous, on-going process. You'll read about it, as it happens, in *Monitoring Times.*

That's all for this month. The role that Flight Service Stations play in the world of aviation and related communications will be spotlighted in the next installment of *Plane Talk.*

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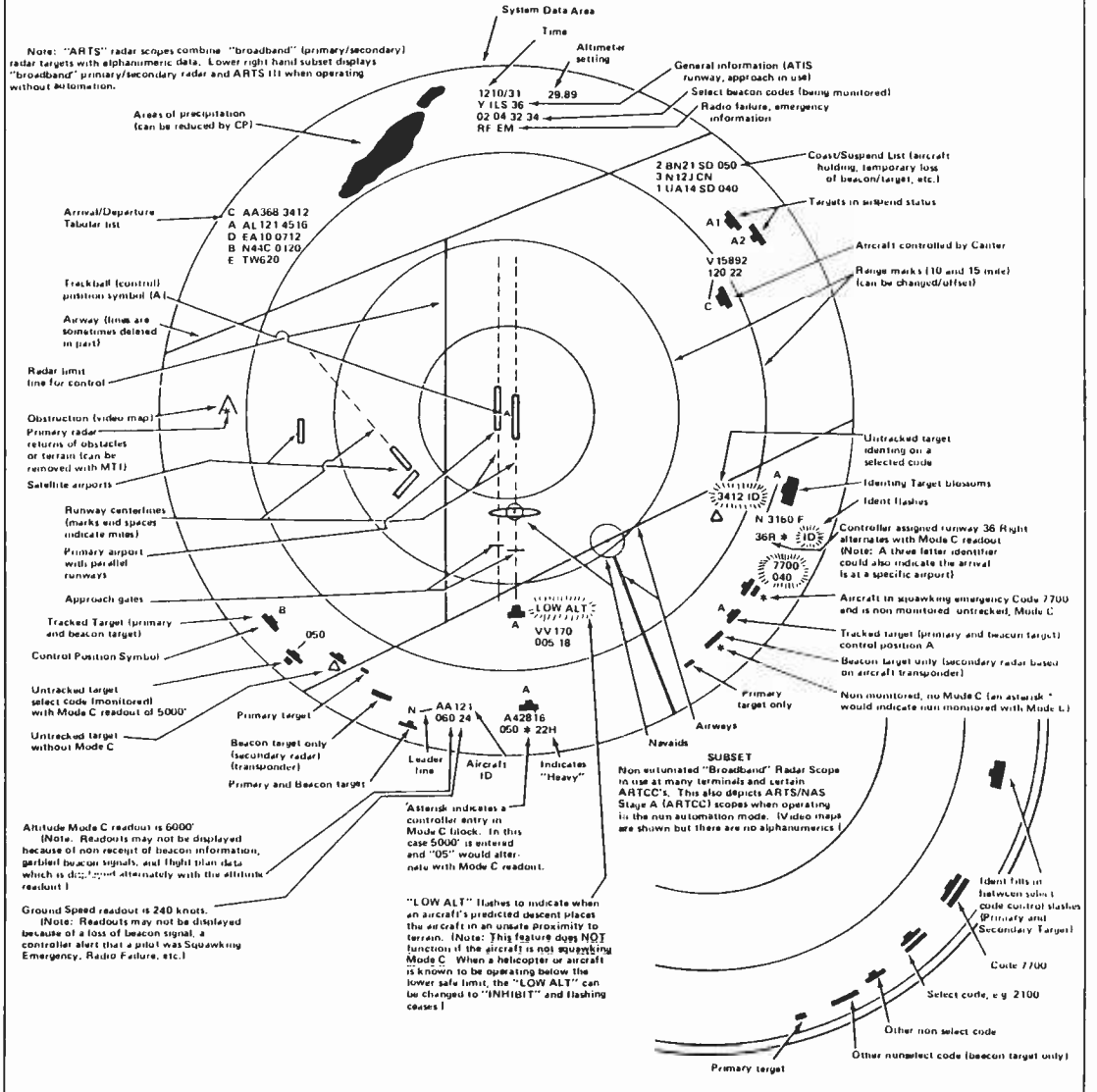
RADAR SERVICES AND PROCEDURES



Material and diagram courtesy of FAA

Ike Kerschner, N3IK

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The National Traffic System

Sending third party (non-amateur) messages has been part of amateur radio since its earliest days. Pioneering hams enjoyed demonstrating their station's capabilities by sending greetings to friends and relatives all over the country. In those dawning days of the hobby (and limited communication range), it was common for an amateur to send a message to a neighboring ham to be relayed to a more distant station till it reached its destination. To be sure, some of the trips that message took were round about -- to say the least. But the dedication of those early hams enabled a rather high percentage of messages to be delivered.

The American Radio Relay League

The American Radio Relay League was actually formed in an effort to organize message handling. Composed of amateurs who were interested in spanning the continent with messages for friends and relatives and to maintain communication during emergency or disaster situations, the basic desire was to provide a public service. And they did it with gusto!

Public demonstrations were often organized and one of the more popular featured the exchange of messages between political figures of various states. On Governor's Day, for example, messages would be sent between the governors of various states or to the President of the United States. These demonstrations were held on an annual basis and were the focus of much media attention and publicity for amateur radio.

Emergency Traffic

Floods, fire and other disasters found the amateur playing an important part in maintaining communications with the outside world. Often, a lone amateur would be a stricken community's only contact with authority. Efforts such as these attracted the attention of the media who would present the image of amateur radio as public spirited men and women willing to serve their community in time of need. There is little doubt that these early traffic handlers did much to ensure the continuity of the hobby we enjoy today.

The Trunk System

Initially the system was composed of amateurs who had reliable stations that were capable of spanning some specific distance. These stations were organized into what was called a "Trunk System." Less powerful stations could send their messages to these "power house" stations for retransmitting to distant points, eventually being relayed to their destination.

As you might imagine, such a system placed a lot of responsibility on a few key stations. For the most part these stations responded with enthusiasm worthy of a zealot. Such dedication earned the pioneer traffic handlers the honored title "Iron Man," for such they were, often staying at the key, hours on end to clear all of their traffic.

Enter National Traffic System

The shortcomings of such a system were obvious. It was unrealistic to expect a few dedicated amateurs to continue to handle large numbers of messages on a continuing basis. Improvement in the system had to wait until a large enough number of amateurs had satisfactory (capable of spanning over 50 miles) transmitters.

Availability of such gear eventually became common with the advent of the vacuum tube and shortly thereafter, a system of local area nets was established. These nets met daily at a specific time and frequency to receive messages from a local level and then send them on to a regional net. The regional net then met after the local nets completed their business. Messages were routed via the regional nets to their final destinations, usually within 24 hours.

This system is today called the National Traffic System (NTS). Consisting of more than 500 nets, it handles hundreds of messages daily. Most of the traffic is of a routine variety (birthday or holiday greetings) but this day-to-day handling of commonplace messages prepares participants in the NTS system to handle emergency traffic speedily and efficiently.

You Can Be Part of the System

Without a doubt, serving the public in this manner is one of the greater joys of amateur radio. All radio amateurs can participate. No longer do you need to be an "Iron Man," holding rigorous daily schedules. Today's nets have so many participants that the active ham need only check in daily, once a week or whenever he can.

Getting Started

The first thing you need to do is to join a net. Nets operate in Morse Code (CW), SSB, RTTY, Packet and FM. CW is still the most popular mode for the beginning traffic handler because it is the easiest method. However there is nothing preventing you from participating on any of the other modes if you have the required license and equipment.

To locate the time and frequency your local nets operate on, obtain a copy of the *Net Directory* from the ARRL (cost $1.00). Also order the free ARRL operating aids FSD-3 (a list of ARRL numbered radiograms) and FSD-218 which is a list of special Q signals that are used in the traffic nets. The *ARRL Operating Manual* is also an excellent investment for the beginning traffic operator.

If you are a rank beginner, consider one of the many beginner or Novice nets. For the most part these nets operate exactly as the other nets, but at a slower speed. You will also find many experienced hands waiting to help you through your first QNI (check in) and guide your entry into traffic handling.

A famous myth about CW traffic handling is that it is all done at speeds over 35 words per minute. 'Tain't so! Average net speeds are from 15 to 20 WPM. It is true that experienced traffic men are usually speed merchants and will zip along at incredible rates without missing a word but because they are experienced, they also understand the need to work at a speed the other station is comfortable with.

If you choose a phone net, you will need to familiarize yourself with the procedures used. Again the *Operating Manual* will grease the way for you. RTTY and Packet also have special protocols to follow so listening to these nets for a few sessions will be helpful.

Growth Within the System

After a few sessions with your regular net you will be invited to become an ORS (Official Relay Station). This means that you are a recognized member of the NTS and familiar with traffic handling. As you progress the Net Manager may ask you to take a stint as NCS (Net Control Station) or represent the local net in the regional net and send and receive traffic from other areas. As your growth continues you will take deep satisfaction in knowing you are becoming a better operator.

Try it, it's fun and it's good for amateur radio!

Polar Bridge Expedition

A group of nine Russians and four Canadians left Sevrenaya Zemlya in the Soviet Union on a journey to Canada's Ellesmere Island several month back. The trip will take the explorers, all told, over 1600

miles.

The adventure is now winding down but there's still a chance to get in on the action. Communications for the group is being handled by amateur radio. The call sign of the expedition is EX0VE, the Soviet base stations call sign is EX0CR while the Canadian base at Resolute Bay is CI8C.

The group is carrying three radios, on HF a Soviet built 10 watt unit for 80, 40 and 20 meters and two VHF Icoms. Power is supplied by lithium batteries. The antenna is an inverted Vee supported by tent poles.

Exact frequencies for the expedition are not available but information can be obtained by tuning to the base stations frequencies between 14.120 and 14.125 MHz. Do not attempt to contact the base stations unless they invite calls from other amateurs. For the most part the frequency is being held open to provide necessary communications for the effort.

QSL's should go to P.O. Box 313, Don Mills, Ontario, Canada.

QRP Corner

The QRP ARCI announces their First Sunday QSO Party (held the first Sunday of each month). Here is a great chance to work QRPers all over the world. Schedule of activities as follows:

UTC	CW	SSB	Novice
1400-1600	14.060	14.285	
1600-1700	21.060	21.385	21.110
1700-1800	28.060	28.885	28.110
1800-1900	7.040	7.285	7.110
1900-2000	14.060	14.285	
2000-2100	21.060	21.385	21.110
2100-2200	28.060	28.060	28.110
2200-2300	7.040	7.285	7.110
2300-0000	14.060	14.285	
0000-0100	7.040	7.285	7.110
0100-0300	3.560	3.985	3.710

Neat Stuff

Kanga Products offers the amateur or SWL who likes to build gear several very interesting kits at prices that are affordable. Transmitters, receivers, converters, clocks, VFO and frequency counters are a few items in their line. For the most part these are partial kits with only the main components included. However they do have a complete parts list and all parts can be purchased through them although for the most part the components not included with the kit can be purchased at the local Radio Shack. To obtain a copy of Kanga's catalog, send one dollar to Kanga Products, 3, Limes Road, Folkestone, Kent CT19 4AU England.

The GM4HBG Screened Loop

This 80 meter receiving antenna is constructed from RG8U coax. Cut one piece 350cm long and remove 30cm of insulation and the copper braid at the center of the coax, (see fig. 2). Do not damage the insulation under the braid. Connect a BNC connector to each end of the coax.

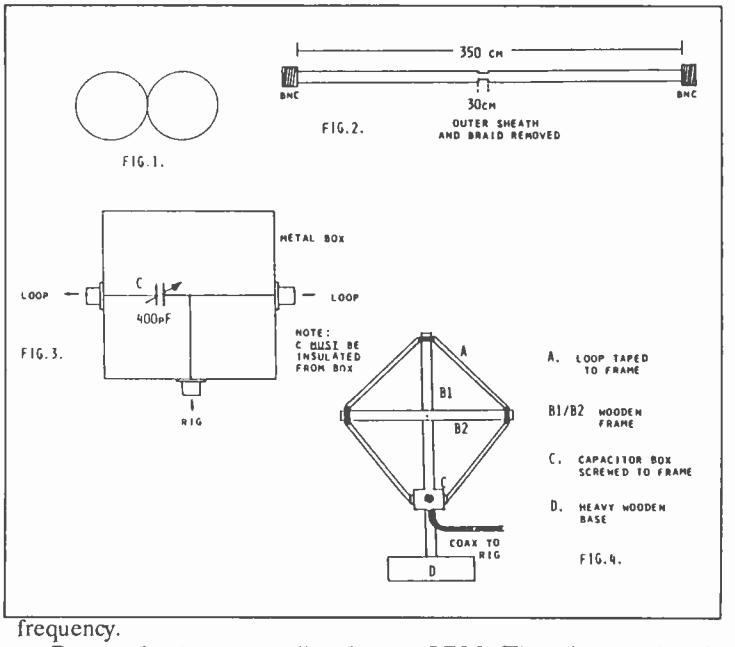
Install a 400pf (365 should be ok) in a small box as shown in the illustration. Also install three BNC connectors in the box.

Next construct a frame of wood or PVC to support the loop as shown in diagram 4.

Wire the connectors as shown at figure 3, and prepare a length of coax to go to the receiver or changeover switch.

Use a dip meter or GDO to resonate the antenna to the desired frequency.

Rotate the loop to null noise or QRM. That little project is courtesy of the SPRAT journal of the G-QRP Club. And that's all for this month. ■



CORRECTION: Listen for OURA's special event station N8HHG June 29-July 1 on 28.450 instead of 29.450 as mentioned last month.

Dr. John Santosuosso

P.O. Box 1116
Highland City, FL 33846

The Year of the Pirate?

Is 1988 the year of the pirate? Well, maybe so. Pirate activity has been at something of a low point the past few years, but that could change in the near future with the situation improving still further in 1989.

The last time pirates were active to a major degree was in the late 1970s and early 1980s. That is not just coincidence. During this period sunspot activity was at its peak. Those pirate transmitters with their usually extremely limited watt power could still be heard over tremendous distances and could be heard regularly. If conditions were particularly good Europirates could make it across the Atlantic on a 100 watts or less. Likewise, it was possible for a North American pirate to go coast to coast on nothing more than flea power.

High Sunspots, More Pirates

As sunspot activity declined so did pirate activity. There isn't much purpose in transmitting when you cannot be heard. To be sure there are always a few pirates around, but the number certainly declined as the 1980s matured. However, we have turned the corner. The low point in sunspot disturbances has now been reached. Over the next several years we should see an increase and with it more jolly bucs on the airwaves.

As we enter the summer months it could be a good idea to keep your ears tuned to the "pirate bands." While propagation at that time is generally not the best for most kinds of radio transmissions, there is a compensating factor for the pirate searcher. Many pirate operators are college students. It may be too inconvenient or risky to haul the old transmitter off to the dormitory with you. Summer vacations are often a better time to broadcast.

During the summer months be especially on the lookout for pirate broadcasts around July 4. National holidays have long been favorite broadcasting times for pirates, and Independence Day seems to be one of the most popular. In the "good old days" if you got lucky and stumbled across a "pirate fest" you might hear five or six different ones in a single holiday evening.

Where to Hear Pirates

Pirates can turn up literally anyplace, but especially for those searching for their very first catch, several spots are probably good places to begin. Check just above the high end of the medium wave broadcast band. Many pirates seeking an audience which may not have shortwave capability will select frequencies in the vicinity of 1620 kilohertz.

Another target area should be those frequencies from about 6210 to possibly as high as 6320 kilohertz. This band, long popular with Europirates, has also been used by North Americans including the most famous pirate of recent months, Radio Newyork International. RNI has vowed to return, and if it does, there is a strong possibility it may turn up on its old frequency of 6240. Of course, some imitators may also decide to take up residence in this same neighborhood.

Finally, be sure to monitor those frequencies between 7400 and 7500 and perhaps even somewhat lower and higher than these

Will 1988 be the year of the pirate? Let us know what you hear and share those rare QSLs with the "Outer Limits" audience!

two points. For years this has been by far the most popular of any of the unofficial pirate bands.

When to Hear Pirates

When should you listen? If pirates can turn up on any frequency, they can also turn up at any time. Still, your best chance is on the weekends, especially UTC Sunday, which is of course, Saturday night and early Sunday morning EDT. Above all do not get discouraged. Pirates are fun to hear, and sometimes the programming is quite creative. However, they do use low power, and those that maintain a regular schedule are seldom around very long. They are soon shut down. So you may go months without hearing one, but if you are persistent sooner or later you will be rewarded.

When you are, let us know what you heard. "The Outer Limits" column very definitely wants your pirate logs and any other pirate news you can send along. Contributions from stations are welcome, and, of course, your confidentiality will be respected.

Recent Pirate Happenings

Terry Krueger writes from Florida to report a recent catch of pirate Voice of Radio Free Indiana on 7448. He also notes that the station announced a phone number which he called to request a QSL. The QSL has been received.

Krueger says that mail being sent to the former New York office of commercial offshore Europirate Radio Caroline is being returned by the post office. He suggests you will have better luck if you try 54 Plainfield Avenue, East Rockaway, NY 11518-1230. However, remember Caroline seldom replies to reports regardless of where you send them. If you did not hear its recent tests on shortwave, you may wish to monitor 6210 kilohertz. The station itself is on a ship anchored in international waters off the southeast coast of England. It is primarily a medium wave broadcaster and has a huge audience in Europe.

Were you one of those people who never did get a reply to your report to Radio Newyork International? Unfortunately this writer was, although he knows of one DXer who got two! Among the more fortunate recipients who did get QSLs was John Demmitt. We reproduce here the RNI logo from John's QSL letter in case you did not get an answer either and would like to see what it looks like.

Hey, how about it RNI? Since you started broadcasting, "Outer Limits" has tried to cover your story the best we could, but we sure could use some help from you! Why not put us on your mailing list?

And in case any of our readers want to send a follow-up report or just write to the RNI staff. You can try either of the following addresses: P.O. Box 010073, Staten Island, NY 10301-0003; or 496 LaGuardia Place, Suite 451, New York, NY 10012.

RADIO NEWYORK INTERNATIONAL

Numbers Intrigue

Attention numbers monitors! Please monitor the frequency of 11464 kilohertz for Spanish numbers transmissions. If you hear any, please let us know the format (4 or 5 digit), your location, and your S-meter reading of the signal strength. Also include time, date, and any other details you think might be helpful. As always, we will not use your name if you request that we keep it confidential. A numbers transmission with an unusually strong signal was recently logged here on 11464 at 2115 UTC.

Several readers report in with some numbers logs. In Texas, Bill Cantrell reports 4-digit Spanish groups on 5810 with sign-off at 0248. In West Virginia, Todd McKown heard Spanish numbers on 6825 kHz at 0604 UTC. Out in Washington, Herman Waterman heard 4-digit Spanish numbers on 8070 at 0106 UTC. He remarks that while the mode was standard AM, with his "BFO off the audio sounded somewhat like a mistuned SSB signal which it definitely was not."

They continue to be all over the place, folks. They cannot hide forever. Someday, perhaps soon, we will know what they are. ■

Interval Signals:

Musical Windows on the World

Have you ever been listening to a program when all of a sudden it's wiped out by somebody's interval signal? The problem usually occurs towards the end of the program, five or ten minutes before the station you're listening to is due to sign off the frequency and another station signs on.

That interval signal isn't, of course, designed to annoy. In fact, the next time you hear one, consider that you're listening to a unique, old shortwave tradition.

Interval signals are generally very brief passages of music, played over and over in advance of a station's sign on. Usually only a few notes long, they're often chosen by how well they can call up an image of the broadcasting station in the listener's mind.

On a more practical level, shortwave stations originally used tuning signals to act as a sort of "beacon," helping listeners locate their station on the dial. That way, if the station was ever forced to change frequencies, all the listener had to do was scan the dial a few minutes before the program came on and listen until he or she found the appropriate tuning signal. The tradition continues today.

Austrian Radio International, for example, starts off their transmissions with the first eight notes of Johann Strauss' *Blue Danube*. Switzerland has a charming little ditty played on a music box. It's perfect for a nation often associated with watchmakers. Britain's is positively regal. Australia's is the bouncy *Waltzing Matilda*. The Voice of America uses *Yankee Doodle*.

Radio Netherland's tuning signal, surprisingly, is a depressing melody played on tolling bells. The station says it's an old Dutch folk song called *Merck toch hoe sterk*. Given its mournful tone, no one would be surprised if the translation from Dutch read something like, "I really hurt." One can easily see roomfuls of frightened, teary-eyed Hollanders crowded around an open casket, singing *Merck toch hoe sterk* as they weep uncontrollably. Compared to Austria's happy *Blue Danube* and Switzerland's charming music box, Radio Netherland's interval signal is positively dirge-like.

Some stations, wanting to take advantage of every moment on the air to get their message across, use their interval signals for political purposes. Radio Beijing in the People's Republic of China plays the first 19 notes of *The East is Red*. Albania signs on with nine notes from the patriotic march, *With Pickaxe and Rifle*, played on two trumpets. Radio Prague is more subtle. They chose the opening bars of Seidl's *Forward Left*. Get the message?

For some stations, the tuning signal is part of a long heritage. Many have used the same one for decades. That's why, a few years ago, when Radio Sweden International decided to change theirs, not a few eyebrows were raised and outraged letters written. Taking the whole subject very seriously, however, the Swedes specially commissioned composer Ralph Lundsten to come up with a new one. The result is the electronic *To the Wide, Wide, World*, a positively spooky piece of music that sounds as if it had been taken directly from the soundtrack of the PBS TV show, *Dr. Who*.

When WCSN, the world service of the *Christian Science Monitor*, decided to go on shortwave, they, too, took the matter of a tuning signal very seriously and commissioned an original. Their goal was that no matter who the listener was -- India, Africa or Nepal -- he would recognize within that interval signal at least elements of their native music. It was a tall task, given the variety of music heard around the world. Recently, however, WCSN has changed its interval signal.

When it comes to the Third World, intervals signals can get very exotic, in both the selection of tunes as well as the instruments they're played on. In a way, they are able to present tiny musical windows on the world.

Benin's Voice of the Revolution uses an instrument called a "Tam-Tam," Burkina Faso a "balafon" and the Congo, a "Zanzi."

Ethiopia's external service, which is now calling itself "The Voice of Ethiopia" (dropping the "revolutionary" part), uses a local flute called the Wahint. In Madagascar, the melody is played on a bamboo instrument called a "Valiha." Mali and Senegal both have interval signals using a local harp called a "Cora." Mozambique's is played on an indigenous xylophone called the "Mbira."

Perhaps one of the most unique interval signals is that of Radio Botswana. Often described by listeners as "barnyard noises," it is a collection of cowbells and animal sounds. Not to be outdone in the animal department is Malawi, which opens its 0253 UTC broadcast with a cock crow. One more animal tuning signal we're aware of: Zambia has the cry of the "fish eagle."

Radio Nacional de Guinea Ecuatorial is unique in that it has transmitters at two different sites. Each has its own interval signal. For some reason, Bata (two 100 kw units on 4925 and 5004 kHz) opens with tribal music; Malabo (6250 kHz) simply starts with the national anthem.

Then there is the tuning signal for Radiodiffusion-Television Centrafricaine on 5034 and 7220 kHz. It's nothing nothing more than someone repeatedly banging out the same chord on a piano. If there is some significance to these particular notes, it is apparently missed on most listeners.

What are the most unusual tuning signals? That award has to be shared with three stations.

For no other reason than the fact that the description and title amuses us, third place goes to the Republic of Guinea's, Voice of the Revolution. Their interval signal is a tune described in the *World Radio TV Handbook* as "the heroic song, *Alpha Yaya*."

Second place goes to a station broadcasting from one half of the famous Iran-Iraq war, Baghdad. Their tuning signal, perhaps among the strangest, is the chirping of a mechanical nightingale.

Finally, one station has an interval signal that, among stations that use songs like, *The Revolutionary People Thrust Onward*, seems enchanting and oddly out of place. That station is the Sierra Leone Broadcasting Service and its interval signal is a song called, simply, *The Rain is Coming*. SLBS, Freetown, is on 5980 kHz. According to the 1988 *Passport to World Band Radio*, there's an English broadcast Saturdays through Thursdays from 2230 to 2330 UTC. That interval signal alone is reason to listen to the station.

Diane Bleck

frequency SECTION

MT Monitoring Team

EAST COAST:

Greg Jordan, Frequency Manager

1855-I Franciscan Terrace
Winston-Salem, NC 27127

Joe Hanlon, PA

WEST COAST:

Bill Brinkley, CA

0000 UTC [8:00 PM EDT/5:00 PM PDT]

0000-0015		Voice of Kampuchea, Phnom-Penh	9693	11938		
0000-0030		BBC, London, England	5965	5975	6005	6175
			7135	7325	9515	9580
			9590	9915	12095	11955
			15435			
0000-0030		Kol Israel, Jerusalem	9435	11605	12080	
0000-0030		Radio Berlin Int'l, East Germany	6080	9730		
0000-0030		Radio Korea, Seoul, South Korea	15575			
0000-0030	M	Radio Norway Int'l, Oslo	9620	11840		
0000-0030	S,M	WINB, Red Lion, Pennsylvania	15145			
0000-0050		Radio Pyongyang, North Korea	15115	15160		
0000-0055		Radio Beijing, PR China	9770	11715	15455	
0000-0100		(US) Armed Forces Radio and TV	6030	11790		
0000-0100		All India Radio, New Delhi	6055	7215	9535	9910
			11715	11745	15110	
0000-0100		CBC Northern Quebec Service	6195	9625		
0000-0100		CBN, St. John's, Newfoundland	6160			
0000-0100		CBU, Vancouver, British Colombia	6130			
0000-0100		CFCF, Montreal, Quebec	6005			
0000-0100		CFCN, Calgary, Alberta	6030			
0000-0100		CBN, St. John's, Newfoundland	6160			
0000-0100		CBN, St. John's, Newfoundland	6160			
0000-0100		CBU, Vancouver, British Colombia	6160			
0000-0100		CFCF, Montreal, Quebec	6005			
0000-0100		CFCN, Calgary, Alberta	6030			
0000-0100		CHNS, Halifax, Nova Scotia	6130			
0000-0100		CKWX, Vancouver, British Colombia	6080			
0000-0100		CFRB, Toronto, Ontario	6070			
0000-0100		FEBC, Manila, Philippines	15445			
0000-0100		(US) Far East Network, Tokyo	3910			
0000-0100		KSDA, Guam	15125			
0000-0100	T-A	KVOH, Rancho Simi, California	9495			
0000-0100	S,M	KVOH, Rancho Simi, California	17775			
0000-0100		KYOI, Saipan	15405			
0000-0100		Radio Australia, Melbourne	15140	15160	15240	15320
			15395	17750	17795	
0000-0100		Radio Baghdad, Iraq	6110	11810		
0000-0100		Radio Canada Int'l, Montreal	5960	9755		
0000-0100		Radio Havana Cuba	9655			
0000-0100		Radio Luxembourg	6090			
0000-0100		Radio Moscow, USSR	9700	9765	11710	11750
			11780			
0000-0100		Radio New Zealand, Wellington	15150	17705		
0000-0100		Radio for Peace, Costa Rica	7375v			
0000-0100		Radio Thailand, Bangkok	9655	11905		
0000-0100		SBC Radio One, Singapore	5010	5052	11940	
0000-0100		Spanish Foreign Radio, Madrid	6125	9630	11880	
0000-0100	T-S	Superpower KUSW, Utah	15580			
0000-0100		Voice of America, Washington	5995	6130	9455	9650
			9670	9775	9815	11580
			11695	11740	15185	15205
			17740			
0000-0100	T-A	Voice of Nicaragua, Managua	6100			
0000-0100		WCSN, Boston, Massachusetts	9852.5			
0000-0100		WHRI, Noblesville, Indiana	7405	9870		
0000-0100		WRNO New Orleans, Louisiana	7355			
0000-0100		WYFR, Oakland, California	5950	6085	9680	
0000-0100	T-A	WYFR Satellite Net, California	9505			
0030-0045		BBC, London, England*	6195	7235	9570	11820
			15435			
0030-0055		BRT, Brussels, Belgium	5910	9925		
0030-0100		BBC, London, England	5965	5975	6005	6120
			6175	7135	7325	9515
			9580	9915	9590	11955
			12095	15435		
0030-0100		HCJB, Quito, Ecuador	9720	11775	11910	15155

LEGEND

- The first four digits of an entry are the broadcast start time in UTC. The second four digits represent the end time.
- In the space between the end time and the station name is the broadcast schedule.

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

If there is no entry, the broadcasts are heard daily. If, for example, there is an entry of "M," the broadcast would be heard only on Mondays. An entry of "M,W,F" would mean Mondays, Wednesdays and Fridays only. "M-F" would mean Mondays through Fridays. "TEN" indicates a tentative schedule and "TES" a test transmission.

- [ML] after a frequency indicates a multi-lingual transmission containing English-language programs.
- The last entry on a line is the frequency. Codes here include "SSB" which indicates a Single Sideband transmission, and "V" for a frequency that varies. [ML] after a frequency indicates a multi-lingual transmission containing English-language programs.
- v after a frequency indicates that it varies
- Notations of USB and LSB (upper and lower sideband transmissions) usually refer only to the individual frequency after which they appear.
- Listings followed by an asterisk (*) are for English lessons and do not contain regularly scheduled programming.

We suggest that you begin with the lower frequencies that a station is broadcasting on and work your way up the dial. Remember that there is no guarantee that a station will be audible on any given day. Reception conditions can change rapidly, though, and if it is not audible one night, it may well be on another.

HOW TO USE THE PROPAGATION CHARTS

Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location (the are divided into east coast, midwest and west coast of North America). Then look for the one most closely describing the geographic location of the station you want to hear.

Once you've located the correct charts, look along the horizontal axis of the graph for the time that you are listening. The top line of the graph shows the Maximum Useable Frequency [MUF] and the lower line the Lowest Useable Frequency [LUF] as indicated on the vertical axis of the graph.

While there are exceptions to every rule (especially those regarding shortwave listening), you should find the charts helpful in determining the best times to listen for particular regions of the world. Good luck!

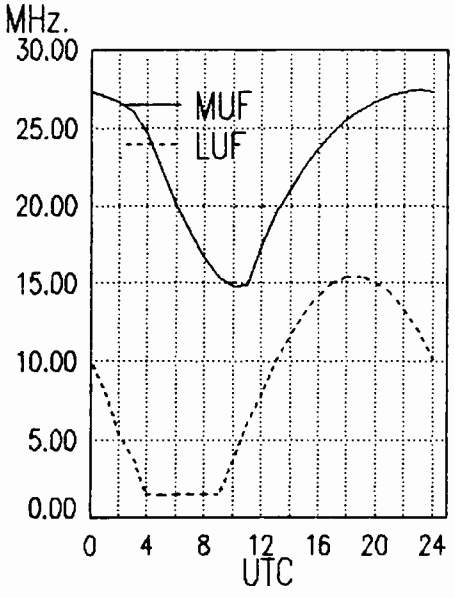
frequency SECTION

0030-0100		Radio Austria Int'l, Vienna	9875			
0030-0100		Radio Budapest, Hungary	6110	9520	9585	9835
			11910	15160		
0030-0100		SLBC, Colombo, Sri Lanka	6005	9720		
0030-0100		WINB, Red Lion, Pennsylvania	15145			
0035-0040		All India Radio, New Delhi	3925	4860		
0045-0100	A	Radio New Zealand, Wellington	15150	17705		
0050-0100		Vatican Radio, Vatican City	6150	9605	11780	

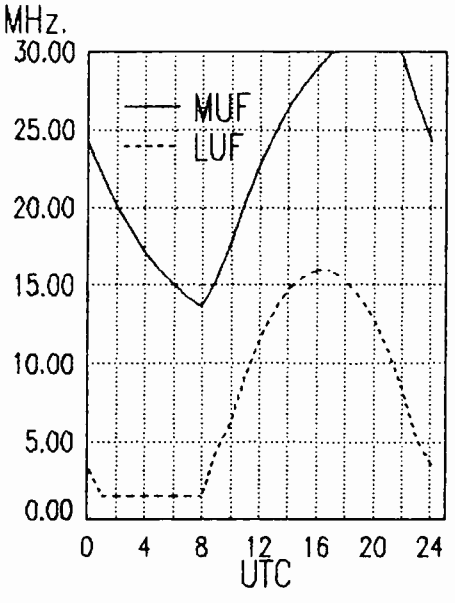
0100 UTC [9:00 PM EDT/6:00 PM PDT]

0100-0103	S	Port Moresby, Papua New Guinea	3295	4890	5960	5985
			6020	6040	6080	6140
			9520			
0100-0110		Vatican Radio, Vatican City	6150	9605	11780	
0100-0115		All India Radio, New Delhi	6055	7215	9535	9910
			11715	11745	15110	
0100-0120		RAI, Rome, Italy	9575	11800		
0100-0125		Kol Israel, Jerusalem	9435	11605	12080	
0100-0130	W,A	Radio Budapest, Hungary	6110	9520	9585	9835
			11910	15160		
0100-0130		Radio Japan, Tokyo	15280	17810	17835	17845
0100-0130		Laotian National Radio	7113v			
0100-0145		Radio Berlin Iny'l, E. Germany	6080	9620	9730	11785
0100-0150		Deutsche Welle, West Germany	6040	6085	6145	9565
			9735	11865		
0100-0150		Radio Baghad, Iraq	6110,	11810		
0100-0155		Radio Austria Int'l, Vienna	9875			
0100-0200		(US) Armed Forces Radio and TV	6030	11790	15345	
0100-0200		BBC, London, England	5975	6005	6120	6175
			7325	9515	9590	9915
			9975			
0100-0200		CBC Northern Quebec Service	6195	9625		
0100-0200		CBN, St. John's, Newfoundland	6160			
0100-0200		CBU, Vancouver, British Colombia	6160			
0100-0200		CFCF, Montreal, Quebec	6005			
0100-0200		CFCN, Calgary, Alberta	6030			
0100-0200		CHNS, Halifax, Nova Scotia	6130			
0100-0200		CKWX, Vancouver, British Colombia	6080			
0100-0200		CFRB, Toronto, Ontario	6070			
0100-0200		(US) Far East Network, Tokyo	3910			
0100-0200		FEBC, Manila, Philippines	15445			
0100-0200		HCJB, Quito, Ecuador	9720	11775	11910	15155
0100-0200	T-A	KVOH, Rancho Simi, California	9495			
0100-0200		KYOI, Saipan	15405			
0100-0200		Radio Australia, Melbourne	15160	15180	15240	15320
			15395	17715	17795	
			17750			
0100-0200		Radio Canada Int'l, Montreal	9755	11845	11940	
0100-0200		Radio Havana Cuba	9655			
0100-0200		Radio Japan, Tokyo	5960			
0100-0200		Radio Luxembourg	6090			
0100-0200		Radio Moscow, USSR	9530	9600	9700	9765
			9865	11750	11780	11860
			15425			
0100-0200		Radio Moscow World Service	17860			
0100-0200		Radio New Zealand, Wellington	15150	17705		
0100-0200		Radio for Peace, Costa Rica	7375			
0100-0200		Radio Prague, Czechoslovakia	5930	6055	7345	9540
			9630	9740	11990	
0100-0200		Radio Thailand, Bangkok	9655	11905		
0100-0200		SBC Radio One, Singapore	5010	5052	11940	
0100-0200		SLBC, Colombo, Sri Lanka	6005	9720	15425	
0100-0200		Spanish Foreign Radio, Madrid	9630	11880		
0100-0200	T-S	Superpower KUSW, Utah	11695			
0100-0200		Voice of America, Washington	5995	6130	7205	9455
			9775	9815	11580	11740
			15160	15205		
0100-0200		Voice of Indonesia, Jakarta	9680	11790		
0100-0200		WCSN, Boston, Massachusetts	9852.5			
0100-0200		WINB, Red Lion, Pennsylvania	15145			
0100-0200		WHRI, Noblesville, Indiana	7405	9870		
0100-0200		WRNO, New Orleans, Louisiana	7355			
0100-0200		WYFR, Oakland, California	5950	7440	9680	
0100-0200	T-S	WYFR Satellite Net, California	9505			
0130-0140	T-S	Voice of Greece, Athens	7430	9420	11645	
0130-0145	TWFS	Radio Budapest, Hungary	6110	9520	9585	9835
			11910	15160		

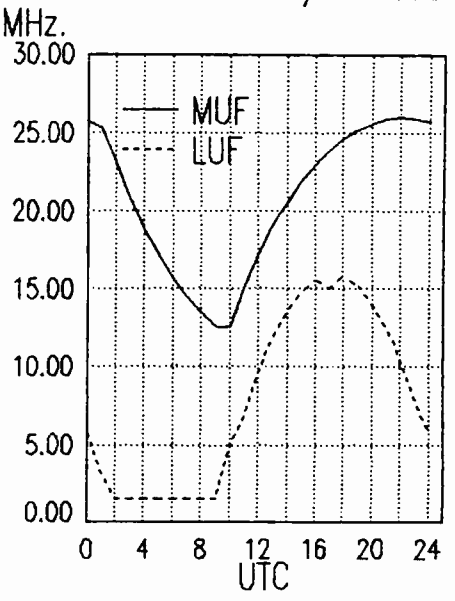
East Coast To
West Coast



East Coast To
South America



East Coast To
Central America/Carribean



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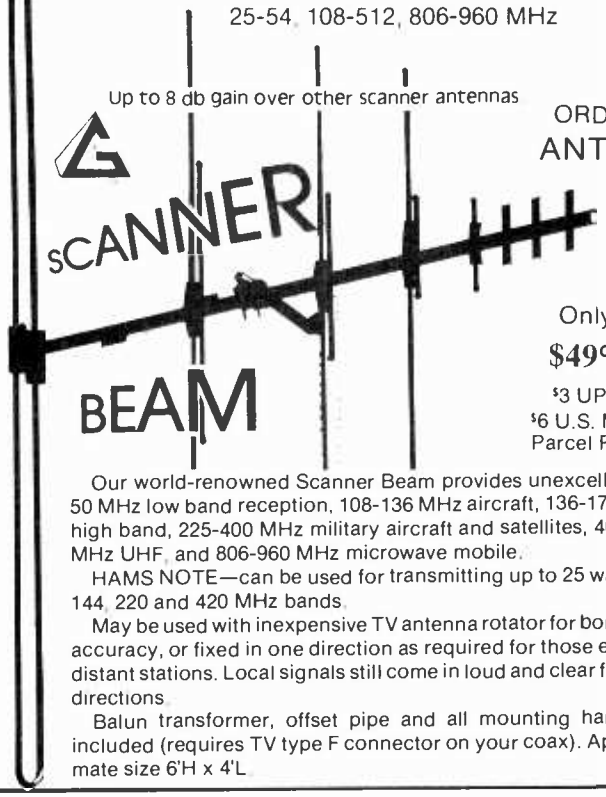

