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MONITORING TIMES

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DXing the PAN AM GAMES

by Jock Elliot

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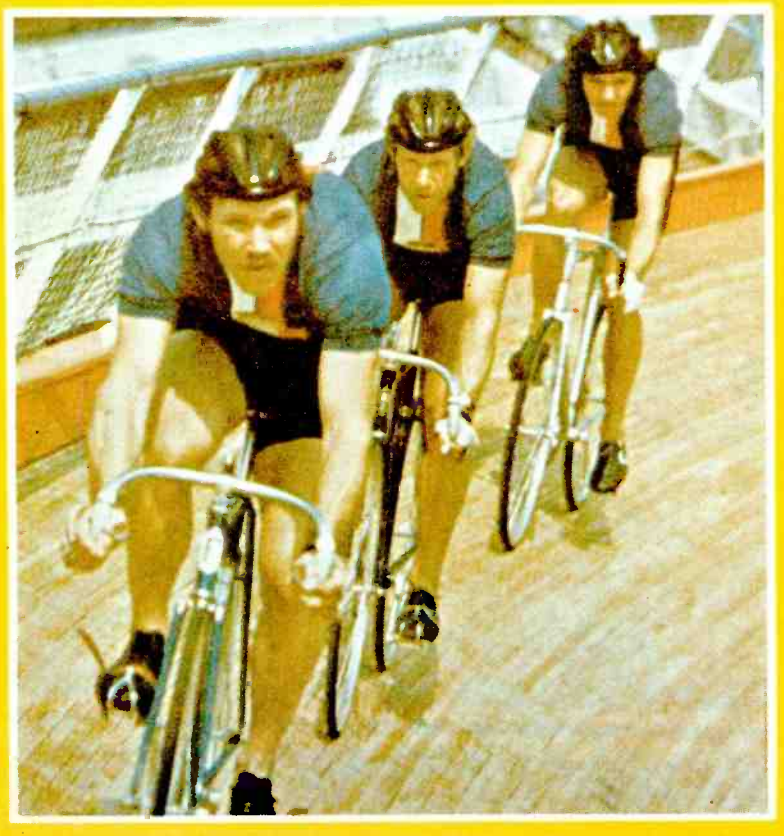

Top Guns at your Airport

by Steve Douglass

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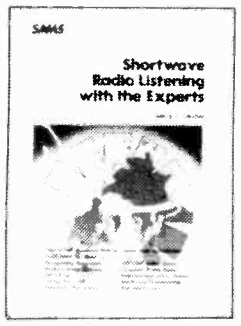
SHORTWAVE LISTENING WITH THE EXPERTS



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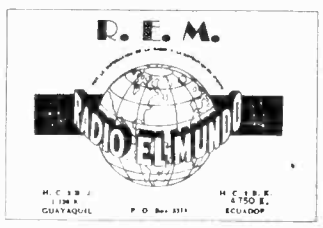
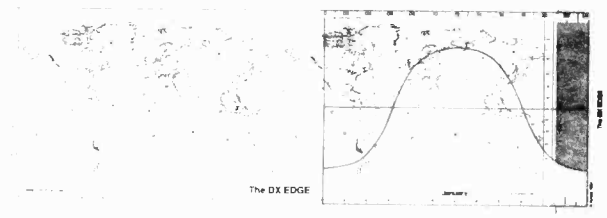


How many countries have you heard with your present antenna

THE DX EDGE $19.95



For years, ham radio operators have known that their best chances of getting those hard-to-hear stations is when their location is in sunset and location of the station they want ot hear is in sunrise. or vice versa. It's called Greyline DXing. But calculating when this occurs has never been easy—until now. With the DX Edge, you can find the perfect time to try for any station at any time of the year. DX Edge puts all this information at your fingertips in an easy, 11 inch plastic slide-rule device. Get the DX Edge plus 12 overlays for each month of the year. Just $19.95. Shipping weight 1 lb.

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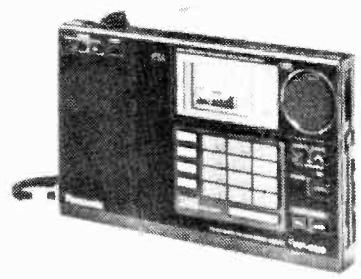

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MONITORING TIMES

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From the Publisher: Things that go bump in the night

As with most mind-boggling conversations, this one began quite casually as I visited an old friend of mine at his surplus radio warehouse. "Boy, I sure was spooked last night," Bill offered. "About 10:30 we were working here in the shop when we heard an enormous roaring of engines. We raced outside and saw a giant aircraft, bigger than a C5, without any visible wings and with two blinking red nose lightsand one blinking red tail light, maneuvering slowly down the valley. It turned without even banking!"

I sat in stony silence, incredulous at the disclosure, waiting for Bill to wink or smile. But Bill was quite serious and continued by relating identical incidents from last summer as reported by farmers in the same valley.

"Seen any flying saucers lately?" I retorted, hoping to break through Bill's facade. "No, but they transmit on 37.4 MHz," he assured me. I frowned. "Didn't you know that?" he chided. "Everybody knows that!"

Now I was sure he was kidding, but he quickly went back to the original subject about the strange aerial machine. "Last summer that thing came by several nights in a row, always around 10:30 PM. Probably some sort of training mission. But it sure is spooky!"

Stealth? I wondered. We were over a hundred miles away from any military base. How could something that size sneak up here without anyone reporting it? Did the FAA have it on radar? No FAA within a hundred miles of here, either!

Bill promised that next time the object paid him a visit he would fire up his spectrum analyzer and look for some loud signals. If they were in the military 225-400 MHz band he would rest easier. But what if they weren't?

The next topic of discussion was even better. "Do you know about the work being done around here by a foundation?" he queried. "Oh, yeah," I recalled; "Communicating with the dead," I continued with a wry grin on my lips. Bill wasn't amused.

"We installed the equipment," he admitted. "We didn't even know what it was for, but I heard the voices after we turned it on!" More stony silence (this was a great day for stony silence). "Do you hear these voices very often?" I quipped, hoping to lighten the topic somewhat.

BIll handed me a hard-cover book entitled, *The Ghost of 29 Megacycles* by John G. Fuller (Souvenir Press), the author of *The Ghost of Flight 409*. It provides a detailed look at the experiments conducted by the Metascience Foundation and its founder, George Meek, who pioneered "Spiricom."

After I returned home I listened intently to the ten-meter frequency, but heard nothing. Maybe you have to be a believer. But if I heard something, maybe I would be.

Bob Grove

On the Cover: 1975 Pan Am Olympic games in Mexico City. Photos used by permission of the United States Olympic Committee: Bruce Jenner in the Decathlon (high jump); Sugar Ray Leonard - Boxing; Grippaldi - weightlifting; S. Wiznick, K. Wesenkamp, unidentified - cycling. Top Gun photos by Steve Douglass: Sunset over Amarillo; Jet trainer pilot from Vance AFB poses with his jet; Fort Worth F-4 Phantom taxis with its chute popped into Carswell AFB. Cover design by Owassa Graphics, Murphy, NC.

Inside this Issue

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Bring Along Your Radio or Tune in from Home!

DXing the Pan Am Games

by Jock Elliott

The biggest sporting event in the world this year -- the 10th Pan American Games -- will be held August 7-23 in Indianapolis. And when the sprinters sprint, the horses gallop, and the kayakers paddle, radios will be there to help coordinate an amazingly complicated sporting spectacle.

The Pan Am Games this year will feature 27 sports in 286 separate events. By comparison, the Los Angeles Olympics had 21 competition sports and two demonstration sports in only 221 events.

