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MONITORING TIMES

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ICOM's State-of-the-Art 'Compatibles': New R7000 Joins World Famous R-71A

"Now with these two superior pieces of equipment, you can enjoy laboratory quality reception from DC to daylight—100 kHz to 2000 MHz! Use them in combination with our fine antennas for signal reception which simply can't be beat."

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Will Canadians Consider Scanner Regulation?

Fresh on the heels of the passage of the U.S. Privacy Act, authorities in Canada appear to be considering action to regulate scanning receivers.

On February 2, 1987, veteran police officer Larry Thomas Young, a member of the Vancouver Emergency Response Team, was killed and his partner injured as they entered the apartment of a known cocaine dealer...who was laying in wait, his scanner tuned to the police frequencies.

Understandably upset by the tragedy, officials wonder openly whether the availability of scanners should be restricted or licensed. But these solutions are too simplistic.

Arguably, Young might be alive today if the suspect had not been prepared for the confrontation; just as arguably, the confrontation would not have occurred if the suspect hadn't been dealing in illicit drugs. Would licensing of scanners have prevented the drug dealer from acquiring one? Just about as well as outlawing cocaine kept him from dealing.

The criminal had already spent ten years behind bars, 20 years leaving a trail of assaults and drug trafficking. Last year he bought a .38 calibre pistol and in January he used it to shoot a buyer. How could a convicted felon buy a handgun? The same way he would buy a scanner.

Better radio security, improved tactical procedures, the use of scramblers, tear gas--would any of these have prevented the shooting? We don't propose to know the solution. We only know that licensing scanners will not work any better than the licensing of guns.

It was a bullet the ended the life of Larry Young, not a scanner.

Bob Grove, WA4PYQ

Forum

Forbidden Frequencies

by Robert Jesse

It has long been the Commission's view that the initial responsibility for signal protection should be on the signal originator, who is in the best position to protect the signal against unauthorized reception and use -
Federal Communications Commission, 89 FCC 2d 455 (1982)

The right of unrestricted access to the radio airwaves enjoyed in the United States since the birth of radio has been struck a death blow by the passage of the Electronic Communications Privacy Act of 1986. Under previous U.S. policy, first codified in the Radio Act of 1912 and affirmed many times since, it was lawful to receive any radio signal so long as the contents of private communications were not divulged or used beneficially - for commercial profit, for example.

As of Jan. 19, the new Privacy Act makes mere reception of specified radio signals illegal, shifting the responsibility for a radio communication away from the one person who transmits it to the millions of people who might receive it. This arrangement is unworkable, and serves mostly to promote a few special commercial interests.

The Privacy Act is not without merit in some other respects. The legal privacy of digital video, electronic mail, and other new forms of communication was left uncertain under the 1968 Federal Wiretap Act, which governed the "aural acquisition" or "oral or wire communications." The new law fills the gap by prohibiting the interception of "wire, oral, or electronic communications," terms broadly defined to cover any conceivable modulation technique applied to any communications medium. The law then exempts from penalty the reception or interception of electronic communications that are "readily accessible to the general public."

This would appear to be a reasonable policy formulation. Wire and similar point-to-point communications are inherently private; that is, they are hard to get at except by physical intrusion. Not being "readily accessible to the general public," they warrant Federal protection from interception. Other media, notably radio signals, behave differently. Without special technology, radio emissions blanket wide geographic areas and they can be received using commonplace, unsophisticated equipment. What could be more "readily accessible" than signals that enter our homes and pass through our bodies?

It might be supposed that since radio waves are readily accessible, there should be no expectation of privacy when using them, and the Government should not attempt to assure it. But the Privacy Act circumvents this straightforward conclusion by including definitions that abrogate the ordinary meanings of the terms defined. Cellular radiotelephone calls, for example, are declared by legislative fiat to be "wire communications" and thus not readily accessible.

The statute also contains a complex, five-part definition of "readily accessible" that has little basis in physical reality. Without regard to band, power, modulation technique, or other engineering criteria, it ordains that certain radio services are not readily accessible to the public - though in fact most are - and makes unauthorized reception of them a criminal act. The law mysteriously permits reception of technically similar services a few megahertz away.

The same logic, were it applied to print media, might grant to certain newspaper pages the same legal privacy given to first-class mail, while allowing the general public unrestricted access to the other pages. The classification of a newspaper page as private or public would depend simple on whether a readership of one or of many was wished. This "logic" is plainly absurd and contrary to decades of reasonable legislative and judicial precedent.

Instead, the law should contain a technically sound and relevant definition of "readily accessible," and protect only communications that are inherently private. The 1968 law achieved nearly the same effect for oral communications using a slightly different test - it protected only oral communications "uttered by a person exhibiting an expectation that such communication is not subject to interception under circumstances justifying such expectation."

To illustrate, a quiet chat in one's parlor would likely be protected. Substitute for the parlor a crowded restaurant or the stage of a packed auditorium, and the expectation of privacy is no longer justified. The law would not grant it. Too bad the Privacy Act prescribes neither a realistic "accessibility" test nor a "justifiable expectation" test for electronic communications.

How can a law of the U.S. Congress declare that some forms of radio are inaccessible and private, when the laws of physics dictate otherwise? It would be charitable to answer that this misguidance is a product of technological ignorance of wishful thinking in Washington, D.C. However, internal inconsistencies in the Privacy Act suggest that it is more a sham than an honest, if puerile, effort to deal with new technology.

One example is the protection extended to cellular radiotelephony under the law. This profits cellular service companies by stemming the loss of revenue from customers who might use the service less if they understood its vulnerability. On the other hand, there is no interdiction whatsoever against the interception of "cordless" telephone conversations, even though the distinction between cellular and "cordless" cannot be supported on technical grounds.

Protection or no, people will not be stopped from receiving radio signals. Even U.S. Representative Robert W. Kastenmeier (D-Wis) who championed the Privacy Act as a bill in the House, acknowledges that its radio provisions are essentially unenforceable. They will thus have no deterrent effect, and they will not increase the actual privacy of cellular radio calls or other broadcasts. All they will do is engender and perpetuate an illusion of privacy where none exists.

Life in the United States is no safer on account of the Electronic Communications Privacy Act, but it is considerably less free - the act gives us nothing for something. Congress ought to scrap the notion of "forbidden frequencies" and begin anew, basing the use and regulation of technology on an accurate assessment of its true properties. Are those properties judged inadequate or unsavory? If so, relief will come only from research and advances in technology - not from wishful legislation.

Robert Jesse, a consultant living in Baltimore, Md., is interested in operating systems, telecom, and security. He received a BES-EE from the Johns Hopkins University in 1981, and was a member of the senior staff there through April 1984.

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Communications Report

FCC Destroys CB Linears

A record seizure of over 400 illegal linear amplifiers, rated from 50 to 2000 watts and valued at $140,000, was shredded into a pile of scrap metal by Southern Metals Company in Charlotte, North Carolina, on March 9 at the direction of the Norfolk office of the Federal Communications Commission.

The contraband boosters were confiscated from Douglas Gilman Brown of D&D Incorporated of Shelby, North Carolina, who plea bargained by admitting to three of 23 counts in Federal Court and received a one year suspended prison sentence, two year probationary period and a $10,000 fine.

Terrorist Network Very Real

A major federal law enforcement monitoring station has revealed to *MT* that a terrorist network in Latin America remains quite active just above the amateur 20 meter band. Using Arabic and Spanish languages, the net utilizes upper sideband on 14399, 14400, 14495, and 14499.5 kHz with a callup at 2100 UTC.

It might be interesting to accumulate a master log of outlaw networks here at *MT*. Listeners with information to contribute are invited to send in their intercepts to Bob Grove at *MT* for possible expansion into a comprehensive list.

FCC Proposes Intrusion Detection Band

Presently operating only on 40.68 MHz, perimeter detection systems may soon be allowed anywhere in the 54-72 and 76-88 MHz range if the FCC's Docket 85-231 is approved.

Systems operating between 30 and 100 MHz are the most sensitive to human movement; below 30 MHz sensitivity to humans decreases and above 100 MHz smaller animals trigger the system.

The system utilizes a "leaky cable" technique whereby a specially-designed coaxial cable deliberately allows a limited amount of its confined RF energy to be radiated into a defined area. It is common in intrusion-protected environments like prisons and nuclear installations.

Armed Forces Day Monitoring

Each year in commemoration of Armed Forces Day, US hams are authorized to work crossband (hams in the amateur spectrum, military on their frequencies) with MARS (Military Affiliate Radio System) stations around the country. Modes include single sideband, radioteletype and Morse code.

This year the activities begin at 1300 UTC Saturday, May 16, and end at 0245 UTC Sunday. An official message will be sent by the Secretary of Defense. Shortwave listeners who receive, copy accurately and send their CW or RTTY transcriptions (complete with originated errors) to the appropriate transmitting station as listed below will receive a special commemorative certificate. Licensed hams will receive a QSL card.

A 10 minute tuning call will precede the special message which will be transmitted at 25 WPM CW at 0300 UTC on May 17 and on 60 WPM/170 Hz shift at 0345 UTC by the following stations on the listed frequencies.

Transmitting Stations

AAE
HF/MARS Radio Facility
Fort Sam Houston, TX
4018.5, 6988.0, 9990.0

AAG
HF/MARS Radio Facility
Presidio of San Francisco, CA
4021.5, 7309.5, 13994.5

AIR
204th Information Systems Group
Andrews Air Force Base
Washington, DC
6995.5, 13997.5

NAM
Naval Communication Area
Master Station LANT
Norfolk, VA
4005.0, 7393.0, 14400.0

NAV
HQ Navy-Marine Corps MARS
Radio Station
Cheltenham, MD
7372.5, 14389.5

NPG
Naval Communication Station
Stockton, CA
4010.0, 76365.0, 13975.5

WAR
HQ Army MARS Radio Station
Fort Meade, MD
4028.5, 6997.5, 14403.5

All entries must include time, frequency and call sign of the military station copied as well as his own name, call sign (if licensed) and address on the same sheet. Entries must be postmarked no later than May 23, 1987 and mailed to the appropriate command:

Station Copied:

AIR
Armed Forces Day Test
2045ISG/DOJM
Andrews AFB, DC
20331-6345

AAE, AAG, WAR
Armed Forces Day Test
Commander, USAISC
ATTN:AS-OPS-OA
Ft. Huachuca, AZ
85613-5000

NAM, NAV, NPG
Armed Forces Day Test
Naval Communications Unit
Washington, DC 20397-5161

Military stations participating in the crossband event will be:

AIR
2045th Info. Systems Group
Andrews AFB
Washington, D.C.

AAE
HF/MARS Radio Facility
Fort Sam Houston, TX

NMN
Coast Guard Comm. Sta.
Portsmouth, VA

NPG
Naval Comm. Sta.
Stockton, CA

NAV
HQ Navy-Marine Corps
MARS Radio Station
Cheltenham, MD

NMH
Coast Guard Radio Sta.
Alexandria, VA

WAR
HQ Army MARS
Radio Sta.
Fort Meade, MD

NPL
Naval Comm. Sta.
San Diego, CA

NZJ
Marine Corps Air Sta.
El Toro, CA

NAM
Naval Comm. Area Master Station LANT
Norfolk, VA

Frequencies on which the military stations will be operating follow. They will announce on their frequencies which amateur frequencies they will be monitoring.

Freq. (kHz)	Emission	Station
4001.5	LSB	NPG
4010.0	CW	NPG
4015.0	CW	NMH
4018.5	LSB	WAR
4021.5	LSB	AAE
4025.0	LSB	AIR
6970.0	CW	NPG
6995.5	CW	AIR
6997.5	CW	WAR
7301.5	LSB	NPG
7306.5	RTTY	AIR
7309.5	LSB	AAE
7315.0	LSB	AIR
7346.5	LSB	NMH
7365.0	CW	NPG
7372.5	RTTY	NAV
7375.0	RTTY	NZJ
7382.5	RTTY	NPL
7393.0	Varied	NMN
9990.0	RTTY/CW	AAE
10259.5	CW	NPG
13927.5	RTTY	NPG
13975.5	CW	NPG
13986.5	RTTY	AIR
13992.5	RTTY/CW	WAR
13997.5	CW	AIR
14375.0	USB	NPG
14385.0	USB	NPL
14389.5	USB	NAV
14400.0	Varied	NAM
14403.5	USB	WAR
14408.0	USB	AIR
14440.0	RTTY	NMH
14480.0	USB	NZJ
20937.5	USB	NMH
20992.5	USB	AAE
20994.5	USB	WAR
20998.5	CW	NPG
21460.0	USB	NPG

Special Event Station

As part of the 38th annual Armed Forces Day celebration, Naval Air Station Memphis in Millington, Tennessee, will be on the air Saturday, May 16, from 1300-2300Z. Manned by sailors and Marines, operations will be heard on or near 7230 kHz (LSB), 14280 kHz (USB), 21370 kHz (USB), 21145 kHz (CW), and 28145 kHz (CW) using the call sign W4ODR.

The Navy Memphis complex is the largest inland naval base in the world and is located 13 miles north of Memphis, Tennessee, approximately seven miles east of the Mississippi River. Over 16,000 military and civilian personnel make it the largest employer in Memphis.

Special red, white and blue certificates will be issued to amateur stations working "whiskey four old dusty rebel" by mailing QSL cards to Military Club Station W4ODR, PO Box 54278, Naval Air Station Memphis, Millington, TN 38054.

Kenwood Expands Facilities

Kenwood Electronics is consolidating its two major divisions which include consumer electronics and communications (Tri-Kenwood amateur and land mobile). The new facility will spread over some ten acres in Carson, California, representing 232,000 square feet of floor space.

A brand new test equipment group has been announced and will be located a 2201 E. Dominguez Street in Carson.

World Radio News

Austria

According to the Vienna newspaper, *Volkstimme*, Paul Lendvi "in the face of massive opposition within the Austrian Radio Service" will be appointed head of the **Austrian Radio Service**. The article claims that the ORF "Eastern expert" intends to restructure the shortwave service into a kind of "Radio Free Austria," complete with broadcasts in Russian, Czech and Hungarian. Austria currently broadcasts in English, German, French and Spanish. (BBCMS) *World Radio Report* inquiries to Radio Austria International regarding the report were unanswered.

Brasil

After apparently losing the VOA as a customer, **Radio Bras** is once again stepping up its efforts to rent transmitter time to other stations. According to station officials, however, there are no strong prospects at the moment.

Burma

The **Burma Broadcasting Service** in Rangoon has English scheduled from 0200 to 0230 on 7185, 0700 to 0730 on 9730 and 1430 to 1600 on 5985 kHz. Meanwhile, the Union of Asian DXers reports that Burma has contracted with the British firm, Incomtel, to install a shortwave network in Rangoon for the Burma Broadcasting Service. Two new 100 kW transmitters will provide the BBS with "border to border" radio communications. The new system is supposedly being installed at this time.

Canada

Gerald Kaplan, the author of a government report on broadcasting in Canada, says Ottawa's attitude toward the CBC [Canadian Broadcasting Corporation] is "dreadful and dismaying." Earlier this month, the government awarded the CBC Canadian $880 million for the fiscal year beginning April 1 -- an increase of 1.3 percent over the previous year. However, points out Kaplan, inflation in Canada runs between four and five percent so the award is really a net loss. As a result, the CBC has announced the elimination of some 325 jobs and plans further reduction in programming.

Kaplan called the CBC "the most significant single source of culture in Canada" and said that the government's refusal to grant the CBC more money shows that his report is being ignored. The CBC is the parent organization of Radio Canada International, which has already been rocked by serious budget cuts in recent years.

CHNX -- an old favorite returns! Since the first week in February, CHNX has been back on the air with a vastly improved signal. According to one of their engineers, the new transmitter is actually a 500-watt military unit that has been on standby since the 1950s. It was revamped and put into service when the previous 500-watter obviously could no longer do the job. The station now puts a fine signal into this area on 6130 kHz during the midday hours. (Bob Hill, Sharon, MA)

Clandestine

Something's up at the anti-Chadian clandestine **Radio Bardai** and it may mean better reception for you. In early February, the station began announcing its "inaugural broadcast" even though it had been on the air for some time. Now, however, signal strength and audio quality have improved.

What has apparently happened is that the transmitter location has moved from Sabha in Libya to the main Libyan transmitter site west of Tripoli. Radio Bardai broadcasts in support of the Transitional National Union Government (GUNT), which is hostile to Hissein Habre's government in Njamena. Listen for any one of several station IDs including "Radio Chad" and "Chadian National Radio." It describes itself as the "voice of liberation" and can be heard on the following schedule. All transmissions are on 6009 kHz and all are directed to Africa.

1100-1130 UTC in French
1130-1200 UTC in Arabic
1200-1315 UTC in Sarah/Korah
1800-1830 UTC in French
1830-1900 UTC in Arabic
1900-2030 UTC in Sarah/Korah

On Saturdays and Sundays, the 1200 to 1315 UTC transmission is extended to 1415 UTC. (BBCMS)

Output by clandestine **Radio Venceremos** is up -- on the air with up to five parallel frequencies: at 1200 UTC it's been heard operating simultaneously on 6610, 6360, 3833, 3787 and 3180 and at 1800 UTC on 6834, 6610 and 6383 kHz. The 0000 and 0200 UTC transmission remain on only one or two frequencies in the 40 and/or 75 meter bands.

The **Voice of the Liberation of Iran** has apparently dropped its the frequency of 7300 kHz and returned to 7080 kHz for its 1630 to 1830 UTC broadcast. The station has also been heard on 9027 kHz.

The **Voice of the Crusader**, also known as the Voice of the Mojahedin-e Khalq, which broadcasts programs hostile to the government of Iran, has been heard on a large number of frequencies as it attempts to escape Iranian jammers. Look for the station from 1400 to around 1530 UTC, and again from 1700 to 2000 UTC on or around 3515, 3930 and 4220 kHz. Frequencies can vary by as much as 5 kHz.

Cuba

Radio Havana Cuba correspondent Francisco Luna passed away late last year. Cause of death is unknown. His replacement is Rolando Pelaez.

Czechoslovakia

The English Service of **Radio Prague** will be introducing, starting May 3, a prime-time, hour-long English transmission to the British Isles and Western Europe. The new program, which will be heard between 1900 and 2000 UTC on 5930 and 7345 kHz, takes the place of two earlier half-hour programs and is, according to Wanda Krygielova of the English Service, designed to "devote more air time to programs based on listeners questions, requests and comments."

Other transmissions to the British Isles and Western Europe will be heard from 1800 to 1830 on 5930 and 7345 kHz and from 2200 to 2230 UTC on 6055 shortwave and 1287 mediumwave. The schedule for North America remains the same:

0100-0157 UTC	5930, 6055, 6015, 7345, 9740, 11990
0300-0357 UTC	5930, 6055, 6015, 7345, 9740, 11990

Every last Sunday of the month, Radio Prague is now broadcasting a concert of serious music based on listeners' requests. If it proves successful, the concert may be extended to other Sundays as well, and to other type of music.

Be sure to let Radio Prague know how you feel about the new broadcasts and programs. You can write to them at Radio Prague, 12099 Praha 2, Vinohradska 12 or call dial your international access number, 42-2-260008. Be sure to mention you read about it in World Radio Report.

Ecuador

HCJB has made some changes to their program schedule. New to the line-up is Reading Room. Produced by WMHK in Columbia, South Carolina, and hosted by Rob Gregory, the program offers some of the best books available from the Christian publishing houses. The program is also broadcast UTC Wednesdays at 0930 to the South Pacific and is expected to be included in the European transmission starting in June.

Finland

For the first time since 1982, **Radio Finland** has begun a regular evening transmission to North America. Specifically beamed to the west coast, it is heard daily between 0430 and 0455 UTC on 11755 kHz.

Other English programs to North America are beamed to the east coast and heard on the following schedule:

1100-1125	Mon-Fri	11945, 15400
1200-1225	Mon-Sat	11945, 15400
1300-1325	Daily	11945, 15400
1325-1355	Sunday	11945, 15400
1400-1425	Daily	15400

Radio Finland has also begun broadcasting in French again. The half hour Saturday news and feature program was first heard in early February and is beamed to Canada. Finland has not broadcast in French since the 1960s. The schedule is:

1330-1355 Sat	11945 and 15400
1530-1555 Sat	15400

And, as if that isn't enough good news from the Finns, Radio Finland has also introduced a new way to keep in touch with the station. Beginning this month, you can call them toll-free in the U.S. at 1-800-221-9539 (outside of Connecticut). You'll hear a taped message with information on the current schedule and have 60 seconds in which to leave a message. Tapes of the answering service will then be mailed to Finland. According to station officials, Radio Finland has concluded that it is economically more viable to maintain a toll-free telephone in the U.S. than to update printed leaflets at regular intervals.

When calling Radio Finland's new toll-free number, please mention that you read about it in *Monitoring Times*.

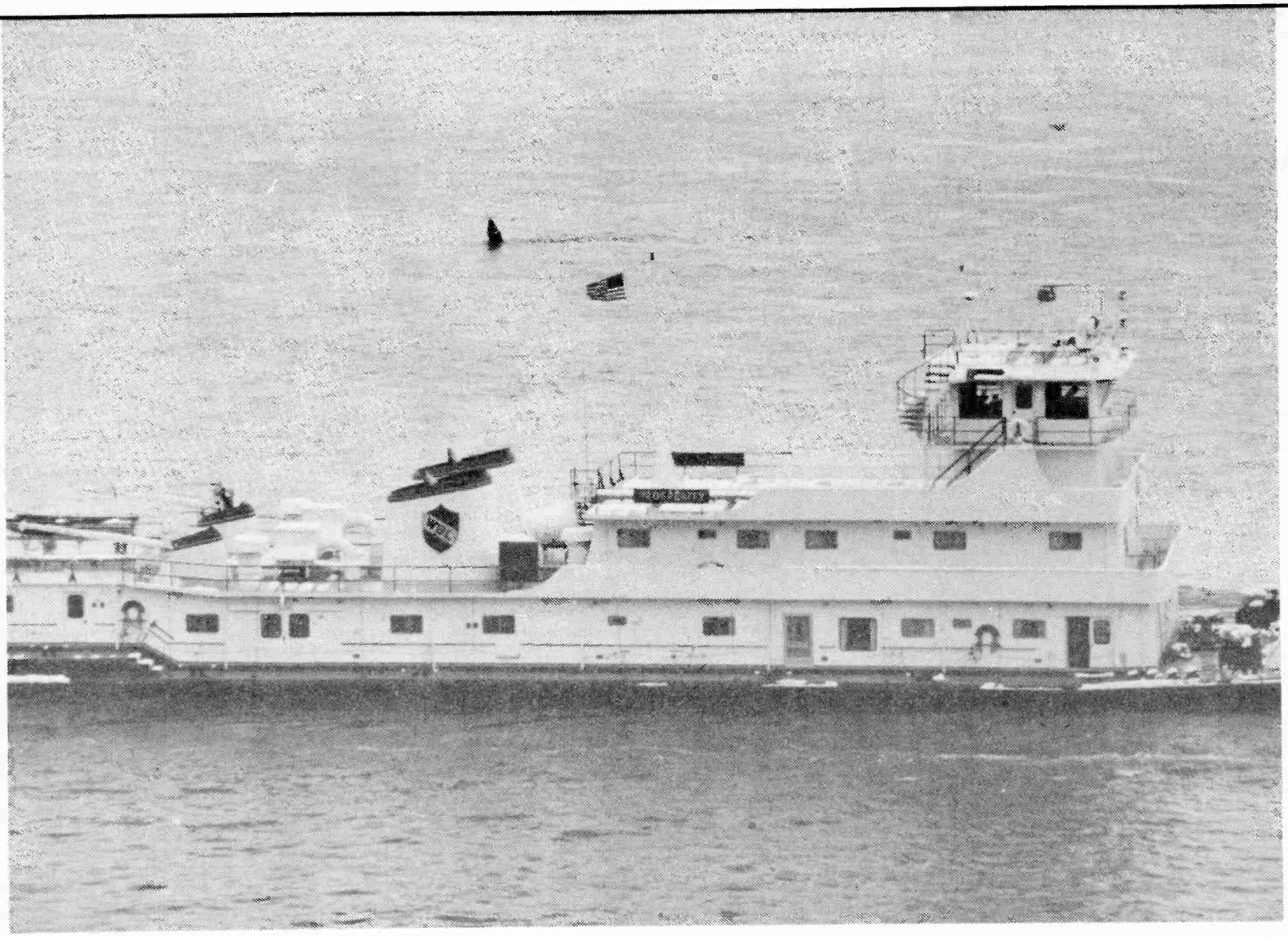
Germany, West

The American-financed Radio Liberty has complained of a considerable increase in Soviet jamming. Gene Pell, president of Radio Free Europe/Radio Liberty, says that the Soviets are now using at least eight jamming transmitters (previously directed against the BBC) and that the act was "illegal and violated international agreements which the USSR has signed." Despite the jamming, says Pell, the radio station was reaching an estimated weekly audience of 52 million adults in the Soviet Union, Eastern Europe and the Baltic States. Radio Liberty broadcasts in Russian and eleven other languages. (BBCMS)

Ghana

Ghana, after a period of some 20 years, has officially restarted its external service. The inaugural broadcast was on March 6 at 0645 UTC and began with the announcement, "This is the External Service of the **Ghana Broadcasting Corporation**. We are radiating on 6130."

Please turn to page 58



TUNING IN THOSE TUGS!

by Ron Seymour

Ever have the feeling you were DXing yourself to death when all you had to do was stick your head out the window? Many times I would sit down at the old radio and try tuning in those far off signals when all I really had to do was get acquainted with local traffic -- where to tune, what to listen on (equipment) and when to listen.

Yep, you guessed it! The 3 W's of all pro monitoring: *what, where* and *when!* In other words, why strain your eardrums hoping for something, when all you really have to do is open your eyes (and ears) for interests which are far easier catches.

For instance, my home town is a bona fide river city -- St. Louis. For a long time I knew full well that this city was a gold mine of river traffic -- historically, commercially or any other way you want to look at it.

As an American history and government teacher, I was well aware that St. Louis abounded in marine interests. But, like so many of us, I though the radio pasture was *always* greener somewhere else! When I purchased my scanner, I only intended to monitor the usual police, fire and medical frequencies.

Finally, I happened upon some articles relating to marine communications; fired up the scanner for Coast Guard, navigational and commercial traffic and... POW! Virtually continuous 24 hour communications relating to commercial shipping interests jumped out of my scanner!

Tugs in Action

Most of the river traffic you will hear in your area, if you are fortunate enough to reside in or visit a river town, is taking place between tugboats, their crews, the Coast Guard, or barge terminal offices on shore. Sometimes you can even find a good vantage point on shore to actually see tugs in action as they try to maneuver huge barges up and down the river to various docking facilities.

Matching up communications on board these tugs with actual sightings can be quite a challenge, especially if you can't see the names of the tugs as they communicate with each other. All is not lost, however; the more you listen to tug operators the more you will eventually unravel their approximate location on the river itself.

Mile Markers?

For all you land lovers and water phobic types, a few explanations are in order before you rush out for sea sick pills and life jackets! The rivers that cater to commercial traffic are well defined as to location points on their shores.

"Mile markers" are often referred to in the Coast Guard communications known as "Notice to Mariners." Transmitted on 157.100 MHz, these daily broadcasts by the Guard keep all river traffic posted as to dangers and general information connected with the waterways.

One of the first times I heard the "Notice to Mariners" broadcast, I was taken aback by a rather sad bulletin. Occasionally, but certainly not frequently, someone associated with barge crews falls into the river of "fails" to answer roll call.

One such victim of the deep was included in a river update along with a description and tugboat operated from. Two days later another Notice to Mariners broadcast gave a scant one-line reference saying, "subject's body recovered."

"Mile markers," as referenced earlier, simply pace off the river in miles and tenths of a mile from the river's mouth. Larger rivers like the Mississippi are divided into upper and lower portions. For instance, the Mississippi starts its zero mile marker at the delta in the Gulf of Mexico and continues upstream to a point at Wickliffe, Kentucky (Wickliffe Barge Point), at the 951.4 mile marker. The stretch in between is known as the Lower Mississippi River.

A few miles downstream from Birds Point, Missouri, at the 2.1 mile marker, the Upper Mississippi River begins and continues northward through St. Louis (167-188 mile marker) and further until no longer navigable.

Most rivers, like the Illinois and Missouri, though definitely huge rivers, simply start their mile markers at zero at their mouths. A few rivers, like the Ohio, are marked in reverse! So in these cases the largest mile marker begins at the mouth and the smallest at the source.

Some care will have to be exercised to learn the direction of the mile markers on your river so as to precisely place hazardous warnings or other reference mentioned by the Coast Guard or other mariners.

A good state or regional map is of tremendous assistance. You will know your map is good for your listening junkets if it has bridge names and lock and dam numbers identified. Many everyday navigational references to bridges, streets, parks, or other landmarks are made by boat operators to locate their whereabouts to others. Routine announcements such as these are brief and can be heard from time to time on the navigational frequency 156.650 MHz.

Typical Conversations

Listening to everyday conversation is everything from boring to humorous as the crews exchange views on operating technique, equipment repairs, taking on water ("got a bucket?") or just plain crabbing! You'll hear both sides of the conversation on 156.300 (safety related), 156.350 MHz, and in 50 MHz increments up to and including 157.000 MHz. Specifically, try 156.875, 156.975, 157.025, and 157.425 MHz.

The nationally-recognized frequency for distress announcements is channel 16, 156.800 MHz. The Coast Guard constantly monitors this frequency for trouble on the river. This channel is also reserved for callup -- one boat asking another to make contact on a certain stated channel. If you've programmed your scanner to include all the frequencies listed, you'll instantly know when contact has been made because the vessels will identify themselves by name.

The best teacher of all in such monitoring is your own personal effort and persistence. A visit to a well-stocked city library will help you find reference materials relating to river terminal operations and owners of tugs and barge lines. Don't forget the most rewarding trip of all: finding an area on your river infested with tugs!

Armed with your handheld scanner and a good visual vantage point to see up and down your river, you will start to pick up on the names of some tugboats. Bring along a camera and some binoculars, too! You'll want to record those tugs on film along with their names, if possible, so as to build up a file on your area operations. Oh, and one more thing -- save me a seat dockside, OK? ■

St. Louis Coast Guard; See "High Seas" for more Mississippi monitoring

VHF-FM Maritime Channels

Chan	Frequency (MHz) Ship	Frequency (MHz) Coast	Points of Communication
Distress, Safety and Calling			
16	156.8	156.8	EPIRB, Intership and ship to coast
Intership Safety			
06	156.300		a. Intership b. For SAR; ship and aircraft of the U.S. Coast Guard
Liaison, U.S. Coast Guard			
22	157.100	157.100	Ship, aircraft, and coast stations of the U.S. Coast Guard and, at Lake Mead, NV, ship and coast stations of the National Park Service
Port Operations			
01	156.050	156.050	Intership and ship to coast
03	156.175	156.175	Same
05	156.250	156.250	Same
65	156.275	156.275	Same
66	156.325	156.325	Same
12	156.600	156.600	Same
73	156.675	156.675	Same
14	156.700	156.700	Same
77	156.875		Intership
20	157.000	161.600	Same
Navigational			
13	156.650	156.650	Intership and ship to coast
67	156.375	156.375	Same
Environmental & Class C EPIRB's			
15		156.750	Coast to ship and EPIRB
State Control			
17	156.850	156.850	Intership and ship to coast
Commercial			
01	156.050	156.050	Intership and ship to coast
63	156.075	156.175	Same
07	156.350	156.350	Same
67	156.375		Intership
08	156.400		Same
09	156.450	156.450	Intership and ship to coast
10	156.500	156.500	Same
11	156.550	156.550	Same
18	156.900	156.900	Same
19	156.950	156.950	Same
79	156.975	156.975	Same
80	157.025	157.025	Same
88	157.425		Intership
Noncommercial			
68	156.425	156.425	Intership and ship to coast
09	156.475	156.475	Same
70	156.525		Intership
71	156.575	156.575	Intership and ship to coast
72	156.625		Intership
78	156.925	156.925	Intership and ship to coast
Public Correspondence			
24	157.200	161.800	Ship to public coast
84	157.225	161.825	Same
25	157.250	161.850	Same
85	157.275	161.875	Same
26	157.300	161.900	Same
86	157.325	161.925	Same
27	157.350	161.975	Same
87	157.375	161.975	Same
28	157.400	162.000	Same
88	157.425	162.025	Same

Uno, Dos, Cuatro: A Guide to the Numbers Stations

From the book by Havana Moon

The Numbers Enigma

For the past twenty five years or so, shortwave listeners have been stumbling upon an unusual phenomenon on the shortwave bands: numbers. At various times and on various frequencies, monitors will hear a woman's voice, often in Spanish but sometimes in other languages -- English, German, even Chinese -- reading groups of seemingly unrelated numbers. There is no station identification. There is no indication of their purpose.

Take the following log of a numbers stations from a recent issue of *World Radio Report* for example:

"The mystery continues: on March 25, 1987, the longest, strongest 'numbers' transmission ever heard here. Transmitter came on the air 1945 UTC on 5929.6 kHz with an exceptionally strong signal, pinning the meter. At 2000 UTC, a woman in American English began counting from one to zero then repeating the numbers 9-8-6 (three times) then counting from one to zero, repeating 9-8-6 three times, and so forth. At 2010, there were eight electronic 'beeps' and a woman saying 'Count 208, count 208' and then a long string of 3-2 digit combinations of numbers (i.e. 243 80).

"At 2030 UTC, unbelievably, the announcer says, 'Repeat count 208. Count 208' and starts the entire 3-2 digit list (over 400 sets of numbers!) over again until until 2049 UTC. There was no formal sign-off or conclusion and the transmitter remained on the air until 2054 UTC.

"It's unbelievable that the location -- let alone the purpose -- of a transmitter this strong, running for well over an hour, cannot be pinpointed with total certainty. Very sensitive information regularly leaks from the highest levels of the U.S. government. How have the numbers transmissions remained such a total secret for over 2 decades? Somebody out there *must* know what these transmissions are all about."

Such frustration is normal. It's all part of the numbers game.

Spanish Lady's Ciphers Tracked by Hams to CIA read the front-headline on the Los Angeles *Herald Examiner*. The date was April 22, 1984, and it was very likely the first time a numbers station made the front page of a major daily newspaper.

...At least one 'Spanish lady' is believed to reside, not in Havana or Managua, but in a concrete block building at Warrenton, VA -- just over 32 miles as the crow flies, from the headquarters of the CIA.

The heavily guarded installation, bristling with towers and antennae, is identified on signs as the "Army Training Warrenton Training Center, Station D." The pentagon says its mission is classified...

Chances are you've heard a numbers transmission... Sure you have. Lurking just a few kilohertz up- or down-frequency. Prowling the post-prime time hours where confirmed insomniacs earn their stripes and over- as well as under-the counter sleep remedies are field tested. They are the damnable numbers.

"Dos, Cero, Cinco, Cero, Cinco" the female with the slightly mechanical sounding voice continues hour-after-hour and night-after-night on a myriad of frequencies. The latest count indicates that well over 250 different frequencies have been utilized for five-digit numbers transmissions since the early '60s. I would say that for one not to hear this semi-bionic femme on the shortwave bands is just about next to impossible. She is just about everywhere. And she has been at it for at least a quarter of a century!

"Quot homines, tot sententiae"[1]

The who, where and most importantly, the why aspects of numbers transmissions are, for the most part, unknown. Most refer to these broadcasts that occur on the hour and the half hour as "spy" transmissions.

The spy theory has been somewhat enhanced over the years by our very own FCC with their strange and inconsistent answers to inquiries from the shortwave listening and amateur radio community. It was the FCC that stated some years back that the 3060 and 3090 kHz five-digit Spanish numbers transmissions were originating from a site near Havana Cuba. It was the same FCC that shortly afterwards denied the statement. ...And then once again said they were coming from Havana! Curious how they continue to change their stories.

Some years later, the FCC complicated matters further by saying that the Commission did not deal in intelligence matters and therefore had no interest in numbers transmissions. They've also stated lots of other things over the years, many of them laughable.

But "spys" isn't the only reason proposed for these mysterious numbers transmissions over the years. There are those who believe that they're World Bank transactions. Coffee bean prices. Bolita scores. Messages to freedom fighters. The suggestions -- like the transmissions themselves -- are almost endless.

Whatever they are, most are made in the full-carrier mode with some SSB (single sideband) transmissions being reported. And it *was* learned a few years ago that some -- not all -- of the four digit Spanish and English transmissions were indeed, as the Los Angeles *Herald Examiner* stated, from sites near Remington and Warrenton, Virginia. Now that's a lot of miles from Havana! But there is, however, a very definite Havana numbers connection. Some numbers transmissions do come from various Cuban sites.

A government source that must remain anonymous tells me that the Sunday, 1500 UTC transmission on 3690 kHz comes from an embassy in downtown Havana. The embassy was not identified. The repeat broadcast is on 4030 kHz at 1530 UTC the same day. But the numbers stations that use 3690 and 4030 kHz at other times and days may or may not be Havana-based.

And what about my earlier references to "semi-bionic"? Well, it would appear that most numbers transmissions are produced by a system similar to that used by the telephone company to inform callers of changed or discontinued phone numbers. It appears that these numbers are then transferred to a tape for transmission at later times.

One thing is certain: a female announcer reading numbers groups in Spanish, German, English and other languages, is familiar to any shortwave listener who has advanced beyond HCJB and Radio Canada International. And it's a subject that never fails to arouse lengthy discussion and controversy whenever SWLs congregate.

Five-Digit Numbers

The five-digit Spanish numbers transmissions are the most commonly encountered type. What you might hear is something like this:

"Atencion 975 20"
(repeated for several minutes)
xxxxx xxxxx
(each "x" represents a single number)
"Final"
(repeated twice)

The meaning of the first three digits remains unknown. Most monitors, however, refer to them as an "identifier" of some type. The other two letters are thought to indicate the "group count" of the message.

It should be noted that the majority of five-digit Spanish stations repeat their transmissions at 30 past the hour rather than at 15 minutes past. I know of no five digit Spanish stations that begin or repeat a transmission at 45 past the hour.

Bleeps and Blunders

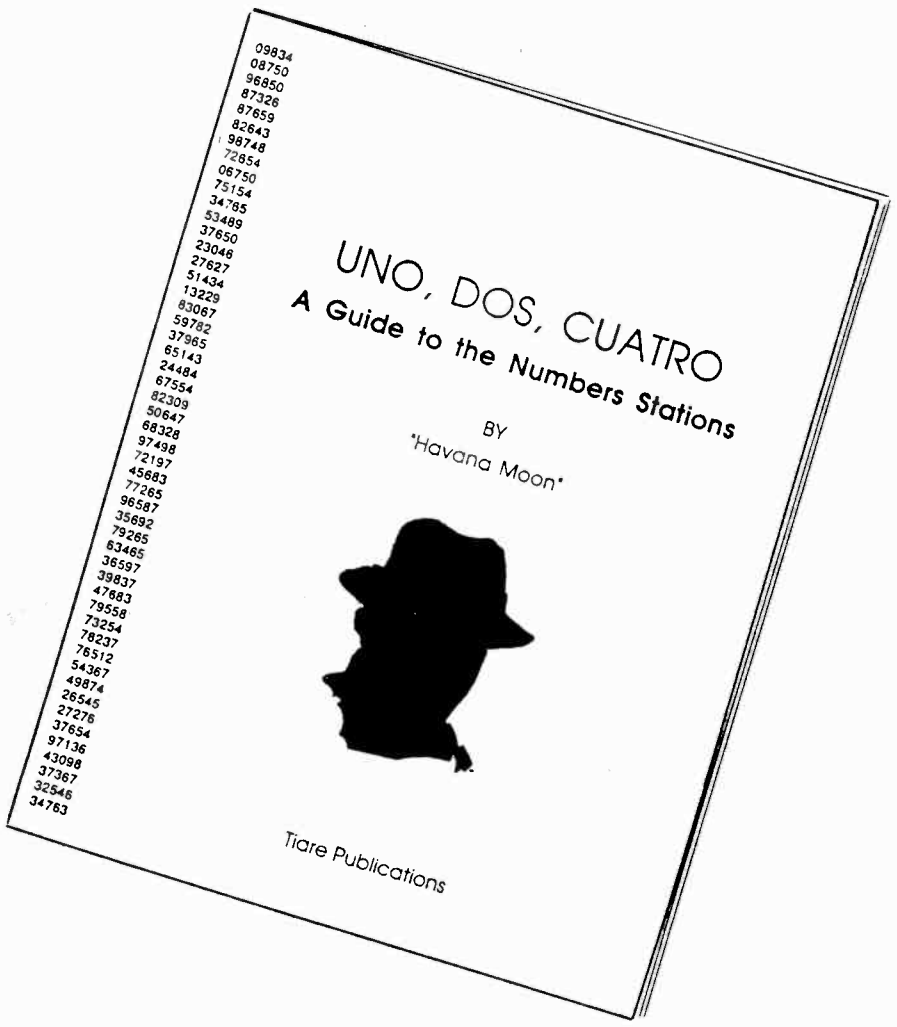
Overly modulated and badly distorted signals are the rule when it comes to five-digit Spanish transmissions. Transmissions often abruptly cease and resume after short -- and at times, lengthy -- delays. "On-air" tape rewinds are common as are false starts. There are even times when one or two of the groups will consist of *six* characters rather than five. This may be a machine error or intentional.

The audio level is often so low on some transmissions that it would be next to impossible for those at the receiving end to copy anything but a small portion of the transmission.

If I were in the spy business, I'd be damned if I would depend on these

[1] *There are as many opinions as there are people.*

--Terrance



transmissions for my instructions! Another line of work would be found if my case officer could provide no better means of communications.

Harmonics (2nd and 3rd) are often reported from Florida and Virginia. I was under the impression that sound engineering practices would dictate *no* harmonics. California also reports harmonics on some 9 MHz frequencies. And spurs -- well, they're numerous up-and-down frequency for many kHz.

Often times, too, you'll hear one or two very faint numbers transmissions underneath the primary transmissions. There are even times when Radio Havana Cuba and Voice of America mixes with numbers transmissions. Of course, there is also the possibility that this *apparent* technical ineptness is nothing more than theatrics! Such things have been known to happen!

And the four-digit crowd? They are, without question, the "ne plus ultra" of the numbers world. They are, most of the time, thoroughly professional.

Where?

My Florida sources tell me that a 4825 kHz transmission at 1330 UTC and at 0500 UTC has determined to be coming from a site near Palm Beach International Airport in Florida. There's also the possibility that the 0200, 0230, 0300, 0330, and 0400 UTC (Wednesdays only) transmissions on 3090, 3445, 4445 and 4052 kHz transmissions are coming from sites in Broward or Palm Beach County in the same state.

Signals with levels of over S9 were monitored in the Spring of 1985 in this area of Florida using a Sony 2001 with no external antenna. Transmissions at 1500, 1530, 1600, 1630, 1700, 1730, 1900, 1930, 2000 and 2030 UTC were all about the same signal level. It is believed that these ones originate from a site near the Kennedy Space Center or Patrick Air Force Base.

But the "U.S. Site Theory" does have its opponents. Said one government communications expert: "Don't overlook the fact that many of the 1030 kHz transmission towers on Cuba would 'load' very well on 3090 kHz..."

Even more bizarre is the slight possibility of some German numbers transmissions originating from a sinister Nazi enclave and transmitter complex hidden deep in the foothills of the Chilean Andes just south of Santiago. One source told me that our very own FCC once stated that some numbers transmissions (language not identified) originated from this part of South America!

How to Hear Them

Use the chart at the right. These are the most common frequencies for the five digit Spanish frequencies. Then sit back, listen, and let your imagination run wild.

Why not tape record one of these transmissions and play it back? How about a long-play recorder? They are very useful -- despite their many drawbacks, notably the price. I would definitely not be without my "extended play." It sure beats sitting up all night in front of the rig to ascertain just what happens on any particular numbers frequency over an extended period of time. And it's a relatively simple matter to chart the counter readings of the recorder to time segments.

Computers? Very definitely! A computer database is a *must* if you are a serious numbers monitor.

Does anyone know what the numbers are really all about? There are those who know the purpose of the numbers stations. And you can rest assured that those responsible for this ongoing mystery don't frequent "fern bars" where decorator color drinks with silly-sounding names are served. My guess is that they might well prefer Tecate or perhaps bourbon. I'll even guess that they have, or will, read this book! That's almost a sure bet. Will they respond? If they do, it will be with disinformation. I would expect nothing less. I would do the same thing if I were in their situation.

The numbers. They are a mystery! They are "dead drops" off a lonely Virginia country road. They are dipole antennas with white coax leading through a broken window of a decaying building on a remote section of a major international airport. They are white unmarked troop transport aircraft loading dark skinned men with uzis in the wee hours of the morning. They are a call from a higher authority. They are things you do not want to know but desire to know. They are the numbers.

Time now for a Tecate and...

Adios
Havana Moon y Amigas
60088

Best Bet Frequencies for Five-Digit Spanish Transmissions

3090 kHz	
3445 kHz	
3690 kHz	
4025 kHz	
4030 kHz	Slavic language numbers transmissions as well as "P" (CW) beacon noted here. This is a MARS frequency.
4044 kHz	
4050 kHz	
4055 kHz	
4125 kHz	This is an international "ship calling" frequency and its use by numbers stations has at least one government agency slightly concerned.
4445 kHz	
4670 kHz	Maintain a close watch on this frequency. All types of numbers transmissions are monitored here.
4780 kHz	Another frequency to monitor closely. Used by FEMA.
4825 kHz	Very active.
5080 kHz	Very active.
5090 kHz	Very active.
5135 kHz	
5250 kHz	
5270 kHz	
5780 kHz	
5810 kHz	Maintain a close watch.
5812 kHz	Maintain a close watch.
6802 kHz	Maintain a close watch. All types of transmissions monitored on this frequency.
6825 kHz	
6825 kHz	
6840 kHz	Maintain a close watch.
6925 kHz	Watch closely. Five digit Spanish on this frequency occasionally. KKN50 marker always down when transmissions occur.
7527 kHz	

In search of the elusive QSL !

DXING LIKE MOST OF US

by Theodore F. Brunner

Larry Miller's article, "DXING with the Eck-spurts" in the February 1987 issue of *MT* hurt to the quick. Miller reports on a bandscan started at 0100 UTC and lasting until 0200 UTC; the frequency covered was 9000 kHz-9600 kHz; and the equipment used ("pretty hot," according to Miller) was a Drake RL7 and a 250 foot inverted L antenna. Miller's ground rules: "We would move up the band, logging everything that we heard in one hour, using the spectrum occupancy chart printed in last month's *MT*.

Miller's results (apart from some thirty other stations): "As you can see, we've made some pretty decent discoveries--a Chinese regional, two spy stations, Radio Free Europe, Radio Station Peace and Progress."

Green with envy at his results, I decided to duplicate Miller's experiment. From the onset, I should note that I am anything but an "Eck-spurt": I happen to be one of those (I suspect thousands of) dilettante DXers who, for years, have been spending Sunday afternoons and evenings trying to check, once again, whether the shortwave bands might (apart from Radio Netherlands, the BBC, the VOA, and sundry radio preachers) possibly contain something other than crackles, rattles and squeals.

My equipment, too, is not very "hot": it consists of a Radio Shack receiver (it says "Realistic DX 302 Quartz-Synthesized Communication Receiver" on the front, but I have no idea what "Quartz-Synthesized" means), and a length of wire stretched from the back of the DX-302 through a hole in the living room wall.

The wire extends in a straight line from the receiver to the garage wall; from there it angles off a tree; next it jogs back to the house and from there it runs to a nail in another tree. All in all, the antenna (I guess you could call it a "horizontal M") is probably 55 feet long.

The wire has red insulation around it, a fact which bothers me no end: could it possibly be that all those fancy radio waves which people like Miller get are stopped by the insulation? Then there is that nail in the tree: might it be that *it* sucks all those exotic radio signals *into* the tree? One of these days, I'll have to do something about both the wire and the nail. On the other hand. I live on top of a hill in Laguna Beach, California. Surely, living on top of a hill ought to help.

In any case, here is how *my* bandscan went. Those of you who (as I do religiously) save your back issues of *MT* may want to pull out the February 1987 issue for comparison; Miller's article starts on p. 14.

0100 UTC

9000 kHz: Auspicious start! Lots of hash, to be sure, but I can also hear at least three separate voices. Can't make sense out of any of them, though. One sounds Spanish. In fact, after a minute or so, they *all* sound Spanish. In any event, Miller didn't encounter anything but hash until he reached 9020 kHz.

9005 kHz: More faint Spanish voices. And some music. Not enough here for an ID.

9015 kHz: An English speaking voice, partially covered by someone singing in Spanish. Again, too much hash to make any sense of it.

9020 kHz: Here's where Miller heard a weak Chinese transmission, and an ID for the Central People's Broadcasting System. I hear nothing but hash.

Chinese Regionals

9030 kHz: Again, Miller heard a Central People's broadcasting station. And again, I hear nothing but hash. Why can't I hear the Chinese?

9056 kHz: Take *that*, Larry! You heard nothing here, but I hear what seems to be a VOA broadcast! After all, where else would they be talking about insulin pumps developed at the University of California?

Numbers Stations

9074 kHz: Here's where Miller heard one of those so-called "numbers" or spy stations. I have *never* heard one of those so-called "numbers" or spy stations. I'd sure love to hear one of them once. Nothing on 9074 kHz, to be sure.

9085 kHz: Ditto.

9110 kHz: Spanish transmission (voice). Can't make any sense out of it.

9115 kHz: More Spanish voices, partially covered by WWV. *WWV?* My God, how can this be? I've never heard WWV broadcasting on 9115 kHz! Must be a problem with my DX-302!

9169 kHz: Very slim pickings until now. Some very faint Spanish here.

9239.5 kHz: Here, Miller encountered an Armed Forces Radio and Television (AFRTS) feeder broadcasting from Barford, England, not a bad catch according to him. Maybe so. Especially if you have a receiver that gives you .5 frequency readouts. My DX-302 doesn't. And there certainly isn't *anything* at either 9239 or 9240 kHz!

9360 kHz: Spanish transmission. Excellent reception. Must be Radio Exterior de Espana, if Miller can be trusted.

9595 kHz: Miller heard Greece here. I hear absolutely nothing. Except lots of hash, of course.

9420 kHz: *There* is Greece! Faint, to be sure, but I recognize the language. According to Miller, 9420 is much stronger than 9595. right on, Larry!

9435 kHz: "No real surprise here," says Miller. "It's Kol Israel broadcasting from Jerusalem in English. A very strong signal." Well, surprise, Larry: all I get is very strong hash.

9445 kHz: According to the *MT* frequency section, I should be hearing the Deutsche Welle here. You guessed it: nothing but hash.

9450 kHz: Nothing. Miller thought he heard what might have been Radio Moscow here.

9465 kHz: Very strong Spanish transmission. Miller suspects the VOA on this frequency.

9470 kHz: Here's where Miller heard Andean-style music. *Andean-style music?* All I hear is Andean-style hash.

9480 kHz: Here, Miller heard what he thinks may have been a Soviet domestic station. I'm green with envy. *Soviet domestic station!* I'm having trouble receiving Radio Moscow! Relayed from Havana, that is! And I *certainly* don't hear anything on 9480 kHz!

Soviet Domestics

9490 kHz: A man's voice, very faintly. Portuguese? Who knows. Miller heard Radio Peace and Progress from the Soviet Union on its way down to South America here.

9510 kHz: Aha! An SSB transmission! Must be, because it sounds like a duck. The problem is that it continues to sound like a duck even after valiant attempts to fiddle with the BFO and sundry other switches and dials. Miller heard Radio Bucharest here. Could it be that people in Bucharest talk like ducks?

9515 kHz: BBC, loud and clear. Big deal!

9525 kHz: Miller gets hash. I get a Spanish transmission, loud and clear. It is now 0129 UTC (I'm rapidly falling behind Miller). Let's wait for an ID. No ID by 0133. Let's move on.

9535 kHz: Another Spanish voice. BUT: this one has middle-eastern music in the background.

9542 kHz: The Deutsche Welle. In English. Pretty fair reception.

0145 UTC

9550 kHz: Spanish transmission, clear, but no ID after several minutes. I'm falling even further behind Miller.

Italy

9575 kHz: "An easy one," according to Miller. "Italy in Italian." Oh yeah? I get hash.

9580 kHz: English conversation. Not clear enough to understand all of it, but somebody is talking about "following your Doctor's advice." Must be the VOA again.

9590 kHz: BBC again (same as 9515 kHz). Loud and clear.

It is now 0200 UTC, and I made it. Barely. Covering 590 kHz in one hour isn't easy. I don't know how Miller did it. The bottom line: No Chinese regionals. No spy stations. No Radio Free Europe. No Radio Station Peace and Progress. Lots of hash, to be sure. And lots of Spanish. A bit of middle-eastern music on 9535 kHz. In the background, unfortunately.

I'll try again next Sunday.

Maybe I'll do something about that red insulation on my antenna between now and then. And that nail's *got* to go! In fact, I might even replace that DX-302. After all: WWV on 9115 kHz?! ■

Why Are People Saying These Nice Things About Us?

World Radio Report
3 Lisa Drive
Thorndale, PA 19372

1 March, 1987

Dear Sirs:

Enclosed please find a money order in the amount of $18 for a year's subscription to **World Radio Report**. I have seen several recent copies of your publication and I am impressed. It is **exactly** what, I as a shortwave listener and editor of a column in a national shortwave listener's club bulletin need to keep up on station schedules and broadcasting times. Its up-to-date and current schedules are certainly the best in the hobby and I feel that I owe it to myself to subscribe.

Keep up the good work! You could not be doing any better!

73,

Donald E. Stidwell
New York, New York

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Photoplay:

The FCC Listens In

by Bob Grove, WA4PYQ

A forest of antennas and wall to wall receivers--a radio hobbyist's dream! The Federal Communications Commission field offices are well equipped to monitor just about anything in the spectrum.

Recently, *MT* was privileged to get a peek inside the nerve center of the Powder Springs, Georgia, monitoring station as shown in the accompanying photographs. While much of the equipment shown in the racks is commercial, the FCC's own Equipment Construction and Installation Branch (ECIB) is headquartered here as well.

ECIB's primary responsibility is to research and develop specialized equipment for the Commission, such as the recently-patented series of mobile radio direction finding (RDF) equipment (those patent rights have been sold, incidentally, to a Fort Lauderdale commercial firm).

The Antenna Farm

The Powder Springs site doesn't want for antennas; at the present time, the following directional and non-directional arrays are in use:

- Wullenweber RDF which provides 200 kHz-30 MHz coverage with a two-degree accuracy;
- HyGain log periodic dipole array (LPDA) for 100-1300 MHz continous coverage;
- six rhombics with switchable direction;
- 4 Beverages with switchable direction;
- two conical monopoles (2-8, 5-30 MHz).

Mobile Equipment

Since the Powder Springs installation is geared up for fixed operation, a special mobile truck is used to resolve problems involving FM, TV, microwave, and cable broadcast complaints which require on-site inspection.

For land mobile services, a special bubble-top van (which houses the patented RDF gear) is dispatched when VHF/UHF complaints are received.