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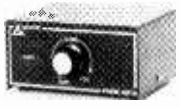

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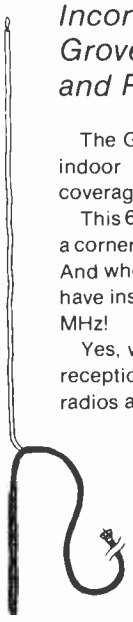

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(you specify connector or receiver model; one for each receiver)

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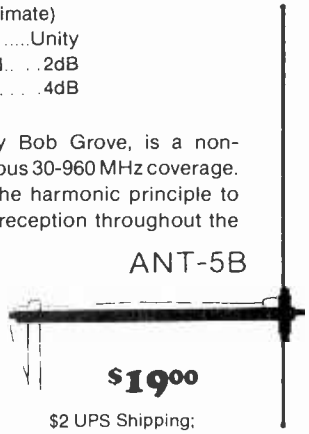

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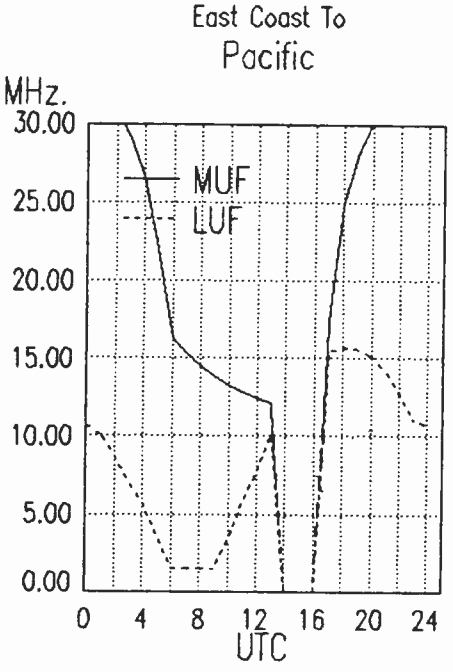
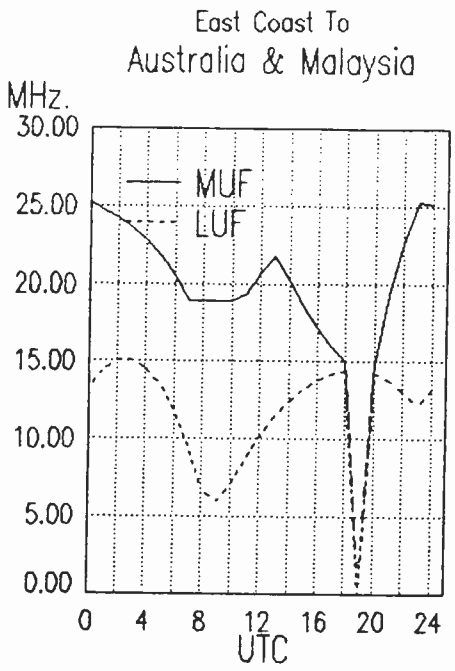
frequency SECTION

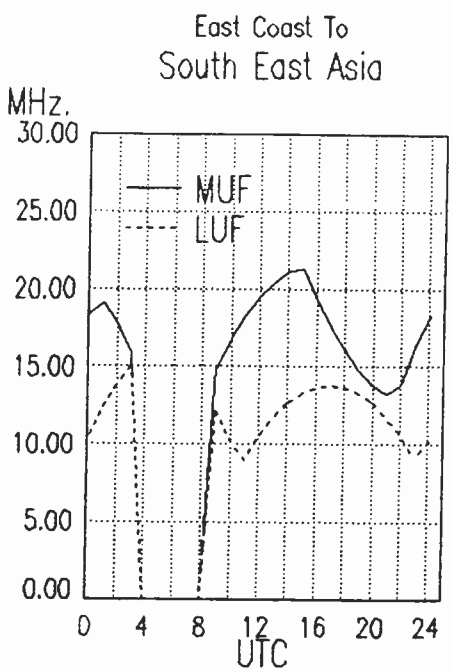
0130-0200		Radio Veritas Asia, Philippines	15330 15365
0145-0200		Radio Berlin Int'l, E. Germany	6080 9620 9730 11785
0145-0200		Radio Korea, Seoul, South Korea	7275 15375

0200 UTC [10:00 PM EDT/7:00 PM PDT]

0200-0215		Vatican Radio, Vatican City	7125 9650
0200-0230		BBC, London, England	5975 6005 6175 7325 9410 9515 9590 9915
0200-0230		Burma Bcasting Service, Rangoon	7185
0200-0230	S	Radio Austria Int'l, Vienna	9875
0200-0230		Radio Kiev, Ukrainian SSR	7165 7205 11790 13645 15180
0200-0230		Swiss Radio Int'l, Berne	5965 6135 9725 9885 12035
0200-0230		La Voz de Mosquitia, Honduras	4910.4
0200-0230		WINB, Red Lion, Pennsylvania	15145
0200-0250		Deutsche Welle, West Germany	6035 7285 9690 11945
0200-0250		Radio Bras, Brasilia, Brazil	11745v
0200-0255		Radio Bucharest, Romania	5990 6155 9510 9570 11810 11940
0200-0255		RAE, Buenos Aires, Argentina	9690 11710
0200-0300		(US) Armed Forces Radio and TV	6030 11790 15345
0200-0300		CBC Northern Quebec Service	6195 9625
0200-0300		CBN, St. John's, Newfoundland	6160
0200-0300		CBU, Vancouver, British Colombia	6160
0200-0300		CFCF, Montreal, Quebec	6005
0200-0300		CFCN, Calgary, Alberta	6030
0200-0300		CFRB, Toronto, Ontario	6070
0200-0300		CHNS, Halifax, Nova Scotia	6130
0200-0300		CKWX, Vancouver, British Colombia	6080
0200-0300		(US) Far East Network, Tokyo	3910
0200-0300		HCJB, Quito, Ecuador	9720 11775 15155
0200-0300	T-A	KVOH, Rancho Simi, California	9495
0200-0300		KSDA, Guam	17865
0200-0300		Radio Australia, Melbourne	15180 15240 15320 17715 17750 17795
0200-0300		Radio Cairo, Egypt	9475 9675
0200-0300		Radio Havana Cuba	9655
0200-0300		Radio Korea (South), Seoul	7275 15575
0200-0300		Radio Luxembourg	6090
0200-0300		Radio Moscow, USSR	6000 6130 9530 9610 9765 9700 9865 11750 15425
0200-0300		Radio Moscow World Service, USSR	17675 17880
0200-0300		Radio Orion, South Africa	3955
0200-0300		Radio for Peace, Costa Rica	7375v
0200-0300	A	Radio New Zealand, Wellington	15150 17705
0200-0300		Radio Polonia, Warsaw, Poland	6095 6135 7145 7270 9525 11815 15120
0200-0300		Radio RSA, South Africa	6010 9580 9615
0200-0300		Radio Thailand, Bangkok	9655 11905
0200-0300		SBC Radio One, Singapore	5010 5052 11940
0200-0300		SLBC, Colombo, Sri Lanka	6005 9720 15425
0200-0300	T-S	Superpower KUSW, Utah	11695
0200-0300		Voice of America, Washington	5995 7205 9775 9815 15205
0200-0300		Voice of Asia, Taiwan	7285
0200-0300		Voice of Free China, Taiwan	5985 7445 9555 9680 11740 17805
0200-0300		Voice of Kenya, Nairobi	6045
0200-0300		WCSN, Boston, Massachusetts	9852.5
0200-0300		WHRI, Noblesville, Indiana	7405 9870
0200-0300		WRNO, New Orleans, Louisiana	7355
0200-0300		WYFR, Oakland, California	5950
0200-0300		WYFR Satellite Net, California	9505
0215-0220		Radio Nepal, Kathmandu	5005 7165
0230-0240		Port Moresby, Papua New Guinea	3925 4890 5960 5985 6020 6040 6080 6140 9520
0230-0245		Radio Pakistan, Islamabad	7010 11570 15115 15580 17660
0230-0300		BBC, London, England	5975 6005 6175 7325 9410 9515 9660 9845 9915 11955
0230-0300		Radio Finland, Helsinki	9635 11755
0230-0300		Radio Netherland, Hilversum	6020 6165 9590 9895







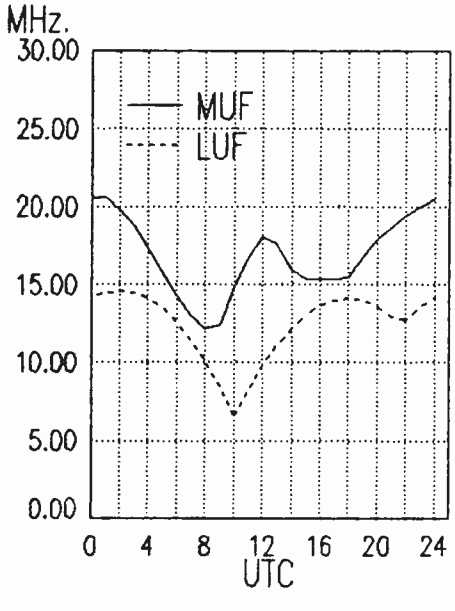
frequency SECTION

0230-0300	T-A	Radio Portugal, Lisbon	6060	9600	9635	9680
			9705			
0230-0300		Radio Sweden, Stockholm	9695			
0230-0300		Radio Tirana, Albania	7065	9760		
0230-0300	S,M	WINB, Red Lion, Pennsylvania	15145			
0240-0250		All India Radio, New Delhi	3905	4860	4880	4895
			5960	5990	6110	6120
			7195	7295	9550	9610
			11830	11870	15305	
0250-0300		Radio Yerevan, Armenian SSR	11790	13645	15180	

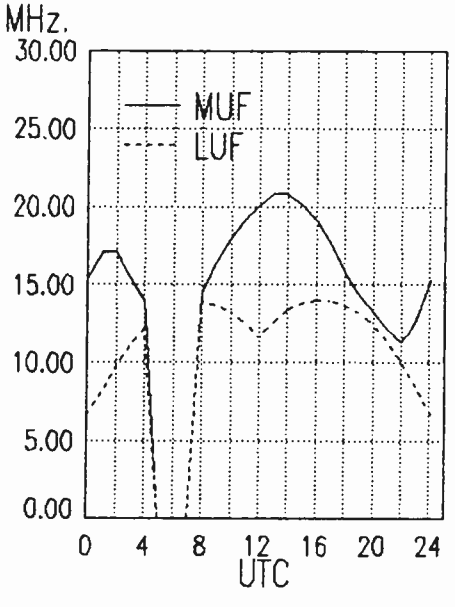
0300 UTC [11:00 PM EDT/8:00 PM PDT]

0300-0307		Radio Pakistan, Islamabad	5090	5930	7095	
0300-0310		CBC Northern Quebec Service	6195	9625		
0300-0315	T-A	KVOH, Rancho Simi, California	9495			
0300-0325		Radio Netherland, Hilversum	6020	6165	9590	9895
0300-0330		BBC, London, England	3955	5975	6005	6155
			6175	6195	7325	9410
			9515	9915	12095	
0300-0330		Radio Budapest, Hungary	6110	9520	9585	9835
			11910	15160		
0300-0330		Radio Cairo, Egypt	9475	9675		
0300-0330		Radio Japan, Tokyo	11870	17825	21610	
0300-0330	S,M	WINB, Red Lion, Pennsylvania	15145			
0300-0345	A	Radio New Zealand, Wellington	15150	17705		
0300-0350		Deutsche Welle, West Germany	6010	6120	9545	9605
			9700	11785		
0300-0350		Voice of Turkey, Ankara	9445			
0300-0355		Radio Beijing, PR China	9770	11715	15455	
0300-0355		Radio Polonia, Warsaw, Poland	6095	6135	7145	7270
			9525	11815	15120	
0300-0356		Radio RSA, South Africa	6100	9580	9615	
0300-0400		(US) Armed Forces Radio and TV	6030	11730	11790	
0300-0400		CBN, St. John's, Newfoundland	6160			
0300-0400		CBU, Vancouver, British Colombia	6160			
0300-0400		CFCF, Montreal, Quebec	6005			
0300-0400		CFCN, Calgary, Alberta	6030			
0300-0400		CHNS, Halifax, Nova Scotia	6130			
0300-0400		CKWX, Vancouver, British Colombia	6080			
0300-0400		CFRB, Toronto, Ontario	6070			
0300-0400		(US) Far East Network, Tokyo	3910			
0300-0400		HCJB, Quito, Ecuador	9720	11775	15155	
0300-0400		La Voz Evangelica, Honduras	4820			
0300-0400		Radio Australia, Melbourne	11945	15160	15240	15320
			15395	17750	17715	17795
0300-0400		Radio for Peace, Costa Rica	7375			
0300-0400		Radio Havana Cuba	9655	6140	9770	
0300-0400		Radio Moscow, USSR	6000	6130	9640	9765
			13645	13665	15425	
0300-0400		Radio Prague, Czechoslovakia	5930	6055	7345	9540
			9630	9740	11990	
0300-0400		Radio Sofia, Bulgaria	9560	9595	11735	11750
0300-0400		Radio Thailand, Bangkok	9655	11905		
0300-0400		SBC Radio One, Singapore	5010	5052	11940	
0300-0400		SLBC, Colombo, Sri Lanka	6005	9720	15425	
0300-0400	T-S	Superpower KUSW, Utah	9815			
0300-0400		Trans World Radio, Bonaire	9535			
0300-0400		Voice of America, Washington	6035	7170	7200	7280
			9525	9550	9575	9740
			11835			
0300-0400		Voice of Free China, Taiwan	5985	9680		
0300-0400		Voice of Kenya, Nairobi	6045			
0300-0400		Voice of Nicaragua, Managua	6100			
0300-0400		WCSN, Boston, Massachusetts	9852.5			
0300-0400		WHRI, Noblesville, Indiana	7355	7405		
0300-0400		WRNO, New Orleans, Louisiana	6185			
0300-0400		WYFR, Oakland, California	5950	15566		
0310-0330		Vatican Radio, Vatican City	6150			
0313-0400		Radio France Int'l, Paris	3965	7135	7175	
			9550	9790	9800	11670
			11700	11995		
0330-0340	S-F	Port Moresby, Papua New Guinea	3925	4890	5960	5985
			6020	6040	6080	6140
			9520			
0330-0400		BBC, London, England	3955	5975	6155	6195
			9410	9915	12095	

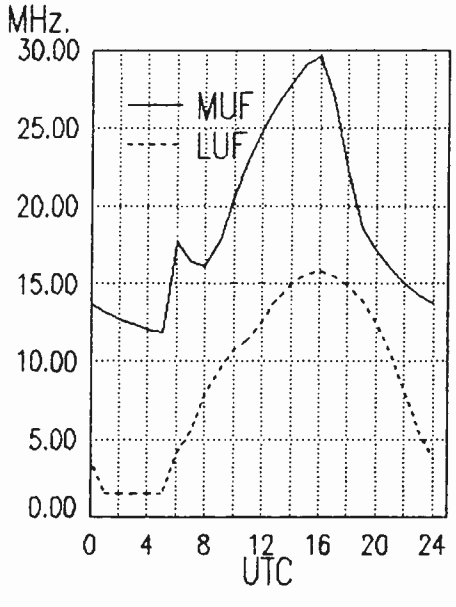
East Coast To
Far East



East Coast To
Central Asia



East Coast To
South Africa

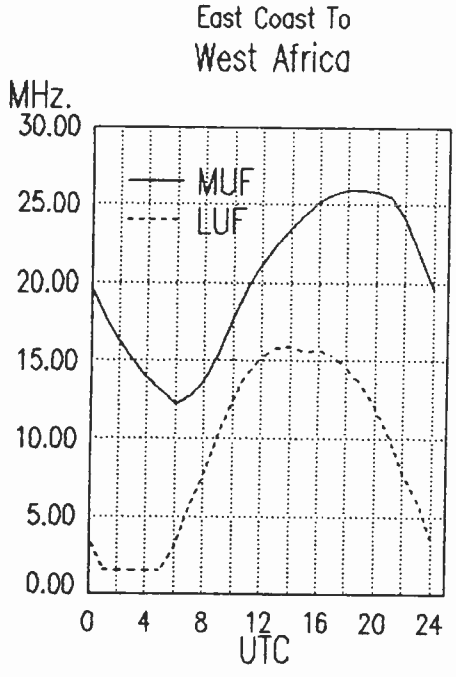


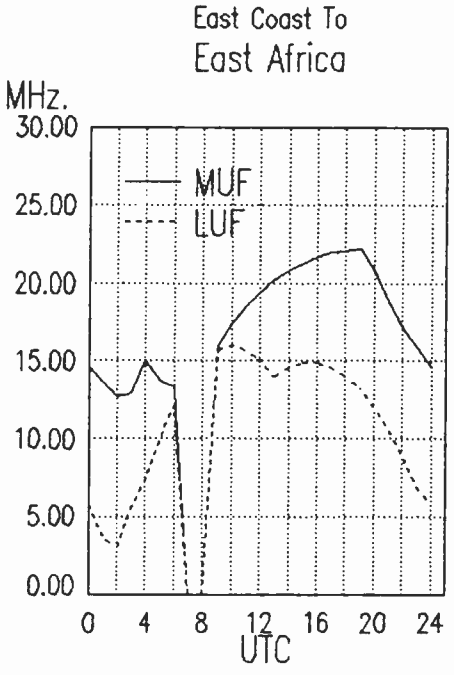
frequency SECTION

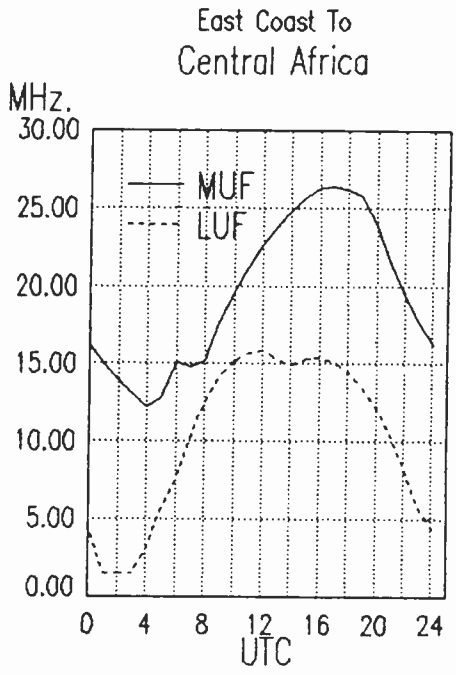
0335-0400		Radio New Zealand, Wellington	11790	15150		
0330-0400		Radio Tanzania, Dar es Salaam	9684			
0330-0400		Radio Tirana, Albania	7065	9755		
0330-0400		Radio Sweden, Stockholm	11705			
0330-0400		United Arab Emirates Radio	9640	11940	15435	17775
0335-0340		All India Radio, New Delhi	3905	4860	9610	11830
			11870	11890	15305	
0340-0350	T-S	Voice of Greece, Athens	7430	9395	9420	
0345-0400		Radio Berlin Int'l, East Germany	5965	9620	11920	
0350-0400		RAI, Rome, Italy	9710	11905	15330	

0400 UTC [12:00 AM EDT/9:00 PM PDT]

0400-0405		Radio Uganda, Kampala	4976	5026		
0400-0410		Radio Thailand, Bangkok	9655	11905		
0400-0410		RAI, Rome, Italy	9710	11905	15330	
0400-0415		Kol Israel, Jerusalem	9010	9435	12080	
0400-0420		Radio Botswana, Gabarone	4820			
0400-0420	T-S	Radio Zambia, Lusaka	3345	6165		
0400-0425		Radio Bucharest, Romania	6155	9510	9570	11940
0400-0425		Radio Netherland, Hilversum	7210	9850		
0400-0426		Radio RSA, South Africa	7270	9580		
0400-0430		BBC, London, England	3955	5975	6005	6155
			6180	6195	7120	7160
			7185	9410	9580	9915
			12095			
0400-0430		La Voz Evangelica, Honduras	4820			
0400-0430		Radio Berlin Int'l, East Germany	5965	9620	11920	
0400-0430	M	Radio Norway Int'l, Oslo	9650	11760		
0400-0430		SLBC, Colombo, Sri Lanka	6005	9720	15425	
0400-0430		Radio Tanzania, Dar es Salaam	9684			
0400-0430		Swiss Radio Int'l, Berne	6135	9725	9885	12035
0400-0430		Trans World Radio, Bonaire	9535			
0400-0450		Radio Pyongyang, North Korea	15160	15180		
0400-0455		Radio Beijing, PR China	9645	11980		
0400-0455		RAE, Buenos Aires, Argentina	9690	11710		
0400-0500		(US) Armed Forces Radio and TV	6030	11730		
0400-0500		CBC Northern Quebec Service	6195	9625		
0400-0500		CBN, St. John's, Newfoundland	6160			
0400-0500		CBU, Vancouver, British Colombia	6160			
0400-0500		CFCF, Montreal, Quebec	6005			
0400-0500		CFCN, Calgary, Alberta	6030			
0400-0500		CHNS, Halifax, Nova Scotia	6130			
0400-0500		CKWX, Vancouver, British Colombia	6080			
0400-0500		CFRB, Toronto, Ontario	6070			
0400-0500		(US) Far East Network, Tokyo	3910			
0400-0500		FEBC, Manila, Philippines	11850			
0400-0500		HCJB, Quito, Ecuador	9720	11775	15155	
0400-0500		KVOH, Rancho Simi, California	9495			
0400-0500		KYOI, Saipan	17780			
0400-0500		Radio Australia, Melbourne	11910	11945	15160	15240
			15320	17715	17795	
0400-0500		Radio Havana Cuba	5965	6035	6140	9655
			9770			
0400-0500		Radio Moscow, USSR	6000	7345	9640	9765
			11790	12050	13645	13665
			15425			
0400-0500		Radio New Zealand, Wellington	11780	15150		
0400-0430		Radio SPLA, Sudanese clandestine	9850			
0400-0500		SBC Radio One, Singapore	5010	5052	11940	
0400-0500	T-S	Superpower KUSW, Utah	9815			
0400-0500		United Nations Radio, Honduras	4820			
0400-0500		Voice of America, Washington	5995	6035	7170	7200
			7280	9525	9575	11835
			11925			
0400-0500		Voice of Kenya, Nairobi	6045			
0400-0500		WCSN, Boston, Massachusetts	9870			
0400-0500		WINB, Red Lion, Pennsylvania	15145			
0400-0500		WHRI, Noblesville, Indiana	7365	7405		
0400-0500	M-A	WMLK, Bethel, Pennsylvania	9455			
0400-0500		WRNO, New Orleans, Louisiana	6185			
0400-0500		WYFR, Satellite Net, California	9520			
0425-0440		RAI, Rome, Italy	5980	7275		
0430-0455		Radio Austria Int'l, Vienna	6155	9875		
0430-0500		BBC, London, England	5975	6005	6155	6180
			6195	7210	9410	9510
			12095			
0430-0500		Deutsche Welle, West Germany	7150	7225	9565	9765







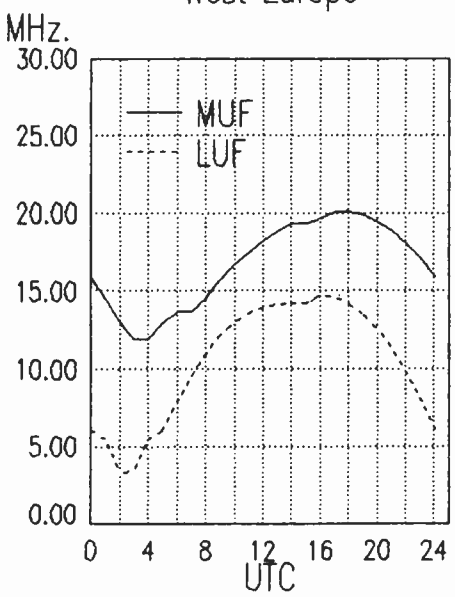
frequency SECTION

0430-0500		Radio Finland, Helsinki	6120	9670	11715	15185
0430-0500		Radio Tirana, Albania	9480	11835		
0430-0500	S,M	Trans World Radio, Bonaire	9535			
0430-0500		Trans World Radio, Swaziland	3205	7205		
0430-0500		Voice of Nigeria, Lagos	7255			

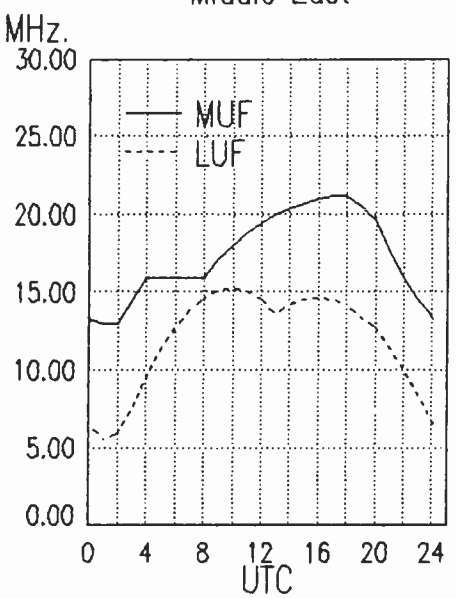
0500 UTC [1:00 AM EDT/10:00 PM PDT]

0500-0510		CBC Northern Quebec Service	6195	9625		
0500-0510		Radio Lesotho, Maseru	4800			
0500-0510	M-A	Radio Zambia, Lusaka	3345	6165		
0500-0515		Deutsche Welle, West Germany	7150	7225	9565	9765
			11765			
0500-0515		GBC, Accra, Ghana	4915			
0500-0515		Vatican Radio, Vatican City	9645	11725	15190	
0500-0530	M	Radio Norway Int'l, Oslo	11735	15310		
0500-0530	S,M	Trans World Radio, Bonaire	9535			
0500-0530		Trans World Radio, Swaziland	3205	5055	7210	
0500-0550		Deutsche Welle, West Germany	6045	6120	9635	9700
0500-0555		Radio Beijing, China	9690			
0500-0600		(US) Armed Forces Radio and TV	6030	11730	11790	
0500-0600		BBC, London, England	3955	5975	6005	6180
			6195	7105	7160	7185
			9410	9510	11790	
0500-0600		CBC Northern Quebec Service	6195	9625		
0500-0600		CBU, Vancouver, British Colombia	6160			
0500-0600		CFCF, Montreal, Quebec	6005			
0500-0600		CFCN, Calgary, Alberta	6030			
0500-0600		CHNS, Halifax, Nova Scotia	6130			
0500-0600		CKWX, Vancouver, British Colombia	6080			
0500-0600		CFRB, Toronto, Ontario	6070			
0500-0600		(US) Far East Network, Tokyo	3910			
0500-0600		FEBC, Manila, Philippines	11850			
0500-0600		HCJB, Quito, Ecuador	6230	9720	11775	
0500-0600		Radio Australia, Melbourne	11910	15160	15240	15395
			17715	17750,	17795	
0500-0600		Radio Cameroon, Yaounde	4850			
0500-0600		Radio Havana Cuba	5965	6035	6090	9770
			6140			
0500-0600		Radio Japan, Tokyo	5990	15235	17810	
0500-0600		Radio Kuwait	15345			
0500-0600		Radio Moscow, USSR	7105			
			7165	7185	7195	7310
			7320	7345	9530	11790
0500-0600		Radio New Zealand, Wellington	11780	15150		
0500-0600		Radio Thailand, Bangkok	9655	11905		
0500-0600	S	Radio Zambia, Lusaka	11880			
0500-0600		SBC Radio One, Singapore	5010	5052	11940	
0500-0600		Spanish Foreign Radio, Madrid	6125			
0500-0600	S	Superpower KUSW, Utah	6155			
0500-0600	S	Swaziland Commercial Radio	6155	9705		
0500-0600		Voice of America, Washington	3990	5995	6035	6125
			7280	9530	9575	9670
			9740	11835		
0500-0600		Voice of Kenya, Nairobi	6045			
0500-0600		Voice of Nigeria, Lagos	7255	15120	15185	
0500-0600		WCSN, Boston, Massachusetts	9870			
0500-0600		WHRI, Noblesville, Indiana	7365	7405		
0500-0600	M-A	WMLK, Bethel, Pennsylvania	9455			
0500-0600		WRNO, New Orleans, Louisiana	6185			
0500-0600		WYFR, Oakland, California	9705	11580		
0500-0600	T-S	WYFR Satellite Net, California	9520			
0510-0520		Radio Botswana, Gaborone	3356	4820	7255	
0515-0530	M-F	Radio Canada Int'l, Montreal	15245			
0530-0545		BBC, London, England*	3990	6050	6140	7210
			9750			
0530-0555		Radio Bucharest, Romania	9640	11840	11940	15340
			15380	17720		
0530-0600		Radio Netherland, Hilversum	6165	9715		
0530-0600		Radio Tirana, Albania	7300			
0530-0600		Trans World Radio, Swaziland	5055	7210		
0530-0600		UAE RAdio, United Arab Emirates	15435	17775	21700	
0545-0600		Radio Berlin Int'l, East Germany	15240	17880	21540	21645
0545-0600	M-F	Radio Canada Intl, Montreal	15245			
0555-0600		Ghana Broadcasting Corp., Accra	4915			
0555-0600		Voice of Malaysia, Kuala Lumpur	6175	9750	15295	

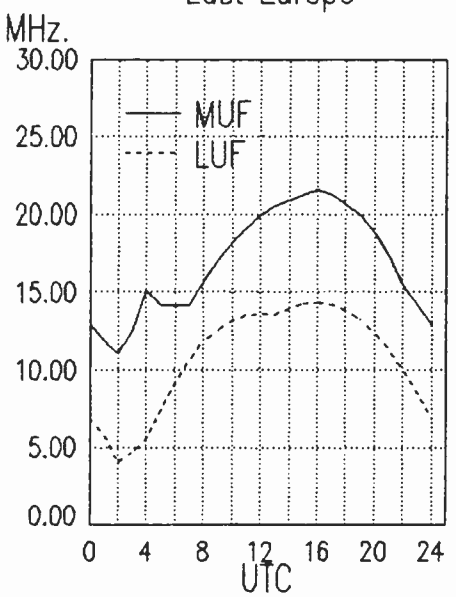
East Coast To
West Europe



East Coast To
Middle East



East Coast To
East Europe



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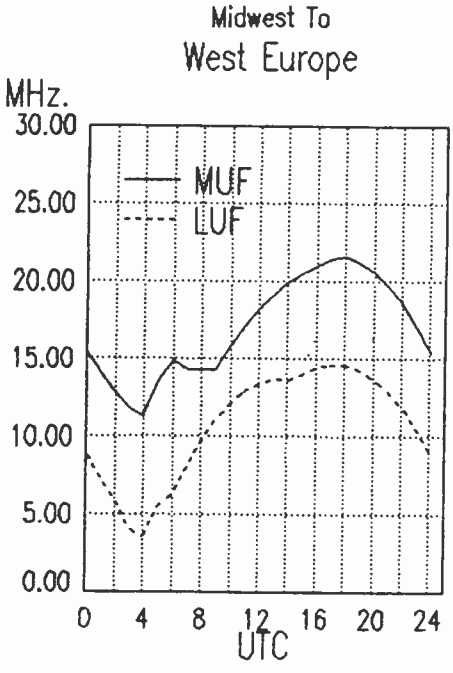
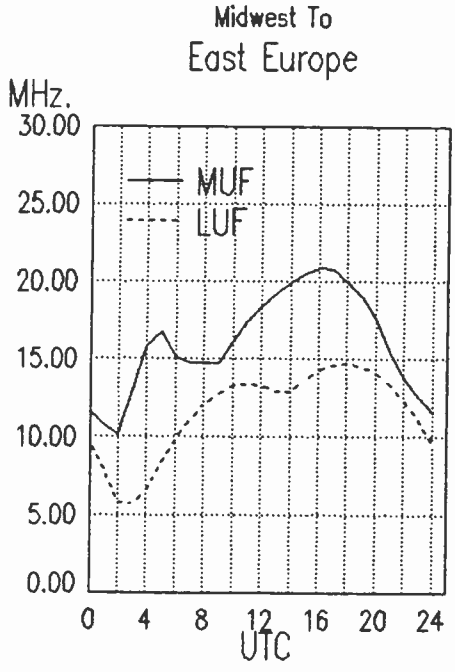
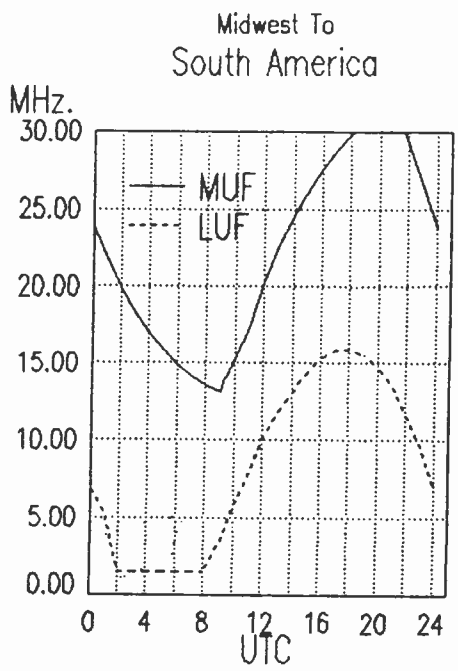
frequency SECTION

0600 UTC [2:00 AM EDT/11:00 PM PDT]

0600-0615		Radio Ghana, Accra	3366	4915		
0600-0615	M-A	Radio Zambia, Lusaka	6165	7235		
0600-0620		Vatican Radio, Vatican City	6185	9645		
0600-0625		Radio Netherlands, Hilversum	6165	9715		
0600-0630		Laotian National Radio	7113			
0600-0630		Radio Australia, Melbourne	11910	11945	15160	15240
			15315	15395	17715	17750
			17795			
0600-0630		Radio Berlin Int'l, East Germany	15240	17880	21540	21645
0600-0630		Trans World Radio, Swaziland	5055	6070	7210	
0600-0630		Voice of Kenya, Nairobi	6045			
0600-0645		HCJB, Quito, Ecuador	6230	9720	11775	
0600-0645		Radio Berlin Int'l, East Germany	5965	11810		
0600-0645	S	Radio Cameroon, Yaounde	4850			
0600-0650		Radio Pyongyang, North Korea	9530	15160	15180	
0600-0700		(US) Armed Forces Radio and TV	6030	11790		
0600-0700		BBC, London, England	3955	5975	6195	7105
			7150	9410	9600	9640
			12095	15280		
0600-0700		CBC Northern Quebec Service	6195			
0600-0700		CBU, Vancouver, British Colombia	6160			
0600-0700		CFCF, Montreal, Quebec	6005			
0600-0700		CFCN, Calgary, Alberta	6030			
0600-0700		CHNS, Halifax, Nova Scotia	6130			
0600-0700		CKWX, Vancouver, British Colombia	6080			
0600-0700		CFRB, Toronto, Ontario	6070			
0600-0700		(US) Far East Network, Tokyo	3910			
0600-0700	F	FEBA, Mahe, Seychelles	17855			
0600-0700		King of Hope, South Lebanon	6215			
0600-0700		KYOI, Saipan	17780			
0600-0700		Radio Havana Cuba	9525			
0600-0700		Radio Korea, Seoul, South Korea	6060	7275	9570	
0600-0700		Radio Kuwait	15345			
0600-0700		Radio Moscow, USSR	7165	7310	7320	
0600-0700		Radio New Zealand, Wellington	11780	15150		
0600-0700	A,S	Radio Thailand, Bangkok	9655	11905		
0600-0700	S	Radio Zambia, Lusaka	11880			
0600-0700		SBC Radio One, Singapore	5010	5052	11940	
0600-0700	S	Superpower KUSW, Utah	6155			
0600-0700		Trans World Radio Monte Carlo	7105			
0600-0700		Voice of America, Washington	6095	6125	7170	7280
			7325			
0600-0700		Voice of Asia, Taiwan	7285			
0600-0700		Voice of Malaysia, Kuala Lumpur	6175	9750	15295	
0600-0700		Voice of Nigaria, Lagos	15185			
0600-0700		WCSN, Boston, Massachusetts	9495			
0600-0700		WHRI, Noblesville, Indiana	7365	9620		
0600-0700	M-A	WMLK, Bethel, Pennsyvlania	9455			
0600-0700		WYFR, Oakland, California	5950	6065	7355	9520
			9815			
0615-0630		Radio Korea, Seoul, South Korea	13670			
0615-0630	M-A	Vatican Radio, Vatican City	15190	17730		
0615-0700		Deutsche Welle, West Germany	9610	9700	11765	15185
0630-0700	A	CPBS-1, China*	11330	15550	15590	17605
0630-0655		Radio Austria Int'l, Vienna	6000	6155	15410	
0630-0655		Radio Netherland, Hilversum	9895	11930		
0630-0700		Radio Australia, Melbourne	11945	15160	15240	15315
			15395	17715	17750	17795
0630-0700		Radio Bucharest, Romania	21600			
0630-0700		Radio Finland, Helsinki	6120	9560	11755	15270
0630-0700		Radio Polonia, Warsaw, Poland	6135	7270	15120	
0630-0700		Radio Tirana, Albania	7205	9500		
0630-0700		Swiss Radio Int'l, Berne	3985	6165	9535	12030
			15430	17570		
0630-0700		Trans World Radio, Swaziland	5055	6070	7210	9725
0630-0700	A,S	Voice of Kenya, Nairobi	7270			
0645-0700		BBC, London, England*	6150	7260	11945	
0645-0700		HCJB, Quito, Ecuador	6130	6230	9720	11775
0645-0700		Radio Bucharest, Romania	11940	15250	15335	17790
			17805	21665		
0645-0700	M-F	Radio Canada Int'l, Montreal	6050	6140	7155	9740
			9760	11840	15235	
0645-0700		Radio Ghana, Accra	6130			
0650-0656		Radio Chile, Santiago (?)	7205			