The Pan Am Games, being held for the second time in the the U.S. (the first time was in Chicago in 1959), will bring together 6,500 athlete, coaches, and officials from 38 countries of the Western Hemisphere; some 3,000 reporters, still photographers, and camera men; and 40 radio stations or radio services from outside the continental United States.

To give you an additional idea of the scale of ***P***an ***A***merican ***X*** -- ***I***ndianapolis (or PAXI, as the organizers call it), the games will involve more than 20,000 volunteers, the opening ceremony will be the largest production that Walt Disney has ever done; and CBS television will broadcast an unprecedented 26 hours of coverage.

One of the keys to getting this mammoth undertaking to run smoothly is good communications. It is Tom Allebrandi's* job to make sure that the communications will do the job.

Allebrandi says, "Our first line of communications will be telephones, with radio as our back-up and primary means of communications where phones simply are not practical."

There are five distinct PAXI networks, tied into a central command post, that are crucial for running the games, providing logistical support, and ensuring public safety functions. For these activities, Allebrandi has cleared and allocated 92 discrete frequencies, running from 138 to 154 MHz, that bracket the two meter ham band.

One thing is notable in its absence from PAXI press releases: frequency lists. The reason, quite clearly, is security. Since the Munich Olympics, when a gang of terrorists took Israeli athletes hostage, with tragic results, the organizers of all large international sporting events have been deeply concerned about security and the threat of terrorism. PAXI does not release a frequency list because the information could be potentially dangerous in the wrong hands.

Networking

For simplicity's sake, the five PAXI radio networks have been labeled A through E by the organizers.

Network A is for Administration. This channel, reserved for the top-level administration of the game, is voice-scrambled because it may involve traffic concerning security, politically-sensitive topics, or potentially controversial information about decisions or rules and regulations. Less than two dozen radios comprise this network.

Network B is reserved for unsworn security people -- the 1,200 volunteers whose job it is to help people out and watch for trouble. About one in four of these "T-shirt cops" will carry a radio, and when trouble occurs or someone needs help, the volunteer calls the professional security, medical, or administrative personnel for help.

Network C, for transportation, involves about 300 handitalkies in the hands of people controlling the movement of 500 buses and 300 cars. These vehicles will be used for transporting athletes, press, and volunteers.

"With more than 20,000 volunteers involved in the Games," says Allebrandi, "it is simply impractical, and flatly impossible, to allow them to drive their cars to the events they are covering. Radios are an essential part of getting these people to the right place at the right time."

Communications for medical coverage of the Games is provided by Network D. At each venue where events are being held, two different medical services will be available. The first medical service is concerned with providing care for athletes who might becomes ill or injured at the event. The second medical service, consisting mainly of emergency medical technicians (EMTs), is devoted to responding to the needs of the spectators. Both services at each venue are directed by a medical officer.

The D Network is tied into a command post linked with the Indiana Hospital Emergency Radio Network (IHERN), which coordinates ambulance service and routing to various hospitals. Once the doors of an ambulance close, IHERN takes over, making sure that the patient inside is taken to the nearest or most appropriate medical facility.

* Tom Allebrandi's name should be familiar to readers of Monitoring Times. He was the Frequency Coordinator for the Indianapolis Motor Speedway, home of the Indianapolis 500. He is on loan to PAXI as vice president for telecommunications and was featured in the June, 1987 MT article, "Racing Radios."

Pan Am Hams

International goodwill is one of the primary reasons for the existence of the Pan American Games, and a group of Indiana amateur radio operators is working to ensure that goodwill reaches the four corners of the globe.

Indiana amateurs, the local Indianapolis radio clubs, will provide worldwide amateur communications for the games using a novel two-station arrangement.

The first station, W9JP, will be located within the confines of the 100-acre Pan American Village at Fort Benjamin Harrison. Housing approximately 4,000 athletes and 1,200 to 1,500 coaches, the Village is a secure area not open to the public. Manned by a select crew of hams, W9JP will provide 2-meter voice and packet communications to a special worldwide station located outside the Pan Am Village in the city of Indianapolis.

The call sign for the special station is W9PAX (for Pan American 10). As Mike Head, one of the organizers of the ham effort explains, "This particular call sign actually belongs to a station in Wisconsin, but the owner has agreed to 'lend' it to us for the special station." (The FCC does not issue call signs for special events.)

Under the dual station setup, anyone inside the Pan American village may go to W9JP to have a message relayed to W9PAX and then transmitted to friends and family throughout the world. Incoming messages are handled in reverse order: received first at W9PAX and then relayed to the Village station.

W9PAX, equipped with four separate rigs capable of operating simultaneously and a gallery of monoband antennas 90-130 feet in the air, will be open for use by any ham from a country which has a reciprocal agreement with the United States. From August 1 through August 23, the station will be on the air around the clock.

If you want to hear W9PAX, CW operations will generally be found 30 kHz up from the bottom of each ham band. For SSB signals, try listening around 1.850, 3.850, 7.250, 14,250, 21.350, and 28.550 MHz. (All you need is a normal shortwave radio with single sideband to hear these.)

If you'd like a reception report, the Indiana Amateurs have promised to QSL reception reports from MT readers. Send your report to:

W9PAX
c/o Mike Koss, W9SU
P.O. Box 18945
Indianapolis, IN 46218-0495

Be sure to include an SASE. As the station is supported entirely by profits made during the local hamfest and receives no money from the Games themselves, you may want to include some extra mint stamps, an IRC or a dollar to help underwrite some of the expenses of this worthy event.

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Network E is an immensely-complicated handitalkie/repeater system directed at providing crucial radio service to events and venues. Getting it all to work is a little like rubbing your head and patting your stomach which standing up in a canoe and doing a *New York Times* crossword puzzle.

Here's why. To start, there are 27 sports involved in 286 separate events. The events take place at 16 different locations within Marion County (where Indianapolis is located) and seven venues outside of Marion County. Each of these events needs its own radio communications capability to coordinate activities within the event. In addition, the people running each event need to have the capability to talk with the central operations center providing overall control of the Games.

To complicate matters even further, there may be several events involving *different sports taking place at the same location at the same time.* For example, if fencing and boxing are both taking place on the same afternoon at the Convention Center, the people running the fencing competition will probably not want to hear what the boxing officials are saying on the radio. On the other hand, there may be times when the fencing and boxing officials clearly need the ability to converse with each other by radio.

In the end, this knotty problem was solved by taking advantage of the fact that, because some venues are many miles apart (and handitalkies are of limited range), some of the frequencies can be reused without causing cross talk. As a result, only 15 discreet simplex frequencies were ultimately needed to provide communications for all 27 sports and 286 events.

In addition to the frequency assigned to the specific event, each handitalkie that an official carries also has a common frequency that ties into the PAXI operations center through a repeater. By using this common channel, officials at different locations or different events at the same location, can talk to each other without messing up local communications.

But there is a lot more to the story of radios at the Pan American Games than just the five basic operations networks.

Amateur Involvement

Indiana amateur radio operators are also assisting in venue communications. For example, during the bicycle road racing event, 96 hams will be stationed around the 12-mile course, providing vital information through 2-meter handheld radios. Other events where hams will be involved include the marathon and the three-day equestrian event.

In addition to the normal law enforcement/public safety networks, there are 14 more networks that indicate how seriously security is being taken at the Games. Among these are three voice-scrambled ones devoted to counterterrorist operations. Some of these "other networks" are run by the FBI, the Secret Service, U.S. Customs, and the Bureau of Alcohol, Tobacco and Firearms. A full list is not available.