Complaints and Protocol

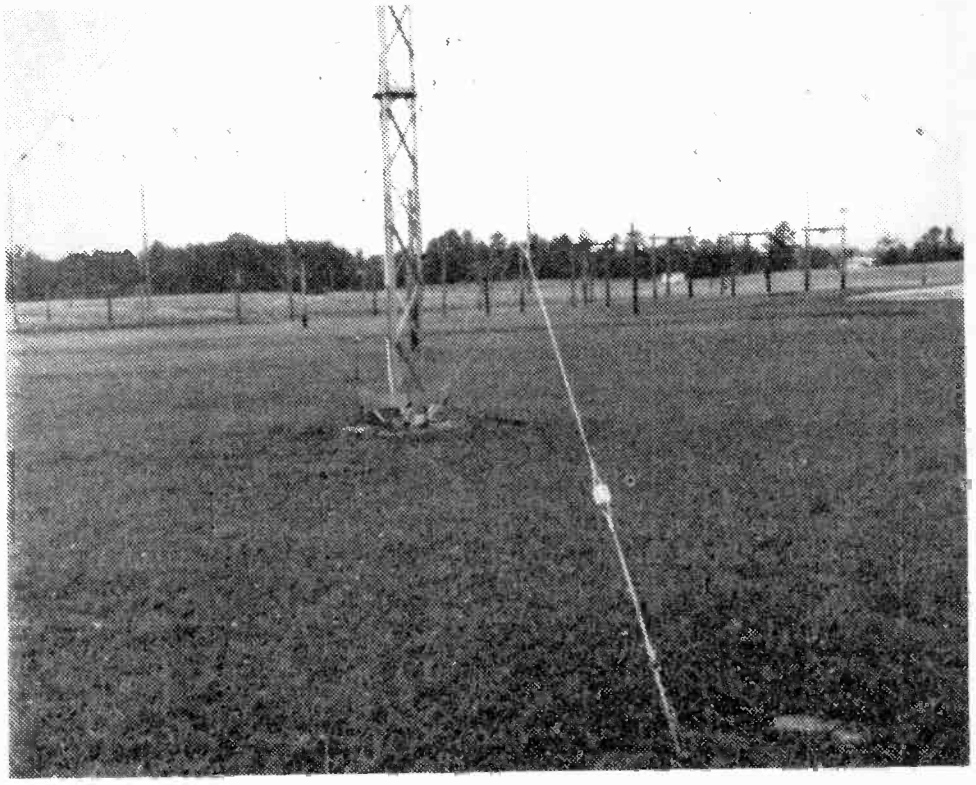
Since the Powder Springs office is encharged primarily with HF (3-30 MHz) fixed service monitoring efforts, their assignments are not always what you and I would expect (CB, ham radio, computers, etc.). Interestingly enough, although complaints do run the entire gamut, a considerable number involve military operations.

The U.S. military agencies are authorized to operate anywhere they wish in the spectrum on a non-interference basis. If a frequency appears to be vacant, they may just latch on to it. Thus, complaints from marine, coastal, amateur, and other fixed services frequently arise.

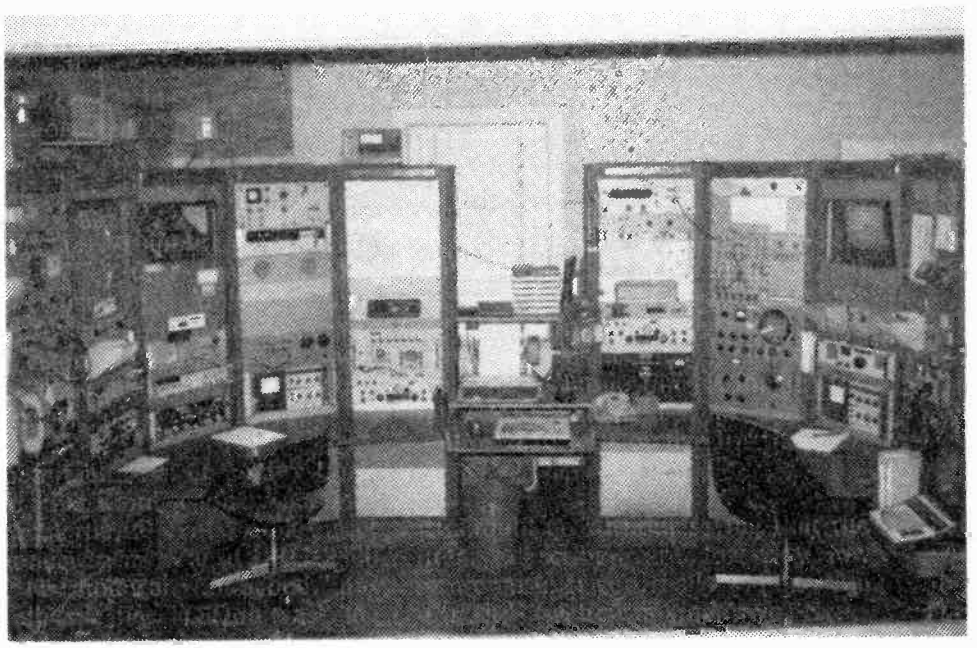
Those Numbers Stations

We asked our hosts whether the notorious "spy numbers stations" give rise to many complaints (see our expose on these in the April, 1984, issue of *MT*). "Not now that everyone knows what they are" was the reply!

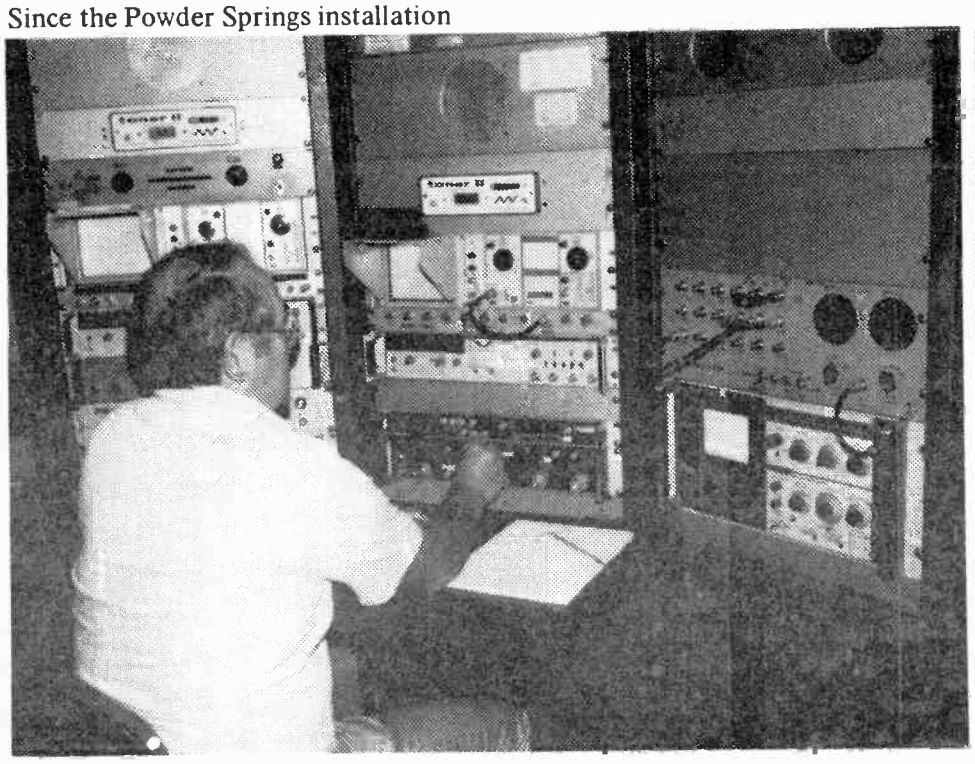
We would like to thank FCC engineers Don Taylor and Jim Crowell for their help in preparing this *MT* exclusive. ■

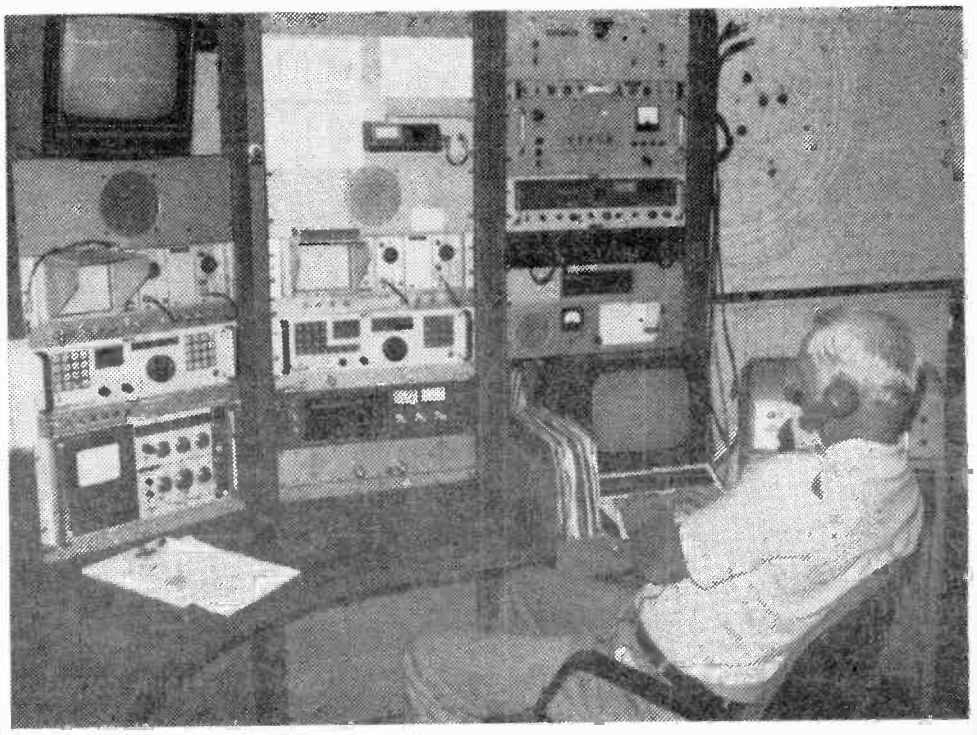


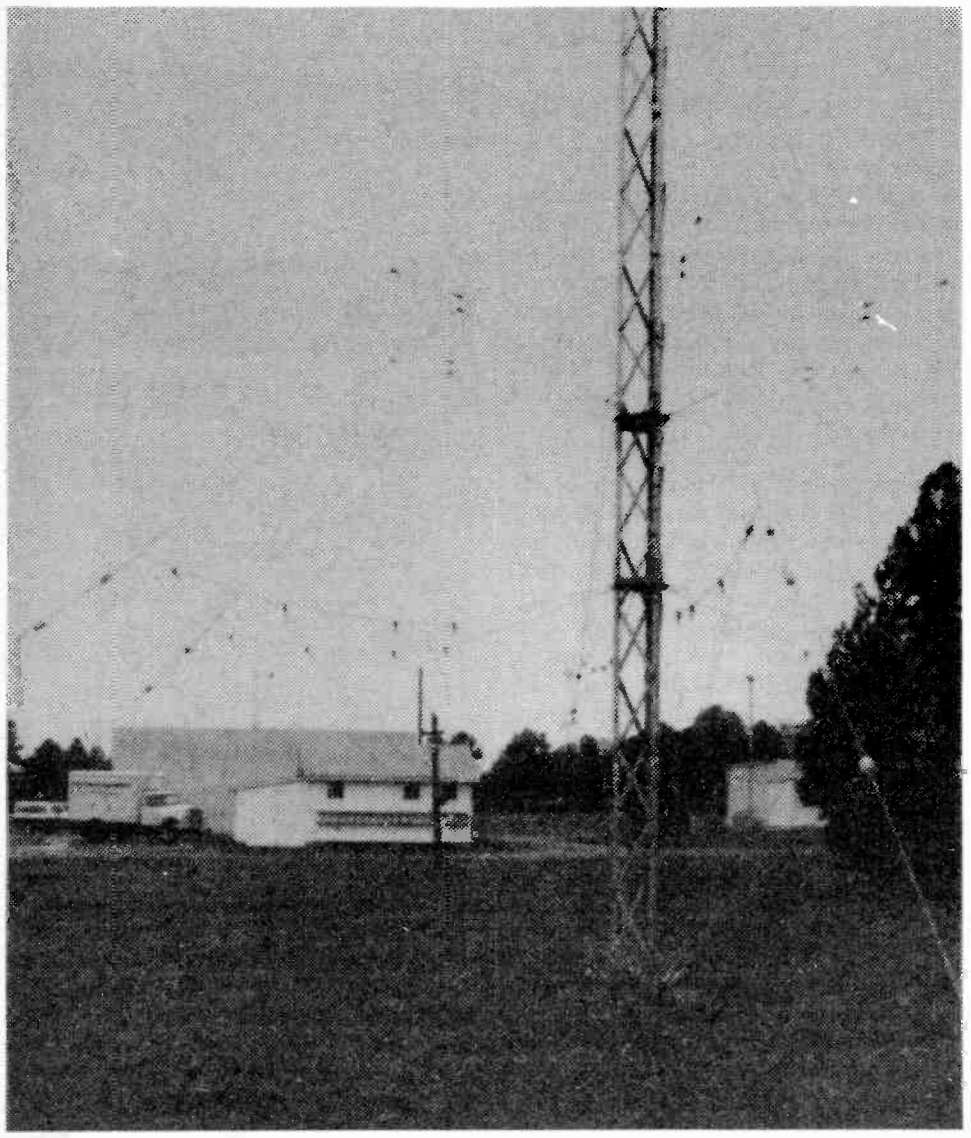
Above and facing page show the antenna field and exterior FCC installation at Powder Springs.



"Inside the FCC" - Two monitoring stations the envy of any hobbyist! (Photos courtesy of FCC)







Ft. Lauderdale FCC Flees Urban Interference

The Ft. Lauderdale, Florida, monitoring station, long helpful in identifying those Cuban jammers on the domestic broadcast band, will be moving.

This coming September their new offices will be located on a 150 acre tract on Lloyd Road in Vero Beach, three miles south of State Road 60 near County Road 512.

The move was necessary to escape the rising electrical noise level from encroaching civilization at the Ft. Lauderdale site.

FCC Office Addresses

Need to contact your local FCC office? MT presents the following up-to-date list for your use; for brevity we omitted the second line in each address which would of course read--"Federal Communications Commission."

ALASKA, Anchorage Office
6721 West Raspberry Road
Anchorage, Alaska 99502
(907) 243-2153

ARIZONA, Douglas Office
P.O. Box 6
Douglas, Arizona 85608
(602) 364-8414

CALIFORNIA, San Diego Off
4542 Ruffner St, Rm 370
San Diego, Cal 92111-2216
(619) 293-5478

CALIFORNIA, Livermore Off
P.O. Box 311
Livermore, Cal 94550
(415) 447-3614

CALIFORNIA, Long Beach
3711 Long Beach Blvd
Room 501
Long Beach, Cal 90807
(213) 426-4451

CALIFORNIA, San Fran Off
424 Customhouse
555 Battery Street
San Francisco, Cal 94111
(415) 556-7701

COLORADO, Denver Office
12477 West Cedar Drive
Denver, Colorado 80228
(303) 236-8026

FLORIDA, Ft.Lauderdale Off
P.O. Box 16027
Ft. Lauderdale, Fla 33318
(305) 473-9845

FLORIDA, Miami Office
Koger Bldg, Rm 203
8675 NW 53rd Street
Miami, Florida 33166
(305) 350-5542

FLORIDA, Tampa Office
1211 N. Westshore Blvd
Room 601
Tampa, Florida 33607
(813) 228-2872

GEORGIA, Atlanta Office
Massell Bldg Rm 440
1365 Peachtree St N.E.
Atlanta, Georgia 30309
(404) 347-3084

GEORGIA, Powder Sprgs Off
P.O. Box 85
Powder Springs, Ga 33073
(404) 943-5420

HAWAII, Honolulu Office
Waipio Access Rd.
P.O. Box 1030
Walpahu, Hawaii 96797
(808) 677-3318

ILLINOIS, Chicago Office
Park Ridge Off Ctr Rm 306
1550 Northwest Highway
Park Ridge, Ill 60068
(312) 353-0195

LOUISIANA, New Orleans
800 W Commerce St Rm 505
New Orleans, La 70123
(504) 589-2095

MAINE, Belfast Office
P.O. Box 470
Belfast, Maine 04915
(207) 338-4088

MARYLAND, Baltimore Off
1017 Federal Bldg
31 Hopkins Plaza
Baltimore, Md 21201
(301) 962-2728

MARYLAND, Laurel Office
P.O. Box 250
Columbia, Maryland 21045
(301) 725-3474

MASSACHUSETTS, Boston
1600 Customhouse
165 State Street
Boston, Mass 02109
(617) 223-6609

MICHIGAN, Allegan Office
P.O.Box 89
Allegan, Michigan 49010
(616) 673-2063

MICHIGAN, Detroit Office
24897 Hathaway Street
Farmington Hills, MI 48018
(313) 226-6078

MINNESOTA, St. Paul Office
Federal Bldg Room 693
316 North Robert Street
St. paul, Minnesota 55101
(612) 725-7810

MISSOURI, Kansas City Off
Brywood Office Twr Rm 320
8800 East 63rd St
Kansas City,Missouri 64133
(816) 926-5111

NEBRASKA, Grand Island Off
P.O. Box 1588
Grand Island, Neb 68802
(308) 382-4296

NEW YORK, Buffalo Office
1307 Federal Building
111 W. Huron Street
Buffalo, New York 14202
(716) 846-4511

NEW YORK, New York Office
201 Varick Street
New York, New York 10014
(212) 620-3437

OREGON, Portland Office
1782 Federal Office Bldg
1220 SW 3rd Avenue
Portland, Oregon 97204
(503) 221-4114

PENNSYLVANIA, Phila Office
1 Oxford Valley Off Bldg
2300 E Lincoln Hwy Rm 404
Langhorne, Penna 19047
(215) 752-1324

PUERTO RICO, San Juan Off
Federal Bldg & Courthouse
Av Carlos Chardon Rm 747
Hato Rey, PR 00918-2251
(809) 753-4567

TEXAS, Dallas Office
9330 LBJ Expresswy Rm 1170
Dallas, Texas 75243
(214) 767-5690

TEXAS, Houston Office
1225 North Loop W, Rm 900
Houston, Texas 77008
(713) 229-2748

TEXAS, Kingsville Off
P.O. Box 632
Kingsville, Tex 78363-0632
(512) 592-2531

VIRGINIA, Norfolk Office
5656 Shell Road
Virginia Beach, Va 23455
(804) 441-6472

WASHINGTON, Ferndale Off
P.O. Box 1125
Ferndale, Wash 98248
(206) 354-4892

WASHINGTON, Seattle Off
One Newport, Room 414
3605 132nd Avenue, S.E.
Bellevue, Wash 98006
(206) 764-3324

SPECIAL REPORT

WARC - HFBC(2)

by Robert Horvitz
Government Affairs Liaison
Association of North American Radio Clubs

For five weeks ending March 8, 1987, delegates from some 120 nations met in Geneva, Switzerland, to try to improve the overcrowded, interference-plagued condition of the shortwave broadcasting bands.

Known formally as the Second Session of the World Administrative Radio Conference for the Planning of the High Frequency Bands Allocated to the Broadcasting Service, WARC-HFBC(2), the conferees aired their differences, made some far-reaching decisions, but left the most difficult issues for another conference about 5 years from now. Shortwave listeners aren't likely to notice any immediate change resulting from this meeting, but over the longer term, WARC-HFBC(2) will probably have a significant impact on shortwave broadcasting.

The conference also marked an important milestone for the Association of North American Radio Clubs: it was the first time that ANARC - or any other international listeners organization, for that matter - participated in a WARC. The US delegation, headed by Ambassador Leonard H. Marks, must be thanked for recognizing the importance of the listener's perspective, for accrediting me as an observer for the final week, and for supporting the distribution of ANARC's Woodpecker Project report at the conference.

USB Broadcasting

Probably the most important decision reached by the conference was to end the use of double-sideband (DSB) modulation for shortwave broadcasting by December 31, 2015, and to encourage a transition to upper-sideband (USB) instead. Transmitters installed after 1991 are to be USB-capable.

Switching to USB will eventually double the number of channels available, thus reducing overcrowding. But it will also make existing DSB-only equipment obsolete, and may raise the minimum shortwave receiver price. The long transition period is intended to ease the economic and technological adjustments.

The conferees noted that "incentives clearly need to be provided to industry to manufacture receivers with synchronous demodulation" (such as the Sony ICF-2010 has) so that tuning in single-sideband signals will be as easy as tuning in DSB signals is now.

They also recommend that "future low-cost broadcast receivers [be] equipped to cover all HF broadcasting bands and, if possible, to provide digital frequency display."

Band-Sharing with Hams

The delegates decided that "the sharing of frequency bands by the Amateur and Broadcasting Services is undesirable and should be avoided." Broadcasters in the 7000-7100 kHz ham band were told to stop transmitting immediately.

While this must come as welcome news for hams, another shoe may drop at a future WARC. Amateurs in North, Central and South America now share the 7100-7300 kHz band with broadcasters. The statement that such sharing is undesirable suggests that a future conference may allot this band exclusively for broadcasting.

Central Planning

WARC-HFBC(2) was supposed to decide on implementing a computerized system for the International Frequency Registration Board (IFRB) to select frequencies for each HF broadcasting station "on the basis of the principles of equality and equitable access." This would be a radical departure from the present "coordinated" system in which each country picks its own broadcasting frequencies.

A few months before WARC-HFBC(2) began, the IFRB published some trial runs of its proposed planning system. The results disappointed even the most ardent supporters of planning. Not only could the plan not accommodate the large number of transmissions that nations want to air, but broadcasters would have to change frequency as often as every half hour to ensure maximum spectrum utilization. Aside from being impractical for many older transmitters, this would make it hard for listeners to locate and stay with a service as it moves from channel to channel.

Since the plan was judged unacceptable in its present form, the conference instructed the IFRB to try to improve it for possible implementation in part of the broadcasting spectrum.

Meanwhile, the IFRB is to develop a new frequency coordination process as an alternative to planning in the rest of the broadcasting spectrum. A future WARC, foreseen as taking place around 1992, will decide whether to implement the plan, or the improved coordination procedures, or both. Until then, the existing coordination procedures will continue to be used.

Out-of-Band Broadcasting?

Postponing the implementation of planning created a problem: an additional 725 had been promised to the HF Broadcasting Service starting in July 1989, on condition that use of the added channels be planned. With the decision on planning delayed to 1992 at the earliest -- and possibly rejected even then -- what will happen to the "band extensions" available in 1989 (11650-11700, 11975-12050, 13600-13800, 15450-15600, 17550-17700 and 21750-21850 kHz)?

In a decision that upset many delegations, the conference extended the deadline for transferring the Fixed Service stations out of the promised spectrum above 10 MHz, and agreed to delay formal reallocation of these bands to the Broadcasting Service pending the outcome of the next HF WARC.

However, since the band extensions are mostly adjacent to overcrowded broadcasting bands, and most of the Fixed Service stations have already been reassigned, we're likely to see broadcasters (continue) moving into this under-used spectrum anyway, citing Radio Regulation No. 342, which permits out-of-band operation so long as no harmful interference is caused to stations following ITU rules.

Since the combined benefits of switching to USB and improved coordination and planning may still not be enough to meet the needs of the HF Broadcasting Service, the conferees recommend that WARC-92 consider allocating additional spectrum for broadcasting. Since this would mean taking channels away from other HF services, it could become an HF reallocation conference, or even a General WARC like the one in 1979.

Woodpecker Report

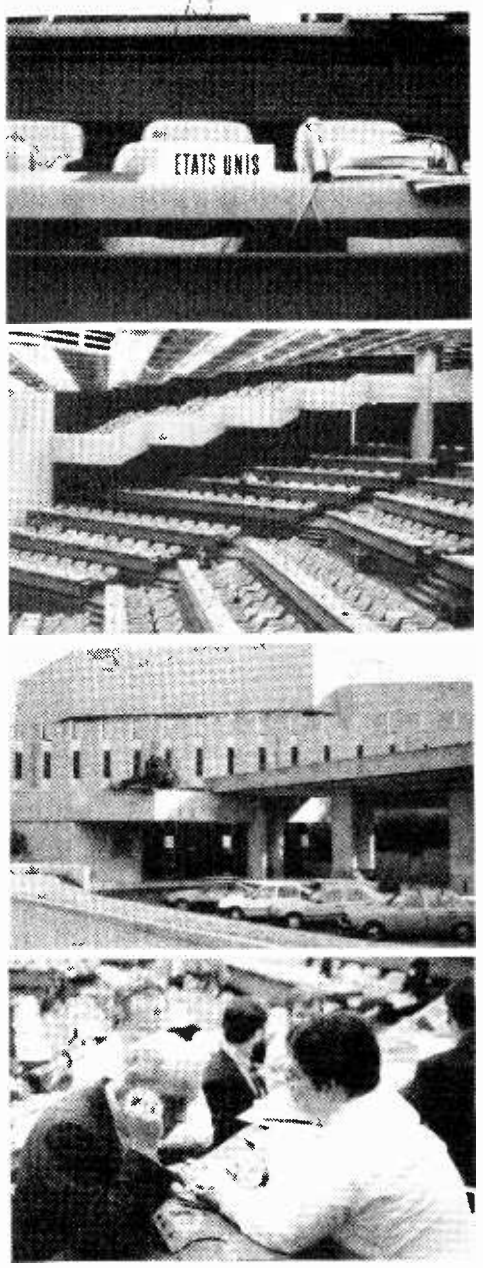
During the second week of WARC-HFBC(2), Ambassador Marks met with W. H. Bellchambers, chairman of the IFRB, and gave him a copy of "The Woodpecker Project: A Preliminary Report." I had a chance to speak with him later. The IFRB is well aware of the problem - not just interference caused by the Woodpeckers, but the proliferation of powerful, frequency-hopping HF radars of all types. While promising that the IFRB would study our report after the conference, Mr. Bellchambers admitted that there wasn't much that the International Telecommunication Union could do without the cooperation of the nations sponsoring such systems.

Soon after the Woodpecker report was released at the conference, the US delegation introduced a resolution directing the IFRB to monitor the HF broadcasting bands to identify and report on sources of harmful interference. Worded broadly enough to include OTH radar signals as well as jamming, this proposal was quickly approved by the conference. Hopefully it will increase awareness of the problem of interference, maybe even inspire offenders to change their behavior.

Final Thoughts

WARC-HFBC(2) had moments of high drama, not to mention hours of tedium. Although the subject matter was ostensibly technical, ideology had a lot to do with how problems were defined and proposals were supported. Politics was never far from the surface.

Given the wide range of opinions represented, it is probably significant that the conference reached any agreement at all. For a long time it looked like it wouldn't. But one of its most interesting aspects was that countries usually antagonistic to each other worked closely together in Geneva: the U.S. and the USSR, India and Pakistan, Iran and Iraq. The airwaves may not always be friendly, but international broadcasting does seem to bring the peoples of the world closer together -- without eliminating their differences. ■



Photos, top to bottom: (1) The U.S. delegation's desk-mark; (2) the room where WARC plenary sessions were held; (3) the entrance to the International Conference Center (4) Deputy Director of the State Department's Office of International Radio Warren Richards (left), confers with David Cohen (right), Spectrum Division, National Telecommunications and Information Administration, during a conference break.

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RADIO ACTIVITY

All Monitoring Times readers -- no matter what their level of expertise -- are encouraged to let us know what they've been hearing.

We welcome your loggings and will present a selection from them each month in this column.

Send your *loggings* to:
Gayle Van Horn
160 Lester Drive
Orange Park, FL 32073

Station news (See "World Radio News", this issue) should be forwarded to:
Larry Miller
3 Lisa Drive
Thorndale, PA 19372

Algeria

Radiodifusion-Television Algerienne on 14492 kHz, the 2nd harmonic of 7246 kHz. Observed around 1740 UTC with chanting and a woman and man in presumed Kabyle. 7246 kHz also heard through severe ham interference and jamming. The 3rd harmonic, 21738 kHz, occasionally makes it here when conditions permit. (Bob Hill, Sharon, MA)

Benin

ORT du Benin at 0510 UTC in French on 4870 kHz. Several selections of African native music. Male announcer with Benin ID and announcements.

Botswana

Radio Botswana from 0348 to 0432 UTC on 4820 kHz. Interval signal and detailed sign on announcement with many AM and FM frequencies, then into program of religious music in Setswana. (John Santosuosso, Oak Hill, FL)

Brasil

Radio Brasil Central at 0140 UTC in Portuguese on 4985 kHz. continuous sports commentary by rapid-fire announcer.

Radio Club do Para at 0135 UTC in Portuguese on 4885 kHz. Heard under Morse code. Station announcements, time check and a lively Saturday night music program of Brasilian samba music

Radio Cultura do Para at 0155 UTC in Portuguese on 5045 kHz. Easy listening and pop music. Station ID and "hallo" to listeners at 0200. More pop music.

Radio Nacional da Amazonia at 1930 UTC in Portuguese on 11780 kHz. Easy listening instrumentals, Amazonia station promotions and pop music.

Radio Nacional Manaus at 0220 UTC in Portuguese on 4845 kHz. Music titles of Portuguese pop, easy listening, and rock music. Local time check for Manaus, talk and more pops.

Radio Poti at 0150 UTC in Portuguese on 4965 kHz. More sports commentary by male announcer. One brief singing ad during a break.

Burkina Faso

TV Burkina at 0635 UTC in French on 4815 kHz. U.S. rhythm and blues music, DJ type format with music intros. Reggae music followed.

Cameroon

Radio Garoua at 0535 UTC in French at 5010 kHz. Native African music to 0558 UTC, announcements, ID at 0600 into English newscast. A good time to get a report for this one is during this English newscast.

Central African Republic

Radio Centrafrique at 0445 UTC in French on 5035 kHz. Local station announcements, native African music, station ID and news reporting format at 0530.

Chad

Radiodiffusion Nacionale Tchadienne at 2150 to 2205 UTC on 4898 kHz. Hilife music and station identification at 2205 UTC. Probably trying to escape Libyan jammer on 4920 kHz. (John Santosuosso, Oak Hill, FL)

Radio Moundou at 0533 UTC in French on 5288 kHz. Native African music. Brief mention of Moundou at 0540 UTC. More African music followed. Lots of noise but fair programming audible.

China

CPBS-1 (Central People's Broadcasting Station) The 3220 channel noted from 2205 UTC with woman in Standard Chinese; presumably news. High-side het QRM, otherwise fair; better on dual 4460 kHz. (Bob Hill, Sharon, MA)

Fujian Front Station (Voice of the Strait) from 1222 to 1243 UTC on 3200 kHz. Commentary in Chinese by woman announcer followed by instrumental Chinese music. (John Santosuosso, Oak Hill, FL)

Clandestine

A Voz de Resistencia do Galo Negro from 0330 to 0344 UTC on 4973 kHz. Rooster interval signal, anthem, and into program in Portuguese with several mentions of Angola. (John Santosuosso, Oak Hill, FL)

Radio Freedom (via Africa No. 1) at 1915 to 2013 UTC on 15475 kHz in French. Program sponsored by the African National Congress with news and commentary, references to "African Solidarity." (John Santosuosso, Oak Hill, FL)

Radio Halgan (via Ethiopia) from 1725 to 1757 UTC on 9590 kHz. Somali commentary and local music. Logging submitted as tentative. (John Santosuosso, Oak Hill, FL)

Radio Iran Toilers (probably via USSR) at 1530 UTC on 10870 kHz with commentary but gone by 1535 UTC. (John Santosuosso, Oak Hill, FL)

Colombia

Ondas Orteguaza at 2330 UTC in Spanish on 4975 kHz. Tone signal with station ID at 2230 UTC, local news and announcements. Weak signal.

Radio Sutatenza at 2240 UTC in Spanish on 5095 kHz. "Canned" promotional for station with ID. News about Bogata.

Costa Rica

Radio Reloj at 0623 UTC in Spanish on 4832 kHz. Popular Spanish music with DJ type announcer and station ID. (C. Volz - Valparaiso, IN)

Dominican Republic

Radio Clarin at 2257 to 2303 UTC on 11700 kHz in Spanish. News and commentary on the Communist threat to the Dominican Republic. Radio Clarin station identification at 2303 but no CID ID heard. (John Santosuosso, Lakeland, FL) [CID is the initials for "Cuba Independent and Democratic", the organization which a few months ago purchased virtually all of Clarin's airtime. -- ed.]

Ecuador

La Voz de los Caras at 0205 UTC in Spanish on 4795 kHz. Spanish ballads and classical music. Announcements and ID between music.

Radio Centinela del Sur at 0330 UTC in Spanish on 4890 kHz. Very lengthy sports commentary.

Radio Iris at 0225 UTC in Spanish on 3381 kHz. Local announcements with talk on city of Esmeraldas. Ecuadorian folk music. [Known locally as "pasillo", the soft like bolero music is played on a guitar. -ed.]

La Voz de Upano at 0155 UTC in Spanish on 5040 kHz. Symphony music. "La Voz de Upano, Macas, Republica de Ecuadora." Also gave frequencies during ID for medium and shortwave.

Radio Quito at 0135 UTC in Spanish on 4920 kHz. Slow Spanish ballads. Music up to 0200 ID of "Radio Quito, La voz de Capital, Quito, Republic de Ecuadora."

Radio Zaracay at 0025 UTC in Spanish on 3395 kHz. News briefs and Radio Zaracay ID after brassy introduction. "Canned" promotional announcements for the station's news.

French Guiana

Radio France International via Montsinery relay, at 0445 UTC in English on 9800 UTC. International news primarily relating to France. Station ID with frequencies and upcoming Spanish programming. Brief instrumental music and into Spansh programming at 0500 UTC. Parallel frequency on 6055 kHz. (Mike Hardester, N. Versailles, PA)

Germany, East

Radio Berlin International at 1311 UTC on 15240 kHz. Africa Service programming. (Dave Kammler, Keflavik, Iceland)

Greece

Radio Station Macedonia from Thessalonkiki is currently relaying its domestic service in Greek on shortwave. The schedule is from 0600-1000 UTC (Sundays only) on 9935 and 11595 kHz, 1000-1600 UTC on 9935 and 11595 kHz and from 1625-2215 UTC on 7000 and 9935 kHz. (BBCMS)

Radio Station Makedonias -- 9550 is the latest new frequency to be found for this one, which has become something of a gypsy in recent months. The station ID is in Greek at 1900 following a time check. (Bob Hill, Sharon, MA)

Guatemala

Radio Chortis at 0035 UTC in Spanish on 3380 kHz. Chortis ID, religious sermon or text followed by religious choral music.

Radio Cultural at 0632 UTC in Spanish on 3300 kHz. Weak signal, but announcer coming through with station ID and two muical instrumentals of "What the Heck" and "Honey, I Love You" (Carl Volz - Valparaiso, IN)

La Voz de Nahuala at 0030 UTC in Spanish on 3360 kHz. Solo flute music, local time check, easy listening music and into Spanish religious music.

Radio Tezulutlan at 0015 UTC in Spanish on 3370 kHz. Local steel drum marimba music. Announcements and mention of city "Coban" with station ID.

Guinea

Radio Diffusion National at 0625 UTC in French on 4900 kHz. Two male announcers with news reporting format and "chit-chat."

Honduras

La Voz Evangelica at 0115 UTC in Spanish on 4820 kHz. Beautiful instrumental guitar ballads, station promotions, program schedule for Sunday followed by more guitar music.

San Radio, HRRI, at 0017 UTC in Spanish on 4755 kHz. Political-sounding discussion on "el presidente de la republica Honduras." Local commercials for Banco-Central Americano and the Nacional Cafe. Brief march music at 0033 UTC and apparent ID as "en Sani Radio informo." Programming switched to the Moskito language. Fading a defiinite problem. (Mike Hardester - N. Versaille, PA)

Iceland

Kalaalit Nunaata Radioa from 1111 to 1135 UTC on 3999 kHz with brief talks and religious music. (John Santosuosso, Oak Hill, FL)

India

All India Radio, Lucknow, on 3205 kHz with "Song of India" from 0023 until 0025, when it seemed to go into a subcontinental vocal. Announcement at 0026, then some kind of flute music. Audio seemed to change at 0030 and again at 0035 (the latter probably for a relay of news in English from Delhi). Followed with great difficulty until around 0120 UTC when it faded below readability.

Seemed parallel to 3365 (Delhi), which would be logical because both outlets carry the Northern Regional Service. After 0100 UTC an even weaker signal on 3223 kHz might well have been Simla! Watch for unusually poor reception of Latin American stations as a tipoff to possibly enhanced subcontinental signals (or, of course, to wretched conditions overall). (Bob Hill, Sharon, MA)

All India Radio: External Service found on new 4990 kHz carrying the 0000-0045 Tamil language transmission. It's parallel to 3905 and 7260 kHz. Pretty decent level, although another station occasionally provides bothersome co-channel QRM. (Bob Hill, Sharon, MA)

All India Radio at 2225 UTC in English on 9910 kHz. Heard only five minutes but enough to hear female announcer giving frequency schedule and ID. My first All India Radio reception in 4 years but not enough info for a report. (Carl Volz - Valparaiso, IN)

Japan

Radio Japan at 1552 UTC on 17785 kHz. Report on Japanese man kidnapped in the Phillipines and a talk about China. (Dave Kammler, Keflavik, Iceland)

Kuwait

Radio Kuwait at 1820 UTC in English on 11675 kHz. U.S. rock music by Rod Stewart and David Bowie.

Lesotho

Radio Lesotho at 0300 UTC in Lesotho on 4800 kHz. Station sign-on with the Lesotho national anthem and ID. Chorus with religious music and a sermon text by male announcer. Looks like this station is active again. (J. Bonet - Lafayette, LA)

Libya

Radio Jamahiriya at 2038 UTC in English on 7245 kHz. Two monotone announcers blasting the U.S. and its naval strategy. Also warned listeners that the U.S. was about to invade Asia. (Carl Volz - Valparaiso, IN) [And Latin America, Europe, the Middle East, Canada, Australia and New Zealand, etc., etc. Now that's entertainment. -ed.]

Malawi

The Malawi Broadcasting Corporation (MBC) Blantyre, has reactived 3381 kHz. as observed several evenings in February. Rapid drums from 0251 UTC, rooster crowing thrice at 0253, then sign-on announcements (including "MBC") followed by music. Returned at 0407 UTC to find hilife-type music and ad or ads in presumed Chichewa. QRM? If you enjoy it, you'll have a wonderful time trying to copy this one! (Bob Hill, Sharon, MA)

Malta

IBRA Radio at 2047 UTC in English on 6110 kHz. Family religious programming and Gospel music. (Carl Volz - Valparaiso, IN)

Nicaragua

Radio Zinica at 1545 UTC on 6120 kHz in Spanish. Excited male announcer with selection of Spanish and English pop music. (Thompson - FL ASWLC)

Niger

RTV Niger at 0540 UTC in French on 5020 kHz. Repetitive African drum music. Two male announcers with talk and ID. (Larry Peterson - Oklahoma City, OK)

Nigeria

Radio Nigeria at 0440 UTC in English on 4770 kHz. Schedule of upcoming programs for the day and Lagos time check for "quarter to six" followed by national news of Nigeria. (Peter Crawford - Lake Marmoset, WI)

Voice of Nigeria on 0815 UTC in English on 7255 kHz. Program Focus then drum beat interval signal with station ID. Excessive static on frequency. (Carl Volz - Valparaiso, IN)

North Korea

Radio Pyongyang at 1200 UTC in English on 9715 kHz. Station ID at top of the hour followed by news, including a pledge of loyalty to "the great leader, President Kim Il Sung." Final report on "golden largescale construction." Monitored up to 1248 UTC. (James Kline, Santa Monica, CA)

Northern Mariana Islands (Saipan)

KYOI at 2124 UTC on 9670 kHz. Rock music. (Dave Kammler, Keflavik, Iceland) [Still broadcasting rock in early March even though now owned by the Christian Science Monitor. Changes in format apparently won't occur for a couple of months, if at all. See CSM interview in February World Radio Report. -- ed.]

Numbers

2302 to 2311 UTC in Upper Side-band with "Papa Juliette" ID and bagpipes. At 2305 UTC into 5-digit German-language numbers. (J. Santosuosso, Lakeland, FL)

2207+ with 5-digit German-language numbers in xxx xx format. Interesting how some numbers transmissions use frequencies in the middle of the broadcast bands. (J. Santosuosso, Lakeland, FL)

South Africa

Radio 5 at 0400 UTC on 4880 kHz. Breakfast Show of light pop music, greetings to listeners and advertisements. Good, strong signal. (Larry Miller, Thorndale, PA)

Sweden

Radio Sweden International at 1606 UTC on 6065 kHz. Report on Sweden's plan to cut aid to non-democratic countries and bureaucracy in government. (Dave Kammler, Keflavik, Iceland)

Tahiti

Radio Tahiti at 0416 UTC on 11825 kHz in Tahitian. Male and female announcer with island music. (Harold Frodge, Midland, MI - ASWLC)

Tunisia

Radiodiffusion Television Tunisienne from 0510 to 0530 UTC on 7525 kHz. Arabic music and announcements in French. (John Santosuosso, Lakeland, FL)

Unidentified

On 6230 kHz, a station can be faintly heard at 2030 to 2056 UTC in what sounds like one of the Romance languages. So far, it's been too weak for any definite program details. Occasionally, there is no audio at all. (Bob Hill, Sharon, MA) ■

frequency SECTION

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.

- 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.
- Frequencies in bold are most likely to be heard regularly in North America.

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.

Frequency updates from readers are also welcome and should be sent to:

Larry Miller, Frequency Coordinator
Monitoring Times
P.O. Box 691
Thorndale, PA 19372

Anyone whose material is used will receive a certificate of appreciation from Monitoring Times. All frequencies on this list in bold have been heard by one or more MT monitors during the previous month.

The MT Monitoring Team

Greg Jordan, NC Rich Foerster, NE
Gayle Van Horn, FL

Honorary Monitors

Terry M. Moore, WDX6USA, El Toro, CA
Richard Tanger, Jr., Pleasantville, NJ
Nicholas Peter Adams, Newark, NJ
Franklin D. Trumpy, Ames, IA
Nick Gollobitz, St. Louis, MO
Leonard Jasiunas, Concord, CA
Paul Hunter, Van Muys, CA
James Kline, Santa Monica, CA
Frank Suopis, Hemet, CA
Robert Zilmer, Rio Rancho, NM
James Brownlee, Jr., Laurens, SC

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

0000-0015	Voice of People of Kampuchea	9693, 11938
0000-0025	Kol Israel	**7410, 7465** 9435
0000-0030	BBC, England	**5975,** 6005 **6120, 6175** 7325, 9515 9590, 9915
0000-0030	KGEI, California	15280
0000-0030	Radio Berlin International	**6080, 9730**
0000-0030	Radio Canada International	**5960, 9755**
0000-0030 M	Radio Norway International	**9590, 9610**
0000-0045	WYFR, Florida	**9680, 15170** **15440**
0000-0050	Radio Pyongyang,North Korea	15140, 15160
0000-0100	Armed Forces Radio and TV	**6030, 11790** **15345, 17765**
0000-0100	All India Radio	9910, **11715**
0000-0100	CBC Northern Quebec Svce	**6195, 9625**
0000-0100	CFCX, Montreal, Canada	6005
0000-0100	CFRX, Toronto, Canada	6070
0000-0100	CFVP, Calgary, Canada	6030
0000-0100	CHNX, Halifax, Canada	6130
0000-0100	CKFX, Vancouver, Canada	6080
0000-0100	KCBI, Texas	11910
0000-0100	KSDA, Guam (AWR)	15115
0000-0100	KVOH, California	**17775**
0000-0100	KYOI, Saipan	15405
0000-0100	Radio Australia	**15160,** 15240 **15320,** 15395 **17750, 17795**
0000-0100	Radio Baghdad, Iraq	**11735**
0000-0100	Radio Beijing,China	**9550**
0000-0100	Radio Discovery,Domin. Rep.	**15045**
0000-0100v	Radio Dublin International	6910
0000-0100	Radio Havana Cuba	**6090, 9740**
0000-0100	Radio Korea (South)	15575
0000-0100	Radio Moscow	**5915, 5920** **5940, 7115** **7150, 7215** **7310, 7440** **11880, 13665**
0000-0100	Radio Thailand	9650, **9665** 11905
0000-0100	Radio Veritas, Philippines	**9740**
0000-0100	Radio New Zealand Int'l	11780, 15150 **17705**
0000-0100	RTL Luxembourg	**6090**
0000-0100	Spanish Foreign Radio, Spain	**9630, 11880**
0000-0100	Voice of America	**5995, 6125** **6130, 9455** **9650, 9775** **9815, 11580** **11680, 11740** **11770, 15205**
0000-0100v	Voice of Nicaragua	**6015**
0000-0100	WCSN, Boston, MA	7365
0000-0100	WINB, Pennsylvania	**15145**
0000-0100	WHRI, Indiana	**9680**
0000-0100	WRNO Worldwide	**7355**
0015-0100	AWR, Costa Rica	**15460**
0030-0100	BBC, England	**5975, 6005** 6075, **6120** **6175, 7325** 9515, **9590** **9915,** 11750
0030-0100	HCJB, Ecuador	**9870, 11910** **15155**
0030-0100 A	KTWR, Guam	15340
0030-0100	Radio Belize	3285
0030-0100 W,A	Radio Budapest Hungary	**6025, 6110** **9520, 9835** **9680**
0030-0100 T-A	Radio Portugal	6005, 9720
0030-0100	SLBC, Sri Lanka	15425
0045-0100 M	Radio Cultural, Guatemala	3300, **5955**
0045-0100	Radio Korea World News Svc	7275
0050-0100	Vatican Radio	**6030,** 9605 11845

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

0100-0115	All India Radio	6035, 7215 9595
0100-0115	Vatican Radio	**6030, 9605** 11845
0100-0120	RAI, Italy	**6010,** 9575
0100-0124	Kol Israel	**7410, 7465** 9435
0100-0130	HCJB, Ecuador	**9870, 11910** **15155**
0100-0130 T-A	Radio Budapest, Hungary	**6025, 6110** **9520, 9835**
0100-0130	Radio Japan General Service	7140, 9675 15235, 17810
0100-0130	Radio Vientiane, Laos	7112v
0100-0130	WINB, Pennsylvania	15145
0100-0145	Radio New Zealand Int'l	**15150, 17705**
0100-0150	Deutsche Welle, West Germany	**6040, 6085** **6145,** 9545 **9565,** 11785
0100-0200	ABC, Perth, Australia	15425
0100-0200	Armed Forces Radio and TV	**6030, 11790** **15355**
0100-0200	BBC, England	**5975, 6005** **6120, 6175** **7325, 9515** **9590, 9915**
0100-0200	CBC Northern Quebec Srvc	**6195, 9625** **11920**
0100-0200	CFCX, Montreal, Canada	6005
0100-0200	CFRX, Toronto, Canada	6070
0100-0200	CFVP, Calgary, Canada	6030
0100-0200	CHNX, Halifax, Canada	6130
0100-0200	CKFX, Vancouver, Canada	6080
0100-0200	FEBC, Manila, Philippines	15315, 21475
0100-0200	KCBI, Texas	11910
0100-0200	KSDA, Guam (AWR)	15115
0100-0200	KVOH, California	**9495**
0100-0200	KYOI, Saipan	15405
0100-0200	Radio Australia	**15320, 15395** 17715, 17750 **17795**
0100-0200	Radio Belize	3285
0100-0200	Radio Canada International	**5960, 9535** **9755,** 11845 11940
0100-0200 M	Radio Cultural, Guatemala	5955
0100-0200v	Radio Dublin International	6910
0100-0200	Radio Havana Cuba	**6090, 9740**
0100-0200	Radio Moscow	**5915, 5940** **6000, 6070** **7115, 7150** **7215, 7320**
0100-0200	Radio Moscow World Service	7130, 7315 11720, **11845**
0100-0200	Radio Prague, Czechoslovakia	**5930, 6055** **7345,** 9540 9740
0100-0200	Radio Thailand	**9665,** 11905
0100-0200v	RAE, Argentina	**9690, 11710**
0100-0200	SBC Radio 1, Singapore	11940
0100-0200	Spanish Foreign Radio, Spain	9630, **11880**
0100-0200	Sri Lanka Broadcasting Corp.	6005, 9720 15425
0100-0200	Voice of America	5995, 6130 **7205, 9455** **9650, 9775** **9815, 11580** **11740, 15205**
0100-0200	Voice of Indonesia	9680, 11790
0100-0200v T-A	Voice of Nicaragua	**6015v**
0100-0200	WCSN, Boston, Mass	7365
0100-0200	WHRI, Indiana	**9852.5**
0100-0200	WINB, Pennsylvania	15145
0100-0200	WRNO Worldwide	**7355**
0100-0200	WYFR, Florida	**9555**
0115-0200	Radio Berlin International	**6080, 9730**
0130-0200	KNLS, Alaska	**11905**
0130-0140	Voice of Greece	**7430,** 9395 **9420**
0130-0200	HCJB, Ecuador	**9870, 15155**
0130-0200	Radio Austria International	**6155**
0130-0200	Radio Veritas Asia,Philipp	**15135, 15360**
0130-0200	WINB, Pennsylvania	15145
0145-0200	Radio Berlin International	**6125, 6165**
0145-0200	Radio Korea	6480, 7275

0200 UTC [8:00 PM EDT/7:00 PM PDT]

0200-0215	Radio Budapest, Hungary	**6025,** 6110 9520, 9835
0200-0215	Vatican Radio	6145, 7125 **9650**
0200-0230	BBC, England	**5975,** 6005 **6120, 6175** **7325, 9515** **9590, 9915**
0200-0230	Burma Broadcasting Corp	7185
0200-0230 S,M	WINB, Pennsylvania	**15145**
0200-0230	Radio Berlin International	**6125, 6165**
0200-0245	Radio Berlin International	**9560, 9620**
0200-0230 M-F	Radio Canada International	**5960, 9755**
0200-0230	Radio Kiev, Ukraine SSR	**7165, 11790** **13645**
0200-0230	Radio Korea World	7275, 11810
0200-0230	Swiss Radio International	**6135, 9625** **9725, 9885**
0200-0230 T-A	Voice of Nicaragua	**6015**
0200-0250	Deutsche Welle, W. Germany	6035, 7285 9650, 9690 11945
0200-0256	Radio RSA, South Africa	6010, **6185** 9615
0200-0300	ABC Perth, Australia	15425
0200-0300	Armed Forces Radio and TV	**6030, 15345**
0200-0300	CBC Northern Quebec Service	6195, **9625**
0200-0300	GBC, Guyana	5950
0200-0300	HCJB, Ecuador	**6230, 9870**
0200-0300	KSDA, Guam (AWR)	15115
0200-0300	KYOI, Saipan	15405
0200-0300	Radio Australia	15240, **15320** 15395, 17795
0200-0300	Radio Belize	3285
0200-0300	Radio Bras, Brazil	**11745**
0200-0300	Radio Bucharest, Romania	5990, **6090** 9510, 9570 **9835,** 11810 11940
0200-0300	Radio Cairo, Egypt	**9475,** 9675 **9900**
0200-0300 T-A	Radio Canada International	**5960,** 9755
0200-0300 T-S	Radio Dublin International	6910
0200-0300	Radio Havana Cuba	**5965, 6035** **6090, 6035** **6140, 6190** **9740**
0200-0300	Radio Japan	**11870,** 15420 15195, 17825
0200-0300	Radio Korea, South	11810
0200-0300	Radio Moscow, U.S.S.R	**5915, 5940** **6000, 6070** **7115, 7150** **7320, 13605** **13665, 12050**
0200-0300	Radio New Zealand Int'l	15150
0200-0300	Radio Polonia, Poland	6095, 6135 **7145,** 7270 9525, 11815 15120
0200-0300	Radio Thailand	**9665,** 11905
0200-0300	Radio Veritas, Philippines	**9740,** 15195
0200-0300	SBC Radio 1, Singapore	11940
0200-0300	Sri Lanka Broadcasting Corp	6005, 9720 15425

frequency SECTION

0200-0300	Voice of America.....	**7205, 9455 9650**
0200-0300	Voice of Asia, Taiwan.....	7285
0200-0300	Voice of Free China, Taiwan.	**5985,** 9555 **11740**
0200-0300	WCSN, Boston, Mass.....	**9815**
0200-0300	WHRI, Indiana.....	**9852.5**
0200-0300 M	World Music Radio.....	6910
0200-0300	WRNO Worldwide.....	**7355**
0215-0220	Radio Nepal.....	5005
0230-0300	BBC, England.....	**5975, 6005 6120, 6175 7325, 9515** 9915
0230-0300	Radio Netherland.....	**6020, 6165 9590, 9895**
0230-0245	Radio Pakistan.....	**5905,** 7315 **11745,** 15115 **15580, 17660**
0230-0300	Radio Sweden International..	9695, 17840 SSB
0230-0300	Radio Tirana Albania.....	**7060,** 7120 **9760**
0230-0300	SLBC, Sri Lanka.....	9720
0240-0250	All India Radio.....	6110, 9545 9610
0250-0259	Radio Yerevan, Armenian SSR	**11790, 13645 15180**

0300 UTC	[11:00 PM EDT/8:00 PM PDT]	
0300-0310	CBC Northern Quebec Service.	**6195,** 9625
0300-0315	Radio Budapest.....	**6025, 6110 9520, 9835**
0300-0325	Radio Netherland.....	**6020, 6165 9590,** 9895
0300-0330	BBC, England.....	**5975, 6005 6120, 6175 7185, 7325 9515, 9600**
0300-0330	Radio Cairo, Egypt.....	**9475,** 9675
0300-0330	Radio Canada International..	**5960, 9755**
0300-0330	Radio Japan General Service	**5960, 15280 15350, 17810 17845**
0300-0330	Radio Kiev, Ukrainian SSR...	**6200, 7165** 9765, 11790 13645
0300-0330 T-S	Radio Canada, Montreal.....	**5960, 9755**
0300-0330 T-A	Radio Portugal.....	**9705**
0300-0350	Deutsche Welle, West Germany	**6045, 6185 9565**
0300-0350	Voice of Turkey.....	9560
0300-0400	Armed Forces Radio and TV...	**6030,** 11730 **11790,** 12060 **15345, 17765 21570**
0300-0400	CFCX, Montreal, Canada.....	6005
0300-0400	CFRX, Toronto, Canada.....	**6070**
0300-0400	CFVP, Calgary, Canada.....	6030
0300-0400	CHNX, Halifax, Canada.....	6130
0300-0400	CKFX, Vancouver, Canada.....	6080
0300-0400	HCJB, Ecuador.....	**6230, 9870**
0300-0400	KNLS, Alaska.....	**9670**
0300-0400	KSDA, Guam (AWR).....	17840
0300-0400	KYOI, Saipan.....	15190
0300-0400 M	La Voz Evangelica, Honduras	4820
0300-0400	Radio Australia.....	**15160,** 15240 **15320, 15395 17715, 17750 17795,** 11750
0300-0400	Radio Beijing, China.....	**9645, 11980 11970, 15445**
0300-0400	Radio Belize.....	**3285**
0300-0400	Radio Cultural, Guatemala...	5955
0300-0400 T-S	Radio Dublin International..	6910
0300-0400 T-S	Radio Earth.....	**7355**
0300-0400	Radio Havana Cuba.....	**6000, 6090 6140, 6190 7400**
0300-0400	Radio Moscow.....	**6130, 7165 7320,** 11770 **11790, 11860 12050, 13665**
0300-0400	Radio New Zealand Int'l....	11780, 15150
0300-0400	Radio Polonia, Poland.....	6095, 6135 7270, **9525** 11815
0300-0400	Radio Prague, Czechoslovakia	**5930, 6055 7345**
0300-0400	Radio RSA, South Africa.....	**3230, 4990 7270,** 9585
0300-0400	Radio Sofia Bulgaria.....	**7115**
0300-0400	Radio Thailand.....	9560, 11905
0300-0400	SLBC, Sri Lanka.....	6005, 9720 15425
0300-0400	Trans World Radio, Bonaire..	**9535**
0300-0400	Voice of America.....	**7280, 9575**
0300-0400	Voice of Free China, Taiwan.	**5985, 9680** 11745
0300-0400	Voz Evengelica, Honduras....	4820
0300-0400	WCSN, Boston, Mass.....	**9815**
0300-0400 M	WHRI, Indiana.....	**7355**
0300-0400 S-F	WMLK, Pennsylvania.....	**9455**
0300-0400 M	World Music Radio.....	6910
0300-0400	WRNO Worldwide.....	**6185**
0305-0400 A	Radio Austria International.	5945, **6055 6155**
0310-0330	Vatican Radio.....	**6150**
0313-0400	Radio France International..	**6005, 6055 6175,** 7135 **7280, 7175** 9535, **9600**
0330-0400 M	CBC Northern Quebec Service.	6195, **9625**
0330-0400	BBC, England.....	**3955, 5975 6120, 6175 9410, 9600**
0330-0400	Radio Austria International.	**6155**
0330-0400	Radio Berlin International..	**9560, 9620**
0330-0400	Radio Havana Cuba.....	6090, **6100 6140, 9740**
0330-0400 S,M	Radio Japan, Tokyo.....	**5960**
0330-0400	Radio Sweden International.	11705
0330-0400	Radio Tanzania.....	5985
0330-0400	Radio Tirana Albania.....	6200, **7065**
0330-0400	UAE Radio, Dubai.....	**9640, 11940 15435**
0335-0340	All India Radio.....	3905, 4860 **7105,** 9545 9610, 11830 11895, **11940**
0340-0400	Voice of Greece.....	7430, 9420
0345-0400	Radio New Zealand Int'l.....	9620, 9645 11705