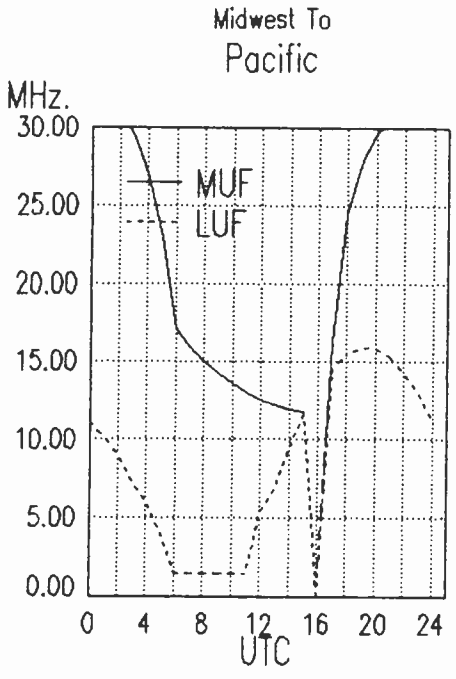


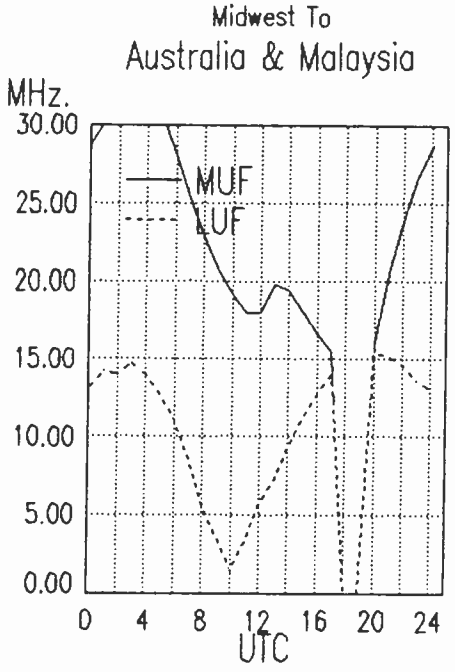


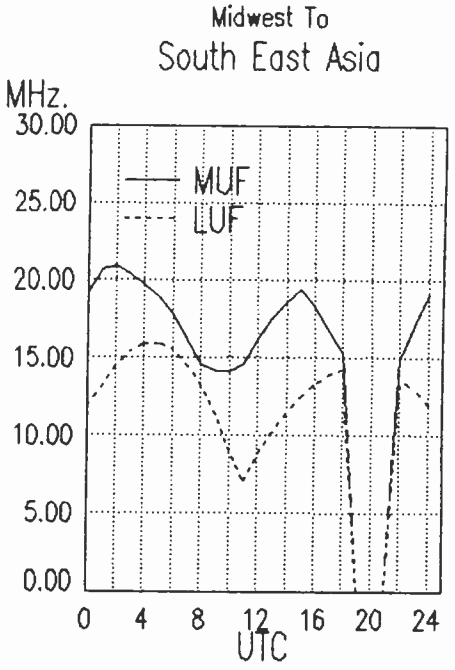
frequency SECTION

0700 UTC [3:00 AM EDT/12:00 AM PDT]

0700-0703		Port Moresby, Papua New Guinea	3925	4890	5960	5985
			6020	6040	6080	6140
			9520			
0700-0710		Radio Bucharest, Romania	11940	15250	15335	17790
			17805	21665		
0700-0710		Radio Sierra Leone, Freetown	5980			
0700-0715		Radio Ghana (HS), Freetown	3366	4915		
0700-0730		BBC, London, England	5975	6195	7120	7150
			7180	9410	9600	9640
			9680	11860	15400	21600
0700-0730		Burma Bcasting Service, Rangoon	9730			
0700-0730		Radio Australia, Melbourne	5995	9655	9845	15160
			15240	15395	17715	17750
0700-0730		Radio Bucharest, Romania	21600			
0700-0730		Radio New Zealand, Wellington	11780	15150		
0700-0730	S	Radio Zambia, Lusaka	11880			
0700-0745		WYFR, Oakland, California	6065	7355	9852.5	
0700-0750		Radio Pyongyang, North Korea	13750	15340		
0700-0800		AWR, Forli, Italy	7257			
0700-0800		CBU, Vancouver, British Colombia	6130			
0700-0800		CFCF, Montreal, Quebec	6005			
0700-0800		CFCN, Calgary, Alberta	6030			
0700-0800		CHNS, Halifax, Nova Scotia	6130			
0700-0800		CKWX, Vancouver, British Columbia	6080			
0700-0800		CFRB, Toronto, Ontario	6070			
0700-0800		ELWA, Monrovia, Liberia	11830			
0700-0800		(US) Far East Network, Tokyo	3910			
0700-0800		HCJB, Quito, Ecuador	6130	9610	9745	11835
			11925			
0700-0800		King of Hope, South Lebanon	6215			
0700-0800		KYOI, Saipan	17780			
0700-0800		Radio Ghana, Accra	6130			
0700-0800		Radio Havana Cuba	9525			
0700-0800		Radio Japan, Tokyo	5990	15195	15235	17810
			21695			
0700-0800		Radio Kuwait	15345			
0700-0800		Radio Moscow, USSR	5905	6020	6095	6150
			6160	6190	7175	7290
			7345	9580		
0700-0800	A,S	Radio Thailand, Bangkok	9655	11905		
0700-0800	S	Superpower KUSW, Utah	6135			
0700-0800		Trans World Radio, Swaziland	6070	9725		
0700-0800		Voice of Free China, Taiwan	5985			
0700-0800	A,S	Voice of Kenya, Nairobi	7270			
0700-0800		Voice of Malaysia, Kuala Lumpur	6175	9750	15295	
0700-0800		Voice of Nigeria, Lagos	15120	15185		
0700-0800		WCSN, Boston, Massachusetts	9495			
0700-0800		WHRI, Noblesville, Indiana	7365	9620		
0700-0800		WYFR, Oakland, California	6065	7365	9620	
0715-0800	A,S	Radio Berlin Int'l, East Germany	6040	7185	9730	21465
			21540			
0715-0730	M-A	Vatican Radio, Vatican City	11725	15190		
0715-0735	S	FEBA, Mahe, Seychelles	15115	17785		
0720-0730	M-A	Vatican Radio, Vatican City	6248	9645	11740	
0725-0800		Trans World Radio, Monte Carlo	7105			
0730-0800		ABC, Alice Springs, Australia	2310	[ML]		
0730-0800		ABC, Katherine, Australia	2485			
0730-0800		ABC, Tennant Creek, Australia	2325	[ML]		
0730-0800		Radio Australia, Melbourne	9655	11720		
0730-0735		All India Radio, New Delhi	5990	6010	6020	7110
			7205	9610	9675	11850
			11935	15235	15250	17705
0730-0745		BBC, London, England*	3975	6010	7230	9915
0730-0755		Radio Finland, Helsinki	6120	9560	11755	
0730-0800		BBC, London, England	5975	9640		
0730-0800		Radio Netherland, Hilversum	9630	9715		
0730-0800		Radio Prague, Czechoslovakia	11685	17840	21705	
0730-0800		Radio Sofia, Bulgaria	9700	11720		
0730-0800		Soloman Islands Broadcasting Corp	9545			
0730-0800		Swiss Radio Int'l, Berne	3985	6165	9535	
0740-0750	W	Radio Free Europe, Munich*	5985	7115	9695	9725
			11895	15355		
0745-0800		Radio Prague, Czechoslovakia	6055	7345	9505	





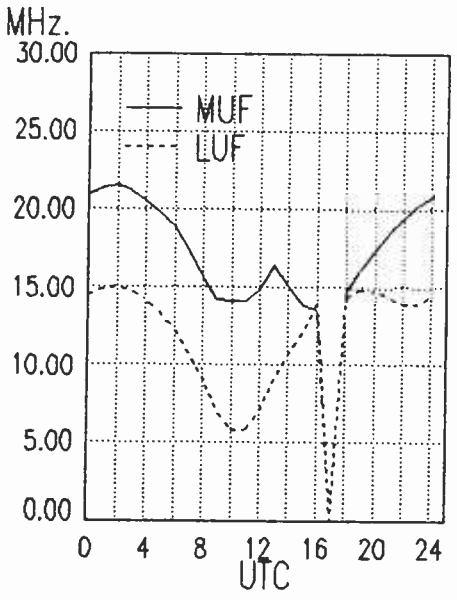


frequency SECTION

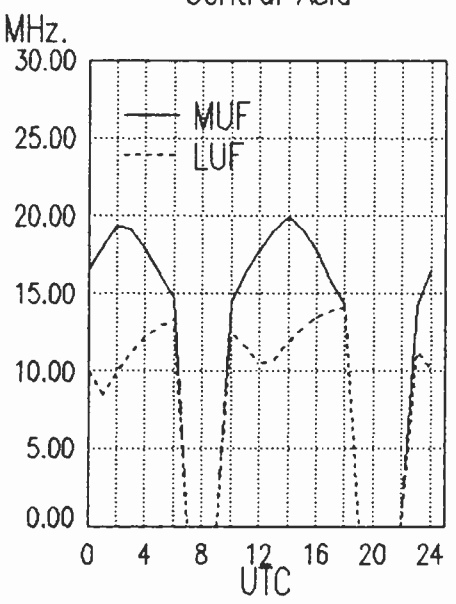
0800 UTC [4:00 AM EDT/1:00 AM PDT]

0800-0805	M-F	Port Moresby, Papua New Guinea	3925	4890	5960	5985	
			6020	6040	6080	6140	
			9520				
0800-0805		Soloman Islands Broadcasting Corp	9545				
0800-0815	M-A	Radio Zambia, Lusaka	6165	7235			
0800-0825	M-F	BRT, Brussels, Belgium	11695	15510			
0800-0825		Radio Netherland, Hilversum	9630	9715			
0800-0825		Voice of Malaysia, Kuala Lumpur	6175	9750	15295		
0800-0830		HCJB, Quito, Ecuador	6130	9610	9745	11835	
			11925				
0800-0830		Radio Bangladesh, Dhaka	12030	15525			
0800-0830		Radio Tirana, Albania	9500	11835			
0800-0830		Voice of Islam, Pakistan	15525	17870			
0800-0835	S	FEBA, Mahe, Seychelles	15325,	17785			
0800-0835		Trans World Radio, Swaziland	6070	9725			
0800-0850		Radio Pyongyang, North Korea	9530	11830	15160	15180	
0800-0900		ABC, Alice Springs, Australia	2310	[ML]			
0800-0900		ABC, Katherine, Australia	2485				
0800-0900		ABC, Tennant Creek, Australia	2325	[ML]			
0800-0900		BBC, London, England	9410	9640			
0800-0900		CBN, St. John's, Newfoundland	6160				
0800-0900		CBU, Vancouver, British Colombia	6160				
0800-0900		CFCF, Montreal, Quebec	6005				
0800-0900		CFCN, Calgary, Alberta	6030				
0800-0900		CHNS, Halifax, Nova Scotia	6130				
0800-0900		CKWX, Vancouver, British Colombia	6080				
0800-0900		CFRB, Toronto, Ontario	6070				
0800-0900		(US) Far East Network, Tokyo	3910				
0800-0900		King of Hope, South Lebanon	6215				
0800-0900		KNLS, Anchor Point, Alaska	6150				
0800-0900		KTWR, Guam	11805				
0800-0900		KYOI, Saipan	11900				
0800-0900		Radio Australia, Melbourne	5995	6080	9580	9655	
			9710	11720			
0800-0900		Radio Korea, Seoul, South Korea	7550				
0800-0900		SBC Radio One, Singapore	5010	5052	11940		
0800-0900	S	Superpower KUSW, Utah	6135				
0800-0900		Trans World Radio, Monte Carlo	7105				
0800-0900		Voice of Indonesia, Jakarta	11790	15105			
0800-0900	A,S	Voice of Kenya, Nairobi	7270				
0800-0900		Voice of Nigaria, Lagos	7255	15185			
0800-0900		WCSN, Boston, Massachusetts	7355				
0800-0900		WHRI, Noblesville, Indiana	7355	9510			
0800-0900		WYFR, Oakland, California	11580	15495			
0805-0900		KTWR, Agana, Guam	11805				
0815-0830	S	Radio Austria Int'l, Vienna	6155	11915	15410	15415	
			17870				
0815-0830		Radio Korea, Seoul, South Korea	9570				
0815-0845	M-F	Voice of America, Washington DC	7175	9575	9750	11710	
			11915	15600	17715	21500	
			[ML]				
0830-0840		All India Radio, New Delhi	5960	5990	6010	6020	
			6050	6065	6100	6140	
			7110	7140	7160	7250	
			7280	7295	9610	11850	
			15235	15250	17705		
0830-0855		Radio Austria Int'l, Vienna	6155	11915	15410	15415	
0830-0855	M-A	Radio Netherland, Hilversum	9630				
0830-0900	S	Bhutan Bcasting Service, Thimpu	6035				
0830-0900		FEBC, Manila, Philippines	11850	15350			
0830-0900		Radio Beijing, China	9700	11755	15440		
0830-0900		Radio Finadland, Helsinki	15245	17795			
0830-0900		Radio Netherland, Hilversum	9630	21486			
0830-0900		Radio Prague, Czechoslovakia	11685	17840	21705		
0830-0900		Swiss Radio Int'l, Berne	9560	9885		13685	
			17830				
			21695				
0830-0900		Voice of Nigeria, Lagos	15120				
0840-0850	M-A	Voice of Greece, Athens	9855	15630			
0845-0900		Radio Berlin Int'l, East Germany	21540				
0845-0900		Radio Prague, Czechoslovakia	6055	7345	9505		
0850-0900		All India Radio, New Delhi	5960	5990	6010	6020	
			6050	6065	6100	6140	
			7110	7140	7150	7160	
			7250	7280	7295	9610	

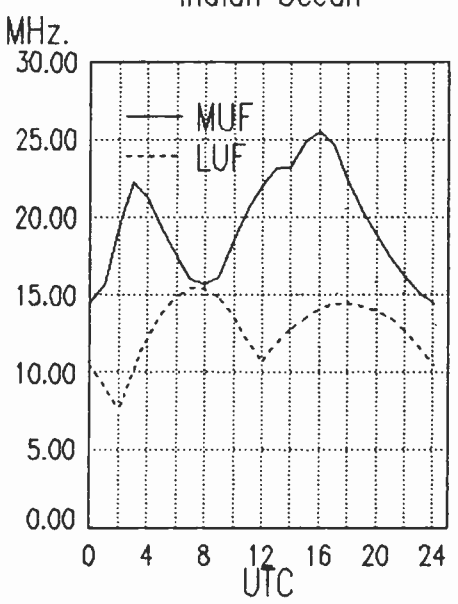
Midwest To
Far East



Midwest To
Central Asia



Midwest To
Indian Ocean



frequency SECTION

			11850	15235	15250	17705

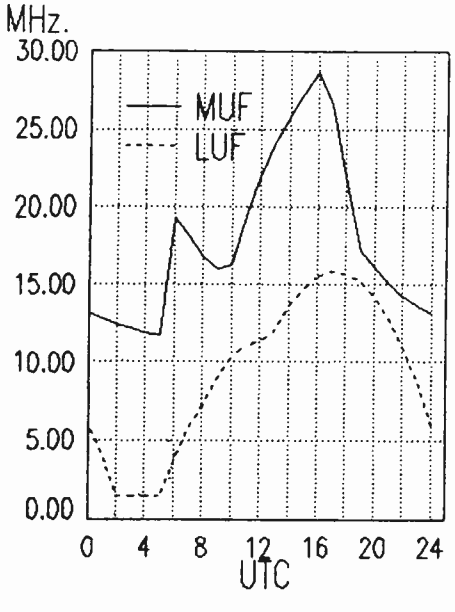
0900 UTC [5:00 AM EDT/2:00 AM PDT]

0900-0905		Africa No. 1, Gabon	7200	15200		
0900-0910		All India Radio, New Delhi	5960	5990	6010	6020
			6050	6065	6100	6140
			7110	7140	7150	7160
			7250	7280	7295	9610
			11850	15235	15250	17705
0900-0910		Port Mresby, Papua New Guinea	3295	4890	5960	5985
			6020	6040	6080	6140
			9520			
0900-0910		Voice of Lebanon, Beirut	6548			
0900-0925	M-F	BRT, Brussels, Belgium	17595	21810		
0900-0930		FEBC, Manila, Philippines	11850	15350		
0900-0930		KTWR, Agana, Guam	11805			
0900-0930		Nippon Broadcasting Corp.	3925			
0900-0930		Radio Beijing, China	9700	11755	15440	
0900-0930		Radio Berlin Int'l, East Germany	21540			
0900-0930		Radio Netherland, Hilversum	21485			
0900-0930	A,S	Radio Prague, Czechoslavkia	11685	17840	21705	
0900-0950		Deutsche Well, West Germany	6160	17780	21650	21680
0900-1000		ABC, Alice Springs, Australia	2310	[ML]		
0900-1000		ABC, Katherine, Australia	2485			
0900-1000		ABC, Tennant Creek, Australia	2325	[ML]		
0900-1000	S	Adventist World Radio, Portugal	9670			
0900-1000		(US) Armed Forces Radio and TV	6030	9530		
0900-1000		BBC, London, England	7180	9410	9720	9740
			9750	11860		
0900-1000		CFCF, Montreal, Quebec	6005			
0900-1000		CFCN, Calgary, Alberta	6030			
0900-1000		CHNS, Halifax, Nova Scotia	6130			
0900-1000		CKWX, Vancouver, British Colombia	6080			
0900-1000		CFRB, Toronto, Ontario	6070			
0900-1000		(US) Far East Network, Tokyo	3910			
0900-1000		HCJB, Quito, Ecuador	6130			
0900-1000		King of Hope, South Lebanon	6215			
0900-1000		KNLS, Anchor Point, Alaska	6150			
0900-1000		KTWR, Guam	11805			
0900-1000	S	KUSW, Salt Lake City, Utah	6135			
0900-1000		Radio Afghanistan, Kabul	4450	6085	15435	17720
0900-1000		Radio Australia, Melbourne	5995	6080	9580	9655
			9710	9760	11720	15415
0900-1000		Radio Japan, Tokyo	11840	15235	17810	
0900-1000		Radio Moscow, USSR	5905	6020	6095	7345
0900-1000	S	Radio Prague, Czechoslovakia	6055	7345	9505	[ML]
0900-1000		Radio Tanzania, Dar es Salaam	7165			
0900-1000		SBC Radio One, Singapore	5010	5052	11940	
0900-1000		Trans World Radio, Monte Carlo	7105			
0900-1000		Voice of Kenya, Nairobi	7270			
0900-1000		Voice of Nigeria, Lagos	7255	15120	15185	
0900-1000		WHRI, Noblesville, Indiana	7355			
0915-0950	M-A	Radio Ulan Bator, Mongolia	9615	12015		
0930-0935		All India Radio, New Delhi	5960	5990	6010	6020
			6050	6065	6100	6140
			7110	7140	7160	7250
			7280	7295	9610	11850
			15235	15250	17705	
0930-0940	M-F	Radio Canada Int'l, Montreal	5960	9755		
0930-0945		BBC, London, England*	9725	11955		
0900-0955		Radio Budapest, Hungary	9835	11910	17710	17780
			21525			
0930-0955		Radio Finland, Helsinki	6120	15245	17860	
0930-1000		CBN, St. John's, Newfoundland	6160			
0930-1000		KTWR, Agana, Guam	11805			
0930-1000		Radio Beijing, China	9700	11755	15440	
0930-1000		Radio Sweden Int'l, Stockholm	9630	15390		
0945-1000		BBC, London, England*	5995	7180	9725	11955
0945-1000	M-A	Radio Prague, Czechoslovakia	6055	7345	9505	

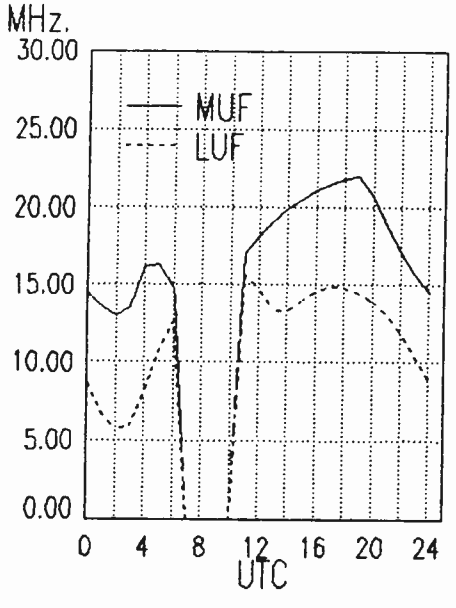
1000 UTC [6:00 AM EDT/3:00 AM PDT]

1000-1030		Deutsche Welle, West Germany	7225	9735	17765	21600
1000-1030		HCJB, Quito, Ecuador	6130	9745	11925	

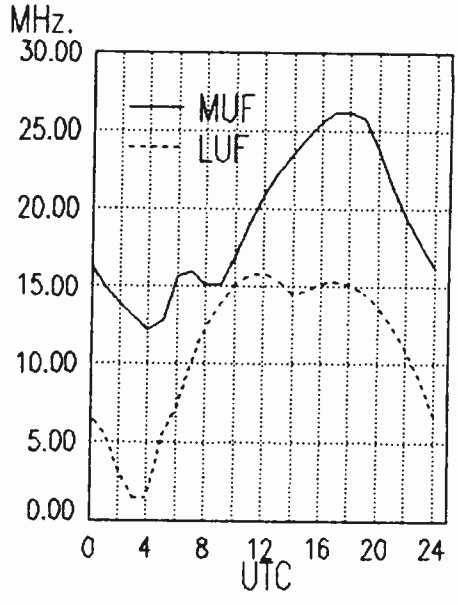
Midwest To
South Africa



Midwest To
East Africa



Midwest To
Central Africa

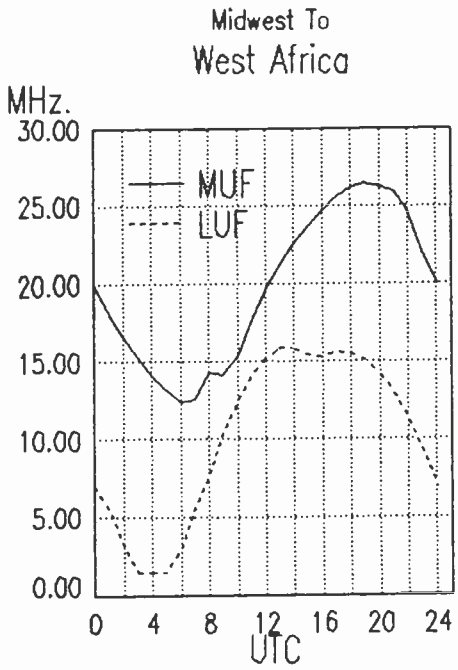


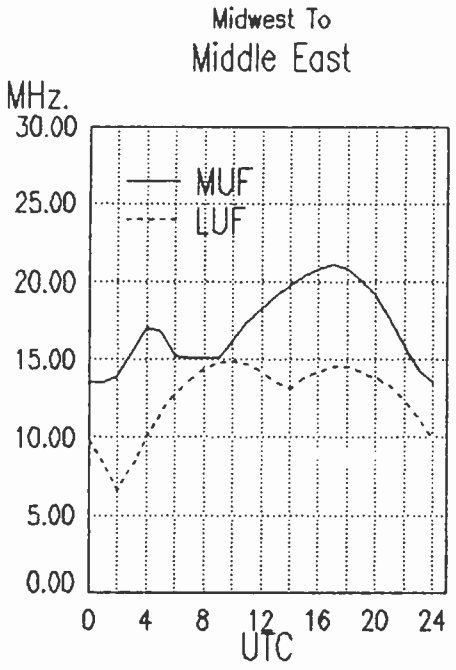
frequency SECTION

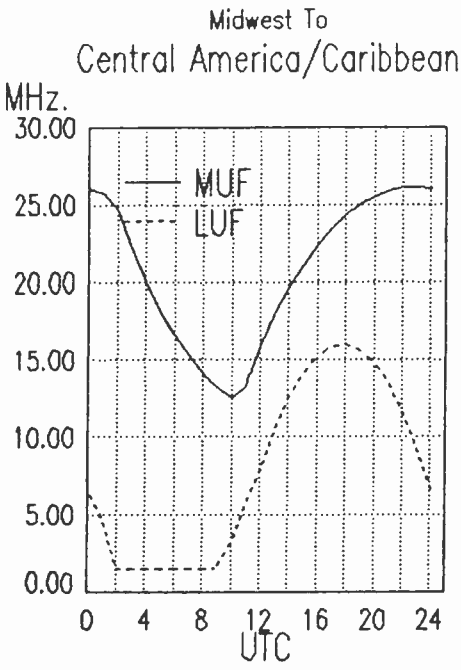
1000-1030		Kol Israel, Jerusalem	9385	11700	15485	15640
			15650	17635	17685	21625
1000-1030		Radio Afghanistan, Kabul	4450	6085	15435	17720
1000-1030		Radio Beijing, China	9700	11755	15440	
1000-1030	S	Radio Norway Int'l, Oslo	9590	15180	15235	17780
			21730			
1000-1030		Radio Tanzania, Dar es Salaam	7165			
1000-1030		Swiss Radio Int'l, Berne	9560	9885	17830	21695
1000-1030		Voice of Ethiopia, Addis Ababa	9560			
1000-1030		Voice of Vietnam, Hanoi	9840	12020		
1000-1055	A	Trans World Radio, Monte Carlo	7105			
1000-1100		ABC, Alice Springs, Australia	2310	[ML]		
1000-1100		ABC, Katherine, Australia	2485			
1000-1100		ABC, Tennant Creek, Australia	2325	[ML]		
1000-1100		(US) Armed Forces Radio and TV	6030			
1000-1100		All India Radio, New Delhi	11860	11915	15130	15335
			17387	117875		
1000-1100		BBC, London, England	6195	11750	12095	
1000-1100		CBN, St. John's, Newfoundland	6160			
1000-1100		CFCF, Montreal, Quebec	6005			
1000-1100		CFCN, Calgary, Alberta	6030			
1000-1100		CHNS, Halifax, Nova Scotia	6130			
1000-1100		CKWX, Vancouver, British Colombia	6080			
1000-1100		CFRB, Toronto, Ontario	6070			
1000-1100		(US) Far East Network, Tokyo	3910			
1000-1100		KNLS, Anchor Point, Alaska	6150			
1000-1100		KTWR, Agana, Guam	11805			
1100-1200		KYOI, Saipan	11900			
1100-1200		Radio Australia, Melbourne	9580	9655	9770	15415
1000-1100		Radio New Zealand, Wellington	9540	11780		
1000-1100	S	Radio Prague, Czechoslovakia	6055	7345	9505	[ML]
1000-1100		SBC Radio One, Singapore	5010	5052	11940	
1000-1100		Superpower KUSW, Utah	6135			
1000-1100		Voice of America, Washington	5975	5985	6125	9590
1000-1100		Voice of Kenya, Nairobi	7270			
1000-1100		Voice of Nigeria, Lagos	7255	15120		
1000-1100		WHRI, Noblesville, Indiana	7355			
1000-1100		WYFR, Oakland, California	5950			
1005-1010		Radio Pakistan, Islamabad	15606	17660		
1030-1040		Voice of Asia, Taiwan	5980			
1030-1055		Radio Austria Int'l, Vienna	17870			
1030-1055		Radio Budapest, Hungary	9835	11910	17710	17780
			21525			
1030-1100		HCJB, Quito, Ecuador	6130	11925		
1030-1100	M-F	Radio Budapest, Hungary	9585	9835	11910	15160
			15220			
1030-1100		Radio Netherlands, Hilversum	6020	9650		
1030-1100	A,S	Radio Tanzania, Dar es Salaam	7165			
1030-1100		SLBC, Colombo, Sri Lanka	11835	15120	17850	[ML]
1030-1100		UAE Radio, United Arab Emirates	15435	17865	21605	
1040-1050	H	Radio Free Europe, Munich*	5985	7115	9695	9725
			11895	15355		
1040-1050	M-A	Voice of Greece, Athens	11645	15630		
1045-1100	M-A	Radio Prague, Czechoslovakia	6055	7345	9505	
1055-1100	S	Trans World Radio, Monte Carlo	7105			

1100 UTC [7:00 AM EDT/4:00 AM PDT]

1100-1105		Radio Pakistan, Islamabad	6090	7290		
1100-1105	A	Port Moresby, Papua New Guinea	3295	4890	5960	5985
			6020	6040	6080	6140
			9520			
1100-1110	S	Port Moresby, Papua New Guinea	3295	4890	5960	5985
			6020	6040	6080	6140
			9520			
1100-1115		Radio New Zealand, Wellington	9540	11780		
1100-1120		Radio Pakistan, Islamabad	15606	17760		
1100-1125		Radio Netherland, Hilversum	6020	9650		
1100-1130		HCJB, Quito, Ecuador	6130	11925		
1100-1130	TES	Radio Caroline, Offshore, Europe	5955			
1100-1130		Radio Japan, Tokyo	5990	6120	7210	17810
1100-1130		Radio Mozambique, Maputo	9525	11818	11835	
1100-1130		Radio Sweden Int'l, Stockholm	6065	9630	21690	
1100-1130		SLBC, Colombo, Sri Lanka	11835	15120	17850	[ML]
1100-1130		Swiss Radio Int'l, Berne	9885	11935	15570	17830
1100-1130		Voice of Vietnam, Hanoi	7430	9732		
1100-1150		Radio Pyongyang, North Korea	6576	9600	11735	
1100-1155		Radio Beijing, China	9665			







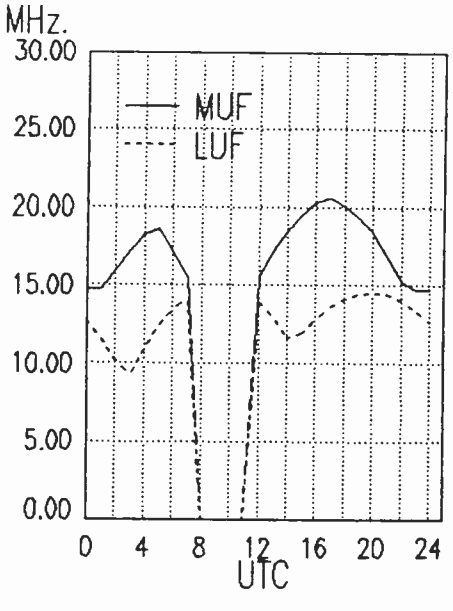
frequency SECTION

1100-1200		ABC, Alice Springs, Australia	2310	[ML]		
1100-1200		ABC, Katherine, Australia	2485			
1100-1200		ABC, Tennant Creek, Australia	2325	[ML]		
1100-1200		(US) Armed Forces Radio and TV	6030	6125	15430	
1100-1200		BBC, London, England	5965	6195	11750	11775
			15070			
1100-1200		CBN, St. John's, Newfoundland	6160			
1100-1200		CFCF, Montreal, Quebec	6005			
1100-1200		CFCN, Calgary, Alberta	6030			
1100-1200		CHNS, Halifax, Nova Scotia	6130			
1100-1200		CKWX, Vancouver, British Colombia	6080			
1100-1200		CFRB, Toronto, Ontario	6070			
1100-1200		(US) Far East Network, Tokyo	3910			
1100-1200		KYOI, Saipan	11900			
1100-1200		Radio Australia, Melbourne	5995	6060	6080	7215
			9580	9645	9710	9770
			11705	11800		
1100-1200		Radio Korea, Seoul, South Korea	15575			
1100-1200		Radio Moscow, USSR	6000	11670	11900	13790
			15225	15475		
1100-1200		Radio RSA, South Africa	17755	21590		
1100-1200	A,S	Radio Tanzania, Dar es Salaam	7165			
1100-1200	S	Radio Zambia, Lusaka	11880	[IRR]		
1100-1200	S	Superpower KUSW, Utah	9850			
1100-1200		Voice of America, Washington	5975	5985	5990	6110
			6160	9590	9760	
1100-1200		Voice of Asia, Taiwan	5980	7445		
1100-1200		Voice of Kenya, Nairobi	7270			
1100-1200		Voice of Nigeria, Lagos	7255	15120		
1100-1200		WHRI, Noblesville, Indiana	5995	11790		
1100-1200		WYFR, Oakland, California	5950	6010		
1110-1120	M-F	Radio Botswana, Gaborone	4820	5955	7255	
1115-1200		Radio Berlin Int'l, East Germany	15445	17880	21465	21540
1115-1125		Radio France Int'l, Paris	6175	9790	9805	11670
			11700	11845	15155	15195
			15300	15315	15435	17620
			17850	21620		
1115-1130		Radio Korea, Seoul, South Korea	7275	11740		
1115-1130		Vatican Radio, Vatican City	11840	21485		
1115-1145		Radio Nepal, Kathmandu	5005			
1115-1200		Trans World Radio, Bonaire	11815			
1115-1200		Voice of Islamic Republic Iran	11790			
1130-1200		Deutsche Welle, West Germany	15410	17765	17800	21600
1130-1200		HCJB, Quito, Ecuador	11740			
1130-1200		Radio Japan, Tokyo	5990	6120	7210	
1130-1200		Radio Netherland, Hilversum	5995	9715	15560	17575
			17605	21480		
1130-1200		Radio Thailand, Bangkok	9655	11905		
1130-1200		Radio Tirana, Albania	9480	11855		
1135-1140		All India Radio, New Delhi	6065	7110	9610	9675
			11850	15320		
1140-1145	M-A	Vatican Radio, Vatican City	6248	9645	11740	
1145-1200		BBC, London, England*	5995	7180		
1145-1200		Radio Prague, Czechoslovakia	6055	7345	9505	

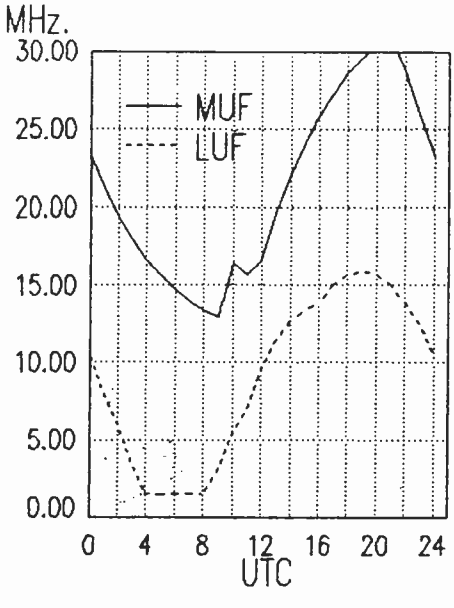
1200 UTC [8:00 AM EDT/5:00 AM PDT]

1200-1205	M-A	Port Moresby, Papua New Guinea	3295	4890	5960	6020
			6040	6080	6140	9520
1200-1215		BBC, London, England*	3915	6065	7275	
1200-1215		Radio New Zealand, Wellington	6100	9540		
1200-1215		Vatican Radio, Vatican City	15190	17865		
1200-1215		Voice of Kampuchea, Phnom-Penh	9693	11938		
1200-1220		Radio Bucharest, Romania	17720	21665		
1200-1220	M-F	Radio Budapest, Hungary	9585	9835	11910	15160
			15220			
1200-1225	M-F	Radio Finland, Helsinki	11945	15400		
1200-1225		Radio Polonia, Warsaw, Poland	6095	7285		
1200-1230	S	Radio Austria Int'l, Vienna	6155	9685	11915	15320
1200-1230		Radio Netherland, Hilversum	5995	9715	15560	17575
			17605	21480		
1200-1230		Radio Somalia, Mogadishu	6095			
1200-1230		Radio Tashkent, Uzbek, USSR	5945	7275	9540	9600
			11785			
1200-1230		Radio Thailand, Bangkok	9655	11905		
1200-1230	S	Radio Zambia, Lusaka	11880	[IRR]		
1200-1235	M-A	Radio Ulan Bator, Mongolia	9615	12015		
1200-1236		HCJB, Quito, Ecuador	6075			