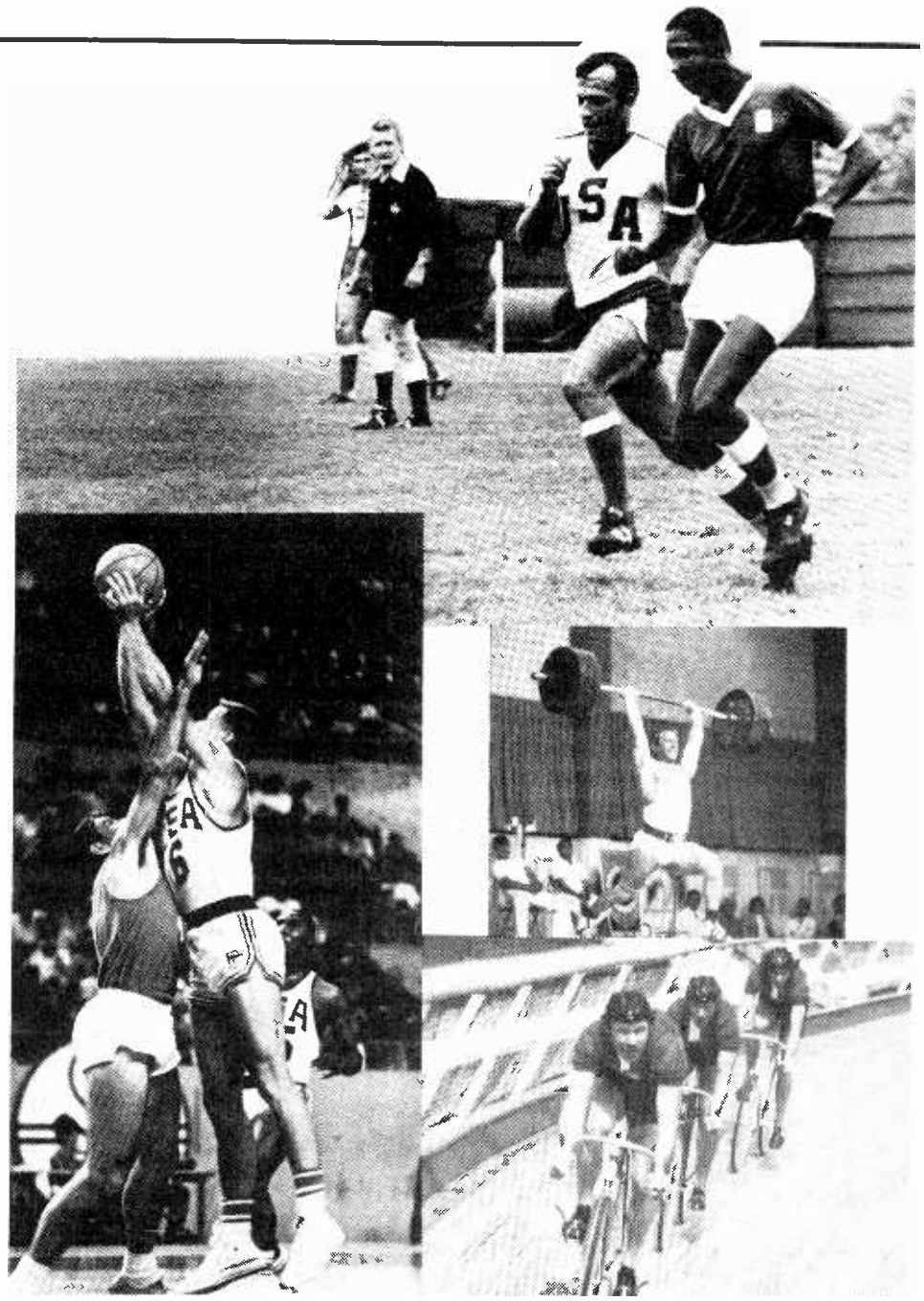
Radios are even helping to get the scoring right. A Swiss timing company is being outfitted with 23 radios issued by PAXI to use in coordination. "They wanted to bring their own radios" wailed Allebrandi, "but their frequencies were right in the middle of our TV channel 11!"

Even the sheer complexity of the opening ceremonies is enough to boggle the mind. There are 30,000 entertainers and participants, including 7,500 skaters, bikers, dancers, horse-drawn carriages, barbershop singers, a 500-voice honor choir, full professional orchestra, 1,000 piece marching band, 20,0000 member card section -- the list goes on and on. Obviously, radio is needed here to direct costume changes and cast movements. There is even a need to coordinate frequencies with the Federal Aviation Administration so that they can deal with the hanggliders, hot air balloons, and ultralight aircraft taking part!

PAXI promises to be one of the greatest spectacles of all time -- not to mention an incredible sporting event. If you're fortunate enough to attend the game in person or live in the Indianapolis area, bring your radios. As a shortwave listener, you can tune about for on the scene coverage. Or watch on TV a dozens of networks from around the world scramble to bring the games to their audience back home. There are an almost unlimited number of DXing opportunities.

Whatever your perspective at the Pan Am Games this month, remember that radio is one of the critical elements. ■

Sports to be contested: archery, athletics, baseball, basketball, boxing, canoeing, cycling, equestrian sports, fencing, soccer, gymnastics, handball, field hockey, judo, pentathlon, roller skating, rowing, shooting, softball, swimming, table tennis, taekwondo, tennis, volleyball, weight lifting, wrestling, yachting!



All photos courtesy of the United States Olympic Committee.

Want to DX the Pan Am Games?

Here is a list of western hemisphere radio stations and broadcasting services that, at press time, were planning to cover the games. Good hunting!

Argentina:	L.S. 5 Radio Riv Diarios-Radios
Brazil:	Radio Imprensa Radio-TV Radio Panamerica Radio Globo Radio Record, S/A
Canada:	Newsradio Radio Canada Int'l Standard BCing News Broadcast News Limited
Colombia:	Radio Cadena (RCN) Caracol Radio Radio Macarena
Cuba:	Radio Rebelde Radio Havana Cuba
Chile:	Radio Nacional Chile
Jamaica:	Radio Jamaica Limited
Mexico:	Div. Not. Nucleo Radio R. Programs de Mexico
Paraguay:	Radio Lo de Marzo
Puerto Rico:	WCMN WLEY WIAC WIPR-TV WALO WAEL WPAB WKUM
Peru:	Radio Callao
Paraguay:	Radio Primero Radio 1 de Marzo
Trinidad & Tobago:	Radio Trinidad
Uruguay:	Radio Imperial Radio Carve Radio Universal
Virgin Islands:	WSTX Radio
West Indies:	Caribbean BC Corp.

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Article and photos by Steve Douglass

Nose of F-4 Phantom looms over photographer.

Thumbs up. Pilot of the F-4 "Fort Worth Phantoms" at Carswell AFB signals ready for taxing.

Top Guns at your Airport

Forty thousand pounds of fighter, guided by 175 pounds of pilot, hurtles toward the runway. *"Spad one five, you are cleared for your touch and go,"* the tower radios. The pilot "Rogers" and flicks a switch. There is a whir of electronic motors and the landing gear drops from the belly of the F-4 Phantom.

Locked in place the wheels grope for the ground like the talons of some huge bird of prey. *"Contact tower on two-five-seven point niner,"* the radio squawks. A screech and a puff of smoke signal that rubber has merged with asphalt.