0400 UTC	[12:00 PM EDT/9:00 PM PDT]	
0400-0405	RAI, Italy.....	**9710, 11910 15330**
0400-0410	Voice of Kenya.....	6090
0400-0415	Kol Israel.....	**7464, 9435 9815, 11585**
0400-0415	Radio Cultural, Guatemala...	3300
0400-0425	Radio Netherlands.....	**7175, 9895**
0400-0425	Radio RSA, South Africa.....	3230, 4990 7270, **9585**
0400-0430	BBC, London, England.....	**3955, 5975 6005, 6120 6155, 6175 7160, 7320 9580**
0400-0430	KNLS, Alaska.....	**9670**
0400-0430	Radio Bucharest, Romania....	5990, 9510 9570, 11810 11940
0400-0430	Radio Finland, Helsinki.....	**6120, 11715 11755**
0400-0430 M	Radio Norway International..	**9650**
0400-0430	Swiss Radio International...	**6135, 9725 9885, 12035**
0400-0430	Trans World Radio, Bonaire..	9535
0400-0430 S,M	Trans World Radio, Bonaire..	4835, 7295
0400-0500	ABC, Perth, Australia.....	**15425**
0400-0500	Armed Forces Radio and TV...	**6030,** 12060 **11730,** 11790 17765

frequency SECTION

0400-0500	Capital Radio, South Africa.	**3927, 3930** 7149
0400-0500	CBC Northern Quebec Service.	6195
0400-0500	CFCX, Montreal, Canada.....	6005
0400-0500	CFRX, Toronto, Canada.....	6070
0400-0500	CFVP, Calgary, Canada.....	6030
0400-0500	CHNX, Halifax, Canada.....	6130
0400-0500	CKFX, Vancouver, Canada.....	6080
0400-0500	HCJB, Ecuador.....	**6230, 9870**
0400-0500	KVOH, California.....	9852.5
0400-0500	Radio Australia.....	9755, **11945** **15160**, 15240 **15320**, 15395 17715, 17795
0400-0500	Radio Beijing.....	**9645, 11980**
0400-0500	Radio Belize.....	**3285**
0400-0500 T-S	Radio Dublin International..	**6910**
0400-0500	Radio Havana Cuba.....	**6035, 6090** **6140, 9740**
0400-0500	Radio Japan.....	**9525, 9675**
0400-0500	Radio Moscow.....	**5940, 7150** **7165, 7320**
0400-0500	Radio Moscow World Service.	**6000, 7150**
0400-0500	Radio New Zealand.....	9620, 11780
0400-0500	Radio Pyongyang, N.Korea...	**15140, 15160** **15180**
0400-0500	Radio Uganda.....	**4976, 5026**
0400-0500	RAE, Argentina.....	**9690**, 11710
0400-0500	VLW 15, Lyndhurst,Australia	15230
0400-0500	VLW 15, Waneroom, Australia	15425
0400-0500	Voice of America.....	**3990, 5995** **6035, 7200** **7280, 9550** **9575, 9670** **11835,** **9840**
0400-0500	WCNS, Boston, Mass.....	**7355**
0400-0500	WHRI, Indiana.....	6910
0400-0500v M	World Music Radio.....	6185
0400-0500	WRNO Worldwide.....	**9680**
0400-0500	WYFR, Okeechobee, Fla.....	**6055**, 6175 **7135, 7175** **7280, 9535** **9550, 9790** **9800**
0415-0430	Radio France International..	
0425-0440	RAI, Italy.....	5980, **7275**
0430-0500	BBC, London, England.....	**5975, 6175** **9510**
0430-0455	Radio Tirana Albania.....	9480, **11835**
0430-0500	Deutsche Welle, W. Germany..	7150, 7225 9565, 9765
0430-0500	Radio Austria International.	**5945**, 6155 **9755**
0430-0500	Radio Truth, S. Africa.....	**5015**
0430-0500	TWR, Swaziland.....	**7210**
0445-0500	Radio France International..	**6055, 6175** **7135, 7175** **7280, 9535** **9550, 9790** **9800**

0500 UTC [1:00 AM EDT/10:00 PM PDT]

0500-0505	Radio Belize.....	3285
0500-0510	Radio Lesotho.....	4800
0500-0515	Vatican Radio.....	11725, 15190
0500-0530	BBC, London.....	**5950, 5975** 6005, **6195** **7160, 7185** **9510, 9580** **9600**
0500-0530	Capital Radio, S. Africa....	**3927.5**
0500-0530 M	Radio Norway International.	**11860**
0500-0530 S,M	Trans World Radio, Bonaire..	9535
0500-0550	Deutsche Welle.....	5960, **6120** **6130, 9635**
0500-0600	ABC, Melbourne, Australia..	15330
0500-0600	ABC, Perth, Australia.....	15425
0500-0600	Armed Forces Radio and TV...	**6030, 11790** **15330, 17765**
0500-0600	CBC Northern Quebec Service.	**6195**, 9625
0500-0600	CFCX, Montreal, Canada.....	6005
0500-0600	CFRX, Toronto, Canada.....	6070
0500-0600	CFVP, Calgary, Canada.....	6030
0500-0600	CHNX, Halifax, Canada.....	6130
0500-0600	CKFX, Vancouver, Canada.....	6080
0500-0600	HCJB, Quito, Ecuador.....	**6230, 9870** 11910
0500-0600	KYOI, Saipan.....	15190
0500-0600	Radio Australia.....	**15160**, 15240 15320, 15395 17715, 17750 **17795, 17795**
0500-0600	Radio Beijing, China.....	9565
0500-0600v	Radio Dublin International..	6910
0500-0600	Radio Havana Cuba.....	**5965**, 6035 **6090, 9740**
0500-0600	Radio Japan General Service.	**9675**, 15235 17810
0500-0600	Radio Moscow.....	**7150, 7165** **7175, 7320**
0500-0600	R. New Zealand, Wellington	**11780**
0500-0600	Radio Uganda.....	**4976, 5026**
0500-0600 S	Radio Zambia.....	11880
0500-0600	SBC Radio 1, Singapore.....	11940
0500-0600	Soloman Islands Bcasting Co	5020
0500-0600	Spanish Foreign Radio.....	**6125**, 9630
0500-0600	TWR, Swaziland.....	**7210**
0500-0600	VLW 15, Lyndhurst,Australia	15230
0500-0600	VLW 15, Waneroo, Australia.	**15425**
0500-0600	Voice of America.....	**6035**, 7200 **7280, 9575** **9760**
0500-0600	Voice of Nicaragua.....	**6015**
0500-0600	Voice of Nigeria, Lagos.....	**7255**
0500-0600	WCSN, Boston, Mass.....	**9840**
0500-0600	WHRI, Indiana.....	**7355**
0500-0600v M	World Music Radio.....	6910
0500-0600 S	WRNO Worldwide.....	6185
0500-0600	WYFR, Okeechobee, Florida...	**6065, 7355** **9680**
0515-0530	Radio Canada Int'l,Montreal	**6050, 6140** **7295, 9750** **11840, 15180**
0530-0600	BBC, London.....	**5975, 9510**
0530-0600	Radio Cameroon.....	4850
0530-0600	Radio Netherland.....	**6165, 9715**
0530-0600	WSZO, Marshal Island.....	**4970**
0545-0600 M-F	Radio Canada Int'l,Montreal	**6050, 6140** **7295, 9750** **11840, 15180**

0600 UTC [2:00 AM EST/11:00 PM PST]

0600-0610	Ghana Radio.....	**4915**
0600-0610	Voice of Kenya.....	**4808**, 6090
0600-0620	Vatican Radio.....	**6185, 9645**
0600-0625	Radio Netherland.....	**6165, 9715**
0600-0645	WYFR, Florida.....	**6065, 7355** **9680**
0600-0700	Armed Forces Radio and TV...	**6030**
0600-0700	BBC, London.....	**3975, 5900** **5950, 5975** **6050, 6195** **7105, 7115** 7150, **7120** **7185, 9600** **9640**, 9915
0600-0700	CFCX, Montreal, Canada.....	6005
0600-0700	CFRX, Toronto, Canada.....	6070
0600-0700	CFVP, Calgary, Canada.....	6030
0600-0700	CKFX, Vancouver, Canada.....	6080
0600-0700	CHNX, Halifax, Canada.....	6130
0600-0700	GBC-2, Accra, Ghana.....	3366
0600-0700	HCJB, Quito, Ecuador.....	**6230, 9870**
0600-0700	King of Hope, Lebanon.....	6280
0600-0700	KVOH, California.....	6005
0600-0700	KNLS, Anchor Point, Alaska..	9555
0600-0700	KYOI, Saipan.....	15190
0600-0700	Radio Australia.....	**11910, 11945** 15160, 15240 **15315**, 17715 17750, **17795**
0600-0700	Radio Cook Islands.....	**11760**
0600-0700	Radio Havana Cuba.....	9525
0600-0700	Radio Korea, South.....	**9570, 7275**
0600-0700	Radio Moscow.....	**7165**
0600-0700	Radio New Zealand Int'l....	**11780**
0600-0700	Radio Pyongyang, N. Korea..	13650, 13680
0600-0700 S	Radio Zambia.....	**11880**
0600-0700	SBC Radio 1, Singapore.....	11940
0600-0700	Soloman Islands Bcasting Co.	5020
0600-0700	VLQ 9, Brisbane, Australia..	9660
0600-0700	VLW 15, Lyndhurst,Australia	15230
0600-0700	VLW 15, Waneroo, Australia.	15425
0600-0700	Voice of America.....	3990, 5995 6080, 6125 **7170, 7200** **7325**, 9530 9550, **9670**
0600-0700	Voice of Asia, Taiwan.....	**7285**
0600-0700	Voice of Free China,Taiwan..	**5985**
0600-0700	Voice of Malaysia.....	6175, 9750 15295
0600-0700	WCSN, Boston, Mass.....	7365
0600-0700	WHRI, Indiana.....	**6100**
0600-0700 S	WRNO Worldwide.....	**6185**
0600-0700	WSZO, Marsall Island.....	**4970**
0600-0700 S	World Music Radio.....	6910
0615-0655 A,S	BRT, Belgium.....	**9880, 21810**
0625-0700	TWR, Monaco.....	7105
0630-0655	Radio Finland.....	**6120, 9560** **11755**
0630-0700	Radio Polonia.....	6135, 7270 9675
0630-0700	Radio RSA, South Africa.....	5980, 7270 **9585**
0630-0700	Radio Sofia, Bulgaria.....	**9700, 11720**
0630-0700	Radio Tirana.....	**7065**
0630-0700	Swiss Radio International...	3985, 6165 9535, 9870 12030, 15430
0645-0700 M-F	HCJB, Quito, Ecuador.....	6205

0700 UTC [3:00 AM EDT/12:00 AM PDT]

0700-0712	Radio Bucharest, Romania...	11940, 15250 15335, 17790 17805, 21665
0700-0715 A	Radio Finland.....	**11755**
0700-0730	Burma Broadcasting Corp.....	9730
0700-0730	BBC, London.....	**5950, 5975** **6195, 7120** **7150, 7185** **9600, 9640**
0700-0730 A,S	TWR, Bonaire.....	9535
0700-0730v	Radio Zambia.....	11880v
0700-0735	TWR Swaziland.....	6070
0700-0745	Radio New Zealand Int'l....	**11780**, 15150
0700-0750	Radio Pyongyang.....	11930, 13750 15340
0700-0800	ABC Brisbane.....	**9660**
0700-0800	ABC Lyndwurst.....	9680
0700-0800	Armed Forces Radio and TV..	15400
0700-0800	CFCX, Montreal, Canada.....	6005
0700-0800	CFRX, Toronto, Canada.....	6070
0700-0800	CFVP, Calgary, Canada.....	6030
0700-0800	CHNX, Halifax, Canada.....	6130
0700-0800	CKFX, Vancouver, Canada.....	6080
0700-0800 A,S	ELWA, Liberia.....	11830
0700-0800	FEBC, Manila.....	11850, 15350
0700-0800	GBC-2, Accra, Ghana.....	3366
0700-0800	HCJB.....	**6130, 6205** **9745, 9845** **9860**
0700-0800	King of Hope, Lebanon.....	6280
0700-0800	KNLS, Anchor Point, Alaska.	**5960**
0700-0800	KYOI, Saipan.....	15190
0700-0800	NBC, Papua New Guinea.....	4890
0700-0800	Radio Australia.....	**5995, 9655** **11720**
0700-0800 S	Radio Earth (via Milano)....	7295
0700-0800	Radio Havana Cuba.....	**9525**
0700-0800	Radio Japan General Service.	**9675, 15230** **15235**, 17810 17855
0700-0800	Radio Kuwait.....	9560
0700-0800	Radio Thailand.....	9655, 11905
0700-0800	SBC Radio 1, Singapore.....	5010, 11940
0700-0800	Soloman Islands Bcasting Svc	5020
0700-0800	VLM4 Brisbane, Australia....	4920
0700-0800	Voice of America.....	**3990, 5995** **6035, 6080** **6125, 7280** **9530, 9540** **9550, 9670** **11840**
0700-0800	Voice of Free China.....	**5985**
0700-0800	Voice of Malaysia.....	6175, 9750 15295
0700-0800	Voice of Nigeria.....	15120, 15185 17800
0700-0800	WHRI, Indiana.....	**7355**
0700-0800 S	World Music Radio.....	6910
0700-0800 S	WRNO Worldwide.....	**6185**
0700-0800	WSZO, Marsall Island.....	**4970**
0715-0730 M-A	Vatican Radio.....	11725, 15190
0715-0800 S	FEBA Radio, Seychelles.....	15120, **17795**
0715-0800 S	KTWR Guam.....	**11715**
0725-0800	TWR Monte Carlo.....	**7105**
0730-0735	All India Radio.....	5990, 6010 6020, 6050 7110, 7250 9610, 11730 11850, 11935
0730-0800	BBC, London.....	**9510, 9600** **9600, 9640** **11860**
0730-0800 S	CPBS, China.....	**11330**
0735-0800 M-H	KTWR, Guam.....	**11715**
0730-0800	Radio Netherlands.....	**9630**, 9715
0730-0800	Swiss Radio Int'l.....	**3985, 6165** **9535**

0800 UTC [4:00 AM EDT/1:00 AM PDT]

0800-0805	GBC, Accra, Ghana.....	3366
0800-0825 M-F	BRT, Belgium.....	9880, **15515**
0800-0825	Radio Netherlands.....	**9630, 9715**
0800-0825	Voice of Malaysia.....	6175, 9750 15295
0800-0830	Voice of Islam,Bangladesh..	11645, **12030**

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0800-0830	HCJB, Quito, Ecuador.....	6130, **6205**, **9745**, **9860**
0800-0845 S	FEBA, Seychelles.....	15120, 17795
0800-0900	AFAN, Antarctica.....	6012
0800-0900	AFRTS Far East Network.....	11750
0800-0900	BBC, London.....	**5975**, **7150**, **9600**, **9640**
0800-0900 S	BBS, Bhutan.....	**6035**
0800-0900	CFCX, Montreal, Canada.....	6005
0800-0900	CFRX, Toronto, Canada.....	**6070**
0800-0900	CFVP, Calgary, Canada.....	6030
0800-0900	CHNX, Halifax, Canada.....	6130
0800-0900	CKFX, Vancouver, Canada.....	6080
0800-0900	FEBC, Manila.....	**6030**, 11890, 21475
0800-0900	FEN, Tokyo.....	**3910**, **6155**
0800-0900 S,A	GBC-2, Accra, Ghana.....	3366
0800-0900	HCJB, Quito, Ecuador.....	**6130**, **9745**
0800-0900	King of Hope, Lebanon.....	6280
0800-0900	KNLS, Anchor Point, Alaska.	**5960**
0800-0900 M-H	KTWR, Guam.....	**11715**
0800-0900	KYOI, Saipan.....	15190
0800-0900	Radio Australia.....	**5995**, **6080**, **9580**, **9655**, **9710**, **9760**, **11720**
0800-0900	Radio Korea World News Svc..	7275
0800-0900	Radio Kuwait.....	9750
0800-0900	Radio Moscow.....	**9795**
0800-0900 S	Radio Prague.....	6055, 9505, 11990
0800-0900	Radio Pyongyang, N. Korea..	**9530**, 13680, **11830**, **15160**, **15180**
0800-0900	RTE Portugal.....	9670
0800-0900	SBC Radio 1, Singapore.....	5010, 11940
0800-0900	TWR Monte Carlo.....	**7105**
0800-0900	Voice of Indonesia.....	11790, 15150
0800-0900	Voice of Nigeria.....	**7255**, 15185
0800-0900	WHRI, Indiana.....	**7355**
0800-0900 S	WRNO Worldwide.....	**6185**
0800-0900	WSZO, Marsall Island.....	**4970**
0830-0840	All India Radio.....	5960, 5970, 5990, 6010, 6020, 6050, 6100, 7110, 7125
0830-0840	Voice of America, Washington	**7175**, **9575**, **9750**
0830-0855	Radio Finland, Helsinki.....	**6120**, **15245**
0830-0855 M-A	Radio Netherlands.....	**9630**
0830-0900	Radio Austria Int'l.....	**7210**, **11840**
0830-0900	Radio Beijing.....	9700, 11755, 15440
0830-0900	Radio Prague,Czechoslovakia	11855, 17840, 21705
0830-0900	HCJB, Quito, Ecuador.....	6130, **9745**, 11925
0830-0900	Radio Netherlands.....	17575, 21485
0830-0900	Swiss Radio International...	9560, **9885**, 11905, 15570
0840-0900	Radio Australia.....	6045, 6060, **9580**, **15395**
0847-0852 A	R. Pacific Ocean, Vladivost.	9500, 9620, 9635, 9795, 9810, 11710, 11815, 11910, 12010, 15260, 15295, 17765, 17815, 17850

0900 UTC [5:00 AM EDT/2:00 AM PDT]

0900-0905	Africa Number One, Gabon....	7200, 15200
0900-0915	BBC, London.....	**5975**, **6045**, **7150**, **9410**, **11750**
0900-0925	Radio Netherlands.....	17575, 21485
1000-1030	Kol Israel.....	11700, 13725, 15640, 15650, 17565, 17685, 17815
0900-0930	Radio Australia.....	**9580**, **9655**, **9710**, **11720**, **15415**
0900-0930	Radio Korea.....	7275
0900-0950	Radio Pyongyang N. Korea....	9765, 11830, 13650
0900-1000	ABC, Brisbane, Australia....	**4920**, **9660**
0900-1000 S	Adventist World Radio.....	9670
0900-1000	AFRTS.....	**6030**, **9530**
0900-1000	Deutsche Welle.....	**6160**, **9690**
0900-1000	FEBC, Manila.....	11890, 21475
0900-1000	FEN, Tokyo.....	6155
0900-1000	HCJB, Quito, Ecuador.....	**6130**, 9745
0900-1000	King of Hope, Lebanon.....	6280
0900-1000	KNLS, Alaska.....	**5960**
0900-1000	KSDA, Guam.....	**15440**
0900-1000	Radio Afghanistan.....	6085, 9590, 15255, 17655
0900-1000	Radio Japan.....	**9675**, **11875**, **11955**, **15235**, **17810**
0900-1000	Radio Moscow.....	9600, 9795, 13645, 13665, 13680, 13705, 15110, 15140, 15155, 15225, 15265, 15490, 17625, 17645, 17665, 17775
0900-1000	Radio New Zealand Int'l.....	9600, 11780
0900-1000	Radio Tanzania.....	9685v
0900-1000 S	Radio Prague.....	6055, 9505, 11990
0900-1000	SBC Radio 1, Singapore.....	5010, 11940
0900-1000	TWR Monte Carlo.....	**7105**
0900-1000	Voice of Nigeria.....	15120, 15185, 17800
0900-1000	WHRI, Indiana.....	**7355**
0900-1000	WRNO Worldwide.....	**6185**
0900-1000	WSZO, Marsall Island.....	**4970**
0915-1000	BBC, London.....	**9760**, **9750**, **11750**
0930-1000	Radio Australia.....	9580, **9655**, **9710**
0930-1000	Radio Budapest Hungary.....	9835, 11910, 15160, 15220, 17710, 21665
0950-1000 M-F	Radio Budapest Hungary.....	9585, 9835, 11910, 15160, 17710

1000 UTC [6:00 AM EDT/3:00 AM PDT]

1000-1010	Voice of Kenya.....	9665
1000-1025 M-A	BRT, Belgium.....	**15515**, **17595**
1000-1030	Afghanistan.....	6085, 9590, 15255, 17655
1000-1030	Deutsche Welle, W. Germany..	7225, 9735, 17765, 21600
1000-1030	Kol Israel.....	**11585**, **11655**, **12080**, **13715**
1000-1030	Radio Australia.....	**9580**, **9655**, **9770**
1000-1030 S	Radio Norway International.	**15180**, **15230**
1000-1030	Swiss Radio Int'l.....	9560, **9885**, 11905, 15570
1000-1030	Voice of Vietnam.....	**9755**, **9765**, 12035
1000-1100	AFRTS.....	**6030**, 6125, **9530**, **9590**, **9700**, **11805**
1000-1100	All India Radio.....	11705, 11810, 15320, 15335, 17387, 17875
1000-1100	BBC, London.....	6195, 9410, 9740, 9760, 11750, 12095, 15070, 15280, 21660
1000-1100	B.S. Kingdom Saudi Arabia..	11855v
1000-1100	CFCX, Montreal, Canada.....	6005
1000-1100	CFRX, Toronto, Canada.....	**6070**
1000-1100	CFVP, Calgary, Canada.....	6030
1000-1100	CHNX, Halifax, Canada.....	6130
1000-1100	CKFX, Vancouver, Canada.....	6080
1000-1100	FEN, Japan.....	3910, 6155
1000-1100	HCJB, Quito, Ecuador.....	**6130**, 11925
1000-1100	Radio Dubai, UAE.....	17775
1000-1100	Radio Honaire, Soloman Ils..	5020
1000-1100	Radio Moscow.....	**9600**, 9795, **11675**, 13665, 13680, 13705, 15135, 15150, 15475, 15550
1000-1100	Radio New Zealand Int'l.....	9600, 11780
1000-1100 S	Radio Prague.....	6055, 9505, 11990
1000-1100	SBC Radio 1, Singapore.....	5052, **11940**
1000-1100	Voice of Nigeria.....	7255, 15120
1000-1100	WHRI, Indiana.....	**5995**
1000-1100 S	WRNO Worldwide.....	**6185**
1005-1010	Radio Pakistan.....	15605, 17660
1030-1040	Voice of Asia, Taiwan.....	5980
1030-1100	Radio Austria International.	9625, 12025, **15270**
1030-1100	Radio Australia.....	**9580**
1030-1100	Radio Netherland.....	**6020**, **9650**
1030-1000	Radio New Zealand.....	6100, 9620
1030-1100	Sri Lanka Broadcasting Corp	11835, 15120, 17850
1030-1100	UAE Radio, Dubai.....	17775, 17865, 21605, 21700
1040-1050	Vatican Radio.....	6250, 9645, 11740
1040-1050	Voice of Greece.....	15630, 17565
1045-1000	Radio Nepal.....	5005, 9590
1050-1100 M-F	Radio Budapest Hungary.....	6025, 9585, 9835, 11910, 15160, 17710

1100 UTC [7:00 AM EDT/4:00 AM PDT]

1100-1115	Radio Pakistan.....	15605, 17660
1100-1125	Radio France Int'l, Paris...	**9790**, **11670**, **11845**,**15155**, **15195**, **15300**, **15315**, **15365**, **15365**, **17620**, **17720**
1100-1125	Radio Netherland.....	**6020**, **9650**
1100-1130	Radio Australia.....	**5995**, **6080**, **7215**, **9580**, **9710**, **9770**
1100-1130 M-A	Radio Finland.....	11945, 15400
1100-1130	Radio Japan.....	**6120**
1100-1130	Radio Maputo, Mozambique....	**9525**, **11815**
1100-1130	Radio Sweden Int'l.....	9630, 15115
1100-1130	Sri Lanka Broadcasting Corp	11835, 15120, 17850
1100-1130	Swiss Radio International..	**9665**, **9870**, 11795, 15570
1100-1130	Voice of America.....	**6110**, **9760**, 15160, 15210, 15425
1100-1130	Voice of Vietnam.....	**9755**, **9765**, 12035
1100-1156	Radio RSA, South Africa....	11900, 15220, 17780
1100-1200	4VEH, Haiti.....	4930
1100-1200	ABC, Brisbane, Australia....	**4920**
1100-1200	ABC, Perth, Australia.....	**9610**
1100-1200	AFRTS.....	**6030**, **9590**, 9700, 15430
1100-1200	BBC, London.....	**5965**, **6195**, 9410, **9510**, **11775**, 15070
1100-1200	B.S. Kingdom Saudi Arabia..	11855v
1100-1200	CFCX, Montreal, Canada.....	6005
1100-1200	CFRX, Toronto, Canada.....	6070
1100-1200	CFVP, Calgary, Canada.....	6030
1100-1200	CHNX, Halifax, Canada.....	6130
1100-1200	CKFX, Vancouver, Canada.....	6080
1100-1200	Deutsche Welle, W.Germany..	**17765**, **17800**
1100-1200	HCJB, Quito, Ecuador.....	**11740**, **15115**, **17890**
1100-1200	Radio Beijing.....	**9535**, **9645**
1100-1200	Radio Japan General Service.	**6120**, **9675**, 11815
1100-1200	Radio Korea.....	7275, 15575
1100-1200	Radio Malaysia, Sarawak.....	**4950**
1100-1200	Radio New Zealand.....	6100, 9600
1100-1200	Radio Pyongyang, N. Korea...	**7300**, **9750**, **9977**
1100-1200	SBC Radio 1, Singapore.....	5052, 11940
1100-1200	Trans World Radio Bonaire..	**11815**
1100-1200	Voice of Asia, Taiwan.....	5980, 7445
1100-1200	Voice of Nigeria.....	7255, 15120
1100-1200	WHRI, Indiana.....	**5995**
1100-1200 S	WRNO Worldwide.....	9715
1100-1200	WYFR, Florida.....	**5985**, **9680**, 11875
1115-1200	Radio Berlin International.	21465, 21540
1115-1130	Vatican Radio.....	17840, 21485
1115-1200	Voice of Islamic Rep. Iran.	**11790**, 15084
1130-1200	Radio Australia.....	5995, **6060**, **6080**, **7215**, **9580**, 9645, **9710**, **9770**, 11800
1130-1200	R. Berlin Intl,E.Germany	**15240**
1130-1200	Radio Japan.....	**6120**
1130-1200	Radio Netherland.....	5955, 9715, 15560, 17575, 17605, 21480
1130-1200	Radio Thailand.....	9655, 11905
1130-1200	TWR Bonaire.....	**11815**
1130-1200	WYFR, Florida.....	9680
1145-1200	Radio Berlin Intl.....	**15240**

1200 UTC [8:00 AM EDT/5:00 AM PDT]

1200-1210	Voice of Is.Rep.of Iran....	**15084**
1200-1215	Radio New Zealand.....	**6100**, **9620**
1200-1215 M-A	Vatican Radio.....	15190, 17840, 17865, 21485
1200-1215 S	Vatican Radio.....	17840, 21485
1200-1215	Voice of People of Kampuchea	9693, 11938
1200-1225	Radio Bucharest, Romania....	9530, 11740, 15345

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1200-1225	Radio Netherland.....	5955, 9715
		15560, 17575
		17605, 21480
1200-1225	Radio Polonia.....	6095, 7285
1200-1230	HCJB, Quito, Ecuador.....	**6075, 11740**
1200-1230	Radio Berlin Intl.....	**15240**
1200-1230 M-A	Radio Finland.....	11945, 15400
1200-1230	Radio Tashkent.....	7325, 9600
		9715, 15460
1200-1235	All India Radio.....	3905, 4800
		4920, 7280
		9565, 9615
		11620, 15245
1200-1235	Radio Ulan Bator Mongolia..	12015
1200-1242	Trans World Radio Bonaire..	**11815**
1200-1250	Radio Pyongyang, N. Korea...	**9715**
1200-1300	4VEH, Haiti.....	4930
1200-1300	ABC, Wanneroo, Australia....	**6140, 9610**
1200-1300	ABC, Brisbane.....	**4920**
1200-1300	AFRTS.....	**6030, 6125**
		9700, 15330
		15430, 21670
1200-1300	BBC, London.....	5965, 6195
		9510, 9740
		9750, 11710
		11750, 11775
		12095, 15070
		17790, 21710
1200-1300	B.S. Kingdom Saudi Arabia..	11855v
1200-1300	CBC Northern Quebec Service.	**9625**
1200-1300	CFCX, Montreal, Canada.....	6005
1200-1300	CFRX, Toronto, Canada.....	**6070**
1200-1300	CFVP, Calgary, Canada.....	6030
1200-1300	CHNX, Halifax, Canada.....	6130
1200-1300	CKFX, Vancouver, Canada.....	6080
1200-1300	FEN, Tokyo.....	**3910, 6155**
1200-1300	GBC, Accra, Ghana.....	7295
1200-1300	HCJB, Quito, Ecuador.....	11740, **11745**
		15115, 17890
1200-1300	KYOI, Saipan.....	11900
1200-1300	Pt Moresby,Papua New Guinea	**4890**
1200-1300	Radio Australia.....	**5995, 6060**
		6080, 7205
		7215, 9580
		9770
1200-1300	Radio Beijing.....	**9535, 9645**
		15280
1200-1200	Radio Moscow.....	**9754, 11750**
		13625, 13790
		15475, 17655
		17820
1200-1300	Radio Tanzania.....	9685
1200-1300	RAE, Argentina.....	15345
1200-1300	SBC Radio 1, Singapore.....	**5010, 5052**
		11940
1200-1300	Voice of America.....	6110, 9760
		11715, 15430
		17790
1200-1300	WHRI, Indiana.....	**11790**
1200-1300 S	WRNO Worldwide.....	9715
1200-1300	WYFR, USA.....	**6105, 9680**
		11830, 11875
		15170
1210-1300	Voice of Nigeria.....	7255, 15120
1215-1300	Radio Cairo.....	17675
1215-1245	Radio Japan Regional Serv..	11875, **15300**
1215-1230	Voice of Islamic Rep. Iran.	**11895, 15085**
1230-1300	Radio Austria International	**15320**
1230-1300	Radio Australia.....	**9560, 15320**
		17655, 17800
1230-1300	Radio Bangladesh.....	15525, **17653**
		21630
1230-1300	Radio Berlin Int'l.....	**21465**
1230-1300	Radio Jordan.....	**9560**
1230-1300	Radio Polonia.....	**15190, 15430**
1230-1300	Radio Sweden Int'l.....	9565, **11735**
1230-1300	TES Radio Veritas,Philippns.	**6160**
1230-1300	Sri Lanka Broadcasting Corp.	6075, 9720
		15425
1230-1300	Voice of Turkey.....	15255
1230-1300	WYFR, Florida.....	15055
1235-1245	Voice of Greece.....	11645, **15360**
		15630, 17565
1255-1300 M-A	Radio Ulan Bator Mongolia...	7235, 9575
		15305
1255-1330 A-S	TWR, Bonaire.....	11815

1300 UTC	[9:00 AM EDT/6:00 AM PDT]	
1300-1315	Radio Berlin International.	**21465**
1300-1330	BBC, London.....	**9510, 11775**
		15070, **17705**
		17790
1300-1330	Radio Australia.....	**5995, 6060**
		6080, 9580
1300-1330	Radio Bucharest, Romania...	**11940, 15250**
1300-1330	Radio Finland.....	15400, **11945**
1300-1330	Radio Korea.....	6135
1300-1330 S	Radio Norway International.	**6040, 9590**
		15310, 17840
		21700
1300-1330	Swiss Radio Int'l, Berne...	**15570, 17830**
1300-1337 A-S	TWR, Bonaire.....	11815
1300-1330 S	WRNO, Worldwide.....	**9715**
1300-1350	Radio Pyongyang, N. Korea...	**9345, 11665**
1330-1355 S	Radio Finland.....	11945, 15400
1300-1400	4VEH, Haiti.....	4930
1300-1400	ABC Waneroo, Australia.....	**6140, 9610**
1300-1400	AFRTS.....	**9700, 15330**
		15430
1300-1400	B.S. Kingdom Saudi Arabia..	11855v
1300-1400	CBC Northern Quebec Service	**9625**
1300-1400	CFCX, Montreal, Canada.....	6005
1300-1400	CFRX, Toronto, Canada.....	**6070**
1300-1400	CFVP, Calgary, Canada.....	6030
1300-1400	CHNX, Halifax, Canada.....	6130
1300-1400	CKFX, Vancouver, Canada.....	6080
1300-1400	CKZU, Vancouver, Canada.....	**6160**
1300-1400	FEBC, Manila.....	11850
1300-1400	FEN, Tokyo.....	**6155**
1300-1400	GBC, Accra, Ghana.....	7295
1300-1400	HCJB, Quito, Ecuador.....	**11740, 15115**
1300-1400	NBC, Port Moresby, Papua New Guinea.....	4890
1300-1400	Radio Australia.....	5995, **6060**
		6080, 9580
1300-1400	Radio Beijing.....	**4460**, 5320
		5860, 5880
1300-1400	Radio Canada Int'l.....	**11720, 11955**
		15440, 17820
1300-1400	Radio Jordan.....	**9560**
1300-1400	Radio Moscow.....	**11840, 15360**
		15475, 15585
1300-1400	Radio RSA, South Africa....	15220, 21535
		21590
1300-1400 TES	Radio Veritas,Philippines...	**6160**
1300-1400	SBC Radio 1, Singapore.....	**5010**, 5052
		11940
1300-1400	Sri Lanka Broadcasting Corp.	6075, 9720
		15425
1300-1400	Voice of America.....	**6110**, 7230
		9660, 9760
		15205
1300-1400	Voice of Nigeria.....	7255, 15120
1300-1400	WHRI, Indianapolis.....	**11790**
1300-1400	WYFR, USA.....	**9680, 11830**
		11875
1315-1400	Radio Berlin Int'l.....	11795, 15445
		17700
1330-1400	All India Radio.....	11810, 15335
1330-1400	Laotian National Radio.....	**7113**v
1330-1400	BBC, London.....	**9750, 9760**
		12095, 15070
		17885, 21710
1330-1400 M-A	BBS, Bhutan.....	**6035**
1330-1445	BBS, Burma.....	**4725**
1330-1355 M-A	BRT, Belgium.....	**15515, 15590**
1330-1400 M-A	Radio Budapest Hungary.....	9835, 11910
		15160, 15220
		17710, 21665
1330-1400 S	Radio Finland.....	**11945, 15400**
1330-1400	Radio Tashkent.....	**7325**, 9715
		15460
1330-1400	Radio Yugoslavia.....	9620, 15240
1330-1400	Swiss Radio International..	**9730, 9885**
		11905, 11955
		12030
1330-1400	U.A.E. Radio.....	**9640, 11940**
		15320, 17775
1330-1400	Voice of Vietnam.....	**9755, 9840**
		12020, 12035
1330-1400	WRNO, Worldwide.....	**11965**
1337-1400 A	TWR, Bonaire.....	11815
1345-1400	Vatican Radio.....	7250, 9645
		11740

1400 UTC	[10:00 AM EDT/7:00 AM PDT]	
1400-1415	GBC-2, Accra, Ghana.....	7295
1400-1430	Radio Australia.....	**9580**
1400-1430	Radio Finland.....	**15400**
1400-1430	Radio Japan General Service.	5990, 7140
		9675, 9695
		11815
1400-1430 S	Radio Norway International.	**11860, 15250**
		15300, 15310
1400-1430	Radio Sweden International.	**11785, 15345**
1400-1500	AFRTS.....	**9700, 11805**
		15330, 15430
1400-1500	All India Radio.....	11810, 15335
1400-1500	BBC, London.....	**12095, 15070**
		15275, 17705
		17790, 17885
1400-1500	CBC Northern Quebec Service.	9625, 11720
1400-1500	CFCX, Montreal, Canada.....	6005
1400-1500	CFRX, Toronto, Canada.....	6070
1400-1500	CFVP, Calgary, Canada.....	6030
1400-1500	CHNX, Halifax, Canada.....	6130
1400-1500	CKFX, Vancouver, Canada.....	**6080**
1400-1500	FEBC, Manila.....	**9665, 11815**
		11850
1400-1500	HCJB, Quito, Ecuador.....	**15115, 17890**
1400-1500	Kuching, Sarawak, Malaysia	**4950**
1400-1500 S	Radio Canada International.	**11720, 11955**
		15440
1400-1500	Radio Jordan.....	**9560**
1400-1500	Radio Korea, South.....	9570, **9750**
		15575
1400-1500	Radio Moscow.....	**11770, 15320**
		15360, 15475
1400-1500	Radio Pyongyang,N.Korea.....	**7300, 9555**
		9750
1400-1500	Radio RSA, South Africa.....	**21590**
1400-1500	Radio Veritas, Philippines	6160
1400-1500	SBC Radio 1, Singapore.....	5010, **5052**
		11940
1400-1500	Sri Lanka Broadcasting Corp.	6075, 9720
		15425
1400-1500	Voice of America.....	**6110, 7230**
		9760, 11715
1400-1500	WHRI, Indiana.....	**15105**
1400-1500 S	WRNO Worldwide.....	**11965**
1415-1430 A,S	KTWR, Guam.....	**9870**
1415-1500	Radio Berlin Int'l.....	**15240**
1415-1430	Radio Nepal.....	**5005**
1415-1500 S,A	GBC-2, Accra, Ghana.....	**3366**
1430-1500	KTWR Guam.....	**9870**
1430-1500	Radio Australia.....	**5995**, 6045
		6060, 6035
		6080, 7205
		9580
1430-1500 M-A	Radio Budapest Hungary.....	**11910**
1430-1500	Radio Korea World News Svc..	7275, 11805
1430-1500	Radio Netherland.....	5955, 11735
		13770, 15560
		17575
1430-1500	Radio Yugoslavia.....	9620, 15240
1430-1500	WYFR, USA.....	**11830, 15170**
1448-1455	Radio Vatican.....	**15090**
1445-1500	Radio Ulan Bator, Mongolia..	9575

1500 UTC	[11:00 AM EDT/8:00 AM PDT]	
1500-1505 M-F	Africa #1, Gabon.....	**15200**
1500-1520	Radio Ulan Bator Mongolia...	9615, 12015
1500-1530	BBS, Burma.....	**4725**
1500-1530	HCJB, Quito, Ecuador.....	**11740, 15115**
		17890
1500-1530	Radio Berlin Int'l.....	**15255**
1500-1530	Radio Netherland.....	**13770, 15560**
1500-1530	Radio Veritas, Philippines..	**9565, 15120**
1500-1530	TWR, Guam.....	9870
1500-1530	Voice of Nigeria.....	7255, 11770
1500-1550	Deutsche Welle.....	**15135, 17825**
1500-1556	Radio RSA, South Africa.....	**21590**
1500-1600	AFRTS.....	**9700, 15330**
1500-1600	BBC, London.....	**9515, 15070**
		15260, 15275
		17885
1500-1600	CBC Northern Quebec Service.	9625, 11720
1500-1600	CFCX, Montreal, Canada.....	6005
1500-1600	CFRX, Toronto, Canada.....	6070
1500-1600	CFVP, Calgary, Canada.....	6030
1500-1600	CKFX, Vancouver, Canada.....	6080
1500-1600	CHNX, Halifax, Canada.....	6130
1500-1600	FEBC, Manila.....	9670, **11850**
1500-1600	KTWR Guam.....	**9870**
1500-1600	Radio Australia.....	**5995, 6030**
		6060, 6080
		6035, 7205
		9580
1500-1600 S	Radio Canada International.	**11720, 11955**
		15440
1500-1600	Radio Japan General Service.	5990, **9695**
		21700
1500-1600	Radio Jordan.....	**9560**
1500-1600	Radio Moscow.....	**11840**
1500-1600	RTM, Sarawak, Malaysia.....	4950
1500-1600	SBC Radio 1, Singapore.....	**5010, 5052**
		11940
1500-1600	Sri Lanka Broadcasting Corp.	6075, 9720
		15425
1500-1600	Voice of America.....	**15205**
1500-1600	Voice of Nigeria.....	7255, 11770
1500-1600	Voice of Indonesia.....	11790, 15150
1500-1600	V. Revolutionary Ethiopia..	9560
1500-1600	WHRI, Indiana.....	**15105**
1500-1600	WRNO Worldwide.....	**15420**
1500-1600	WYFR, Florida.....	**11830**
1513-1600 F-S	FEBC, Seychelles.....	**11820**
1530-1600	KNLS, Alaska.....	**7355**
1530-1545	Radio Bangladesh.....	7195

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1530-1600		R. Prague, Czechoslovakia..	**9735, 11690**
			11990, 13715
			17705, 17840
			21505
1530-1600		Swiss Radio International..	**9735, 11690**
			15430
1530-1600		Voice of Asia, Taiwan.....	**5980, 7445**
1540-1550		Voice of Greece.....	11645, 15630
			17565
1545-1600		Vatican Radio.....	11810, **15090**
			17730

1600 UTC		**[12:00 PM EDT/9:00 AM PDT]**	
1600-1605		SBC Radio 1, Singapore.....	11940
1600-1615		Radio Pakistan.....	9645, **11615**
			11675, 11735
			11925, 15515
			15595, 17660
1600-1630	S	Radio Norway International..	**9660, 11870**
			11925, 15310
1600-1630	M-F	Radio Portugal.....	15105
1600-1630		Radio Sweden Int'l.....	**11705**
1600-1630		Voice of Vietnam.....	**9755, 9840**
			12020, 12035
1600-1645		TWR, Swaziland.....	3200
1600-1700		AFRTS.....	**9700, 15330**
			15430
1600-1700		BBC, London.....	**11775, 12095**
			15070, 15260
			15275, 15400
			17705, 17880
1600-1700	A	CBC Northern Quebec Service.	9625, 11720
1600-1700		CFCX, Montreal, Canada.....	6005
1600-1700		CHNX, Halifax, Canada.....	6130
1600-1700		CFRX, Toronto, Canada.....	6070
1600-1700		CFVP, Calgary, Canada.....	6030
1600-1700		CKFX, Vancouver, Canada.....	6080
1600-1700	S	KCBI, Texas.....	**11735**
1600-1700		KNLS, Alaska.....	**7355**
1600-1700		KYOI, Saipan.....	9665
1600-1700		Radio Australia.....	6035, 6060
			6080, 9550
			9580, 15320
1600-1700		Radio Beijing.....	**9570, 11600**
1600-1700		Radio France International.	**11705, 17620**
1600-1700		Radio Jordan.....	9560
1600-1700		Radio Korea.....	**5975, 9870**
1600-1700		Radio Malawi.....	3380, 5995
1600-1700		Radio Moscow.....	**9470, 9490**
			11770, 11840
			11950
1600-1700		Radio Prague, Czech.....	**11990, 13715**
			15110, 17705
1600-1700		Radio Riyadh, Saudi Arabia..	9720v
1600-1700		Radio Tanzania.....	6105
1600-1700		Radio Zambia.....	9505
1600-1700		UAE Radio.....	**9640, 11940**
			11955, 15320
1600-1700		Voice of America.....	**9575, 15205**
			15410, 15445
			15580, 15600
			17785, 17800
			17870
1600-1700		Voice of Nigeria.....	7255, 11770
1600-1700		WCSN, Boston, Mass.....	**15270**
1600-1700		WHRI, Indiana.....	**15105**
1600-1700		WINB, Pennsylvania.....	**15295**
1600-1700	TEST	WMLK, Pennsylvania.....	**9455**
1600-1700		WRNO Worldwide.....	**11965**
1600-1700		WYFR, Florida.....	**11580, 11830**
			15170, 15575
1610-1620	M-F	Radio Botswana.....	4820, 7255
1610-1645		Radio Belem.....	3205
1630-1655	M-A	BRT Belgium.....	**17595**
1630-1700		ELWA, Liberia.....	11830
1630-1700		Radio Nacional Angola.....	7245, 9535
			11955
1630-1700		Radio Netherland.....	6020, **9515**
1630-1700		Radio Polonia.....	7125, 9525
1630-1700		Radio Sofia, Bulgaria.....	11735, 11840
			15310
1630-1700		Voice of Africa, Egypt.....	15255
1645-1700		Radio Berlin Int'l.....	**9730**
1645-1700		Radio Pakistan.....	**6205, 7100**
			9560, 9465

1700 UTC		**[1:00 PM EDT/10:00 AM PDT]**	
1700-1710		Voice of Lebanon.....	6548
1700-1715		Kol Israel.....	**9385, 9460**
			11585, 11655
1700-1720		Radio Netherland.....	**6020, 9515**
1700-1730		Radio Australia.....	6035, 6060
			7205
1700-1730		Radio Berlin Int'l.....	**9730**
1700-1730		Radio Japan.....	**5990, 11815**
1700-1730		Radio Norway International.	**15220**
			15310
1700-1745		BBC, England.....	**11775, 15070**
			15260, 15275
			15400
1700-1800		AFRTS.....	**9700, 11805**
			15330, 15345
			15430
1700-1800		CBC, N. Quebec, Canada....	**9625, 11720**
1700-1800		CFCX, Montreal, Canada.....	6005
1700-1800		CFRX, Toronto, Canada.....	6070
1700-1800		CFVP, Calgary, Canada.....	6030
1700-1800		CHNX, Halifax, Canada.....	6130
1700-1800		CKFX, Vancouver, Canada.....	6080
1700-1800		CKZU, Vancouver, Canada.....	6160
1700-1800		KCBI, Dallas.....	**11735**
1700-1800		KNLS, Alaska.....	**7355**
1700-1800		KYOI, Saipan.....	9665
1700-1800		Radio Beijing.....	**9570, 11600**
1700-1800		Radio Korea, South.....	5975, 15575
1700-1800		Radio Moscow.....	**7115, 7150**
			9825, 11840
1700-1800	MWF	Radio Nacional, Eq.Guinea	9535
1700-1800		Radio Nacional Angola.....	7245, 9535
			11955
1700-1800		Radio Pyonyang, N. Korea....	7105, **7205**
			7305, **9325**
			9960, 9977
			11665
1700-1800		Radio Riyadh, Saudi Arabia..	9720v
1700-1800		Radio Tanzania.....	6105
1700-1800		Radio Zambia.....	9505
1700-1800		Voice of Africa, Egypt.....	15255
1700-1800		Voice of America.....	**15410, 15445**
			15580, 15600
			17785, 17800
			17870
1700-1800		Voice of Nigeria.....	11770
1700-1800		WCSN, Boston, Mass.....	**15270**
1700-1800		WHRI, Indiana.....	**15105**
1700-1800		WINB, Pennsylvania.....	**15400**
1700-1800		WMLK, Bethel, Pa.....	**9455**
1700-1800		WRNO Worldwide.....	**15420**
1700-1800		WYFR, Florida.....	**11580, 11830**
			11875, **15170**
1715-1800		Radio Berlin International..	6080, 6115
1730-1755		BRT, Belgium.....	**5910, 11985**
1730-1800		Radio Australia.....	6035, **9580**
1730-1800		Radio Bucharest, Romania....	7145, 9640
			9690, 11830
1730-1800		Radio Polonia.....	6135, 9540
1730-1800		Radio Portugal.....	**11915, 13250**
1730-1800		Radio Surinam.....	17755
1745-1800		BBC, London.....	**9410, 9750**
			12095, 15070
			15260, 15275
			15400
1745-1800		SLBC, Sri Lanka.....	**11800**

1800 UTC		**[2:00 PM EDT/11:00 AM PDT]**	
1800-1810		Voice of Kenya.....	6135
1800-1830		Radio Canada International.	**15260, 17820**
1800-1830		Radio Japan.....	7250, **9675**
1800-1830		Radio Mozambique.....	3340, 9620
1800-1830		Swiss Radio Int'l.....	**9535**
1800-1830		TWR, Monte Carlo.....	11965
1800-1900		Voice of Africa, Egypt.....	15255
1800-1830		Voice of Vietnam.....	**9755, 9840**
			12020, 12035
1800-1900		Deutsche Welle.....	7285, 9700
			9745, 11785
1800-1850		Radio Nacional do Brasil...	**15265**
1800-1900		4VEH, Haiti.....	4930
1800-1900		AFRTS.....	**15330, 15345**
			15430, 17765
1800-1900		All India Radio.....	**11620**, 11940
			15280
1800-1900		BBC, London.....	**6180, 6195**
			9410, 11820
			12095, **15070**
			15275, 15400
1800-1900		CBC, N. Quebec Service.....	**9625, 11720**
1800-1900		CFCX, Montreal, Canada.....	6005
1800-1900		CFRX, Toronto, Canada.....	6070
1800-1900		CFVP, Calgary, Canada.....	**6030**
1800-1900		CKFX, Vancouver, Canada.....	6080
1800-1900		CKZU, Vancouver.....	**6160**
1800-1900		KCBI, Texas.....	**11735**
1800-1900		KNLS, Alaska.....	7355
1800-1900	M-F	KVOH, California.....	**17775**
1800-1900		KYOI, Saipan.....	9665
1800-1900		Radio Australia.....	5995, 6045
			6060, 6035
			6080, 7215
			9580
1800-1900	A,S	Radio Canada International.	15260, 17820
1800-1800v		Radio Jamahiriya, Libya....	15450v
1800-1900		Radio Korea.....	5975, 15575
1800-1900		Radio Maputo, Mozambique....	**9620**
1800-1900		Radio Moscow.....	**9735, 9765**
			11840
1800-1900		Radio Kuwait.....	**11675**
1800-1900	MWF	Radio Nacional, Eq.Guinea...	**9553**
1800-1900		Radio New Zealand Int'l....	11780, 15150
1800-1900		Radio Riyadh, Saudi Arabia..	9720v
1800-1900		Radio Tanzania.....	6105
1800-1900		Radio Zambia.....	9505
1800-1900		RAE, Argentina.....	15435
1800-1900		TWR, Swaziland.....	9550
1800-1900		Voice of America.....	**11760, 15580**
			15410, 17785
			17870, 17800
1800-1900		WCSN, Boston, Mass.....	**21640**
1800-1900		WHRI, Indiana.....	**11705**
1800-1900		WINB, Pennsylvania.....	15400
1800-1900		WRNO Worldwide.....	**15420**
1800-1900		WYFR.....	**9852.5**
1805-1830	A,S	Radio Austria Int'l.....	**9725, 12015**
1814-1817		Radio Suriname Int'l.....	17755
1815-1900		Radio Bangladesh.....	6240, **7295**
			7505
1830-1855	M-A	BRT Brussels, Belgium.....	5910, **9905**
1830-1855		Radio Finland.....	**6120, 9610**
			11755
1830-1900		Radio Polonia.....	5995, 6135
			7125, 7285
			9525, 9675
			11840
1830-1900		Radio Sweden Int'l.....	**9755**
1830-1900		Radio Tirana.....	7065, 9480
1830-1900		Swiss Radio International...	**6165, 9535**
			9885, 11955
1830-1900		Radio Netherlands.....	6020, **9540**
			17605, 21685
1830-1900		Radio Sofia, Bulgaria.....	**9700, 11720**
1830-1900		Spanish Foreign Radio.....	**7275, 9765**
			11840, 15375
1830-1900		Radio Abidjan, Ivory Coast.	11940
1830-1900		Radio Havana Cuba.....	**11795**
1830-1900		Radio New Zealand.....	11780, 15150
1840-1900		Voice of Greece.....	11645, 12105
			15630
1845-1900		All India Radio.....	7412, 11620

1900 UTC		**[3:00 PM EDT/12:00 PM PDT]**	
1900-1915		Radio Bangladesh.....	**6240, 7295**
			9855, 11555
1900-1925		Radio Netherland.....	6020, **9540**
			17605, **21685**
1900-1925		Radio Prague, Czechoslovakia	5930, 7345
1900-1930		Kol Israel.....	**7465, 9010**
			9435, 9815
			9855
1900-1930		Radio Budapest Hungary.....	6025, 7220
			9585, **9835**
			11910, 12000
1900-1930	M-F	Radio Canada International..	**5995, 7285**
			15260, 15325
			17820, 17875
			21695
1900-1930		Radio Japan.....	**11705**
1900-1930		Radio Kiev, Ukrainian SSR...	7230, 6010
			6090, 6165
1900-1930	S	Radio Norway Int'l.....	**9590, 11870**
			15310
1900-1930		Radio Yugoslavia.....	**6100, 7240**
			9620
1900-1930		Spanish Foreign Radio.....	**15375**
1900-1930		Voice of Vietnam.....	**9755, 9840**
			12020, 12035
1900-2000		4VEH, Haiti.....	4930
1900-2000		AFRTS.....	**15330, 15345**
			15430, 17765
			21620
1900-2000		All India Radio.....	7150, 9665
			11620, 11845
			15265
1900-2000		BBC, London.....	**3955, 7325**
			9410, 11820
			15070, 15400
1900-2000		B.S. Kingdom Saudi Arabia..	**9720**
1900-2000		CBC Northern Quebec Serv....	**9625**
1900-2000		CFCX, Montreal, Canada.....	6005
1900-2000		CFRX, Toronto, Canada.....	6070
1900-2000		CFVP, Calgary, Canada.....	6030
1900-2000		CKFX, Vancouver, Canada.....	6080
1900-2000		CKZU, Vancouver, Canada.....	**6160**
1900-2000		HCJB, Ecuador.....	**15270, 17790**
1900-2000		KCBI, Texas.....	**11735**
1900-2000		KNLS, Alaska.....	**7355**
1900-2000		KVOH, California.....	**17775**

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1900-2000		Radio Australia.....	5995, 6045
			6060, 6035
			6080, **7205**
			9580
1900-2000		Radio Beijing.....	9860, 11500
1900-2000	TES	R. Discovery, Dominican Rep	15045
1900-2000		Radio Havana Cuba.....	**11795**
1900-2000		Radio Kuwait.....	**11675**
1900-2000		Radio Moscow.....	**9685, 9735**
			9775, 11840
1900-2000	MWF	Radio Nacional,Eq.Guinea....	**9553**
1900-2000		Voice of America.....	**9760, 15410**
			15445, 15580
			11760, 17785
			17800, 17870
1900-2000		Voice of Nigeria.....	7255, 11770
1900-2000		WCSN, Boston, Mass.....	**21640**
1900-2000		WHRI, Indiana.....	**11980**
1900-2000	S,A	WINB, Red Lion, Penna.....	**15185**
1900-2000		WMLK, Bethel, PA.....	**9455**
1900-2000		WRNO Worldwide.....	**15420**
1900-2000		WYFR, Okeechobee, Florida..	**9852.5,11830**
			11875
1910-1920		Radio Botswana.....	3355, 4820
1920-1930	M-A	Voice of Greece.....	7430, 9395
			9420
1930-2000		Radio Beijing, China.....	9440, 11515
			11905
1930-2000		Radio Bucharest, Romania....	7145, 9690
			9750, 11940
1930-2000		Radio Finland.....	6120, 11755
1930-2000		Voice of Islamic Rep. Iran..	9022
1935-1955		RAI, Italy.....	**7275, 9710**
1940-2000		Radio Ulan Bator Mongolia...	7235, 15305
1950-2000		Vatican Radio.....	6190, **7250**
			9645