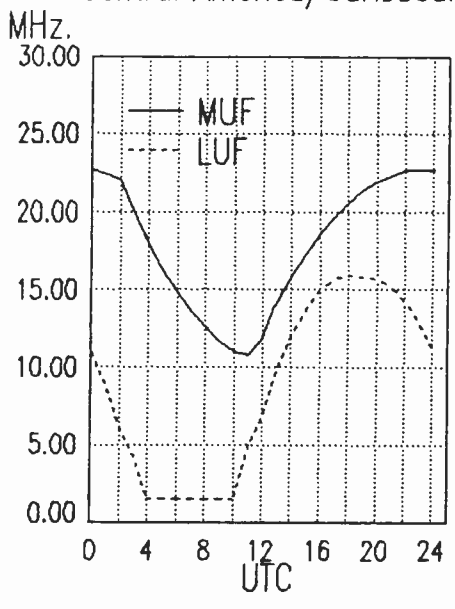
West Coast To
Middle East



West Coast To
South America



West Coast To
Central America/Caribbean



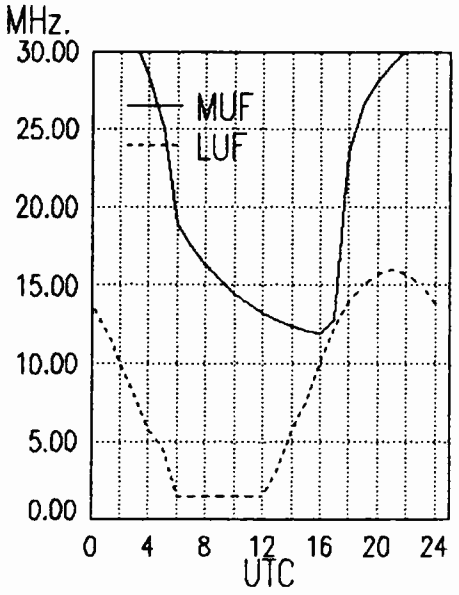
frequency SECTION

1200-1250		Radio Pyongyang, North Korea	9600	9555	11735	
1200-1255		Radio Beijing, China	7335	9530	9635	9665
			9770	11600	11715	11755
1200-1300		ABC, Alice Springs, Australia	2310	[ML]		
1200-1300		ABC, Katherine, Australia	2485			
1200-1300		ABC, Tennant Creek, Australia	2325	[ML]		
1200-1300	S	Adventist World Radio, Africa	17890			
1200-1300		(US) Armed Forces Radio and TV	6030	6125	15430	
1200-1300		BBC, London, England	5965	6195	9740	11750
			11775	12095	15070	18080
1200-1300		CBN, St. John's, Newfoundland	6160			
1200-1300		CFCF, Montreal, Quebec	6005			
1200-1300		CFCN, Calgary, Alberta	6030			
1200-1300		CHNS, Halifax, Nova Scotia	6130			
1200-1300		CKWX, Vancouver, British Colombia	6080			
1200-1300		CFRB, Toronto, Ontario	6070			
1200-1300		(US) Far East Network, Tokyo	3910			
1200-1300		HCJB, Quito, Ecuador	11740	15115	17890	
1200-1300		KYOI, Saipan	11900			
1200-1300		Radio Australia, Melbourne	5995	6060	6080	7205
			7215	9580	9645	9710
			9770	11705		
1200-1300		Radio Moscow, USSR	6000	7135	11670	11900
			13790	15140	15150	15225
			15420	15460	15475	15490
			15540	15585	15595	17655
			17820			
1200-1300		Radio RSA, South Africa	21590			
1200-1300	A,S	Radio Tanzania, Dar es Salaam	7165			
1200-1300		SBC Radio One, Singapore	5010	5052	11940	
1200-1300	S	Superpower KUSW, Utah	9850			
1200-1300		Trans World Radio, Bonaire	11815			
1200-1300		Trans World Radio, Sri Lanka	11920			
1200-1300		Voice of America, Washington	6110	9760	11715	
1200-1300		Voice of Kenya, Nairobi	7270			
1200-1300		Voice of Nigeria, Lagos	7255	15120		
1200-1300		WCSN, Boston, Massachusetts	5980			
1200-1300		WHRI, Noblesville, Indiana	5995	11715		
1200-1300		WYFR, Oakland, California	5950	6175	6185	
1200-1300		WYFR Satellite Net, California	13695			
1215-1300		Radio Berlin Int'l, E. Germany	15445	17880	21465	21540
1215-1300		Radio Cairo, Egypt	17675			
1230-1235		All India Radio, New Delhi	3905	4800	4920	7280
			9565	9615	11620	11735
			15120			
1230-1245		Radio Korea, Seoul, South Korea	7275	11740		
1230-1255		Radio Austria Int'l, Vienna	6155	9685	11915	15320
1230-1300		BBC, London, England*	6125	7255	6195	9635
			9660	11780	12040	15270
			15390	15435	17695	
1230-1300		Radio Bangladesh, Dhaka	11750	15525		
1230-1300		Radio Sweden, Stockholm	15190	15430		
1240-1250	M	Radio Free Europe, Munich*	5985	7115	9695	9725
			11895	15355		
1245-1255		Radio France Int'l, Paris	9805	11670	11845	15155
			15195	15300	15315	15365
			21620	21645		
1245-1300		Radio Berlin Int'l, E. Germany	9665	11705	11785	15170
			15240			

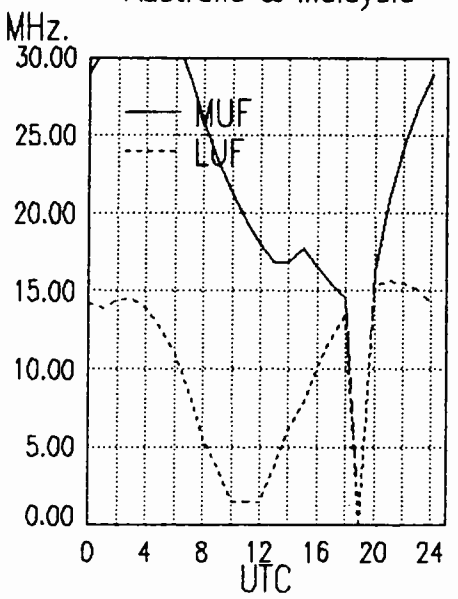
1300 UTC [9:00 AM EDT/6:00 AM PDT]

1300-1305		Port Moresby, Papua New Guinea	3295	4890	5960	5980
			6020	6040	6080	6140
			9520			
1300-1315		Radio Berlin Int'l, East Germany	21465	21540		
1300-1325		Radio Bucharest, Romania	9690	11940	16405	17720
1300-1330		BBC, London, England	5965	5995	6195	7160
			9510	9740	9750	9760
			11750	11775	12095	15070
			17705	18080		
1300-1330		Radio Berlin Int'l, E. Germany	9665	11705	11785	15170
			15240			
1300-1330		Radio Cairo, Egypt	17675			
1300-1330		Radio Finland, Helsinki	11945	15400		
1300-1330		Radio Ghana, Accra	4915	7295		
1300-1330	S	Radio Norway Int'l, Oslo	9590	15190	15310	21700
			25730			

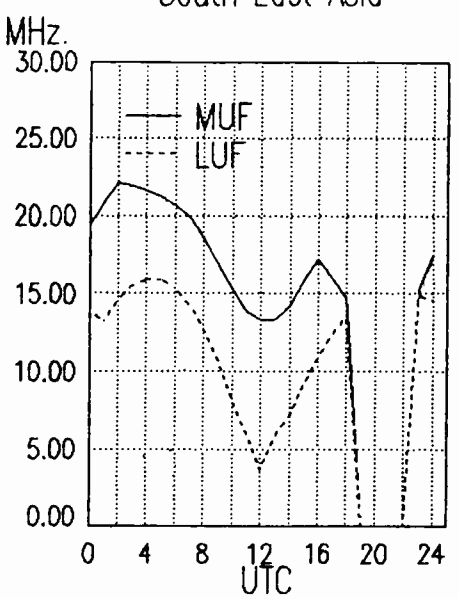
West Coast To
Pacific



West Coast To
Australia & Malaysia



West Coast To
South East Asia

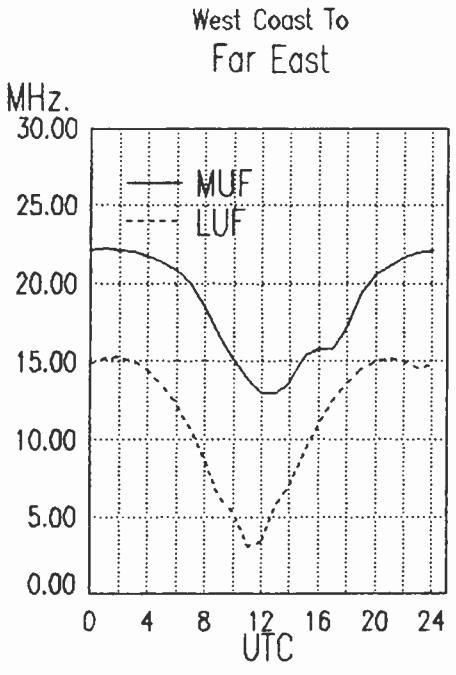


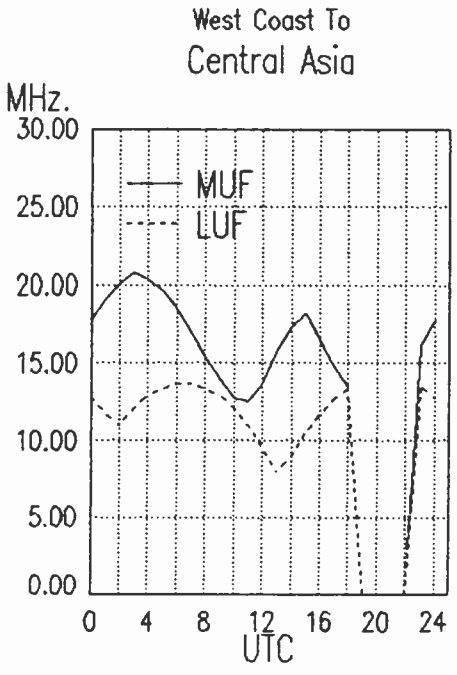
frequency SECTION

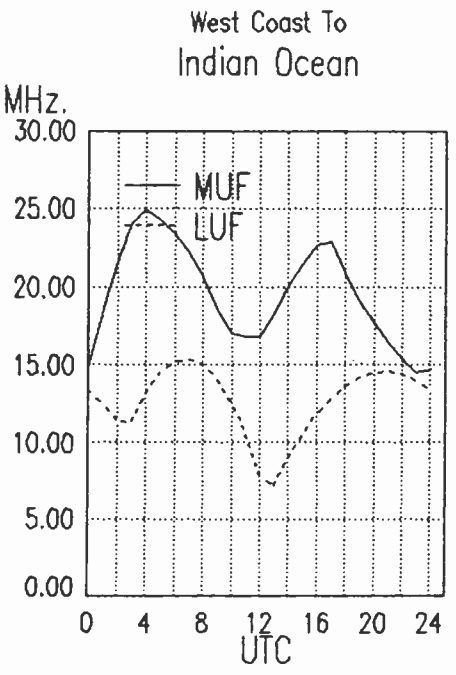
1300-1330		Swiss Radio Int'l, Berne	6165	9535	12030	
1300-1330		Trans World Radio, Sri Lanka	11920			
1300-1330		Voice of Kenya, Nairobi	7270			
1300-1332	A,S	Trans World Radio, Bonaire	11815			
1300-1350		Radio Pyongyang, North Korea	9325	9345		
1300-1355		Radio Beijing, China	7335	9530	11600	11755
1300-1400		ABC, Alice Springs, Australia	2310	[ML]		
1300-1400		ABC, Katherine, Australia	2485			
1300-1400		ABC, Tennant Creek, Australia	2325	[ML]		
1300-1400		(US) Armed Forces Radio and TV	6030	6125	15330	15330
			15430			
1300-1400		CBN, St. John's, Newfoundland	6160			
1300-1400		CBU, Vancouver, British Colombia	6160			
1300-1400		CFCF, Montreal, Quebec	6005			
1300-1400		CFCN, Calgary, Alberta	6030			
1300-1400		CHNS, Halifax, Nova Scotia	6130			
1300-1400		CKWX, Vancouver, British Colombia	6080			
1300-1400		CFRB, Toronto, Ontario	6070			
1300-1400	S	ELWA, Monrovia, Liberia	11830			
1300-1400		(US) Far East Network, Tokyo	3910			
1300-1400		FEBC, Manila, Philippines	11850			
1300-1400		HCJB, Quito, Ecuador	11740	15115	17890	
1300-1400	M-A	KYOI, Saipan	11900			
1300-1400		Radio Australia, Melbourne	5995	6060	6080	7205
			9580			
1300-1400	S	Radio Canada Int'l, Montreal	9625	11720	11955	15440
			17820			
1300-1400		Radio Jordan, Amman	9560			
1300-1400		Radio Moscow, USSR	6050	7135	7185	9820
			9830	11670	11840	11900
			12040	13625	13790	15225
			15540	15585	15595	17655
			17820			
1300-1400		Radio SPLA (Sudanese clandestine)	4666	9550	11710	
1300-1400	A,S	Radio Tanzania, Dar es Salaam	7165			
1300-1400		SBC Radio One, Singapore	5010	5052	11940	
1300-1400	S	Superpower KUSW, Utah	9850			
1300-1400		Voice of America, Washington	6110	7230	9455	9760
			11715			
1300-1400		Voice of Nigeria, Lagos	7255	15120		
1300-1400		WCSN, Boston, Massachusetts	5980			
1300-1400		WHRI, Noblesville, Indiana	9455	11790		
1300-1400		WYFR, Oakland, California	5950	6010	6175	11580
			15170	13695		
1300-1400		WYFR Satellite Net, California	13695			
1305-1315		Radio France Int'l, Paris	6175	9790	9805	11670
			11845	15155	15195	15300
			15315	15365	17620	17720
			17850	21645		
1315-1325		Voice of Lebanon, Beirut	6548			
1330-1355	M-A	BRT, Brussels, Belgium	15590	17600		
1330-1400		BBC, London, England	5995	6195	7160	9510
			9740	11750	11775	12095
			15070			
1330-1400		All India Radio, New Delhi	9545	10330	11810	15335
1330-1400	M-A	Bhutan Bcasting Service, Thimpu	6035			
1330-1400		Laotian National Radio	7113			
1330-1400		Radio Korea, Seoul, South Korea	7275			
1330-1400		Radio Tashkent, Uzbek, USSR	5945	7275	9540	9600
			11785			
1330-1400		Swiss Radio Int'l, Berne	11695	11955	15135	15570
			17830	21695		
1330-1400		UAE Radio, United Arab Emirates	15435	17865	21605	
1330-1400		Voice of Kenya, Nairobi	6100			
1330-1400		Voice of Turkey, Ankara	15255			
1330-1400		Voice of Vietnam, Hanoi	9840	12020		
1332-1400	A	Trans World Radio, Bonaire	11815			
1345-1400		Radio Korea, Seoul, South Korea	6135	7275	11740	15575

1400 UTC [10:00 AM EDT/6:00 AM PDT]

1400-1405	A	Trans World Radio, Bonaire	11815			
1400-1425		Radio Austria Int'l, Vienna	9665	12010	15320	
1400-1425		Radio Finland, Helsinki	11945	15400		
1400-1427		Voice of Nigeria, Lagos	15120			
1400-1430		ABC, Alice Springs, Australia	2310	[ML]		
1400-1430		ABC, Tennant Creek, Australia	2325	[ML]		



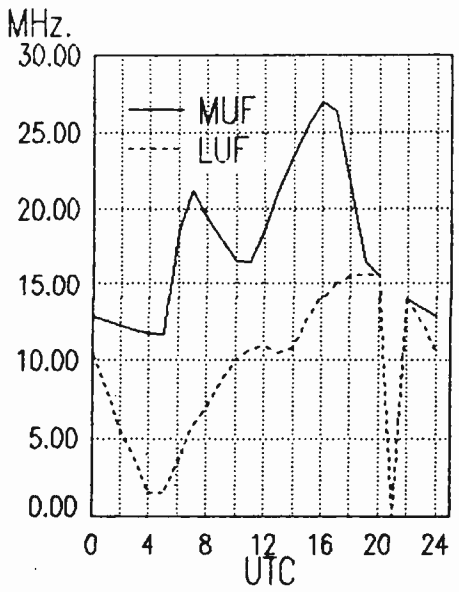




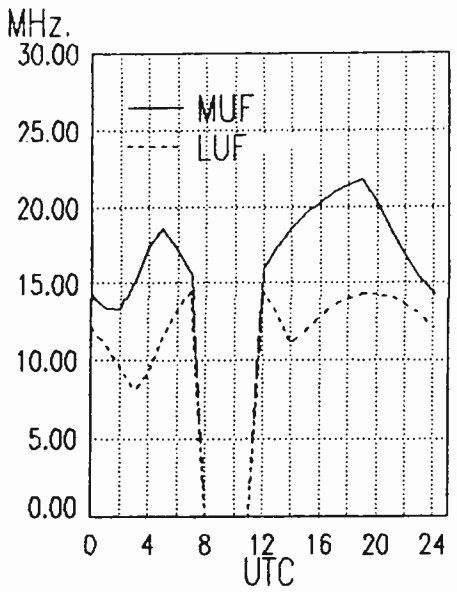
frequency SECTION

1400-1430	S	Radio Norway Int'l, Oslo	15300	15305	15310		
1400-1430		Radio Peace and Progress, USSR	7440	9550	9635	9790	
			11835	15470	17560		
1400-1430		Radio Polonia, Warsaw, Poland	6095	7285			
1400-1430		Radio Sweden, Stockholm	9695	11785	15345		
1400-1430		Radio Tirana, Albania	9500	11985			
1400-1430		Voice of Ethiopia, Addis Ababa	9550	11710			
1400-1430		Voice of Republic of Iran	15085				
1400-1450	T	Radio Free Europe, Munich*	5985	7115	7695	9725	
			11895	15355			
1400-1450		Radio Pyongyang, North Korea	6576	11735			
1400-1455		Radio Beijing, China	11600	15165			
1400-1500		ABC, Katherine, Australia	2485				
1400-1500		ABC, Perth, Australia	9610				
1400-1500		Adventist World Radio, Italy	7275				
1400-1500		All India Radio, New Delhi	9545	11810	15335		
1400-1500		(US) Armed Forces Radio and TV	6125	15330	15430		
1400-1500		BBC, London, England	5995	6195	7160	9740	
			11705	11750	12095	15070	
1400-1500		CBN, St. John's, Newfoundland	6160				
1400-1500	M-A	CBU, Vancouver, British Colombia	6160				
1400-1500		CFCF, Montreal, Quebec	6005				
1400-1500		CFCN, Calgary, Alberta	6030				
1400-1500		CHNS, Halifax, Nova Scotia	6130				
1400-1500		CKWX, Vancouver, British Colombia	6080				
1400-1500		CFRB, Toronto, Ontario	6070				
1400-1500	S	ELWA, Monrovia, Liberia	11830				
1400-1500		(US) Far East Network, Tokyo	3910				
1400-1500		FEBC, Manila, Philippines	9670	11850			
1400-1500		HCJB, Quito, Ecuador	11740	15115	17890		
1400-1500		KYOI, Saipan	11900				
1400-1500		Radio Australia, Melbourne	5995	6035	6060	6080	
			7205	9580			
1400-1500	S	Radio Canada Int'l, Montreal	9625	11720	11955	15440	
			17820				
1400-1500		Radio Japan, Tokyo	5990	7210	9695	11815	
1400-1500		Radio Jordan, Amman	9560				
1400-1500		Radio Korea, Seoul, South Korea	9570	9750	15575		
1400-1500		Radio Moscow, USSR	5905	5920	5980	6020	
			6050	6095	6185	7105	
			7135	7185	7315	7345	
			9530	9830	11670	11840	
			13790	15225	15475	15540	
			15595	17655			
			17820				
1400-1500		Radio RSA, South Africa	9655	15125	17755	21590	
1400-1500	A,S	Radio Tanzania, Dar es Salaam	7165				
1400-1500		SBC Radio One, Singapore	5010	5052	11940		
1400-1500	S	Superpower KUSW, Utah	9850				
1400-1500		Voice of America, Washington	6110	7230	9645	9760	
1400-1500		Voice of Kenya, Nairobi	6100				
1400-1500		Voice of Malaysia, Kuala Lumpur	4950				
1400-1500		Voice of Nigeria, Lagos	7255				
1400-1500		WCSN, Boston, Massachusetts	13760				
1400-1500		WHRI, Noblesville, Indiana	9455	11790			
1400-1500		WRNO, New Orleans, Louisiana	11965				
1400-1500		WYFR, Oakland, California	5950	6015	6175	11580	
			15050	15170			
1415-1420		Radio Nepal, Kathmandu	3230	5005			
1415-1425	T,F	Radio Budapest, Hungary	6110	9535	9585	11910	
			15160				
1415-1500		Radio Berlin Int'l, East Germany	15240	17880			
1425-1500	S	Radio Austria Int'l, Vienna	9665	12010	15320		
1425-1500	S	Radio Finland, Helsinki	11945	15400			
1430-1455	M-A	Radio Budapest, Hungary	9585	9835	11910	15160	
			15220				
1430-1500	F	ABC, Alice Springs, Australia	2310	[ML]			
1430-1500	F	ABC, Tennant Creek, Australia	2325	[ML]			
1430-1500		Burma Broadcasting Service	5985				
1430-1500		King of Hope, Southern Lebanon	6280				
1430-1500		KTWR, Agana, Guam	9780				
1430-1500		Radio Australia, Melbourne	6060	7205	9580		
1430-1500		Radio Netherland, Hilversum	5955	11735	13770	15560	
			17575				
1430-1500		Radio Prague, Czechoslovakia	9605	11685	13715	15110	
			15155	17705	21505		
1430-1500		Radio Sofia, Bulgaria	7245	9740	11735		
1430-1500		Radio Yugoslavia, Belgrade	7240	15240	15415		
1445-1500		Radio Berlin Int'l, East Germany	11785	15170	15255		
1445-1500	M-A	Radio Ulan Bator, Mongolia	9575	15305			

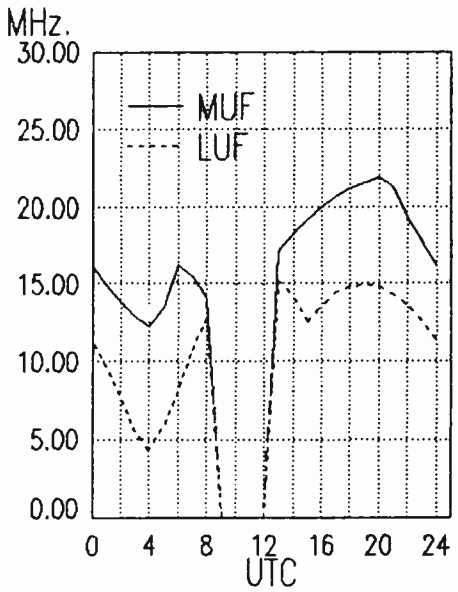
West Coast To
South Africa



West Coast To
East Africa



West Coast To
Central Africa

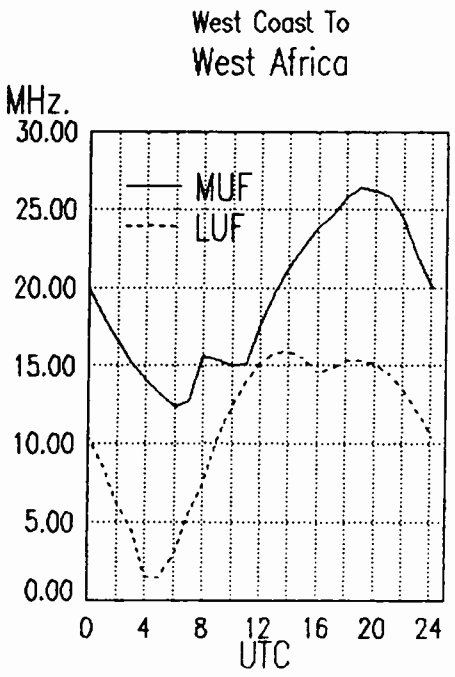


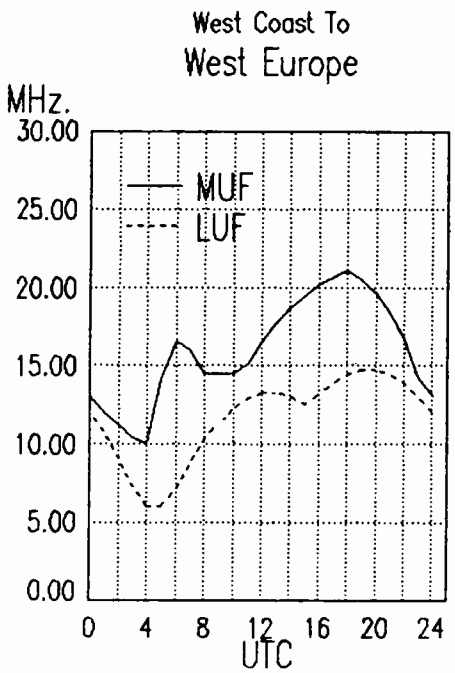
frequency SECTION

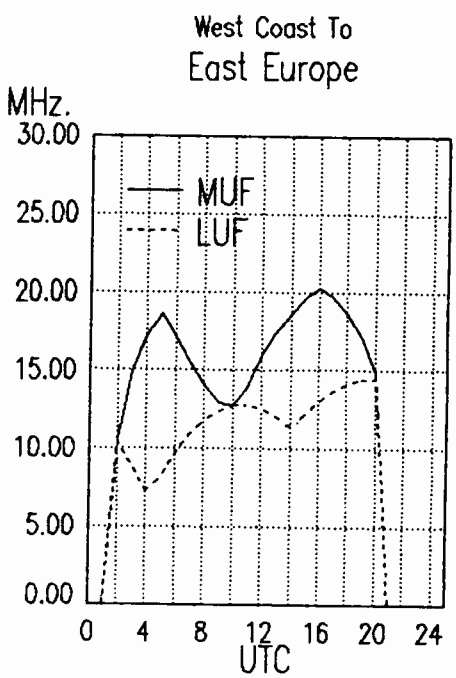
1445-1500		Vatican Radio, Vatican City	6248	7250	9645	11740
			11960	15090	17870	

1500 UTC [11:00 AM EDT/7:00 AM PDT]

1500-1505		Africa No. 1, Gabon	7200	15200		
1500-1510		Vatican Radio, Vatican City	11960	15090	17870	
1500-1515		FEBA, Mahe, Seychelles	15325			
1500-1520		Radio Ulan Bator, Mongolia	9575	15305		
1500-1525		Radio Bucharest, Romania	9510	9690	11775	11940
			15250	15335		
1500-1525		Radio Netherland, Hilversum	5955	11735	13770	15560
			17575			
1500-1530		Radio Berlin Int'l, East Germany	11785	15170	15255	
1500-1530		Radio Sofia Bulgaria	7245	9560	11735	15310
1500-1530	A,S	Radio Tanzania, Dar es Salaam	7165			
1500-1530		Radio Veritas Asia, Philippines	9770	15215		
1500-1545		WYFR, Oakland, California	5950	6175	11830	15170
			15375	17612		
1500-1550		Deutsche Welle, West Germany	7225	9735	17765	15135
			21600			
1500-1550		KTWR, Agana, Guam	9820			
1500-1550		Radio Pyongyang, North Korea	6576	7290	9325	9640
			9977			
1500-1555		Radio Beijing, China	11600	15165		
1500-1600	F	ABC, Alice Springs, Australia	2310 [ML]			
1500-1600		ABC, Perth, Australia	9610			
1500-1600	F	ABC, Tennant Creek, Australia	2325 [ML]			
1500-1600		(US) Armed Forces Radio and TV	9700	15330	15430	
1500-1600		AWR, Alajuela, Costa Rica	15460			
1500-1600		BBC, London, England	5995	6195	7160	9515
			9740	11750	12095	15070
			15260	15400	15420	17705
			17885			
1500-1600		Burma Broadcasting Service	5985			
1500-1600		CBC Northern Quebec Service	9625	11720		
1500-1600		CBN, St. John's, Newfoundland	6160			
1500-1600		CBU, Vancouver, British Colombia	6160			
1500-1600		CFCF, Montreal, Quebec	6005			
1500-1600		CFCN, Calgary, Alberta	6030			
1500-1600		CHNS, Halifax, Nova Scotia	6130			
1500-1600		CKWX, Vancouver, British Colombia	6080			
1500-1600		CFRB, Toronto, Ontario	6070			
1500-1600	S	ELWA, Monrovia, Liberia	11830			
1500-1600		(US) Far East Network, Tokyo	3910			
1500-1600		FEBC, Manila, Philippines	9670			
1500-1600		HCJB, Quito, Ecuador	11740	15115	17890	
1500-1600		King of Hope, Southern Lebanon	6280			
1500-1600		KSDA, Agat, Guam	11980			
1500-1600		KYOI, Saipan	11900			
1500-1600		Radio Australia, Melbourne	5995	6035	6060	6080
			7205	7215	9580	
1500-1600	S	Radio Canada Int'l, Montreal	9555	9625	11720	11915
			11955	15315	15440	17820
1500-1600		Radio Japan, Tokyo	5990	7210	11815	21700
1500-1600		Radio Jordan, Amman	9560			
1500-1600		Radio Moscow, USSR	5905	5920	5980	6020
			6050	6095	6165	7135
			7185	7315	7345	11670
			11705	11840	11900	13790
			15475	15585		
1500-1600		Radio RSA, South Africa	9655	15125	17755	21590
1500-1600		SBC Radio One, Singapore	5010	5052	11940	
1500-1600	S	Superpower KUSW, Utah	9850			
1500-1600		Voice of America, Washington	9000	9760	15205	
1500-1600		Voice of Ethiopia, Addis Ababa	7165	9560		
1500-1600		Voice of Indonesia, Jakarta	11790	15150		
1500-1600		Voice of Kenya, Nairobi	6100			
1500-1600		Voice of Malaysia, Kuala Lumpur	4950			
1500-1600		Voice of Nigeria, Lagos	7255	11770		
1500-1600		WCSN, Boston, Massachusetts	13760			
1500-1600		WHRI, Noblesville, Indiana	15105	21640		
1500-1600		WRNO, New Orleans, Louisiana	11965			
1500-1600		WYFR, Oakland, California	5950	6175	13695	
			15170			
			15375	17612		
1500-1600	M-A	WYFR Satellite Net, California	13695	15375		
1505-1530		Radio Finland, Helsinki	11850	15185		





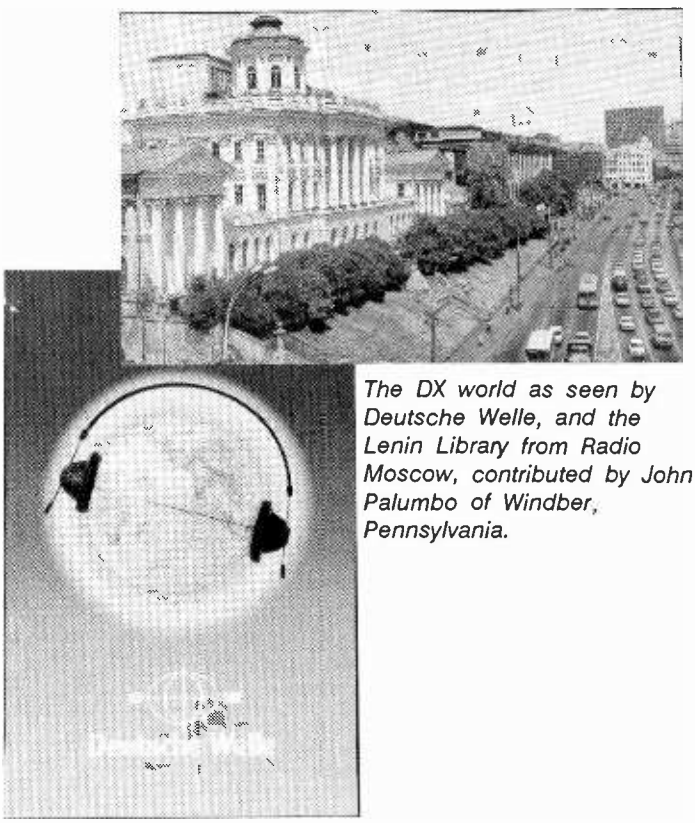


frequency SECTION

1515-1600		Radio Berlin Int'l, East Germany	6115	7295	9730		
1515-1600		FEBA, Mahe, Seychelles	11865	15325			
1530-1545		All India Radio, New Delhi	3905	3925	4860	6160	
			7160	7412	9545	9950	
1530-1555	M-A	BRT, Brussels, Belgium	17595	15510	21810		
1530-1555		Radio Austria Int'l, Vienna	6155	11780	11915		
1530-1600		Radio Prague, Czechoslovakia	6055	7345	9605	11665	
			11685	11990	15110	13715	
			17705	21505			
1530-1600		Radio Tanzania, Dar es Salaam	9684				
1530-1600		Radio Tirana, Albania	9480	11835			
1530-1600		Swiss Radio Int'l, Berne	9885	15430	17830	13685	
1530-1600		Voice of Asia, Taiwan	5980	7445			
1530-1600		Voice of Nigeria, Lagos	15120				
1540-1550	M-A	Voice of Greece, Athens	9855	11645	15630		
1545-1600		Radio Canada Int'l, Montreal	9555	11915	11935	15315	
			15325	17820			
1545-1600		Radio Korea, Seoul, South Korea	7275	9870			
1545-1600		Vatican Radio, Vatican City	11810	15120	17730		
1550-1600	H-S	KTWR, Agana, Guam	9780				

1600 UTC [12:00 PM EDT/9:00 AM PDT]

1600-1610		FEBA, Mahe, Seychelles	11865	15325			
1600-1610		Radio Lesotho, Maseru	4800				
1600-1610		SBC Radio One, Singapore	5010	5052	11940		
1600-1625		Radio Budapest, Hungary	6110	9585	9835	11910	
			15160				
1600-1625		Radio Prague, Czechoslovakia	6055	7345	9605	11665	
			11685	11990	15110	13715	
			15110	17705	21505		
1600-1630		ELWA, Monrovia, Liberia	11830				
1600-1630	S	Radio Norway Int'l, Oslo	9660	11850	11870	15310	
1600-1630		Radio Pakistan, Islamabad	7365	9465	9785	11615	
			11625	15125			
1600-1630		Radio Polonia, Warsaw, Poland	6135	9540			
1600-1630	M-F	Radio Portugal, Lisbon	15245				
1600-1630		Radio Sweden, Stockholm	6065	11855			
1600-1630		SLBC, Colombo, Sri Lanka	6075	9720			
1600-1630		Trans World Radio, Swaziland	5055	9525			
1600-1630		Voice of Asia, Taiwan	5980	7445			
1600-1630		Voice of Vietnam, Hanoi	9840	12020			
1600-1645	H-A	KTWR, Agana, Guam	9820				
1600-1645		Radio Nacional Angola, Luanda	7245	9535	11955		
1600-1645		UAE Radio, United Arab Emirates	11730	15320	17865		
1600-1655		Radio Beijing, China	7295	9570	11715	15130	
1600-1700	F	ABC, Alice Springs, Australia	2310	[ML]			
1600-1700		ABC, Perth, Australia	9610				
1600-1700	F	ABC, Tennant Creek, Australia	2325	[ML]			
1600-1700		(US) Armed Forces Radio and TV	9700	15330	15430		
1600-1700		AWR, Alajuela, Costa Rica	15460				
1600-1700		BBC, London, England	5975	5995	6195	7105	
			7180	9515	9605	9740	
			11705	11820	12095	15070	
			15260	15400	17885		
1600-1700		CBC Northern Quebec Service	9625	11720			
1600-1700		CBN, St. John's, Newfoundland	6160				
1600-1700		CBU, Vancouver, British Colombia	6160				
1600-1700		CFCF, Montreal, Quebec	6005				
1600-1700		CFCN, Calgary, Alberta	6030				
1600-1700		CHNS, Halifax, Nova Scotia	6130				
1600-1700		CKWX, Vancouver, British Colombia	6080				
1600-1700		CFRB, Toronto, Ontario	6070				
1600-1700		(US) Far East Network, Tokyo	3910				
1600-1700		HCJB, Quito, Ecuador	11740	15115	17890		
1600-1700	S	KCBI, Dallas, Texas	11735				
1600-1700		Radio Australia, Melbourne	5995	6035	6060	6080	
			7205	7215	9580		
1600-1700		Radio Beijing, China	15130				
1600-1700		Radio Canada Int'l, Montreal	9625	11720	11955	15440	
			17820				
1600-1700		Radio France Int'l, Paris	6175	9860	11705	11995	
1600-1700		Radio Jordan, Amman	9560				
1600-1700		Radio Korea, Seoul, South Korea	5975	9870			
1600-1700		Radio Malawi, Blantyre	3380	5995			
1600-1700		Radio Moscow, USSR	5905	5920	5980	6020	
			6050	6095	6165	7105	
			7115	7135	7150	7315	
			7345	7440	9565	11670	
			11840				
1600-1700		Radio Riyadh, Saudi Arabia	9705	9720			
1600-1700		Radio Tanzania, Dar es Salaam	9684				
1600-1700		Radio Zambia, Lusaka	9580				
1600-1700	S	Superpower KUSW, Utah	15225				
1600-1700		Voice of America, Washington	9575	9700	9760	15205	
			15410	15445	15580	15600	
			17785	17800	17870		
1600-1700		Voice of Kenya, Nairobi	6100				
1600-1700		Voice of Nigeria, Lagos	7255	15120			
1600-1700		WCSN, Boston, Massachusetts	21640				
1600-1700		WHRI, Noblesville, Indiana	15105	21550			
1600-1700		WRNO, New Orleans, Louisiana	11965				
1600-1700		WYFR, Oakland, California	9535	11830	13695	15170	
			21525				
1600-1700	M-A	WYFR Satellite Net, California	15566				
1602-1700		WINB, Red Lion, Pennsylvania	15295				
1610-1615	M-A	Vatican Radio, Vatican City	6248	7250	9645	11740	
1610-1620	M-F	Radio Botswana, Gaborone	3356	4820			
1610-1625	M-F	FEBA, Agana, Guam	15325				
1610-1650		Deutsche Welle, West Germany	13780	15105	15595	21680	
1630-1645		Trans World Radio, Swaziland	5055	7285	9525		
1630-1655	M-A	BRT Brussels Belgium	17595	21810			
1630-1700	M-A	ELWA, Monrovia, Liberia	11830				
1630-1700		Radio Netherland, Hilversum	6020	15570			
1630-1700		Radio Peace and Progress, USSR	9470	9490	9515	9760	
			9860	11980	12030	12050	
1630-1700		Radio Polonia, Warsaw, Poland	7125	9525	11840		
1630-1700		SLBC, Colombo, Sri Lanka	6075				