No sooner has the Phantom touched down than it is up again. Gear up and throttle back, the fighter climbs with a roar up into the sky. *"Tower Spad, one five would like to shoot another,"* he radios. *"Roger, One five; contact approach control on three-five-one point seven."*

A common sight at any Air Force base would be an F-4 Phantom fighter on a training mission, shooting "touch and gos" but what I just described may be happening at your local airport. Here in Amarillo it is not uncommon to see fighters training, a B-52 bomber refueling or even the newest B-1 bomber on a practice approach.

An air show happens almost every day here -- It may be happening at your hometown airport. For UHF military monitoring buffs it is a great place to see the craft you are eaves-dropping on and pick up some good frequency information.

If you have a flight service station at your local airport, call them up and see if they get much military traffic. You might be surprised to find out just who stops in; I ran into the Secretary of the Navy at ours!

A Visit to Amarillo

Amarillo has the second longest runway in the world. Over three and a half miles long it is only exceeded in length by a strip at Edwards AFB in California. The Amarillo strip was originally used by B-52s during the Vietnam War, but the base was closed in the late sixties. The military gave the strip to the city under one condition; that the armed forces could use it free of charge to train its pilots.

The extra long runway is a great place for the training crews of all kinds of military aircraft. One pilot told me that it was "great for making mistakes!" That is the main reason why fighters flock here. Another good reason is that Amarillo is centrally located nationally and is a good place to stop and refuel.

Century Aircraft, the F.S.S. here, is equipped to refuel almost any kind of military aircraft, so it is not rare to see a C-5a or a Navy F-14 poised refueling. The people at Century were very gracious in letting me have the run of the place.

I noticed that they had walkie-talkies all transmitting on 122.950 MHz and a Realistic Pro-2020 for monitoring other aero frequencies. All of the refueling vehicles had multi-channel Motorola rigs for talking to the tower and ground control on 118.3 and 121.9 MHz.

On the first day I visited I was lucky enough to catch a squadron of Phantoms stopped at Century to refuel; the 335th TAC fighter squadron was flying across the country. Believe me, the sight of row after row of F-4 Phantoms with their engines

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screaming was an awesome sight! The pilots refer to their craft as a "double ugly," or the "Rhino."

While talking to the pilots they eagerly showed me their jets. One of the first things I looked for in the cockpit was the radio which was sometimes hard to locate in the maze of dials and knobs. I made note of the frequencies that were preset into their Collins UHF transceivers.

I also brought my portable scanner with me and stored any new frequencies I had obtained. The pilots seemed interested in my scanner and I showed them how it worked. They seemed amazed that anyone could monitor their frequencies! One said he would have to get him one so he could listen in at home when he left the service.

One pilot, call sign "Buzzard," explained how one gets a personal call sign. "You usually get it from a friend at a party or a buddy; usually your call sign has something to do with your personality, hobby, etc. In your case, because you are a radio buff, a good call sign for you would be "Static!"

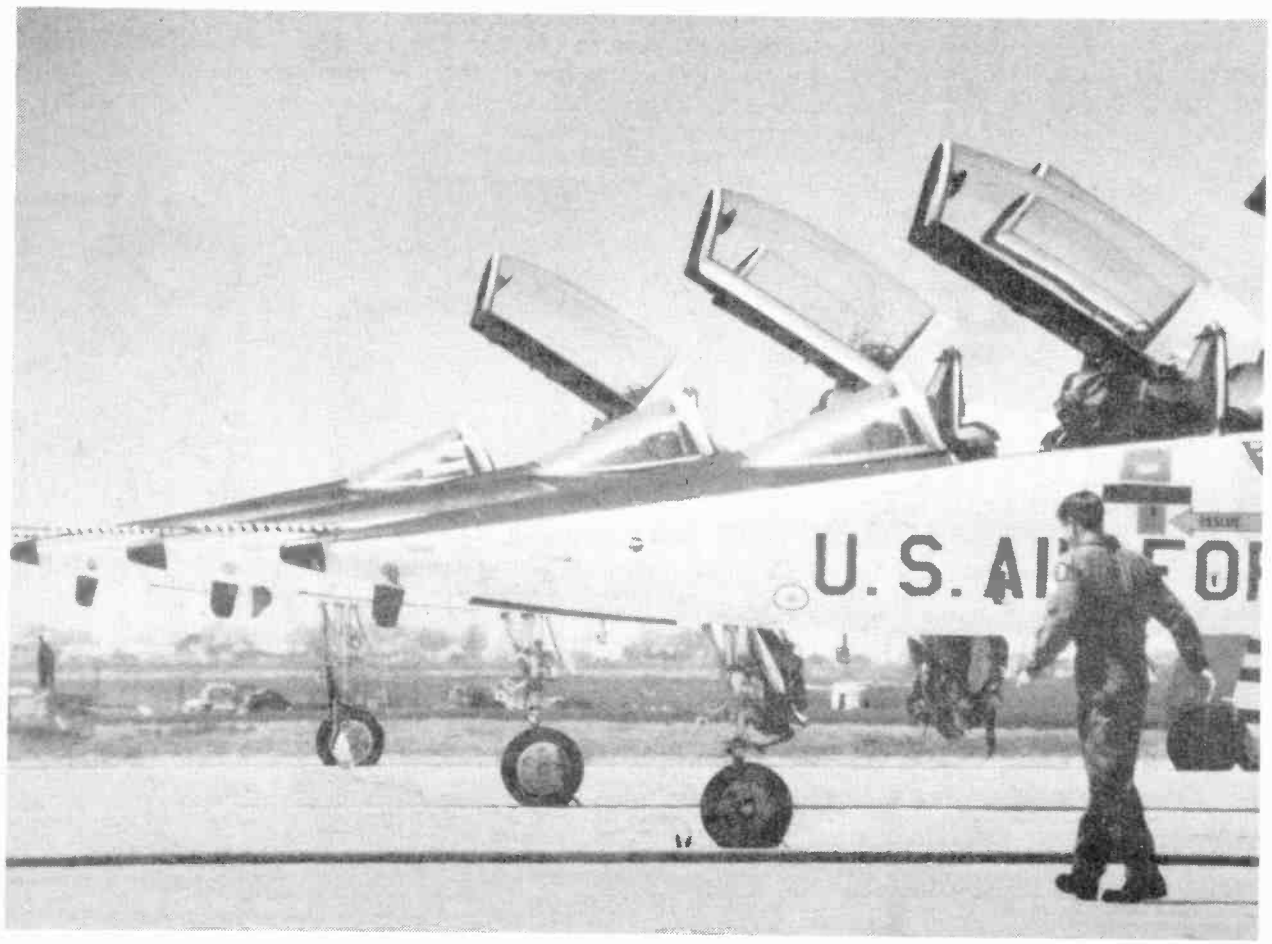
If you are a military monitor, call your local flight service station and ask them if you can visit. Bring your scanner and your camera and watch the skies. Who knows, maybe there are some top guns at your airport right now! ■

Military Aircraft Nationwide

236.6	Air Force control towers
241.0	National Guard
243.0	Emergency, all agencies
255.4	Flight Service Stations
257.8	Military aircraft to FAA towers
272.7	Flight Service Stations
311.0	Strategic Air Command primary
321.0	Strategic Air Command secondary
3486.	Military aircraft to FAA towers
381.8	Coast Guard air primary
239.8	METRO (Wx)
275.8	Ground Control
342.5	METRO (Wx)
240.2	USN towers
372.2	AF dispatch
289.4	Clearance delivery
297.0	MAC air to air
364.2	NORAD primary
305.4	RDF
225.4	Ground control
264.9	NORAD secondary
266.5	SAC air refueling
318.0	SAC air refueling secondary
360.2	USN IFR
305.6	TAC training

F-4 pilot, call sign "Buzzard," poses at the business end of his fighter. His "G suit" prevents him from blacking out during high speed maneuvers.