2000 UTC		[4:00 PM EDT/1:00 PM PDT]	
2000-2005		Radio Ghana.....	4915
2000-2005		Radio Ulan Bator Mongolia...	9575, 15305
2000-2010		Vatican Radio.....	**6250**, 7250
			9645
2000-2010		Voice of Kenya.....	4808
2000-2015	M-F	Radio Cotonou, Benin.....	4870
2000-2015		Radio Togo, Lome.....	3220, 5047
2000-2025		Radio Beijing, China.....	9440, 11515
			11905
2000-2025		Radio Bucharest, Romania....	7145, 9690
			9750, 11940
2000-2025	M-H	Radio Polonia.....	7125, 7145
			9525, 9695
2000-2030		Radio Australia.....	6060, 6035
			6045, 6080
			7250, 9580
			9620
2000-2030		Radio Algiers, Algeria.....	**17745**
2000-2030		Radio Budapest, Hungary.....	**9585, 9835**
			11910
2000-2030	M-F	Radio Canada International..	**5995, 9670**
			11945, 115325
			17820, 17875
2000-2030	S	Radio Norway International..	**7125, 9525**
2000-2030		Radio Polonia.....	7125, 7145
			9525, 9675
2000-2030		Radio Prague, Czechoslovakia	5930, 7345
2000-2030		Voice of Islamic Rep. Iran..	9022, 11930
2000-2030		Voice of Nigeria.....	**7255, 11770**
2000-2030		WRNO Worldwide.....	**15420**
2000-2045		All India Radio.....	7160, 9665
			9755, 9910
			11620, 11865
20000-2050		Voice ofTurkey.....	**7125**
2000-2100		AFRTS.....	11805, 15330
			15345, 15430
			17765
2000-2100		BBC, London.....	**6175, 6190**
			6195, 7325
			9410, 9765
			15260
2000-2100		CBC Northern Quebec Service.	9625, 11720
2000-2100		CFCX, Montreal, Canada.....	6005
2000-2100		CFRX, Toronto, Canada.....	6070
2000-2100		CFVP, Calgary, Canada.....	**6030**
2000-2100		CHNX, Halifax, Canada.....	6130
2000-2100		CKFX, Vancouver, Canada.....	6080
2000-2100		CKZV, Canada.....	6160
2000-2100		King of Hope, Lebanon.....	6280
2000-2100		KNLS, Alska.....	**7355**
2000-2100		KVOH, California.....	**17775**
2000-2100		KYOI, Saipan.....	**9670**
2000-2100		Radio Baghdad, Iraq.....	7170
2000-2100		Radio Kuwait.....	**11675**
2000-2100		Radio Moscow.....	**9735, 9775**
			11840
2000-2100		R. Nacional, Equator Guinea	15106v
2000-2100		Radio New Zealand.....	11780, 15150

2000-2100		Radio Pyongyang, N. Korea...	6575, 7105
			9345, **9960**
			9977
2000-2100		Radio Zambia.....	9505
2000-2100		Voice of America.....	**9760, 11760**
			11980, 17800
			17870
2000-2199		WCSN, Boston, Mass.....	**9465**
2000-2100		WHRI, Indiana.....	**9770**
2000-2100		WRNO, Worldwide.....	**11705**
2000-2100		WYFR, Okeechobee, Florida..	**11830, 15170**
2005-2100		Radio Damascus Syria.....	**12085**
2015-2100		ELWA, Liberia.....	11830
2015-2100		Radio Cairo, Egypt.....	**9655**
2025-2045		RAI, Italy.....	7235, **5990**
			11800
2030-2100		Falkland Islands Bcast Svc..	2380 / 3958
2030-2100		IBRA Radio.....	6110
2030-2100		Radio Australia.....	6035, 6045
			6080, 7215
			9580, 9620
2030-2100		Radio Beijing.....	6955, 7480
			9440, **11515**
2030-2100		Radio Netherland.....	9540, 9715
			9895, 11740
2030-2100	M-F	Radio Portugal.....	**6170, 9740**
2030-2100		Voice of Nigeria.....	**11770**
2030-2100		Radio Sofia, Bulgaria.....	**6070, 7115**
			9700
2030-2100		Voice of Vietnam.....	**9755, 9840**
			12020, 12035
2045-2100		All India Radio.....	7160, 9550
			9665, 9910
			11620, 11870
2045-2100		Radio Berlin International.	**6125**
2050-2025		Voice of Islamic Rep.,Iran..	**9022**

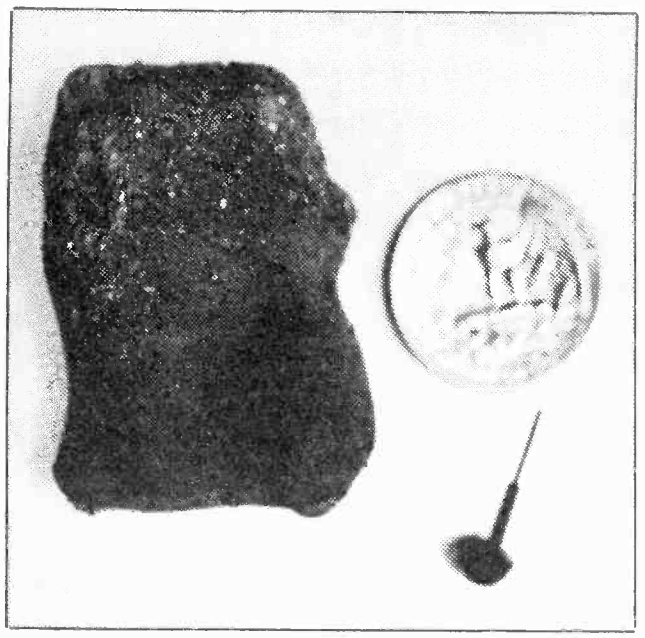
2100 UTC		[5:00 PM EDT/2:00 PM PDT]	
2100-2110		Vatican Radio.....	**6200, 7250**
			9645
2100-2115		Radio Cairo, Egypt.....	**9655**
2100-2115		Radio New Zealand Int'l....	11780, 15150
2100-2220		ELWA, Liberia.....	11830
2100-2125		BRT, Belgium.....	**5910, 9675**
2100-2125	S-F	CBC Northern Quebec Service.	**9625, 11720**
2100-2125		Radio Beijing.....	9440, **11515**
2100-2125		Radio Netherland.....	**9540, 9715**
			9895
2100-2130		Radio Finland.....	6120, **11945**
			15400
2100-2130		Radio Australia.....	**9580**
2100-2130		Radio Berlin International..	**6125**
2100-2130		Radio Canada Int'l.....	**11790, 15325**
2100-2130		Radio Japan General Service.	7140, 9675
			11815
2100-2130		Radio Sweden International.	11845, 11955
2100-2130		Swiss Radio International..	**11955, 12035**
2100-2140		Radio Havana Cuba.....	**15230**
2100-2145		WINB, Red Lion, Penna.....	**15185**
2100-2150		Deutsche Welle, West Germany	6010, 7130
			9675, 9765
			11815
2100-2150		Radio Pyongyang, N. Korea...	6575, 9360
			11660
2100-2155		Radio Beijing.....	**11500**
2100-2156		Radio RSA, South Africa.....	**7270, 9585**
2100-2200		AFRTS.....	**15330, 15345**
			15435
2100-2200		All India Radio.....	7412, 9665
			9910, 11620
2100-2200		BBC, London.....	**6005, 6175**
			7325, 9410
			12095, 15260
2100-2200		CFCX, Montreal, Canada.....	6005
2100-2200		CFRX, Toronto, Canada.....	6070
2100-2200		CFVP, Calgary, Canada.....	**6030**
2100-2200		CHNX, Halifax, Canada.....	6130
2100-2200		CKFX, Vancouver, Canada.....	6080
2100-2200		Falkland Islands Bcast Svc..	2380, 3958
2100-2200		FEN, Tokyo.....	15260
2100-2200		King of Hope, Lebanon.....	6280
2100-2200		KSDA, Guam.....	**7160, 11965**
2100-2200		KVOH, California.....	**17775**
2100-2200		KYOI, Saipan.....	9670
2100-2200		Radio Baghdad, Iraq.....	**9875**
2100-2200v		Radio Jamahiriya, Libya.....	**7245**
			9635, 11815
2100-2200		Radio Moscow.....	**6200, 7115**
			7310, 9490
			9775, 11840
			13665
2100-2200	M-A	Radio Nacional Angola.....	9535, 7245
2100-2200		R. Nacional, Equat. Guinea.	15106v
2100-2200	F,A	Radio Zambia.....	9505
2100-2200		RTL, Luxembourg.....	6090
2100-2200		Voice of Africa (Cairo)....	15375

2100-2200		Voice of America.....	**6045, 9760**
			11760, 15410
			15445, 15580
			17785, 17800
			17870
2100-2200		Voice of Asia.....	**7445, 9845**
2100-2200		WCSN, Boston, Mass.....	**9465**
2100-2200		WHRI, Indiana.....	**9770**
2100-2200		WRNO, Louisiana.....	**11705**
2100-2200		WYFR, Okeechobee, Florida..	**11830, 15170**
2105-2200		Radio Damascus, Syria.....	9950
2115-2120	F	Radio Free Europe,W.Germany	**3970, 6135**
			7200, 9725
			11855
2115-2230		Radio Yugoslavia.....	6100, 7240
			9620
2130-2200	T,F	BBC Falklands Service.....	**9915**, 11820
			12040, 15390
2130-2200	S-F	CBC Northern Quebec Service	**11720**
2130-2200		HCJB, Quito, Ecuador.....	**11740**, 15270
			17790
2130-2200		KGEI, San Francisco, CA....	15280
2130-2200		Kol Israel.....	**7410, 7465**
			9010, 9435
			9815
2130-2200		Radio Austria International.	5945, 6000
			9870
2130-2200		Radio Australia.....	**15150**, 15160
			15395
			17795
2130-2200		Radio Canada International.	11945, 15150
2130-2200		Radio Prague.....	6055
2130-2200		Radio Sofia, Bulgaria.....	**6070, 11720**

2200 UTC		[6:00 PM EDT/3:00 PM PDT]	
2200-2205		Radio Damascus, Syria.....	9950
2200-2207		Voice of America.....	11740, 15160
			17730, **17775**
2200-2210		Radio Sierra Leone.....	5980
2200-2215		Vatican Radio.....	**9615**
2200-2225		RAI, Italy.....	**5990**, 9710
			11800
2200-2230		All India Radio.....	7160, 9550
			9665, 9910
			11620, 11870
2200-2230	S-F	CBC Northern Quebec Service	**9625, 11720**
2200-2240		Radio Jamahiriya, Libya.....	**7245**
2200-2245		Radio Berlin Int'l.....	**6070, 6125**
2200-2230		Radio Canada International..	5960, 9755
2200-2230	S	Radio Norway International..	**9590, 9605**
2200-2230		Radio Sofia, Bulgaria.....	**11720**
2200-2300		AFRTS.....	**6030, 11790**
			15330, 15340
			15435
2200-2300		BBC, London.....	5975, **6005**
			6120, 6175
			7325, 9410
			9515, 9915
			12095
2200-2300		CFCX, Montreal, Canada.....	6005
2200-2300		CFRX, Toronto, Canada.....	6070
2200-2300		CFVP, Calgary, Canada.....	6030
2200-2300		CHNX, Halifax, Canada.....	6130
2200-2300		CKFX, Vancouver, Canada.....	6080
2200-2300		CKZU, Vancouver.....	**6160**
2200-2300		Falkland Islands Bcast Svc..	2380 / 3958
2200-2300		King of Hope, Lebanon.....	**6280**
2200-2300		KSDA, Guam.....	**7160**
2200-2300		KVOH, California.....	**17775**
2200-2300		KYOI, Saipan.....	15405
2200-2300		Radio Australia.....	**15320, 17795**
2200-2300		Radio Baghdad, Iraq.....	**9875**
2200-2300		Radio Moscow.....	**5915, 5940**
			7115, 7150
			7215, 9490
			9520, 13665
2200-2300		Radio Pyongyang, N.Korea...	11735
2200-2300		R. Vilnius, Lithuanian SSR..	**6200, 7165**
			11790, 11860
			13645
2200-2300		Voice of Free China, Taiwan.	**7355, 9465**
			9955
2200-2300		Voice of Turkey.....	**7225, 9560**
			17760
2200-2300		WCSN, Boston, Mass.....	**7365**
2200-2300		WHRI, Indiana.....	**11770**
2200-2300		WRNO Worldwide.....	**11705**
2200-2300		WYFR, Florida.....	**11830, 17845**
2205-2230		Vatican Radio.....	6015, 9615
			11830
2230-2300	S	CBC Northern Quebec Service.	9625, 11720
2230-2300		Swiss Radio International...	6190
2245-2300		All India Radio.....	6035, **7215**
			9595, 9912
			11765
2245-2300		GBC1 Ghana.....	**4915**

freq SECTION

2300 UTC	[7:00 PM EDT/4:00 PM PDT]		
2300-2330	BBC, London	5975,	**6005**
		6120,	**6175**
		7325,	**9590**
		9915,	**9515**
2300-2330	KGEI	15280	
2300-2330	Kol Israel	**7410,**	7465
		9435	
2300-2330	Radio Canada International..	**9755,**	**11710**
2300-2330	Radio Sweden International..	**9695,**	**11705**
2300-2345	Radio Berlin International..	6080	**9730**
2300-0000	4VEH, Haiti	4930	
2300-0000	AFRTS	**6030,**	**11720**
		15345	
2300-0000 A,S	CBC Northern Quebec Service.	**6195,**	**9625**
2300-0000	CFCX, Montreal, Canada	6005	
2300-0000	CFRX, Toronto, Canada	6070	
2300-0000	CFVP, Calgary, Canada	**6030**	
2300-0000	CHNX, Halifax, Canada	6130	
2300-0000	CKFX, Vancouver, Canada	6080	
2300-0000	CKZU, Vancouver	**6160**	
2300-0000	Falkland Islands Bcast Svc..	2380 /	3958
2300-0000	FEBC, Manila	15320	
2300-0000	KCBI, Texas	**11910**	
2300-0000	KVOH, California	**17775**	
2300-0000	KYOI, Saipan	15405	
2300-0000	Radio Australia	**15320,**	**17795**
2300-0000	Radio Baghdad	**11735**	
2300-0000	Radio Japan	**11800**	
2300-0000	Radio Korea, South	15575	
2300-0000	Radio Moscow, U.S.S.R.	**5915,**	**5940**
		7115,	**7150**
		7185,	**7215**
		7320,	**13665**
2300-0000	Radio Sofia Bulgaria	**6070,**	**11720**
2300-0000	Radio Pyongyang, N. Korea..	11735,	**13650**
2300-0000	Radio Thailand	9650,	11905
2300-0000	RTL, Luxembourg	6090	
2300-0000	Spanish Foreign Radio	**6020**	
2300-0000	Voice of America	9640,	11740
		15160,	15185
		15290,	17730
		17740,	**17820**
2300-0000	WCSN, Boston, Mass.	**7365**	
2300-0000	WHRI, Indiana	**11770**	
2300-0000	WRNO Worldwide	**9615**	
2300-0000	WYFR, Florida	**9680,**	**15170**
		15440	
2330-2355	BRT Belgium	**9675,**	**9925**
2330-0000	BBC, London	**5975,**	**6005**
		6120,	**6175**
		7325,	**9515**
		9590,	**9915**
		12095	
2330-0000 S-F	Radio Canada International..	**5960,**	**9755**
2330-0000	Radio Kiev, Ukrainian SSR...	**6200,**	**7165**
		11790,	**11860**
		13645	
2330-0000 TES	Radio Veritas,Philippines...	**9740**	
2330-0000	Voice of Vietnam	**9765,**	**9840**
		12020,	12035
2330-0000	Voice of Nicaragua	**6015**	
2330-0000	WINB, Pennsylvania	15145	
2345-0030	Radio Berlin Intl.	**6080,**	**9730**
2345-0000	Radio Korea, South	7275,	**15575**



Bugs in the Forest

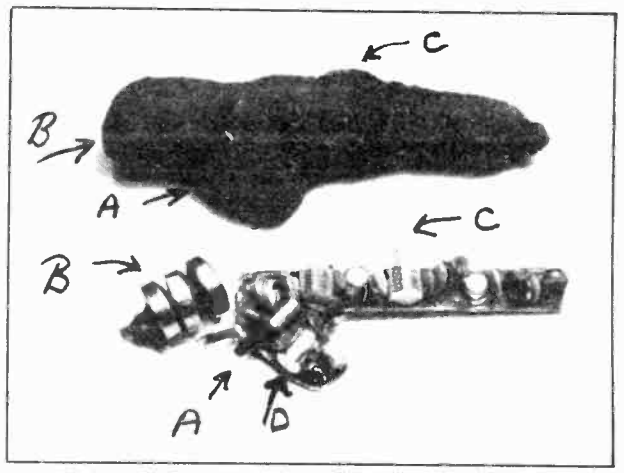
by Bob Grove

Electronics plays a vital role in many unusual environments. For example, during the war in Viet Nam, miniature transmitters, camouflaged to resemble lumps of peat or other jungle floor debris, would detect vibrations and send short radio bursts to nearby monitoring receivers.

Used to detect troop movements (and, as some wags observed, "They even look like troop movements!"), the tiny transmitters were comprised of a transistor oscillator on 150 Mhz connected to an inertia switch. Power was provided by three mercury cells.

The devices carried the official nomenclature "Transmitter, Radio T-1151 (V) / USQ, Forked Stick, Peat Moss" and were distributed in cartons of ten where they would be scattered near known footpaths and roadways, blending easily into the natural terrain.

Several different configurations were made (see accompanying illustrations), one of which was stripped with methyl ethyl ketone by the surplus dealer who sold them. A recent telephone call reveals that the supply is now exhausted as these interesting devices have disappeared for posterity into the hands of collectors.



Removal of a plastic arming pin (A) would activate the mercury cells (B); frequency was factory adjusted by coil (C) and seismic switch (D), containing a free-floating spring, would be activated by vibrations which would cause the spring to touch the side of the switch casing.

Ike Kerschner
RD 1 Box 181-A
Kunkletown, PA 18058

Complete assembly instructions on how to build...

A Simple Directional Antenna for the HF Bands

In response to the many requests I have received for a better shortwave antenna, this month's column will describe the famous W8JK flat top beam, an antenna which is an excellent choice for the SWL or new radio amateur.

It is easy and inexpensive to construct, is not too large for the average lot, has a 4 dB gain both transmitting and receiving when compared to an ordinary dipole antenna, and it is bi-directional; that is, it sends or receives signals best in two directions (broadside to the flat top).

The flat top beam can be mounted either horizontal or vertical to the ground. If mounted horizontally, try to keep both ends elevated at least 25 feet. Vertical mounting has the advantage of requiring only one support and it can be rotated to take advantage of the directive characteristics.

DIRECTIVITY AND AIMING

Usually we assume directive antennas must be pointed very precisely at the station to be worked; that is not the case with the W8JK beam as the lobe of maximum gain is at least 45 degrees wide.

If a station on the east coast of the U.S. aims the antenna northeast, most of Europe and a good part of North Africa will be within the lobe of maximum gain on one side of the beam.

The other side of the beam will cover the western U.S., Central America and much of the Pacific. Erecting a second array at right angles to our northeast antenna will cover the balance of the earth.

PHYSICAL LAYOUT

Figure 1 shows a view of the W8JK beam from the top. As you can see, the antenna is made up of two dipoles spaced a specific distance apart and connected to each other by two wires that cross over each other to establish proper phase relationships between the dipoles so their signals will enhance each other, providing gain and directivity.

SOME SIMPLE COMPUTATIONS

The W8JK can be designed for any frequency using the following formulas: The length in feet = 468/frequency in MHz; and the spacing in feet = 117/frequency in MHz.

$$\ell_{ft} = \frac{468}{F_{MHZ}} \qquad S_{ft} = \frac{117}{F_{MHZ}}$$

As an example let's assume you want to receive signals on a frequency of 20 MHz. The length of the dipoles would be 468/20 MHz or 23.4 feet (23'5"). The spacing between dipoles is 117/20 MHz or 5.85 feet or (5'10"). Dimensions are not extremely critical--plus or minus a few inches will not hurt anything.

Using an antenna tuner the 20 MHz antenna will produce good gain and directivity up to 40 MHz; it will also work fine on frequencies lower than 20 MHz but will not produce gain or directivity below that design frequency.

A GOOD MULTIBAND DESIGN

An excellent multiband flat top can be constructed for 10-30 MHz, using a length of 46 feet and spacing of 11.5 feet. (NOTE: you must use an antenna tuner designed to tune balanced feeders with this antenna.)

MATERIAL

The W8JK is considerably heavier than the usual dipole or long wire and requires strong wire for the element; use 14 or 12 gauge copper-clad steel wire. The phasing section (crossed wires that connect to feedline) can be made of lighter wire if you wish.

Spacers should be one inch square straight-grained pine, redwood, high quality spruce, or heavy 3/4-inch-diameter bamboo for beams designed for frequencies above 12 MHz. Lower frequency beams should use 1" x 2" pine or 1" diameter bamboo.

If you are fortunate enough to find bamboo wrap each of the sections with fiber strapping tape. Whatever material you use give it two coats of spar varnish or shellac. NOTE: Do not use metal of any type for the spacers! PVC is OK for spacings of less than six feet but will not stand up to stresses of larger spacing.

If the antenna is to be used only for receiving use whatever you have on hand for insulators. If you are an amateur and want to transmit it is imperative that high quality ceramic insulators be used!

The center insulator will require a piece of insulating material such as plastic or varnished wood at least 1/4" thick and 4-1/2" x 3" (figure 2).

A length of good quality 300 ohm TV twinlead is used to feed the antenna.

BUILD IT

A flat top beam consists of two one-half-wavelength dipoles spaced one-eighth wavelength apart. Calculate the dipole length from the formula, allow three additional feet of wire for connecting to the insulators and cut two lengths of wire.

If you antenna is cut for 10 MHz you will need two lengths of wire 49 feet long. Cut one length in half (24-1/2 feet) and attach an insulator to each end; take up the excess wire through the insulator (9 inches on each end) and wrap several turns around the long portion of the wire and solder carefully. Repeat for the other 49 foot length of wire.

You now should have four lengths of wire 23 feet long with an insulator at each end. Set them aside for now.

CENTER INSULATOR

Figure 2 illustrates construction of the center feed line insulator. There are four holes in the wide part; the upper hole on each side should be large enough to clear the wire used for the cross-over lines. One of these holes must be about one-half inch higher than the other so the wires will clear each other.

The holes beneath these upper holes are for machine screws--3/16" will clear number 10 hardware. If you choose smaller screws make the holes an appropriate diameter.

Cut a hole at the marked location large enough to clear the width of the spacer you are using. Now, cut the slots in the lower part of the insulator; these slots are a strain relief for the feedline and they must be large enough to just clear the wire you will use to feed the antenna. ▶

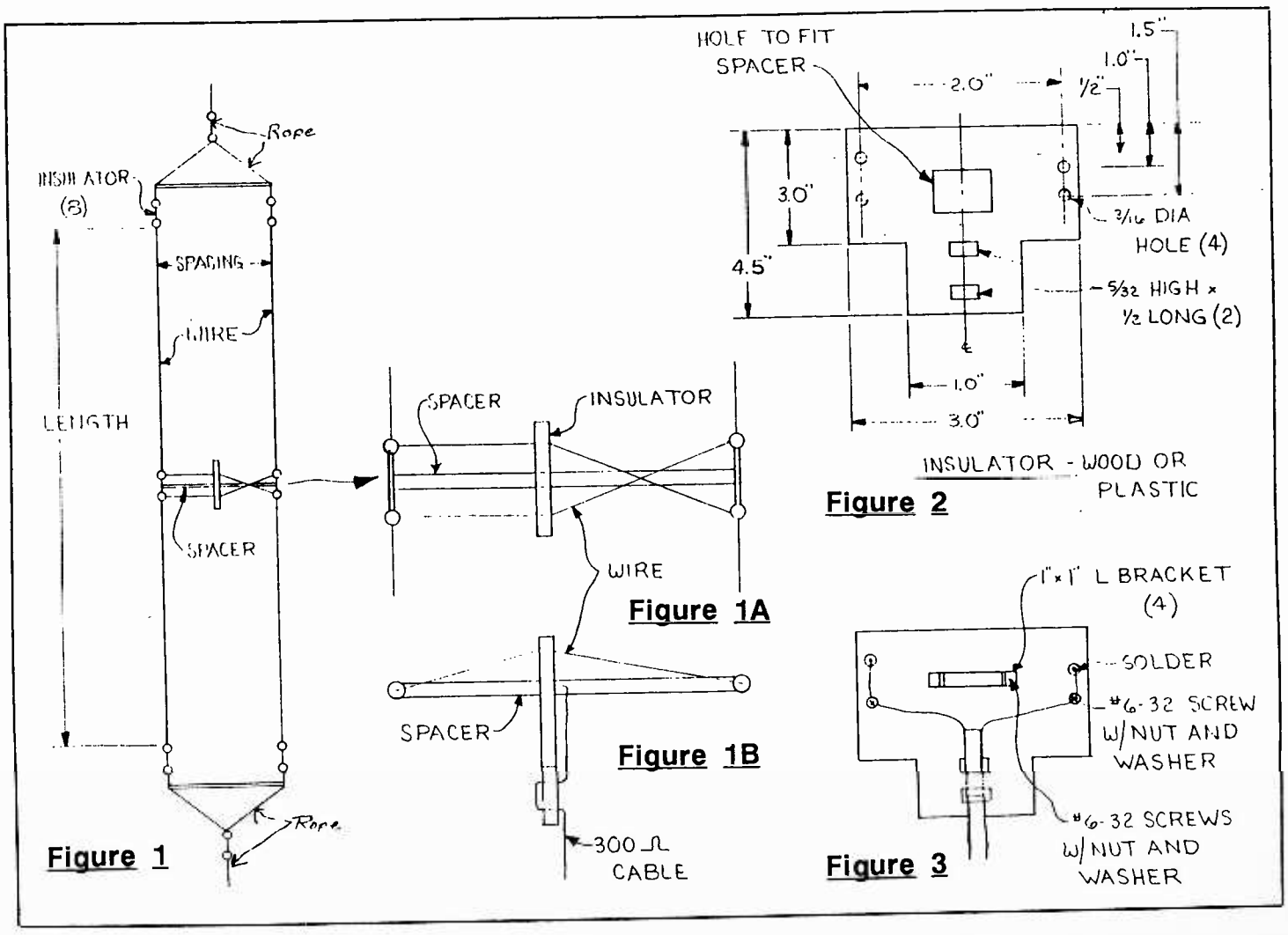


Figure 1

Figure 1A

Figure 1B

Figure 2

Figure 3

Cut the insulator to the indicated shape or leave it rectangular if you like.

Place the insulator on your center spacer and slide it 4 or 5 inches from the center and secure it with the L brackets. You can also use pieces of wood screwed and glued in front and back of the insulator to hold it in place.

SPACERS

Begin by preparing the center spacer. If you are building the 10 MHz version this spacer should be12 feet long. Measure in three inches from each end and drill a hole large enough to pass the wire used for the elements (see fig. 4).

Measure three inches in from the end of the two end spacers and mark the wood; do not drill any holes.

ASSEMBLY

Lay the components together on the ground so they look like figure 1. Run a piece of wire one foot long through the holes you drilled in the center spacer; use this wire to connect the insulators at the center of each dipole together and draw the insulators up against the wood spacer.

Wrap the wire around the insulator just as you did on the dipole sections and solder. The spacer should be snug between the insulators (fig. 4). Repeat for the other dipole.

Wrap and solder a one-foot-length of wire to reach end insulator. Now wrap the wire around an end spacer tightly where you made the mark three inches from one end (solder the ends).

Repeat this procedure on the other side of the spacer. Be sure the dipoles are even and do the other spacer the same way.

FEED SYSTEM ASSEMBLY

Run a wire from the one side of center of a dipole through the insulator and to the opposite wire of the dipole on the other side (see fig. 1A), solder these wires at the dipole as you connect them. Repeat for the other half.

Prepare the 300 ohm twinlead by splitting it back about two inches from one end and inserting this end through the slots (figs. 1B & 3); strip the end wires and mount solder lugs on them.

Solder two wires two inches long to each of the wires that pass through the center insulator, mount solder lugs on these wires and secure the lugs from the crossover wires and the lugs from the feedline with a machine screw (fig. 3).

Loop the feedline from the bottom of the insulator to the center of the wooden center spacer and tape it securely in place keeping the strain off the fragile insulator. The feedline should hang down from the center of the antenna.

ERECTING

Make a rope yoke at each end spacer as shown in figure 1. Secure the rope by wrapping it around the spacer and tying it tightly. Use epoxy glue to prevent slippage.

Tie a rope to the center of each yoke at the balance point; use this rope to secure the array to the towers or supports. It may be necessary to use light ropes from the ends of the spacers to ensure the antenna remains horizontal (spacers parallel to the earth).

Figure 5 illustrates other feed methods. The method on the left is good for only one band of frequencies while the other will allow operation over a wide range of frequencies similar to the center fed method. Use one of these end feeds if the antenna is used vertically.

There is a great deal more to the W8JK story and the following two books will provide information on other W8JK arrays that produce even higher gain:

ARRL Antenna Handbook, available from ARRL (225 Main St., Newington, CT 0611), or *Radio Handbook* by William I. Orr, W6SAI, available from Howard W. Sams & Co. (4300 West 62nd St, Indianapolis, IN 46268).

Good luck with your flat top; I know it will do a find job for you. Keep the letters and cards coming. ■

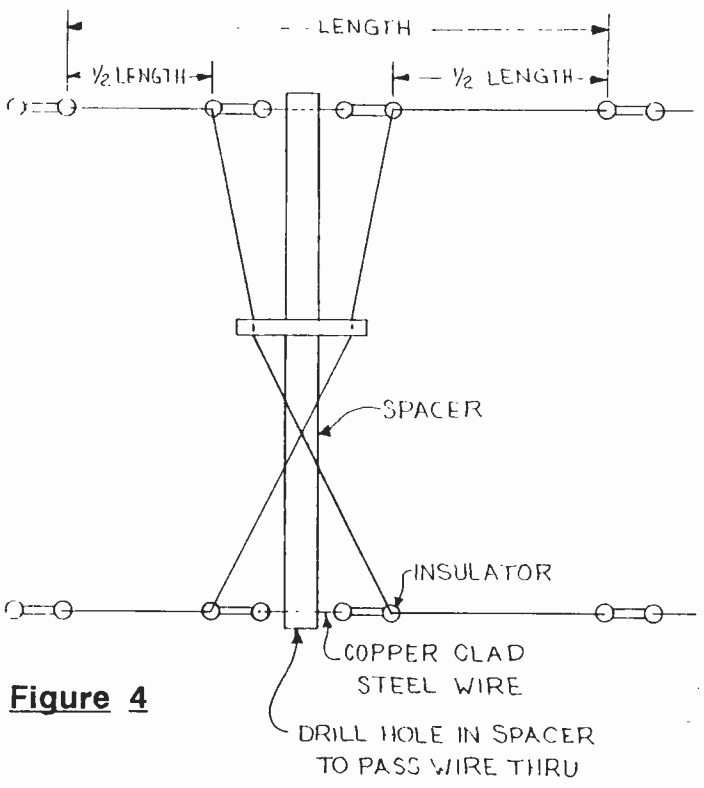
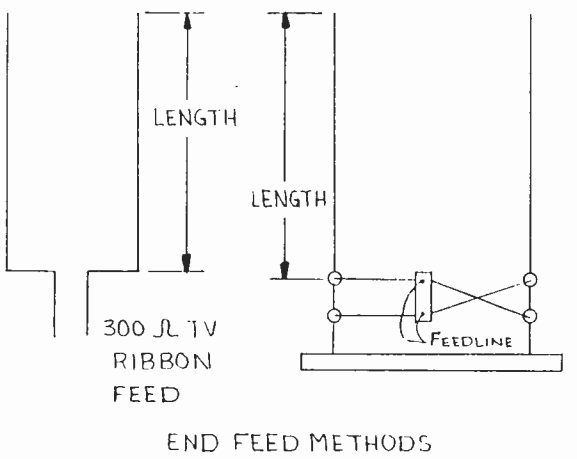


Figure 4



END FEED METHODS

Figure 5

Pricing Used Receivers, Scanners and Accessories

Often the prospective shopper becomes bewildered by ads and prices in his eternal quest to upgrade his monitoring post. Even more at the mercy of Madison Avenue hype is the newcomer who wants to break into radio but doesn't have any notion as to the price he should pay for that introductory receiver or scanner.

A letter just received from Donnie Pardue of Sanford, North Carolina, accented the dilemma. He had a wonderful time at the Charlotte Hamfest but had no idea which were good prices and which were not.

While Grove Enterprises was still taking trade-ins (they no longer are due to the high cost of advertising single pieces for resale), they composed a practical pricing guide to new and used equipment which we have updated and reproduced here.

Interpreting the Price Guide

The first column lists in alphabetical order the manufacturer and model number of the receiver, scanner or accessory. Manufacturer's suggested retail is not shown since it is unrealistically high to allow dealers to offer discounts.

The second column shows the lowest retail price that the article was advertised for, often considerably lower than the typical advertised price because of leaders (low markups to attract shoppers), closeouts and the continuing rise of the yen.

The third column lists Grove's trade-in appraisal, leaving a reasonable profit margin after advertising, overhead, inspection, reconditioning, shipping costs, a 15-day unconditional return-for-refund privilege, and a 90-day warranty.

The last column shows the used resale price, computed to be attractively competitive with prices for similar new equipment.

A blank space simply means that accurate pricing information was not (we would appreciate any information to fill in the blanks so that we can maintain an up-to-date list!).

The Variables

There is no steadfast rule in pricing used (or new) equipment. The appraisal below assumes that the equipment is in excellent condition, is not missing any original accessories and includes an operating manual.

There is considerable disparity between original prices of some equipment and appraisal value used. The explanation is simple: Some older equipment was excellent and remains in high demand; some was absolutely awful--and certainly got no better with time!

Finally, the more recent a used piece is, the more likely it is that replacement parts will be available. This has a substantial bearing on the value.

The list is not intended to be the consummate guide to pricing, but should give the prospective buyer some ammunition when he ventures into a dealer's booth or a fleamarket at the next hamfest!

Used Equipment Pricing Guide

Product	Retail	Trade	Resale
Ace AR-33	$ 229	$ 100	$ 149
AEA CP-1 Computer Patch	$ 269	$ 120	$ 189
AEA CP-100/C64	$ 378	$ 175	$ 249
AEA MBA/RO reader	$ 289	$ 100	$ 149
Ambassador 2020	$ 199	$ 80	$ 129
Ameco Active Antennas	$ 74	$ 40	$ 59
Arcom AP4 Active Antenna	$ 129	$ 35	$ 69
Autek QF-1A	$ 49	$ 20	$ 39
Barlow Wadley XCR-30	$ 239	$ 60	$ 99
Bearcat 100	$ 269	$ 50	$ 89
Bearcat 100XL	$ 179	$ 100	$ 149
Bearcat 101	$ 299	$ 30	$ 59
Bearcat 140	$ 92	$ 40	$ 79
Bearcat 145XL	$ 99	$ 50	$ 89
Bearcat 150	$ 132	$ 50	$ 89
Bearcat 151	$ 179	$ 60	$ 99
Bearcat 160	$ 143	$ 50	$ 89
Bearcat 170	$ 149	$ 60	$ 99
Bearcat 175XL	$ 154	$ 90	$ 129
Bearcat 180	$ 159	$ 60	$ 99
Bearcat 20/20	$ 199	$ 80	$ 129
Bearcat 200	$ 172	$ 70	$ 119
Bearcat 201	$ 189	$ 70	$ 119
Bearcat 210	$ 299	$ 60	$ 99
Bearcat 210XL	$ 159	$ 80	$ 129
Bearcat 210XW	$ 174	$ 90	$ 139
Bearcat 211	$ 249	$ 70	$ 99
Bearcat 220	$ 249	$ 70	$ 119
Bearcat 250	$ 269	$ 100	$ 149
Bearcat 260	$ 219	$ 100	$ 149
Bearcat 300	$ 239	$ 100	$ 159
Bearcat 350	$ 388	$ 120	$ 179
Bearcat 50XL	$ 108	$ 50	$ 89
Bearcat 800XLT	$ 269	$ 150	$ 199
Bearcat Alert	$ 39	$ 20	$ 29
Bearcat BC15	$ 99	$ 30	$ 59
Bearcat BC5	$ 86	$ 20	$ 49
Bearcat BC70XL	$ 174	$ 90	$ 129
Bearcat BC210XLT	$ 219	$ 100	$ 149
Bearcat DX1000	$ 284	$ 150	$ 199
Capri Descrambler	$ 49	$ 20	$ 29
Cobra SR 900	$ 109	$ 50	$ 79
Cobra SR 925	$ 164	$ 80	$ 129
Cobra SR 10	$ 129	$ 60	$ 89
Cobra SR 12	$ 199	$ 100	$ 149
Collins 51S1	$1500	$ 500	$ 699
Collins 75S3	$ 620	$ 150	$ 199
Datong FL-2	$ 295	$ 50	$ 89
Drake 4245	$2695	$1000	$1499
Drake DSR-1	$2195	$ 500	$ 799
Drake DSR-2	$2750	$ 600	$ 899
Drake R-7	$ 950	$ 300	$ 399
Drake R4B	$ 430	$ 100	$ 149
Drake R4C	$ 450	$ 100	$ 149
Drake R7A	$1150	$ 400	$ 499
Drake SPR4	$ 500	$ 200	$ 299
Drake SSR-1	$ 200	$ 50	$ 89
Drake SW4A	$ 295	$ 100	$ 149
Drake TR7/DR7 w/AC	$ 950	$ 600	$ 795
Eye-Com 1000 Fiche Reader	$ 140	$ 50	$ 99
Fanon M8HLU	$ 99	$ 30	$ 59
Fanon Slim-6HLU	$ 98	$ 30	$ 59
Fox BMP-10/60	$ 129	$ 50	$ 89
Galaxy R-1530	$ 700	$ 300	$ 399
Galaxy R-530	$ 795	$ 200	$ 299
GE World Monitor II	$ 169	$ 60	$ 99
Grove Minituner (TUN3)	$ 39	$ 15	$ 29
Grove Power Ant (ANT4C)	$ 39	$ 10	$ 19
Grove Scanner Filter (FTR3)	$ 19	$ 5	$ 10
Grundig BR1140	$ 930	$ 200	$ 249
Grundig Satellit 300	$ 388	$ 100	$ 149
Grundig Satellit 600	$ 890	$ 300	$ 399
Grundig Satellite 3400	$1000	$ 300	$ 399
Grundig Yacht Boy 100	$ 150	$ 50	$ 89
Grundig Yacht Boy 700	$ 279	$ 80	$ 129
Heathkit SB313	$	$ 100	$ 149
Heathkit SW7800	$ 299	$ 100	$ 149
Icom IC720A	$ 689	$ 300	$ 399
Icom IC751	$ 989	$ 400	$ 599
Icom R70	$ 639	$ 300	$ 399
Icom R7000	$ 839	$ 600	$ 799
Icom R71A	$ 599	$ 500	$ 599
Infotech M200F	$ 449	$ 150	$ 199
Infotech M600	$ 699	$ 300	$ 399
Infotech M600A	$ 699	$ 400	$ 499
Infotech M6000	$ 849	$ 500	$ 599
JIL SX100	$ 149	$ 50	$ 89
JIL SX200	$ 149	$ 60	$ 99
JIL SX400	$ 359	$ 200	$ 279
JRC NCM515 controller	$ 145	$ 60	$ 99
JRC NDH515 memory	$ 175	$ 80	$ 129
JRC NRD 505	$1200	$ 500	$ 599
JRC NRD 525	$ 995	$ 800	$ 949
JRC NRD-92	$3600	$2000	$2500
JRC NRD-93	$5900	$4000	$4500
JRC NRD515	$ 899	$ 500	$ 599
Kenwood QR666/R300	$ 200	$ 30	$ 59
Kenwood R1000	$ 359	$ 200	$ 249
Kenwood R11	$ 69	$ 30	$ 59
Kenwood R2000	$ 449	$ 300	$ 379
Kenwood R600	$ 134	$ 80	$ 129
Kenwood R5000	$ 749	$ 500	$ 599
Kenwood TS430S	$ 689	$ 300	$ 499
Kenwood TS440S	$ 849	$ 500	$ 699
Kenwood TS930S	$1249	$ 700	$ 899
Kenwood TS940S	$1549	$1000	$1299
Kenwood VC10 converter	$ 134	$ 60	$ 99
Kenwood VC20 converter	$ 169	$ 80	$ 129
Lafayette BCR-101	$ 249	$ 50	$ 89
McKay Dymek DA-100	$ 149	$ 50	$ 79
McKay Dymek DR100	$1150	$ 400	$ 499
McKay Dymek DR22	$ 500	$ 100	$ 199
McKay Dymek DR33C	$1950	$ 500	$ 699
McKay Dymek DR44	$ 800	$ 300	$ 399
McKay Dymek DR55	$ 800	$ 300	$ 399
MFJ 1020A	$ 79	$ 30	$ 59
Mizuho SX-3	$ 90	$ 40	$ 69
National HR0 500	$1200	$ 300	$ 399
National HR0-600	$	$ 400	$ 599
Palomar Loop Antenna preamp	$ 62	$ 20	$ 49
Palomar Loop Antenna	$ 62	$ 20	$ 49
Panasonic RF 2200	$ 112	$ 30	$ 59
Panasonic RF 2600	$ 179	$ 40	$ 69
Panasonic RF 2800	$ 179	$ 50	$ 79
Panasonic RF 2900	$ 178	$ 60	$ 99

Panasonic RF 3100	$ 266	$ 100	$ 149
Panasonic RF 799	$ 169	$ 40	$ 79
Panasonic RF-4900	$	$ 150	$ 199
Panasonic RF085	$ 79	$ 30	$ 59
Panasonic RF4800	$	$ 100	$ 149
Panasonic RF6300	$ 469	$ 200	$ 269
Panasonic RF9	$ 79	$ 30	$ 49
Panasonic RF9000	$2800	$ 500	$ 699
Panasonic RFB300	$ 179	$ 70	$ 129
Panasonic RFB50	$ 119	$ 40	$ 69
Panasonic RFB600	$ 427	$ 150	$ 199
Philips/Magnavox 2999	$ 299	$ 150	$ 199
Radio Shack DX100	$ 284	$ 100	$ 149
Radio Shack DX150/A/B	$ 159	$ 50	$ 89
Radio Shack DX160	$ 159	$ 50	$ 89
Radio Shack DX200	$ 229	$ 70	$ 99
Radio Shack DX300	$ 299	$ 30	$ 69
Radio Shack DX302	$ 299	$ 50	$ 89
Radio Shack DX360	$ 79	$ 30	$ 49
Radio Shack DX400	$ 149	$ 50	$ 99
Radio Shack DX55	$ 49	$ 20	$ 39
Radio Shack DX66	$ 66	$ 30	$ 49
Radio Shack PRO2001	$ 399	$ 40	$ 79
Radio Shack PRO2002	$ 399	$ 90	$ 139
Radio Shack PRO2003	$ 349	$ 100	$ 149
Radio Shack PRO2004	$ 399	$ 250	$ 299
Radio Shack PRO2008	$ 269	$ 60	$ 99
Radio Shack PRO2009	$ 199	$ 60	$ 99
Radio Shack PRO2010	$ 199	$ 100	$ 139
Radio Shack PRO2011	$ 159	$ 60	$ 99
Radio Shack PRO2020	$ 279	$ 100	$ 149
Radio Shack PRO2021	$ 299	$ 150	$ 199
Radio Shack PRO32	$ 299	$ 150	$ 199
Radio Shack PRO24	$ 99	$ 20	$ 39
Radio Shack PRO25	$ 99	$ 40	$ 59
Radio Shack PRO26	$ 99	$ 40	$ 59
Radio Shack PRO30	$ 199	$ 60	$ 99
Radio Shack PRO31	$ 199	$ 90	$ 129
Radio Shack PRO48	$ 159	$ 30	$ 49
Radio Shack PRO55	$ 119	$ 30	$ 49
Radio Shack SX190	$ 249	$ 50	$ 99
Regency ACT-R-1	$ 75	$ 20	$ 39
Regency ACT-R-106	$ 96	$ 30	$ 59
Regency ACT-T-16K	$ 249	$ 30	$ 69
Regency C403	$ 59	$ 20	$ 49
Regency D100	$ 164	$ 60	$ 99
Regency D300	$ 189	$ 80	$ 139
Regency D310	$ 129	$ 60	$ 99
Regency D810	$ 178	$ 80	$ 139
Regency DX3000	$ 179	$ 80	$ 139
Regency HX1000	$ 204	$ 90	$ 139
Regency HX1200	$ 209	$ 100	$ 149
Regency HX1500	$ 219	$ 150	$ 199
Regency HX2000	$ 159	$ 60	$ 99
Regency HX2200	$ 176	$ 80	$ 129
Regency HX50	$ 109	$ 30	$ 59
Regency HX750	$ 79	$ 30	$ 59
Regency INF-1			
Regency INF-2			
Regency K100	$ 144	$ 50	$ 89
Regency K500	$ 270	$ 70	$ 129
Regency M100	$ 197	$ 80	$ 129
Regency M400	$ 224	$ 100	$ 149
Regency MX1000	$ 198	$ 90	$ 139
Regency MX3000	$ 198	$ 90	$ 139
Regency MX4000	$ 179	$ 60	$ 99
Regency MX4200	$ 186	$ 60	$ 99
Regency MX5000	$ 329	$ 150	$ 199
Regency MX5500	$ 329	$ 170	$ 229
Regency MX7000	$ 399	$ 250	$ 299
Regency RH256B	$ 399	$ 200	$ 299
Regency RH600B	$ 499	$ 300	$ 399
Regency R1040	$ 136	$ 50	$ 89
Regency R1050	$ 139	$ 50	$ 89
Regency R1060	$ 87	$ 50	$ 89
Regency R1070	$ 99	$ 50	$ 89
Regency R1075	$ 104	$ 60	$ 99
Regency R1080	$ 129	$ 70	$ 99
Regency R1090	$ 149	$ 80	$ 119
Regency R806	$ 89	$ 40	$ 69
Regency RCD-MRP1	$ 38	$ 15	$ 29
Regency TS-1	$ 239	$ 140	$ 179
Regency TS-2	$ 319	$ 200	$ 249
Regency UC102	$ 124	$ 60	$ 99
Regency XL156	$ 114	$ 40	$ 69
Regency XL56	$ 129	$ 30	$ 59
Regency Z10	$ 146	$ 50	$ 89
Regency Z30	$ 129	$ 50	$ 89
Regency Z45	$ 149	$ 80	$ 129
Regency Z60	$ 164	$ 90	$ 139
Sangean ATS801	$ 99	$ 40	$ 69
Sangean ATS803	$ 179	$ 80	$ 129
Sangean SG789	$ 59	$ 30	$ 39
Sanyo RP8880	$ 279	$ 90	$ 139
Signal One	$	$ 600	$ 999
Sony AIR-8	$ 269	$ 150	$ 199
Sony AN-1	$ 79	$ 20	$ 49
Sony CRF 330K	$2200	$ 300	$ 499
Sony CRF-1	$1300	$ 400	$ 499
Sony CRF320	$1200	$ 200	$ 299
Sony ICF 6800W	$ 531	$ 250	$ 299
Sony ICF2001	$ 199	$ 50	$ 89
Sony ICF2002	$ 199	$ 100	$ 149
Sony ICF2010	$ 279	$ 150	$ 199
Sony ICF4910	$ 89	$ 30	$ 59
Sony ICF5900W	$ 119	$ 50	$ 89
Sony ICF6500W	$ 99	$ 40	$ 69
Sony ICF6700W	$ 250	$ 100	$ 149
Sony ICF7600A	$ 120	$ 40	$ 69
Sony ICF7600D	$ 199	$ 100	$ 149
Sony WA5000	$ 105	$ 30	$ 59
Sony WA8000	$ 199	$ 40	$ 69
Swan 600R with 330 tuner	$	$ 200	$ 299
Ten Tec RX325	$ 549	$ 300	$ 399
Toshiba RPF11	$ 79	$ 30	$ 59
Uniden CR2021	$ 95	$ 50	$ 89
Yaesu FIF232C interface	$ 69	$ 20	$ 49
Yaesu FRA7700 active antenna	$ 49	$ 20	$ 39
Yaesu FRG7	$ 279	$ 80	$ 129
Yaesu FRG7000	$	$ 100	$ 150
Yaesu FRG7700	$ 399	$ 150	$ 199
Yaesu FRG8800	$ 499	$ 350	$ 399
Yaesu FRG9600	$ 469	$ 230	$ 299
Yaesu FRT7700 tuner	$ 51	$ 20	$ 39
Yaesu FRV7700 converter	$ 131	$ 40	$ 79
Yaesu FT-1	$1699	$ 800	$ 999
Yaesu FT-980	$1300	$ 700	$ 899
Yaesu FT757GX	$ 729	$ 400	$ 599
Yaesu MU7700 memory	$ 131	$ 40	$ 179

Martin Williams ...

The early days of radio through the life of one radio pioneer

Our story begins in Cambridge City, Indiana, at the turn of the century. This rural community in east central Indiana is the birth place of Martin R. Williams, a man of humble beginnings and simpler times who likens his life to that of a character in a Horatio Alger novel.

Martin's memorable radio career began in 1914 when, at the age of 9 he would sweep the floor of the railroad station across the street from his house. The railroad telegrapher befriended young Martin and taught him the continental code, then used by wire telegraph services. This event "sparked" Martin's interest in communications and radio which set him on a path he would follow the rest of his life.

At the age of 14 Martin Williams was introduced to spark-gap radio transmitters by Fred Rowe, one of the first amateur radio operators in the area. Martin built his own equipment and within two years was making local headlines with his new wireless station.

Martin chose the callsign KKA -- Yes, I said *chose*, as all that was required to operate an amateur radio station in those days was the know-how.

In 1922 Martin worked for both Western Union and the postal telegraph office. The following year, on completion of High School, Martin enrolled in Dodges' Radio School at Valparaiso, Indiana, now Valpo-Tech.

Martin points out that even though the vacuum tube had been invented several years earlier, they were still almost totally unheard of except in textbooks like the one studied at the Dodge school. It covered everything known about vacuum tubes in its day -- it took only one page!

After graduating from radio school, Martin made a trip to Chicago to take the commercial radiotelegrapher's test offered by the newly-formed Bureau of Navigation of the Department of Commerce. It would be some time before the Federal Communications Commission would appear on the scene.

High Seas Radio

Martin left Chicago with a First class Commercial Radio Telegraph license in hand. The Radio Corporation of America successfully recruited him for a position as telegrapher onboard the "F.B. Squires," a freighter plying the Great Lakes. In less than a year Martin was promoted to Station Manager of the Cleveland RCA Marine facility. During this stay in Cleveland, he equipped several ships with radio equipment and direction finding gear.

In 1924 and 1925 Martin spent much of his time in New York. All the RCA-owned ships' radio equipment and those of Henry Ford were to be converted to vacuum tube. Before the conversion, the standard equipment on board ships was a Marconi QMS (quenched multiple spark) radio transmitter and a Marconi 106B crystal receiver.

Ford owned a fleet of ships he was sending into the rain forest of South America in order to set up his own rubber plantations; Martin equipped them with the needed radio gear on an RCA contract.

Martin reports that Henry Ford was very particular about his radio equipment. As far as it was practical, all knobs, trim and controls on all his ships had to be silver; cost was not important. Mr. Ford asked Martin to be Chief Radio Officer on the voyage to South America, but he declined, sending instead his friend and associate at RCA, Ralph Humes.

It was during his stay in new York that Martin met the famed Guglielmo Marconi, whose office was across the hall from Martin's. RCA was formed in 1919 and bought Marconi Wireless that same year, giving RCA a monopoly on communications gear.

WGO Marine Radio

In 1926 RCA promoted Martin to District Manager of the Great Lakes region. He was responsible for all radio communications in the district and worked out of RCA's marine station WGO north of Chicago. Martin had over 60 radio operators and 32 ships under his management.

On all of his voyages across the Great Lakes, Martin had only one close call. While traveling on Lake Michigan the ship became lost in a violent storm. The engines were out and the station lost all power and could not send an SOS. Martin recollects that the crew gave up all hope of being saved and fell on their knees begging God to save them. Someone's prayers apparently got through -- the ship and all its crew survived the storm to sail again!

NBC Radio

It was not long before Martin was to receive another promotion, this time to RCA's broadcasting division, NBC. He accepted a position as engineer of radio station WTAM in Cleveland, where he earned his reputation as an expert in broadcasting. He would use this expertise to establish several TV and radio stations in the years that followed.

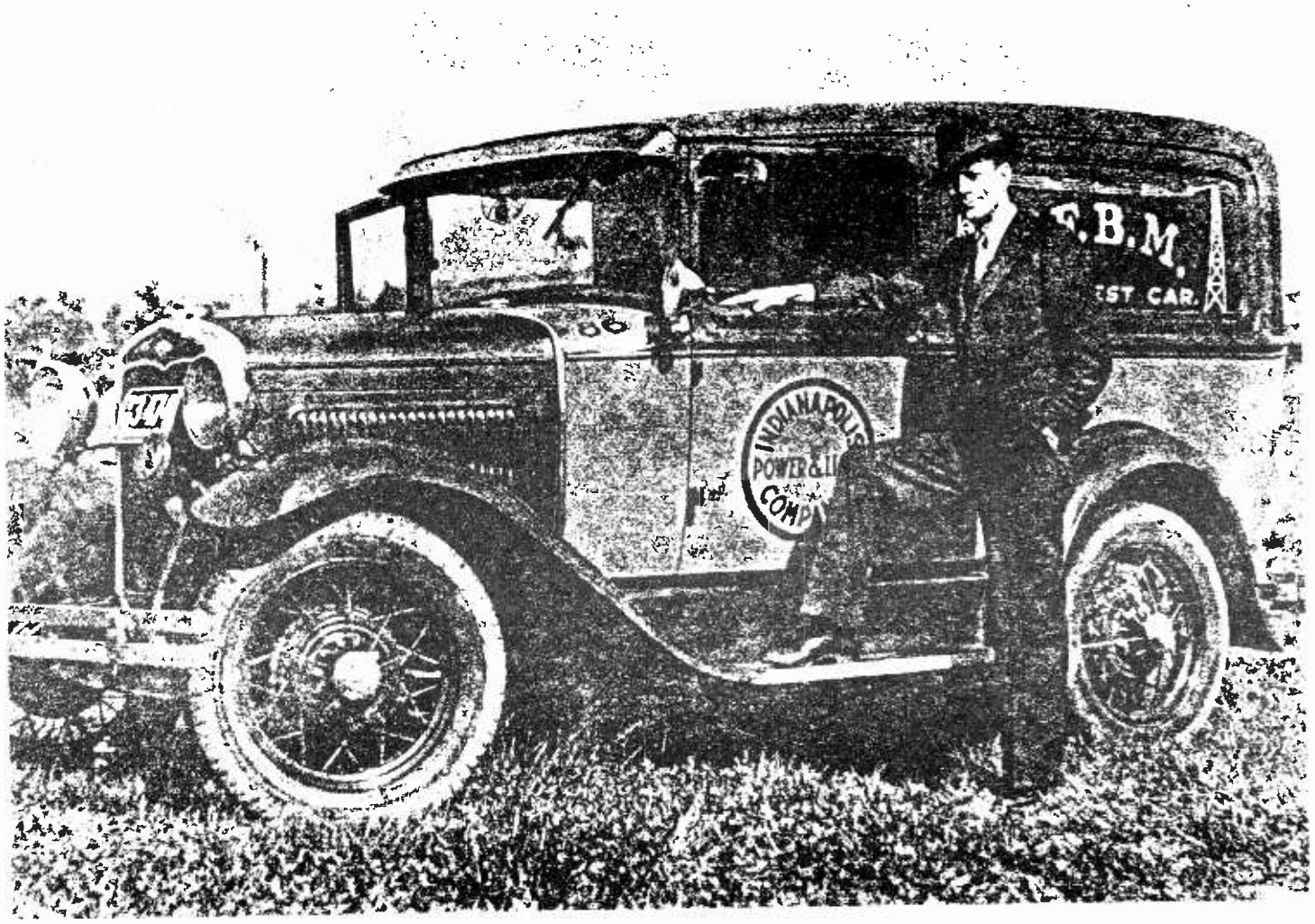
It was during his stay at WTAM that Martin engineered two radio firsts. In 1929 RCA had Martin design and install the first two-way radio communications equipment in a private (non-military) aircraft, an RCA corporate Fokker aircraft. Later this same year he installed the first two-way radio equipment in the Goodyear blimp at Wingfoot Lake near Akron, Ohio.

FM Indianapolis

By 1930 Martin Williams had spent several years away from home and he decided it was time to return to the land of his youth. When a local--perhaps *the* local--radio station in Indianapolis at this time, WFBM, offered him position of Chief Engineer, it did not take him long to make up his mind.