The DX world as seen by Deutsche Welle, and the Lenin Library from Radio Moscow, contributed by John Palumbo of Windber, Pennsylvania.

frequency SECTION

1630-1700		Swaziland Commercial Radio	6155				
1630-1700		Voice of Africa, Egypt	15255				
1630-1700	M-A	Voice of Namibia (Angola)	11955				
1640-1650	S	Radio Free Europe, Munich*	5985	7115	9695	9725	
			11895	15355			
1645-1700		BBC, London, England*	6195	7180	9605		
1645-1700		Radio Bujumbura, Burundi	3300				
1645-1700		Trans World Radio, Swaziland	7285	9525			

1700 UTC [1:00 PM EDT/10:00 AM PDT]

1700-1705		Radio Uganda, Kampala	4976	5026			
1700-1715		Kol Israel, Jerusalem	9385	9640	9925	11585	
1700-1715	M-A	Voice of Namibia (Angola)	11955				
1700-1725		Radio Netherland, Hilversum	6020	15570			
1700-1730		Radio Australia, Melbourne	5995	6060	6080	7205	
			9580				
1700-1730		Radio Berlin Int'l, East Germany	6115	7260	9730		
1700-1730		Radio Japan, Tokyo	5990	11815			
1700-1730	S	Radio Norway Int'l, Oslo	9655	15220	15310		
1700-1730		Radio Sweden Int'l, Oslo	6065				
1700-1730		Swiss Radio Int'l, Berne	3985	6165	9535		
1700-1745		BBC, London, England	5975	5995	9515	9740	
			11820	12095	15070	15260	
			15400	17885			
1700-1750		Radio Pyongyang, North Korea	7290	9325	9640	9977	
1700-1755		Radio Beijing, China	7295	9570			
1700-1800	F	ABC, Alice Springs, Australia	2310	[ML]			
1700-1800		ABC, Tennant Creek, Australia	2325	[ML]			
1700-1800		(US) Armed Forces Radio and TV	9700	15330	15430		
1700-1800		AWR Africa, Gabon	9625				
1700-1800		CBC Northern Quebec Service	9625	11720			
1700-1800		CBN, St. John's, Newfoundland	6160				
1700-1800		CBU, Vancouver, British Colombia	6160				
1700-1800		CFCF, Montreal, Quebec	6005				
1700-1800		CFCN, Calgary, Alberta	6030				
1700-1800		CHNS, Halifax, Nova Scotia	6130				
1700-1800		CKWX, Vancouver, British Colombia	6080				
1700-1800		CFRB, Toronto, Ontario	6070				
1700-1800		(US) Far East Network, Tokyo	3910				
1700-1800	A,S	KCBI, Dallas, Texas	11735				
1700-1800		Radio Havana Cuba	11920				
1700-1800		Radio Jordan, Amman	9560				
1700-1800	M-F	Radio Malabo, Equatorial Guinea	9553	[ML]			
1700-1800		Radio Moscow, USSR	11840	13790			
1700-1800		Radio Riyadh, Saudi Arabia	9705	9720			
1700-1800		Radio Tanzania, Dar es Salaam	9684				
1700-1800		Radio Zambia, Lusaka	9580				
1700-1800		RTM Morocco	17815				
1700-1800		SBC Radio One, Singapore	5052	11940			
1700-1800	A,S	Swaziland Commercial Radio	6155				
1700-1800	S	Superpower KUSW, Utah	15225				
1700-1800		Voice of Africa, Egypt	15255				
1700-1800		Voice of America, Washington	6110	9575	9645	11760	
			11920	15410	15445	15580	
			15600	17785	17800	17870	
1700-1800		Voice of Kenya, Nairobi	6100				
1700-1800		Voice of Nigeria, Lagos	11770				
1700-1800		WCSN, Boston, Massachusetts	21640				
1700-1800		WHRI, Noblesville, Indiana	15105				
1700-1800		WINB, Red Lion, Pennsylvania	15295				
1700-1800	S-F	WMLK, Bethel, Pennsylvania	9465				
1700-1800		WRNO, New Orleans, Louisiana	15420				
1700-1800		WYFR, Oakland, California	9535	11580	11830		
			13695				
			15170				
1700-1800		WYFR Satellite Net, California	13760				
1715-1730		Radio Korea, Seoul, South Korea	9870	15575			
1715-1745		BBC, London, England*	3975	6185	7165		
1715-1800		Radio Berlin Int'l, East Germany	9665	15145	15255		
1718-1800		Radio Pakistan, Islamabad	6210	7835			
1725-1740		Radio Suriname Int'l, Paramibo	7835v				
1725-1800		Radio New Zealand, Wellington	11780	15150			
1730-1735		All India Radio, New Delhi	4840	4860	4920	6160	
			7412	9950			
1730-1755		BRT Brussels, Belgium	5910	11695			
1730-1800		KNLS, Anchor Point, Alaska	7355				
1730-1755		Radio Bucharest, Romania	7105	9530	9685	11790	
			11940				
1730-1800		Radio Australia, Melbourne	5995	6035	6060	6080	
			7205	9580			
1730-1800		Radio Berlin Int'l, E. Germany	6115	7260	9730		
1730-1800		Radio Polonia, Warsaw, Poland	6135	9540			
1730-1800		Radio Prague, Czechoslovakia	9605	11685	11695	11990	
			13715	15110			
1730-1800		Radio Sofia, Bulgaria	7245	9560	11735	15310	
1730-1800		Radio Yugoslavia, Belgrade	5980	6100	7240	11735	
1730-1800		RAE, Buenos Aires, Argentina	15345				
1734-1800		FEBA, Mahe, Seychelles	11760				
1745-1800		BBC, London, England	9515	9740	12095	15070	
			15260	15400			
1745-1800		SLBC, Colmbo, Sri Lanka	11800				

1800 UTC [2:00 PM EDT/11:00 AM PDT]

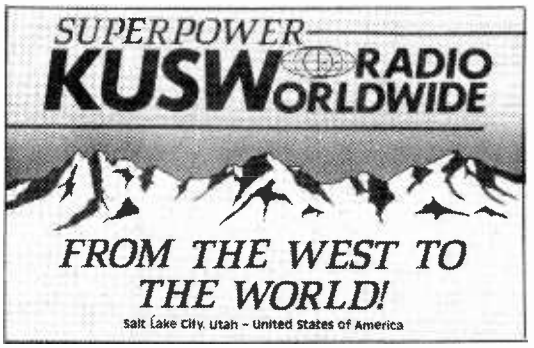
1800-1805	A	SBC Radio One, Singapore	11940				
1800-1815		Radio Cameroon, Yaounde	3970	4750	4795	4850	
			5010				
1800-1815		SLBC, Colombo, Sri Lanka	11800				
1800-1825	A,S	FEBA, Mahe, Seychelles	11760				
1800-1825		Radio Prague, Czechoslovakia	9605	11685	11990	13715	
			15110	21505			
1800-1825		RAE, Buenos Aires, Argentina	15345				
1800-1830		BBC, London, England	9740	11820	12095	15070	
			15400				
1800-1830	S	Radio Bamako, Mali	4835	5995			
1800-1830		Radio Canada Int'l, Montreal	15260	17820			
1800-1830		Radio Mozambique, Maputo	3265	4855	9618		
1800-1830		Radio Prague, Czechoslovakia	5930	7345	13715		
1800-1830		Radio Sofia Bulgaria	7245	7155	9700		
1800-1830		Swiss Radio Int'l, Berne	3985	6165	9535		
1800-1830		Voice of Africa, Egypt	15255				
1800-1830		Voice of Vietnam, Hanoi	9840	12020			
1800-1845		Radio Abidjan, Ivory Coast	7215				
1800-1845		Trans World Radio, Swaziland	9525				
1800-1850		Deutsche Welle, West Germany	11785	13790	15135	17715	
1800-1850		Radio Bras, Brasilia, Brazil	15265				
1800-1856		Radio RSA, South Africa	17880				
1800-1900	F	ABC, Alice Springs, Australia	2310	[ML]			
1800-1900	F	ABC, Tennant Creek, Australia	2325	[ML]			
1800-1900		All India Radio, New Delhi	11935	15360			
1800-1900		(US) Armed Forces Radio and TV	9700	15330	15430		
1800-1900		CBC Northern Quebec Service	9625	11720			
1800-1900		CBN, St. John's, Newfoundland	6160				
1800-1900		CBU, Vancouver, British Colombia	6160				
1800-1900		CFCF, Montreal, Quebec	6005				
1800-1900		CFCN, Calgary, Alberta	6030				
1800-1900		CHNS, Halifax, Nova Scotia	6130				
1800-1900		CKWX, Vancouver, British Colombia	6080				
1800-1900		CFRB, Toronto, Ontario	6070				
1800-1900		(US) Far East Network, Tokyo	3910				
1800-1900	A,S	KCBI, Dallas, Texas	11735				
1800-1900		KNLS, Anchor Point, Alaska	7355				
1800-1900		Radio Australia, Melbourne	5995	6035	6060	6080	
			7205	7215	9580		
1800-1900		Radio Jamahiriya, Libya	15450				
1800-1900		Radio Korea, Seoul, South Korea	15575				
1800-1900		Radio Kuwait, Kuwait	11665				
1800-1900	M-F	Radio Malabo, Equatorial Guinea	9553	[ML]			
1800-1900		Radio Moscow, USSR	11840	12060			
1800-1900		Radio New Zealand, Wellington	11780	15150			
1800-1900		Radio Riyadh, Saudi Arabia	9705	9720			
1800-1900		Radio Tanzania, Dar es Salaam	9684				
1800-1900		Radio Zambia, Lusaka	9580				
1800-1900	M-A	Superpower KUSW, Utah	15225				
1800-1900	A,S	Swaziland Commercial Radio	6155				

frequency SECTION

1800-1900		Voice of America, Washington	9700	9760	11760	15410	
			15445	15580	15600	17785	
			17800	17870	21485		
1800-1900		Voice of Kenya, Nairobi	6100				
1800-1900		Voice of Nigeria, Lagos	11770	15120			
1800-1900		WCSN, Boston, Massachusetts	15390				
1800-1900		WHRI, Noblesville, Indiana	13760	17830			
1800-1900		WINB, Red Lion, Pennsylvania	15295				
1800-1900	S-F	WMLK, Bethel, Pennsylvania	9465				
1800-1900		WRNO, New Orleans, Louisiana	15420				
1800-1900		WYFR, Oakland, California	11580	15170			
1800-1900		WYFR Satellite Net, California	11830	13695			
1815-1900		Radio Bangladesh, Dhaka	6240	7505			
1830-1855		Radio Austria Int'l, Vienna	5945	6155	11825	12015	
1830-1855		BRT, Brussels, Belgium	5910	9860	11695		
1800-1855		Radio Polonia, Warsaw, Poland	5995	6135	7125	7285	
			9525	11840			
1830-1900		BBC, London, England	12095	15070	15400		
1830-1900		Radio Budapest, Hungary	6110	7220	9585	9835	
			11910	15160			
1830-1900	A,S	Radio Canada Int'l, Montreal	15260	17820			
1830-1900		Radio Finland, Helsinki	6120	9550	11755	15185	
1830-1900		Radio Havana Cuba	15155				
1830-1900		Radio Kuwait	11665				
1830-1900	MWF	Radio Mozambique, Maputo	3265	4855	9618		
1830-1900		Radio Netherland, Hilversum	6020	15175	17605	21685	
1830-1900		Radio Sofia Bulgaria	9700	11720			
1830-1900		Radio Sweden, Stockholm	15240				
1830-1900		Spanish Foreign Radio, Madrid	7275	9765	11840	15375	
1830-1900		Voice of Islamic Republic Iran	9695				
1830-1900		WINB, Red Lion, Pennsylvania	15185				
1840-1850	M-A	Voice of Greece, Athens	11645	12045	15630		
1840-1900		Radio Senegal, Dakar	4950				
1845-1855		Radio Nacional, Conaky, Guinea	4833	4900	7125		
1845-1900		All India Radio, New Delhi	7412	11620			
1855-1900		Africa No. 1, Gabon	4830	15475			

1900 UTC [3:00 PM EDT/12:00 PM PDT]

1900-1903		Africa No. 1, Gabon	15475				
1900-1915		Radio Bangladesh, Dhaka	6240	7505			
1900-1915		Radio Tanzania, Dar es Salaam	9684				
1900-1925		Radio Netherland, Hilversum	6020	15175	17605	21685	
1900-1925		Voice of Islamic Republic Iran	9695				
1900-1930	F	ABC, Alice Springs, Australia	2310	[ML]			
1900-1930	F	ABC, Tennant Creek, Australia	2325	[ML]			
1900-1930		Kol Israel, Jerusalem	11605	15485			
1900-1930		Radio Afghanistan, Kabul	7160	9640			
1900-1930		Radio Berlin Int'l, East Germany	9665	11920	15255		
1900-1930		Radio Japan, Tokyo	9505				
1900-1930		Radio Kiev, Ukraine, USSR	6010	6090	6165	7170	
1900-1930	S	Radio Norway Int'l, Oslo	9590	15220	15310		
1900-1930	M-F	Radio Portugal, Lisbon	11870	15250			
1900-1930		Radio Sofia, Bulgaria	7245	9560	11735	15310	
1900-1930		Radio Yugoslavia, Belgrade	5980	7240	9620		
1900-1930		Spanish Foreign Radio, Madrid	7275	9765	11840	15375	
1900-1930		Voice of Vietnam, Hanoi	9840	12020			
1900-1955		Radio Beijing, China	6860	9470			
1900-2000		All India Radio, New Delhi	7412	11620	11935	15360	
1900-2000		(US) Armed Forces Radio and TV	9700	15330	15430		
1900-2000		BBC, London, England	6180	9410	9740	11820	
			12095	15070			
1900-2000		CBC Northern Quebec Service	9625	11720			
1900-2000		CBN, St. John's, Newfoundland	6160				
1900-2000		CBU, Vancouver, British Colombia	6160				
1900-2000		CFCF, Montreal, Quebec	6005				
1900-2000		CFCN, Calgary, Alberta	6030				
1900-2000		CHNS, Halifax, Nova Scotia	6130				
1900-2000		CKWX, Vancouver, British Colombia	6080				
1900-2000		CFRB, Toronto, Ontario	6070				
1900-2000		(US) Far East Network, Tokyo	3910				
1900-2000		HCJB, Quito, Ecuador	11790	15270	17790		
1900-2000	A,S	KCBI, Dallas, Texas	11735				



KUSW QSL's have been contributed by Bob Doyle of Shelton, CT, John Florence, program director for KUSW (along with times and frequencies - Thanks), Radio Danny of Providence, RI, and E.E. Patterson of Evergreen Park, IL.-- Obviously a popular station!

1900-2000		KNLS, Anchor Point, Alaska	7355				
1900-2000		KYOI, Saipan	9495				
1900-2000		Radio Algiers, Algeria	9509	9685	15215	17745	
1900-2000		Radio Australia, Melbourne	6035	6060	6080	7205	
			7215	9580			
1900-2000		Radio Ghana, Accra	6130				
1900-2000		Radio Havana Cuba	15155				
1900-2000		Radio Kuwait, Kuwait	11665				
1900-2000	M-A	Radio Malabo, Equatorial Guinea	9553	[ML]			
1900-2000		Radio Moscow, USSR	9735	11840	12060		
1900-2000		Radio New Zealand, Wellington	11780	15150			
1900-2000		Radio Prague, Czechoslovakia	5930	7345			
1900-2000		Radio Riyadh, Saudi Arabia	9705	9720			
1900-2000		Radio Zambia, Lusaka	9580				
1900-2000	M-A	Superpower KUSW, Utah	15400				
1900-2000	A,S	Swaziland Commercial Radio	6155				
1900-2000		Trans World Radio Swaziland	3205				
1900-2000		Voice of America, Washington	9760	11760	15410	15445	
			15580	15600	17785	17800	
			17870				
1900-2000		Voice of Ethiopia, Addis Ababa	9595				
1900-2000		Voice of Kenya, Nairobi	6100				
1900-2000		Voice of Nigeria, Lagos	7255	11770			
1900-2000		WCSN, Boston, Massachusetts	15390				
1900-2000		WHRI, Noblesville, Indiana	13760	17830			
1900-2000		WINB, Red Lion, Pennsylvania	15295				
1900-2000	S-F	WMLK, Bethel, Pennsylvania	9465				
1900-2000		WRNO, New Orleans, Louisiana	15420				
1900-2000		WYFR, Oakland, California	11830	13695	15170	21615	
1900-2000	M-A	WYFR Satellite Net, California	15375	15440			
1910-1920		Radio Botswana, Gaborone	3356	4820			
1920-1930	M-A	Voice of Greece, Athens	7430	9425	11645		
1930-1940		Radio Togo, Lome	5047				
1930-2000		ABC, Katherine, Australia	2485				
1930-2000		Radio Beijing, China	6955	7480	9440		
1930-2000		Radio Bucharest, Romania	5990	6105	7145	7195	
1930-2000	M-F	Radio Canada Int'l, Montreal	5995	7235	11945	15325	
			17875				
1930-2000		Voice of Republic of Iran	9022	9770			
1935-1955		RAI, Rome, Italy	7275	7290	9575		
1940-2000	M-A	Radio Ulan Bator, Mongolia	9575	11870			
1945-2000		All India Radio, New Delhi	9755	11860			

2000 UTC [4:00 PM EDT/1:00 PM PDT]

2000-2005	S-F	Port Moresby, Papua New Guinea	3295	4890	5960	5985	
			6020	6040	6080	6140	
			9520				
2000-2005		Radio Zambia, Lusaka	3345	6165			
2000-2005	M-A	Vatican Radio, Vatican City	6190	6248	7250	9625	

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			9645 11700 15120
2000-2010	A	Radio Zambia, Lusaka	3345 6165
2000-2010		Voice of Kenya, Nairobi	6100
2000-2015		Radio Togo, Lome	3220 5047
2000-2015	M-A	Radio Ulan Bator, Mongolia	9575 11870
2000-2015		Trans World Radio, Swaziland	3205
2000-2025		Radio Beijing, China	6955 7480 9440
2000-2025		Radio Bucharest, Romania	5990 6105 7145 7195
2000-2030		KNLS, Anchor Point, Alaska	7355
2000-2030		Radio Australia, Melbourne	6035 7205 7215 9580 9620
2000-2030		Radio Budapest, Hungary	6110 7220 9585 9835 11910 15160
2000-2030		Radio Canada Int'l, Montreal	9555 6030 11945 15325 17820 17875
2000-2030		Radio Ghana, Nairobi	3366 4915
2000-2030		Radio Norway International, Oslo	9590 15310
2000-2030		Radio Polonia, Warsaw, Poland	7125 7145 9525
2000-2030		Swaziland Commercial Radio	6155
2000-2030		Voice of Nigeria, Lagos	7255
2000-2030		Voice of Republic of Iran	9022 9770
2000-2045		All India Radio, New Delhi	7412 9755 9910 11620 11860
2000-2045		WYFR, Oakland, California	11830 13695 15170 15375 15440 17750 21525
2000-2050		Radio Pyongyang, North Korea	6576 9345 9640 9977
2000-2056		Radio RSA, South Africa	7270 11900 15252
2000-2100	M-A	ABC, Alice Springs, Australia	2310 [ML]
2000-2100		ABC, Katherine, Australia	2485
2000-2100	M-A	ABC, Tennant Creek, Australia	2325 [ML]
2000-2100		(US) Armed Forces Radio and TV	15330
2000-2100		BBC, London, England	12095 15070 15260 15400 17760
2000-2100		CBN, St. John's, Newfoundland	6160
2000-2100		CBU, Vancouver, British Colombia	6160
2000-2100		CFCF, Montreal, Quebec	6005
2000-2100		CFCN, Calgary, Alberta	6030
2000-2100		CHNS, Halifax, Nova Scotia	6130
2000-2100		CKWX, Vancouver, British Colombia	6080
2000-2100		CFRB, Toronto, Ontario	6070
2000-2100		(US) Far East Network, Tokyo	3910
2000-2100		Radio Kuwait, Kuwait	11665
2000-2100		King of Hope, Southern Lebanon	6280
2000-2100		KVOH, Rancho Simi, California	17775
2000-2100		KYOI, Saipan	9495
2000-2100		Radio Baghdad, Iraq	9875
2000-2100	M-F	Radio Malabo, Equatorial Guinea	9553
2000-2100		Radio Moscow, USSR	9735 11840 12010
2000-2100		Radio New Zealand, Wellington	11780 15150
2000-2100		Radio Riyadh, Saudi Arabia	9705 9720
2000-2100		Radio Zambia, Lusaka	9580
2000-2100		Superpower KUSW, Utah	15400
2000-2100		Voice of America, Washington	9760 11760 15600
2000-2100		Voice of Turkey, Ankara	9825
2000-2100		Voice of Nigeria, Lagos	11770
2000-2100		WCSN, Boston, Massachusetts	15390
2000-2100		WHRI, Noblesville, Indiana	13760 17830
2000-2100		WRNO, New Orleans, Louisiana	15420
2003-2100		WINB, Red Lion, Pennsylvania	15295
2005-2100		Radio Damascus, Syria	11900 12085
2010-2100	A,S	Voice of Kenya, Nairobi	6100
2015-2100		ELWA, Monrovia, Liberia	11830
2015-2100		Radio Cairo, Egypt	9670
2025-2045		RAI, Rome, Italy	7235 9575 9710
2030-2055		Radio Polonia, Warsaw, Poland	6095 7285
2030-2100		Radio Australia, Melbourne	9580 9620
2030-2100		Radio Beijing, China	6955 7480 9440 9745 11790
2030-2100	A,S	Radio Canada Int'l, Montreal	6030 9555 11945 15325 17820 17875
2030-2100		Radio Korea, Seoul, South Korea	13670
2030-2100		Radio Netherland, Hilversum	15560
2030-2100	M-F	Radio Portugal, Lisbon	7155 9740
2030-2100		Radio Sofia Bulgaria	7115 7155 9700
2030-2100		Radio Tirana, Albania	9480 11835
2030-2100		Voice of Africa, Cairo, Egypt	15375
2030-2100		Voice of Vietnam, Hanoi	9840 12020
2030-2100		Spanish Foreign Radio, Madrid	7275 9765
2040-2100		Radio Havana Cuba	15230 15300
2045-2100		All India Radio, New Delhi	7412 9550 9910 11620 11715
2045-2100		IBRA Radio, Malta	6100
2045-2100		Radio Berlin Int'l, East Germany	5965 6125
2045-2100		Vatican Radio, Vatican City	9625 11700 11760 15120
2045-2100		WYFR, Oakland, California	11830 13695 15170 15566 17612 17845
2050-2100		Vatican Radio, Vatican City	6190 7250 9645

2100 UTC [5:00 PM EDT/2:00 PM PDT]

2100-2105		Radio Damascus, Syria	11900 12085
2100-2105		Radio Zambia, Lusaka	3345 6165
2100-2110		Vatican Radio, Vatican City	6190 7250 9645
2100-2110	A,S	Voice of Kenya, Nairobi	6100
2100-2125		BRT Brussels, Belgium	5910 9925
2100-2115		IBRA Radio, Malta	6100
2100-2125		Radio Austria Int'l, Vienna	5945 6155 9585 9870
2100-2125		Radio Beijing, China	6955 7480 9440 9745 11790
2100-2125		Radio Bucharest, Romania	5990 6105 7145 7195
2100-2125		Radio Netherland, Hilversum	9540 9715 9895 15560
2100-2130		Radio Berlin Int'l, East Germany	5965 6125
2100-2130	T,F	Radio Budapest, Hungary	6110 9585 9835 11910 15160
2100-2130		Radio Japan, Tokyo	5965 7140 7280 17835
2100-2130		Radio Korea, Seoul, South Korea	13670
2100-2130		Radio Moscow, USSR	9490 9620 9865 11675 11840
2100-2130		Radio Sweden, Stockholm	6065 11845
2100-2130		Swiss Radio Int'l, Berne	9885 12035 15570
2100-2135		ELWA, Monrovia, Liberia	11830
2100-2140		Radio Havana Cuba	15230 15300 15340
2100-2145		Radio Cairo, Egypt	9670
2100-2150		Deutsche Welle, West Germany	9650
2100-2150		Radio Baghdad, Iraq	9770
2100-2155		Radio Beijing, China	6860 9470 9860
2100-2200	M-A	ABC, Alice Springs, Australia	2310 [ML]
2100-2200		ABC, Katherine, Australia	2485
2100-2200	M-A	ABC, Tennant Creek, Australia	2325 [ML]
2100-2200		All India Radio, New Delhi	9550 9910 11715
2100-2200		(US) Armed Forces Radio and TV	15330 15345 15430
2100-2200		BBC, London, England	3995 5975 6005 6175 6180 7325 9410 12095 15070 15260 17760
2100-2200		CBC Northern Quebec Service	9625 11720
2100-2200		CBN, St. John's, Newfoundland	6160
2100-2200		CBU, Vancouver, British Colombia	6160
2100-2200		CFCF, Montreal, Quebec	6005
2100-2200		CFCN, Calgary, Alberta	6030
2100-2200		CHNS, Halifax, Nova Scotia	6130
2100-2200		CKWX, Vancouver, British Colombia	6080
2100-2200		CFRB, Toronto, Ontario	6070
2100-2200		(US) Far East Network, Tokyo	3910
2100-2200		King of Hope, Southern Lebanon	6280
2100-2200		KSDA, Agat, Guam	11965
2100-2200	M-A	KUSW, Salt Lake City, Utah	17715
2100-2200		KVOH, Rancho Simi, California	17775
2100-2200	A,S	Radio Malabo, Equatorial Guinea	9552.5
2100-2200	A,S	Radio Zambia, Lusaka	9580
2100-2200		Voice of Africa, Cairo, Egypt	15375
2100-2200		Voice of America, Washington	6040 6045 9760 11760 15410 15445 15580 17785 17800 17870
2100-2200		Voice of Nigeria, Lagos	15120
2100-2200		WCSN, Boston, Massachusetts	15390
2100-2200		WHRI, Noblesville, Indiana	9770 17830
2100-2200		WINB, Red Lion, Pennsylvania	15185

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2100-2200		WRNO, New Orleans, Louisiana	13760
2100-2200		WYFR, Oakland, California	9852.5 15170 17845
2100-2200		WYFR Satellite Net, California	13695 15375
2110-2200		Radio Damascus, Syria	117651 11900
2115-2200		BBC, London, England	3995 5975 6005 6175 6180 7325 9410 9915 12095 15070 15260
2115-2130		Radio Yugoslavia, Belgrade	5980 7240 9620
2125-2155	S	Radio Austria Int'l, Vienna	5945 6155 7205 9655
2130-2145		BBC, London, England*	5965 7160
2130-2200		BBC, London, England*	6030 7230 9635
2130-2200		HCJB, Quito, Ecuador	15270 17790
2130-2200		Kol Israel, Jerusalem	9435 9815 11605
2130-2200		Radio Canada Int'l, Montreal	11880 15150 17820
2130-2200		Radio Finland, Helsinki	6120 111745 11755 15400
2130-2200		Radio Sofia, Bulgaria	9700 11720
2130-2200		Radio Tirana, Albania	9480
2130-2200		Radio Vilnius, Lithuanian SSR	6100
2130-2200		Swiss Radio Int'l, Berne	6190
2135-2150	S-F	ELWA, Monrovia, Liberia	11830
2150-2200	M-F	ELWA, Monrovia, Liberia	11830

2200 UTC [5:00 PM EDT/3:00 PM PDT]

2200-2205	M-F	ELWA, Monrovia, Liberia	3993 11830
200-2210	M-H	Port Moresby, Papua New Guinea	3925 4890 5960 5985 6020 6040 6080 6140 9520
2200-2210		Radio Sierra Leone, Freetown	5980
2200-2215	M-A	ABC, Alice Springs, Australia	2310 [ML]
2200-2215	M-A	ABC, Tennant Creek, Australia	2325 [ML]
2200-2215		BBC, London, England*	5965 7160
2200-2215	M-F	Voice of America, Washington	9640 11740 15120
2200-2225		BRT, Brussels, Belgium	5910
2200-2225		RAI, Rome, Italy	5990 9710 11800
2200-2225		Vatican Radio, Vatican City	6015 9615 11830
2200-2230		ABC, Katherine, Australia	2485
2200-2230		All India Radio, New Delhi	9550 9910 11620 11715
2200-2230		CBC Northern Quebec Service	9625 11720
2200-2230	S	KGEI, San Francisco, California	15280
2200-2230	M-A	KUSW, Salt Lake City, Utah	15580
2200-2230	S	Radio Norway Int'l, Oslo	15165 15180
2200-2230		Radio Prague, Czechoslovakia	6055
2200-2230		Radio Sofia, Bulgaria	9700 11950
2200-2230		Radio Vilnius, Lithusanian SSR	7165 7400 11790 13645 15180
2200-2245		Radio Berlin Int'l, E. Germany	5965 9730 11965
2200-2245		WINB, Red Lion, Pennsylvania	15185
2200-2245		WYFR, Oakland, California	9505 11830 13695 15375 21525
2200-2250		Voice of Turkey, Ankara	7135 7160 9445 17760
2200-2255		RAE, Buenos Aires, Argnetina	6060 9690 11710
2200-2300		(US) Armed Forces Radio and TV	6030 15345 15430
2200-2300		BBC, London, England	5975 6005 6175 6180 7325 9410 9590 9915 12095 15070 15260
2200-2300		CBN, St. John's, Newfoundland	6160
2200-2300		CBU, Vancouver, British Colombia	6160
2200-2300		CFCF, Montreal, Quebec	6005
2200-2300		CFCN, Calgary, Alberta	6030
2200-2300		CHNS, Halifax, Nova Scotia	6130
2200-2300		CKWX, Vancouver, British Colombia	6080
2200-2300		CFRB, Toronto, Ontario	6070
2200-2300		(US) Far East Network, Tokyo	3910
2200-2300		King of Hope, Southern Lebanon	6280
2200-2300		KVOH, Rancho Simi, California	17775
2200-2300		Radio Australia, Melbourne	15160 15240 15320 15395 17795
2200-2300	M-F	Radio Canada Int'l, Montreal	5960 9755
2200-2300		Radio For Peace, Costa Rica	13660
2200-2300		Radio Havana Cuba	7140
2200-2300		Radio Moscow, USSR	6130 9490 9610 9640 9665 9765 11710
2200-2300		SBC Radio One, Singapore	5010 5052 11940
2200-2300		Voice of America, Washington	15120 15185 15290 15305 15320 17740
2200-2300		WCSN, Boston, Massachusetts	15300
2200-2300		WHRI, Noblesville, Indiana	9770 17830
2200-2300		WRNO, New Orleans, Louisiana	13760
2215-2230		BBC, London, England*	11820 15390
2230-2300	A,S	CBC Northern Quebec Service	9625 11720
2230-2300		Radio Beijing, China	3985 6165
2230-2300		Radio Jamahiriya, Libya	11815 15450
2230-2300		Radio Mediterran, Malta	6110
2230-2300		Radio Polonia, Warsaw, Poland	5995 6135 7125 7270
2230-2300		Radio Tirana, Albania	7215 9480
2245-2300		All India Radio, New Delhi	6055 7215 9535 9910 11715 11745
2248-2300		WINB, Red Lion, Pennsylvania	15145

2300 UTC [7:00 PM EDT/4:00 PM PDT]

2300-2315		BBC, London, England	5975 6005 6175 6195 7325 9410 9515 9590 9915 12095 15070
2300-2330		Kol Israel, Jerusalem	9435 11695 12080
2300-2330		Radio Canada Int'l, Montreal	9755 11730
2300-2330		Radio Mediterran, Malta	6110
2300-2330		Radio Polonia, Warsaw	5995 6135 7125 7270
2300-2330		Radio Sofia, Bulgaria	9700 11950
2300-2330		Radio Sweden, Stockholm	9695 11705
2300-2345		Radio Berlin Int'l, East Germany	9730
2300-2345		WINB, Red Lion, Pennsylvania	15145
2300-0000		All India Radio, New Delhi	6055 7215 9535 9910 11715 11745
2300-0000		(US) Armed Forces Radio and TV	6030 15345
2300-0000		CBC Northern Quebec Service	9625 11720
2300-0000		CBN, St. John's, Newfoundland	6160
2300-0000		CBU, Vancouver, British Colombia	6160
2300-0000		CFCF, Montreal, Quebec	6005
2300-0000		CFCN, Calgary, Alberta	6030
2300-0000		CHNS, Halifax, Nova Scotia	6130
2300-0000		CKWX, Vancouver, British Colombia	6080
2300-0000		CFRB, Toronto, Ontario	6070
2300-0000		(US) Far East Network, Tokyo	3910
2300-0000	M-A	KUSW, Salt Lake City, Utah	15580
2300-0000		KVOH, Rancho Simi, California	17775
2300-0000		Radio Australia, Melbourne	15160 15240 15320 15395 17795
2300-0000		Radio for Peace, Costa Rica	13660
2300-0000		Radio Jamahiriya, Libya	11815 15450
2300-0000		Radio Japan, Tokyo	7280 11800 15195 15280 15300
2300-0000		Radio Moscow, USSR	9765 9865 11750 11780 15475
2300-0000		Radio Thailand, Bangkok	9655 11905
2300-0000		WCSN, Boston, Massachusetts	15300
2300-0000		WHRI, Noblesville, Indiana	9770 17830
2300-0000		WRNO, New Orleans, Louisiana	13760
2300-0000		WYFR, Oakland, California	5950 9505 9858
2315-2330		BBC, London, England*	11820 15390
2315-0000		BBC, London, England	5975 6005 6175 7325 9515 9590 9915 11955 15435
2320-2325	M-A	Radio Prague, Czechoslovakia	6055 9630
2330-2355	M-A	BRT, Brussels, Belgium	9925 11695
2330-0000	M-A	Radio Budapest, Hungary	6110 9520 9585 9835 11910 15160
2330-0000	M-F	Radio Canada Int'l, Montreal	5960 9755
2330-0000		Radio Korea, Seoul	15575
2330-0000		Radio Tirana, Albania	6200 7065 9760v
2330-0000		Voice of Vietnam, Hanoi	9840 12020
2335-2345	M-A	Voice of Greece, Athens	9395 11645
2345-0000		BBC, London, England*	3915 6080 7180 9580
2348-0000		WINB, Red Lion, Pennsylvania	15145

Send us your special QSLs and we'll copy and return them promptly, to be used as space permits (QSL editor, PO Box 98, Brasstown, NC 28902).

Day to Day Shortwave

How to Use This Section

Day to Day Shortwave is your daily guide to the programs being broadcast on the international bands. Wherever possible, actual advance program details for the listed stations are included. To use this section, simply look up the day on which you are listening, check the time, and decide which program interests you. Then go to the frequency section in order to locate the frequency of the station/program on the dial.

All days are in *UTC*. Keep in mind that the new UTC day begins at 0000 UTC. Therefore, if you are listening to the shortwave at 7:01 PM [EST] on your local Thursday night, that's equal to 0001 UTC and therefore *Friday* UTC.

We invite readers to submit information and reviews about their favorite programs. These must be in UTC day and time and can be sent to program manager Kannon Shanmugam.

We also invite broadcast stations to submit advance program details for publication in *Monitoring Times*. Copy deadline is the 1st of the month preceding publication (details for programs to be broadcast in July must be received by Kannon before June 1. Information can be FAXed via 1-704-837-6416 and must include the following information at the top of the first page: To: Monitoring Times, Brasstown, North Carolina. Phone: 1-704-837-9200.