Below: T-38 Talon jet trainers await their student pilots on the ramp.



Amarillo UHF Aero Freqs

351.7	Amarillo approach West
290.3	Amarillo approach East
307.0	Amarillo departure
257.9	Amarillo tower
255.4	Amarillo F.S.S.
319.9	Albuquerque Center
397.9	Albuquerque Center/Holloman AFB
279.6	Tucumcari Approach
381.6	Albuquerque Center high altitude
251.1	Albuquerque Center low altitude
358.3	Cannon AFB "TAC" approach
378.8	Reese AFB "SAC" approach
289.4	Altus AFB "SAC" and "MAC" approach
281.4	Kansas City Center
319.9	Denver Center
344.5	Air Force Weather
375.7	Altus AFB refueling
323.1	Tinker AFB
241.0	Air National Guard refueling
260.2	SAC refueling
372.2	SAC
375.7	SAC

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Focus

Providing Perspective and Insight

by Edwin Warner

Good documentaries seem to be disappearing from broadcasting, a casualty of leaner times and changing program philosophies. Happily, this is not the case at the Voice of America, where in our current affairs division we broadcast *Focus* five times a week. With 20 minutes devoted to each program, we are able to probe behind the news, wrestle with a number of issues, and come up with an in-depth analysis. Those involved find it gratifying and sometimes exhausting work.

Twelve writer-broadcasters handle all aspects of the program from beginning to end. They do the research, set up and conduct the interviews, cut the portions they need from the tape, write the script, suffer the editing, and finally, voice the material. Other broadcasting operations provide good accounts of the news and serviceable interviews, but I think VOA is almost alone in offering a structured analysis on a daily basis.

Focus reporter Rory Eriksen describes how he and his colleagues go about their work.

"Creating a *Focus* documentary involves much more than simply reporting on an event or issue. The writer must go beyond the basic facts to develop in-depth understanding -- knowledge of why the incident occurred or the issue arose, what the consequences are, proposed solutions to the problem, and, if possible, what the future may hold."

After discussions with *Focus* editor Steven Munson on the direction of the program, the writer starts careful and exhaustive research. When reporting on another nation or region, he or she consults with members of VOA's language services to obtain perspective and insight. After that, the reporter fleshes out his knowledge with a few days of interviews with informed people of varying political outlook -- usually a mix of academics, government officials, important political figures, eye-witnesses, and any others who can authoritatively discuss the issue at hand.

The *Focus* reporter travels to the source and reaches out through satellites and phone lines to record these experts' thoughts. VOA's worldwide correspondent network provides advice and reporting from the scene when needed.

After synthesizing this huge volume of information and recorded sound, the *Focus* writer seeks to bring the issues alive through a combination of vivid writing, actualities (recorded voices or bits of sound, such as the chanting of a politician's supporters), and music, when appropriate. After editing, the reporter records the program with the help of a *Focus* production unit.

Focus ... on what?

There is never a shortage of subjects for *Focus*. Some topics can hardly be avoided -- the controversy over the Strategic Defense Initiative, or Star Wars, for example, or the debate over a possible treaty for eliminating intermediate nuclear weapons. These subjects present a challenge because at the same time that we analyze the arguments, we must make them crystal clear for an audience that is not familiar with the details or with the American political scene.

This means sometimes starting from scratch, as Andy Baroch does in his program on the intermediate nuclear force. Then, segment by segment, he builds his program. Context helps make issues clear. In a *Focus* on the controversy over the Reagan administration's arms sale to Iran, for example, Jonas Bernstein explained that some events partly emerged from the continuing struggle between the Congress and the President.

Focus topics are pretty evenly divided between foreign and domestic issues. In recent weeks, foreign topics have included changes in China, the crackdown in South Africa, the war in Afghanistan, the shift of command in the Soviet Union, the chaos in Lebanon, and the struggle in the Philippines. *Focus* programs on the United States have dealt with the growing service economy, the self-contained world of shopping malls, the possibility of changes in the U.S. Constitution, the opening of the presidential campaign, and the more productive life of the nation's disabled.

Focus writer Ted Landphair at work on a script.

Ed Warner

Writers Sam Iker and Deborah Cooper

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In response to requests from our language services for more information about our military, John Young is working on *Focus* programs on the volunteer army and the build-up of the navy.

Sometimes, *Focus* writers can provide special insights not available elsewhere. We were intrigued by reports that while applications for patents had leveled off in America, the number issued to foreign inventors is rapidly increasing. What is going on? Are Americans less inventive these days, another sign of diminishing competitiveness? We asked Andrew Baird, who handles most of our economic programs, to find out. Pulling together interviews with the head of the U.S. Patent Office, a leading patent attorney, a professor of law, and two economists, Baird came to the conclusion that there is not too much to worry about. American patents are slowing down because they are being scrutinized more closely to weed out inconsequential inventions. More patents for foreigners are to be expected because their economies, once dormant, are now growing.

We are similarly impressed by the increase in the number of black mayors around the country, more than 6500 now. How are they doing, especially those who preside over cities where industries and jobs are moving out? Barbara Schoetzau interviewed Mayor Coleman Young of Detroit, among others, and found that they are coping pretty well with their sizable problems, though they have one that is not always recognized: the sometimes unreasonably high expectations of the voters who put them in office.

Focus deals mostly with the present but we take an occasional backward glance, reminding our listeners of important historical events. Our resident historian is Francis Ronalds, whose recent series of programs on the U.S. Constitution won wide praise and VOA's annual award for news and English broadcasting.

Ronalds also turned out a series of probing scripts on the 40th anniversary of World War II, and another marking the 30th anniversary of the Hungarian uprising. His most recent historical *Focus* dealt with the Russian Revolution of 1917.

Focus also has a lighter side, and as often as not Elizabeth Arrott provides it. I think her farewell to Cary Grant would have delighted the debonaire actor, and her tribute to 100 years of Hollywood must have brought back pleasant memories for many moviegoers.

Sam Iker, who handles environmental issues, changed course to examine the continuing popularity of the great detective, Sherlock Holmes. Ike interviewed a variety of fans to find out why a fictional character should be so real to so many people around the world.

The Writers

Our *Focus* writers come from varied backgrounds in broadcasting and print journalism, from think tanks and academic life and from the VOA newsroom and intern program. David Cleveland joined us after completing a 900-page novel, so *Focus* scripts hardly seem daunting. Cleveland covers the arts for us and on one occasion -- it must be said -- the exotic. He was fascinated by the story of the Vietnamese veteran who decided to brave the South Seas in a small boat to rescue the woman he had left behind in Vietnam. David chronicled this quixotic mission in a *Focus* that had more than a touch of the seas stories of Joseph Conrad.

I'll conclude with a fairly typical letter from a listener, this one in The Gambia:

"I must commend VOA on its daily presentation of *Focus*. Over the months that I have been a listener, I have found the program to be consistently good. There are a wide variety of topics and everything discussed is of interest. Living in rather primitive circumstances, I haven't much access to information on current affairs except by way of shortwave. There, VOA has become quite essential to me. *Focus* has been especially helpful in following what is happening in the outside world. I must admit to being as addicted to it as some people are to the TV soap operas." ■

Edwin Warner is the chief of VOA's current affairs division. Focus is heard Monday through Friday on the Americas Service at 0210 UTC on 5995, 6130, 9455, 9650, 9775, 11580 and 15205 kHz.