Between 1930 and 1936 Martin set up the first remote radio broadcast and the first mobile news unit with two-way capabilities in Indianapolis.

During World War II Martin contributed significantly to the American effort by providing the government with well-trained radio engineers and operators. He was an instructor for the Army Signal Corps and the Roscoe Turner Aeronautical Corporation, both located in Indianapolis at that time.



Martin Williams' mobile news wagon for WFBM in the early thirties.

1942 saw Indianapolis's first FM radio station thanks to Martin's efforts. He was granted a construction permit for an FM station in the old FM band on a frequency of 47.3 MHz -- WABW. He was also granted an AM station, WBBW on 1550 kHz, now WXLW on 1590 kHz.

The Mexico Connection

The war years were very busy for Martin. Under the auspices of the Mexican government, he helped the Indianapolis-based Electronic Laboratories of Canada to establish Mexico's first radio manufacturing plant.

Martin worked directly with the University of Mexico's best students and graduate students to establish a competent staff. Before the end of the war and in spite of shortages of wire and vacuum tubes, Electrica General was founded and operational.

From the end of the war to the mid 50's Martin worked largely in local broadcasting. It was during this time that he put several midwest radio and TV stations on the air.

Cable TV

It was 1944 when the first cable TV system was designed and engineered. Martin R. Williams produced a complete report to several prospective corporate partners for his cable TV/radio system, but with little success. He had begun his studies on cable broadcasting in the 1930's and designed a simple interface system for the distribution of radio signals into individual homes from broadcasting stations.

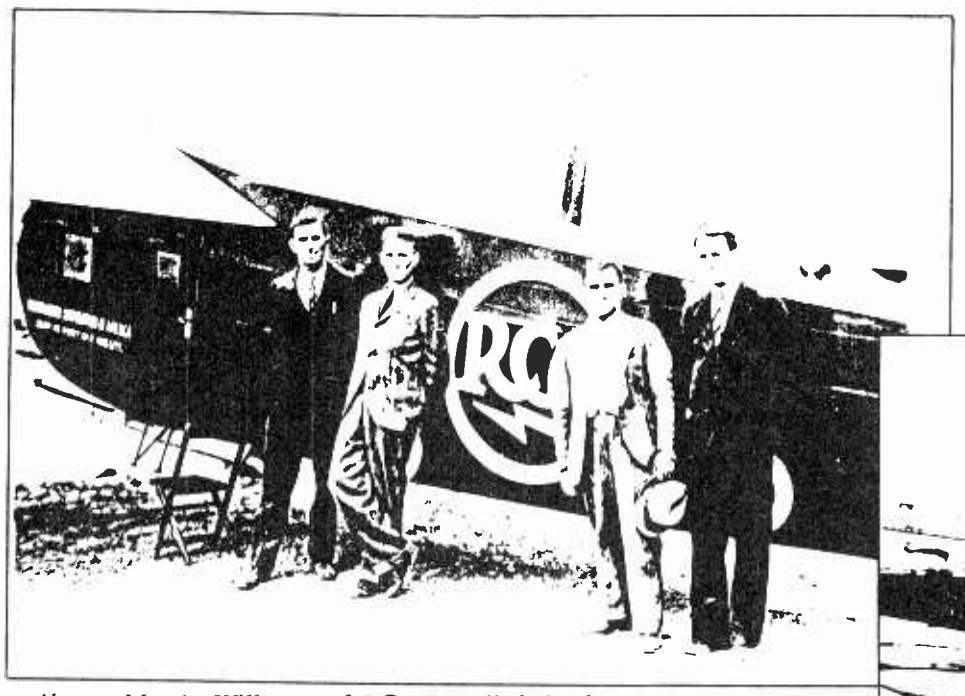
Martin R. Williams

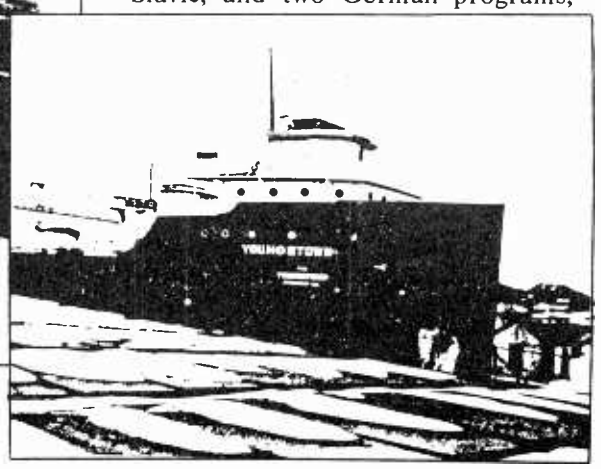
The telephone company had developed a complicated and expensive system for transmitting video over their cables but it was for short distances and was cost-prohibitive. Martin's system was economical. He proposed a small radio-size unit which would be plugged into a wall outlet; he was well ahead of his time on this one!

Not-so-foreign Broadcasting

Though Martin was not directly connected to any of the early foreign broadcasters, he did operate an international *domestic* station. In 1956 he applied for a construction permit for a 100,000 watt FM station and was granted the next year a permit for a 25,000 watt FM station on 95.5 MHz (WFMS -- "Williams FM Services"). WFMS was a call sign previously used by the U.S. Treasury Department which they agreed to relinquish!

WFMS began broadcasting a variety of semi-classical and ethnic music in 1957.





Above: Martin Williams of RCA installed the first two-way radio telephone communication in a private commercial aircraft, shown here during the 1929 Cleveland Air Races. (Right) One of the ships Williams outfitted with radio and direction-finding equipment.

Early in the history of WFMS, Martin was approached by the wife of a former Ambassador to Germany about starting a German language program. Martin agreed to the idea and the program details were worked out. The German language program became very popular and before the end of the first year on the air several other ethnic groups had approached Williams about having their own programs.

By the mid-60's WFMS was broadcasting in Spanish, French, Gallic, Slavic, and two German programs, giving the station a shortwave "flavor." Another program, "Travel the World in Song," was narrated by Willis Conover of the Voice of America's Jazz Program. This program was distributed by the department of the Navy, taking its listeners to ports of call around the world in music.

In the 1930's Martin was on the Indiana State Police communications committee which established that state's first law enforcement radio network. Retirement has never quenched the interest of this energetic radio pioneer and, more recently, he has been working with local consumer groups to ensure that their right to listen is protected. ■

Donald Dickerson holds an Advanced Class Amateur Radio license and a Commercial Radiotelephone license. He has worked in broadcasting and currently is a communication operator with a protective service jockying computer security systems, teletype, surveillance equipment and a VHF radio network. His amateur interests are in monitoring the U.S. and Soviet satellite and space programs.

MAKING WAVES

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HiFi AM -- A Boon to DXers

Like anyone else willing to stick his neck out, I've made predictions concerning the future of AM broadcasting. I've said that the band would not fade away to a handful of utility stations, as some have predicted, and that the current decline in listenership is part of a normal transition phase. I've stated that AM stereo is not the savior of AM broadcasting. And again and again I've stated that the key to AM or any medium's success is in its programming *to* the audience, not *at* it. DX'ers who understand the changing strategies of broadcasting will have a better chance of bagging once-elusive DX through "smart" listening techniques.

Interestingly, the National Association of Broadcasters has come to the aid of DX'ers in proposing new standards for high-fidelity AM. For years, broadcasters have (preemphasized) high frequencies to overcome poor response of radios, which have been manufactured with narrower bandwidths to reduce co-channel interference. As broadcasters boost, more interference is the result, and the narrower the receiver bandwidths become . . . you get the picture.

The NAB wants stations to reduce audio bandwidth to 10 kHz and manufacturers to offer more wideband receivers, enabling consumers to hear the higher fidelity available on AM. The plan is voluntary, but if broadcasters do reduce the bandwidth (and perhaps also modulation to 100% or lower) less co-channel interference will result, opening up new DX channels.

Bonneville International has raised a valid objection to the plan, saying that to reduce audio bandwidth from 15 kHz to 10 kHz is going to degrade the sound of AM, and that the wider bandwidth is necessary to AM stereo's development and competitiveness to FM stereo, which also uses a 15 kHz bandwidth. Bonneville calls for removal of narrow-band receivers, instead.

I've been listening to the band on a neat little wideband AM stereo receiver, Sony's discontinued SRF A-100. Frankly, I'm a little disappointed, but not surprised in the wide range of quality available. Some AM stereo stations just don't sound much better in stereo than in mono, and two locals, KALI-1430 and KWNK-670, sound better than most stations broadcasting either in FM or AM. And they're still both mono!

KDAY-1580 sounds terrific, but its rap and urban contemporary music splatters from 1560 to 1600. At night, KBOI-670 and KOMA-1520 are the most pleasing to my ears in stereo, and although both are using the C-QUAM system, according to my latest lists, neither exhibits "platform" motion, or the swaying of the sound from one channel to the other common to C-QUAM but not exhibited by the other stereo system, Kahn.

KDAY-1580, which I receive mostly by skywave here at the west end of the San Fernando Valley, wanders back and forth atop KNIX-1580, which is a Kahn station, for a most unique listening experience. Not all C-QUAM stations seem to wander, but if you do hear platform motion in a stereo station, you're sure to have a C-QUAM broadcaster. Don't assume that a steady signal is a Kahn station, however.

To my knowledge, two countries (Australia and Brazil) have already adopted C-QUAM as their national AM stereo standard, and the Canadian Association of Broadcasters has recommended Canada do the same. But in the U.S., the Commerce Department is favoring the encouragement of manufacturers to market multi-system receivers, and the National Telecommunications and Information Administration is calling for the marketplace to produce a multi-system decoder chip, and for government and industry to recognize that AM should be allowed to develop into a medium similar to FM, with less interference and better sound and signal quality.

I once had questioned the FCC's wisdom in not choosing an AM stereo standard in the beginning, but this course to me now seems more sensible, with the public the big winner if high-fidelity sound and wideband receivers become available.

Of course, the FCC's recent freeze on daytime-only applications for AM stations means that the nighttime bands could become even more crowded. But the movement towards better sound fidelity and talk shows would be more significant for the DX'er who takes advantage of the numerous pauses in conversation to DX under a local station's signal!

The pre-eminence of talk stations on the AM band has already enabled DX'ers to DX on adjacent channels to their locals, as most speech sounds do not tend to splatter across the audio bandwidth. More religious interests have been purchasing stations, and although some program Christian or gospel music, many just sell time, or "broker" allotments for instant profit. And believe me, a non-professional announcer will provide his listening audience of DX'ers with many dead-air opportunities, as well as shows which run over or under the normal hourly break time conventionally used by other stations to give legal ID's.

Oddly enough, CBS and Westinghouse o&o's, many of which are news/talk stations, have been converted to stereo in the interests of better sound quality. Locally, all-news KNX-1070 has been broadcasting in C-QUAM for over a year, but I honestly cannot say that the sound is markedly better than before, as KNX's sound quality has always been quite good, as have KABC-790 and KFWB-980, both news and talk. Other stations around the country have reported calls from delighted listeners after converting to stereo, with KDKA-1020 averaging a call an hour for the first few days after the conversion to stereo.

Station Letters Deregulated?

An amusing proposal from the FCC has been to eliminate limiting stations west of the Mississippi River to K- call designations, and those east of the Big Muddy with W- calls, as it has done since 1932. Befuddled industry officials tend to see this move as a last gasp effort of outgoing FCC chairman Mark Fowler to further deregulate the FCC, but I say, "So what?"

And while you're at it, Mr. Fowler, let H. Dickson Norman have his NDXE call for his shortwave operation, bring back three-letter calls, and why not allow five-letter calls, as Mexico does now? This way, local KIQQ-100.3 could convert its non-ID "K-Lite 100" to KLITE. Better yet, let's throw in the hyphen; after all, six letter calls are allowed by TV stations: WCBS-TV is a legal, six-letter call plus hyphen.

Please turn to page 37

OUTER LIMITS

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The "Walking Man": Although the technique is not used widely now as in the past, it once was common for some numbers stations to come on the air with only a carrier and then a sound similar to a man walking. Now Pennsylvania's John Demmitt has solved the mystery as to what the "walking man" is and why.

According to Demmitt, the purpose of the sound is to enable the listener to zero in on the precise or best frequency. The sound is produced inside the transmitter itself and also is useful for conducting tests of the transmitter. Demmitt believes that it is a beat frequency oscillator in the transmitter that actually makes the sound. And there you have one more piece to the mysterious puzzle of the numbers.

Speaking of numbers, the new book, *Uno, Dos, Cuatro*, by the legendary Havana Moon, will be enjoyable reading for anyone intrigued by the numbers stations. It is available for $13.95 from Miller Publishing, 3 Lisa Drive, Thorndale, PA 19372.

Strange Happenings on the Medium Waves: Those of us in Florida have monitored an unexplained heterodyne which first turned up in late February. Heard only during darkness, it originally appeared on 1230 kHz. This writer could hear it quite distinctly behind WONN Lakeland.

A reliable source indicates that another station suffered so much interference that some of its local listeners complained it was almost inaudible. When the station in turn complained to the FCC, it was advised that the FCC was not concerned about the matter and did not intend to do anything about it.

Early in March the heterodyne was no longer audible on 1230. However, it is now being monitored nightly on 1340 kHz! Interestingly enough, both frequencies are so-called "graveyard" medium wave channels with hundreds of local, low-power stations.

The WIBS-FM Bust: Bob Arenella sends an item from the New York *Daily News*. In February, for the second time, the FCC shut down WIBS-FM, located in Brooklyn and operating on 107.9 MHz. The station specialized in providing music and news from Haiti, Trinidad, Guyana, and other Caribbean countries for immigrants to the New York metropolitan area. Unfortunately, it was also causing interference for WEBE-FM, a licensed broadcaster in Westport, Connecticut. About twenty volunteers were involved in the WIBS operation.

Last month we reported the closing of KSOS in Fresno, California, which primarily served the black community. Both WIBS and KSOS were pirates. Both rendered real community service. Neither would have any chance of raising the large amount of capital needed to put a licensed station on the air. Are we to believe that the airwaves should belong only to the rich and powerful?

On a happier note, it is time to hear from our pirate expert, Scott McClellan.

The McClellan Report: Mace Twigg checks in with his latest discoveries. He nabbed his first medium

wave pirate, KOLD, on 1630 kHz between 0642 and 0707 UTC. There was heavy beacon interference, but he heard several IDs and lots of music from the 1950s and 60s.

Mace also logged Radio North Coast International on 7447 kHz from 2345 to 2351 UTC. They played "Oh, Canada" and then gave an announcement of their new mailing address. They indicated that they had some problems with their previous address, so if you wrote to RNCI and did not receive a reply, you might want to try again via their new address: P.O. Box 5074, Hilo, Hawaii 96720.

KNBS has been heard again after quite an absence, on 7445 kHz between 2303 and 2325 UTC. They played various rock music, gave some phoney public service announcements, and some information on the neutron bomb. Phil Muzik gave their address as via P.O. Box 982, Battle Creek, MI 49016.

Herman T. Adams reports hearing a numbers broadcast, given in Spanish by a female, on 5242 between 0403 and 0410 UTC. After it signed off, he found the same three numbers, then a count through ten, on 5080 kHz until 0412 UTC. Herman says he would like to correspond with other *MT* readers with a similar interest in numbers stations. His address is 343 8th Street NE G2, Atlanta, Georgia 30309. Please enclose a SASE.

That's it for this time around. If you hear a broadcast from a pirate station, please share your catch with your fellow *MT* readers! I am also considering having a regular question and answer session, so if you have any questions, please send them along. Thanks! See you again next month.

Other News: Florida's David Crawford informs us that the European offshore commercial medium wave pirate Laser is active again. This time it is apparently using the frequency of 576 kHz, as fellow pirate Radio Caroline took over its former frequency of 558. Are any of our European readers hearing Laser? On very rare occasions, Radio Caroline has been audible in North America on 963 kHz.

A source with impeccable credentials and excellent contacts in the Middle East informs us that none of the anti-Khomeni broadcasters have the power to seriously threaten the Iranian government. They can be an irritation but little more.

If you want to tune in one of these broadcasters, probably the easiest one to hear is Voice of the Crusader. Try for the station sign on around 0300 to 0315 UTC. The frequency is normally about 4420 kHz but is sometimes higher or lower.

You may also have to put up with the notorious Iranian bubble jammers, but sometimes the signal is reasonably good. All programs are in the Farsi language. Now, if you want a tougher challenge, try for clandestine Radio Iran Toilers on 10870 kHz with sign on at 1530 UTC. That one will not be easy.

Finally, since we are on the subject of the Middle East, there is one local organization with clandestine broadcasts in that part of the world which gets support from both Israel and a powerful Arab Muslim group. Unfortunately, we have been asked not to disclose its name, but, as the old cliche goes, sometimes truth is stranger than fiction.■

Dr. John Santosuosso will be on vacation in June. Scott McClellan will be filling in for him.

UTILITY INTRIGUE

Don Schimmel

516 Kingsley Road SW
Vienna, VA 22180

Tactical Callsigns

To lead off the column this month here is a list of tactical callsigns furnished by a reader in Michigan who wishes to remain anonymous.

Bobcat	T-43 Navigation Trainers, ANG, Colorado Springs, CO
Big Daddy	815 WRS CP, Keesler AFB a.k.a. "Teal Ops"
Dragnet	Controller on AWACS aircraft on operational mission
Dusty	C-141 aircraft, McGuire AFB
Fury	C-130 ANG, Bradley, CT
Gator	T-43 Nav Trainers, 454th TFS, Mather AFB
Glass Eye	USAF A/C on NUDET visual observation mission
Headdancer	TAC EC-135 Tactical Deployment ABNCP
HiFi	45th AD KC-135
Hunt	KC-135 A/C McGuire AFB
Idaho	FBI Aircraft
Mop Up	USN C-130 A/C, Whiting Field, CA
Music	USMC C-130 A/C
Nalo	USMC C-9 Transport
Nighthawk	USMC HMX-1 VIP helo
Omaha	U.S. Customs A/C (E-2C?)
Pacom 01	A/C with CINCPAC aboard
Parrot	USN T-39 Radar intercept trainer
Peapod	USAF AC-130
Rat	USNR transport A/C
Rod	A-10 Thunderbolt, Westover AFB
Samp	USAF A/C on Air Sampling Mission
Shark	USCG/DEA Aircraft
Swing	USN C-9 Aircraft

ID'd by Mistake

Greg Wilson, New Jersey, described a recent identification he was able to make as follows:

"As a utility buff, you know that one of life's greatest pleasures is to be able to identify an activity through witnessing some form of compromise on the part of an operator. I want to share with you just such a case for it illustrates how a mistake can work to the listener's advantage.

"On 8 Feb 1987 at 0350 UTC, I rolled upon an extremely chirpy station calling CQ on 6860.5 kHz. After a long string of CQ's he ID'd as FRL. He continued his calling until 0359 when the operator began a period of nonsense--I'm sure out of boredom. Finally, he began very methodically calling CQ DX and signed CO2JS (a Cuban Amateur allocation). A classic mistake for now I knew with little doubt that FRL was probably a Cuban station.

"For the next five minutes,the operator carried on what appeared to be an imaginary ham QSO during which he identified himself as Fernando with a QTH in Havana, Cuba!! (Note that 6860 is some 140 kHz below the 40 meter ham band--too far to be considered a mistaken out of band operation.) At 0405 he stopped and sent WSL WSL WSL DE FRL FRL QSV V's.

"I hope this will help shed some light for those who may have copied FRL in the past, as I have."

Thanks so much, Greg, for your very interesting report. Several months ago I experienced a similar happening when a station, again apparently due to boredom, carried on a one-sided contact. He seemed to be sending equipment control names such as *RF gain, AF gain, standby, tuning*, etc. He then went into 5L groups and after several lines of these switched to sending 5F groups and then just plain nonsensical key play.

OK Net

MT reader Williams, South Carolina, forwarded some comments on two activities he has been following. On 6565 kHz he heard conversations with mixed English/Spanish with lots of X-rated four-letter words as well as some 4F groups. He noted all communications ended with the word "OK" and thus has named the net the OK Net. In the past he says he has found it on several frequencies between 5 and 7 MHz.

His next logging was of a DEA net on 11288 kHz at 1400. He heard Hotel One, Swordfish 09/104 and 109, Foxtrot Four Mike, Omaha 19 and 59, Slingshot, Ambush, Shrimpboat, Bobcat, Ulysses (USCG Sta), Cougar (Eglin AFB), Almighty and Domino. All tracking boats and aircraft in the Gulf of Mexico all day.

On the Numbers

After reading about the "numbers" stations for several years, Jack Smith, VA, advises he finally intercepted one. Here are the details:

"15 Feb 1987 at 1100-1145Z. 14421/11532 kHz. From 1100-1110Z callup signal with SS/YL repeating count 1-0 alternated with "833." At 1110Z several (4-5) one-second audio tones of about 600 Hz with the YL stating "Grupo 211" followed by text of 4F groups. At about 1128Z the numbers were repeated and at 1145Z the transmission closed with a "fin" sign off.

"I found several things interesting about the transmission. At 1100Z the 14 MHz band was totally dead (6 AM EST) and no "skip" stations could be heard above about 12 MHz, and indeed even at 12 MHz, signals were generally very weak. The 14421 MHz signal stayed at S-8 on my receiver (Drake R-7) for the entire transmission, with no fades whatsoever.

"Clearly this was not sky wave reception and my location must be within 20 to 30 miles of the transmitter. This correlates very nicely with a Culpepper/Remington, Virginia transmitter site (first reported in *MT*).

"As an aside, I found the choice of a 14 MHz frequency at that hour to be a bit strange. The 14 MHz band has been opening up to the Caribbean and Central America at about 1130-1200Z. In fact, a few minutes after the 1145Z sign off of the numbers station, the 14901 kHz Cuban/Tass press RTTY station was printable, although it did not reach normal strength until about 1230 or 1300Z.

"Given these propagation facts of life, the 14421 kHz signal couldn't have been heard other than in the Washington, DC, area. (I assume that if the government is running Spanish-speaking agents in Washington, that there are easier methods of communication!)

"The 11532 kHz signal was somewhat weaker than the 14421 signal, although I suspect at least part of the difference is the antenna I was using is resonate on ham bands and suffers some degradation as you go outside those bands.

"The transmission mode was AM, but only the upper side band was transmitted. This is the likely result of using a transmitter chiefly used for SSB/FSK/MUX for circuit. Also, the signal carried a very distinct RTTY tone in the background.

"I have recently read in either *MT* or *PopCom* speculation that the RTTY tone was the result of cross-mod with other transmitters at the site. That is certainly possible.

"It is also possible that there is some audio cross-talk in the telephone or microwave circuits that feed the transmitter plant and that the RTTY represents signals that are either received or transmitted by the plant. In any case, the RTTY was a very noticeable component of the transmission.

"I concur with Robert Dyquetta's conclusion in the February *MT* that the audio is computer controlled and voice synthesized; no person could read 211 series of four-digit groups (twice, yet) without making an error or with exactly the same cadence and pronunciation! (The pace was exactly one group every five seconds--about 2.5 seconds to read the group and 2.5 seconds pause, presumably for the recipient to write down the message.) Further, the synthesizer seemed to have a slight problem with the number '3' or 'tres.' The final syllable was prematurely terminated throughout the transmission, both in the call-up and in the groups transmitted."

Jack, we thank you for sharing your observations with *MT* readers.

Special Interest Items

3073.4 FEB 170135Z CW

The callsigns on this net have been seen on other frequencies previously indicated in the column. ABA appears to be the Control Station with other members of the net being: CAB, DAR, ELE, FOG, GAL, HUM, IDE, plus one other call I couldn't get due to QRM/QRN. The traffic consisted of five different messages, each one being exactly 30 groups in length.

The characters noted were the letters A-Z plus the Spanish Nyeh (MW) and the digits 2, 3, and 8. A typical heading would be preceded by the abbreviation PBL (possible 'preambulo' - preamble) followed by the message number and group count as in this example: PBL PBL NR 002 GR 30 AAA.

Upon completion of the transmission of the text, Control would call the stations, generally in alphabetic order, and request the QSL.

FEBRUARY 1987 LOGGINGS

KHZ	DTOI	MODE/IDENTIFICATION/COMMENTS
245	280453	MCW/YZE Beacon, Gore Bay (Manitoulin) Ontario, Canada
353	200332	MCW/QG Beacon, Windsor, Ontario, Canada
362	200334	MCW/SB Beacon, Sudbury, Ontario, Canada
391	200339	MCW/DDP Beacon, San Juan (Dorado), PR
394	200341	MCW/YB Beacon, North Bay, Ontario, Canada
404	200343	MCW/YSL Beacon, St. Leonard,NB, Canada
404	200352	MCW/YXL Beacon, Sous Lookout, Ontario, Canada
417	200354	MCW/HHG Beacon, Huntington, IN
3026.5	270112	CW/DE MLD2 (British alloc) NR2 -P-270100Z FEB 87 -ZEU BT UNCLAS GR18 DRILL (text of 5L groups)
3422	260022	CW/ADO DE DEL (unid) QSA5 QTR 1920 K. Other end replied with EE.
3485	170138	USB/New York Radio giving Aviation WX for various Canadian & U.S. locations
4665	280059	CW/WAP DE MZK,AUH DE WAP, LKI DE MZK/ (all unid)/ QSA requests
6243	281427	CW/Unid stn calls KMG, MJK, MDA & ZDK
6244.3	181300	CW/ABA DE DEL (unid) QSA IMI K
6519.8	201453	USB/Barge traffic. Control telling unid stn to drop various barges at Baton Rouge and other locations.
6586	280014	USB/unid aricraft calls Accra, Ghana ATC for course and altitude clearance. Also heard ACCRA DE ABIDJAN
6675	120015	AM/Czech-YL with 5F groups
6940	212309	USB/To OM-SS/sounds like fishing ops
6976.8	201506	CW/WX in Spanish for various Mexican locations
13178.2	181410	USB/Two OM conversing in Italian
13370.6	201524	RTTY 75-425/NBA (US Navy, Balboa, Panama) testing with RY tape.
13572	181725	CW/VVV DE CTP (Oeiras Naval Radio, Portugal) QSX 4 8 12 16 MHz/ His signal very weak and chirpy for past few days.
13743.7	201757	RTTY 75-170/MARS traffic
14445	181717	CW/VVV DE LFU/6467 LFN/8527.5 LCJ/9980 LHG/14445 (Rogaland, Norway)
14503.4	181713	LSB/Two OM in conversation in Spanish
14556	181242	CW/Automatic sent/5L grps with spec charac IM AA OE OT.

Later during the schedule I heard station JAR calling and this may have been the callsign I missed copying earlier.

Several of the net stations have signals that sound like a raspy peanut whistle. Possibly a rig powered by batteries??

3088.2 FEB 180015Z CW

I cut in on this message of 5L groups. The BT was sent followed by OWWS AR. Shortly afterwards the station sent GUG8 GUG8 etc. The call was set approximately ever five seconds.

3228.8 FEB 180010Z CW

A 5L group message was in progress. After the last group, AFBNA, there was a pause and then BT JGC8, another pause and then SXGZ SXGZ SXGZ DE JGC8 JGC8 QTC 750 18 0108 BT 993 SXGL BT and into 5L groups. The characters were sent at medium speed and auto sent.

3262 FEB 18008Z CW

Auto sent at slow speed, 5L groups. Must have been a long message because I stayed with it for several minutes but the message had not been completed. Not same message as on 3290.

3290 FEB 180006Z CW

Another auto sent at slow speed, 5L groups. Pause after ten groups then into next ten groups. Not the same message as on 3262.

6212.6 FEB 162212Z CW

This traffic was 5F groups, automatic sent, zero cut as letter T.

6911 FEB 212310Z CW

Message of 5L groups with message repeated every few minutes. Missed heading because I was checking back and forth on other targets. There was a pause after every ten groups of text. Message ended with BT AR.

8002 FEB 271536Z CW

The letter W repeated over and over, hand sent. After many minutes of this a callup of OT7F OT7F OT7F DE YAAX YAAX K. After a short pause he went back to the W W W W etc. At 1556Z he sent DE YAAX OK SK SK. The other end was never heard. This frequency has been identified as being a Soviet military frequency.

13971.9 FEB 181420Z CW

Speed key sent 5F groups. All figures sent full except zero which was cut as the letter T. Very good fist, weak signal, some fading. This was a very long message.

14616.4 FEB 231707Z RTTY 50-425

The callsigns were copied several times and printed out as U7A54 and U7A59. It is suspected these were garbled and should have been Y7A54/Y7A59 which are assigned to Berlin, GDR. The traffic was 5L groups and the headings contained many trigraphic addressee indicators such as: AAB ALG DAM DAR KAI MEX PEK PHO TRI ISL JAK KAB MAD MAN NIK TIR and WAS.

The heading was brief containing some addressee indicators, a message number and the date and time. This latter was given as 23021752 where 23 was the day, 02 the month and 1752 being the time. A 5L group appeared on the next line by itself and the text commenced on the next line. ■

Scanning from New Hampshire

Contributed by "Bill"

DATE	TIME	FREQ	MODE	TRAFFIC
12/12	1615Z	6693	USB	Halifax mil in comms w/6OUR re TWA flt 741 (747 acrft) enrt Goose Bay w/fire in cargo bay. 6OUR advises change to callsign Rescue 01 by Halifax
12/12	2145	5696	USB	CG Helo 1485 in comms w/COMSTA San Francisco
12/20	2000	5696	USB	CG Helo & CGC Sanibel in comms w/NY Rescue re vessel in distress
12/20	0024	8822	USB	Voyager 1 in comms w/Mission Cntrl re Mr. Reagan catching hell about Iran thing want him at Edwards on Tues when you land to help him out
12/22	1510	4428.7	USB	COMSTA Portsmth in comms w/CGC Sanibel w/msg welcoming 1st Dist Rear Adm Johanson Sands to new Port of Rockland (ME)
12/23	1353	11176	USB	MAS70014 Merry Christmas comms w/MacDill AFB
12/31	2155	5696	USB	Fr. of Trc. Norfolk Rescue Disp. C-130 #1503 to search/attempt to find origin of trfc
1/1	0015	2182	USB	CGC Point Highland w/grp Port Macon on SAR; freq switch to 2675 kHz
1/2	1940	6757	USB	Air Force 1 to Andy for signal check
1/2	2258	5697	USB	Uniform 4 Sierra req signal check 3 times/no resp
1/3	0127	4428.7	USB	COMSTA Portsmth in comms w/VSL re medical emerg on board; medical treatment instructions relayed
1/3	0254	194	AM	Aircraft wx continuous for Maine
1/5	2318	2670	USB	CGC Spenser in comms w/grp Cape May
1/7	1742	5696	USB	CG 01 in phone patch w/Washington Air Sta. via COMSTA Portsmouth
1/12	1712	5696	USB	COMSTA Portsmouth & CGC Chilula in comms
1/13	2320	5696	USB	COMSTA Boston in comms w/CG helo 1472 re flare sightings near Metinicus Rock,ME. This helo also hrd on 164.55 VHF in comms w/Cape Cod Air Sta re same incident at this time.

Massachusetts Scanner Frequencies

Contributed by Mark Simari
Bridgewater, MA

There are so many frequencies in Massachusetts, I have chosen only the critical freqs of interest. Enjoy.

Mass. State Police

42.340	Andover area "A" troop Ch 2
42.400	Concord "C" troop Ch 1
42.420	Radar "55" team;also road blocks
42.440	Spare (used) also for road blocks
42.460	Car-car (E.Mass.) west of Worster used as base
42.500	Yarmouth area Cape Cod
42.540	Spare (used);also for road blocks
44.740	Boston SPD Hdqtrs heard everywhere; also SPD helicopter
156.090	SPD, Logan Airport, stn "L"
159.030	SPD, Mass Pike (rptr) stn "M"
158.970	SPD intercity; used in most cities and towns in E.Mass. when a major APB is called. Once this freq is turned on, about 45 towns hear the AOB at once (rptr) the APB at once (rptr)
39.760	Registry of motor vehicle police, main ch.
39.800	" , "Tac II"
462.972	Boston City Ambulance
39.580	Metro District Comm. Police main ch.
39.660	", "Tac II"

Boston Police Dept. (rptrs)

460.125	Capitol Police (Gov's police)
460.300	Tow, license check, info, NCIC, Leaps
460.400	West Roxbury
460.425	Dorchester area
460.450	N. Boston
460.475	Expressway area, N.Stn
460.500	S.Boston Hyde Park
453.800	Special events chan.

Boston Fire Dept. (rptr)

33.740	Old freq still used for fire calls
453.700	Administrative msgs
483.162	Main fire call at boxes, houses
483.262	Rptr, fire scene
483.662	Rptr, fire scene
483.762	Rptr, fire scene

Bapern Boston Area Police Enforcement Regional Network

These freqs go to repeaters that all towns and police cars monitor when car chases are from town to town.

470.487	North District
470.562	West District
470.462	East District
470.587	South District

Selected Cities and Towns

Billerica (repeater)

482.662	Main Chan.
482.637	Tac III
482.687	Tac II
33.660	Fire

Chelmsford (repeater)

482.512	Main Chan
482.637	Tac III
482.687	Tac II
33.660	Fire

Dracut (Repeater)

482.462	Main Chan
482.637	Tac III
482.687	Tac II
154.325	Fire

Lawrence (repeater)

482.562	Main Chan
482.637	Tac III
482.687	Tac II
154.315	Fire

Lowell (repeater)

482.412	Main chan.
482.637	Tac III
482.687	Tac II
154.010	Lowell Fire
33.660	Mutual Aid Fire
155.265	Lowell area medic ambulance (covers about 10 towns)

Methuen (repeater)

482.462	Main Chan
482.637	Tac III
482.687	Tac II
154.325	Fire

Nashua Police

460.100	Chan I
460.200	Chan II
154.325	Fire

Springfield Police (rptr)

460.100	
460.125	All chans
460.300	are changed
460.400	every week
460.425	
460.450	

Tewksbury (repeater)

482.662	Main Chan
482.637	Tac III
482.687	Tac II
33.660	Fire

Tyngsboro (repeater)

482.512	Main Chan
482.637	Tac III
482.687	Tac II
33.660	Fire

Wilmington (repeater

482.487	Main Chan
482.637	Tac III
482.687	Tac II
154.725	Fire

Woburn (repeater)

482.612	Main Chan
482.637	Tac III
482.687	Tac II
154.725	Fire

Worchester Police (rptr)

460.100	
460.150	
460.175	
460.200	
460.450	Fire Ch.II
460.500	Fire Ch.I

New Hampshire State PD

44.820	Car-car, Helicopter
44.940	Main Ch. Concord,NH
45.300	Exeter NH
156.090	S.NH SPD Ch for APB's,etc

Mass State Police Codes

Code

1 Emergency any type
Q1 Usedfor "special" files on known offenders riding highways or rest areas
2 Go to Hdqtrs (Boston) or barracks
3 Going to court
4 Busy at location
5 Received message
6 Where is your location?
7 Unit off air atlocation
8 Unit involved in accident
9 License check SS No;in Mass
10 Vehicle ID check still or moving
11 NCIC check U.S. wide
14 M&W (missing & wanted) in Mass
15 LEAPS check
16 Vehicle crash or accident

A=Cars troop Andover area
C=Cars troop Concord area
L=Cars troop Logan airport
M=Cars troop Mass Pike
X=Cars unmarked, spec invest
K=Cars K-9 dog unit
"55"=Team speed chasers ■

G. P. Mengell

2685 Ellenbrook Drive
Rancho Cordova, CA 95670

G.O.E.S.

(Geostationary Operational Environmental Satellite)

Nine of these orbiting space meteorological platforms, launched by NASA under the auspices of NOAA, represent the finest example of advanced weather predicting space platforms.

There is some ambiguity over these systems--often they are ruled by separate agencies and their pre-launch names are often changed once they are in orbit. Not all of them are fulfilling their original mission because of policy changes, equipment failure or even direct interference by a non-subscriber.

The early GOES prototypes were called Synchronous Meteorological Satellites (SMS), the first being launched in May 1974. After some initial problem with its UHF downlink, it has performed satisfactorily to date. Listed below are the nine GOES satellites and their launch dates:

SMS 1	May 5, 1974
SMS 2	Feb 6, 1975
GOES I	Oct 16, 1975
GOES II	Jun 16, 1977
GOES III	Jun 16, 1978
GOES IV	Sep 9, 1980
GOES V	May 22, 1981
GOES VI	Aug 1983
GOES VII	Feb 24, 1987

Unfortunately, not all these satellites are in working order; presently, the three units are pre-positioned at 135° and 75° West. After initial failure as an imager, GOES II became GOES Central at 107° W. Its primary function is to relay non-direct images and wefax (meteorological data) to ground station operators.

All GOES satellites orbit at approximately 22,930 miles from earth and are positioned as to be directly over the equator. Their orbit speed at that distance was designed so the satellite will always appear to hover at its fixed position above the equator due to its synchronous relation to the speed of the earth's rotation.

The advantage of GOES over the polar orbiters like Tiros-N is the sweeping panorama of the entire globe. Storms can be tracked with greater accuracy and increased lead time can be given to public officials to either brace for storms or evacuate populations to areas of safety. The classic comparison is of the great Galveston, Texas, hurricane of the last century which claimed 5,000 lives and Hurricane Alicia of 1983, whose death toll was under 100 due largely to early hurricane warnings made possible by the GOES weather satellite system.

Storm warning, although critical, is not the GOES system's only function; it provides daily data on the state of the atmosphere and its water vapor content, oceanographic data and weather facsimile.

GOES Imagery

The heart of the weather system

For the past decade we have become accustomed to the familiar weather maps seen daily on TV weather reports. One might see "color satellite three" or "eye in the sky." But under all of this razzle-dazzle is the GOES satellite, continuously generating black and white images and sending them back to earth where they are picked up by subscriber television services.

Cloud and temperature imagery in both the visible and infrared modes is accomplished by a "Visible Infrared Spin Scan Radiometer Atmospheric Sounder" (VAS). Data collected by an optical (reflecting) telescope is downlinked to Earth where it is processed and then retransmitted back to GOES for users to receive on 1690.1 MHz.

VAS day and night cloud and earth mapping imagery has a resolution of about half a nautical mile in the visible mode and 3.7 nautical miles in the infrared mode; additionally, VAS also monitors the earth's atmospheric carbon monoxide absorption bands, providing a method to determine a three dimensional structure of atmospheric temperature and water vapor distribution.

The VAS can be programmed for a limited coverage mode; selected latitudinal bands of varying North-South dimensions can be imaged to calculate a vertical profile of atmospheric temperature and water vapor.

Special Assignments

Occasionally the GOES system will be called on for additional imagery, usually requested by the National Weather Service office in Kansas City, Missouri. This station's main responsibility is the forecast of severe weather warnings and it has the authority to activate GOES E in the RISOP (Rapid Interval Scan) mode. In this mode, the VISSAR-VAS is commanded to scan the target area for severe weather every 15 minutes and transmit the results back to Wallops Island, Virginia.

RRSD (Research Rapid Scan Days) are activated by subscribers in the research community and allows, for example, researchers to use stereographic techniques for viewing imagery. This is done by combining the VISSR (VAS) on GOES West with that of GOES East. This results in additional imagery for GOES East users at 15 and 45 minutes past the hour and for GOES West subscribers between on the hour and the half hour.

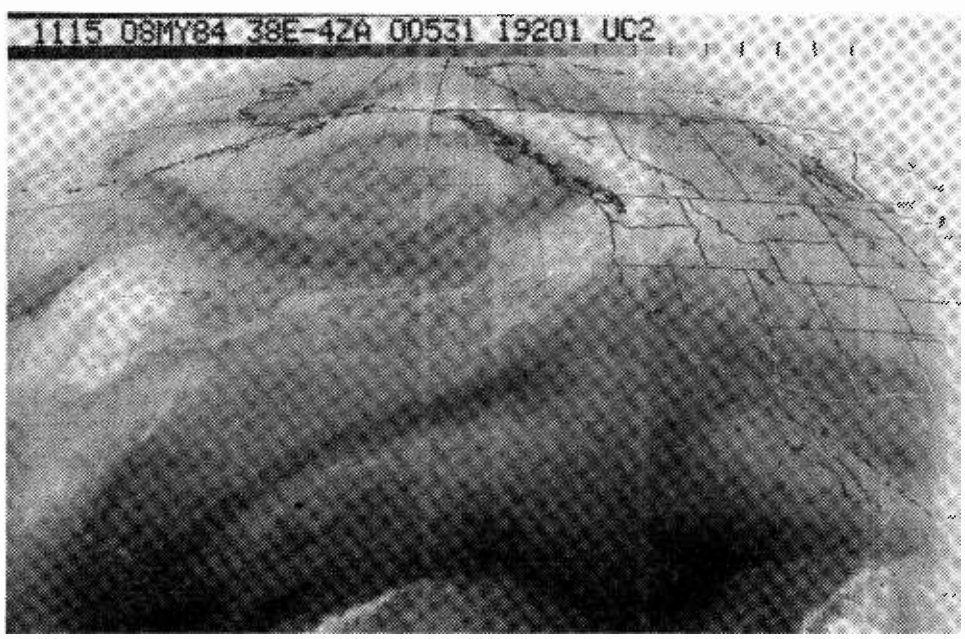
Another program supported by the GOES system is the hurricane research support (HRS), usually implemented about mid-June through the end of October and rewritten at the end of each hurricane season. There is no limit to the amount of HRS during this season. The HRS is usually broken down into three separate modes of operation:

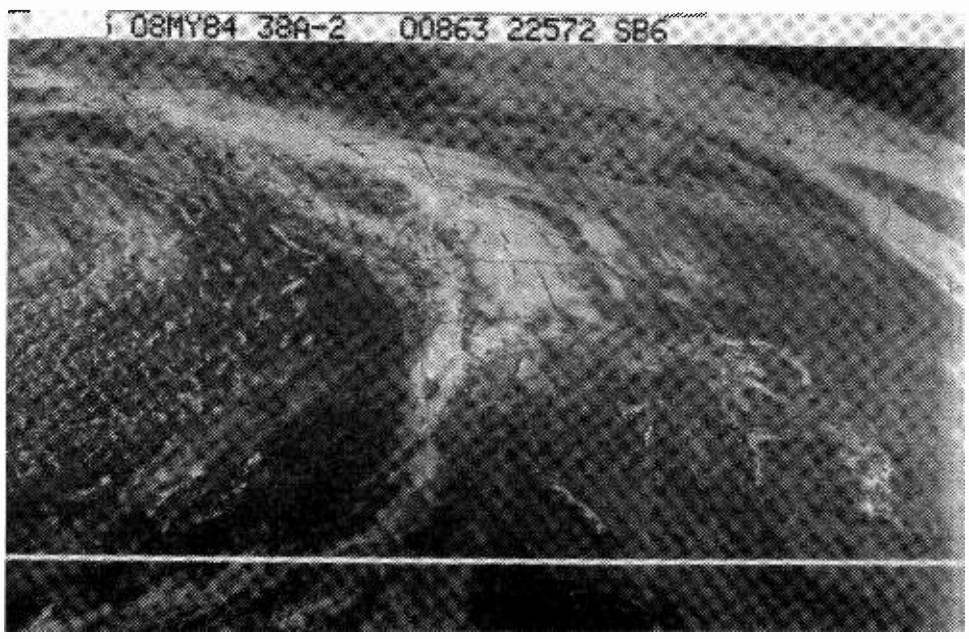
The Hurricane Research Day (HRD) consists of a partial earth disc scan of approximately 1200 lines every 15 minutes for three one-hour periods a day, generating a series of five pictures. A 1200 line scan terminates the imagery at about 15° South.

HRD (10) is a partial earth scan of 800 lines every ten minutes for three one-hour periods a day, generating a series of six pictures. This program may be implemented for any storm west of 50° West longitude. An 800 line scan terminates the imagery at about 12° North latitude.

HRD (7-1/2) consists of partial earth scans of 1200 lines every 15 minutes with three additional series of six images of 600 scan lines. The interval between 600 lines imagery is roughly 7-1/2 minutes. The line scan terminates roughly 25° North latitude. This mode is restricted to tropical storms which threaten the United States and this particular plan is limited to ten days a season.

NEXT MONTH: GOES WEFAX--getting the signal down to earth ■



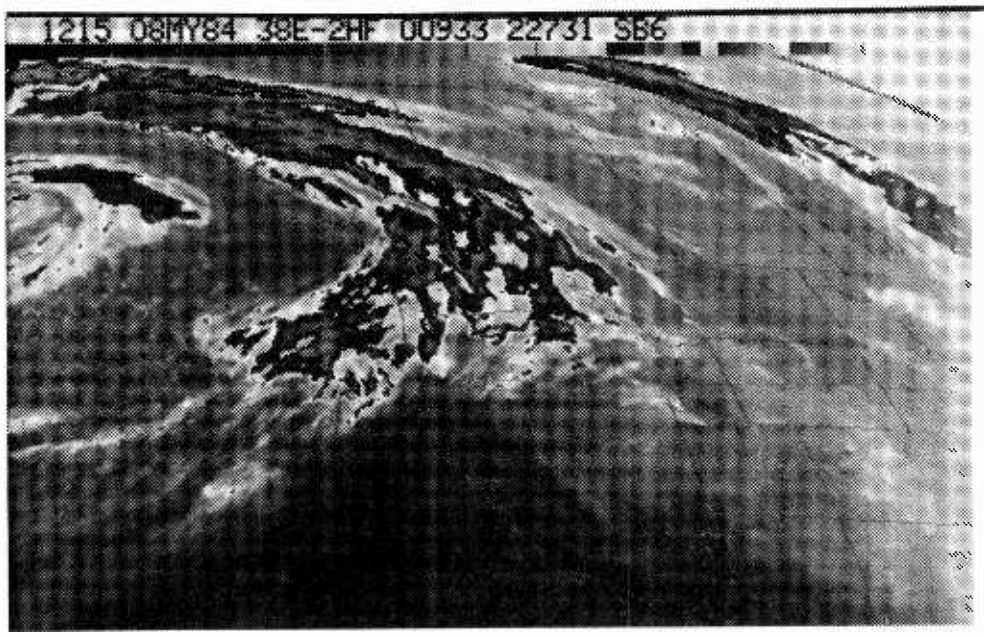


READING RTTY

Contributed by Patrick Sullivan, CA

Report: Dec Loggings

Freq	Mode	Shift	GMT	Call	Service	City	Country	Remarks
2692.0	RTTY	75/85R	0616	DHJ 51	GRENGLE METEO	KOLN	FRG	WX
5765.5	FAX	120/576	0727	JBK 3	METEO	TOYKO	JAPAN	DATA CHARTS
5768.8	FAX	120/576	0730	JBK 3	KEMIGAWA	TOYKO	JAPAN	JAPANESE TEXT
6328.1	FAX	120/576	0800	CFH	CANADIAN FORCES	HALIFAX	N.S.	OCEAN FEATURE ANALYS
6330.4	RTTY	75/850	0757	CFH	CF HALIFAX	HALIFAX	NS	WX
6498.9	ARQ	100/170	0522	WLO	MOBILE RADIO	MOBILE AL	USA	TELEGRAMS
6500.5	ARQ	100/170	0649	KPH 1	SHIP TFC	SAN FRANCISCO	USA	MSG TO STAR DENVER
6504.6	ARQ	100/170	0100	WCC	CHATHAM RADIO	CHATHAM MA	USA	WX
6944.0	FAX	120/576	2000	CKN	CF VANCOUVER	VANCOUVER	B.C.	SEA SURFACE TEMP
6946.0	CW	-	1936	CKN	CF VANCOUVER	VANCOUVER	BC	NEWS
6979.8	RTTY	50/850	0228	CCS	CN SANTIAGO	SANTIAGO	CHILE	RY/5 LTR GRPS
8077.8	FAX	120/576	2200	SMA 8	NORRKOEPING MET	NORRKOEPING	SWEDEN	SURFACE MAPS
8617.1	FAX	60/576	0801	JJC	KYODO NEWS	TOKYO	JAPAN	JAPANESE TEXT
8712.0	ARQ	100/170	0600	WLO	PRESS	MOBILE	USA	FINANCIAL NEWS
9395.8	FAX	120/576	0143	NPM	USN METEO	PEARL HARBOUR	USA	PACIFIC WX MAP
9438.0	FAX	120/576	0939	JMJ 3	TOKYO METEO	TOYKO	JAPAN	WX MAPS
9438.0	FAX	120/576	0823	JMJ 3	TOKYO METEO	TOKYO	JAPAN	WX MAPS
10805.3	RTTY	50/850	0130	NA	PRESS	BUENOS AIRES	ARG	-
10879.8	RTTY	75/170	0815	-	VOA FEEDER	GREENVILLE N.C.	USA	NEWS
11070.0	RTTY	75/170	0500	LOR	AN	PUERTO BELGRANO	ARG	RY/CODED TFC
13097.8	ARQ	100/170	2325	WLO	MOBILE RADIO	MOBILE	USA	SPORTS
13540.1	RTTY	50/850R	0012	-	NEWS	-	-	SPANNISH TXT
13540.2	RTTY	50/850	0018	LOR	AN	PUERTO BELGRANO	ARG	RY TEST
13579.9	RTTY	50/170/R	2122	HMS 32	KCNA	PYONGYANG	KOREA	RY TEST
13751.2	FAX	288/576	0000	-	REUTERS	-	-	PRESS PHOTOS
17021.6	CW	-	1621	WLO	MOBILE RADIO	MOBILE AL.	USA	TELEGRAMS
17397.7	RTTY	50/425	2226	BBE 52	PTT	SHANGHAI	CHINA	RY TEST WITH CLN565
17450.3	RTTY	50/425	2234	CLN 565	PTT	HAVANA	CUBA	RY TEST WITH BBE 52
18130.1	FAX	120/576	0145	JMJ 5	TOKYO METEO	TOKYO	JAPAN	WX MAPS
18200.6	RTTY	50/425	2215	-	PRENSA	HAVANA	CUBA	-
18433.0	FAX	60/288	2100	-	REUTERS	BUENOS AIRES	BRAZIL	PRESS PHOTO
19215.2	TDM2	192/850	1900	LOR	AN	PUERTO BELGRANO	ARG	METEO
19448.1	RTTY	50/425/R	2015	.	CUBAN PRESS	.	.	.
21036.7	FAX	120/576	2130	NPM	USN METEO	PEARL HARBOUR	USA	PACIFIC WX MAP



Pictured: Three examples of GOES imagery in the NW Quadrant mode, all taken on the same day. They show (left to right):

1. The Eastern Pacific basin: a band of significant weather approaches the British Columbia Pacific Northwest coast.
2. The water vapor imagery for the same area indicates the potential for serious precipitation.
3. An infrared image shows "splotchy" areas of heavy weather. Thus, by infrared enhancement, we can separate precipitation from more violent weather.

A typical example of the I.R. gray scale may be as follows:

White	-70° to -75°C
Black	-64°C to -69°C
Light gray	-54°C
Dark gray	-30°C to 41°C
Off-white	2°C to -29°C

MAKING WAVES
cont'd from p. 33

I'm not being facetious. Catchy call letters, better sound fidelity, AM stereo, and technical innovations such as receivers which tune continuously from AM to FM may all be necessary techniques (added, I hope, to innovative, narrowcast programming *to* listeners) in an all-out effort to woo listeners back to the traditional AM band. I don't like to improve my DX records at the expense of bankrupt stations which go off the air and leave local channels open to DX, but if more effort is not forthcoming, the AM band may indeed become a wasteland of utilities and time-brokered outlets.

Recycling Your WRTH:

Several years ago, I "adopted" Argentina's Asociacion DX del Litoral after finding out that galloping inflation in that country prevented many hobbyists from purchasing decent DX rigs, let alone extras such as the *WRTH*. For several years I've been sending them my surplus bulletins and *WRTH*'s I've found or had sent to me by other charitable DX'ers.

ADXL's Emilio Pedro Povrzenic recently wrote me and requested that I not send bulletins, as he had to pay customs duty on them; I'm still planning to continue sending *WRTH*'s, as he and other ADXL members have distributed them as far afield as Peru during DXpeditions.

I would suggest that readers check the current *WRTH* for the addresses of third-world DX clubs and forward their unused *WRTH*'s, *RDI*'s, and other reference material, rather than trying to flog them at flea markets. You have little to lose, except the cost of postage, and you'll probably receive some nice letters as I have. You might also consider joining the club to receive their bulletin, and the best way to avoid high money conversion rates is to offer the club a subscription to a U.S. club in return for a sub from the foreign club. It's a great way to practice your foreign language proficiency, and you'll gain insights into how DX'ers feel about world affairs.

I appreciate your letters to me, too. How about letting me know if one of your local stations provides unique programming to its audience? I do swap tapes; write for details. Until the next time, 73. ■

James R. Hay
141 St. John's Blvd.
Pointe Claire, P.Q.
Canada, H9S 4Z2

The Mississippi River

This month the Mississippi River is the subject of discussion. The mighty Mississippi is a busy river, and New Orleans is a busy port. The following stations are among the offerings of New Orleans to those interested in maritime radio.