Program Manager:
Kannon Shanmugam
4227 Wimbledon Drive
Lawrence, KS 66046

Sunday

0000 BBC: World News
0009 BBC: News about Britain
0015 BBC: Radio Newsreel
0030 BBC: Great British Concert Halls
0100 BBC: News Summary
0100 Radio Japan: News
0101 BBC: Play of the Week
0115 Radio Japan: One in a Hundred Million
0200 BBC: World News
0202 Radio Cairo: Egyptian Music
0205 Radio Cairo: Do You Know?
0209 BBC: The Sunday Papers- -Of interest to expatriates; limited appeal.
0215 Radio Cairo: News
0225 Radio Cairo: Alternative Point of View
0230 BBC: The Ken Bruce Show (music mix and entertainment news)
0230 Radio Netherlands: World News
0235 Radio Cairo: Life in Egypt
0235 Radio Netherlands: Newsline
0245 Radio Cairo: Listeners' Mail
0250 Radio Netherlands: Over to You! (letters)
0300 BBC: World News
0300 Radio Japan: News
0309 BBC: News about Britain
0315 BBC: From Our Own Correspondent- -In-depth news stories similar to "Radio Newsreel," with some real gems.
0315 Radio Cairo: News
0315 Radio Japan: One in a Hundred Million
0400 BBC: Newsdesk
0430 BBC: Music Feature
0445 BBC: Reflections (religion)
0450 BBC: Financial Review
0500 BBC: World News
0509 BBC: Twenty-four Hours (news magazine)
0530 BBC: Big Bands--The Singers
0530 Radio Netherlands: World News
0535 Radio Netherlands: Newsline
0550 Radio Netherlands: Over to You! (letters)
0600 BBC: Newsdesk
0630 BBC: Jazz for the Asking
0700 BBC: World News
0709 BBC: Twenty-four Hours (news magazine)
0730 BBC: From Our Own Correspondent- (see Sun 0315)
0745 BBC: Book Choice
0750 BBC: Waveguide (SW radio)
0800 BBC: World News
0800 KNLS: Country Music
0809 BBC: Reflections (religion)
0815 BBC: The Pleasure's Yours (classical music requests
0815 KNLS: Let's Talk
0830 KNLS: American Music Spotlight
0900 BBC: World News
0909 BBC: The Sunday Papers-(see 0209)
0915 BBC: Science in Action
1000 BBC: News Summary
1001 BBC: Short Story
1100 BBC: World News
1100 Radio Japan: News
1109 BBC: News About Britain
1115 BBC: From Our Own Correspondent- (see Sun 0315)
1116 Radio Japan: Commentary
1121 Radio Japan: Hullo America
1130 BBC: Great British Concert Halls
1145 Radio Japan: Meet the People
1200 BBC: News Summary
1201 BBC: Play of the Week
1300 BBC: World News
1309 BBC: Twenty-four Hours (news magazine)
1330 BBC: Sports Roundup
1345 BBC: The Tony Myatt Request Show
1400 BBC: News Summary
1500 BBC: Radio Newsreel
1500 KNLS: Faith for Today
1515 BBC: Concert Hall
1515 KNLS: Bible Reading
1530 KNLS: Swingin' Years
1600 BBC: World News
1600 KNLS: Country Music
1609 BBC: Commentary
1615 BBC: From Coca to Cocaine
1615 KNLS: Let's Talk
1630 KNLS: American Music Spotlight
1645 BBC: Letter From America
1700 BBC: World News
1709 BBC: Reflections (religion)
1715 BBC: Jazz for the Asking
1745 BBC: Sports Roundup
1800 BBC: Newsdesk
1800 KNLS: Faith for Today
1815 KNLS: Bible Reading
1830 BBC: Brain of Britain (quiz show)
1830 KNLS: Swingin' Years
1830 Radio Netherlands: Happy Station (music and letters)
1900 BBC: News Summary
1901 BBC: Classical Record Review
2000 BBC: World News
2009 BBC: Twenty-four Hours (news magazine)
2030 BBC: Sunday Half-hour (religious feature)
2030 Radio Netherlands: Happy Station (music and letters)
2100 BBC: News Summary
2101 BBC: Short Story
2115 BBC: The Pleasure's Yours (classical music requests)
2200 BBC: World News
2225 BBC: Book Choice
2230 BBC: Financial Review
2240 BBC: Reflections (religion)
2245 BBC: Sports Roundup
2300 BBC: World News
2300 Radio Japan: News
2309 BBC: Commentary
2315 BBC: Letter From America
2316 Radio Japan: Commentary
2321 Radio Japan: Hullo from Tokyo
2330 BBC: Feature
2345 Radio Japan: Meet the People

Monday

0000 BBC: World News
0009 BBC: News About Britain

Your Guide to Shortwave Listening in June

0015 BBC: Radio Newsreel
0030 BBC: Religious Service
0100 BBC: News Summary
0100 Radio Japan: News
0101 BBC: Drama Feature
0115 Radio Japan: Japan Travelogue
0145 BBC: A Schubert Anthology
0200 BBC: World News
0200 Radio Cairo: Egyptian Music
0205 Radio Cairo: Egyptian Products
0209 BBC: Commentary
0215 BBC: Peebles' Choice (music)
0215 Radio Cairo: News
0225 Radio Cairo: Letter From Egypt
0230 BBC: Science in Action
0230 Radio Netherlands: Happy Station (music and letters)
0235 Radio Cairo: Quiz of the Month
0245 Radio Cairo: Egyptian Song
0250 Radio Cairo: Cultural Life in Egypt
0300 BBC: World News
0300 Radio Cairo: Between Egypt and America
0300 Radio Japan: News
0309 BBC: News About Britain
0310 Radio Cairo: Egyptian Song
0315 BBC: Good Books--Very nice, detailed opinions on books. Highly recommended.
0315 Radio Cairo: News
0315 RadioJapan: Japan Travelogue
0330 BBC: Anything Goes
0400 BBC: Newsdesk
0430 BBC: Behind the Wall
0445 BBC: Reflections (religion)
0450 BBC: Waveguide (SW radio)
0500 BBC: World News
0509 BBC: Twenty-four Hours (news magazine)
0530 BBC: Nature Notebook
0530 Radio Netherlands: Happy Station (music and letters)
0545 BBC: Recording of the Week
0600 BBC: Newsdesk
0700 BBC: World News
0709 BBC: Twenty-four Hours (news magazine)
0730 BBC: From Coca to Cocaine
0800 BBC: World News
0800 KNLS: American Magazine
0809 BBC: Reflections (religion)
0815 BBC: Behind the Wall (book journey through China)
0815 KNLS: World Radio Broadcast
0830 BBC: Anything Goes (odd record-ings)
0830 KNLS: Jazz "E"
0900 BBC: World News
0909 BBC: British Press Review
0915 BBC: Good Books-(see Mon 0315)
0930 BBC: Financial News
0945 BBC: Peebles' Choice
1000 BBC: News Summary
1030 BBC: The Vintage Chart Show
1100 BBC: World News
1100 Radio Japan: News
1109 BBC: News About Britain
1116 Radio Japan: Commentary
1126 Radio Japan: Tokyo Pop-in
1130 Radio Japan: Japan Travelogue
1130 BBC: The Ken Bruce show (music mix with entertainment news)
1145 Radio Japan: Crosscurrents (topical discussion)
1200 BBC: Radio Newsreel
1215 BBC: Brain of Britain 1988 (quiz show)
1245 BBC: Sports Roundup
1300 BBC: World News
1309 BBC: Twenty-four Hours (news magazine)
1330 BBC: Anything Goes (odd record-ings)
1400 BBC: World News
1405 BBC: Outlook
1500 BBC: Radio Newsreel
1500 KNLS: American Magazine
1515 KNLS: Bible Reading
1530 KNLS: Swingin' Years
1545 BBC: Music Feature
1600 BBC: World News
1600 KNLS: American Magazine
1609 BBC: Commentary
1615 KNLS: World Radio Broadcast
1630 KNLS: Jazz "E"
1645 BBC: The World Today (news feature)
1700 BBC: World News
1709 BBC: Book Choice
1715 BBC: Music of the Royal Courts
1745 BBC: Sports Roundup
1800 BBC: Newsdesk
1800 KNLS: American Magazine
1815 KNLS: Bible Reading
1830 BBC: Multitrack 1: Top 20 (pop music)
1830 KNLS: Swingin' Years
1830 Radio Netherlands: World News
1835 Radio Netherlands: Newsline
1850 Radio Netherlands: The Research File (science)
1900 BBC: News Summary
1901 BBC: Outlook
1945 BBC: Peebles' Choice
2000 BBC: World News
2009 BBC: Twenty-four Hours (news magazine)
2030 BBC: Sports International (feature)
2030 Radio Netherlands: World News
2035 Radio Netherlands: Newsline
2050 Radio Netherlands: The Research File (science)
2100 BBC: News Summary
2101 BBC: Network UK (feature)
2115 BBC: This Particular Place
2130 BBC: The Vintage Chart Show
2200 BBC: World News
2209 BBC: The World Today (news feature)
2225 BBC: Book Choice
2230 BBC: Financial News
2240 BBC: Reflections (religion)
2245 BBC: Sports Roundup
2300 BBC: World News
2300 Radio Japan: News
2309 BBC: Commentary
2315 BBC: Education Today
2316 Radio Japan: Commentary
2326 RadioJapan: Tokyo Pop-in
2330 BBC: Multitrack 1: Top 20 (pop music)
2330 Radio Japan: Japan Travelogue
2345 Radio Japan: Crosscurrents (topical discussion)

Tuesday

0000 BBC: World News
0009 BBC: News About Britain
0015 BBC: Radio Newsreel
0030 BBC: Music of the Royal Courts
0100 BBC: News Summary
0100 Radio Japan: News
0101 BBC: Outlook
0116 Radio Japan: Commentary
0126 Radio Japan: Tokyo Pop-in
0130 BBC: Short Story
0145 BBC: This Particular Place
0200 BBC: World News
0202 Radio Cairo: Egyptian Music
0205 Radio Cairo: Arab Poetry
0209 BBC: Commentary
0215 BBC: Network UK (feature)
0215 Radio Cairo: News
0225 Radio Cairo: Spotligh On the Middle East
0230 BBC: Sports International (feature)
0230 Radio Netherlands: World News
0235 Radio Cairo: Tourism In Egypt
0235 Radio Netherlands: Newsline
0245 Radio Cairo: Egyptian Song
0250 Radio Cairo: This Is Islam
0250 Radio Netherlands: The Research File (science)
0300 BBC: World News
0300 Radio Cairo: Meeting In Cairo
0300 Radio Japan: News
0309 BBC: News About Britain
0315 BBC: The World Today (news feature)
0315 Radio Cairo: News
0316 Radio Japan: Commentary

Your Guide to Shortwave Listening in June

0326 Radio Japan: Tokyo Pop-in
0330 BBC: John Peel (progressive rock music)
0400 BBC: Newsdesk
0430 BBC: A Schubert Anthology
0445 BBC: Reflections (religion)
0450 BBC: Financial News
0500 BBC: World News
0509 BBC: Twenty-four Hours (news magazine)
0530 BBC: New Ideas
0530 Radio Netherlands: World News
0535 Radio Netherlands: Newsline
0540 BBC: Turning Over New Leaves (religious books)
0545 BBC: The World Today (news feature)
0550 Radio Netherlands: The Research File (science)
0600 BBC: Newsdesk
0630 BBC: Counterpoint
0700 BBC: World News
0709 BBC: Twenty-four Hours (news magazine)
0730 BBC: This Particular Place
0745 BBC: Network UK (feature)
0800 BBC: World News
0800 KNLS: Country Music
0809 BBC: Reflections (religion)
0815 BBC: Tech Talk (engineering)
0815 KNLS: Sound Words
0830 BBC: Music of the Royal Courts
0830 KNLS: All That Jazz
0900 BBC: World News
0909 BBC: British Press Review
0915 BBC: The World Today (news feature)
0930 BBC: Financial News
0935 BBC: Sports Roundup
1000 BBC: News Summary
1001 BBC: Discovery (science)
1030 BBC: Sports International (feature)
1100 BBC: World News
1100 Radio Japan: News
1109 BBC: News About Britain
1115 BBC: Waveguide (SW radio)
1116 Radio Japan: Commentary
1125 BBC: Letter From Scotland
1126 Radio Japan: Tokyo Pop-in
1130 BBC: Citizens (drama serial)
1130 Radio Japan: Asia Now
1145 Radio Japan: Let's Learn Japanese
1200 BBC: Radio Newsreel
1215 BBC: Multitrack 1: Top 20 (pop music)
1245 BBC: Sports Roundup
1300 BBC: World News
1309 BBC: Twenty-four Hours (news magazine)
1330 BBC: Network UK (feature)
1345 BBC: Recording of the Week
1400 BBC: World News
1405 BBC: Outlook
1445 BBC: A Schubert Anthology
1500 BBC: Radio Newsreel
1500 KNLS: American Magazine
1515 BBC: A Jolly Good Show (rock music)
1515 KNLS: Bible Reading
1530 KNLS: Swingin' Years
1600 BBC: World News
1600 KNLS: Country Music
1609 BBC: Commentary
1615 BBC: Omnibus (topical feature)
1615 KNLS: Sound Words
1630 KNLS: All That Jazz
1645 BBC: The World Today (news feature)
1700 BBC: World News
1715 BBC: Citizens (drama serial)
1745 BBC: Sports Roundup
1800 BBC: Newsdesk
1800 KNLS: American Magazine
1815 KNLS: Bible Reading
1830 BBC: Development '88
1830 KNLS: Swingin' Years
1830 Radio Netherlands: World News
1835 Radio Netherlands: Newsline
1850 Radio Netherlands: Images (arts feature)
1900 BBC: News Summary
1901 BBC: Outlook
1939 BBC: Stock Market Report
1945 BBC: Report on Religion--News on modern religion. You might be surprised
2000 BBC: World News
2009 BBC: Twenty-four Hours (news magazine)
2030 BBC: Meridian (arts feature)
2030 Radio Netherlands: World News
2035 Radio Netherlands: Newsline
2050 Radio Netherlands: Images (art feature)
2100 BBC: News Summary
2110 BBC: Turning Over New Leaves (religious books)
2115 BBC: From Coca to Cocaine
2145 BBC: Andy Kershaw's World of Music (exotic music)
2200 BBC: World News
2209 BBC: The World Today (news feature)
2225 BBC: Letter From Scotland
2230 BBC: Financial News
2240 BBC: Reflections (religion)
2245 BBC: Sports Roundup
2300 BBC: World News
2300 Radio Japan: News
2309 BBC: Commentary
2315 BBC: Concert Hall
2316 Radio Japan: Commentary
2326 Radio Japan: Tokyo Pop-in
2330 Radio Japan: Asia Now
2345 Radio Japan: Let's Learn Japanese

Wednesday

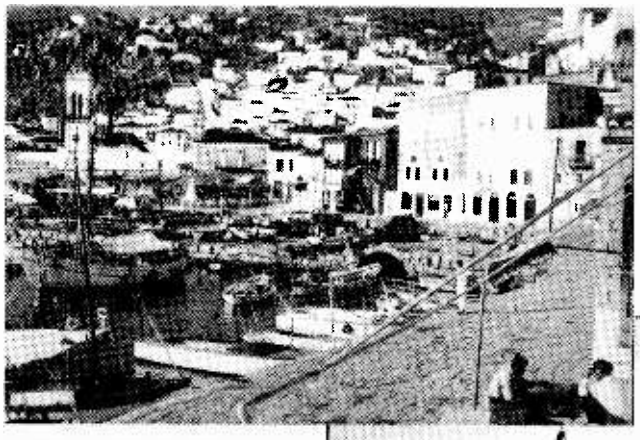
0000 BBC: World News
0009 BBC: News About Britain
0015 BBC: Radio Newsreel
0030 BBC: Omnibus (topical feature)
0100 BBC: News Summary
0100 Radio Japan: News
0101 BBC: Outlook
0116 Radio Japan: Commentary
0126 Radio Japan: Tokyo Pop-in
0130 BBC: Report on Religion-(see Tue 1945)
0145 BBC: Country Style--British country music. Hmmmm...
0200 BBC: World News
0202 Radio Cairo: Egyptian Music
0205 Radio Cairo: Wednesday Talk
0209 BBC: Commentary
0215 BBC: Big Bands-The Singers
0215 Radio Cairo: News
0225 Radio Cairo: Commentary
0230 BBC: Citizens (drama serial)
0230 Radio Netherlands: World News
0235 Radio Cairo: Nile Cruise
0235 Radio Netherlands: Newsline
0245 Radio Cairo: Listeners' Mail
0250 Radio Netherlands: Images (art feature)
0300 BBC: World News
0300 Radio Japan: News
0309 BBC: News About Britain
0315 BBC: The World Today (news feature)
0315 Radio Cairo: News
0316 Radio Japan: Commentary
0326 Radio Japan: Tokyo Pop-in
0330 BBC: Discovery (science)
0400 BBC: Newsdesk
0430 BBC: Time for Verse
0440 BBC: Book Choice
0445 BBC: Reflections (religion)
0450 BBC: Financial News
0500 BBC: World News
0509 BBC: Twenty-four Hours (news magazine)
0530 BBC: Report on Religion-(see Tue 1945)
0530 Radio Netherlands: World News
0535 Radio Netherlands: Newsline
0545 BBC: The World Today (news feature)
0550 Radio Netherlands: Images (art feature)
0600 BBC: Newsdesk
0630 BBC: Meridian (arts feature)
0700 BBC: World News
0709 BBC: Twenty-four Hours (news magazine)
0800 BBC: World News
0800 KNLS: American Magazine
0809 BBC: Reflections (religion)
0815 BBC: Classical Record Review
0815 KNLS: Let's Talk
0830 BBC: Brain of Britain 1988 (quiz show)
0830 KNLS: Classical Music
0900 BBC: World News
0909 BBC: British Press Review
0915 BBC: The World Today (news feature)
0930 BBC: Financial News
0935 BBC: Sports Roundup
0945 BBC: Music Feature

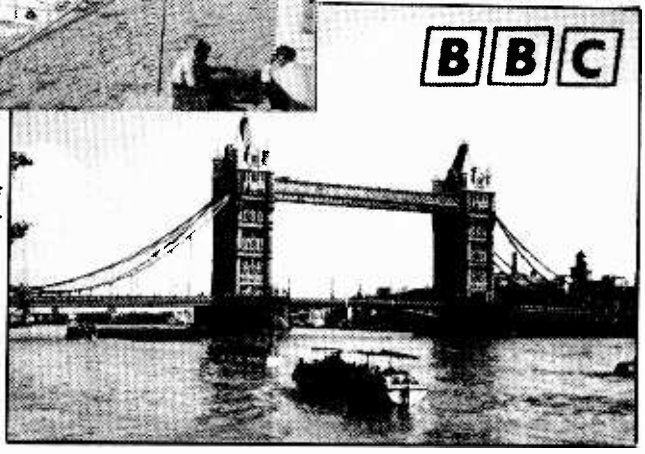
Your Guide to Shortwave Listening in June

1000 BBC: News Summary
1001 BBC: Omnibus (topical feature)
1100 BBC: World News
1100 Radio Japan: News
1109 BBC: News About Britain
1116 Radio Japan: Commentary
1126 Radio Japan: Tokyo Pop-in
1130 BBC: Meridian (arts feature)
1130 Radio Japan: Radio Japan Journal
1145 Radio Japan: Japan Panorama
1200 BBC: Radio Newsreel
1215 BBC: Irving Berlin and Friends
1225 BBC: The Farming World
1245 BBC: Sports Roundup
1300 BBC: World News
1309 BBC: Twenty-four Hours (news magazine)
1400 BBC: World News
1405 BBC: Outlook
1445 BBC: Report on Religion-(see Tue 1945)
1500 BBC: Radio Newsreel
1500 KNLS: American Magazine
1515 BBC: Education Today
1515 KNLS: Bible Reading
1530 BBC: King Street Junior (drama)
1530 KNLS: Swingin' Years
1600 BBC: World News
1600 KNLS: American Magazine
1609 BBC: Commentary
1615 BBC: Counterpoint
1615 KNLS: Let's Talk
1630 KNLS: Classical Music
1645 BBC: The World Today (news feature)
1700 BBC: World News
1709 BBC: A Letter from Wales
1715 BBC: Society Today
1730 BBC: New Ideas
1740 BBC: Book Choice
1745 BBC: Sports Roundup
1800 BBC: Newsdesk
1800 KNLS: American Magazine
1815 KNLS: Bible Reading
1830 KNLS: Swingin' Years
1830 Radio Netherlands: World News
1835 Radio Netherlands: Newsline
1850 Radio Netherlands: The Savage Breast (music feature)
1900 BBC: News Summary
1901 BBC: Outlook
1939 BBC: Stock Market Report
1945 BBC: Good Books-(see Mon 0315)
2000 BBC: World News
2009 BBC: Twenty-four Hors (news magazine)
2030 BBC: Assignment
2030 Radio Netherlands: World News
2035 Radio Netherlands: Newsline
2050 Radio Netherlands: The Savage Breast (music feature)
2100 BBC: News Summary
2101 BBC: Network UK (feature)
2115 BBC: Counterpoint
2145 BBC: Recording of the Week
2200 BBC: World News
2209 BBC: The World Today (news feature)
2225 BBC: A Letter from Wales
2230 BBC: Financial News
2240 BBC: Reflections (religion)
2245 BBC: Sports Roundup
2300 BBC: World News
2300 Radio Japan: News
2309 BBC: Commentary
2315 BBC: Write On . . . (letters)
2316 Radio Japan: Commentary
2326 Radio Japan: Tokyo Pop-in
2330 BBC: Multitrack 2 (pop music)
2330 Radio Japan: Radio Japan Journal
2345 Radio Japan: Japan Panorama

Thursday

0000 BBC: World News
0009 BBC: News About Britain
0015 BBC: Radio Newsreel
0030 BBC: King Street Junior (drama)
0100 BBC: News Summary
0100 Radio Japan: News
0101 BBC: Outlook
0116 Radio Japan: Commentary
0126 Radio Japan: Tokyo Pop-in
0130 BBC: Waveguide (SW radio)
0140 BBC: Book Choice
0145 BBC: Society Today
0200 BBC: World News
0202 Radio Cairo: Egyptian Music
0205 Radio Cairo: Questions and Answers
0209 BBC: Commentary
0215 BBC: Network UK (feature)
0215 Radio Cairo: News
0225 Radio Cairo: Egypt's Foreign Policy
0230 BBC: Assignment
0230 Radio Netherlands: World News
0235 Radio Cairo: Story and Author
0235 Radio Netherlands: Newsline
0245 Radio Cairo: Science in Egypt
0250 Radio Netherlands: The Savage Breast (music feature)
0255 Radio Cairo: Egyptian Songs
0300 BBC: World News
0300 Radio Cairo: Egyptian Treasures
0300 Radio Japan: News
0309 BBC: News About Britain
0315 BBC: The World Today (news feature)
0315 Radio Cairo: News
0316 Radio Japan: Commentary
0326 Radio Japan: Tokyo Pop-in
0330 BBC: From Coca to Cocaine
0400 BBC: Newsdesk
0430 BBC: Classical Record Review
0445 BBC: Reflections (religion)
0450 BBC: Financial News
0500 BBC: World News
0509 BBC: Twenty-four Hours (news magazine)
0530 BBC: Peeble's Choice
0530 Radio Netherlands: World News
0535 Radio Netherlands: Newsline
0545 BBC: The World Today (news feature)
0550 Radio Netherlands: The Savage Breast (music feature)
0600 BBC: Newsdesk
0630 BBC: Irving Berlin and Friends
0640 BBC: The Farming World
0700 BBC: World News
0709 BBC: Twenty-four Hours (news feature)
0730 BBC: Andy Kershaw's World of





QSLs from the Voice of Greece and the BBC, compliments of Paul Williams of Shaw AFB, South Carolina.

Your Guide to Shortwave Listening in June

Music (exotic music)
0745 BBC: Network UK (feature)
0800 BBC: World News
0800 KNLS: Country Music
0809 BBC: Reflections (religion)
0815 BBC: Country Style-(see Wed 0145)
0815 KNLS: Let's Talk
0830 BBC: John Peel (progressive rock music)
0830 KNLS: Jazz "E"
0900 BBC: World News
0915 BBC: The World Today (news feature)
0930 BBC: Financial News
0935 BBC: Sports Roundup
1000 BBC: News Summary
1001 BBC: Assignment
1030 BBC: King Street Junior (drama)
1100 BBC: World News
1100 Radio Japan: News
1109 BBC: News About Britain
1115 BBC: New Ideas
1116 Radio Japan: Commentary
1125 BBC: A Letter from England
1126 Radio Japan: Tokyo Pop-in
1130 Radio Japan: In Business
1130 BBC: Citizens (drama serial)
1145 Radio Japan: Asian Crossroads
1200 BBC: Radio Newsreel
1215 BBC: Multitrack 2 (pop music)
1245 BBC: Sports Roundup
1300 BBC: World News
1309 BBC: Twenty-four Hours (news magazine)
1330 BBC: Network UK (feature)
1400 BBC: World News
1405 BBC: Outlook
1445 BBC: Write On . . . (letters)
1500 BBC: Radio Newsreel
1500 KNLS: American Magazine
1515 BBC: The Pleasure's Yours (classical music requests)
1515 KNLS: Bible Reading
1530 KNLS: Swingin' Years
1600 BBC: World News
1600 KNLS: Country Music
1609 BBC: Commentary
1615 BBC: Assignment
1615 KNLS: Let's Talk
1630 KNLS: Jazz "E"
1645 BBC: The World Today (news feature)
1700 BBC: World News
1715 BBC: Citizens (drama serial)
1745 BBC: Sports Roundup
1800 BBC: Newsdesk
1800 KNLS: American Magazine
1815 KNLS: Bible Reading
1830 BBC: Discovery (science)
1830 KNLS: Swingin' Years
1830 Radio Netherlands: World News
1835 Radio Netherlandsa; Newsline
1850 Radio Netherlands: Media Network (SW radio)
1900 BBC: News Summary
1901 BBC: Outlook
1939 BBC: Stock Market Report
1945 BBC: Here's Humph!
2000 BBC: World News
2009 BBC: Twenty-four Hours (news magazine)
2030 BBC: Meridian
2030 Radio Netherlands: World News
2035 Radio Netherlands: Newsline
2050 Radio Netherlands: Media Network (SW radio)
2100 BBC: News Summary
2101 BBC: Talking From . . .
2115 BBC: A Jolly Good Show (rock music)
2200 BBC: World News
2209 BBC: The World Today (news feature)
2225 BBC: A Letter from England
2230 BBC: Financial News
2240 BBC: Reflections (religion)
2245 BBC: Sports Roundup
2300 BBC: World News
2300 Radio Japan News
2309 BBC: Commentary
2315 BBC: Seven Seas
2316 Radio Japan: Commentary
2326 Radio Japan: Tokyo Pop-in
2330 BBC: Irving Berlin and Friends
2330 Radio Japan: In Business
2345 Radio Japan: Asian Crossroads

Friday

0000 BBC: World News
0009 BBC: News About Britain
0015 BBC: Radio Newsreel
0030 BBC: Music Now (modern classical music)
0100 BBC: News Summary
0100 Radio Japan: News
0101 BBC: Outlook
0116 Radio Japan: Commentary
0126 Radio Japan: Tokyo Pop-in
0130 BBC: Music Feature
0145 BBC: Talking From . . .
0200 BBC: World News
0202 Radio Cairo: Egyptian Music
0205 Radio Cairo: Holy Koran Interpretation
0209 BBC: Commentary
0215 BBC: Tech Talk
0215 Radio Cairo: News
0225 Radio Cairo: Focus
0230 BBC: Citizens (drama serial)
0230 Radio Netherlands: World News
0235 Radio Cairo: Readers' Corner
0235 Radio Netherlands: Newsline
0245 Radio Cairo: Listeners' Mail
0250 Radio Netherlands: Media Network (SW radio)
0300 BBC: World News
0300 Radio Japan: News
0309 BBC: News About Britain
0315 BBC: The World Today (news feature)
0315 Radio Cairo: News
0316 Radio Japan: Commentary
0326 Radio Japan: Tokyo Pop-in
0330 BBC: The Vintage Chart Show
0400 BBC: Newsdesk
0430 BBC: Country Style-(see Wed 0145)
0445 BBC: Reflections (religion)
0450 BBC: Financial News
0500 BBC: World News
0509 BBC: Twenty-four Hours (news magazine)
0530 BBC: Education Today
0530 Radio Netherlands: World News
0535 Radio Netherlands: Newsline
0545 BBC: The World Today (news feature)
0550 Radio Netherlands: Media Network (SW radio)
0600 BBC: Newsdesk
0630 BBC: Meridian (arts feature)
0700 BBC: World News
0709 BBC: Twenty-four Hours (news magazine)
0730 BBC: Write On . . . (letters)
0745 BBC: Seven Seas
0800 BBC: World News
0800 KNLS: American Magazine
0809 BBC: Reflections (religion)
0815 KNLS: Let's Talk
0830 BBC: Music Now (modern classical music)
0830 KNLS: All That Jazz
0900 BBC: World News
0909 BBC: British Press Review
0915 BBC: The World Today (news feature)
0930 BBC: Financial News
0935 BBC: Sports Roundup
1000 BBC: News Summary
1001 BBC: Andy Kershaw's World of Music (exotic music)
1030 BBC: Jazz for the Asking
1100 BBC: World News
1100 Radio Japan: News
1109 BBC: News About Britain
1116 Radio Japan: Commentary
1126 Radio Japan: Tokyo Pop-in
1130 BBC: Meridian (arts feature)
1130 Radio Japan: One in a Hundred Million
1145 Radio Japan: Let's Practice Japanese
1200 BBC: Radio Newsreel
1230 BBC: Business Matters
1245 BBC: Sports Roundup
1300 BBC: World News
1309 BBC: Twenty-four Hours (news magazine)
1330 BBC: John Peel (progressive rock music)
1400 BBC: World News
1405 BBC: Outlook
1445 BBC: Nature Notebook
1500 BBC: Radio Newsreel
1500 KNLS: American Magazine
1530 KNLS: Swingin' Years
1600 BBC: World News
1600 KNLS: American Magazine
1609 BBC: Commentary

Your Guide to Shortwave Listening in June

1615 BBC: Science in Action
1615 KNLS: Let's Talk
1630 KNLS: All That Jazz
1645 BBC: The World Today (news feature)
1700 BBC: World News
1709 BBC: A Letter from Northern Ireland
1715 BBC: Music Now (modern classical music)
1745 BBC: Sports Roundup
1800 BBC: Newsdesk
1800 KNLS: American Magazine
1815 KNLS: Bible Reading
1830 BBC: Multitrack 3 (pop music)
1830 KNLS: Swingin' Years
1830 Radio Netherlands: World News
1835 Radio Netherlands: Newsline
1850 Radio Netherlands: Rembrandt Express (magazine)
1900 BBC: News Summary
1901 BBC: Outlook
1939 BBC: Stock Market Report
1945 BBC: Personal View
2000 BBC: World News
2009 BBC: Twenty-four Hours (news magazine)
2030 BBC: Science in Action
2030 Radio Netherlands: World News
2035 Radio Netherlands: Newsline
2050 Radio Netherlands: Rembrandt Express (magazine)
2100 BBC: News Summary
2101 BBC: Network UK (feature)
2115 BBC: Europe's World
2130 BBC: Business Matters
2145 BBC: Behind the Wall (book journey through China)
2200 BBC: World News
2209 BBC: The World Today (news feature)
2225 BBC: A Letter from Nortern Ireland
2230 BBC: Financial News
2240 BBC: Reflections (religion)
2245 BBC: Sports Roundup
2300 BBC: World News
2300 Radio Japan: News
2309 BBC: Commentary
2315 BBC: From the Weeklies (press review)
2316 Radio Japan: Commentary
2326 Radio Japan: Tokyo Pop-in
2330 BBC: Multitrack 3 (pop music)
2330 Radio Japan: One in a Hundred Million
2345 Radio Japan: Let's Practice Japanese

Saturday

0000 BBC: World News
0009 BBC: News About Britain
0015 BBC: Radio Newsreel
0030 BBC: Personal View
0045 BBC: Recording of the Week
0100 BBC: News Summary
0100 Radio Japan: News
0101 BBC: Outlook
0116 Radio Japan: Commentary
0126 Radio Japan: Tokyo Pop-in
0130 BBC: Andy Kershaw's World of Music (exotic music)
0200 BBC: World News
0202 Radio Cairo: Egyptian Music
0205 Radio Cairo: Questions and Answers
0209 BBC: Commentary
0215 BBC: Network UK (feature)
0215 Radio Cairo: News
0225 Radio Cairo: Current Events
0230 BBC: People in Politics
0230 Radio Netherlands: World News
0235 Radio Cairo: Stamp Collector's Club
0235 Radio Netherlands: Newsline
0245 Radio Cairo: Songs We Sing
0250 Radio Netherlands: Rembrandt Express (magazine)
0300 BBC: World News
0300 Radio Cairo: Architecture of the Pharaohs
0300 Radio Japan: News
0309 BBC: News About Britain
0310 Radio Cairo: Egyptian Song
0315 BBC: The World Today (news feature)
0315 Radio Cairo: News
0316 Radio Japan: Commentary
0326 Radio Japan: Tokyo Pop-in
0330 BBC: Europe's World
0345 BBC: Business Matters
0400 BBC: Newsdesk
0430 BBC: Here's Humph!
0445 BBC: Reflections (religion)
0450 BBC: Financial News
0500 BBC: World News
0509 BBC: Twenty-four Hours (news magazine)
0530 BBC: Personal View
0530 Radio Netherlands: World News
0535 Radio Netherlands: Newsline
0545 BBC: The World Today (news feature)
0550 Radio Netherlands: Rembrandt Express (magazine)
0600 BBC: Newsdesk
0630 BBC: Meridian (arts feature)
0700 BBC: World News
0709 BBC: Twenty-four Hours (news magazine)
0730 BBC: From the Weeklies (press review)
0745 BBC: Network UK (feature)
0800 BBC: World News
0800 KNLS: Country Music
0809 BBC: Reflections (religion)
0815 BBC: A Jolly Good Show (rock music)
0815 KNLS: Let's Talk
0830 KNLS: American Music Spotlight
0900 BBC: World News
0909 BBC: British Press Review
0915 BBC: The World Today (news feature)
0930 BBC: Financial News
0935 BBC: Sports Roundup
0945 BBC: Personal View
1000 BBC: News Summary
1001 BBC: Here's Humph!
1015 BBC: Letter from America
1030 BBC: People and Politics
1100 BBC: World News
1100 Radio Japan: This Week
1109 BBC: News About Britain
1115 BBC: Big Bands-The Singers
1130 BBC: Meridian (arts feature)
1200 BBC: Radio Newsreel
1215 BBC: Multitrack 3 (pop music)
1245 BBC: Sports Roundup
1300 BBC: World News
1309 BBC: Twenty-four Hours (news magazine)
1330 BBC: Network UK (feature)
1345 BBC: Sportsworld
1400 BBC: News Summary
1401 BBC: Sportsworld
1500 BBC: Radio Newsreel
1500 KNLS: American Magazine
1515 BBC: Sportsworld
1515 KNLS: Bible Reading
1530 KNLS: Swingin' Years
1600 BBC: World News
1600 KNLS: Country Music
1609 BBC: Commentary
1615 BBC: Sportsworld
1615 KNLS: Let's Talk
1630 KNLS: American Music Spotlight
1700 BBC: World News
1709 BBC: Book Choice
1715 BBC: The Ken Bruce Show (music mix with entertainment news)
1745 BBC: Sports Roundup
1800 BBC: Newsdesk
1800 KNLS: American Magazine
1815 KNLS: Bible Reading
1830 BBC: Great British Concert Halls
1830 KNLS: Swingin' Years
1830 Radio Netherlands: World News
1835 Radio Netherlands: Newsline
1850 Radio Netherlands: Over to You! (letters)
1900 BBC: News Summary
1901 BBC: Play of the Week
2000 BBC: World News
2009 BBC: Twenty-four Hours (news magazine)
2030 BBC: Meridian (arts feature)
2030 Radio Netherlands: World News
2035 Radio Netherlands: Newsline
2050 Radio Netherlands: Over To You! (letters)
2100 BBC: News Summary
2115 BBC: Music Feature
2130 BBC: People and Politics
2200 BBC: World News
2209 BBC: From Our Own Correspondent-(Sun 0315)
2225 BBC: Book Choice
2230 BBC: New Ideas
2240 BBC: Reflections (religion)
2245 BBC: Sports Roundup
2300 BBC: World News
2300 Radio Japan: This Week
2309 BBC: Commentary
2315 BBC: The Tony Myatt Request Show

ASK BOB

Bob Grove, WA4PYQ

Questions sent to MT are answered in this column as space permits. If you prefer an answer by return mail, you must include a self-addressed, stamped envelope.

Q. Before World War II, what frequencies were used by the railroads? (Robert Brock, Phoenix, AZ)

A. The trend in all communications has been to move gradually higher in frequency. Early communications began in the hundreds-of-kilohertz range, gradually shifting into the high frequency (shortwave) bands by World War II, during which tactical communications were conducted as high as 400 MHz.

Commercial communications moved more slowly; police could still be heard around 1700 kHz--just above the AM broadcast band--as late as the 1950s and early '60s. Without a doubt, the lower shortwave spectrum probably witnessed point-to-point train communications experiments before World War II.

It is possible, however, that short-range switch yard communications had already begun their shift to lower VHF. FM was growing in popularity due to its inherent noise reduction, an important consideration in industrial environments.

Q. No matter how hard I tighten the Grove Scanner Beam to my metal mast, it slips in a high wind. What can I do? (Jerry Humes, Portland, OR)

A. This is a rare problem, easily cured. Add about 4 feet of rigid PVC pipe, reinforced with a broomstick or other wood down its center if necessary, to the top of your mast. Mount the Scanner Beam to it, sliding the antenna snug against the PVC pipe, sawing off the excess length on the old offset pipe.

Placing the Scanner Beam against the mast prevents torque leverage developing from winds, the non-metallic upper section prevents interaction of the mast with the antenna, and the grip between the toothed bracket and the plastic pipe will have better "bite" than with the metal mast.

Q. I have a loud hum on my AC/DC radio which goes away if I hold the cord in a certain position. What's happening here? (Robert Covington, Baltimore, MD)

A. Common mode hum is an annoying property frequently reported by listeners, especially on the shortwave bands. It is caused by unbalanced AC currents on the antenna or feedline interacting with the AC power line or cord.

The problem can usually be reduced by experimenting with different configurations of grounding (be careful when grounding a tube-type AC/DC radio--the chassis may be "hot"!), and is sometimes entirely eliminated by switching to battery operation.

Q. Why don't scanners automatically resume searching after a few seconds after stopping on a busy frequency? This could manually defeated by pressing the "hold" button if the listener wanted it to remain there. (George Kleiser, Rayne, LA)

A. Japanese scanning receivers like the ICOM R7000 do have the automatic search resume, but it is sharply criticized by consumers because it won't wait until a signal goes off the air before it leaves the frequency. Such an option allowing the user his choice would be desirable, especially when the search sequence stops on dead carriers, birdies, intermod and image products, and so forth. It's just a matter of cost.

Q. I recently bought a Cobra SR15 hand-held programmable scanner and noticed that when I first turned it on it had unusual frequencies--66.45, 76.825, 87.425 MHz--in memory. I could not program in similar frequencies myself. How come? (Harold Winard, Wharton, NJ)

A. The Cobra SR15 is the same scanner as the Bearcat BC100XLT. A Uniden engineer advised us that these are pre-programmed test frequencies burned into ROM (memory) at the factory, and cannot be keypad-entered. You can restore these unusual frequencies by removing the batteries, allowing the radio to go dead, then reinstalling them again.