HUGE

70 PAGE

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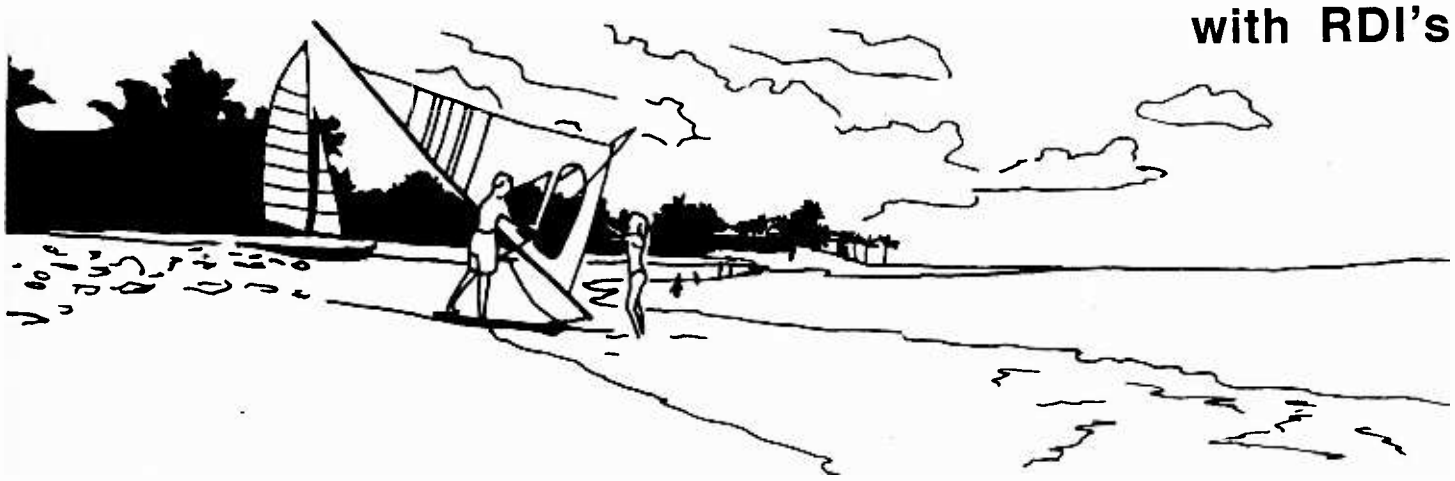
Tropical Band Scan

with RDI's Tony Jones



Tony Jones is probably one of the world's finest monitors. His work is well-respected, both professionally and within the shortwave listening community. Up from the Radio Database International South America monitoring post in Paraguay to put the finishing touches on the 1988 edition of RDI, we tapped him to do a tropical bands band scan for Monitoring Times.

When Larry Miller approached me to do a tropical bandscan, I thought he was about to send me to some sun drenched beach with a portable receiver in my hand. Unfortunately, he had other things in mind.

"No, man," he said, "you stay right where you are, and dig something out of those tropical bands".

Reluctantly, I agreed, though not without some misgivings. Heavy lightning storms had broken out to the west, and were headed our way. Propagation was disappointingly bad, even allowing for the season. And interference from utility stations was particularly severe.

On the plus side, I had the use of some good equipment, a Drake R7 and a 230 foot inverted L antenna. This combination of good equipment and poor reception conditions would suggest that almost all the stations heard could be tuned on a shortwave portable, given average conditions.

The monitoring site chosen -- in eastern Pennsylvania -- is fairly typical of the north-east, and anyone living in the area between Washington and Boston should experience similiar results, possibly even better.

The range of frequencies chosen for the bandscan was from 4500 to 5100 kHz. This choice was virtually forced upon me, since frequencies lower down were severely affected by atmospheric static from the approaching lightning storm. In addition, the 60 meter band (4750-5050 kHz) contains the largest number of stations of any of the so called "tropical bands," the others being 75 meters (3900-4000 kHz), 90 meters (3200-3400 kHz) and 120 meters (2300-2500 kHz).

The scan commenced at 0200 UTC and ended just after 0300. This meant that the opportunities of picking up Bolivian stations were reduced somewhat, but that signals from the Pacific coast of South America had a better chance of making it to the eastern U.S.

The number of channels theoretically available in the range 4500-5100 is considerable, since many stations operate on split frequencies, sometimes intentionally, but more often than not because of inadequate frequency stability. As an aid to possible identification of these stations, a copy of the 1987 *Radio Database International* was conveniently close at hand. Anyway, this is what was heard.

0200 UTC

4565 kHz: The first broadcast station to appear was this Radio Liberty feeder, transmitting from the 10 kilowatt facility at Holzkirchen in the Federal Republic of Germany. Broadcasting in the Independent Sideband mode, it was feeding the relay site at Gloria, near Lisbon (Portugal), with Russian on one sideband and Ukrainian on the other.

4588 kHz: Upper Sideband. Another feeder, this time from Argentina. Radio Rivadavia's relay for stations in the interior, via the ENCOTEL transmitter complex at General Pacheco, Buenos Aires. This station normally has a great deal of sports programming, but was heard with Argentinian popular music until cut at 0204. Other channels where it is possible to tune Radio Rivadavia are 9115 kHz, until 2300 UTC or later, or via LRA36 Radio Nacional (in the Argentinian sector of Antarctica) on 15474 kHz, from around 1400 UTC (both are Sundays only).

4712.3 kHz: Radio Abaroa, from Riberalta, up in the north of Bolivia. Weak and with considerable atmospheric static, but not enough to blot out a nice selection of Bolivian boleros (part of a program of musical dedications).

4755 kHz: The first Brazilian to appear, Radiodifusora do Maranhao, from Sao Luis in the northern part of the country. On a 24-hour schedule, but reception often difficult due to co-channel interference from teletype (RTTY) signals, as was the case on this occasion. Unmistakable Brazilian sambas. No sign of the second Brazilian on this channel, which is easily identifiable by the large amount of "musica sertaneja", somewhat similar to the Paraguayan polca.

4765 kHz: Radio Moscow's Cuban relay, with nondescript programming in Russian, the music best described as Soviet middle of the road. Spot on frequency and no spurious radiation on other channels. Must have overhauled the transmitter!

4780.1 kHz: One of the best known stations on the band. La Voz de Carabobo, in Valencia (Venezuela). A mixture of Venezuelan rhythms and Spanish popular music. Fewer announcements than usual.

4790 kHz: Possibly the first Latin American station I ever logged, some twenty-odd years ago, and one of my favorites. Radio Atlantida, up in the north-eastern corner of Peru. Heard on this occasion with community oriented programming in Spanish.... "we will work together until our objectives have been reached....." A particularly loud burst of static prevented me from hearing just what those objectives were.

4795 kHz: Radio Nueva America. The second of only three Bolivians noted on this night. Spanish programming typical of the station, which is one of the best known in La Paz. Short news items and middle of the road music. Not a particularly strong signal, but perfectly readable.

4815.4 kHz: Probably the most enjoyable music heard throughout the scan period. Alternating themes of salsa and the even more rumbustious cumbias. Extremely contagious, and difficult to leave, especially as the signal was also very strong. One of the most popular Colombian stations in years gone by, and it has only recently returned to shortwave after several years off the air. Located at Valledupar, near the Venezuelan border, Radio Guatapuri has long been a friend of SWL's and has in the past readily replied to listeners' correspondence.