156.500	WAB 974	Interocea
156.425	KBK 470	Tally Ho Club
156.275	KEB 551	Puerto Rico Marine M?
156.975	KEB 551	Puerto Rico Marine M?
156.450	KGA 332	Mid Gulf Shipping
156.350	KGA 526	Atlantic and Gulf Stevedoring
156.725	KGA 526	Atlantic and Gulf Stevedoring
156.950	KGW 406	Louisiana Materials
156.900	KID 465	Compass Marine Service
156.900	KIL 917	Equitable Shipyards
156.425	KJA 306	New Orleans Yacht Club
156.650	KJA 549	State of Louisiana
156.350	KKW 601	Harbor Towing
156.675	KKW 601	Harbor Towing
156.900	KKW 601	Harbor Towing
156.450	KLI 759	E.H. Bisso & Son
156.950	KLU 759	E.N. Bisso & Son
156.350	KPB 694	Racal Decca Marine
156.900	KQU 515	Marmac Corp.
156.250	KTD 465	Compass Marine Services
156.975	KTD 542	Radcliff Materials
156.900	KTD 572	Union Mechling Corp.
156.275	KTR 901	Federal Barge Lines
157.025	KTR 901	Federal Barge Lines
156.450	KVL 852	J.S. Sareussen Marine
156.725	KVL 858	Joseph C. Domino Inc.
156.900	KVL 858	Joseph C. Domino Inc.
157.025	KVL 858	Joseph C. Domino Inc.
156.675	KVR 408	Crescent Towing & Salvage
156.950	KVR 408	Crescent Towing & Salvage
156.450	KXR 958	Marine Chartering Co.
156.650	KYX 723	State of Louisiana
156.650	KYY 723	State of Louisiana
156.500	KZA 964	Dundee Communications
156.725	KZA 964	Dundee Communications
156.500	KZA 969	Cargo Ship Service
156.725	KZV 752	Compass Marine Service
156.900	KZV 752	Compass Marine Service
156.450	KZX 956	Waterfront Transport
156.900	KZX 956	Waterfront Transportation
156.450	WDT 552	Oceanic Marine Supply
156.650	WDT 574	State of Louisiana
156.900	WHD 543	Public Service Co.
156.350	WHD 600	Sunrise Shipping
156.450	WHD 749	Neptune Supplies Inc.
156.500	WHD 785	Electro Nav
156.275	WHD 817	Compass Dockside Inc.
156.950	WHD 817	Compass Dockside Inc.
156.975	WHD 839	Lomasney Boat Co. Inc.
156.175	WHG 616	New Orleans Ship Supply
156.450	WHG 871	Norwegian Seamans Church
156.475	WHG 974	Southern Yacht Club
156.350	WHH 204	Intermare Agency Services
156.450	WHH 316	Bisso Marine Inc.
156.725	WHH316	Bisso Marine Inc.
156.350	WHU 386	Canal Barge Company
156.925	WHY 459	Tocon Inc.
156.500	WHU 672	Great Lakes Dredge and Dock
156.500	WHY 709	Moran Shipping Agency
156.450	WIW	Indian Towing Co.
156.500	WQA 307	All Ships Supply
156.275	WQA 310	Point Landing Inc.
156.500	WQA 310	Point Landing Inc.
156.900	WQA 314	Fleur de Lis International
156.250	WQA 349	Adams Barge Crafts
157.025	WQA 349	Adams Barge Crafts
156.975	WQB 529	Energy Transport
156.175	WQZ 374	Compass Marine Services
156.950	WQZ 374	Compass Marine Services
156.450	WQZ 446	Delta Steamship Line
156.350	WRD 510	Golden Gulf Marine
156.900	WRS 016	Compass Dockside Inc.
156.725	WRS 916	Compass Dockside Inc.
156.725	WRV 417	Central Gulf Lines
156.450	WRV 617	Central Gulf Lines
156.950	WXZ 287	Oil Transport Co.
157.025	WXZ 516	Orgulf Transport

For those living further away but who would like to be able to hear something, New Orleans is alive and well and living also on MF and HF (shortwave). Here is a sampling of stations which you can try for -- all upper sideband mode.

kHz		
2096.5	WQA 314	Fleur de Lis International
4123.6	KVR 408	Crescent Towing & Salvage
4125.0	KEJ	Sea Land Services
	KIY	Bulk Shipping
	KTR 901	Federal Barge Lines
	KVR 408	Crescent Towing & Salvage
	WHD 785	Electro Nav
	WQA 314	Fleur de Lis International
	WWT	River Gulf Agencies
4143.6	KEO	Ocean Drilling & Exploration
	WDI	Exxon Communications
	WEK	Offshore Navigation
	WIW	Indian Towing
4419.1	KEO	Ocean Drilling & Exploration
6218.6	WDE	Exxon Communications
	WEK	Offshore Navigation
6221.6	KEO	Ocean Drilling & Exploration
	WDI	Exxon Communications
	WIW	Indian Towing
6521.9	KEO	Ocean Drilling & Exporation
	WHU 672	Great Lakes Dredge & Dock
8291.4	KIY	Bulk Shipping co.
	WDE	Exxon Communications
	WEK	Offshore Navigation
8294.2	KEJ	Sea Land Services Inc.
	KEO	Ocean Drilling & Exploration
	KIY	Bulk Shipping Co.
	WHU 672	Great Lakes Dredge & Dock
	WKZ 287	Oil Transport Co.
12429. 2	KEJ	Sea Land Services
	KTR 901	Federal Barge Lines
	KXR 958	Marine Chartering
	WIW	Indian Towing Co.
12432.3	KEO	Ocean Drilling & Exploration
	KXJ 711	Gulf Oil Communications
	WRD 703	Brondomar Agencies
12434.0	KVR 408	Crescent Towing and Salvage
12435.4	WHD 785	Electro Nav
	WRD 510	Golden Gulf Marine
16585.7	KVR 408	Crescent Towing and Salvage
16587.1	KEJ	Sea Land Services
	KIY	Bulk Shipping Co.
	KVR 408	Crescent Towing and Salvage
	KXR 958	Marine Chartering
	WEK	Offshore Navigation
16590.2	KIY	Bulk Shipping Co.
	WQB 529	Energy Transport
	WRD 703	Brendomar Agencies
	WWT	River Gulf Agencies
16593.3	KEO	Ocean Drilling & Exploration
	KXJ 711	Gulf Oil Communications
	WHU 672	Great Lakes Dredge and Dock
22122.6	KVR 408	Crescent Towing and Salvage
22127.1	KIY	Bulk Shipping Co.
	WIW	Indian Towing Co.
22130.2	KXJ 711	Gulf Oil Communications
22133.3	KEJ	Sea Land Services
	KEO	Ocean Drilling & Exploration

It must be noted that the above listing is only a sampling of the various stations on these frequencies; other services will be found on the same frequencies, and there are a few other frequencies carrying marine traffic.

Following the river further north to Tennessee, Memphis has the following amongst its VHF-FM offerings:

156.450	WCF	Davis Construction
156.950	WHG 866	Delta Refining Company
156.450	WHG 886	Delta Refining Company
156.925	KPB 639	Dewart Marine Electronics
156.950	KPB 639	Dewart Marine Electronics
156.550	KXE 302	Economy Boat Store
156.975	KTD 493	Ergon Inc.
156.350	WHN 230	Fullen Dock and Warehouse
156.975	WHU 223	Gulf Oil Corporation
156.450	KEB 477	Kergh Communications
156.550	KVL 911	Memphis Harbor Services
156.450	WRD 771	Memphis Park Commission
156.950	WXZ 530	Oakmont Marine Corp.
156.350	KXE 294	River City Harbor Services
156.950	WGL	Southern Towing Co.
156.450	WHU 633	Spartan Transportation
156.500	KEB 477	Tergh Communications
156.450	WQZ 210	Treasure Island Fleet
156.450	KCE 244	Valley Towing
156.950	KCE 244	Valley Towing
156.350	KJC 771	Waterways Marine
156.500	KJC 771	Waterways Marine
156.900	KJC 771	Waterways Marine
156.500	KSK 167	Wepfer Marine Inc.
156.450	KSK 267	Wepfer Marine Inc.
156.900	KBS	Wm. C. Ellis & Sons Inc.

The following SSB listings may prove useful to those with shortwave receivers, and living at greater distance.

2086.0	WJG	WJG Telephone Company
2192.0	WJG	WJG Telephone Company
2782.0	WJG	WJG Telephone Company
4087.8	WJG	WJG Telephone Company
4123.6	WHU 633	Spartan Transportation
4125.2	KBS	Wm. C. Ellis & Sons
	KCE 244	Valley Towing
	KKA	Central States Dredging
	WCF	Davis Construction
	WHH 301	Waxler Towing
	WHU 633	Spartan Transportation
	WRE	McAllister Construction
4143.6	KSK 267	Wepfer Marine
	WBC	Southern Towing
	WFL	Southern Towing
6209.3	WJG	WJG Telephone Company
6217.2	WHU 633	Spartan Transportation
6218.6	WHH 301	Waxler Towing
	WHU 633	Spartan Transportation
6221.6	KBS	Wm. C. Ellis & Sons
	KCE 244	Valley Towing
	KKA	Central States Dredging
	WCF	Davis Construction
	WRE	McAllister Construction
6521.9	KSK 267	Wepfer Marine
	WBC	Southern Towing
	WFL	Southern Towing
8701.2	WJG	WJG Telephone Company
8289.7	WHU 633	Spartan Transportation
8291.1	KBS	Wm. C. Ellis & Sons
	KKA	Central States Dredging
	KSK 267	Wepfer Marine
	WBC	Southern Towing
	WCF	Davis Construction
	WFL	Southern Towing
	WHH 301	Waxler Towing Co.
	WHU 633	Spartan Transportation
	WRE	McAllister Construction
8294.2	KBS	Wm. C. Ellis & Sons
	KCE 244	Valley Towing Service
12333.1	WJG	WJG Telephone Company
12427.2	KBS	Wm. C. Ellis & Sons
12435.4	KCE 244	Valley Towing Service
16518.9	WJG	WJG Telephone Company

The two cities which have been looked at have a great deal to offer the listener, as has the entire Mississippi River system. If you haven't already tried, give them a go -- you might get a pleasant surprise.

From the *"MT Goof"* department, Brian Paul proved that it doesn't take long to catch an error. A photo published along with my last column looked like Florida; It didn't take long for Brian's postcard to arrive pointing out that the picture is of *Halifax, Nova Scotia!!*

As always your comments and suggestions are welcome to the address at the masthead. Until next time -- Good listening. ■

(Don't miss this month's feature "Tuning in the Tugs" for more on Mississippi monitoring!)

Scanner Market Update

by Larry Wiland

Being a fanatical scanner enthusiast, I have attempted to compile a list of *most* of the current Bearcat and Regency programmable scanners which are in production, have been discontinued, or have been discontinued but are still available for sale through various distributors in limited quantities.

AVAILABLE

Uniden/Bearcat:
BC-210XW; BC-100XL; BC-145; BC-175; BC-800XLT; BC-50XL; BC-70XL

Regency:
HX-1500; HX-2200; MX-3000; R-806; R-1070; R-1075, INF-1/2, TS-1/2

DISCONTINUED

Uniden/Bearcat:
BC-140; BC0170; BC-100; BC-210XL; BC-210; BC-211; BC-220; BC-20/20; BC-250; BC-260; BC-300; BC-350; BC-101; CP-2100

Regency:
MX-5000; BX-5500; BX-7000; MX-4000; HX-2000; R-1060; R-1050; Z-10; Z-30; Z-45; Z-60; D-810; K-100; K-500; M-100; M-400, HX-3000 (proposed); MX-8000 (proposed)

The following scanners are now "obsolete" in that repair parts are *no longer available*, and the respective manufacturer will *no longer be able to repair them for this reason* (verified by the factory...):

Bearcat(Uniden)
BC-101; BC-210; BC-250, BC-220 (some parts)

Some discontinued scanners are still available from dealers still new in the box; you may therefore be able to get a great "deal" on these, but be aware that, if you have a problem at a later date, you may be unable to get your "bargain" repaired.

THOSE "OTHER" BRANDS

Radio Shack and other brand scanners are not listed because these makers frequently change their lines at will, often replacing them with new, updated models. •

Radio Shack Maintains Cellular Privacy Stance

A recent call to Ed Juge, W5TOO, Director of Market Planning for Tandy Corporation, confirmed that company's rigid posture concerning monitoring cellular telephone conversations. Juge feels that there is enough similarity between a cellular phone and a home telephone that there is a reasonable expectation of privacy by the user.

Questioned further about the deletion of the cellular portion of the 800 MHz band on their new PRO-2004 scanner (which can be restored by cutting a diode; see April issue of MT, p. 28), Juge maintained that, while Tandy's official position is that certain frequencies should not be available for uninvited monitoring, the company is aware of the competition and could re-evaluate their position in the future.

Asked about the facts behind a rumor that future production models of the PRO-2004 may have new circuitry which cannot be modified to restore cellular coverage, Juge said he could not comment. If such were the case, there would be no notification to prospective owners nor any obvious change in the serial number sequence. •

Monitoring the U.S. Coast Guard

contributed by Tony Orelik
East Pittsburgh, PA

International Ice Patrol Broadcasts
(USB, CW, RATT, FAX)

Freq (kHz)	Scheduled Time (UTC)
5320, 8502, 12750	0018
5320, 8502, 12750	0050
8502, 12750	1218
8502, 12750	1250
8502, 12748	1600

CG Ship and Shore

Coast Guard ships may use the following frequencies to transmit urgent and safety messages when required.

VHF/UHF AM	USB	VHF FM
121.5 MHz	2003	156.3 MHz (Ch. 6)
243.0 MHz	2638	156.5 MHz (Ch.12)
	2670	156.8 MHz (Ch.16)
		157.1 MHz (Ch.22)

Atlantic Area Broadcast Notice to Fishermen

BOSTON (NMF) Information pertinent to the 200 mile Fisheries Conservation zone (FCZ), including the location of fixed fishing gear, is broadcast by COMMSTA Boston.

8502 kHz at 1350, 2150 UTC

Larry Van Horn

160 Lester Drive
Orange Park, FL 32073

Cuban Satellite TV

Cuban television has finally reached the satellite age. A recent article for the *Gramma* by Gustavo Robeno indicates that the Cuban TV network ICRT is now broadcasting through the Gorizont 4 satellite at 14° west. Downlink frequency is 3825 MHz.

According to Mr. Robeno the broadcast will seek to reflect Cuban reality in its different manifestations. The theme song by Pablo Milanes was written especially for the broadcast. Initially there will be three hours of programming three days a week (Friday-Sunday) from 2300-0200 UTC. Programs will include news, entertainment, cultural events, sports, and music.

Using the Gorizont 4, the broadcast on channel 11 should be visible from the eastern part of North America, the Caribbean, South America, Africa, and Europe. "Program material will be selected mainly from current broadcast by Cuba's two TV channels," Mr. Robreno said.

TVRO equipped *MT* readers might want to check out their reception of the Gorizont 4 utilizing Cuban TV as a marker. Many thanks to our friend at CNN for this information.

In the Ole Mailbag

VHF/UHF Satellites:

Lloyd Scott in Bartow, Florida, has been hearing some satellites on his Yaesu FRG-9600. Below is a summary of what he has been hearing.

UTC	MHz		
3/8/87			
0520	137.500	Weather Fax	NOAA sat
0535	253.750	Data	Flsatcom
0545	262.505	Continuous Tone	Fltsatcom
3/11/87			
2140	261.675	Phone patch	Fltsatcom
2150	261.900	"Fire control" wkg aircraft-- "Fox Tango"??	Fltsatcom
0100	150.000	Data	Soviet Cosmos Navsat
0120	149.940	Data	Soviet Cosmos Navsat

Congratulation, Lloyd, on finally hearing some sats. I told you we all weren't imagining things!

Michael Rooksberry has been doing some more UHF military aero listening in his area of Michigan and presents the following list:

251.8	Military A/C very active
385.7	Camp Graylin AAF, MI
287.5	MIANG-Selfridge
238.9	Mil A/C activity [Aerial Refueling Track 109H Pri - lvh]
259.3	KI Sawyer AFB [Approach/Departure Control - lvh]
292.0	Unknown [Autovon wideband channel AF - lvh]
228.7	NORAD [Incognito callsign? - lvh]
301.5	SAC Wurtsmith AFB
370.8	Military A/C very active [I am very interested in this one, Mike. It is one of my unknowns; how about some more information, callsigns, etc.]

Nice list, Mike, and keep us posted on 370.8.

A reader in Illinois who would rather remain anonymous sent along several loggings of telemetry on 19.954 MHz. These transmissions come from the Cosmos 1466 satellite, an add-on space module that has been docked to the Salyut 7 space station. By the time this reaches print there should be one of these modules docked to the MIR space station, so check 19.954 as a beacon for voice comms on 143.625 MHz.

Bob Kelty has sent along some information to fill in the holes I mentioned in the March *MT* in the 225-400 MHz band:

256.3	Air-to-air tactical (service not specified)
274.9	Clearance delivery, MCAS, Tustin, CA
293.3	Oakland center FAA
319.5	Air-to-air refueling, USAF
343.5	Air-to-air refueling chan.2, designator 21, back-up to 396.2 USAF
360.5	Air-to-air refueling, USAF

Thanks a bunch, Bob. I recently received a new AP-1B flip supplement and it shows some of the aerial refueling channels in there as well as some other new channel allocations. I will send a by-frequency list to Bob real soon for publication and hope that is helps some of our other mil aircraft listeners list to tanker operations.

Monitoring the Voyager

Jack Sullivan recently dropped a note to say that he did not see any advance press in *MT* regarding the Voyager flight and the frequencies they used. That's right, Jack; in this business of satellite listening there are no schedules or constant frequencies that a particular activity adheres to.

Satellite listening is just like utility listening--catch as catch can. The Voyager people were paranoid about handing out any frequencies due to possible jamming from hams (their quote, not mine!). As it turned out it didn't do them much good on HF as I heard several idiots (my term) jamming their comms. A real sad state of affairs, too.

The best I can tell all of you about monitoring satellites is to monitor, monitor, and monitor some more. The satellites are there--you have to be patient. Next month I will start a series in *MT* for the beginner on monitoring satellites. Be sure to catch it.

Jack would like to correspond with others who share his interests; these include military satellites of all types, federal government monitoring, space, VHF/UHF military comms, propagation (skip, etc.) and complex comm systems. You can write to Jack Sullivan, P.O. Box 701, Franklin Park, NJ 08875.

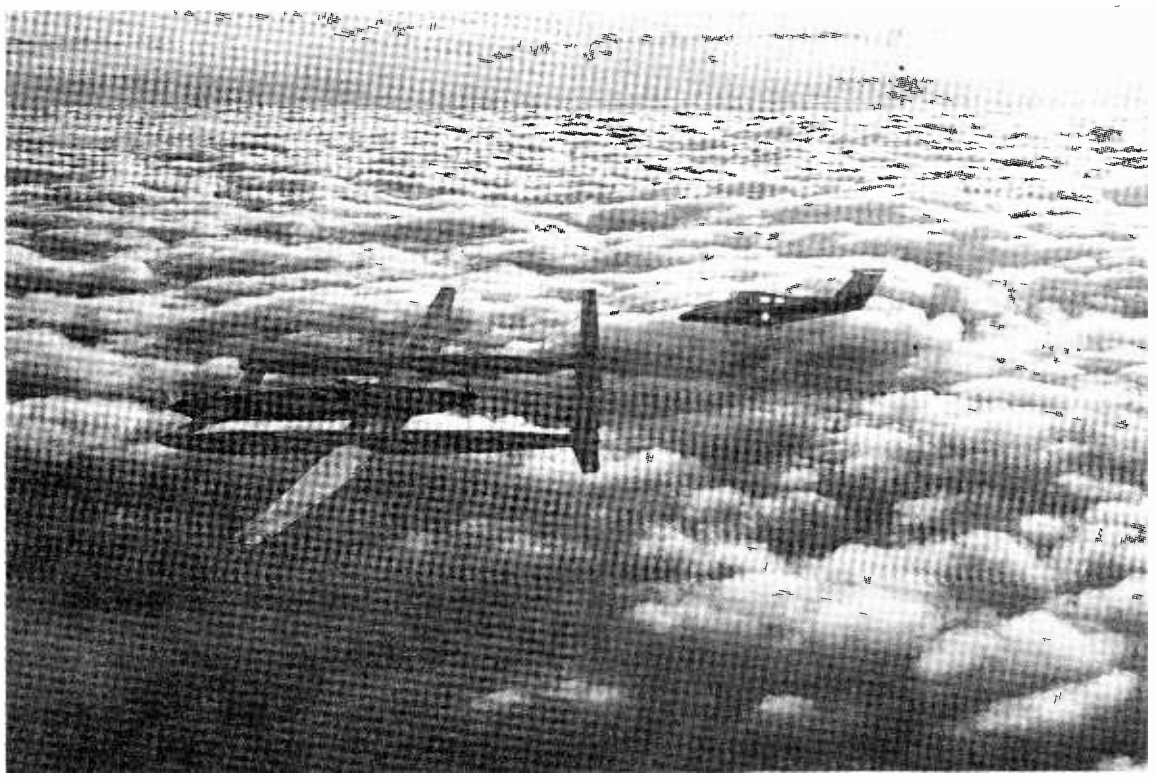
Speaking of the Voyager, Ken Bowles in Union, Missouri, has gotten a Voyager QSL card. Unfortunately, I did not receive an address for reports. If Ken would be so kind as to drop me a card, I'll print the address here in SFS for others that want to QSL this historic mission.

Zel Eaton also monitored the Voyager mission. He reported that 8820, 6640, 6550, and 5469 kHz were in use by the crew. He also indicates that they may have worked WOM (Maritime Coastal Station) on channels 417 & 805. Zel also notes that they ran a comm check with Offutt on 262.550/296.150 through the Fltsatcom.

Zel has also included the following frequency list for NE Missouri mil aircraft activity:

311.0	SAC Airborne command post primary
321.0	" secondary
255.4	" [UHF Flight Service Stations - lvh]
381.3	" [USAF TAC 'Golden' - lvh]
342.5	Offutt Metro
383.2	Scott AFB Ops
235.1	Refueling [AR-16 refueling track-primary-lvh]
319.9	"Hawkeye 41" [K.C. ARTCC-Quincy sector-low alt-lvh]
252.1	Aerial refueling [Prob 442 TFW in KC, Mo-lvh]
269.3	Kansas City center [Kirksville sector-high alt-lvh]
260.2	Refueling [AR-100 refueling track-primary-lvh]
370.9	Kansas City center [Kirksville sector-low alt-lvh]
248.2	Simul with 120.0 in Columbia, MO; app/dep control
340.0	Offutt [What are you hearing here, Zel?-lvh]

Nice list, Zel, and I hope you can report some TVRO transponder-by-transponder, satellite-by-satellite listing with that new dish very soon. ▶



I would like to thank Spence Taylor, Utility editor, ASWLC, for the pictures of the Soviet spacecraft on display at the Russian pavilion at EXPO. Spence, don't be surprised where they will show up next--hi!

New Satellite Frequencies

Some new satellite frequencies have come to life in the last couple of weeks. I have found what appears to be a new USAF channel on 138.375. This satellite appears to be geostationary and has a tentative bearing from John Biro in Massachusetts of 135 degree azimuth, 22 elevation. John and I both heard what sounded to be amplitude compandered sideband (ACSB) on this channel. There are three new satellite assignments here that do not appear in the unclassified IRAC files:

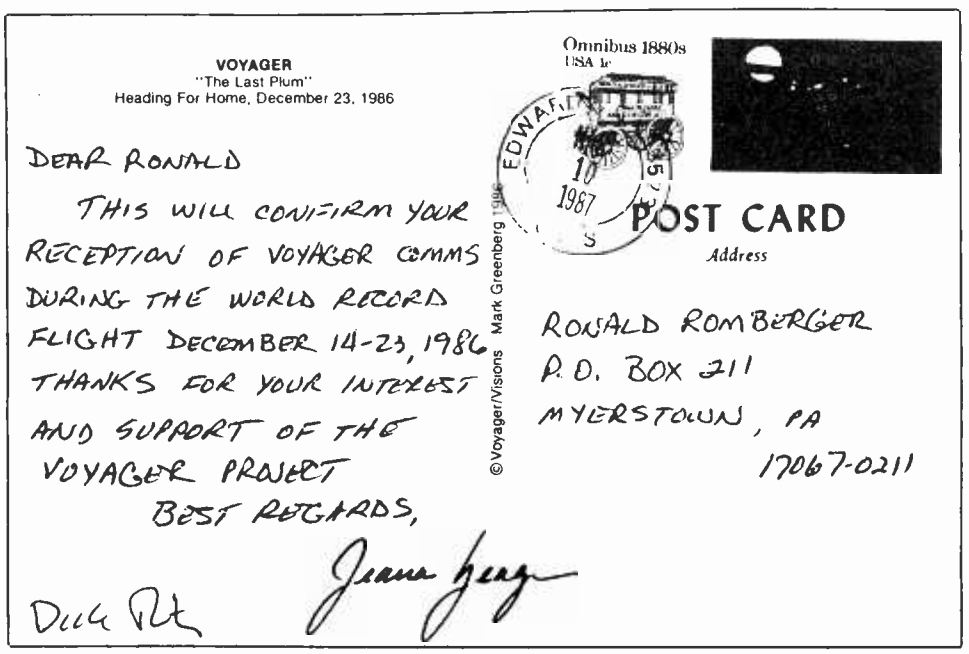
138.350	USAF Space
138.360	USAF Space
138.375	USAF Space

Any help by *MT* readers on watching these would be appreciated.

Also what appears to be a new downlink from what could be a new constellation of Soviet EW satellites (possible Volna link) has appeared on 294.825 MHz. This one really bears watching for those of us on the east coast.

Another new interesting frequency is 142.975 MHz. This frequency has only given up on/off type keying in the NBFM mode. It appears that it might be coming from the MIR or al least from an orbiting type spacecraft.

MT readers are invited to send in your loggings on these and any other satellites (please include pointing data on geostationary satellites) and mil aircraft frequencies to the address in the masthead. If you would like a reply please include an SASE. 'Til next month, best of 73s to all.■



Ronald Romberger of Myerstown, PA, also received a QSL from Voyager, which he had reproduced to share with us.

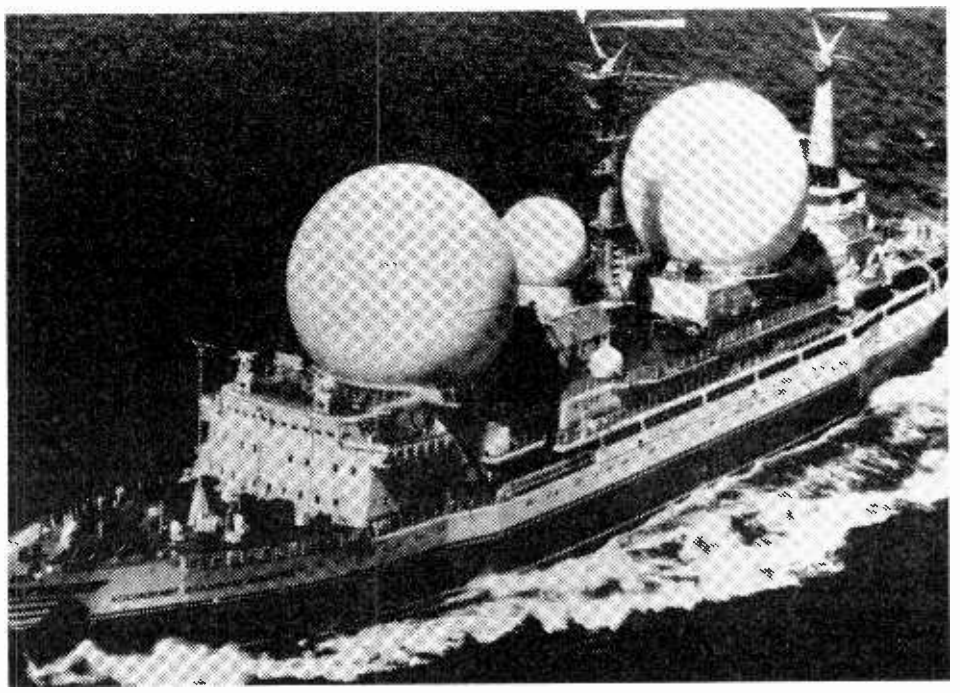
The Search for Soviet Space Event Support Ships

by John Biro

The Soviet Union operates a large number of SESS (Space Event Support Ships) which provide worldwide spacecraft and satellite tracking/recovery capability.

The Soviet policy of using sea-based support tracking ships is in contract with that of the U.S. policy of using the older ground tracking station and the present satellite network known as TDRS (Tracking and Data Relay Satellite).

The SESS ships are listed in Larry Van Horn's *Communications Satellites* but, to date, I have not seen a list of call signs for the ships nor whether communications was only via satellite or of HF is used. I had a gut feeling that there had to be an HF backup so the search for the SESS started.



Soviet ship Kosmonavt Komarov

The Search Begins

Friday, 16 January 1987

The *Progress-27* cargo ship carrying expendable materials for the Soviet Space Station *MIR* was launched. A mission was on its way, so I started looking for the SESS. Rumor had it that the Soviets had a TDRS-like relay satellite ready and would not need the SESS.

Monday, 26 January 1987

A report was given that the *Kosmonavt Viktor Patsaev* was seen sailing out of the Black Sea, probably for the coast of Gibraltar. This was the only SESS that I had been able to find out about, but it is normal procedure for a recovery ship to be in this area in case of early deorbiting.

The NASA Orbital Element set arrived and showed that the orbit of *MIR* had been altered by about 16 km; this would make it possible for a Saturday morning launch the 31st of January.

Saturday, 31 January 1987

Radio Moscow announced that the booster rocket that would launch two cosmonauts on a flight to the orbiting *MIR* space station had been fueled for liftoff. A news report from British TV the previous evening said that a Soviet Proton launch over the weekend failed because the final stage did not ignite. It was believed that this was to be a TDRS type comm sat for the MIR station.

A new satellite was required as Cosmos 1700 had failed and was drifting in orbit; this would mean that an SESS would have to set sail for the North Atlantic. Radio Moscow announced that the Cosmonauts were "praying" for the launch, especially for help on non-standard events, but there was no launch.

Thursday, 5 February 1987

The launch was covered "live" on Moscow TV and as 21:38 UTC *Soyuz-TM2* was on its way to dock with *MIR* late Saturday. During the live coverage they showed FCC (Flight Command Center, equal to our Mission Control), revealing a tracking map with the first orbit and range circle of all the tracking stations.

I quickly put the videotape into stop motion and looked at the frozen picture. Horrors! There was no tracking circle near Sable Island; in fact, there were no range circles that were sea-based. Would I get a chance to locate the SESS?

Saturday, 07 February 1987

The link-up of the two Soviet cosmonauts was shown live on TV; a new picture from the Freeze Frame Trick still failed to display sea-base range circles around Sable Island. It looked as though the old SESS relay would not be used for this mission; worse yet, there would be no communications easily monitored from the *MIR* on 143.625 MHz.

Minutes ticked by, then the squelch of my radio broke with a Russian voice! The FCC map had not shown the SESS, but they had to be there. The search went on, and looking over the RTTY data it was hard to tell because Russian words seem to be spelled differently, and I could not be sure.

Then my first break. I received a listing of callsigns for several of the SESS (see Table-1) and knew what callsigns to look for. Would communications between FCC and the SESS be on HF or satellites? I decided that the SESS would at least use HF marine frequencies for telex messages, so this is where I started the search.

Friday, 27 February 1987

At about 0400 UTC a RTTY message was intercepted on 8356 kHz (50/170/N) "UUYG DE UKFI NIL SK.....+ Z K + K SK... S SK.. "

I checked my list. Yes, it is the *Yuri Gargarine* calling an unknown ship! I did not hear a reply and the frequency went silent. I now knew where to look.

Then a big break: a block *Kriptogramma* message was addressed to five of the SESS. I had read that a typical mission had four to five ships--there could be more but most likely I had the list (see Table-1). The message started: "KRIPTOGRAMMA= USYY UUVO UUYZ UUYG 4/+ UKFI="...

Thursday, 05 March 1987

RTTY was intercepted on 6267.28 kHz at 0330 UTC. Not all messages use call signs -- in fact few do. I was very lucky to catch these interceptions, but would I copy the name of the ship to confirm the name/call sign list?

Then came another *Kriptogramma*, this time to the *Kosmonaw Vitor Pacaev*. I had seen these names before but, because of the strange spelling, I had passed it off as wishful thinking.

"KRITOKAMMA NIS KROWI48 4343+ NIS KOSMONAWT WIKTOR PACAEW="... Russian words are not spelled the same as in English; in the name of the SESS *Kosmonavt Viktor Patsaev*, note the use of a "W" for the letter "V" and the use of the letter "C" for "TS."

Ship Assignments

The *Kosmonavt Yuri Gargarin* and the *Adakemik Sergey Korolev* operate in the Atlantic Ocean and most likely the *Nevel* in the South Atlantic to provide reliable communications throughout the mission.

The *Kosmonavt Vladimir Komarov* (UUVO) has an unusual hull and massive radomes enclosing its antenna arrays. The horn-like mast-mounted devices are actually antennas. It has been reported to use the Molniya 1 relay satellite which is mutually visible between the ship and the Soviet Union.

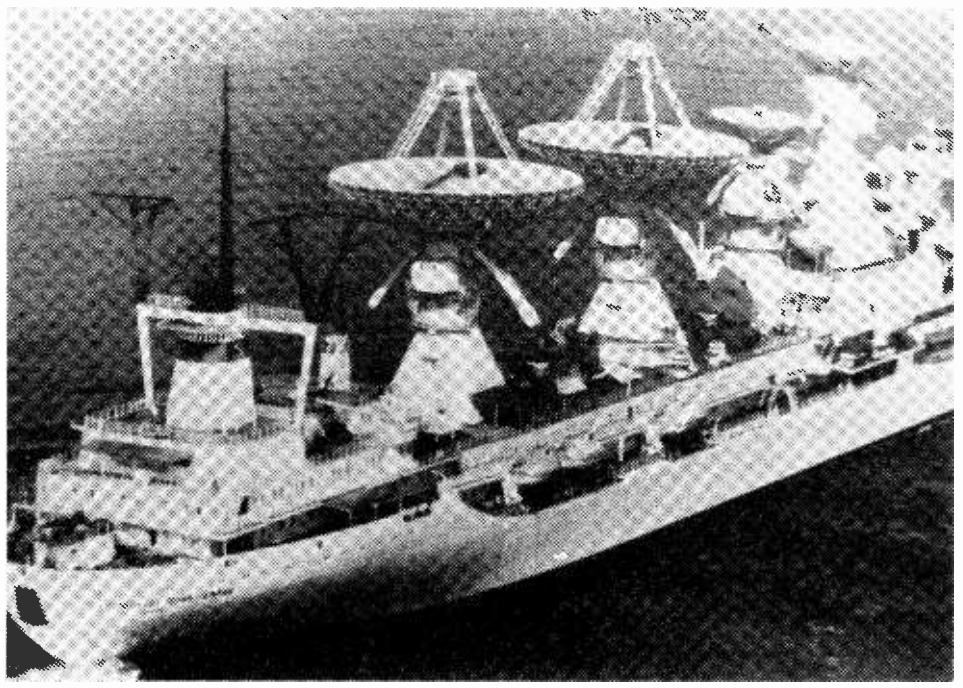
The *Kosmonavt Yuri Gagarin* (UKFI) is one of the largest of the SESS. It was built in Leningrad in 1970 and was designed to operate away from home base for up to six months. It is equipped with a library containing about 10,000 books, a theater that holds 300 people, nine elevators, three swimming pools, and a sports hall big enough for a football game!

It is very impressive looking and is loaded down with radomes and from 100 to 130 antennas including several big dishes. The first of the two smaller dish antennas (just behind the bridge) is typically used for Molniya communications; the other one of similar size was intended to make trajectory and orbital measurements.

The two larger dishes were originally used for deep space work. Computer control allows for automatic tracking of satellites even during Force 7 storms.

Table - 1

Name of Ship	Call Sign
KOSMONAVT GUEORGY DOBROVOLSKY	UZZV
KOSMONAVT IOURII GAGARINE	UKFI
KOSMONAVT KOMAROV	UQBV
KOSMONAVT PAVEL BELIAEV	UTDX
KOSMONAVT TITOV	UOMW
KOSMONAVT VIKTOR PATSAEV	UZYY
KOSMONAVT VLADIMIR KOMAROV	UUVO
KOSMONAVT VLADISLAV VOLKOV	U1VZ
KOSMONAVT/USJE	USJE
KOSMONAVT/USRG	USRG
AKADEMIK SERGEY KOROLEV	U1SZ
AKSAY	UQRX
BEZHITSA	????
BOROVICHI	UVAU
KEGOSTROVE	UKBH
NEVEL	UUYZ
RISTNA	UKHL
MORZHOVITS	UUYG



Soviet support ship Yuri Gagarin

These ships are operated by the Civilian Research Institute.

Monitoring the SESS

The SESS use HF RTTY (mostly 50/170/N) monitored around 6267 and 8356 kHz, with most of the activity from 0000 to 0400 UTC. The messages are varied in format including simple telex, cyrillic, strange spellings, *Kriptogramma*, etc. Once in a while without warning the baud rate will be changed to 100/170/N.

The Russian ships are about the only ones not using SITOR and ARQ and, with the 170 Hz shift, they are easy to find. Table-1 gives typical spelling of the ship names and call-signs which will be recognized.

The *Yourii Gagarine* (yes, yet another spelling!) is stationed off the coast of Sable Island and the *Kosmonavt Viktor Patsaev* is off the coast of Gibraltar. The *Nevel* was seen in port in Brazil in early January, so it is probably off the coast of South America. The Flag Ship *Kosmonavt Vladimir Komarov* and UUYG positions are unknown at this time.

When you monitor one of these vessels check out the time and frequency, then compare it with normal radio propagation (or with computer programs like "MINMUF") to compute the possible communications window with *MIR* or for best band conditions for communication from one SESS to another.■

Good Reference Material:

Communications Satellites by Larry Van Horn. Grove Enterprises.

Soviet Naval Developments, by The Nautical and Aviation Publishing Company.

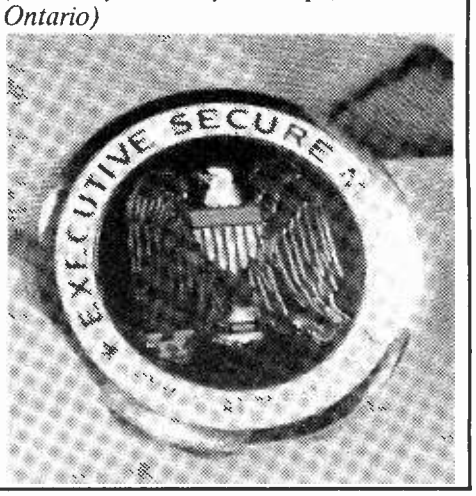
From the Government Printing Office [Part 1 and 2 are no longer in print]

Soviet Space Program 1966-70, Part 1.
Soviet Space Program 1976-80, Part 2. Manned space program.
Soviet Space Program 1976-80, Part 3. Unmanned space activities

Is It Secure?

The accompanying photo shows the seal which is placed on radios designated "secure" for the President of the United States. The system is installed and maintained by the National Security Agency (NSA).

(Photo by Anthony Trollope, London, Ontario)



ON THE HAM BANDS

Mike Mitchell, Jr., W7WHT
P.O. Box 20279
Seattle, WA 98102-1279

THE HISTORY CONTINUES -
Developments in the late 1920s

As we mentioned in the March installment, the '20s brought radio's coming-of-age in terms of technical achievement in general and amateur radio in particular. CW replaced spark and the ideas of Deforest, Armstrong and Reinartz became the designs of choice in equipment.

Of course there were operating triumphs, too. DX and regular communications across the oceans were possible mostly due to Armstrong's receiver designs. And radio shorthand ("QST English") became the international language of amateurs (vy for very, the Q signals, etc.). The world did not speak English, but the amateurs were all speaking the QST brand of radio "pidgin English"!

In 1924, the U.S. authorized a few amateurs to experiment with short waves in the area of 80, 40, 20, and 5 meters (which soon were to become the official ham bands). The result was the greatest discovery in the history of radio!

Why was it great? Because all the electrical engineers and physicists and knowledge at that time said it wouldn't work!

This is a common phenomenon is science and engineering, especially in the academic world which often asks "why?" instead of "why not?" But the amateurs, stuck with frequencies lower than 200 meters, had nothing to lose and, by perseverance, continuing experimentation, and maximizing equipment design (plus a lot of help from the little understood ionospheric layers), they succeeded far beyond their hopes and expectations.

It was hard to convince most amateurs that short waves were useful; they, too, had their doubts. But the 100 meter transoceanic two-way QSOs of 1923 and 1924 were the final proof and amateurs quickly started the move "down the DX."

The next big discovery was that transcontinental DX could be worked on some of the new short-wave bands in daylight! Amazing! Then they did it across the oceans, too! Staggering! Within a very short period, many amateurs were working great DX 24 hours a day using 40 and 20 meters.

Some amateurs tried to figure out why this all worked. Several learned academics and scientists advanced good theories and were in the ball park, but John Reinartz, an amateur, came closest to describing what we know today about the ionospheric layers.

With all the international amateur radio activity and DXing, the International Amateur Radio Union (IARU) was formed in 1925 and has been a force for amateurs ever since in international radio lawmaking.

On the technical front, the second half of the '20s was as prolific as the first half. Many improvements were made and experiments resulted in designs still in use today.

Amateurs were given the 10 and 3/4 meter (420 MHz) bands and much good work was done there. They quickly learned that DX below 10 meters did not improve.

Tetrode tubes (with screen grids) were developed as were "AC" tubes which deleted the need for "A" (filament) batteries. Using crystals for transmitter frequency control really improved signal stability. Bandspread controls and AF selectivity improvements in receivers improved reception.

High frequency power tubes were developed, modulated RF amplifiers and buffer amplifiers became accepted designs, and high quality modulation (100%) was developed for 'phone work. More efficient antenna coupling and the directional possibilities of antennas were learned.

All this technical advancement led to much better operation and reduced the band space requirements for each signal. All in all, it was a great period of learning and development.

Next Month: *The real radio laws arrive.*

AMATEUR RADIO CLUBS - A Great Resource

If you have been regularly reading the history segments you will have noticed the impact of the social side of hamming. This social trait really shows up at ham clubs, a great place for education and enlightenment.

For the beginner they are a fantastic resource; it's very hard to have a problem that hasn't already happened to someone else who will be glad to tell you how he solved it. Most clubs also have a broad enough membership that the answer to any technical or operational question can be provided by someone present at any meeting.

Clubs have personalities, too. Some are people-oriented, some are technically-oriented and others are project- or subject-oriented. And some clubs are all these things and more.

No matter what your interest or disposition, you can find a club to suit your tastes. If you're out in the "sticks," you can often join a club in the nearest city, picking one with a good newsletter and following along by mail. If they have a special event (contest, field day or hamfest) you can make the trip and participate directly. No matter how you do it, it's usually fun.

In areas of large population you will often find many clubs to choose from. In such cases, you should spend a few months visiting all of their meetings. Most likely you will find one that fits like the proverbial "old shoe," join it, and pay dues happily ever after!

SWL's are welcome at most ham clubs and many clubs allow anyone who "has an interest in amateur radio" to join. If you like to monitor hams, you might consider checking out the local club(s) and see if you're welcome. It can be a lot of fun for you, too!

Not all activities are directly club-related. In Seattle, there is a restaurant (open 24 hours a day, seven days a week) which has what is called the "W7" room (the state of Washington is in the seventh amateur district). There are over 15 clubs in the greater Seattle area, but the W7 room is open to all hams and on any given day you can show up for lunch at noon and dine with 10 to 20 hams from all over the area! What a great way to keep in touch with fellow hams.

The purpose of all this comment on clubs is to get you interested in joining a local club or, if there aren't any, in starting one! It's not all that hard. Both the ARRL and *73* magazine have information which is very helpful. Write to them and they will send it to you. (ARRL, Newington, CT 06111; 73 magazine, P.O. Box 931, Farmingdale, NY 11737 - ask for July 1986 issue #310.)

Get with it and join in the fun. See you at the club!

BITS AND PIECES

Tiare Publications (P.O. Box 493, Lake Geneva, WI 53147) recently announced the availability of *The World Ham Net Directory* by Mike Witowski (see review in this month's "Library Shelf"). It lists 300 special interests ham nets world wide covering a myriad of subjects. The author also wrote the hamband DXing chapter in *Shortwave Listening with the Experts.*

There is a net for every interest, and if you are interested, you should have this book ($9.95 plus $1.00 shipping in US, plus $2.00 elsewhere, available directly from the publisher).

Speaking of books, Stu, W2LX, VP of Radio Publications, sent me a copy of the *Interference Handbook* ($9.95 plus $1.00 shipping from Radio Publications, Inc., P.O. Box 149, Wilton, CT 06897). This is a "must have" book for anyone who listens to or transmits on radio, TV, etc., especially in the urban environment and for mobile operation.

Without a doubt, interference is the Murphy's law of hamming and SWLing ("If it can happen, it will happen!). Pick up a copy of this book at your local ham or book store or order it directly from the publisher. You'll be happy with it and your neighbors will love you for it!

I was watching Russian television recently (Channel TV-1, Moscow, February 20, 0835 Moscow Time) and on the program "Youth and the World," I saw V.A. Shcherbakov, UA3ASL (RA3ASL?), interviewed regarding the fun of hamming in the USSR. His station was located in a small room with a window, and the walls were covered with QSL cards and a world map (in English and Russian). In fact, it reminded me of my own shack at age 15!

The QSL's included many from the U.S. (W5s, 0s, 3s, 2s, 7s, were noticed). OHØBEs picture QSL card caught my eye and I would have missed the rest of the show if they had not panned away from it. I would like to have an eyeball QSO with her! (No, I don't speak Finnish, but I would sure like to give it a try!)

The discussion dealt with call signs, QSL cards, rag chewing, contests, and the fun of doing all those things.

The interviewer managed to insert one point about world peace and the horrors of nuclear testing (complete with a picture of a test shot at Bikini), but otherwise it was a very non-political interview. It was obviously aimed at promoting amateur radio for young people in the USSR (TV-1 channel is seen all over the country, not just in Moscow).

The gear looked homebrewed (except for one item) and looked very well built. The transceiver resembled an R-390, but there was never a good enough closeup to see the details. I suspect it was a tube rig.

All in all it was a most interesting segment. It's too bad we can't get similar spots about amateur radio on TV here in the U.S. Of course, the networks here have more choice as to what they present!

COMING UP: In the next few months we will be discussing the long and short of DXing (June), a two-part piece on packet radio (July and August) and in September we will discuss contesting.

We have only five more segments on the history of amateur radio, including a wrap-up. After that, the main subject section will expand and we'll have more "Bits and Pieces."

I really appreciate your letters; as you have seen, I include them when they contain good information of interest to all or questions of interest to others. I do want this column to contain dialog. So, to put it simply, keep those cards and letters coming! ■

CONVENTION CALENDAR

Date	Location	Club/Contact Person
Apr 3-5	Visalia, CA	Cal State-Int'l DX Convention/Len Geraldi K6ANP 9705 Old Redwood Hwy, Penngrove, CA 94951
Apr 4	Rochester, MN	Rochester ARC/ Bill McGurk WB0YEE 2253 Nordic Ct., NW Rochester, MN 55901
Apr 4-5	N.Little Rock,AR	Delta Division Conv/ Wayne Mahnker WA5LUY 8 Canyon, N.Little Rock, AR 72116
Apr 5	Charleston, WV	Charleston ARC/ William Kibler Jr K8WMX 182 Monterey Dr, St. Albans, WV 25177
Apr 5	Willingboro,NJ	Willingboro ARG/ Jose Alvarez K2KMO 1343 Thornwood Dr, Mt Laurel, NJ 08054
Apr 5	Grosse Pointe,MI	SE Michigan ARA/ Richard Ward KC8OH 22434 Melrose Ct, E.Detroit, MI 48021
Apr 10-12	Kansas Cty, MO	Missouri State/ Chuck Miller WA0KUH 7000 NE 120th St, Kansas City,MO 64166
Apr 11-12	Trenton, NJ	Trenton State College ARC/ Allen Katz Dept.Elect.Eng., Trenton State College ARC Trenton, NJ 08650-4760
Apr 11-12	Alexandria,LA	Central Los Angeles ARC/ Ed Crump KB5CX P.O. Box 31, Alexandria, LA 71309
Apr 12	Raleigh, NC	Raleigh ARS/ Chuck Littlewood K4HF 2005 Quail Ridge Rd, Raleigh, NC 27609
Apr 18	Marietta, GA	Kennehoochee ARC/ Dean Harris KD4BB 3478 Sabrina Ct, Marietta, GA 30066
Apr 24-26	Dayton, OH	Dayton Hamvention/ DARA Box 44, Dayton, OH 45041
Apr 25	Spokane, WA	Inland Empire VHF Rad Am/ Robt Spencer W. 3022 Francis, Spokane, WA 99205-7259
May 1-3	Fresno, CA	Fresno ARC/ Harry Billings WA6UOR 3912 N. Palm, Fresno, CA 93704
May 2	Owego, NY	STARC/ Mike Gruska, N2NW 3 Londonderry Lane, Owego, NY 13827
May 2	Cedarburg, WI	Ozaukee RC/ James Douglas Jr. KA9DDN 101 E. Clay St., Saukeville, WI 53080
May 2-3	Baton Rouge,LA	LA State Convention/ Rick Pourciau NV5A 879 Castle Kirk Dr, Baton Rouge, LA 70808
May 2-3	Greenville,SC	Blue Ridge ARC/ John Chism 203 Lanewood Dr, Greenville, SC 29607
May 3	Drexel Hill,PA	Delaware Co ARC/ David Tatum 10 Green Tree Lane, Malvern, PA 19355
May 3	Sullivan, IL	Moultrie ARK/ Vernon Jack K9SWY PO Box 143, Gays, IL 61928
May 3	Melville, NY	Suffolk Co RC/ David Potter W2GZD 51 Bayport Ave, Bayport, NY 11705
May 9	Duluth, MN	Arrowhead RAC/ Ron Carlson K0BR 5128 Wyoming St, Duluth, MN 55804
May 9	Flemington,NJ	Cherryville Rptr Assn/ Donald Mazak NR2H 2 Meadowrun Way, Flemington, NJ 08822
May 10	Medina, OH	Medina 2 Meter Gp/ Clarence Miller WA8JLA 620 Oak St, Medina, OH 44256
May 15-17	Broken Arrow,OK	Broken Arrow ARC/ Dave Cox NB5N 1812 S. Umbrella Ct, Broken Arrow, OK 74012
May 16	Godfrey, IL	Lewis & Clark RC/ Harold Elmore KC9GL 5203 Dixon Dr, Godfrey, IL 62035
May 16-17	Rochester, NY	Atlanta Div/NY State/ Harold Smith K2HC 153 Mason Ave, Rochester,NY 14626
May 16-17	Birmingham, AL	Birmingham ARC/ Dan Morgan KB4MDI 632 Stonehaven Dr, Birmingham, AL 35226
May 17	Tamaqua, PA	Tamaqua Trans.Soc./ Allen Breiner W3TI 212 Race St, Tamaqua, PA 18252
May 17	Athens, OH	Athens Co ARA/ John Cornwell NC8V 101 Coventry Lane, Athens, OH 45701
May 17	Wabash, IN	Wabash Co ARC/ Donald Spangler 235 Southwood Dr, Wabash, IN
May 17	Old Brige Twp, NJ	Old Bridge Radio Assn/Chris Mohr N2DHN 50 Harrison Place, Parlin, NJ 08859
May 17	Randolph, OH	Portage ARC/ Joanne Solak KJ3O 9971 Diagonal Rd, Mantua, OH 44255
May 17	Wrightstown,PA	Warminster ARC/ Frederick Reichert KA3BET 1062 Quarry Hall Rd, Norristown, PA 19403
May 17	Old Westbury,NY	Long Is Mobile ARC/ Henry Wener WB2AW 53 Sherrard St, E Hills, NY 11577
May 17	Knoxville, IL	Knox Co ARC/ Ketih Watson WB9KHL 119 S. Cherry St. 3, Galesburg, IL 61403
May 17	Kankakee, IL	Kankakee ARS/ Frank DalCanton KA Rte 1 Box 361, Chebanse, IL 60922
May 23	Columbia, MO	Central MO RA/ Joyce Maggi KA0KSL Rte 10, 4 Bon Gor Ct, Columbia, MO 65202
May 23-24	Knoxville, TN	RAC of Knoxville/ George Nichols 12434 Buttermilk Rd, Knoxville, TN 37932
May 24	Ephrata, PA	Ephrata ARS/ Randy Maurer WA3HLP 1655 West Main St, Ephrata, PA 17522
May 24	Roanoke, VA	Roanoke Valley ARC/ Ronnie Bratton KA4YUY 205 Wentworth Ave NE, Roanoke, VA 14012
May 29-31	Sioux City, NE	Siouxland ARA/ Dick Pitner 2931 Pierre, Sioux City, NE 51104
May 29-31	Seaside, OR	Oregon State Convention/ Randy Stimson KZ7T 9890 SW Inglewood, Portland, OR 97225
May 31	Newington, CT	Newington ARC/ Joel Kleinman N1BKE Newington, CT 06111
Jun 5-7	Arlington, TX	Texas State/ John Fleet WA50HG Box 25028, Dallas, TX 75225
Jun 7	Salina, KS	Central Kansas ARC/ Jim McKim 1404 S. 10th St, Salina, KS 67401
Jun 7	Erlanger, KY	Northern KY ARC/ John Thernes WM4T 60 Locust Ave, Covington, KY
Jun 7	Rome, NY	Rome Radio Club/ William Effland Rte 233 Box 157, Westmoreland, NY 13490
Jun 7	Manassas, VA	Ole VA Hams ARC/ Art Whittum W1CRO 12212 Woodlark Ct, Manassas, VA 22111
Jun 7	Muncie, IN	Muncie Area ARC/ Harvey McMath WB9SYL PO Box 2283, Muncie, IN 47302
Jun 7	Pittsburgh,PA	The Breeze Shooters/ Wm Kristoff Jr N3BPB 205 Twin Oak Dr, Wexford, PA 15090
Jun 7	Akron, OH	Goodyear ARC/ D.R. Buckwalter KC3CL Akron, OH 44316
Jun 13-14	Albany, GA	GA State Convention/ John Crosby K4XA 2506 Devon Dr, Albany, GA 31707
Jun 13-14	Hays, KS	Hays ARC/ Robert Pletcher NN0N 1104-C East 17th St, Hays, KS 67601
Jun 14	New York, NY	Hall of Science ARC/ Stephen Greenbaum 85-10-34 Ave, Jackson Heights, NY 11372
Jun 14	Willow Spgs,IL	6 Meter Club of Chic/ Jim Novak WA9FIH 2337 So.6th Ave, No. Riverside, IL 60546
Jun 20	Cortland, NY	Skyline ARC/ Billy Williams N2AGF Cortland, NY 13045

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.

New Low-End Scanner from Regency

Regency Electronics has announced the next step up in the low-cost R series of programmable scanning receivers. The R1090 adds a number of advanced features not found in earlier 1040-1075 models, including 45 memory channels, automatic weather scan and priority.

Frequency coverage is 30-50, 144-174 and 440-512 MHz, read out on a fluorescent display which also conveys other status messages. Memorized channels may be sequentially scanned or grouped into four banks. Additional features are fast/slow scan speed, capacitor memory backup (no battery required) and channel lockout.

The R1090 comes with telescopic whip, AC cord and instruction manual. Its recommended retail price is $239.95.

Hamtronics CA137-28 Weather Satellite Converter

Hamtronics®, Inc. recently announced a new receiving converter designed for reception of weather fax pictures transmitted from satellites operating in the 137 MHz band. Basically a modified version of their CA144 two-meter amateur converter, the CA137-28 Converter translates all signals received in the 136-138 MHz satellite band for reception on tunable 28-30 MHz wideband FM receivers.

To make the conversion in dial frequency, simply subtract 108.000 from the frequency you want to receiver. The converter uses a low-noise front end to provide sensitivity of less than 0.2 uV; it operates on +13.6 Vdc at 30 mA.

The Hamtronics® CA137-28 Converter is available in three versions: a wired and tested version in the 4x4x2 inch cabinet, $69; kit form, $49; and a kit to build just the pc board module, less case, $39. Shipping and handling is $3.

Scanner Bookarama

Traveler's Frequency Directory

Second edition (61 pages, 6" x 9", paperbound; $8 from Scan America, 430 Garner Drive, Dept. MT, Suffield, OH 44260-1557)

Intended for the interstate motorist, this handy mobile guide tells the user the frequencies to program as he travels from state to state. Since virtually all listeners in this category will be monitoring law enforcement, this is the book's emphasis.

Arranged alphabetically by state, lists include highway patrol channelization plans, ten codes, and even zone charts to help with programmaing within a given state.

Military Radio Systems (California)

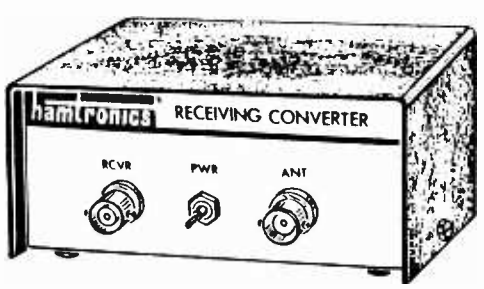
By Robert Kelty (80 pages, 8-1/2" x 11", offset printed/stapled; $10 from Mobile Radio Resources, 2661 Carol Drive, Dept. MT, San Jose, CA 95125)

Intended as a supplement for Kelty's popular *Government Radio Systems*, this publication follows the same format and comprehensive quality. Listings concentrate on non-sensitive military base communications throughout the state of California.

Repeater input/output pairs are given as appropriate, even with tone squelch frequencies in some cases. Channelization plans are included. Because military frequency blocks are similarly shared nationwide, the guide is a handy reference outside California as well.

Scanner Master-- Maine, New Hampshire/Vermont

(Approximately 300 pages, 8-1/2" x 11", perfect bound; $23.95 plus $1.75 shipping from Scanner Master, P.O. Box 428 Dept MT, Newton Highlands, MA 02161; 617-653-9041)



Two new scanner directories from co-editors Edward Soomre and Richard Barnett reflect the excellence of their previous books. Excellent bold printing shows data arranged in convenient cross reference by city, frequency and service.

Contents are probably the broadest based to be found in any directory, including public safety, schools, sports teams, marine, aircraft, railroads, hotels, business, weather channels, amusement parks, government, amateur radio, and many more.

An introductory chapter provides system profile details for those who would like to know more about the planning that goes into major radio communications installations, and a handy reprint from the FCC shows frequency allocations for the services in low, high and UHF scanner bands.

Haruteq Scanner Book (Quebec edition)

By Bart Veerman (115 pages, 8-1/2" x 11", spiral bound; $14.95 in Canadian funds plus $3 postage from Haruteq, PO box 9268, Dept. MT, Stoney Creek, Ontario, Canada, L8G 3X9)

Arranged by cross-referenced frequency and location, the Haruteq guide profiles the entire province of Quebec and does it well. Major agencies like RCMP; Bureau of Energy, Mines and Resources; airlines and airports; public utilities; government and law enforcement.