The same engineer told us that it is impossible for the VCO (oscillator) to track those frequencies; the readout is simply a display of the algorithms (commands) given to the microprocessor. What you are hearing are probably images of signals at other frequencies.

Q. I have a Grove PRE-3 preamplifier. When I attempt to use it on the 800 MHz range, I notice a definite difference in signal levels between its two output connectors--how come? (Jon Mechlin, Marlborough, MA)

A. Good question. The circuit board layout apparently favors the "RECEIVER 2" port over the "RECEIVER 1" port for 800 MHz reception; the difference is not pronounced, however, below 500 MHz. Since the anomaly does not degrade performance (simply use that second port for 800 MHz reception), the product will not be redesigned at this time.

Q. Could you please give me the frequency of the Central Electric Membership Corporation (REA) in Sanford, NC? (J. Gray Allen, Sanford, NC)

A. Licensed as KIH510, they can be found on 48.26 MHz. Rural power companies are typically assigned low band frequencies because of their wide area coverage.

Q. Does anyone make a voice descrambler for police scanner reception? (James Richards, Hackettstown, NJ)

A. No. A couple of years back, Capri Electronics, Don Nobles Electronics (DNE) and even Grove Enterprises manufactured them, but the Electronic Communications Privacy Act (ECPA '86) specifically forbids monitoring scrambled transmissions.

Obviously, agencies utilizing scramblers have descramblers as well, but these two functions are built into the same equipment.

Q. How does one know what mode to set a scanner or receiver in when searching the VHF and UHF frequency ranges? (William Browne, Scottsdale, AZ)

A. Most VHF/UHF bands have specific emission types authorized by the FCC. These include wideband FM (TV and FM broadcasting), AM (civilian and military aeronautical), and narrow band FM (low, high, UHF, and 800 MHz land mobile services).

Typically, the bandplan is as follows: 29-54 MHz, FM-N; 54-72 MHz, FM-W; 72-76 MHz, FM-N; 76-108 MHz, FM-W; 108-136 MHz, AM; 136-174 MHz, FM-N; 174-216 MHz, FM-W; 216-225 MHz, FM-N; 225-400 MHz, AM; 400-406 MHz, FM (data and telemetry); 406-512 MHz, FM-N; 512-806 MHz, FM-W; 806-960 MHz, FM-N.

Q. In the March issue of MT, you printed a list of cellular telephone frequencies indicating that the mobiles are 824-849 MHz and the bases are 869-894 MHz. Why do I hear cellular telephones on my scanner in the 961-980 Mhz range? (William Browne, Scottsdale, AZ)

A. These signals are called "images"; they are generated by the mixer stage of your scanner and will appear offset from the actual frequencies by 21.4, 21.6 or 21.7 MHz depending upon the make and model of the scanner.

In spite of efforts by scanner manufacturers to censor cellular reception by eliminating those frequency ranges, cellular signals may be clearly heard on their images.

Q. Is it practical to modify my low, high, UHF, FM-only scanner to receive the 225-400 MHz military aircraft band? (D.B., Bangor, ME)

A. No, for two reasons: The microprocessor, oscillator and RF tuning circuits will not track that far out of their design ranges; even if they did, air-to-ground transmissions are in the AM mode and your scanner will only receive FM signals -- you would hear little, if any, audio.

Q. How can I receive out-of-band signals on my programmable scanner?

A. The original Regency "Touch" (ACT-T-16K) could be tricked by pressing "MANUAL, 9, CLEAR" before entering a frequency outside the advertised frequency range for the scanner. Later models were even more easily tricked by pressing the decimal key first. Electra Bearcats could be tricked by a variety of keypad sequences. Radio Shack scanners never could.

Present day models can no longer be keypad-manipulated to extend their design frequency coverage. While some Regency scanners will accept frequency entries outside their advertised limits, they were intentionally designed to allow this overrange as part of their alignment procedure.

■

Lawrence Magne

Editor-in-Chief
Passport to World Band Radio

The New Sony ICF-7601 Portable

How do you take the temperature of the world band radio market? Keep an eye on how many new models of affordable portables are being introduced. First-time listeners scoop these up because they're not costly and they're easy to operate. They're fully self-contained, too, so they can be carried anywhere from the patio to Papeete.

Receiver of the Month Club

Newcomers must be coming in at quite a clip, because lately at least one interesting new portable has been introduced every month. This isn't happening just in North America, either. Gordon Darling of Papua New Guinea -- and you can't get much farther away than that -- just returned from a tour of Asia. Gordon points out that in the Orient the Sony ICF-2001D -- what's sold in North America as the ICF-2010 -- is selling faster than Sony can produce them. That's despite the high cost, ever-rising yen and the set's appetite for batteries.

This month is no exception to the brisk pace of new-portable introductions. In the US, Sony recently unveiled yet another new portable, the ICF-7601.

Volksradio of the Eighties

This is no ordinary event. Why? Because it's apparent that the '7601 is meant to be the successor to the ICF-7600 series of analog portables that has already sold over a million units worldwide and is a favorite of such varied types as story-hunting newsmen in Nairobi and bored diplomats in Nanjing.

When you're shooting for your second million, you don't rock the radio raft. The '7601 is, as you'd expect, basically the old ICF-7600A, but with a mud pack and facelift worthy of a grand old dame.

Keep It Simple, Sensible

One reason for the '7600 series' having been such a winner is that each set has had a sensible balance of characteristics: small enough to carry on trips or on foot, but large enough to produce decent sound -- good performance, but not great -- cheap, but not expensive. And each has been all but foolproof to operate.

So it is with the '7601. It's light, compact, uses only four ordinary "AA" cells (none of those weird watch cells here) and has been carefully designed to be easy and logical to operate -- what's called "good ergonomics" among the tardily trendy. All the controls are where they belong and even the pushbuttons operate with good "feel".

But...BUT...the '7601 has hardly any features. There is a power "hold" switch to keep the set from being turned on accidentally -- say, while you're traveling. There's also an elevation leg, albeit one that tends to collapse if you operate the radio on a smooth surface. There's also an all-but-useless LED "glow light" to give some coarse indication of signal strength. And, to top things off, there's a two-position "news-music" tone switch.

That's it in the features department. There's not even a dial light, -- and don't even begin to think of such lip-smacking goodies as synchronous detection or reception of single-sideband signals.

New Model Gives Improved Coverage

The '7601 covers AM up to 1700 kHz, which means it will receive the new 1600-1700 kHz band planned for the Americas. That's a plus over many competing models and earlier models in this series.

FM coverage is 76-108 MHz, which is unusually generous, so you can tune FM stations almost anywhere in the world. In fact, for listening to near-distance broadcasts, all this set lacks is longwave -- which is only used outside the Americas, anyway -- and the soon-to-be-phased-out FM low band used in Eastern Europe and the Soviet Union.

However, unlike the more costly Sony ICF-SW1 covered last month, the '7601's FM is in monaural only.

But you're not paying big bucks to hear local stations. Shortwave is the draw, and the '7601 covers most of the shortwave broadcasting spectrum in 10 bandspreaded segments.

The 120, 90 and 75 meter bands are covered in one cramped segment using the set's simple mediumwave circuitry. This circuitry is only single conversion and so doesn't do a bang-up job. But, then, most ordinary listeners -- as opposed to knob-clutching shortwave junkies and muggers lying in wait for Dan Rather -- don't listen to these bands very often, if at all. It's clear this set is aimed at the average news and music listener, not the broadcast DXer -- and certainly not the ham or utility DXer.

The set's superior double-conversion circuitry is used to cover the big-league 60, 49, 41, 31, 25, 21, 19, 16 and 13 meter bands. There is generous overlap on both sides of each band, so the frequencies for most stations on the air are covered. This is a big plus over the earlier '7600A. And it's nice to see that the '7601, unlike some competing models, includes the important new 21 meter band. This band, now being used by a growing number of stations, will be chocablock with juicy catches when it's officially unveiled next year.

Multiple Conversion Means Better Performance

What's the difference between single-conversion and double-conversion circuitry?

No, none of this has to do with football. What it refers to is radio circuits which, by their very nature, tend to produce false or "repeat" sounds up and down the dial. As a result, you can hear stations and funny codes and other sounds bothering whatever it is you're trying to hear.

Single conversion circuits are pretty bad in this regard, so better models have double-conversion circuitry to provide quieter results. You hear fewer disruptive sounds and more of the station you're after.

But double conversion is not a tangible concept, not like so many peas in a pod. Some double-conversion designs are much better at reducing image and IF rejection than others, and in this regard that of the '7601 is only fair.

Old-Fashioned Tuning Lacks Precision...

Last month I noted how the new ICF-SW1 has digital frequency readout, programmable channel memories and synthesized tuning. All these high-tech goodies make it easier to bring up the station you want to hear.

The '7601, being a slight upgrade of a set design already mucho years old, has old-fashioned needle-and-dial tuning. There's no memories or any of that sort of thing, either -- which should suit traditionalists just fine. As to how accurate the dial's readout is, it's roughly plus or minus 30 kHz in the single-conversion shortwave band segment and plus or minus 15 kHz within the more numerous double-conversion band segments.

This isn't the sort of resolution that will gladden the hearts of radio buffs, but it's more than adequate for most ordinary world band radio listeners. Too, if you use the set often enough you get used to the nuances of the readout and can figure out pretty much what channel you've tuned in.

...But Sensitivity Packs a Wallop

The earlier '7600's were noted for their excellent sensitivity, and the '7601 is a worthy heir in that respect. It's great for flushing out weak signals, and in this respect the set's old-fashioned analog circuitry is a help because it's so quiet.

But beyond that, things aren't so upbeat. Selectivity is no better than with earlier '7600's, and that's a pity. As a result, adjacent-channel interference on shortwave is worse than it should be.

A lesser drawback is some crosstalk in the shortwave band selector switch. Because of this, you can occasionally hear stations in an adjacent band segment bleeding over to interfere with the station you're trying to hear.

A '7601 is a '7601 is a '7601

As to finding a '7601 outside the US, Sony of Canada is not yet sure when the '7601 will be introduced or what it will cost. Sony also seems to be backing away from its tradition of using varying model designations for the same receiver sold in different parts of the world. This was originally started some years back to discourage "gray market" sales of Sony radios brought in from overseas "through the back door". But this complicates production and inventory, so cost-conscious Sony says the new model will be called the "ICF-7601" whether it's for sale in Syracuse or Singapore.

Godzilla Engineers vs. King Kong Yen

Considering it's a Japanese radio, the '7601 is reasonably priced for what it does. Partly, this is because corners have been cut on some little, nonessential things -- the way some Japanese cars have gone to orange-peeley paint jobs and the like in order to cope with the monster yen.

For example, the telescopic antenna has a simpler-than-usual swivel, and its tip is plastic instead of stainless steel. Too, there are minute what-look-like-hairline cracks in the cabinet. Fortunately, a little body English reveals these are apparently surface blemishes, rather than cracks. Even Sony's name is merely painted on the cabinet in drab gray paint, rather than being proudly emblazoned in the usual shiny metal letters.

The Bottom Line

The '7601, which lists for $139.95, is no glamour gal. It's more like a Volkswagen Beetle that keeps chugging on and selling well but, like most of the rest of us, shows more of its age with every passing year.

All that having been said, aside from the improvement resulting from Sony's double-conversion circuitry, the '7601 doesn't appreciably outperform such inexpensive non-Japanese models as the single-conversion Philips/Magnavox D1835, which lists for $69.99. But double conversion does improve reception and is worth a premium, and Sony is a master at marketing world band radios. So it's a sure bet the '7601 will be a major seller for some time to come. ■

You can hear Larry Magne's equipment reviews the first Saturday night each month over Radio Canada International's popular SWL Digest. For North America, it's 8:10 PM Eastern Time on 5960 and 9755 kHz; for Europe, 2008 UTC on 5995, 9670, 11945, 15325, 17820 and 17875 kHz. Larry's "What's New in Equipment" is also featured various other Saturdays throughout the month, while PASSPORT editors Don Jensen and Tony Jones report on world broadcasting the third Saturday night each month.

Passport's "RDI White Paper" equipment reports are carried in the US by EEB and Universal Shortwave; in Canada by PIF Book-by-Mail; and in Europe by Interbooks and the Swedish DX Federation. A free catalogue of the latest editions of these exhaustive laboratory and "hands-on" reports -- which cover, warts and all, the most advanced radios and antennas on the market -- may be obtained by sending a self-addressed stamped envelope to Publications Information, International Broadcasting Services, Ltd., Box 300, Penn's Park PA 18943 USA.

The Bearcat 200/205XLT

by Larry Wiland

They're here! After months of anxious waiting and several production delays, the Uniden/Bearcat BC200XLT and its identical twin, the BC205XLT (differently numbered because of its importation through another contract order), are showing up in the hands of dedicated scanner owners everywhere. And what a scanner it is!

Identical in appearance to the recently-released BC-100XLT, the 200/205 represents a radical departure from the handheld programmable scanners of the past, incorporating the latest technology -- slide-off battery pack, surface-mount components, brightly-illuminated LCD readout (which automatically switches off to conserve battery power after 15 seconds), 200 memory channels and total 806-960 MHz (after cellular restoration) coverage.

At First Glance

Upon opening the box one discovers a well-constructed radio in a sturdy grey case. An array of small, but easy-to-read, buttons are arranged strategically across the face of the unit. All functions are legibly labelled.

Above this array is the LCD window which displays bank indicators, operational modes, channel and frequency readouts, and a low battery warning. The volume and squelch controls, earphone jack (with protective cover) and BNC antenna connector are on the top of the case.

A wall-mount power supply is included which allows the scanner to be operated while it is charging the Nicad battery pack. A small earphone, leatherette case and flexible "duck" antenna are also included.

The professional slide-off battery pack is similar to those used on handie-talkies and identical to that used on the BC100XLT. An LED alerts the user that the battery is successfully being charged when attached to the appropriate charging cord. For listeners who want a fresh pack charging while one is in use, this is the way to go. Order a spare.

Bearcat's traditional simplicity of programming is carried on in the 200/205; memory channels may be accessed directly by pressing the channel number and "manual," or may be stepped through sequentially by repeatedly pressing "manual."

The rubber keys are soft, yet tactile, providing the user with solid confirmation of an entry (with no irritating "beep" with every keystroke!). Weighing 2 pounds, 3 ounces, the 200/205 measures 2-3/4"W x 7-1/2"H x 1-1/4"D.

The Specs

Frequency coverage is 29-54 MHz FM, 118-136 MHz AM, 136-174 MHz FM, 406-512 MHz FM and 806-956 MHz FM (assuming cellular coverage has been restored; as shipped from the factory, 800 MHz coverage excludes 824-849 and 869-894 MHz). Instant weather scan is pre-programmed into ROM for quick access.

IF selectivity is stated as -55 dB at +/-25 kHz. Measured sensitivity is very close to that advertised (see sidebar article), 0.4-0.8 microvolts VHF/UHF and 1.0 microvolt at 900 MHz.

The 7.2 volt battery pack may be directly charged from any 12 VDC supply since it contains an integral voltage regulator. In a mobile installation, power may be taken directly from the battery line, wired to the 12 volt system or plugged into a cigarette lighter adaptor.

Individual channel lockout and delay are user-programmable, and the entire keypad may be locked at the press of a button to avoid accidental change while carrying the unit. Any frequency range may be searched for activity; if an active frequency is found, it may be entered directly in to a memory channel.

Up to 200 frequencies, along with delay, may be banked into ten groups of twenty. Each bank offers a selectable first-channel priority function, if desired, for a total of ten priority channels, sampled for activity every two seconds.

Personal Impressions

While the keypad is small and may be intimidating to those with large fingers, it has a good "feel" -- reassuring tactile feedback. There is a significant (about one second) delay between executing the frequency entry and seeing it come up on the display. Programming 200 channels takes a while!

Audio is loud and clear, adequate for all but the cab of a speeding locomotive! Sensitivity on all ranges is excellent (see sidebar article), although the rubber flex antenna is a compromise. The radio responds much better to a full-size antenna such as the Grove ANT-8 telescopic whip, a mobile antenna or outdoor base antenna.

While intermodulation and image response seems to be improved over previous models, these annoying interference phantoms are still there. Aircraft transmissions will suddenly pop up in the middle of the 155 MHz police/fire band and strong trunked repeaters could be heard in multiple spots throughout the 800 MHz range.

There are a few "birdies" as well; these self-generated signals are most often discovered during the search routine and sound like dead carriers (signals with no modulation on them). They are certainly no worse, however, than those heard on other scanners.

The Bottom Line

The BC200/205XLT is quite probably the finest hand-held scanner on the market. While still in short supply, quantities are expected to arrive in this country shortly. It is available for $264.95 plus $5 shipping from Grove Enterprises.

■

FOR CELLULAR RESTORATION: Full directions will appear in next month's "Helpful Hints," or you may send $2.00 plus SASE to Monitoring Times for instruction sheet.

SENSITIVITY AND IMAGE MEASUREMENTS OF THE BC200/205XLT

by Raymond A.J. Pesek, WB8NXR
Brunswick, OH

Recent measurements made with an IFR FM/AM-1200S service monitor disclosed a number of interesting characteristics of the new Uniden BC-200 (and 205) XLT scanner. FM readings were made using a 1000 Hz tone deviated at 4.5 kHz; AM readings also used a 1000 Hz tone with 80% modulation.

Image rejection is rather poor, especially at 800 MHz where images may actually be stronger than the desired frequency! An unmodified scanner could readily monitor forbidden cellular telephone conversations by merely adding 21.7 MHz to the censored frequencies.

At low and aircraft bands (29-54, 118-136 MHz), the image appears 21.7 MHz above the scanner frequency; at UHF the image will appear 21.7 MHz below.

Maximum squelch setting requires, on the average, signals 3-4 times stronger than those at minimum (most sensitive) setting to break squelch. The following measurements were made with the squelch set at the most sensitive position.

Freq. MHz	Sensitivity	Image Response
29	0.25 uV	4.5 uV/-25 dBm
41.5	0.25 uV	5.0 uV/-26 dBm
54	0.50 uV	2.5 uV/-10 dBm
118	0.25 uV	1.8 uV/-19 dBm
127	0.30 uV	2.5 uV/-20 dBm
135.975	0.25 uV	2.0 uV/-19 dBm
406	0.30 uV	0.45 uV/-1 dBm
459	0.25 uV	0.50 uV/-6 dBm
512	0.30 uV	1.0 uV/-10 dBm
806	0.80 uV	0.6 uV/0 dBm
876.5	0.70 uV	0.65 uV/0 dBm
947	1.0 uV	0.60 uV/0 dBm

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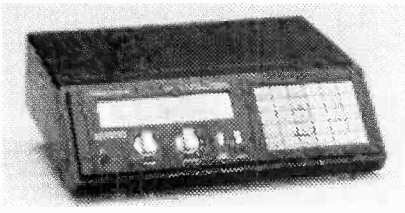

Comes with simple instructions to restore cellular coverage disabled by the factory, or we will restore it for $10.

You can walk into your chain retail store and pay over $400 for this new luxury scanner, or you can order it from Grove for only $389.

The PRO-2004 provides continuous frequency coverage between 25-520 and 760-1300 MHz in your choice of mode—AM, narrowband FM or wideband FM. With no crystals needed, this exceptional unit delivers a wide range of frequencies not found on most scanners—including public service, broadcast FM, military bands and CB!

Search mode finds new channels, with an incredible 300 channels available for storing the ones you like. Rapid 16-channel-per-second scan and search complements this scanner's high sensitivity and excellent selectivity, providing for maximum distance reception, even in crowded band conditions. Built-in speaker and telescoping antenna are included. Jacks provided for external antenna (BNC female), headphone, external speaker, tape recorder and DC adaptor.

Order SCN 5

Retail ~~$419.95~~

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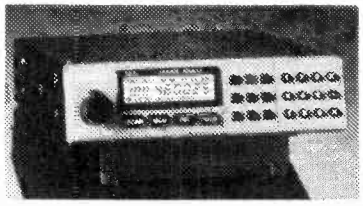
Bearcat BC760/950XLT



Measuring a tiny 2" high by 7" wide and deep, this upgraded version of the BC600XLT is ideal for compact mobile or base installations. Features include user-programmable search ranges, five priority channels, individual channel lockout and delay, direct channel access, external antenna jack (MOT female), and optional CTCSS tone-squelch decoder. Mobile mounting kit, DC cord, AC wall adaptor, plug-in whip, and operating manual are all included at no extra charge!

In addition to normal 29-54, 118-174 and 406-512 MHz coverage, the new 760/950 also has 806-960 MHz (less cellular band; we can restore full coverage for $10 at time of order). And with its pre-programmed service search capability, just push a button to find active police, fire, aircraft, maritime, emergency, and weather channels!

One hundred memory channels may be scanned sequentially or in five 20-channel banks.

Recommended Retail ~~$389.95~~

New Low Price

$279.00

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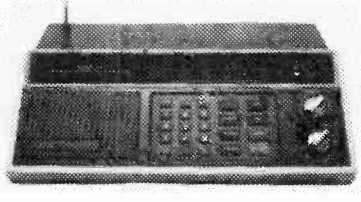
$15 Canada Air P.P.

Bearcat BC800XLT

Top of the Line—With 800 MHz!



SCN 11

Yes, the BC800XLT features wide frequency coverage: 29-54, 118-136 (AM), 136-174, 406-512, and 806-912 MHz with 40 channels of memory in two banks.

Other features include rapid scan (15 channels per second), powerful 1.5 watt audio amplifier, two telescoping antennas (one for 800 MHz range), better than 1 microvolt sensitivity, 55 dB selectivity @ ± 25 kHz, instant weather reception, brilliant fluorescent display, AC/DC operation, direct channel access, individual channel delay, priority channel one, fully synthesized keyboard entry.

Dimensions: 10½"W x 3⅝"H x 8"D; *Weight: 7 lbs., 2 oz.*

List Price ~~$499~~

Grove Price Only

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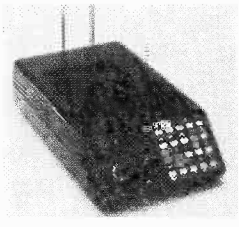
$15 Canada Air P.P.

Turboscan 800!



From Regency

The Regency TS-2 boasts the fastest scan and search rates in the industry—50 channels per second—more than three times faster that the next closest competitor. Six memory banks store up to 75 separate frequencies, selectable by groups or in a continuous sequence.

Frequency coverage is wide: 29-54 MHz FM (ten meter amateur, low band and six meter amateur), 118-174 MHz (Am aircraft and FM high band), 406-512 MHz FM (UHF federal government and land mobile), and 806-950 MHz (microwave mobile).

Other features include instant weather channel, priority, direct channel access, and scan delay. Accessories included are telescopic antennas, AC power supply, DC mobile cord, and mobile mounting bracket.

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The New Grove SR-1000 Spectrum Surveillance Receiver

Back in April *Monitoring Times* printed an initial press release of the new Grove SR-1000 Spectrum Surveillance Receiver. Additional specifications for the receiver, to be released this fall, were unveiled at last month's Dayton Hamvention. According to the manufacturer, Grove, "There has been a deluge of inquiries from SWL's, scanner enthusiasts, private investigators and government agencies."

The receiver is still under active development, so the specifications are tentative and subject to change.

A lot of radio in a desktop box

Measuring 16"W x 5-1/4"H x 13" D, the SR-1000 features continuous frequency coverage from 100 kHz to 1000 MHz and digital frequency readout to 100 hertz. A cathode ray tube (CRT) oscilloscope display presents a visual panorama of all signals within a bandwidth of 100 kHz, 1 MHz or 10 MHz.

Five modes -- wideband frequency modulation (WBFM), narrowband frequency modulation (NBFM), amplitude modulation (AM), upper sideband (USB) and lower sideband (USB) -- permit reception of virtually every possible mode of emission.

Frequencies may be set by a two-inch tuning knob or direct-entry keypad. Tuning increments -- "speed" -- may be selected from 100 Hz, 1 kHz, 10 kHz, 100 kHz or 1 MHz, allowing rapid capture of signals which pop up on the surveillance screen.

An LED bargraph shows relative signal strengths and a center-tuning indicator alerts the user when he is exactly on frequency for precise receiver adjustment.

Up to 100 memorized frequencies may be stored along with mode, individually recalled simply by rotating the tuning dial with memory selected. Reception may be enhanced by a preamplifier, attenuator, notch filter and tone control. A squelch circuit works in all modes, eliminating irritating background noise.

Wide dynamic range reduces intermod and images from strong signal overload, so apparent in many scanners and shortwave radios. Rear panel jacks allow tape recorder activation and recording for unattended monitoring or permanent logging.

The price? This is the most difficult specification, according to Grove. A receiver this advanced requires sophisticated development; Grove is targeting under $2000 -- pretty optimistic and very reasonable considering the closest competitor sells for $16,000!

The reader is cautioned that these descriptions are preliminary and some could change before production begins this fall. For further information, contact Grove Enterprises, P.O. Box 98, Brasstown, NC 28902 or phone 1-704-837-9200.

Haruteq Scanner Book

Ontario Edition

by Bart Veerman (126 pages, 8-1/2" x 11", perfect bound; $14.95 plus $3 postage and handling; Ontario residents must add 7% sales tax; from Haruteq, PO Box 9268, Stoney Creek, Ontario, Canada L8G 3X9)

Canadian scanning enthusiasts should rejoice at this latest directory for the Ontario provincial region. Listings are cross-referenced by frequency and city, and cover the frequency range 30-960 MHz.

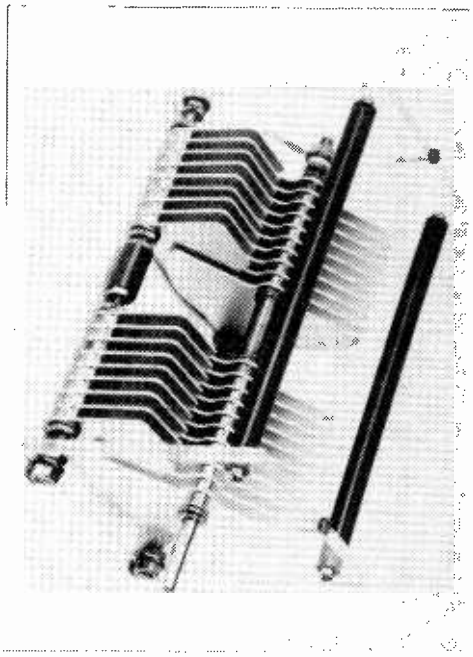
Services include police (including RCMP) and fire, mobile phones, aircraft and marine, government and provincial, business and industrial, military, media, transportation and paging.

An introductory text is packed with nuggets of information useful to the beginner and experienced listener alike; topics include system details, antennas, interpreting marine weather forecasts (MAFOR) and frequency allocation details. Several police ten codes are presented for more meaningful police reception.

Nevada High-Power Variable Capacitor From Kilo-Tech

Kilo tech is now offering high quality variable capacitors capable of withstanding very high RF voltages up to 7.8 KV. The Nevada High-Power variable capacitor is constructed of brass, ultra high-grade aluminum with gold anodizing and high voltage acrylic. The caps are suitable for high power antenna matching units, power amplifiers and transmitters. Two values are currently offered: 500 pf (Model TC-250: $29.00) and 250 pf (Model TC-500: $40.00).

For more information, contact Kilo-Tech at P.O. Box 1001, Oak View, California 93022.



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TH5MK2S	5 element 'Thunderbird'	
TH2MK3S	2 element 'Thunderbird'	
TH7DXS	7 element 'Thunderbird'	
TH6DXX	conversion kit to TH7DXS	
EXP 14	Explorer 14 triband beam	
QK710	30/40 M conv. Exp 14	
	Monoband	
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105BAS	'Long John' 5 element 10 mtr	
155BAS	'long John' 5 element 15 mtr	
204BAS	4 element 20 meter	$299.00
205BAS	'Long John' 5 element 20 mtr	
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7-2S	'Discoverer' 2 elem. 40 meter beam.	
7-3S	converts 7-2S to 3 elem. beam	
	Multiband Verticals	
18HTS	'Hy-Tower' 10 thru 80 meters	
14RMQ	roof mt kit for 12 AVQ,14AVQ and 18ATV/WB	
18VS	base loaded, 10 thru 80 meters	
12AVQS	trap vertical 10 thru 20 meters	
14AVQ/WBS	trap vertical 10 thru 40 meters	
18AVT/WBS	trap vertical 10 thru 80 meters	
	Multiband Doublets	
18TD	portable tape dipole 10-80 meters	
2BDQS	trap doublet 40 and 80 meters	
5BDQS	trap doublet 10 thru 80 meters	
	VHF ANTENNAS Beams & Verticals	
23BS	2 meter 3 element beam	
25BS	2 meter 5 element beam	
28BS	2 meter 8 element beam	
214BS	2 meter 14 element beam	
64BS	4 element 6 meter beam	
V-2S	colinear gain vertical 138-174 MHz.	
V-3S	colinear gain vertical 220 MHz.	
V-4S	colinear gain vertical 430-470 MHz.	
GPG2A	base, 2 mtr. ground plane 3 dB	
	VHF & UHF Mobiles	
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HB144GRI	HyBander 2mtr 6dB gain 3/8-24 mt.	
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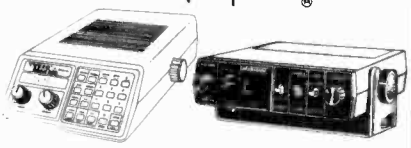

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Same except 35 channels 11 band.

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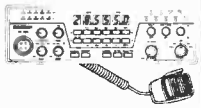

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BC560XLT	16 Ch 10 band mobile	$99.90
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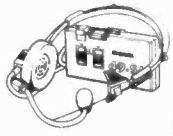
MAXON....$26.95



Model 49SA - 49 MHz, FM 2-WAY RADIO hands free operation, voice activated transmit up to ½ mile. Batteries optional

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same features as 49SA except uses "AA" nicad batteries and comes with battery charger

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Compact SUPERHET, city/highway, audible & visual alarm, dash/visor.

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Dual conversion superhet, city/hwy, LED's, audible alarm, compact.

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2 power cords, travel case, dual conversion superhet, city/hwy, audible & LED alerts, mini size.

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X & K band superhet, LED's, city/hwy, audio alarm, dash/visor.

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Dual conversion superhet, mini size, LED's, audible alert.

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Sequential LED alert, tone alert, X & K band, dash/visor.

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NEW TRI-BAND, X, K & Ka, sequential LED's & city/highway setting.

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Compact SUPERHET, City/Hwy, LED's, volume alert, Dash/Visor.

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Superhet, city/highway switch, audible & visual alarm.

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Long range dual conversion, X & K band, LED's, audible alert w/volume control, antifalsing, city/hwy, dash/visor.

RD21 . . . . . **$69.90**
Mini size, audible & visual alert, omni-polarity guard, dash/visor.

RD25 . . . . . **$89.90**
Deluxe mini, same as above with sequential LED's.

Tricking the HX-2200 Out of Range

One of the most popular sports in scanner monitoring seems to be discovering keyboard techniques to extend the frequency coverage beyond that stated by the manufacturer.

Formerly, many scanners could be manipulated out of range by combinations of keypad entries, but manufacturers have recently begun to restrict their intended frequency coverage by undefeatable ROM design.

Gary Churchill of St. John's, Newfoundland, may have discovered a way of fooling the Regency HX-2200. He suggests that in addition to continuous 118-174 and 406-512 MHz, the unit is capable of 800-1200 MHz just by entering 1.200 MHz. Try it!

Tuning Out and Tuning In

Being a typical scanner enthusiast, I believe in having a scanner on whenever possible. One of my favorite times being early weekend mornings. I turn on the scanner, make coffee and watch the day unfold.

As the day progresses, TV, conversations and standard household noises fill the air, competing with my scanner for attention. That's when listening gets tough. Trying to hear the scanner as I go about my business around the house can be rough!

Then one day, while glancing at the Radio Shack catalogue, I saw an ad for wireless headphones. I went out and bought a pair, came home and hooked them up to my scanner. Operation is simple. You plug the phono jack to your scanner and turn on the headphones. Sound quality and coverage are great!

I can now walk around anywhere in the room and listen to the scanner. No more missed transmissions because I can't hear; no more bothering the family. I can even listen to the scanner when I step out onto the patio -- without dragging out a lot of equipment.

(Contributed by Mike Bucko, Independence, Missouri)

De-Beeping the Regency DX-3000

I've discovered a way to disable the "beep" heard when keys are depressed on the scanner. This modification could be helpful to those who find this practice annoying.

Here's the procedure:

1. As always, unplug the power cord.
2. Remove the volume and squelch knobs.
3. Turn the scanner over and remove the four Phillips screws. Pull the cover off and set it aside.
4. Remove the top cover by carefully prying on the cover ends with a small screwdriver. Set the cover aside.
5. Locate the conductor strip to the left of the keyboard and gently unplug it.
6. Grasp the fifth pin from the front of the scanner with needlenose pliers and remove it by pulling upwards while applying heat with a soldering iron. Save the pin in case you change your mind!
7. Plug the conductor strip back in and reassemble the covers and replace the knobs.

This modification does not affect any other function of the scanner and may work on the Regency D-310 as well. An interesting idea might be to install a small switch so that you could turn the "beep" off and on at will.

Improving Sensitivity on the PRO-2004

Monitoring Times has mentioned the poor sensitivity of the PRO-2004 before, but living in a suburb of Philadelphia, it has not been a problem. I have, however, experienced *intermittent* sensitivity. (This is best noticed with an "S" meter-equipped radio.)

I traced the problem to the poor quality BNC connector on the rear of the radio. The center contact is "fork" shaped and no matter how I tensioned it, ultimately it would lose contact with the mating connector.

Although removing and replacing this connector is a dog of a job, after the job was done, the problem of intermittent sensitivity disappeared. Now, I'm 99% satisfied with this radio. I'm still trying for 100%. If only someone out there knows how to increase the scan delay!

(Contributed by Kenneth W. Camuccio, Runnemede, New Jersey.)

An Inexpensive Aid to Outrageous DXing

Would you like to boost the effectiveness of your DXing? If you would, there's a nifty little product called "The DX Edge."

The DX Edge is deceptively simple. It's a kind of plastic slide rule showing two maps of the world, side-by-side. Into this slide rule you snap one of 12 clear plastic slides (one for each month of the year) with the scale for local standard time marked across the top. On the face of each slide is a transparent area and a shaded transparent area.

Just line up the scale with local standard time over the part of the map with your location and the DX Edge shows you which parts of the world are in darkness and in light.

OK, you say, so what if I know where it is light and dark? What does that do for my DXing? Say that you're a sidebander. Eleven meter propagation is generally best during daylight hours. So, it doesn't make any sense, except in times of very high sunspot activity, to try to make a DX contact unless both locations are in daylight.

In addition, the DX Edge allows you to take advantage of an impressive phenomenon called Grey Line DX. What happens is this: when it is sunrise or sunset at your location, you may get unusually good reception from other locations that lay along the grey line, that is twilight, or the line between daylight and night.

The DX Edge is available from most shortwave stores.

Warning! An Outside Antenna May be Hazardous to Your Sony's Health

The Sony ICF-2010 and the ICF2002 portable shortwave receivers have external antenna jacks. An antenna adapter is supplied with the ICF-2010 that has a small junction box with a lid to gain access to the terminals inside. A coax cable can be terminated inside the box. This adapter is a neat idea but there is a problem.

Sony doesn't tell you that an internal protection circuit, which is connected to the rod antenna, is disconnected from the radio when an outside aerial is hooked up. This lack of protection at the external antenna jack can cause serious damage to the radio. Any static or lightning strike during even a moderate storm can damage the unit's amplifier stage. This will cause the radio to have poor reception.

There are several ways to protect your radio. First, you can use an antenna tuner with built-in lightning protection (check the manufacturer's specifications for lightning protection). Or, you can use an active antenna like the Sony AN-3 or Grove PRE-3 power antenna. Both will offer the protection

your radio will need under moderate conditions. Of course, as indicated in last month's Helpful Hints, nothing will save your radio from a nearby or direct hit!

Another way to protect the radio from lightning is to add your own protection circuit. This can be done by purchasing a package of diodes from Radio Shack. The part number is 276-1122 and you'll get ten 1N914 silicon switching diodes. Only two are needed for the modification so you'll have an ample supply for those stormy months ahead. The diodes themselves can be damaged if they're connected to the coax during a storm. I have a PL259 and a double female coax connector on the Sony adapter which allows a quick disconnect to the antenna lead-in wire.

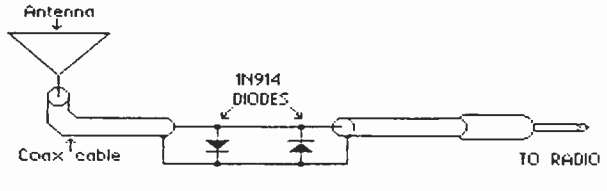
Install the diodes inside the junction box as shown in the diagram. Be careful when soldering the diodes to the metal strain relief tabs which are used to hold the coax. If the glass diodes are over-heated, they may break. This can be prevented by tinning the tabs first. This modification should also be done on the second adapter for the ICF-2010, which is used for the separate external FM antenna input.

If you think that your radio has poor sensitivity or it just doesn't pull in the shortwave stations like it used to, you may be the victim of lightning-itis. Then you will need to take it to an authorized Sony repair shop. However, if you have the expertise to do it, you may want to take a whack at it yourself.