4820 kHz: A weak Spanish speaking station, with very little music. *Radio Database International* lists just one that would fit - HRVC La Voz Evangelica, transmitting from Tegucigalpa, Honduras. This is a religious station, and the virtually all-talk format would fit.

4830 kHz: Nice up-tempo Venezuelan music interspersed with Spanish announcements. No doubt about this one - it's Radio Tachira, in San Cristobal. The only other Latin heard on this frequency in recent times is the Bolivian Radio Grigota, which ends its shortwave transmissions around 0140 UTC.

4832 kHz: Tell-tale time checks "en la capital" provide an easy clue to Radio Reloj (Clock Radio) broadcasting out of San Jose, the Costa Rican capital. Time announcements are separated by middle of the road Latin music.

4840 kHz: A mixture of Venezuelan tunes and Latin pop indicate that this is Radio Valera from the town of the same name, and not the Peruvian station Radio Andahuaylas which can often be heard on the same channel. This was confirmed a little later, at 0243, when local lottery results were followed by a joint time check and station identification: "Radio Valera da la hora exacta...."

4845 kHz: A mess of a frequency, with a powerful utility transmitter dominating everything else. Something underneath the mess, possibly the *RDI* listed Radio Nacional operating out of Manaus in northern Brazil with a power of 250 kilowatts.

4850 kHz: Radio Capital, broadcasting out of Caracas, Venezuela, with its usual mix of Spanish and English pops interspersed with Spanish commercials. Several

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Caracas addresses. Considerable interference from the station on 4851.2 kHz (See next item).

4851.2 kHz: Unidentified Spanish speaker, squeezed between Radio Capital on one side and utility signals on the other. *RDI* lists Radio Luz y Vida on 4851v, and the programming heard would seem to indicate that this is indeed the Ecuadorian.

0215 UTC

4865 kHz: Another unidentified station, and too much static to make out the language. Possibly La Voz del Cinaruco from northern Colombia, as Arauca is only marginally farther south than Valledupar, home of Radio Guatapuri on 4815.4 kHz.

4870 kHz: Radio Rio Amazonas, Macuma, Ecuador. PSA's, plugs for local stores, doctors, etc; brief program review, all in Spanish. No Indian languages, sometimes heard from this station.

4875 kHz: Blocked by utility signals at first, but heard with MPB at 0250 re-check. For the uninitiated, MPB signifies Musica Popular Brasileira (=Brazilian Popular Music) and refers to a particular type of music, and not Brazilian popular music in general. In this instance RDI does not help much either, as it lists two 10 kilowatt Brazilian stations on this channel, one in Rio de Janeiro and one in Boa Vista in the north of the country. The chances are that it is Radio Nacional Boa Vista which is coming in, as virtually nothing is being heard from south of Brasilia.

4905 kHz: Another Brazilian, probably Radio Araguaia, with nondescript popular music. No clue to the location in either the commercials or the kind of Portuguese spoken. A second, much weaker station underneath, possibly Radio Relogio Federal from Rio de Janeiro.

4915 kHz: Brazilian "futebol" (soccer) commentary, with advertisements for local beer. Station identification for Radio Anhanguera (pronounced an-yan-gay-ra) at 0221.

4920.4 kHz: An easy one. Radio Quito, possibly the easiest Ecuadorian to pick up outside HCJB, with local soccer game in Spanish. One of the teams is last year's champion, Nacional of Quito, but no mention of the other. Seems to be one way traffic!

4945 kHz: Radio Illimani. The second station heard from La Paz and the only Bolivian station owned by the State (apart from those run by the military). Sports commentary in Spanish, but difficult to follow because of co-channel interference from the 50 kilowatt Radio Nacional in Porto Velho, the latter with Brazilian popular music.

4960 kHz: Poor reception when first tuned, but much better at 0254, when heard with strange banjo-like music until 0300. Then sign-off announcement in Spanish, giving station identification for "Emisora Cultural Radio Federacion". Mentioned both this frequency and 3360 kHz. Closed with Ecuadorian national anthem. Located in Sucua, deep inside the Ecuadorian hinterland, and programs are often in local Indian languages.

4969 kHz: Venezuelan "Top Forty" music, with time checks "en Rumbos," so no problem with station identification. It's Radio Rumbos, broadcasting from Caracas. This station has not been putting out a very strong signal in recent years and has recently had stability problems with its transmitter, with the frequency varying between 4970 and 4969 kHz. The parallel channel of 9660 kHz not audible at this time because of interference.

4975 kHz: Spanish vocals and low key announcements. No identification, but almost certainly Radio del Pacifico, a religious station from Lima, Peru. It formerly had some programs in English, but these were dropped a few years back. The station has always tried to keep a low profile, but had temporary political problems some months ago. The parallel channel of 9675 not audible due to interference.

4980 kHz: No doubt about this one! The station that most listeners to the tropical bands cut their teeth on. Ecos del Torbes, from San Cristobal, Venezuela. "Musica romantica", Venezuelan style, with plenty of beat to it, accompanied by the familiar rapid-fire announcements in Spanish.

4990.7 kHz: Radio Ancash. Disappointing fare from this Peruvian station, known more for its up-tempo folkloric music than the semi-romantic themes heard on this occasion. Better luck next time!

5025 kHz: Excited basketball commentary from Radio Rebelde, well known for its coverage of Cuban sports. The best signal on the band at this time, hardly surprising when you consider Havana is within virtual shouting distance of the Florida coast. For those *MT* readers interested in making out what is being broadcast over Spanish speaking stations, it might be worth their while to note that the Spanish translation for "basketball" is "baloncesto" (correct), or "basquetbol" (anglicized).

0230 UTC

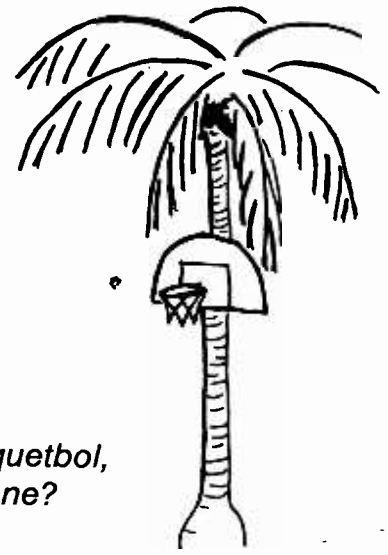
5025 kHz: Radio Rebelde (continued). More basketball, between the Soviet Union and .... South(!) Korea. You hear some strange things on shortwave!

5045 kHz: A weak Brazilian station, probably Radio Cultura do Para (though *RDI* also lists another, weaker station on the same frequency). Some music and Portuguese announcements coming up through the static, but nothing much to go on.

5055.1 kHz: Continuous Spanish talk, and difficult to follow because of interference from 5055.3 (heterodyne whistle and all). Program format strongly suggests Faro del Caribe ("Caribbean Lighthouse"), a religious station in San Jose, Costa Rica.

5055.3 kHz: Impossible to make out even the language, though probably a Latin. An ideal challenge for a dedicated DXer.

5095 kHz: Radio Sutatenza, Bogota. 50 kilowatts of power, and almost swamped by very strong CW (Morse) signals. Some Spanish programming makes it through the gaps, but nothing much to indicate the nature of the programs.



Basquetbol, anyone?

It's 0240 UTC, and we have reached the upper frequency limit of the scan. All that can be done now is to quickly go through the frequency range one last time, just in case some of the interference has disappeared. If there is nothing new, it might be possible to catch one or two station ID's from some of the weaker stations.