Additional chapters feature hints for better listening including bandplanning, weather forecast interpretation, antenna measurements, interference, and repeater systems.

Scanner Radio Listings Cleveland/Akron/Youngstown edition

By Norm Schrein (8-1/2" x 11", 269 pages, perfect bound; available from Amateur Electronic Supply, 28940 Euclid Avenue, Dept. MT, Wickliffe, OH 44092)

Now that Fox Marketing has discontinued their local scanner directories (they had about three dozen), editor Norm Schrein has secured permission for private publication of his scanner monitoring database. Fox will continue to publish their new regional directories, however.

This first edition for Ohio follows the quality printing and binding of the previous Fox efforts; it is an updated version of a previous Cleveland directory, expanded to include Akron, Youngstown and bordering communities.

Traditional with the series, this newest directory is cross referenced by location, licensee, call sign, service, and frequency.

...And Other Books,

The World Ham Net Directory

By Mike Witkowski (28 pages, 8-1/2" x 11", spiral bound; $9.95 plus $1 shipping ($2 foreign) from Tiare Publications, PO box 493, Lake Geneva, WI 53147)

No amateur or SWL with an inquisitive mind should be without this new directory from Tiare. Mike Witkowski has done and excellent job of compiling worldwide amateur radio networks to be heard between 3 and 30 megahertz.

Conveniently cross referenced by alphabetized name, frequency and time, "the directory lists many categories found on a scheduled basis--severe weather and emergency networks, Morse training, International Police Association, traffic handling, novice training, swap shops, veterans groups, RV service, Russian DX, maritime, religious--you name it, and you will find it!

This handy directory, combined with the ARRL net directory, provides a powerful monitoring tool for the HF ham bands.

Radio's First Two Decades

(63 pages, 6" x 9", paperbound; $3.50 plus $1 shipping from Cologne Press, PO box 682, Dept. MT, Cologne, NJ 08215)

Radio historians will delight in this excellent reprint of a 1942 book describing milestones in the evolution of commercial radio. Lavishly illustrated with historic photos (mostly from RCA and the Brown Brothers), the book describes the classical theories of radio wave transmission and how early experimenters coped with the phenomena.

Pioneers like Maxwell, Hertz, Marconi, Fessenden, DeForest, Edison, Fleming, and Armstrong are all referenced by their contributions. Written in a very easy-to-read manner, *Radio's First Two Decades* is an enjoyable and relaxing primer on our hobby.■

Lawrence Magne

Editor, Radio Database International

MAGNE TESTS...

The Panasonic RF-B60 Portable

Back in the late 1970's and early Eighties, Panasonic was a name to be reckoned with in world band radio. Their pioneering RF-2800 was the first digital portable to hit the market, and it was so successful that until early this year a variant of it -- the GE World Monitor -- was still being sold. Other Panasonic gems of the period were the RF-2200, which came with its own rotatable antenna, and the RF-2900...an improved version of the '2800.

In fact, Panasonic's world radio design team did so well that they got promoted to another department to design computer hardware. Unfortunately, the new team didn't do as well as the first one did. So Panasonic faded into the background while firms, such as Sony, charged forward to fill the gap.

Now, it seems as if Panasonic is back with some really worthwhile shortwave products. We've looked at a couple of these recently, the most interesting being the compact model RF-B60.

It's always been part of Panasonic's "corporate culture" to avoid innovation and to concentrate, instead, on doing a slightly better job than the guys who got there first. It's not a very exciting philosophy, but it has turned Panasonic into one of the great names in electronics.

RF-B60 A Takeoff On Sony's Popular ICF-2002

The 'B60 fits right into the Panasonic mold. It's obviously a takeoff on Sony's ICF-2002 -- also known as the ICF-7600D -- which Sony came out with in 1983. It's tuning is fully synthesized, and the set's size, weight and features combine to make it ideal for traveling. But it does have a number of improvements -- along with some of drawbacks -- as compared with Sony's popular model.

The first and most notable improvement is in the tuning. The Sony has up/down slewing buttons, but no tuning knob. The Panasonic has both. The Sony tunes in 5 kHz increments, whereas the Panasonic tunes in either 5 or 1 kHz increments. The Sony uses slewing to leap from one band to the next, while the Panasonic has a more convenient pushbutton arrangement.

Programmable channel memories can be useful if you listen to certain stations regularly. The Panasonic has 36 of these, whereas the Sony has only ten. However, for shortwave the Panasonic has only nine, whereas all ten of the Sony's work on shortwave. So the Panasonic's advantage is more apparent than real.

The Panasonic also has a little flip-up chart where you can mark down what stations are entered within each memory channel. With the Sony, you have to mark these down on a separate slip of paper or keep them in your head.

A signal strength indicator can be an aid in tuning, and also is nice to have for monitoring and logging. The Panasonic has a digital indicator with fifteen increments; the Sony has a single little "glow light" that is all but useless. On the other hand, the Panasonic indicator tends to overread, which makes it less useful than it could be.

Superior Audio Quality

But probably the biggest plus with the Panasonic is its audio quality, which is superior to that of the Sony. Even though the Panasonic has only a two-position switch for a tone control, it sounds quite pleasant on longwave, mediumwave AM, FM and shortwave. In fact, this little set sounds so good that you can but wonder what a set of bass and treble controls could have accomplished -- especially on FM!

There are some other refinements, too...two clocks instead of one, for example. Panasonic's warranty is two years, too -- twice as long as Sony's.

But there are some aspects of the Sony that will continue to make it preferable, especially for the DXer. For one thing, the Panasonic won't receive single-sideband signals, even though a brochure that comes with the set goes into some detail explaining single sideband. The Sony does receive single sideband. And Sony's selectivity is a bit tighter, too, although that on the Panasonic is well-suited to reception of ordinary international broadcasters.

Another small touch found on the Sony, but not on the Panasonic, is a separate clock display. You can read the time and frequency at the same time, as the set has separate displays for each. But the Panasonic displays the clock or the frequency, but not both simultaneously.

Otherwise, the two sets share much in common. Both have only fair field sensitivity with the built-in telescopic antenna, and neither has adequate dynamic range to operate successfully with a serious outdoor antenna. Also, neither has a dial light to aid in nighttime operation, and the clocks on both sets don't display seconds. Both read out frequencies to 1 kHz on an LCD.

For traveling, both have "lock" controls to prevent the sets from going on accidentally in your suitcase and running down the batteries. But the Panasonic's lock slider switch is right alongside the volume slider control. So we found ourselves switching that on and off accidentally at times.

Unusual Tuning Knob

Designers of portables try to keep protrusions to a minimum, as these tend to get hit and sometimes even knocked off while the set is being toted about. In this regard, the 'B60's tuning knob is interesting for two reasons. First, it appears as a conventional -- yet almost flush -- round knob on the front panel. But, in addition, it operates as a knurled control from the side of the set.

That's a clever approach to a very traditional control, although it would have worked a heck of a lot better if Panasonic had included a fast-tuning dimple on the front of the knob. The way it is now, you can't grip the side of the knob. Because it's recessed, you're stuck with having to turn it by pressing down hard on the knob's front surface -- hardly the ideal arrangement, and tiring, too.

The 1987 *Radio Database International* shows the Sony ICF-2002/ICF-7600D as listing for $269.95 in the US. Not surprisingly, the Panasonic RF-B60 lists at the same price, to the penny.

The Bottom Line

The bottom line is that Panasonic's new offering is the better choice for the typical shortwave listener. It's a snap to operate and sounds darned good. By the same token, the Sony's tighter selectivity will continue to make it preferable for DXing. Hams and others tuning non-broadcasting signals have no real choice, as the Panasonic can't receive these sorts of signals intelligibly. ■

You can hear Larry Magne's equipment reviews and news, along with reports from *Radio Database International*'s Don Jensen and Tony Jones, the first Saturday night of each month over Radio Canada International's "SWL Digest" at 8:00 PM Eastern Time on 5960 and 9755 kHz.

RDI White Papers providing in-depth "hands-on" and laboratory evaluation of a variety of tabletop receivers, plus a just-released 33-page report evaluating popular outdoor antennas, are now available for $4 each postpaid in North America, or $6 airmail worldwide, from *RDI* dealers worldwide, or direct from *Radio Database International*, Box 300, Penn's Park PA 18943 USA. A complete list of all available *RDI White Papers* may be obtained by sending a self-addressed stamped envelope to the same address.

Grove
Used Equipment

First come, first served. *All products subject to prior sale. Prices include 90 day limited warranty on used equipment and UPS shipping. For charge orders (minimum $15) or C.O.D. call 1-704-837-9200. Send check or money order to Grove Enterprises, P.O. Box 98, Brasstown, NC 28902.*

RECEIVING EQUIPMENT

Radio Shack PRO-2 Tunable/Crystal Public Service Receiver -
30-50 and 152-174 MHz AM or FM. Excellent with manual. Sell $69.00.

Bearcat 350 Deluxe Scanners (3 in stock) -
50 memory channels, alpha numeric readout, excellent. AC cord, manual, whip, original box. Cost $400, sell $179.

Realistic PRO-2001 Programmable Scanner -
16 channels, low/high/UHF bands Fair appearance, good working order. Cost $400, sell $79.

ACCESSORIES

InfoTech M200E Multimode Demodulator -
Morse (6-85 wpm), RTTY (60, 66, 75, 100 wpm), and ASCII, like new with manual and original box; cost $400, sell $199.

Heathkit HO-13 Ham Scan
(Panadaptor CRT spectrum display) adjusted for Icom R7000 (10.7 MHz IF); 700 kHz wide display. Very good condition with manual. Sell $179.

Modublox 5/8 Wave Telescoping High Band Whip, BNC base.
Ideal for extended range on 2-meter handi-talkie or handheld scanner. Cost $65, sell $25.

Qume Sprint Daisy Wheel Printer;
Wide carriage, extra print wheels and ribbons; excellent. Cost $2000, sell $850.

InfoTech M200E RTTY/Morse Demodulator -
Morse (6-85 wpm), RTTY (60, 66, 75, 100 wpm), and ASCII, like new with manual and original box; cost $400, sell $199.

MFJ 722 Optimizer -
SSB/CW notch filter, like new. Cost $80, sell $49. Requires 12 VDC, (available for $9.95).

HAL CWR6850 Telereader
(portable RTTY/CW terminal with built-in 'scope display) with keyboard, excellent with manual; 1-100 WPM Morse; 45, 50, 57, 75, 110, 300 baud RTTY; requires 12 VDC @ 1.7 A.; cost $700, sell $379. Regulated 12 volt power supply, $15.

B&W FL 10/1500 TVI Filter
for ham or CB transceivers up to 1500 watts, like new with instructions. Cost $45, sell $29.

TEST EQUIPMENT

Telonic SM-2000 Laboratory Sweep Generator
with 4 plug-ins; LH-2 (0-100 MHz), S-4 (150-500 MHz, E-1 (500-1800 MHz), E-2M (600-2400 MHz). Very good condition with manual, $1500.

TS-418BU Signal Generator,
400-1000 MHz, metered output, 0.2-200,000 microvolts; very good condition with manual, $150.

TS-382/DU Audio Oscillator,
metered output, 20-200,000 Hz; good condition with schematic, $75.

TOOLS

Waage RSP2-13-1 Solder Pot,
1200 watt, thermostat, 4" x 8" bath; very good condition; cost $187, sell $125.

Kester 63/37 Bar Solder,
32 one-poound bars, new. Cost $320, sell $250. Combination solder pot and solder, above, $400.

FINAL CLEARANCE!

Signal Amp (PRE2) -
1-1000 MHz antenna-mounted preamplifier for short wave or scanner use; 20 dB midband gain, low noise. Only 13 left, so HURRY! $59 value, sell $20 including UPS shipping. (Requires AC adaptor; available for $9.95 (ACC20) plus $1.50 UPS shipping).

Low-Loss RG-6/U Cable -
Ideal for shortwave and scanners! RG-6/U is universally preferred by the cable TV industry and works exceptionally well for scanners and short wave installations too. Impedance is 75 ohm. 100% shielded, foam-dialectric with 18 gauge solid-copper center conductor. PVC covered, all-weather coax suitable for the most stringent requirements. Order plenty at this clearance cost! UPS shipping included.

1000 ft (CB-1K)	$119	value $69!
500 ft (CB500)	$79	value $39!
200 ft (CB200)	$31	value $19!

NEW BOOKS AT COST

(Limited supply, shipped bookrate; prices for USA only)

Muzzled Media by Gerry Dexter - A guide to tell where and when to tune for English language news from other countries. Order BOK20. $8.95 value for only $6.50.

The Hidden Signals on Satellite TV by Tom Harrington and Bob Cooper, Jr. - How you can receive stock market reports, long distance telephone, news and press teletype, special sports events, background music National Public Radio and MORE! Second edition, 234 pages. Order BOK19 $19.95 value only $8.50.

Clandestine Confidential by Gerry Dexter - All about the counterculture of world broadcasting. Hear rebels and terrorists spread their word through shortwave radio. Includes addresses for QSL's. Order BOK21. $8.95 value for only $3.50.

Secrets of Successful QSL'ing by Gerry Dexter - Increase your QSLs with this excellent reference book on the protocol of QSLing. Order BOK22. $9.95 value for only $6.75.

Language Lab by Gerry Dexter - Simple how-to book to assist you in requesting and receiving Spanish QSLs. Order BOK23. $12.95 value only $8.75.

Sherwood Signal Monitor

It was only a matter of time before enterprising manufacturers recognized the need for add-on spectrum displays for high technology receivers like the ICOM R7000. A CRT (cathode ray tube) screen can visibly show a wide swath of radio spectrum, revealing the presence of signals away from the frequency to which the receiver is tuned (see illustration).

The Sherwood SCA-7000 is exemplary as a spectrum display unit (SDU)--low profile, easy to use and accurate in its representation, but it's expensive for the hobby listener, costing considerably more than the ICOM R7000 itself with which it is designed to be used.

In limited supply, the SCA-7000 is targeted at the countermeasures profession. A three-inch round CRT allows a 2-1/2" display which represents one megahertz spectrum bandwidth (reduceable to under one kilohertz with a front panel control). Powered by either 115/230 VAC or 12.5-16 VDC, the SCA-7000 measures 6"W x 4"H x 11.5"D and weighs 4 pounds.

Front panel controls include sweep rate, center frequency, gain, log/linear deflection, and center marker. Recessed rear panel adjustments are provided for intensity and focus.

Our Test

The SCA-7000 spectrum display unit was connected to the 10.7 MHz IF output of an off-the-shelf ICOM R7000 receiver. A strong local signal was tuned in and the SDU was adjusted according to instructions. Within seconds (the warmup period for the filament of the CRT) a strong "pip" or "spike" appeared, announcing the presence of the signal.

The trace was sharp and linear, end to end, and closely-spaced signals were readily discernible as separate spikes on the trace, even when considerably different in amplitude--a definite plus when looking for "snugglers" (weak bugs purposely placed close in frequency to strong broadcast signals to avoid detection by broadband countermeasures tools). Signals up to one megahertz apart remained on screen and tracked smoothly as the receiver dial was turned.

Signal-to-noise ratio of the SDU is excellent; if a signal was strong enough to break the squelch of the receiver, it was visible above the noise floor ("grass") on the display. From turn-on until power-down, even after several hours, the baseline remained virtually driftless on the screen with no touch-up adjustments required.

Selectivity of the Sherwood was outstanding; the dual-conversion circuit features high-side injection and showed no in-band images even with the strongest signals present. Its compact size makes it an ideal companion for the R7000.

An SDU provides an enormous advantage to the VHF/UHF monitor; regardless of the receiver setting, as soon as a signal comes on the air within the sweep range of the unit it will be spotted; the receiver is quickly tuned to that frequency to capture the elusive transmission.

(SCA-7000 signal monitor; $1600 from Sherwood Communications, 1310 Industrial Highway, Southampton, PA 19866; ph. 215-357-9065).

JABCO Voicegate

Listeners are always looking for a "magic box" which will make a silk-purse receiver out of a sow's-ear noisebox. While the ultimate accessory will never be found, the new JABCO "Voicegate" is the most flexible audio processor we've had the pleasure of testing.

Connected between the speaker or earphone jack of a receiver and your external speaker, the Voicegate needs 12-20 volts AC or DC power at 500 ma. (optional supply $9.95); an internal voltage regulator smoothes out the appropriate DC level.

Audio input (4-16 ohms nominal) from the receiver is processed selectively by two adjustable null (notch) filters (400-4000 Hz approx.) and one peak (bandpass) filter (400-5000 Hz approx.).

An audio gate (squelch) separates background noise from the desired signal and also keys a relay which may be used as a tape recorder activator. As much as 2 watts of audio is available from the LM380 internal audio amplifier.

First Impressions

The Voicegate is housed in a professional-looking, painted aluminum cabinet with wood-grain vinyl panels. A removable top cover allows access to internal adjustments (if ever necessary) and reveals a clean, well-laid-out printed circuit board.

Compact (6"W x 2-1/2"H x 6"D) and lightweight (19 oz), the controls are very tight on the front panel, somewhat awkward for fat fingers. The null controls are extremely sharp tuning, and the small knobs take some patient tweaking.

Panel legends are bold black and, for the most part, quite easy to read. While the dial marks do not match the rotational stops of the three controls, tuning is done by ear and the marks provide high/low directional information.

After pointing out these few criticisms it is a pleasure to point out the performance perks of the Voicegate.

Our Lab Test

The Voicegate was connected to a Kenwood TS440S transceiver for its audio source; the main output was connected to a Kenwood speaker and the tape output was connected to an InfoTech M600 RTTY/Morse demodulator.

Null Performance

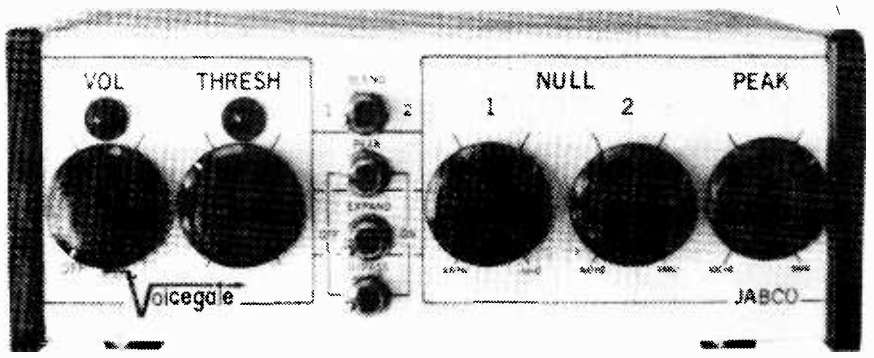
Two rotary null (notch) controls permit the simultaneous reduction of any two tones in the audio passband; alternatively, both controls may be adjusted to the same frequency to provide even greater reduction of a single offending tone.

One of the best applications of the unusual dual notch feature is the reduction of two-tone frequency shift keying (FSK or RTTY) interference; one control is set on the mark signal and the other on the space signal, permitting the desired signal to be much more readable.

Peaking

A peak control permits selection of a single audio note (400 to 5000 Hz) such as a CW signal to be copied while reducing adjacent signal interference. To test this function we purposely chose a crowded CW band and selected a weak signal in the background mire.

As the peak control was turned, one at a time the various pitches of the clustered signals were enhanced,



then suppressed. The effect was sharp, yet not unduly harsh, and definitely provided an extra measure of audio selectivity.

Stubborn residual interference from extremely strong CW signals was easily attenuated or removed by the null controls.

Threshold

An unusual feature is the threshold control, really an audio squelch system. When signals are near the noise floor of the receiver, listening fatigue is inevitable; but with adjustable threshold, the listener can provide a level below which the noise disappears, making voices or Morse signals seem to appear out of a quiet background.

A "blend" control permits the injection of a small amount of background noise to decrease the distortion of abrupt threshold action (fast attack/decay) and the separation between signal and noise can be further enhanced by calling in the "expand" switch.

An unintentional benefit of the Voicegate's record output jack is the ability to feed audio at an adjustable level to a RTTY or Morse demodulator, then turn down the unit's volume control so that the irritating audio doesn't have to be audible. What a blessing-- no more doors slammed by family members who are being driven to distraction by the "diddly-diddly" sound of radioteletype!

Bypass

The unit may be conveniently disabled at any time at the throw of a toggle switch, restoring the audio system to the receiver and speaker alone. To the Voicegate's credit, with the unit left active and all controls set to minimum (threshold and volume on), there is hardly a perceptible difference between the receiver's audio and that which passes through the Voicegate -- characteristic of a well-designed accessory.

It is rare that an accessory which we test winds up as part of our own monitoring post, but the Voicegate is there on permanent assignment. ●

Clem Small, KR6A/1, CET
R.R. 1, Box 181
Salisbury, VT 05769

VHF-UHF Antennas - Conclusion

VHF-UHF antennas may be categorized into two groups: beams or directional antennas; and nondirectional or omnidirectional antennas. When I say "beam," I am referring to an antenna which has a pronounced directional pattern in the horizontal plane. A nondirectional antenna, of course, tends to have a radiation pattern which is essentially the same in all directions (again, this refers to the horizontal plane).

The "Nondirectionals":

We'll start our discussion of nondirectional antennas with the groundplane, which is probably the most widely used VHF-UHF antenna ever devised. There are some very good reasons for its wide usage: it provides nondirectional coverage, it is easy to construct and to erect, and it stays up well in high winds. And, although it has low gain (1.8 dB less than a dipole) it is sufficiently sensitive to provide good coverage of local communications in most situations.

But the groundplane does have its limitations: it is essentially a one-band antenna and its gain is not adequate for weak signal reception.

Within any one band its bandwidth can be extended, as is true for most antenna designs, by making the elements "fatter" (larger in diameter). Multiband groundplanes can also be constructed by such means as using individual elements for each band to be covered, all mounted on the same antenna frame.

But if we really want a broadbanded nondirectional antenna, the discone is hard to beat. Just as with the groundplane, it is limited by low gain. It also is somewhat unwieldy in physical design and is a bit more prone to wind damage than a groundplane. But this is more than made up for by its 10 to 1 frequency coverage. That's a very wide bandwidth, indeed, allowing coverage from VHF into UHF.

Probably the next most common antenna in use for VHF-UHF work, especially in monitoring, is the venerable dipole. And again there are good reasons for its popularity. A halfwave dipole exhibits 1.8 dB gain over the quarterwave type antenna. When mounted vertically, it provides a flatter vertical radiation pattern than the groundplane. This flatness of pattern allows more of the signal to travel near the earth, less being wasted in skywave radiation. This makes the vertical dipole a bit better at digging out distant signals.

The 1.8 dB increase in gain isn't much, but sometimes that's all you need to bring a signal up to "copyable" level. Unless it is broadbanded in some fashion, the bandwidth of the straight dipole is somewhat limited. For use across a single wide band, the halfwave folded-dipole design gives greater bandwidth than a simple dipole.

An antenna with an even flatter pattern and more gain (1.2 dB, referenced to a dipole) is the 5/8-wave vertical groundplane. Short of going to one of the multi-section, long verticals discussed below, this antenna is one of the more respected designs for single-band omnidirectional coverage.

Polarization

The horizontal dipole is much used for commercial television in the VHF-UHF bands, and for some work in amateur radio. In my experience, most other VHF-UHF services seem to prefer vertically polarized signals.

Antenna polarization is a function of how you orient the antenna when you mount it. Vertically oriented dipoles, for instance, are vertically polarized. Horizontally mounted dipoles are horizontally polarized. You should consider polarization when you mount your antenna and set it up for the polarization most commonly encountered in the signals which you monitor.

On the HF band (3-30 MHz) polarization isn't so much a consideration; the signals change polarization randomly along their propagation path. But on the line-of-sight propagation bands, VHF and above, polarization is an important antenna consideration. Improper polarization of an antenna in respect to the incoming signal can result in more than 20 dB loss of signal strength ... and that, you don't want!

Higher Gain Nondirectional Antennas:

The multiple skirt-sleeve, or multiple radial-set antennas are designed to utilize several in-phase radiating sections on a single vertical antenna. They often provide something like 3 to 5 dB gain (or more for super long versions) over a dipole; and, in so doing, they produce a flatter omnidirectional radiation pattern when compared to the single halfwave antennas or the 5/8 wavelength vertical mentioned above.

These antennas are necessarily physically longer than the lower-gain models and therefore require more mounting space. Being longer, they also have more wind resistance and so are not as tolerant of high winds as lower-gain models. They can be made quite durable, however, so this needn't be a problem if they are constructed well.

A Note on Antenna Gain Figures:

You will notice that I compared the gain of the antennas mentioned above to that of a halfwave dipole, a standard practice for antenna comparisons. Since most of us have used halfwave dipoles we have some idea of what it means if an antenna is said to have more or less gain than a dipole.

Beware! Some manufacturers use other references such as isotropic radiators or quarterwave antennas. If we are assuming that they are reporting gain for their antenna as referenced against a dipole, then this makes their antennas sound more responsive than is actually the case.

You may see two apparently physically identical antennas, for two different manufacturers, and yet one claims a higher gain figure than the other. Chances are that the one with the higher-claimed gain is not referenced to a dipole. Actually, the gain of the two antennas is likely to be identical.

Beams:

The three-element Yagi-Uda beam is probably the most widely used beam for both shortwave and VHF-UHF work. It is relatively lightweight, easy to construct, and it had a beam width that is narrow enough to give it good gain (8 dB), but not so narrow as to make if difficult to aim.

The two-element cubical-quad beam is also much used for similar reasons. Although its dimensions are in the shape of a large cube (thus "cubical" in the name) it is, nevertheless, lightweight and relatively easy to handle. The quad has a gain of 7 dB.

Either of these beam designs can be constructed to utilize more elements, leading to gains of 10 to 15 dB or more.

Both types of antennas can be constructed to give good response over a single band of frequencies. Some broadbanding is possible with the Yagi-Uda, and multiple elements can be constructed for the quad to allow it to operate on more than one band. But for wide frequency coverage with a reasonably-sized, rotatable beam antenna, the LP (log periodic) design is usually chosen.

The LP type of antenna can exhibit a 10 to 1 frequency coverage, allowing good performance across wide segments of the spectrum with one antenna. This broad response comes at a price, however; the LP design provides less gain than a comparably-sized quad or Yagi-Uda beam.

Polarization for the Yagi-Uda or the LP depends on how you orient the antenna elements during mounting, just as for the dipoles discussed earlier.

Placement of the feedline attachment determines the quad's polarization: Feeding the driven element at center of the top or bottom edge give horizontal polarization; feeding at the middle of a side gives vertical polarization. ▶

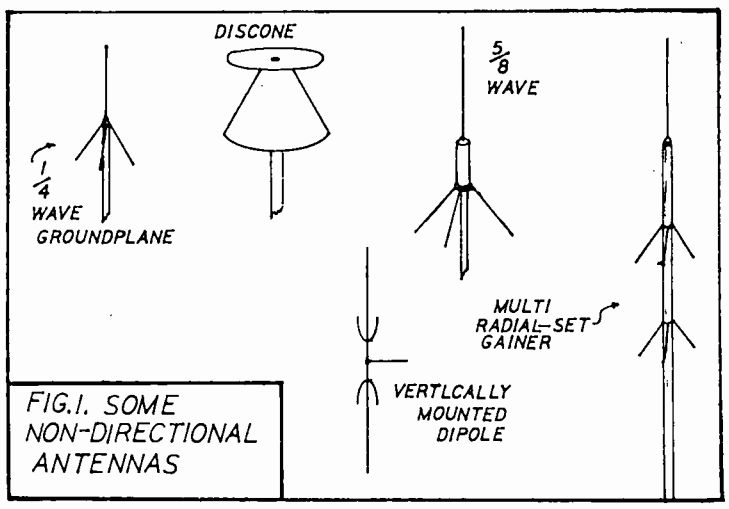


FIG. 1. SOME NON-DIRECTIONAL ANTENNAS

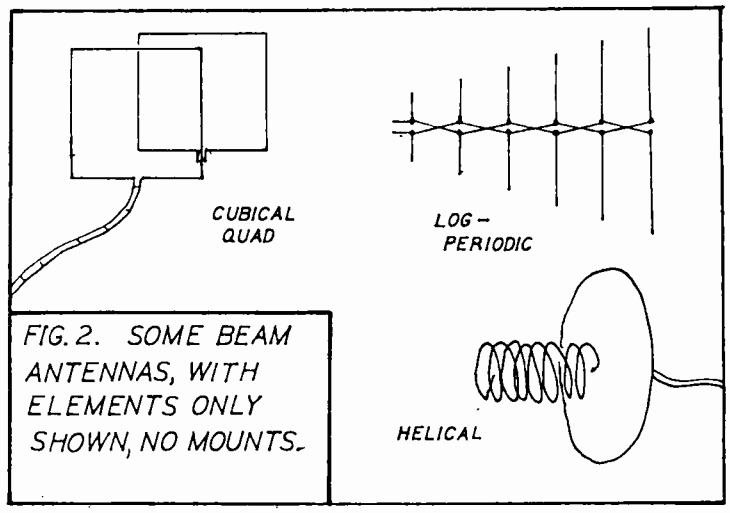


FIG. 2. SOME BEAM ANTENNAS, WITH ELEMENTS ONLY SHOWN, NO MOUNTS.

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For space, satellite or other demanding UHF work, parabolic dish reflector antennas and helical antennas are useful. Both are capable of very high gain, 20 dB and more. This high gain leads to a relatively narrow beam width and accurate aiming is necessary with these antennas.

The helical antenna exhibits circular polarization which reduces its response to non-circularly polarized signals by 3 dB. However, in some instances where you desire to receive signals of varying polarizations, this 3 dB loss may be more than compensated by the high gain.

Both the helical and the dish antenna would be classified as relatively broadband, giving good response over a fairly wide range of frequencies. This can be up to 8 to 1 for the helix.

The bandwidth of the parabolic dish antenna is determined partly by the feed-antenna, the small antenna at the focal point of the dish which receives the reflected energy. Frequently a dipole is used as the feed-antenna, but other, more broadbanded antennas, such as the LP, may be used.

And So...:

Obviously this discussion has not covered all antennas, but it has covered the more popular types you may encounter. Designs you will find in communications catalogs and how-to-build-it articles will most likely be some variant of the designs discussed here.

Where to Go for More Help:

In today's hi-tech world, antennas are one of the few components in your communication system which you can build, and expect to have a commercial-quality component when you finish (if you work carefully). Communications journals such as *MT, CQ, Ham Radio, QST, 73,* and *Popular Communications* frequency carry articles on constructing your own antennas. The references at the end of this column are good sources for both construction information and also discussions of the principles involved in antenna performance.

If you decide to buy rather than build, try writing the communications equipment suppliers who advertise in *MT* or any of the other communications journals; tell them you want information on the antennas they sell. There are a number of commercial antenna manufacturers and, among the lot of them, there are quite a few designs available to you.

Please turn to page 54

Computer Logic - The Next Step

Last month we looked at some of the more common TTL chips found in garden variety PC adapter cards; this month we are going to start the design of the universal parallel adapter and get down to some serious hardware building.

Before I go any further with the hardware, let me say for those of you who have a working knowledge of the PC bus that we are going to build an adapter that works in the "polling" mode; this means that the software running in the PC must constantly check each device on the adapter to see if it needs attention. This is in contrast to an "interrupt-driven" device which adds a lot of hardware and software to the project.

The adapter we are undertaking will be simple in nature and easily constructed and, even more important, easy to program. Most of you will probably do the required programming in BASIC; however, Pascal, C or most any other PC language will suffice. The examples in the following columns will be given in Basic.

Getting Started

On the hardware side, I suggest wire-wrap construction on a standard prototype board specifically designed for the pc. MDR Microdevices and others carry them, and one is available from your local IBM dealer.

I would recommend the IBM version because the interface circuitry is already on the card and requires only that you insert the appropriate chips. I cannot emphasize enough to value of good sockets.

Referring to the schematic, everything to the left of the dotted line is circuitry that is on the prototype card, requiring only that the sockets be installed and the appropriate chips inserted.

We will use wire-wrap sockets in all positions and U1, U2,U3,U5, and U6 are all soldered on all pins. All other sockets need only be soldered on alternate corners to secure them to the card.

The above-mentioned IC sockets are soldered complete because they use the pc lands whereas the remaining sockets are completely wire-wrapped and contact no printed circuit lands.

Wire-wrap sockets are used in all locations because we must make wire-wrap connections to ICs that also have pc lands to accomplish the interface. Some of the pre-wired sockets on the prototype card will not be used.

Keeping Track

I would suggest photocopying the schematic and using a highlighter pen to trace each wire as it is installed on the card. IC sockets U8 through U12 can be positioned next to the hardwired area on the card in any neat orderly fashion. Layout is not critical.

Resistors can be 1/4 or 1/2 watt carbon 10% units; I find the quarter watt size easy to work with and they can be installed in a spare wire-wrap socket or just stuck through the card and wire-wrapped.

If you choose to wrap on the resistor leads, be sure to solder the wraps after everything is working. The round resistor leads will oxidize and give trouble later. The square socket pins will give a gas tight seal and do not require soldering.

S1 through S4 comprise a 4-position dip switch which can also be socket mounted or soldered in and wires soldered to the switch, with the further end wire-wrapped to the appropriate pins.

Voltage and Grounds

U8 through U12 will have to have voltage and ground pins wired in addition to the wiring shown. I use black 30-gauge wire for grounds and red for voltage wiring. Wrap the wire on the appropriate pin and then cut, strip and solder the other end to the voltage or ground bus.

Use a separate wire for each voltage and ground pin--do not daisy chain these pins. If you are using the IBM card, there are voltage and ground distribution busses all across the card. Connect the pins to these busses with the shortest wire length possible.

Install a 1 microfarad tantalum capacitor for every three chips used and wire from the voltage bus to the ground bus as near the chips as is reasonably possible.

All chips use a +5 Vdc; it is a good idea to install a 10 microfarad tantalum cap from the +5V bus to the ground bus at the point where the tab pins connect to the bus. The IBM card has holes in place for many of these capacitors.

If you are using other than the IBM card, you may have to wire-wrap all the chips including the PC bus connections. In the schematic, the left vertical row of figures starting with A9 signifies the card tab pin and the designation in parentheses is the bus signal name.

General Hints

Orient all the modules so that they face the same way; i.e., all pin one positions in the lower right corner for example. Leave at least two rows ▶

COMPUTER CORNER
cont'd from p.51

between modules. Arrange the wire wraps so there is a maximum of two wraps on any one pin.

If the card is to be installed in a pc, there is room enough to leave the pins full length; if it's going into an XT or clone, the pins may have to be cut off to avoid hitting an adjacent card. In this case, cut the pin off just even with the top of the wrap.

Keep the modules together, as we will be adding more modules as the construction proceeds. The ten modules installed thus far should occupy about the first third of the card.

Theory

Starting from the left side of the schematic, U1, 2 and 5 are buffer chips that present one TTL load to the pc bus (Remember last month's discussion on the 224 and 245 chips?). U1 buffers the data bus bits and provides direction control via pin 1 which is connected to the I/O read line and allows data to be transferred from the card when I/O read is low, and data to be transferred from the bus to the card when I/O read is not active.

If pin 19 of U1 is high, the chip is in a tristate condition and the bus is free to be driven by some other source. U5 is only a buffer for its lines; there is no direction change or disabling taking place U2 buffers the remaining lines in the same fashion.

AEN (address enable) and the address bits on U2 and U5 are presented to U9 and U8 with the exception of the four lines going to U10. Port address (I/O addresses) are ten bits wide, allowing addresses up to hex 3FF.

U10 is an exclusive OR circuit that works with the A2, 3, 4, and 8 address lines. A2 and 3 determine the low order section of the address the card operates at. A8 determines the high order section.

In the range of 000 hex through 3FF, many adapter cards are found. The IBM-assigned address range of the prototype card is hex 300 through 31F. There is a game adapter card whose address is assigned 200 through 20F but, in fact, only uses 201. By exclusive ORing bit 8 with switch 4, we can set the high order section to either a 2 or a 3, resulting in a card address of 2xx or 3xx.

The same exclusive OR circuit on each of the A2 and 3 address bits allow setting the low order section of the card address. The middle digit of the address is decoded from the A4, 5, 6, and 7 address lines. A5, 6, and 7 are fed to U9 along with AEN to enable U8 when they are all 0, thus A4 is the only address bit of the middle digit that can change, and results in either a 0 or a 1 in that position.

The final address combinations that can be set via the switches are:

200	300	210	310	204	304
214	314	208	308	218	318
20C	30C	21C	31C		

This leaves us with 16 possible addresses to set the card at to avoid addressing conflicts. If you intend to do much game playing, I wouldn't set the card at 200 unless all other addresses are used, as the chances of a game adapter card being installed later are quite good.

I realize that no one is going to build and install 16 of these adapter cards, but the address decoding presented here is not unique to our adapter; I have used this same circuit in many cards where four or fewer port addresses will handle the card being developed.

At any rate, we now have decoded all address bits except A0 and A1, combined the decodes with AEN, and used the resulting logic signals to enable the pin 9 output of U8. Pin 9 is a "this card address" decode which enables the U1 chip via U6. Now, the top half of U8 will decode A0 and A1 to determine which of the U11-U12 AND gates to turn on.

For example, if A0 and A1 are both off, U8 pin 4 will go low, gating one side of the Read A U12 AND gate and one side of the Write A AND gate. If we are writing to this address, U5 pins 4 and 16 will be low, resulting in the U11 AND gate Write A output going low. This is the card signal that represents our attempt to write to card address A.

Next month we will hook something to the U1 data bus, and use the read and write signals from U11 and 12 to control it.

If you remember from a previous column, the bus protocol, or rules, dictate how data at gating is done on the bus. For our card, the microprocessor in the pc makes sure that the address on the bus and the data at U1 are all correct before it sends the I/O read or write signal.

The only timing considerations we have to worry about are the gating on our adapter. We can be reasonably sure that the data, addressing and gating signals are correct at the card tab pins.

Checkout

At this point you should have all the sockets, chips, capacitors, resistors, etc. installed on the card and wired according to the schematic. If you have a small, 5-volt bench supply, you may want to connect it to the +5 and ground busses and check that no shorts exist.

As wired, the card should draw about 200-300 milliamps of current; otherwise, check with an ohmmeter between the two busses with *no chips plugged in*. The resistance should be 100 Kohms or greater with all switches open.

Each switch should cause a 1 Kohm reading if closed by itself. If this checks out, install the chips in the sockets and plug the card into any opens lot in the pc. Power on and verify that the pc runs normally. If it does, you are done until next month.

Parts List		Power Pins +5V	GND
U1	74LS245	20	10
U2	74LS244	20	10
U3	74LS08	14	7
U5	74LS244	20	10
U6	7402	14	7
U8	74LS139	16	8
U9	74S260	14	7
U10	74LS266	14	7
U11,12	7432	14	7
R1-R4	1 Kohm 10%		
S1-S4	4 Pos.DIP		

Uh-Oh!

If the machine refuses to power up (no fan) there is a wiring error in the +5 volt wiring. If the power comes on (fan runs, etc.) but you get beeps, parity errors, or reference codes, a wiring error on the address or data bus wiring is indicated.

Go over the card until you find it. In some cases, pulling the chips and replacing them one at a time helps to isolate the wiring error. It also helps to have a friend double-check your assembly.

Once you get the pc running with the card installed, you might want to review last month's discussion of the 273 and 373 latch chips. We will be installing some of them next month. Until then, Happy Wiring. ■

Solar Power

This is a subject that on first observation has been beaten to death, even though it's in its infancy for the general public. Efficiency ratios have increased better than 40% since 1980 in consumer items and the cost, although still rather high, has come down a great deal.

For 13.2 volts, the optimum for 12 volt devices, you're looking at approximately $8.00 per volt @ 1/2 amp or about $105.00. With careful shopping at surplus or manufacturers' "over-run" outlets, this can be cut by 50% or better.

The uses are many. Due to clouds and other optical interference a high efficiency battery is mandatory for serious applications as a constant back-up, rechargeable power source. We're also going to rule out high current electric motors. (*If* you have the money, running a large electric motor in the back of beyond is a real thrill, unequaled by a chain saw!)

The best "all assembled" unit for the money is the 12PJ4496B in the 1987 63A catalogue of J.C. Whitney (1917 - 19 Archer Ave., P.O. Box 8410, Chicago, IL 60680; Ph. 312-431-6102) 13 V @ 1/2 A for $19.44 plus about $5.00 shipping, ins. and handling. They take Visa and MC. I've never used one - only have seen its picture with the attached power cords (cigarette lighter, male and female "cassette" types). If it does what it says, it's worth it.

The manufacturers of some shortwave receivers and scanners may not have spent the 20 cents for a direct DC connector; my Yaesu FRG-8800 is one. The holes are "punched," but that's all (see fig. 1). Don't ask me why they don't do it - it drives me crazy!

If you're back-packing or watching your electric bill or just want to feel a tad superior, a complete solar setup is shown in Fig. 2. Please note that if you have to "up-convert" back to 120 VAC using solar, at present it will cost in the neighborhood of $500.00 for just a receiver, cassette deck and phonograph!

For the ham, a good receiver and 5 watt transmitter can be literally run "for free" indefinitely. The only other thing one would need is a log cabin and cozy fire.

As to the battery, a motorcycle unit from an auto supply (if you can put up with explosive hydrogen fumes and spillage) is inexpensive. Otherwise, I've found another new item: the #29-265 portable VCR battery from MCM Electronics (858 E. Congress Park Drive, Dayton, OH 45459; 800-543-4330 for MC or Visa) is $39.80 and it is designed for continuous commercial service (CCS). ICAS mean "intermittent commercial and amateur service."

File that in your memory bank as these ratings are normally printed on the device label! It's a darn good guide to quality; i.e.: for a 12 V bench power supply, the rating would typically be: 2 A CCS, 4 A ICAS. Get it? Got it? Good!

MCM also has a *sealed* lead-acid battery made by Hitachi (#29-260) that's rated at 1.9 amp-hours for $27.95 with a fairly standard DC plug. The disadvantage with this is just the recharge time is longer: the #29-265 just takes an hour as opposed to four or five for the #29-260.

It should go without saying that the items described are for very low power use. If you really want to "go for it," we're talking two Sears "Diehards" and a solar panel the size of a wall painting (2' x 3').

This little treatise is simply intended for those who wish to try, for a limited sum, the potential of the medium.

Receiver Basics: "To Be or Not to Be?"

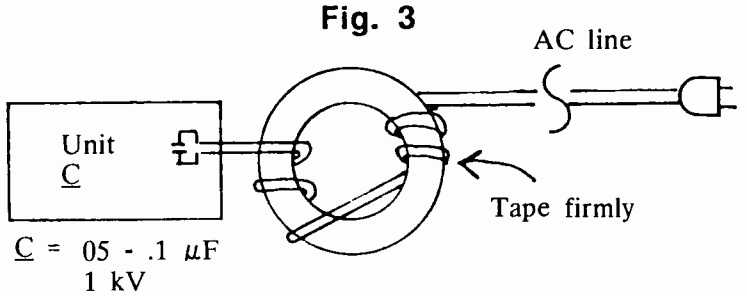
We columnists get guidelines from Bob Grove as to what he feels you would like to see. It's very expensive to put a response card in the magazine -- we do on special occasions. What I'm going to do is slightly different.

The number of subscribers is semi-secret so this is a real test. If enough of you will simply say, "Yes, I Do" on a postcard to equal 20% of the number (pass-on readers qualify), sent to P.O. Box 98, Brasstown, NC 28902, I will tell you, in a humorous, easy to understand manner, exactly how a radio works and how to reap the maximum benefit from the controls.

(I've *never, ever* had to replace a worn out RF gain control in 32 years -- they're *always* fully clockwise from the time the user buys it!)

"Hey," you say, "I don't give a dead rat as to how they work!" That's exactly what the survey's for. If enough of you feel that way, we'll put the subject on the "back burner." Be advised, however, that you're not simply veto'ing something that looks as though a Japanese chicken with diarrhea ran across it -- I don't do that. Instead, you'd be losing out on some very funny reading with an education. Will you take a minute and less than 20 cents? Identification isn't necessary!

Fig. 3



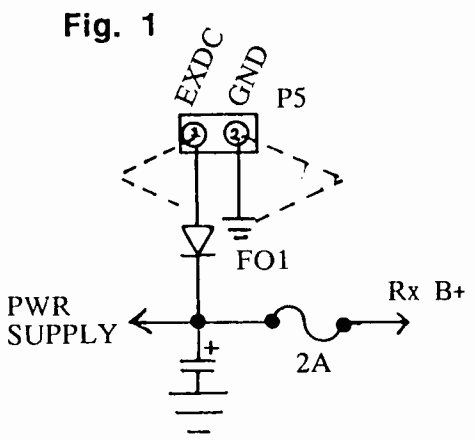
More on Noise

It's been brought to my attention that capacitive (touch) "on/off" switches for some lights are going for first place in the RFI department. The reason, as usual, is that the manufacturers don't want to go the extra 30 cents. I haven't had this problem, not having one of these devices (although my electronic chess set just about shut down everything in my house), but I sure know what to do about it!

You need to solder a .05 or .1 μF @ 1 kV capacitor across the AC line *in the unit*. Be sure to unplug it before doing this. This usually takes care of it. In extreme cases, a half-dollar size toroid core needs to be wound three turns one way and two turns the other at the AC power cord *at the unit* (Fig. 3).

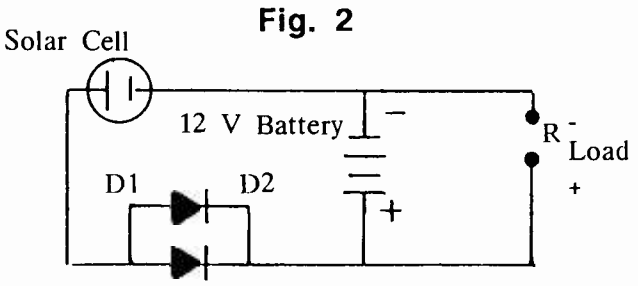
As always, enjoy! Questions will be answered when an SASE is provided. ■

Fig. 1



Dotted line = missing

Fig. 2

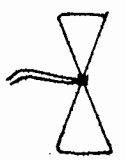


D1, R.S. 276-1141, unless using J.C. Whitney unit;
D1 and chg. LED built in.
D2 1.2 V LED chg indicator

Errata:

200-500 MHz Antenna

In the April issue of *MT*, page 59, builders of the 200-500 MHz antenna were instructed to mount it vertically as shown. Unfortunately, the diagram was skewed to fit the page space. When you mount your antenna, it *should* look like this instead:



ANTENNA TOPICS
cont'd from p.53

RADIO RIDDLES

Last Month's Radio Riddle: Last month I may have insulted the antenna world by calling a "phantom antenna" a "dummy." And, although "dummy" is a legitimate name for that antenna, I attempted to make amends by asking you if you had heard about the "smart antennas." Let me explain now.

We all know what an antenna tuner is, right? An antenna tuner is a device we use to bring the antenna system, as a whole, into the proper electrical state such that it will accept energy from the transmitter. If we could get an antenna to do that by itself, without us needing to "tune it up," then that would be pretty smart of the antenna, wouldn't it?

There are such tuners available which will automatically re-tune the antenna system to any new frequency to which the transmitter is changed. I have to admit that the "smarts" are in the automatic antenna tuner, rather than in the antenna element, but they are both part of the antenna system.

So, at least we have "smart" antenna *systems* today. These smart devices are supported by computer logic circuits, just as is a "smart" computer terminal. The computer revolution is upon us, even in the world of antennas.

This Month's Radio Riddle: We all know that Heinrich Hertz was the man who discovered and reported radio waves to the scientific world. We also know that the word "heck" is a slang word, roughly equivalent to "doggone it!" But what about a word that sounds as if it were a combination of Heinrich's last name and this slang?

The word is "hectohertz." What does it mean? (Hint: "Hecto" *isn't* derived from the slang expression!) Check next month's "Antenna Topics" column for the startling (well, at least interesting) answer! ■

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Q. Continuous coverage?

Will Regency or any other manufacturer be releasing a hand-held scanner with continuous coverage including the 225-400 MHz military aircraft band? (Claudio Gallesi, Trezzo d'Adda, Italy)

A. A couple of years ago, Regency Electronics prematurely announced the imminent release of their new HX3000 hand-held, wide-coverage, programmable scanner. Unfortunately, the product never progressed beyond the planning stages, ostensibly due to insoluble problems with internally-generated spurious signals ("birdies").

While no manufacturer presently admits developing such a product, it is only a matter of time.

Q. Local frequencies?

Where can I find lists of local frequencies to hear on my scanner? (Jack Dudley, Electra, TX)

A. At the present time dozens of desktop publishers are putting out a myriad frequency lists for all parts of the country. Your local Radio Shack store, especially the larger, older and more established outlets, should have such lists for their customers. They also carry the popular "Police Call Directory" which should help.

Additionally, Fox Marketing (4518 Taylorsville Rd., Dayton, OH 45424) publishes an exhaustive Dallas/Ft. Worth directory and a Houston/Beaumont directory as well as other localized directories throughout the country.

Finally, get in touch with a local listeners' club for private collections.

Q. Earphone adapter?

How can I adapt my mini-stereo headphones to be used with a standard earphone jack on a shortwave receiver? (John Pratt, Lebanon, IN)

A. John wrote back supplying his own answer--or rather the answer provided by his eighth-grade grandson! A ready supply of adaptors of all types may be had from Radio Shack; in this particular case, the RS #274-348 solved the problem handily!

Q. Two jacks to a cable?

How can I hook the two antenna jacks on my BC-800XLT scanner to one antenna cable? (Paul Koutnik, Downers Grove, IL)

A. Since the 800 MHz band requires an entirely different antenna than those normally found for standard VHF/UHF scanners, a separate Motorola jack was provided for that band on the BC-800XLT.

The easiest way to solve the one-antenna/two-jack problem is with a standard TV-type VHF/UHF splitter found at virtually any discount house TV department. You will need to assemble appropriate cables to match the F fittings on the splitter to the Motorola jacks on your scanner. These parts may be found at Radio Shack. You will have to cut off the Motorola plug on your existing cable and attach an F fitting to couple to the splitter.

Q. Overcharging?

I have a Regency HX1500 scanner, rechargeable batteries and the specified Regency MA518 charger. After 4-5 hours of charging the back of the radio feels quite warm. Am I in danger of harming either the radio or the batteries? (Ron Smithberg, Joliet, IL)

A. Probably not. It is common for rechargeable batteries to feel quite warm; it is not common for them to be too hot to hold comfortably, however! This would reduce their useful life. Chances are all is OK. We have had no reports of reduced life using the appropriate combination you have mentioned.

Q. Intermod and images?

Would you explain the terms "intermod", "images" and "harmonics"? (Jack Koonan, LA, CA)

A. While all three manifest themselves as receiver interference, their causes are quite different.

"Intermod" (short for "intermodulation") is caused when a "nonlinear" junction of two metals (it can be a transistor in the receiver or even a corrosive joint in a nearby rain gutter) permits two strong signals on different frequencies to mix and produce new frequencies which are the sum and difference of the originals.

For example, say two shortwave broadcasters are received very strongly on their authorized transmitter frequencies of 11840 and 17765 kilohertz. If they cause intermod the spurious signals will be heard at 29605 (sum) and 5925 (difference) kilohertz.

Intermod is most commonly recognized by the simultaneous presence of combined audio from the two programs, a dead giveaway to intermod encountered by scanner listeners in metropolitan areas as well.

"Images" are produced normally in all receivers, but careful design (good radio frequency selectivity) can minimize their presence. An image is also a "sum and difference" product in the receiver's mixer stage. When the receiver's oscillator mixes with the incoming signal, two additional new signals are produced in the receiver similar to the intermod condition described above.

For example, if a receiver is tuned to 11840, its oscillator may be on 12295 to produce 455 kilohertz difference, a common intermediate frequency (IF). But the difference frequency, 11385, will also be present. Note that the desired receive frequency and the image frequency are separated by 910 kilohertz; a primary image will always be displaced from the desired signal frequency by twice the IF.

A harmonic is a whole-number multiple of a signal frequency and is a fault of the transmitter. For example, if you live near a broadcaster on 1320 kilohertz, you may hear weak harmonics on 2640 and 3960 kilohertz, the second and third harmonics (the "first harmonic" is the fundamental signal frequency--not a harmonic at all).

All licensees are required by law to keep harmonic radiation below a prescribed minimum level to avoid interference with other services.

Another receiver malady produced by strong signal overload is "dynamic compression" or "desensitization". This characteristic may be recognized as a general loss in receiver sensitivity resulting from a nearby transmitter causing the receiver to drop in gain even though it is not tuned to the transmitter's frequency.

Dynamic compression is caused when the receiver's amplifier is forced to process a signal much too strong for its design, reducing its gain capability; desensitization occurs when a receiver senses a strong signal and automatically cuts back its gain to prevent overload. ■

Faster Scan/Search Speed for Radio Shack Scanners

by Larry Wiland

The PRO-2021

With 200 programmable channels, the Pro-2021 is a fine radio but lacks sufficient scan/search speed. With 200 programmable channels (10 banks of 20 channels each), scanning more than a couple of its banks will result in more than a few missed replies to radio traffic taking place on your favorite channels.

The owner's manual lists the fast scan speed at 8 channels per second and the slow-scan speed at 4 channels per second. With the following modification you can increase the fast-scan rate to 11 channels per second, and the slow-scan to 6 channels per second.

First, you will need one 15K-ohm, 1/4 or 1/2 watt resistor, radio solder and a small soldering iron, and simple hand tools. Make sure the radio is *unplugged* from its power source, and that the 9-volt memory battery is *removed*! As you will be working in an area directly connected to the microprocessor, failure to heed this advice may prove *fatal* to your scanner!!

Now, remove the upper case-half *only* by removing the four screws (two per side) on both sides of the outer case, as well as the one screw on the rear apron of the radio which fastens the upper case to this surface.

Carefully lift up the top case section and unplug the white plastic two-conductor speaker plug, allowing removal of the upper case entirely to simplify working inside the radio.

With the scanner sitting upright and facing you, locate resistor R-147 (a 39K-ohm resistor to the left-front of the main board--almost behind the vicinity of the LCD display). Carefully snip the leads at the resistor body with a pair of sharp wirecutters to leave as much of the existing leads as possible. Solder the 15K-ohm resistor to those remaining leads.

If you wish to totally replace R-147, it will be necessary to remove the lower case half and unsolder an RF shield on the underside of the board; soldering the new resistor to the old leads simplifies the process.

Reassemble the scanner in reverse order of disassembly, reinstall the memory battery, reconnect the scanner to the wall outlet; reprogram the memory, and you will now have a radio that scans and searches three more channels per second--an improvement you can *see* as the numbers fly by.

The PRO-2003

Though recently discontinued by Radio Shack, the PRO-2003 can still be found on some store shelves with a substantially reduced price tag. The scanner is an excellent unit all-around except for its slow scan/search speed. The following modification will reduce the scan/search period from 12 to 8 seconds on slow-scan speed and from 7 to 4 seconds on high speed.

Let's Begin: First, remove the three Phillips-head screws on the upper rear of the radio, as well as the eight screws with washer-type heads and the remaining six which are recessed into the pressboard bottom case of the scanner (all are on the underside of the radio and are brass-colored).

Next, loosen (but do *not* remove) the two silver screws directly beneath the headphone jack and slide the jack rearward so it will clear the case when it is removed. Turn the radio right-side-up and carefully pull off the volume and squelch knobs. Now carefully remove the outer case, unplugging the speaker leads at the speaker and the keypad connected at the chassis (just follow the wiring harness).

Once the case is removed, set the scanner right side up facing you and locate resistor R-11, a 47K-ohm unit at the upper left of the digital LED display.

You may either bridge it with a 92K-ohm resistor, soldering the new resistor's leads to the existing 47K leads so that they are "piggybacked," or replace it with a 33K-ohm resistor in the same manner as with the PRO-2021 described earlier, clipping the leads close to the old resistor body to leave enough length to solder the new resistor to.

Reinstall the keypad harness connector and the speaker lead and test the scanner before reassembly. The scan and search speeds should be noticeably faster and all other radio functions should be unchanged.