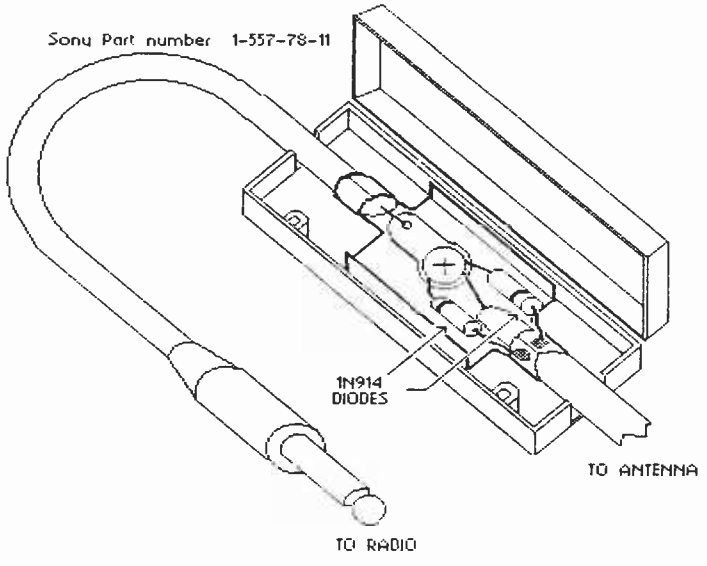
The first thing you need is a replacement transistor. I found an American-made replacement known as the J304 or a 2N5951 [Jamco Electronics, 1355 Shortway Road, Belmont, CA 94002]. There is also a Phillips ECG replacement for the J304, which is the ECG312. [Phillips ECG, Inc., Distributor and Special Markets Division, 1025 Westminster Dr., P.O. Box 3277, Williamsport, PA 17701].

If you don't believe in replacements, you can get the Sony part from Joseph Electronics [8830 N. Milwaukee Avenue, Niles, Illinois 60648] or the "2SK" numbered part from MCM Electronics. (MCM is a parts importer and has a large stock of Japanese-made transistors and ICs at a reasonable price. Their address is 858 E. Congress Park Drive, Centerville, Ohio 45459-4072.) The Sony part number for the 2002 or the 2010 is 8-729-800-42 and the transistor is 2SK152. It's a good idea to purchase the service manual for either radio before tackling this job.

(Contributed by Jack Albert, New Lenox, New York)



If You don't have the adapter below, connect the diodes as shown in the above schematic



INSTALLING THE DIODES IN THE SONY ANTENNA ADAPTER

W. Clem Small, KR6A, CET

Rt. 1 Box 64A
Weybridge, VT 05753

MT Readers Reply

Now and then I like to pause in my coverage of antenna related topics, and review some of the correspondence which readers of *Monitoring Times* send in. It is always interesting to see what other people have come up with in their search for an antenna to fit their particular needs.

Window on the World

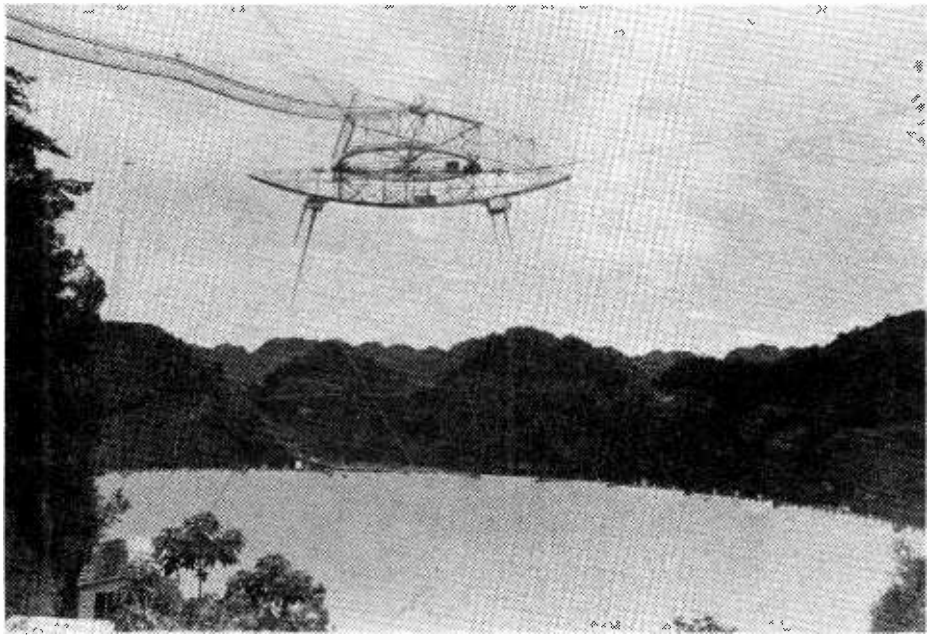
Ruth Hesch, a shortwave listener from White Plains, New York, writes that in order to avoid having her outdoor antenna be too obvious, she used a red wire to construct an antenna which would match the color of the bricks of the building where she lived.

Then, when workmen working on the wall broke her red antenna, she came up with a solution which was even less visually-obvious. For this second antenna, she put a wire around the inside of the metal frame of the picture/casement window in her home. With this antenna and a cold-water pipe ground connection, Ruth was able to "get all the stations I want, and many others." Although she doesn't claim that this antenna is a DX chaser, it seems to be doing quite well.

In the amateur radio sector, J. Frank Brumbaugh of Bradenton, Florida, solved his antenna problems in a fashion somewhat similar to the SWL antenna described above. He ran a coaxial feedline (RG-59) out to the aluminum framework which holds the fiberglass screening around his eleven foot by six foot balcony. The center conductor of his coax went to the aluminum framework, and the outer braid was connected to two lengths of wire.

One of these lengths of wire was a quarter wavelength long on ten meters, and the other one was a quarter wavelength long on fifteen meters. At the inside end of the cable, a Heathkit HFT-9 antenna tuner completed the setup.

The day after installing his antenna, Frank worked stations in Texas, Mississippi, Arkansas, Ohio, Illinois, Missouri, and Indiana on the ten meter band. "...not much signal strength, but excellent audio and mainly solid QSOs."



The giant radiotelescope antenna at Arecibo, Puerto Rico.

The Long and the Short of It

Just to show that you can never quite be sure of what a particular skywire will do until you try it, let's mention an antenna comparison made by Henry M. Henriksen, of Racine, Wisconsin. He had a 32 foot longwire, 16 feet above ground. He also had a dipole antenna which he had made for his scanner from two 18 inch rods. This dipole antenna was mounted about 18 feet above ground, and fed with coaxial cable.

Henry writes that, in one of his "less sane moments" he tried the short dipole, designed for his scanner, as a shortwave receiving antenna. The results were quite surprising, in that "...reception of all the standard stations was about twice the gain of that of the long wire. What made matters worse (or better) was that I picked up stations never heard before, such as Sri Lanka, New Zealand, India, and many others."

So, never give up without trying; a short antenna may still be effective at times.

MONSTERWIRE!

Short antennas do have their uses, but did you ever wish you had just a little bit more space so that you could put up that big antenna you've been dreaming of for so long? (If you could afford to pay for it, that is!). Well, let's all give a sigh of envy as we read of Brian Webb's 5000 foot antenna! Yes, 5000 foot, that's almost a mile long.

It seems that Brian, of Van Nuys, California, and a friend were able to lay this tremendous length of 24 gauge solid plastic insulated wire directly on the ground in some barren land in the Mojave desert. No attempt was made to ground the receiver ground connection, mainly due to the poor soil conductivity in the area.

This antenna was intended for long wave and medium wave reception. On the longwaves its output was so high that it was necessary to attenuate the signal level before it was useful. On the medium wave band, good reception was had, but only in certain directions, due to the high degree of directionality of the antenna. Even on

the shortwave bands "... the antenna appeared to exceed the performance of shorter elevated wires."

On the medium wave band, some AM broadcast stations were received at "S-20" with this antenna, although they were inaudible using a center-loaded, vertical automobile whip antenna.

Brian reports that the antenna "... appears to offer good gain, directivity, and bandwidth. One potential problem which needs to be anticipated is receiver front end overloading. Use of an RF attenuator or receiver with good front end performance should prevent overloading."

Eye On the Sky

Monitoring Times has several times carried articles which refer to the giant radiotelescope antenna at Arecibo, Puerto Rico. Reader Bernard Wimmers and his wife had the good fortune to be stationed near there a few years back. On a trip to see the antenna, they took the picture shown.

The cage-like structure suspended in mid-air contains the receiving antenna elements which pick up the signals focused up to them from the dish-shaped reflector on the ground beneath. That lighter, striped area at the bottom of the figure is the reflector itself. No doubt ET could have easily called home, if only he had had access to this behemouth!

Aloha!

A while back I discussed diversity reception in this column. Dick Hedlund wrote from Honolulu, Hawaii, to reminisce about the old days, and an RCA shortwave diversity system used there in the 1930s. This system, with its multiple antennas, covered a lot of real estate.

It was used to pick up shortwave broadcasts from Point Reyes, California, so that they could be rebroadcast locally in Hawaii. Boxing events, big dance bands, the *Lucky Strike Hit Parade*, and other such entertainment were made possible there by this diversity link. Dick tells us that the fade and hiss were obvious, but everything was still quite intelligible. Nowadays, however, satellite reception is great, and it is "... not like the old days!"

Radio Riddles

This Month's Radio Riddle: If the old radio operator's antenna rule about mounting antennas high and in the clear for good reception is true, how can it be possible that we hear of antennas which are effective when mounted on the ground, underground, or even under water?

Last Month's Radio Riddle: Last month I asked you why vertical polarization, rather than horizontal, or even than circular polarization is accepted as the standard polarization for the VHF and UHF bands.

Unfortunately, it seems that most man-made noise is vertically polarized. And so, horizontal polarization is used for television services, to minimize noise-interference to the video signal. But for most other VHF and UHF services, the signals are vertically polarized.

This is a simple result of the way that we mount antennas for mobile work in these services. A vertical whip is so much more convenient and rugged to use than other antenna designs that we have standardized on this design and the vertical polarization which it produces. The noise problem, which can destroy TV video, is minimized by use of FM in most VHF-UHF services.

And So...

That's it for this time. Many thanks to you readers who take the time to send in the interesting tidbits of information such as those which make up this month's column. I'm sorry that I can't get them all in the column, but they are all appreciated. 'Til next time, Peace, DX, 73

■

Terry Staudt, LPE, W0WUZ

716 N. Roosevelt
Loveland, CO 80537

CB --
The One and Only

Having received the "golden fleece" for missing deadlines, I've been assigned to tell you all about CB. I don't hate CB. I just have a violent antipathy toward the "users" (read: "abusers") of the service.

Having lived in Ft. Worth, Texas, in '77-'79 (more CBs per capita than any other city in the U.S.), I was forced, due to desire to keep eating, to learn all about it from top to bottom.

You haven't lived until you've listened to CB in Ft. Worth! It sounds like a hog farm before Easter. *"This is that one 'Wile Chile', hayou boutit."* Enough.

CB was established by the government in the late 1950s as a radio service for people with short-range needs to communicate with home or business. In the beginning it worked as intended, although the equipment was primitive and left a lot to be desired. The frequency was 26.965 to (now) 27.405, the German Afrika Corps tank allotment. After the war, it was given to hams, but because it had no harmonic relationship to the other ham bands -- significant because of multi-use antennas, it saw little use.

Nature abhors a vacuum, so that's why it was re-allocated to the Citizen's Band Service.

Words for the Uninitiated

Before I go into what's available in the way of equipment and antennas, a few words to the uninitiated are called for.

In this service, which now requires *no* license whatsoever, (even though the previous rules were little more than a post card), you have to face the fact that there're a lot of people over 21 who shouldn't be on the air. The last thing you want to do is "rise to the bait."

My wife and I were on the airport freeway in Ft. Worth one evening and yes, I had a CB in the car. She thought it was a good idea. It transpired that a fellow on Channel 19, the highway frequency everybody is on, let loose with a few "damns and hells." An injured party came on and said "there are women and children, preachers and teachers listening to you." The reply, suffice to say, turned the air ultra-violet! Leave them alone and they usually go away. The difference between grown men and little boys is just the price of their toys.

The equipment available today is excellent. You really have to try hard to go wrong. There are two major manufacturers, Uniden and Cybernet of Japan, with a very few competitors. What this means is no matter where you get the set, with the exception of Penny's and Sear's which are made by Alps (and which are also very good), you will very likely get one or the other.

Bells and Whistles

The only thing to look for in "bells and whistles" is a noise blanker. This is infinitely better than the common ANL (automatic noise limiter) and works wonders with ignition noise. You'll have to pay some $20.00 more for a set with this feature.

Whatever you get, be advised that it will put out about 2 1/2 watts and modulate a little over 40 percent. If you don't know anyone with an FCC 2nd class license or higher with the facilities, you need to take the set to a CB shop for a "legal peak-out." Four watts at 100 percent modulation.

Why, you ask? The reason is simply that the manufacturer of the unit and the jobber doesn't want the FCC to "pull" a representative sample and find it exceeds these specifications. They would wind up with a warehouse full of sets they couldn't sell. So, they stay on the safe side to the detriment of the consumer.

That's a real shame, as it adds about $15.00 to the price of the radio. They can usually go over four watts, but the difference between say, four watts and six isn't really very important -- less than one "S" unit. To be quite honest, the FCC doesn't really care *as long as the radio isn't modified!* They know that the difference is too minor to work up a sweat over. I'll probably get a hot one over this, but several FCC field engineers have told me this is, in fact, the truth. I already knew that. You also will be lucky to get an extra six blocks. . . .

Stay on the safe side, for the radio, not the FCC. Contrary to popular opinion, the FCC cannot stop a car to measure the power of your radio. They have to have the State Police and a Federal Marshall with them, so except in the case of a trucker running a thousand watts with a crummy linear wiping out 10 channels, it just doesn't happen.

The Antenna

Nothing works like a nine foot whip, period. It's a quarter wave on 11 meters and shortening it only reduces your range. I realize you all have seen little 16 inch whips on both sides of a Honda -- the salesman is laughing all the way to the bank and you wonder why you can't talk home from a mile away. No problem. These little things not only work terribly, they cancel themselves out. Two antennas on CB have to be at least 8 feet apart to radiate. It's a law of physics.

If your family can't stand the full size, a fiberglass wound antenna such as the "Firestik" and Radio Shack's can be gotten from four feet up and work very well. Otherwise, the only shortened antenna that works reasonably well is the K-40. I honestly don't know why, but it's an

observable fact.

A lot of off-road four wheelers and hunters have come to me in my area, wanting the best possible results. I can identify with that, as these people are not "whing dings."

My reputation follows me as a miracle worker, so I try not to disappoint. What I do is put the radio on the bench and check power, frequency and modulation. Adjust it to specs and install it in the vehicle, using an SWR meter with the longest antenna they can put up with. A range of 12-18 miles isn't all unusual. I get $55.00 for the whole thing and have never had a come-back. I usually recommend a Radio Shack CB (Uniden) and full size metal or fiberglass whip. It works.

On SSB

Except for the most difficult situation and CB hobbyists, it isn't worth the money as there are so few sets out there to receive you. If you are really serious, this mode can give you a few crucial extra miles and may well be worth it if business use is your paramount interest. As to the CB hobbyist, this gets your feet wet for the true enjoyment of ham radio. Except for local chit chat, however, if you work 'skip' and are caught by the FCC, you can kiss that ham license goodbye, FOREVER. They have no sense of humor.

I realize that this just scratches the surface of the subject. I honestly had to sit down at the typewriter until little beads of blood appeared on my forehead to get it out, having listened as the CBer was shot and killed over a channel dispute in Ft. Worth. It was sick. The fellow's wife, after he was shot, got on the radio and said "I hope you're satisfied, you just killed a damn good CBer, and he was the father of my children." This was reported by the Ft. Worth *Star-Telegram*, verbatim.

Show's you how effective the whole thing is. Enjoy?

Any questions will get my attention when an SASE is provided.

■

For more information on CB Radio, Monitoring Times recommends Tom Kneitel's, "Tomcat's Big CB Handbook." It's available from your favorite bookstore or direct from the publisher at P.O. Box 56, Commack, New York 11725.

CONVENTION CALENDAR

Date	Location	Club/Contact Person
June 3-4	St Paul, MN	North Area RA/Steve Glatzel K0FHC 7400 Noble Ave, Brooklyn Park, MN 55443
June 3-5	DFW Metroplex,TX	West Gulf Div/John Fleet WA5OHG Box 25028, Dallas, TX 75225
June 4	Coeurd'Alene,ID	Kootenai ARS/Walter Hogeweide K7ETJ N.11655 Sundler La, Rathdrum, ID 83858
June 4	Columbia, MO	Ctrl MO RA/Dewey Bennett N0HKN PO Box 13 Mid Sta, Columbia, MO 65203
June 5	Princeton, IL	Starved Rock ARC/Ken Stasiak WB9ZFO Box 134, Lostant, IL 61334
June 5	Manassas, VA	Old Va Hams ARC/Art Whittum W1CRO 12212 Woodlark Court, Manassas, VA 22111
June 5	Pittsburgh, PA	Breeze Shooters/William Kristoff Jr N3BPB 205 Twin Oak Dr, Wexford, PA 15090
June 5	Salina, KS	Ctrl KS ARC/Jim McKim W0CY 1404 S. 10th, Salina, KS 67401
June 5	Chelsea, MI	Chelsea Comm Club/Robert Schantz K8JVK 416 Wilkinson St, Chelsea, MI 4818
June 5	Newington, CT	New'ton ARL/Joel Kleinman N1BKE 225 Main St, Newington, CT 06111
June 5	Muncie, IN	Muncie Area ARC/Robert Casada KC9QY 2608 Sycamore, Muncie, IN 47302
Jun 10-11	Albany, GA	Albany ARC/John Crosby K4XA PO Box 1205, Albany, GA 31702
June 11	Midland, MI	Ctrl MI ARA/David Burdeaux WD8DII 409 Heathermoor, Midland, MI 48640
June 11	Winston-Salem,NC	Forsyth ARC/Bob Gates KJ4IC Box 60, Cedar Grove Pk, Kernersville, NC 27284
June 12	Queens, NY	Hall of Sci ARC/Stephen Greenbaum WB2KDG 85-10 34th Ave, Jackson Hgts, NY, NY 11372 144.300 simplex; 223.600 rptr; 445.225 rptr
June 12	S Dartmouth,MA	SE MA ARA/Pete Kodis N1EXA PO Box 9187, N Dartmouth, MA 02747
June 12	Willow Spgs,IL	Six Meter Club/James Novak WA9FIH 2337 S. 6th Ave, N.Riverside, IL 60546
June 12	South Bend, IN	Michiana ARC/Fred Boehlein KE9FE 733 E. 4th St., Mishiwaka, IN 46544
June 18	Cortland, NY	Skyline ARC/Curt Smith WA2TOL 3673 S. Pendleton St, Cortland, NY 13045
Jul 9-10	Lake Canton,OK	Lake Canton Field Day/ Tim Mauldin WA5LTM P.O. Box 19097, Oklahoma City, OK 73144 146.52 simplex; 144.85/245.465 rptr
Jul 10	Atlanta, GA	GA State Conv/ Sandy Donahue WA4ABY 960 Ralph McGill Blvd, Atlanta, GA 30306
Jul 10	Pittsburgh, PA	North Hills ARC/ Bob Ferrey, JR. N3DOK 9821 Presidential Dr., Allison Park, PA 15101
Jul 10	Alexander, NY	Genesee RA Inc/ Ed Grabowski KC2ZR 11458 Sanderson Rd, Medina, NY 14103
Jul 10	DownrsGrove,IL	DuPage ARC/ Ron Smith K9QAM 4823 Florence, Downers Grove, IL 60515
Jul 16	Union, ME	Mid-Coast ARRC & Yanke RC/ Lynda Hawke 198 Cony St, Augusta, ME 04330
Jul 16	Loraln, OH	Northern OH ARS/ John Jones WA8CAE 4612 Timberview Dr, Lorain, OH 44053
Jul 17	Washington, MO	Zero-Beaters ARC/ Ken Bowles K9OCU 14 Geotown Ct, Union, MO 63084
Jul 17	Wheeling, WV	Triple States RAC/ Ralph McDonough K8AN RD 1 Box 240, Adena, OH 43901
Jul 17	Van Wert, OH	Van Wert ARC/ Jack Snyder WD8MLV Rt 2 Box 153-C, Ohio City, OH 45874
Jul 23-24	Chicago, IL	ACLR-DeVry/ Alice Myk 6520 W 28th St, Berwyn, IL 60402
Jul 31	Peotone, IL	Hamfesters RC/ John Schipitsch W9BNR PO Box 42792, Chicago, IL 60642
Jul 31	W.Friendshp,MD	Balt RA TV Soc/ Mayer Zimmerman W3GXK 8711 Allenswood RD, Randallstown, MD 21133
Jul 31	Asheville, NC	W.Carolina ARC/ Phil Haga KA4CAC Rt.5 Box 438, Candler, NC 28715
Jul 31	Grdn Praire,IL	Big Thunder ARC/ Jim Brimsby W9HRF 210 Oak Lawn Lane, Poplar Grove, IL 61065

MONITORING TIMES IS HAPPY TO RUN ANNOUNCEMENTS OF RADIO EVENTS OPEN TO OUR READERS. Send your announcement at least 60 days before the event to: Monitoring Times Convention Calendar, P.O. Box 98, Brasstown, NC 28902.

The Pros and Cons of Matchmakers

by Ike Kerschner

The designer of receivers, filters, amplifiers, transmitters, antennas and all the other electronic things that make up the "good life" always has a specific operating impedance for the overall system in mind. The finished product has this either stamped on it or specified in its operating manual.

Operating the equipment at other than its designed impedance causes problems. In a receiver for instance, we may experience poor sensitivity, reduced dynamic range, distorted output and generally disappointing performance. Filters, when mismatched, may not filter at all. Transmitters and amplifiers will in some cases destroy themselves if operating impedances aren't strictly observed. Ms. Match is no lady.

What's to be done?

There is a simple way out for the novice: Be sure that everything in the R.F. system has the same operating impedance -- and the same characteristics too. For instance, a 75 ohm balanced transmission line is no match for a receiver with a 75 ohm *unbalanced* input. Though the impedances are the same, the parameters are quite different.

In the audio output circuitry of a radio, impedance must be respected, too. We all know that plugging 8 ohm headphones into a high impedance headphone jack causes distorted, low output. There is, however, an easy fix for this problem. It's called the line impedance matching transformer. Believe it or not, such a fix also exists for the radio frequency circuits around your radio shack. While a bit more complicated than an audio transformer, the matchbox (a.k.a. antenna tuner) accomplishes impedance transformations with ease while taking care of any reactive component as well.

Do I need one?

As pointed out, if you stick with a co-ordinated system and operate only within its design limits, the answer is probably no. There are however, many terrific antennas and some super radios that were never designed for any known standard operating impedance. That these units were not made for each other doesn't mean the effort involved in matching them won't be rewarded.

Some systems, designed to be compatible, really have hidden matching circuits built-in to avoid the mismatch. It would seem that a better understanding of these devices is needed both for the novice and for the old hand. The main reason I say this is that the drawbacks of using a matcher can out-weigh the advantages.

What's a Mis-Match, anyway?

Engineers love to quantify stuff. Formulas and numbers are their game. When given the problem of properly connecting two radio devices together, they had to invent a quantity that would give some measure to the degree of disagreement between the units.

As a practical matter, most devices are interconnected by transmission lines. If energy is directed down a line toward a load and a finite disagreement in operating impedance exists between the line and the load, some energy will be absorbed by the load while the rest is sent back up the line. What happens to the rejected energy has been the subject of more than one barroom brawl. Let's hold off on this point just a bit.

The net effect of electrical energy directed down a line and encountering a portion (or all) of itself returning back up the line causes waves of energy -- true crests and troughs -- to appear as though standing still on the line. The greater the mismatch, the higher the crests and the deeper the troughs. If we divide the crest's height by the trough's height, we get a standing wave ratio (SWR). And if we determine the crests and troughs by measuring their voltages, we define a voltage standing wave ratio.

Most engineers are happy at this point. All are happy if you emphasize that a mismatched line has a continuously varying impedance throughout its physical length. With this concept, there's no need for a transmitter to be on line. Even a receiver can suffer from mismatched line conditions.

What's bad about high SWR?

Sometimes nothing. If the radio transmitter or power amplifier is designed to handle it, almost all of the reflected energy eventually gets back to the load anyway. The reflected energy is redirected at the sending end back up the line and joins the newly generated energy from the sending unit. This is why a mismatched transmitter seems to have a higher power output than possible, when measured on an in-line watt meter.

If the sending unit can be damaged by the reflection due to a mismatch, special circuitry exists for the sending end that will dump this returned energy into a dummy load. Now that you know all this, I'd advise you to stay away from any drinking establishments frequented by so-called "experts".

But this doesn't mean very much to the shortwave listener who couldn't care less that a high SWR decreases the power handling capability of a transmission line, though he may be interested in the fact that all signal losses increase with increasing SWR

Say what, SWL?

There are other more important consequences. Receivers and preamplifiers can easily overload on unwanted, out-of-band signals or become unstable when connected to a line with a high SWR A unity SWR is often called a "flat line". It really says all the energy is going one way, nothing is being returned and there are no energy lumps. Any filters or other additions to a flat line should not alter this condition.

Well, can a matchbox flatten transmission lines?

Usually, transmission lines display symptoms of high SWR because the antenna doesn't match the line. If the antenna is mismatched to the feedline, there will always be a standing wave condition on the line even for receivers. Unless of course the match box is placed between the transmission line and the antenna. This is generally considered inconvenient though often done. The usual place for the matchbox is between the transmission line's end and the radio. At least in this position the matcher can transform whatever impedance is present at that point on the line to something the radio is happy with.

It doesn't tune the SWR?

Not for the conditions just put forth. So in this case, don't call it a transmission line tuner. By the way, it doesn't tune the antenna either, so don't call it an antenna tuner. It's only a matching unit that transforms one impedance to another. And some of the fancier units can change balanced lines into unbalanced lines. Be careful here, though. These balun transformers only work properly over specific resistive impedance levels and never work well if a significant reactive component is involved. But I'm getting complex.

Will it improve my noise level?

Many SWL's and most hams know that a horizontal antenna is less responsive to noise than a vertical antenna simply because so much man-made (and natural) noise propagates in a vertically polarized mode. So they string up a horizontal wire and run some transmission line up to it giving little thought to SWR Granted, at a few frequencies this antenna and transmission line may agree perfectly in operating impedance. At other frequencies they will not.

This effect appears as a standing wave problem in-so-far as the apparent impedance along the transmission line changes point by point. Your radio will not have been designed to accommodate this, thus justifying use of a matching unit.

Remember, you can't change the SWR if the antenna doesn't match the line. The downside of this is your transmission line will become a parasitic antenna. After all, an antenna is -- loosely speaking -- a transmission line that doesn't go anywhere and therefore intrinsically has an infinite SWR

So, if your feedline has standing waves on it, it too becomes an effective antenna. It will obviously have some vertical length which will surely pick-up noise. And worse yet, any computer gear or terminal units used in your radio room can generate noise easily picked up by this mismatched hunk of transmission line. A matching unit will do you no good here. It will be just as noisy with or without it.

In some cases though, loud local signals and noise are concentrated over a limited frequency range. Because the matching unit itself can only accommodate a very narrow frequency span at any; given setting, it can fail to efficiently match off-frequency signals to your receiver. If this improved selectivity benefits your particular receiver, then you are in luck. Many receivers do benefit from the apparent selectivity a matcher yields.

You mean I've got to readjust this matcher for each station?

Well, maybe not each station but certainly band by band. For those with scanning receivers, this is not a very handy tool. Certainly the matcher is not for everyone.

But who does need one?

It's very good for those constantly working with new antennas. If more than one matcher is available, different antenna, transmission line and equipment combinations can be tested easily. When results are promising, more permanent arrangements can be effected. Transmitter harmonics will be suppressed, if you are interested in that sort of thing.

My buddy told me his tuner fixed all his noise problems

There is the unique situation in which the receiver is the only item that doesn't match an otherwise harmonious system. In this one special case, a match box really does shine. It does reduce the SWR to a flat line condition. It does reduce signal losses on the line. It will improve the noise immunity of the antenna feedline system. But this is not the usual case.

As discussed in the previous cases, receiver selectivity, stability and performance may be improved. For the ham, transmitter harmonics can be attenuated. Equipment specifications will probably be met. All of these good things can only be accomplished at the expense of frequency agility. It is a wise man who said that everything in life involves a compromise. That's why some men marry bad cooks.

■

From the Editor:

A Second Chance for AM

It's nighttime. You turn on your radio and scan across the dial. All about you is chaos. Stations are broadcasting on top of one another. They fade in and out. Audio quality is awful and the noise! It's just too much!

We're talking about shortwave, right? Wrong. We're talking about the good old AM broadcast band. And it's a mess. Sure, there are AM stations that are still "making it." But there are probably far more that aren't. Conduct an informal survey of your friends. How many of them still listen to AM radio? Point made.

The reason why we bring this up is because AM radio *has* been having some pretty rough times. Some say that the band is dead. And while broadcasters work to revitalize it, there's still contention. AM stereo is a good example. What system should be used? Will receiver manufacturers support the concept of AM stereo with new product? And if they do, will more people listen?

Right now, the U.S. Federal Communications Commission is looking at the 1605 to 1705 kHz expansion of the AM broadcast band. And, as can be expected, a lot of questions are being asked. Should daytimers be given first shot at the frequencies? How about minorities? Should they get first crack at the new frequencies? Especially intriguing, too, is the proposal for establishing one-licensee national channels in the new frequency range.

All this is really beside the point. What's really important is that right now, the FCC has the opporunity to set new standards for a virgin frequency range. And what they do with it can create either another mess or a method of allocation that can be used as the basis for all of the AM band in the future.

It's too late to get in on the first round of comments on the AM band expansion (Docket 87-267). But the second round doesn't close until this month. If you would like to make your two cent's worth known in Washington concerning the AM band expansion, write. Make yourself heard. Because if you don't so now, all we'll be able to do later is sit back and complain. Remember what happened with the Electronic Communications Privacy Act -- a lot of your hobby is now illegal!

Larry Miller

LETTERS

continued from page three

Ham Radio: A Wonderful Hobby

I am a disabled army veteran and an ex-"mental" patient who has found a creative way to spend my leisure hours: ham radio. It all started when I read an article in *CQ* (I believe) about volunteers who went to mental hospitals in New York State to help patients obtain their novice license. I thought that if they could do it, so could I. And after 14 months of study, I did! Today, I plan to go for my Extra Class license. Hope to work you some day!

(Withheld)
Evanston, Illinois

The Unfriendly Keyboard

I received by first copy of *Monitoring Times* in February and have been meaning to write ever since regarding your editorial on unfriendly computers.

From the jargon of that piece, I gather that you're using an MS-DOS-based computer. I quite agree as to its unfriendliness. But please don't paint all computers with the same brush. A friendly computer does exist. It's call the Apple Macintosh.

Al LaPlaca
Centereach, New York

We Want Scanners!

We could use more scanner frequencies for the west coast.

P.J. Nemecek
Whittier, California

Danmarks Calling...

I recently heard Radio Denmark at 1935 UTC on 11861 MHz. A male announcer said that "This is the shortwave service of Radio Denmark." That was the end of the English. Any chance of getting a QSL out of them? Will they respond? How many IRCs are required? Could you please tell me the address to write to?

Reinhard Foy
West Swanzey, New Hampshire

Radio Denmark, despite the fact that their programs are entirely in Danish (except for the ID you heard), welcome reception reports and will respond with a QSL card and an informational folder. Their address is: Radio Denmark, Shortwave Department, Radiohouse, DK-1999 Frederiksberg, Denmark. Or you could call them at 01-358181.

Denmark continues to have problems with their shortwave service. I've heard that because of the interference that their transmitter causes local residents, they operate it at half power (50 kw). You might take the opportunity of your reception report to ask them to consider some broadcasts in English. They will politely say no, but if they get enough letters... --ed.

Caroline Calling...

For the last 45 minutes, I have been copying Radio Caroline on 6210 kHz. I would like to send them a reception report but I do not have an address. Do you? By the way, I heard them from 0215 to 0300 but they were on the air both before and after that. My *Radio Database International* [Passport to World Band Radio] book shows Riverside Radio on this frequency but they very definitely announce "Radio Caroline." I have not heard the above-mentioned illegal again.

Chuck Oliver
Spring, Texas

MT's Dr. John Santosuosso says that Radio Caroline is "a notoriously bad verifier" but suggests sending your report to the station's New York office and asking them to pass it on to the ship on which the station is based, the Ross Revenge. The address is RSI Communications, 25 Randall Avenue, Lynbrook, NY 11563. Some reports say, however, that the station is refusing mail at that address. --ed.

Bangladesh Calling...

The Bangladesh DX-club International is publishing its English bulletin, *The Bangladesh Calling DX-ers* every three months. A membership fee of US$50.00 will create an excellent opportunity for foreigners to receive our bulletin for a year and promote world peace and friendship.

MD. Iqbal Khandker, Chairman
Bangladesh DX-club International
Department of External Affairs
c/o Int'l Communications Division
G.P.O. Box No. 4051
Dhaka, Bangladesh

World peace, perhaps. Certainly a healthy profit at $12.50 an issue! --ed.

Lawful Listening

Several letters have been received regarding author and attorney Kenneth Vito Zichi's "Getting Started" column entitled, "Radio Listening and the Law" [April, 1988]. The column covered, primarily, the controversial Electronic Communications Privacy Act, which makes illegal certain radio monitoring. The subject is complex but it both requires and deserves substantial discussion. Because of this complexity, however, we have selected only one letter for publication.

It appears to me that the Electronic Communications Privacy Act's amendments to 18 U.S.C. 2510 and 2511 may be unenforceable. I reach this conclusion after reading the April 1988 edition of *Monitoring Times* wherein a lawyer, on pages 34-35 of that edition, shows that the Act is so incomprehensible that even lawyers don't understand it.

[The author] Mr. Zichi cites the exception in the act for communications "readily accessible to the general public" as "a loophole you can drive a truck through." In fact, this is more like the eye of a needle. You see, as is often the case in federal legislation, the term "readily accessible to the general public" doesn't take on its everyday meaning in this statute since the term is specifically defined in paragraph 16 of the preceding section, 18 U.S.C. 2510. This is a bit Orwellian in that if Congress defines blue to be red, it is red for the purpose of the law.

In any case, the definition of "readily accessible to the general public" is stated in the statute as follows:

(a) not scrambled or encrypted;
(b) not transmitted using modulation techniques whose essential parameters have been withheld from the public with the intention of preserving the privacy of such communication;
(c) not carried on a subcarrier or other signal subsidiary to a radio transmission;
(d) not transmitted over a communications system provided by a common carrier, unless the communication is a tone only paging system communication;
(e) not transmitted on frequencies allocated under part 25; subpart D,E, or F of part 74; or part 94 of the Rules of the Federal Communications Commission, unless, in the case of a communication transmitted on a frequency allocated under part 74 that is not exclusively allocated to broadcast auxiliary services, the communication is a two-way voice communication by radio.

The first two of these are no problem. If a signal is scrambled, law-abiding DXers will leave it alone. Paragraph (c) begins the real restrictions on DXers. Under the statutory definition, signals on subcarrier, such as the types being experimented with in television at the moment, are not readily accessible to the general public and are not permitted listening.

The next section poses the greatest problem for DXers. Under the definition, any signal, other than a tone, which is transmitted by a common carrier is off limits. The FCC defines a common carrier as "any person engaged in rendering communications service for hire to the public." (47 CFR 21.2) The statutory definition given in 47 U.S.C. 153(h) is a bit more specific:

(h) "Common carrier" or "carrier" means any person engaged as a common carrier for hire, in interstate or foreign communication by wire or radio or interstate or foreign radio transmission of energy, except where reference is made to common carriers not subject to this chapter; but a person engaged in radio broadcasting shall not, insofar as such person is so engaged, be deemed a common carrier.

This definition is very broad and will include, beyond obvious services such as cellular telephone, radiotelegraph services, mobile radio services, and just about every other utility station on the face of the earth.

The types of radio transmissions made off limits to DXers by paragraph (e) are certain satellite communications, certain microwave communications, and auxiliary stations to broadcasters used for such things as feeds from the mobile van back to the studio or from the studio to the transmitter. The frequencies of these services are all above 1 gigahertz except for the bands 928-929 MHz and 944-960 MHz.

The exception to this is the frequency assignment given to remote broadcast pickup stations under subpart D of part 74. This service, which is off-limits to DXers, is assigned bits and pieces of the radio spectrum from 1606 kHz through 455.925 MHz.

Twenty-six frequencies in the shortwave band are allocated to this service. The allocations are scattered between 25.87 MHz and 26.47 MHz, but unless you have a copy of the FCC Rules and Regulations, there is no easy way for a DXer to know that listening to these transmissions is a federal offense.

This is precisely why I maintain that this law is unenforceable. In order for a prosecution under 18 U.S.C. 2511 to be successful, the government must prove beyond a reasonable doubt that the DXer intentionally intercepted a protected transmission. Since even attorneys are unsure what frequencies are off limits, how can the government hope to prove that a DXer who happens upon one of these federally-legislated minefields in the radio spectrum, actually intended to do so?

In the same issue [Letters, April 1988], Jim Small of Omaha, Nebraska, likens listening to cellular telephone transmissions to climbing a telephone pole and clipping on a handset. The writer simply misses the point regarding the rights being asserted. This is not a question of protecting an arcane hobby enjoyed by a small minority. The ECPA makes it a crime to listen to the radio.

Those people who believe that cellular telephone and other radio-transmitted services should have privacy have not considered the implications of this thing. A more apt analogy than climbing a telephone pole to eavesdrop is that the providers of cellular service want the right to parade down Main Street with no clothes on and then prosecute anyone who looks.

In my opinion, the First Amendment demands that all radio communications which are not scrambled in some way so that they really are not accessible to the general public, are fair game to anyone with a receiver. And if the U.S. Attorney wants to prosecute me, he better be ready for a long fight.

Frank Terranella
Smith, Don, Alampi & Scalo
Englewood Cliffs, New Jersey

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