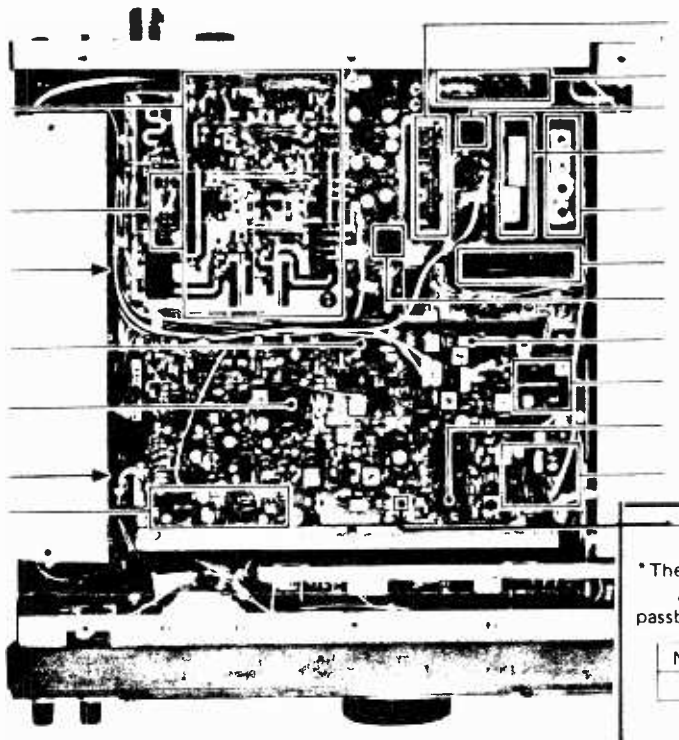
The mod makes the radio "come alive," giving it improved performance right up there with the new breed of fast-scan receivers. •

Better AM Selectivity on the ICOM R7000

by Rene Borde

This simple procedure will narrow the AM selectivity from the factory AM filter preset of ∓7.5 kHz at -6 dB to ∓3.0 kHz at -6 dB. The illustration shows a top view of the RF/IF units (owner's manual, page 33).

Remove the receiver's complete top cover; be careful of the speaker leads which are plugged into the unit. Locate J8 in the IF units, marked NAR and WIDE.



Carefully lift the shorting connector straight up from the factory preset WIDE position and press it down firmly into the NAR position. Replace the top cover and enjoy the receiver's improved AM selectivity! •

A Simple Birdie Trap for the MX7000
(and possibly the MX5000, too!)

by Philip Smith

If you are the owner of a Regency MX-7000 receiver, you might be one of the unlucky ones who have been "attacked" by internally generated signals which interfere with reception of legitimate signals, often stopping the scan or search sequence. The 7000's microprocessor has a grand ol' time messing up frequencies below 80 MHz.

I tried many remedies which have worked with other scanners: new antennas, antenna boosters, *NO* antenna, and different power supplies. Still, the entire VHF low band was plagued with the old crows.

Frustrated, I sent the scanner to Regency twice. The first time it came back is was the same despite the pieces of foil they added here and there. The second time it was returned with a reply, "Scanner received in perfect working order." *Baloney!*

Now that my scanner's warranty had expired, I decided to explore the problem myself. I tried shielding the main circuit board and the microprocessor board. This just made the birdies even stronger.

After poking around with a capacitor at lines connecting the micro and radio boards, I finally found a remedy worth writing about. All it requires is a small Phillips screw driver and a small .47 microfarad capacitor:

1. Unplug the power source.
2. Turn the MX-7000 upside down. Remove the two screws next to the rubber feet.
3. Remove the four screws from the case on the back of the unit.
4. Remove the top cover and face the keyboard toward you, right side up.
5. Loosen, but do not remove, the screw on the right side of the rear of the circuit board.
6. Hook the negative lead of the .47 μfd capacitor around this ▶

EXPERIMENTERS WORKSHOP
cont'd from p. 55

screw and tighten it back down.
7. Locate plug J4 at the back edge of the circuit board, a white plug towards the right, next to a flat transistor.
8. Insert the other lead of the capacitor snugly into the right most opening in the plug alongside the blue wire so that it makes good contact.
9. Make sure the capacitor cannot bump against any other components. Put the cover back on the unit with the six screws.

This modification worked for two MX-7000 scanners so far without affecting reception or operation in any way. The number of birdies in my scanner were reduced to about five percent. The few birdies that remained were weakened to the point that they could usually be squelched out. •

A Short Wave Crystal Radio

by Henry E. Johnson, K4IPY

The lowly crystal set has been relegated to the realm of toys and curiosity for kids and nostalgia buffs. Kids get a kick out of hearing a local DJ on headphones from a simple radio they can build, while old-timers remember the cat's whisker and the adjustment of dials for coupling and tuning to report they had heard KDKA.

Today, the eight buck Japanese transistorized AM-FM pocket jobs with headphones make everyone say, "So what?" But with a different objective in mind, I thought that a simple crystal set ought to be given a try...with a new twist.

The new objective was to see what could be heard on shortwave rather than the familiar BC band. With the circuit shown in figure 1, the world was opened; a new experience was at hand. What could be simpler?

An antenna transformer for the 6-18 Mc range (Miller part #C-320-A), a run-of-the-mill 365 pf variable capacitor connected to a National Velvet Vernier drive (gleaned from some WW II surplus stuff), and a 1N34 diode--that's all that went into the basic circuit.

I used a larger knob on the vernier drive to smooth out the changes in frequency; my ancestral Brush BA-200 crystal type headphones were plugged into the usual open circuit phone jack; binding posts and an SO-239 were both used for antenna input.

The antenna is an inverted "L" with a 70' flat top and a 30' down lead. The ground is an 8' copper clad steel rod driven into always-moist earth at a point some 8' from the work bench. The cabinet is a Radio Shack utility box, cat #270-253-A.

During the "smoke test" the number and strength of incoming signals boggled the mind...Good heavens, it works! I allotted short periods of time at sunrise, at sunset and during the evenings until I was satisfied that shortwave radio on a crystal set was possible--and until my patience grew thin at focussing attention on what was coming in through the cans. The strong signals were OK; but the weak ones suggested there must be a better way of presenting the audio from this rig.

I unplugged the phones and plugged in my Archer (Radio Shack) 200 mW amplifier. Now I could listen in comfort and I didn't feel any guilt because of this added "high-tec" accessory because I had already proven that SW AM signals can be heard on a crystal set!

Christmas and New Years were fun times with this set-up, fun for me and amusing for my friends. And guess what? Never once have I heard any local broadcast station interference on this crystal radio. That's remarkable!

Making it even better

Well, as always happens with us guys who play with radios, some "what-ifs" cropped up. I needed to inject some local RF into this gem if any CW or SSB was going to be heard. On hand was an MFJ 40-meter VFO which I connected to the crystal set by way of a coax "T" fitting. One side of the T took the VFO signal, the other took the antenna by way of a banana plug.

Well, here we went again. Goosebumps! As I tuned the VFO through the 40 meter band there were the SSB and CW signals loud and clear! The 200 mW audio amplifier sounded like a regular all-band receiver (with little selectivity) but, boy, could I hear some great stuff!

There was a QSO under way between KC4TX and another guy whose call I couldn't read after taking notes with my shaking hand. I did record a CW QSO between WB4ESH (Dave) near Daytona, Florida, and KB4QHH, near Kitty Hawk, North Carolina. This one I verified by a landline call to Dave at his home at Holly Hill near Daytona. Dave was amazed; and he's an old "sparks" who keeps a crystal set around just for the heck of it.

Next I got the urge to see what an antenna tuner would do for this rig. I connected my Ten-Tec model 277 antenna tuner between the antenna and the receiver input and... whoooboy! After selecting the signal I wanted, the tuner was adjusted until most of the crud on either side of the desired signal was much lower. Now, I wonder what would happen if I substitute Bob Grove's MiniTuner III and his Power Ant IIIs for the Ten-Tec?!

Table 1

Signals heard on the 6-18 Mc crystal radio

BBC, most likely via a relay
Radio Havana, Cuba
Radio Moscow...at every 1/8th inch along the low frequency end of the dial
Brussels, Belgium
Deutsche Welle
RSA, Johannesburg, South Africa
Radio Australia (in the early morning)
HCJB, Quito, Ecuador (a regular signal)
WYFR, Florida, Family Radio
CHU, Canada, time signals
Radio Canada International
Voice of America
Radio Nederland
Lots of ham and maritime CW signals
WCC, Chatham, maritime

So,...?

In simple terms, I had a tunable RD circuit covering 6 to 18 MHz, with most signals heard between 6 and 12 MHz. The Q (selectivity) of the circuit is not great; therefore, the response curve at any given dial setting is quite broad. The strong AM signals predominate and there is a lot of QSB (fading). Sometimes the strong ones fade out and weak ones can be heard loud and clear.

With the CW and SSB signals we have a situation something like a lake in Florida at night when the alligators are floating about with just their eyes above water. An observer with a flashlight (that's our VFO) sweeps it across the lake (that's me tuning the VFO) until the beam meets a 'gator's eye.

Voila! an orange glow wherever the light beam meets an eye. That's one way to explain what is happening when the VFO signal is tuned to one of the many CW or SSB signals in the broad passband of this crystal receiver.

The VFO messes up an AM signal, but does wonders with ham CW and maritime CW and RTTY. The CW sounds great and, wonder, of it all, DX is there! Sigs from Florida, Massachusetts, WCC at Chatham with traffic lists, hams in 8, 9 and Ø land, and some ships at sea.

How the 40 meter signals from the VFO beat with the signals in other bands I can't explain,* but they sure do. An audio filter of some simple sort ought to improve the stuff being heard, but that's another "what-if"...and we're beginning to make things complicated.

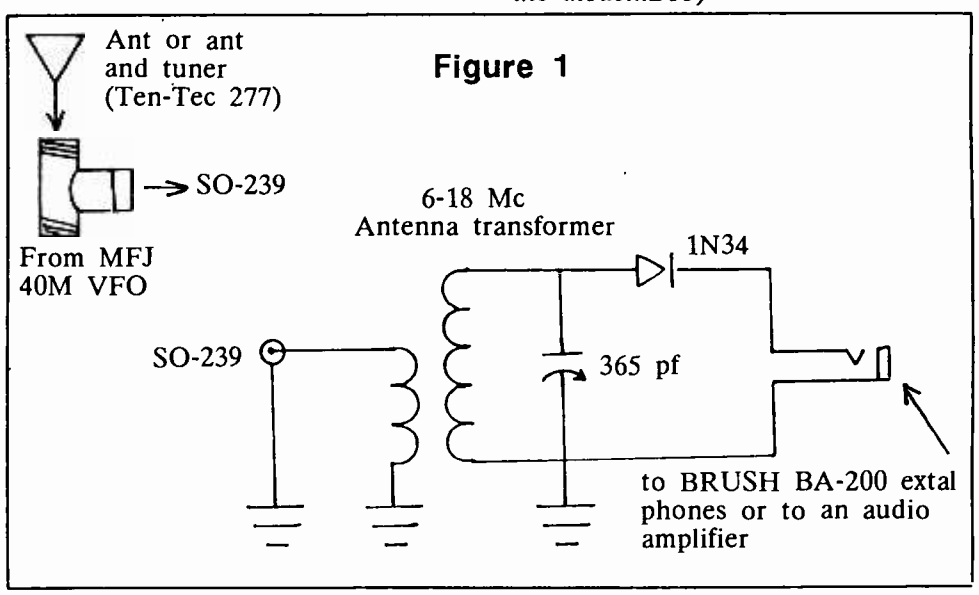
In retrospect...

I haven't re-invented the wheel; I've just learned to have fun with it. I had been brought up on the idea of limited coverage for a crystal set even though my old friend, Bob Howard, W4LJY, of Arlington, Virginia--a ship's "sparks" from the very early '20s--had thrilled me with stories of hearing class B signals (that's damped waves, spark, to you newcomers) way out in the Pacific and Atlantic. That was long wave DX on primitive receiving sets.

Now, with so much more radiated power and a whole lot of AM, I can vouch for hearing DX on a shortwave crystal set. Ah, ... ain't it fun?! •

** (Probably intermod from strong signals--including the VFO--mixing at the diode...Bob)*

Figure 1



Side-by-Side Scanner Antenna Comparison:

The Grove Scanner Beam, Omni, and Hustler DCX Discone

by Jack Sullivan

A Note from the Publisher:

It's always a gamble to say to an author, "Go ahead and write whatever you want and I'll publish your findings". Nevertheless, that was the case with this article. Author Jack Sullivan was told he could have two Grove Enterprises antennas right out of stock--nothing special about them. His findings--unabridged--are reported below along with footnotes where clarification was called for.

When Bob Grove offered to let me test his Scanner Beam and Omni against the Hustler DCX discone, I jumped at the chance. My house sits unobstructed on a mountain ridge with line-of-sight access to two metropolitan areas and several busy military bases.

Initial Impressions-- and a couple of problems

The Scanner Beam had the potential of being the ultimate monitoring antenna with capabilities beyond my present omnidirectional setup. It is a log periodic dipole array (LPDA), commonly used for TV reception because of its enormously wide bandwidth while still showing the directional and gain properties of the narrow bandwidth Yagi ("beam").

I wasn't surprised to unpack the Scanner Beam and find an inexpensive TV antenna with a bracket included to mount it vertically rather than horizontally as is done for TV reception. Adding to that "inexpensive" feel was the apparent lack of assembly instructions, a factor that gave me quite a bit of subsequent difficulty despite years of antenna experience (1).

The antenna comes with its elements folded to fit in its box and is extended for installation. The elements pivot on flimsy plastic pieces which lock the elements into their extended positions. Even after taking precautions, one of the plastic pieces cracked (2).

I hope this component failure doesn't result in premature deterioration of the Scanner Beam. Putting an antenna on my roof is just like sending it to the moon--it should work for a long, long time before I see it again! Antenna failures also follow Murphy's Law: If it's going to go, it will happen at the worst possible time!

The second assembly problem relates to the clamps used to secure the antenna to the piece of aluminum tubing used as the cross boom and supplied with U-bolts and toothed locking pieces. They would appear to face each other--wrong! Both toothed braces are nestled together on one side.

If assembled incorrectly the clamps will not support the weight of the antenna. There is also a danger of collapsing the antenna tubing if the U-bolts are over-tightened (on both the Scanner Beam and Omni as well).

The Omni

I can't comment on the theory behind the Omni because I'm not familiar with it. It is basically a vertical unsymmetrical dipole; the top element is 48 inches long and the bottom is 18 inches. My guess is that this arrangement causes the antenna to be resonant all over the spectrum because it works very well!

Initial Test Results

The Scanner Beam was connected by RG-6/U coaxial cable to an ICOM R7000 receiver. A list of 20 transmitters in the 150-500 MHz range at varying distances was drawn up and tested against a comparison Hustler DCX discone antenna ten feet higher and connected to the receiver by RG-8/U coax.

The results from this first test were both surprising and encouraging; in the 100-150 MHz range the Scanner Beam showed an average 0.36 S-units (over 2 dB) above the discone, and in the 150-500 MHz range, 1.2 S-units (over 7 dB)! The improvement was quite noticeable while listening.

Later Tests

With the Scanner Beam mounted on my chimney and turned by a Channel Master TV rotator, I heard the UHF homing beacon 50 miles away at Navy Lakehurst ("NEL", 274.8 MHz) for the first time; Navy area control ground station at Lakehurst ("Giant Killer", 249.8 MHz); and fire trucks in Manhattan, also 50 miles away, on their repeater input frequency (154.01 MHz)!

Table 1

Freq. Range (MHz)	Omni vs. DCX	Scanner Beam vs. Omni
59.75-127.05	0.9 dB	12.3 dB
141.4-185.75	-8.7 dB	11.6 dB
265.5-282.3	2.9 dB	6.7 dB
419.0-471.0875	2.6 dB	-0.5 dB
880.74-1163.0	4.6 dB	4.2 dB

Front-to-back ratio, a good measure of an antenna's directional efficiency, was measured on three NOAA weather broadcast stations. The front was consistently 2 S-units (12 dB) better than the back; in my estimation this is outstanding performance for an antenna costing under $100 (the Scanner Beam sells for $49; professionally made log-periodic beams such as are used at FCC monitoring stations sell for thousands of dollars and probably don't work much better!).

The Scanner Beam gives varying amounts of gain over its large frequency range as might be expected. Frequencies in the 25-75 MHz range are received much better than with the Hustler DCX; the difference in signal strength was to be expected as the DCX is advertised to cover only down to 40 MHz and is not very resonant below about 50 MHz.

The Final Test

Being a scientist (chemist) by both training and profession I tried to set up as objective a comparison as possible among the Omni, Scanner Beam and Hustler antennas. A total of 42 received signals were measured on the R7000 S-meter between 59.75 MHz (TV channel 2 audio) and 1163 MHz (nearby TACAN station) with the results shown in Table 1.

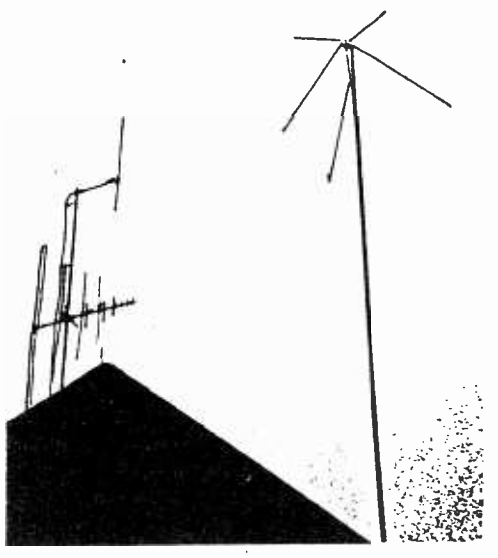
Conclusions

The Omni is as good as or better than the DCX except for the segment that includes the VHF high band. The only explanation I can think of is that the design of this unit produces a null in this range (3).

The Omni is a good buy if you're looking for an omnidirectional antenna covering a very wide range of frequencies. The Hustler DCX coverage is not the same in every direction; the Omni doesn't have that problem.

The results with the Scanner Beam show excellent gain at least up to 300 MHz where it starts to fall off. It is a great product for the money and really enhances a monitoring set-up, either fixed in a single direction or mounted on a rotator. I hear signals with it that were just not there without it. Its uses in direction finding are obvious.

The Grove antennas have now been up at my location over a month and have gone through several severe winter storms with winds in excess of 50 mph; there have been no problems. I now use them as my monitoring antennas. ■



Hustler DCX Discone on the right; to the left, Omni antenna mounted on top and Scanner Beam below on the same mast (A greater vertical separation than shown is recommended, due to possible interaction between the antennas).

(1) *The Scanner Beam is custom made for Grove Enterprises by a leading TV antenna manufacturer, thus the resemblance to a TV antenna. Since all units come with complete installation instructions, obviously Jack's was inadvertently left out of the package.*

(2) *A small run of insulators early this year turned out to be brittle; all broken units were replaced at no charge by Grove Enterprises and the manufacturer has corrected the problem.*

(3) *Minor variations in performance of most antennas will occur with different mounting configurations due to the proximity of other metal such as a mast, nearby antenna or even the feedline.*

The announcement went on further to give its full schedule:

0645-0800 (English Service 1)
0800-0900 (French Service 1)

1845-2000 (English Service 1)
2000-2100 (French Service 2)

All programs are beamed to West Africa; however, reception is decent in North America. The restart of the External Service coincided with the 30th anniversary of independence of Ghana. It was originally conceived in early 1960s by Kwame Nkrumah "to quicken the pace of African emancipation from colonialism, white minority settler domination and apartheid." Signing on the air in 1961, it closed some time later due to technical problems.

While the purpose of the original External Service to to "provide a voice that would improve the self-esteem of blacks in North America, Europe and Asia," the aim of the revised service is more modest; to build bridges to Ghana's neighbors in West Africa region.

Greece

Radio Station Macedonia from Thessalonkiki is currently relaying its domestic service in Greek on shortwave. The schedule is from 0600-1000 UTC (Sundays only) on 9935 and 11595 kHz, 1000-1600 UTC on 9935 and 11595 kHz and from 1625-2215 UTC on 7000 and 9935 kHz. (BBCMS)

Iran

Iran has been using the frequency of 15084 kHz for a relay of its Persian-language domestic service from 0730 to 2030 UTC. While still audible on other frequencies, broadcasts in English (1115-1215), Bengali (1215-1315), Urdu (1315-1415), and Arabic (1730-2030) are no longer heard on 15084 kHz. (BBCMS)

In fact, on March 10, the external service in Persian was reorganized and extended to the following schedule:

1430 to 1630 UTC to the Indian subcontinent; 1830 to 2030 to Europe and 2130 to 0130 UTC to Europe and North America, all on 9022, 9555 and 15084 kHz. [9022 and 15084 kHz were missing from the air for a week during February, the victim of a nasty air raid by Iraq. They have since returned.] The program is now called the "Familiar Voice Program". Their address is 15 Khordad Square, Voice of the Islamic Republic of Iran, Tehran.

Iraq

An Iraqi transmitter on 7140 kHz that normally signs on at 0600 UTC in order to carry **Radio Baghdad**'s Persian Service to Iran was heard at 0530 UTC without any programs. At a few minutes before 0600, it began playing music from Baluchistan. An announcement, spoken by a man with a Baluchi tribal accent, followed:

"In the hope of a future meeting, oh freedom seekers of Iranian Baluchistan! In the hope of a future meeting, oh Iranian people who are fighting against the band of Khomeini's tyrants! In the hope of future meetings, all you esteemed sons and brothers, we entrust you to God. We invite you to listen to the Voice of Truth and Sincerity which reflects your aspirations; the voice of the movement of the Mojahedin of Iranian Baluchistan; the voice that tells you the truth. This program has been introduced to tell you the clear facts which are as clear as the hearts burning with faith and love for Baluchistan and its nobel scions. So that in every corner of the soil of Iranian Baluchistan a bunch of flowers may sprout and blossom; that the children may regain their smiles of happiness and blessings and bounty may return to the fields, harvests and cities. Forge ahead towards a bright future!"

Another voice heard from. Now that's entertainment.

Israel

Kol Israel's 1100-1130 English transmission has been noted on a new channel of 15095 kHz.

Jordan

According to a new schedule from **Radio Jordan**, the station is on shortwave from 1230 through 1700 UTC on 9560 kHz. Programs are in English and include news, music and even drama.

Kiribati

Broadcasts on 14803 kHz have been heard Fridays at 0645 UTC. During that time, the station is carrying a Radio New Zealand program for stations in the Pacific area. The broadcasts are in AM. Most other broadcasts are in English or I-Kiribati.

Keep an ear on this one. It's a difficult catch -- from a station experiencing some difficulties. Apparently, Radio Kiribati has run up an bill of AUS$25,000 in unpaid electric bills. The government has allowed the station to go commercial in an effort to raise revenues but it is now using its own generators for its electricity. (RNMN)

Laos

Udomsai Provincial radio now heard on 4535 kHz from 2230 to 0030 UTC and again from 1100 to 1300 UTC.

Libya

Libya has added a new frequency for its **Voice of the Greater Arab Homeland** broadcasts. That frequency, 21645 kHz, is easily heard in North America from its 1150 UTC sign on until fade out at around 1600 UTC. The program can also be heard on 15415 kHz. Both are in Arabic, however, listen for the words, "jamahiri-ya" (sounds like: "jam e huh ree yuh"), "Libya" (sounds like: "Lee bee yuh") and Reagan. All seem to be repeated at least ten times per minute. (with Mark Swarbrick, Thorndale, PA)

Malawi

The **Malawi Broadcasting Corporation** (MBC) Blantyre, has reactivated 3381 kHz, as observed several evenings in February. Rapid drums from 0251 UTC, rooster crowing thrice at 0253, then sign-on announcements (including "MBC") followed by music. Returned at 0407 UTC to find hilife-type music and ad or ads in presumed Chichewa. QRM? If you enjoy it, you'll have a wonderful time trying to copy this one! (Bob Hill, Sharon, MA)

Netherlands

The English schedule for **Radio Netherlands** is as shown in Table 1. All transmissions are broadcast daily except for the 0830-0855 broadcast to Australia which is heard weekdays only. The letter preceding the frequency indicates the transmitter site.

Radio Netherlands has been having some problems with the audio from the Bonaire transmitter. The problems occurs when audio is fed over one of two telephone lines through a complicated transmission path via Curacao, off South America. A new satellite receiving dish is now under construction at the transmitter site, hopefully eliminating the sometimes muffled sounds coming from Bonaire.

Be on the lookout for special programming on May 19 when Prins Claus officially opens the new Flevo transmitter site at 1130 UTC.

New Zealand

New Zealand returned to standard time in early March and **Radio New Zealand** has announced a new schedule. All broadcasts are heard daily except for the 0345 to 0730 transmission which is heard on Saturdays only.

1830-2105 UTC 11780, 15150 kHz
2345-0145 UTC 15150, 17705 kHz
0345-0730 UTC 11780, 15150 kHz
1030-1215 UTC 6100, 9600 kHz
(RNMN)

North Korea

Radio Pyongyang's official English schedule is as follows:

Europe

1300-1400 UTC 9325, 9345 kHz
1500-1800 UTC 7300, 9325 kHz
2000-2100 UTC 6576, 9345 kHz

Middle East and Africa

0700-0800 UTC 13750, 15340 kHz
1500-1800 UTC 9960, 9977 kHz
2000-2100 UTC 9960, 9977 kHz

Table 1

B = (Bonaire) Netherland Antilles, F = (Flevo) Holland and M = Madagascar

Time	Frequency	Target
0230-0325	F 6020, F 9895	East Coast North America
0230-0325	B 6165, B 9590	East Coast North America/Caribbean
0400-0425	F 7175, F 9895	Middle East/East Africa
0530-0625	B 6165, B 9715	West Coast North America
0630-0655	F 9895, F 11930	West Africa
0730-0825	B 9630, B 9715	New Zealand/Australia
0830-0855	B 9630	Australia
0830-0925	M 17575, M 21485	Asia
1030-1125	B 6020, B 9650	Australia/Caribbean/Surinam
1130-1225	F 5955, F 9715, F 17605	Middle East/Europe
1130-1225	F 15560, M 17575, M 21480	East and Southeast Asia
1430-1525	M 11735, F 13770, F 15560, M 17575	South and East Asia
1430-1525	F 5955	Europe
1630-1725	M 6020, M 9515	South and East Africa
1830-1925	B 17605, B 21685	Central and Northwest Africa
1830-1925	M 6020, M 9540	South and East Africa
1830-1925	F 6020	Europe
2030-2125	M 9540, M 9715, F 9895 F 11740	West Africa

Southeast Asia

0400-0500 UTC 15140, 15160 15180 kHz
0600-0700 UTC 9530, 13650 15160, 15180 kHz
0800-0900 UTC 9530, 11830 15160, 15180 kHz
1400-1500 UTC 7300, 9555 kHz

North America

0000-0100 UTC 15140, 15160 kHz
1100-1200 UTC 7300, 9977 kHz
1200-1300 UTC 9600, 9715 kHz
2300-0000 UTC 11735, 13650 kHz
(Sandy Manning, Plano, TX)

Spain

Spanish Foreign Radio broadcasts to North America daily at 0000, 0100 [both on 6125 and 9630 kHz] and 0500 UTC [6125]. All broadcasts begin with 15 minutes of news. Other programs include:

UTC Sunday: :15 Sports Round-up, :19 Press Review, :24 Radio Club, :39 Regional Music, :42 Excursions in Spain

UTC Monday: :11 Sports Round-up, :15 Weekly Summary of Events in Spain, :20 The Spanish Presence in the United States (A series on Spaniards who, beginning with the days of exploration, have left their mark on the U.S.), :30 DX, :40 Regional Music, :43 Spain's Cities

On Tuesday through Saturday, the program is divided in two parts. Panorama: (Includes Spanish pop music, editorial comments, press review, weather bulletin) Spain Today: (Political, economic, cultural, scientific and human interest topics. On Tuesdays, there is a sports program.)

Surinam

Radio Surinam International has announced that they will be adding Spanish language broadcasts to their line-up later this year, via the 250 kW transmitters of Radio Bras in Brazil. Surinam is already on the air in via Brazil in Dutch and English. Programs are fed via phone line from Paramaribo.

Surinam already relays over RadioBras on 17755 kHz, weekdays from 1700 to 1745 kHz in Dutch and English.

United States

According to a source at **Radio Marti**, management at the station is "abusive, autocratic, unprofessional and demoralizing" and that employees are "bailing out as fast as they can qualify for vacant jobs elsewhere in the VOA." The problem is so severe, said an anonymous source, that the remaining staff is "stretched to the limit."

Allegations include missing job descriptions and performance evaluations, arbitrary and capricious shift assignments, favoritism and preselection for promotions and politics and secrecy in outside hiring. Said an official of the American Federation of Government Employees (AFGE) who is representing the Radio Marti staff, "We just hope Marti's management wakes up to the need for modern, constructive employee relations while they still have employees and a program to manage." VOA director Richard Carlson has responded with an internal investigation.

Rev. Lester Sumrall, the man behind **World Harvest Radio International** and who says he is "chasing communism, not with bullets but with the Gospel," has sent a letter to listeners and supporters asking for $60.00 so that he can buy a new four and a half million watt shortwave transmitter. The total cost of the transmitter is $426,534.00.

Says Sumrall, "Since we signed on the air, we have divided our [broadcast] time between Europe [12 hours a day] the Near East and Africa [12 hours a day]. With a second transmitter, we would be able to broadcast behind the Iron Curtain 24 hours a day."

It is believed that the transmitter Sumrall speaks of is one originally ordered by KVOH for their new site in California. But KVOH backed out of the deal, reportedly citing technical problems with the unit. KVOH eventually purchased a used transmitter from HCJB in Ecuador. Should you wish to help Dr. Sumrall, WHRI's address is P.O. Box 12, South Bend, Indiana 46624. Says Sumrall, "I will put the name of every partner who contributes at least $500.00 on the big, beautiful blue door of this mighty voice of salvation."

The **Voice of America** has, "because of budgetary restrictions," cut back on some of its transmissions in English and several other languages. Gone is the daily English broadcast from 0700 to 0800 UTC to Europe, North Africa, and the Middle East. Also among the missing in the English category is the 2200 to 2300 UTC broadcast to Africa.

The VOA also dropped all weekend programming in Swahili and Hausa to Africa, cutting back from seven to five hours a week. Daily broadcasts in Vietnamese and Russian to European USSR were cut back by one hour.

Fortunately, all is not lost. There has been an increase in Creole language broadcasts. Starting in 1978 with a generous four minute newscast every Friday, it was jacked up to 15 minutes a day during the Haitian revolt against Duvalier in February of 1986 and now offers the brave people of that impoverished nation a full half hour a day. It can be heard on 9640, 11740 and 15120 kHz starting at 2130 UTC.

The official schedule for **KNLS**, Anchor Point, Alaska is:

0800-1100 5960 (English to Asian Pacific Coast)
1100-1230 5990 (Chinese to China)
1230-1400 7400 (Chinese to China)
1400-1630 6090 (Russian to Central Russia)
1630-1930 7355 (English to Asian Pacific Coast)
1930-2200 7355 (Russian to Asian Pacific Coast)

The European service appears to have been dropped.

KSDA, Adventist World Radio in Guam, conducted some tests in early March. And according to Arthur Cushen, the station's schedule is an entirely new one.

0000-0800 UTC 11720 kHz
0800-1200 UTC 11840 kHz
1200-1600 UTC 11920 kHz
1600-1700 UTC 11710 kHz
1700-2200 UTC 11705 kHz
2200-0000 UTC 11880 kHz
(RNMN)

U.S.S.R.

Radio Moscow has increased its broadcasting to Latin America in Spanish and German. In Spanish, one hour has been added from 0200 to 0300 on 7105, 7175, 7250, 7280, 7360, 7370, 7390, 9610 and 9710 KHZ. Radio Moscow is now broadcasting in Spanish to Latin America continuously from 2300 to 0500 UTC with a regional service to Cuba from 0030 to 0100 and 0200 to 0300 UTC and for Chile from 2100 to 2200 and from 0230 to 0330 UTC.

The German transmission runs from 0530 to 0630 UTC on 7230, 7360, 7420, 9450 and 12010. This brings Moscow's weekly output of German to 49 hours, not including the daily 30 minute broadcast from Radio Station Peace and Progress. This is the first time Radio Moscow has had an early morning service in German since 1969. (BBCMS)

Radio Moscow now has a new Editor-in-Chief of their North American Service. He is Spartak P. Alexeyev, who replaced Konstantine Zlobin.

Vanuatu

Radio Vanuatu stopped broadcasting after the island was hit by a cyclone. The station building was severely damaged. Radio Vanuatu operates on 3945 kHz (10 kW) and 7260 kHz (2 kW) from 1900 to 1115 UTC. Broadcasts are in Bislama, French and English and include relays of both Radio Australia and the BBC.

Vatican

Vatican radio has experienced the loss of 9645 kHz. That frequency, usually on the air from 1815 to 2200 UTC, is missing due to a transmitter overhaul.

Vietnam

The **Voice of Vietnam** broadcasts in English on the following schedule:

1000-1030 UTC 9840, 12020
1100-1130 UTC 7419, 12020
1330-1400 UTC 9840, 12020
1545-1600 UTC 10010, 12035
1600-1630 UTC 9840, 12020
1615-1630 UTC 10010, 12035
1800-1830 UTC 9840, 12020
1900-1930 UTC 9840, 12020
2030-2100 UTC 9840, 12020
2330-0000 UTC 9840, 12020

The Voice of Vietnam does not formally announce target areas for its broadcasts but it is thought that none are specially intended for North America and in any case, reception is generally poor in this country. The 7419 kHz frequency used in the 1100 to 1130 UTC transmission is announced as 7416 kHz but actually drifts as high as 7436 -- so scout around. Those interested in "brushing up" their Vietnamese might also want to tune in 6450 and 7419 kHz from 0100 to 0200 for news in slow, dictation-speed Vietnamese.

Yemen, People's Democratic Republic

Dr. Muhammad Ahmad Jirghum, Minister of Culture and Information, has issued a decree appointing Fadl Mutlaq as Director General of radio broadcasting. If you feel strongly about the absence English broadcasts from the People's Democratic Republic of Yemen on shortwave, take this opportunity to write to Mr. Mutlaq and tell him that his country desperately needs an English language service to North America. His address is P.O. Box 1222, Aden, People's Democratic Republic of Yemen. And once again, perhaps -- just perhaps -- the words "Idha'atu-I-gumhuriya al-Yaman ad-dimuqrattiya ash-sha'abiya min' Aden" will ring out strong and proud on shortwave receivers in the United States of America. Yemen!■

An Unsurveyed Opinion

The article concerning 1987 survey results (p.5, 4/87 edition) would of course indicate that most of those who bothered to fill out the survey would be shortwave listeners instead of scanner listeners. After all, only 1-1/4 of the 23 questions asked (one concerning favorite make/model of scanner and a four-parter about hours devoted to listening) had anything to do with scanning.

The article itself described it quite succinctly; "If you ask bus riders their favorite mode of transportation, most will say 'the bus'." Since the survey was obviously biased towards shortwave listening I didn't bother filling it out; and possibly the other 20,199 non-respondents felt the same way.

The magazine is still the best there is, and the very timely articles concerning scanner modifications and new models really help keep me informed. Although my own personal opinion is there are too many shortwave articles, I understand completely that if it weren't for the diverse coverage in the pages of *MT*, it would not enjoy the success and low subscriber rates that it now has.

John D. Comstock
Stillwater, OK

Swearing Off

Would you please reconsider your policy of allowing profanity to appear in your publication? Admittedly our society has generally accepted the use of the name of the Lord to express emphasis, amazement, surprise, anger and is the writer's device in sit-coms to elicit laughter. But there are still some people who are grieved by the careless use of the Lord's name, who take seriously what the Bible says in Exodus 20:7.

As publisher surely you do not have to allow your editors to leave profanity in their columns, as happened on page 13 of the April issue.

Edwin Hill
Kaufman, Texas

Reader Hill refers to an interview with DXer Bob Hill as conducted by MT editor Larry Miller. It is a judgment call in journalistic reporting as to which quotes may prove offensive to a reader. Although the passages in question are very common in American parlance, we are sorry that reader Hill took offense.

"Insufficient Address"

A word of warning to people who wish to order the *Police Call Radio Guide* (reference p.47 of April 1987 *MT*): their letters may get returned by the Post Office Department. I sent in an order for this publication from the printed announcement that it was ready and the letter was returned because it had no street address (because the company doesn't provide one in any of their literature).

Let the buyer beware. I for one refuse to do any business with this company ever again!

Larry Dale Anderson
Mesa, Arizona

Hollins, a reliable company, has used this address for years. We have no explanation as to why your order was returned. Have any other readers had a similar experience?...Bob

Raven Society Unmasked!

In *MT* some time ago it was reported that the Raven Society of British Columbia had a very large number of stations operating on the assigned frequency of 9115.5 kHz with 3A 3J type emission. I'm sure many people were puzzled as to why this organization with so many stations was not recognized by at least one *MT* reader.

Just recently I came up with an answer to my question. Indians!

You heard it folks. The Raven Society of British Columbia is a regional net for native Indian communities on the west coast. 9115.5 and three other frequencies on HF are to be used for anything including off shore fishing.

The original purpose was to give the communities a way to keep up their cultural ties but as things went on some bands added BC Tel crystals to their radios and eventually some radios ended up in the garbage.

There has been a small surge in interest in getting the network going again before they lose the frequencies altogether, so you might want to try 9115.5 SSB when the band is up.

Any questions? Contact me at: Communications, P.O. Box 712 Station B, London, Ontario, Canada N6A 4Y8.

Tony Trollope
London, Ontario

President in the Clear

After reading "Surveillance: Part II; Not Being Compromised," by Jerry Cody in the April '87 issue, I wish to point out one error.

In the article's third paragraph, Cody talks about the 10 Oct '85 non-secure phone patch from President Reagan aboard Air Force One returning to Andrews AFB from Chicago, to Secretary of Defense Weinberger who had just departed Ottawa for Maine aboard SAM 30502. Mr. Cody states that the reason the phone patch was in the clear was because the encryption keys aboard both aircraft were incompatible.

This is not true. I believe the call went in the clear because of a malfunction with crypto gear aboard one of the aircraft. The SAM fleet does not have secure voice capability on HF yet, and because of several technical reasons, the only possible link for them to use to communicate directly was HF voice.

In any event, I believe the actual conversation made no direct mention of the hijackers, nor of the Achille Lauro. The very brief dialog went along the lines of the President saying, "Go ahead with the plan earlier discussed, and contact me when it is completed."

Direct information to and from the aircraft regarding the plan to divert the EgyptAir 737 went via a secure record circuit ("India Oscar"), and as far as I know, all involved parties were kept fully informed by secure means.

Tim Tyler
Ypsilanti, MI

Matthias Not Bought

Re: Editorial "The Best Congress Money Can Buy" (April 1987). I protest the use of former Senator Charles Matthias' name in a most unfair way.

As a United States Senator, Charles Matthias had the highest respect of his colleagues and his constituents for his integrity, his intelligence, and his independent-mindedness.

When you juxtapose his statement concerning congressional fundraising overwhelming good judgment with the fact of his sponsorship of the Electronic Communication Privacy Act of 1986, you imply that this support for the Act was influenced by fundraising.

Nothing could be further from the truth. In view of the fact that at the time Senator Matthias gave his support to this Act he had already announced his decision not to run again, fundraising pressure was not a factor in his support of the bill--even if he were susceptible.

The quotation you attribute to Senator Matthias was made in the context of his campaign against the law permitting Political Action Committee support of congressional races.

Nathaniel Finestone
Mountainside, NJ

Hamtronics Converter

You asked for comments from owners of 800 MHz converters. I own a Hamtronics unit which I am very pleased with; I have it attached to a Radio Shack PRO-2021 and it works fine.

Being a technician for a Motorola repair facility and having to monitor customers and our trunking system it performs great; sensitivity is .5 uv. I own one personally and my shop has four other units attached to BC210's and M100's.

From my personal experience, the Hamtronics unit doesn't perform well with BC250 and BC210 units as it will receive the channels, but in scan mode it will skip over channels in use! Even if you type in our control channel, which is up all the time, it will ignore it 90% of the time! I think this has something to do with Bearcat's different IF stages. If we wish to monitor our five-channel trunking system, we must step to each channel manually to listen.

However, when attached to M100's or my Pro-2021, it will lock on to each channel every time! They do work well and the price is reasonable, too.

Using a Motorola 3 dB gain mobile antenna at my house on a mount provides excellent and clear reception. When using these converters you just about have to use an antenna specifically for 800 MHz; a Hi-band or Tri-band antenna just won't get it!!

Curtis Harbin, Tech.
Tri-Cities Communications
Johnson City, TN

GRE America Converter

After reading your comments on 800 MHz converters in the March issue, I though you might be interested in my experience with the GRE America Super Converter 8001. I have found the unit to be totally satisfactory. I have not measured sensitivity, but it receives all of the local frequencies at full quieting.

The enclosure is an attractive metal box. The quality looks good. It has a short output cable terminated with a Motorola plug which many scanners use for external antenna input. A short quarter wave whip is included. The whip can be unplugged to allow external antenna input. The unit is powered by a 9 volt transistor battery but has a jack for external powering. I have found that I can leave the scanner whip connected and have the converter plugged into the external antenna connection (converter on) and receive both 800 MHz and regular scanner frequencies without unacceptable degradation.

The offset frequency is 400 MHz which makes the frequency translation very simple.

When I ordered the unit the company said the converter was being taken off the market because of ECPA but I have continued to see ads for it since then, so don't know the status now.

The price was $59.94 plus $4.00 shipping without any surcharge for credit card use. Their address is: GRE America, Inc., 425 Harbor Blvd., Belmont, CA 94002; 800-233-5973/ 415-491-1400.

Joe Myers KD4A
Pelham, Alabama

■

SWL Call Letters

Caught some flak -- both pro and con -- concerning last month's comments on shortwave listener's "call letters". Still, I have to stick to what I said: call letters for SWLs are useless -- they literally serve no purpose. They don't get you any better "service" when QSLing broadcast stations. And there is not one station -- not a single one -- to whom you send mail with these calls that doesn't know they're phoney.

God knows, getting a legitimate amateur radio call is becoming easier with every passing year. If call letters are what you want, get a ham ticket. Ham calls signify something -- you earned them. And there are groups like the Federal Communications Commission and the American Radio Relay League who actually have the need and organization to utilize them. But SWL calls? C'mon!

Ike Kerschner, who first brought the subject up in his February *Monitoring Times* column, replied with a note saying, "If all the listener is interested in is SWBC [shortwave broadcast stations] then I agree with you that call signs are unimportant. But the listener interested in QSLing amateurs" continues Ike, "is at an advantage using a call for two reasons.

"First, it identifies him to the amateur and makes it a bit easier to do the QSL chores. Most amateurs prefer to send the card to a bureau because it keeps costs down and is easier than addressing many individual cards.

"Second, if a QSL bureau receives a QSL card addressed to Larry Miller, how do they look it up? Envelopes are usually filed by call sign at the bureau and having a call makes things easier for the folks who must distribute the cards."

In any case, for those unfamiliar with these bureaus -- and again, I emphasize that this is for people who QSL ham radio operators only -- I should explain that the SWL or amateur sends several self-addressed, stamped envelopes to the bureau, they file them and as cards come in, they are placed in your envelope. When your envelope contains about 8 cards, they are mailed to you.

But how about about filing these envelopes by name, I wonder to myself. Does it make it all that much easier for the bureau to file my envelope under "Miller, Larry" than to file it under "KMILLER8847-NBC0711"?

I called the American Radio Relay League, which works on behalf of amateur radio operators much as the Foundation for International Broadcasting does for SWLs and I spoke with Bob Schetgen, Technical Information Specialist. Bob feels that the SWL call letters "are probably more for a sense of belonging than anything else" although he ads, "I suspect they could help when dealing with the bureaus." In any case, Bob points out that the ARRL's outgoing QSL bureau is open to members only.

In the end, I guess that if wearing half a melon on your head when you listen to shortwave helps you have fun with your hobby, then do it. If printing up cards with "call letters" on them does the trick for you, then enjoy. After all, that's what it's all about. Fun. And God knows there's always someone out there in shortwaveland willing to sell you whatever you want.

Call-in Shows

A lot of stations are starting to pick up on the idea of using the phone to maintain contact with listeners. And that's the subject of a note from Perry Oliver in Pittsburg, Pennsylvania. "Do you really think anyone is going to spend ten or twenty dollars to call one of these overseas numbers you've been listing for the stations?"

Can't say, old man. Although I should point out that given the right time of day, calling overseas can now be less expensive than a call across the state at the same time period. Among those to get on the bandwagon are HCJB -- which seems to have no shortage of people willing to drop a dime for their call-in shows. To get their answering machine you have to dial 011-593-2-241-550, and then ask their HCJB switchboard operator for extension 489.

Finland, however, has the ultimate. They have a toll-free number in the U.S. Just dial 1-800-221-9539 and you'll connect with another answering machine that'll give you the latest Radio Finland schedule. Then there's 60 seconds in which to leave your message -- comments about programs, etc. The messages are then, says a station official, sent to Finland for reply. Radio Finland says it's less expensive than printing and mailing out program schedules all the time.

It's an interesting concept and I'll be interested to hear how it works out. And in your comments. Give the number a ring. Then let me know if you think it replaces the printed schedule. Of course, when you do ring, please mention you read about it in *Monitoring Times*.

Speaking of phones, there have been some questions as to why it is difficult --nix that -- impossible to get through to the Thorndale office by phone. Please allow me to apologize for the inconvenience and to explain. Thorndale is an office separate from *Monitoring Times* headquarters in Brasstown, North Carolina and therefore unequipped to handle the large volume of calls that often pass through here. Further, there is only one line. Thus, the chances of an all-day busy signal are great.

We do, however, purposely leave the phones open from 4 to 5 PM EDT Monday through Friday for your prepaid calls. The number is 215-384-8944. Calls at other times of the day are often met by that annoying busy signal or our troublesome answering machine, Fred.

As always, we welcome your cards and letters. The address -- if you want to make me walk down to the post office -- is Box 691, Thorndale, PA 19372. If you're feeling kind, send it here at 3 Lisa Drive and I'll only have to trot down to the mailbox.

Until the next time, good listening. And P.S. Look for some surprises in the next issue of *Monitoring Times*!

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WANT TO BUY: REGENCY M-400 scanner with manual and accessories. Write or call: Ron Hughes, 1902 Lausanne St., Memphis, TN 38117 (901) 682-0945.

WANTED: Frequencies related to the Indy 500. Drivers, pit crew, security, crash, track crew, etc. Will refund postage. Timothy Rall, 12027 Summerville Dr., Sharonville, OH 45246; (513)671-2221.

WANTED TO BUY: Radio not too expensive that would pick up all aircraft, space shuttle, and most satellites; also Air Force and weather air stations. Gene Perryman, Box 1104 Rt. 2, Kendrick, Idaho 83537.

COLLINS Military surplus cache, R-390 receivers and like equipment, parts, manuals. 35 East Pond Rd., Narragensett, RI 02882; (401) 783-7106.

WANTED: ICOM 551 6-meter transceiver. WB3HWF, 1575 Ditmore-Stroll, Newark, OH 43055.

ATARI P/D software for ham, SWL, and etc. For sale or trade. SASE for details. Jerry Callam, 10 Avalon Rd., Mount Vernon, OH 43050.

JOIN a radio listening club. Complete information on major North American clubs and sample newsletter $1.00. Association of North American Radio Clubs, P.O. Box 462, Northfield, MN 55057.

NRD-515, 3 Collins filters, speaker, mint, $975.00. SONY-2010, $225.00. Mark Gorden, (415) 556-5116; (415) 752-2013.

ALDEN Weatherfax chart recorder Model 9321, new condition, 9 rolls ALFAX paper, two new stylus belts, price $600.00. Mort Pratt, Box 7671, Portland, ME 04112.

For Sale: INFO-TECH M200F. Like new, little used with original box and manual, $189. Riley Kinney, 1325 Woodgate Way, Tallahassee, FL 32312, (904) 487-1089.

Wanted: GROVE Scanner converter for 225-400 MHz military aircraft. John Todd, 1606 Sanya Circle, Anchorage, OK 99508, (907) 337-9737.

Custom made tie clasps and lapel pins - Engravable with your call leters. Send large SASE for illustrated list. Michael S. Sabodish Sr., 11-A Matawan Avenue, Cliffwood, NJ 07721.

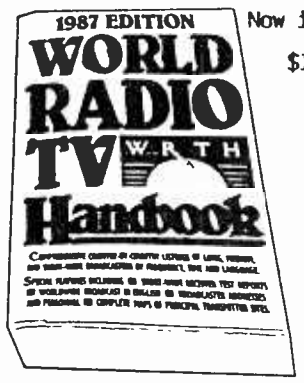
Wanted: Tube HiFi equipment (all makes and models). Early loudspeakers and HiFi magazines. Jack Smith, 288 Winter Street, N. Andover, MA 01845.

SONY ICF-2010, like new. $275. Write: DB, 1312 Skyline, Stillwater, OK 74075

Homebrew Projects - Lists, SASE. WB2EUF, Box708, East Hampton, NY 11937.

To subscribe to THE MONITORING TIMES Please turn to page 61

8 MOST WANTED



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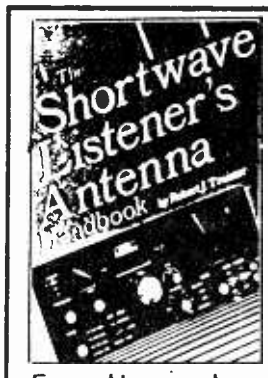

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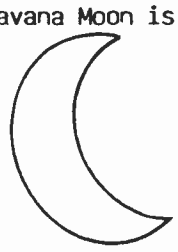
We first came across this book while doing a senior research paper in school -- and fell in love with it. In fact, were so impressed with it that we're now decided to offer it for sale to shortwave listeners everywhere. Written in 1982, it is the product of some 25 years of research by one of the leading scholars in the field. For the serious shortwave listener who wants a fuller, more complete understanding of the fascinating medium of shortwave, this book is an absolute must. Easy reading, too! Hardback 36.90

Havana Moon is Back!



Uno, Dos, Cuatro: A Guide to the Numbers Stations

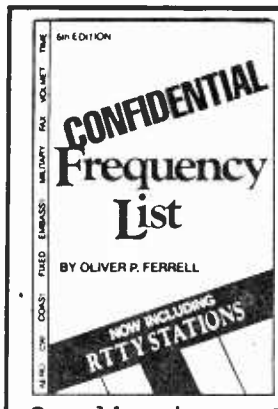
Just about everyone who's ever listened to shortwave has heard them -- somber-voiced men and women reading out seemingly meaningless groups of numbers in any one of a variety of languages. But what are they? And who's responsbile for them? Former *MT* columnist Havana Moon attempts to shed some light on this decades-long mystery in a new, 73 page report. Excellent reading! $13.95

Perfect for Beginners!

We've had a lot of requests over the years for a good, solid, beginner's book on shortwave -- something that starts with the basics and can explain them in easy-to-understand terms. And we finally found one. Former *Popular Communications* columnist Harry Helms covers shortwave from A-Z in a way that's easy to understand for anyone who's just getting started. $14.95

RDI

Radio Database International is the *ultimate* frequency guide to the shortwave bands. And with its easy-to-use computer - generated graphics, high accuracy and reliability, it's become our best selling book for two years in a row! Also includes Larry Magne's highly-acclaimed receiver reviews -- no longer found in the World Radio TV Handbook. Shortwave has a new "bible!" Get your copy today and be an instant expert on the shortwave bands! Just $12.95.



Compliment your Radio Database International -- with its coverage of the shortwave broadcast bands -- with a copy of Confidential Frequency List. Covers the non-broadcast bands from 4000 to 27999 kHz including everything from ships at sea to embassies to Press Agencies like Tass to INTERPOL and weather stations. $15.95.

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Complete Shortwave Listener's Handbook, 3rd edition by Bennett, Helms and Hardy. A new, revised edition of this classic guide to shortwave listening. A great introduction. Preface by the VOA's Gene Reich, host of shortwave's feeblest DX program. 294 pp. $16.95

Radio Receiver: Chance or Choice by Reindeer Lichte. Reviews of over 100 receivers -- from the ICOM R71A to the Sony 2010 -- by German Engineer Rainer Lichte. $18.50

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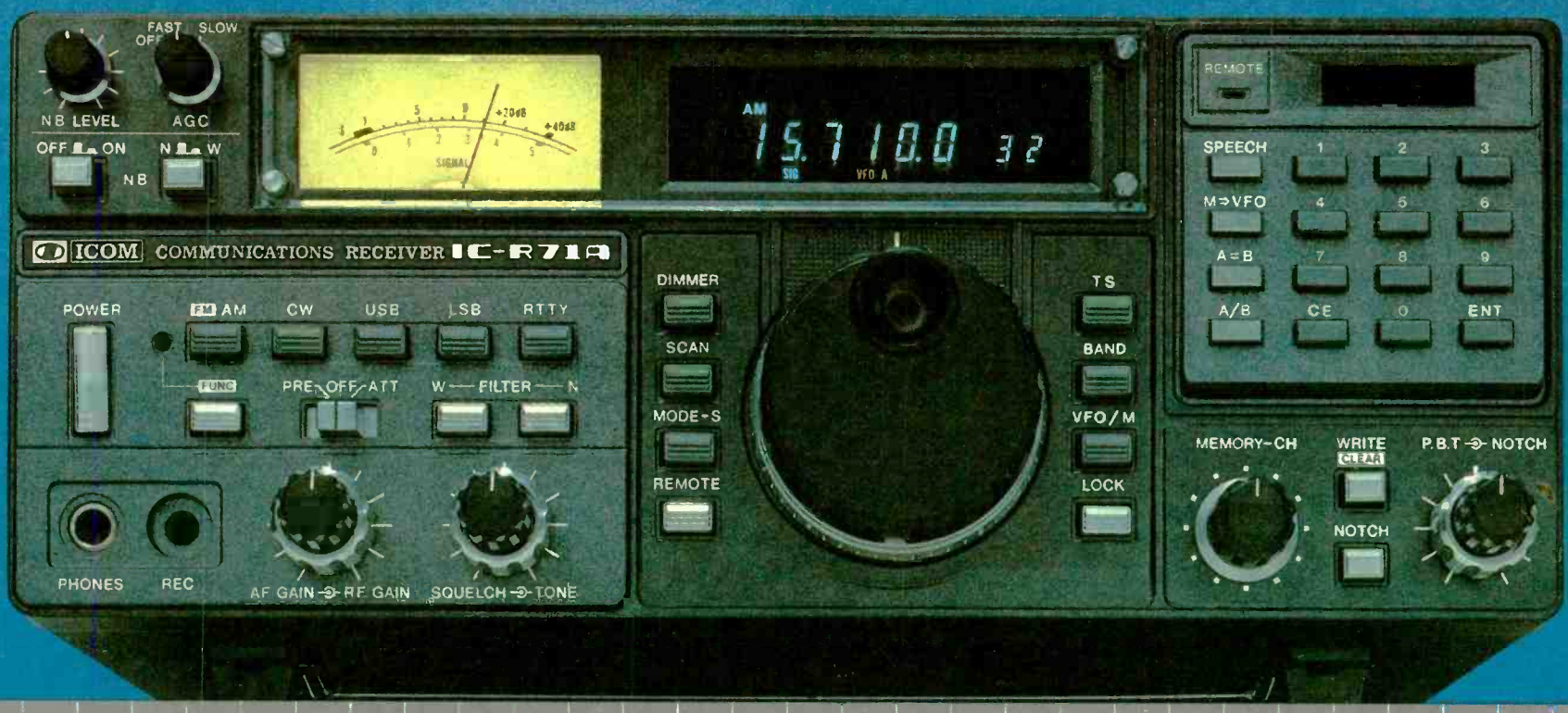
ICOM HF Receiver

IC-R71A



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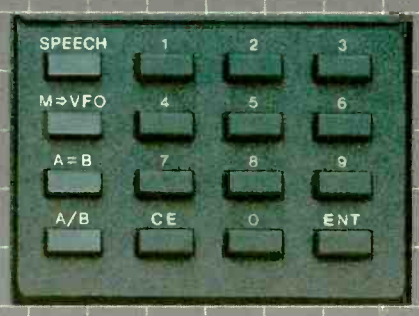

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