0305 UTC, and everything is finished. Most stations heard have been correctly identified, despite the adverse reception conditions. All in all, a reasonably satisfactory sixty-five minutes. A clap of thunder reminds me that the storm is getting nearer -- a good time to disconnect the receiver, grab a beer, and put my feet up. ■

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DXing Uruguay is catch as catch can . . .

Sometimes we CAN

by Charles Sorrel

One of the essential factors in the achieving of DX success is recognizing the need to act on things when those things are hot. Get in while the getting's good or next week or next month the pattern will change and the target will be lost for months -- perhaps years or even forever.

This is truer in some cases than in others, of course. If you don't tune in the BBC or Deutsche Welle tonight, chances are pretty good that you can put it off and still be pretty confident it'll be there when you come back to it. But for many other countries and the stations therein, it can be a lot chancier. Case in point: Uruguay, a South American country with more than one shortwave voice but which also lacks the immense broadcaster population of Brazil and Peru.

For instance. Despite what was listed in the *World Radio TV Handbook*, during the spring of 1985, DXers were unable to find a single shortwave station on the air from Uruguay. About one year later, things had improved to the point where there were two stations on the air -- irregularly.

A few months past that and the majority of the admittedly few Uruguayans were at least occasionally active. Go back a decade or two and you'll find the pattern hasn't changed much. Periods of full activity at best, downscaling to zero activity in a worst case situation.

To add to the fun, Uruguayan stations aren't exactly heard at armchair levels. Transmitter powers are on the anemic side, frequencies are too often covered by other stations. Yet occasional periods do arise during which a frequency will be free of QRM, "deep south" conditions will be above average and, most importantly, the Uruguayan will be in an active mode and reception can be made.

Best Bets

One of South America's oldest broadcasters is SODRE, the government radio. Originally, S.O.D.R.E. stood for "Servicio Oficial de Diffusion Radio Electrica" but a year or so ago the station changed its official name to "Servicio de Radiotelevision y Espectaculos." Despite the change, the SODRE acronym has been retained.

SODRE operates a number of AM stations based in cities around the country -- about a dozen of them in all, including three separate frequencies for the main outlet in Montevideo. Like the other Uruguayan shortwave stations, SODRE's high frequency service seems to get a rather catch as catch can treatment and doesn't appear to be very high on the management's list of priorities.

The *World Radio TV Handbook* lists SODRE as only on 9620 kHz -- and irregularly at that -- but other frequencies including 6125, 11895, and 15275 kHz, with transmitters for each, are reported to be available. These channels have been included in various other listings over the years.

9620's 2.5 kilowatts is listed for activity between 2300 and 0300 UTC and indeed most reception does occur within that framework, apparently indicating that there is no morning activity, at least at present. SODRE is a fairly good verifier of listener reports sent to Sr. Fernando Manfredi, SODRE, Apartado 11, Montevideo.

Another longtime Uruguayan broadcaster is Radio El Espectador which

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is part of a group owned by Diffusoras del Uruguay S.A. at 1287, Montevideo. Radio El Espectador, which is located at corporate headquarters, has been active of late about a half a kilohertz about its nominal 11835 frequency. It's listed as using 5 kW and operating from 2300 to 0200 during which period it is most often heard. Other sources say the schedule starts at 1000 UTC.

Another Diffusoras del Uruguay operation is Radio Libertad Sport, occasionally active on 6045 kHz with 1 kW. Over the years, the station has been referred to as Radio Sport and Radio Libertad, both on the air and in station literature. In any case, it's most likely to be caught at its sign on, usually 0930 but sometimes 0900 or 1000 UTC.

Also in Montevideo is La Radio which, again, is only active on an occasional basis. La Radio uses 1 kW on 6035 kHz. *Radio Database International* lists this for 24 hour a day operation. Best reception opportunities are around 0900 or 1000 UTC. There have been no reports of this one for several months so it may well be inactive. And when it is active, it's only a "sometimes" verifier of reception reports, which go to Plaza Independencia 846, Montevideo.

Something of a case of split personality occurs from time to time on 11735 kHz. Two stations under the same ownership, Radio Oriental and Radio Monte Carlo and both in Montevideo, can be heard here. Some days it is Oriental, some days Monte Carlo and at times it seems to be a joint program. It may be that Radio Monte Carlo is carried on local Sundays only, with Oriental being aired, or the "combo" program aired the rest of the time.

In addition to 11735 kHz, 9595 is also used sometimes. Most loggings seem to occur in the 2300 to 0200 UTC time slot. Verifications are a bit on the chancy side but reports can be sent to Ave. 18 de Julho 1224, Montevideo.

In the category of semi-station there is La Voz de Artigas, which is the Uruguayan equivalent of Argentina's Radio Rividavia. La Voz de Artigas is an AM station in the town of Artigas and it uses 4945 kHz as a feeder, generally to send live sports coverage back to the main studios. Unlike Rividavia, however, the Artigas feeder is not active on a consistent basis. It seems most likely to be heard during early evenings on the weekends.

Uruguay offers challenges to beginner and old timer alike ... just check the trails often enough, send out an occasional scout, and you, too, will log everything there is to be heard ...

One DXer noted an instance in which the same live play-by-play programming on the Artigas feeder was also being carried on 11735 kHz (Oriental) and 11835 kHz (El Espectador), so it might be wise to check these first and if you spot something, drop down to 4945 kHz and dig. Reports on this one have been verified from Ave. Lecueder 483, Artigas.

Of the same ilk but far less often heard is a feeder for Radio Cristal in Montevideo. This was noted about a year ago on 4970 kHz, also carrying play by play sports. It doesn't seem to offer much hope for a log unless you just happen to check it and get lucky.

In the years gone by, such Uruguayan stations as Radio Sarandi, Radio Carve, Radio Fenix and La Voz de Melo all had shortwave outlets. Today they are only active on AM and the silence coming from their high frequency transmitters over the years indicates there is little chance of any of them ever returning to the air -- but who knows.

Still, there are six or seven DX opportunities available from Uruguay. Like Paraguay and Chile, there are opportunities that offer challenges to both beginner and old timer alike. All you need to do is check the trails often enough, send out an occasional scout and one day, you too will be able to say that you've logged everything there is to hear from Uruguay. ■

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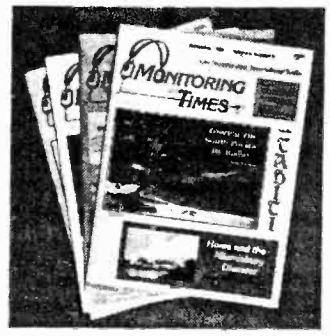

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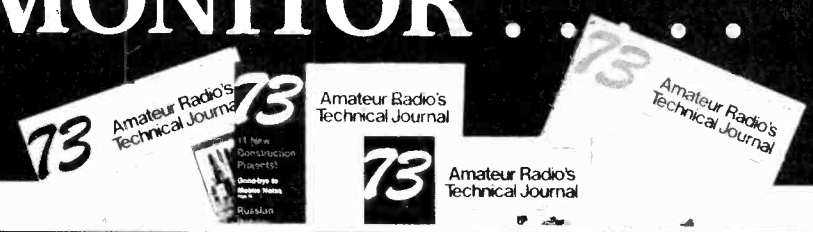

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RADIO ROUNDUP: Broadcasting

Larry Miller

3 Lisa Drive
Thorndale, PA 91372

It's a shame that someone doesn't give out QSL cards for thunderstorms because I've been hearing a lot of them lately. Summer is, as you well know, not always the best time for DXing. Atmospheric noises -- thunderstorms -- anywhere along the path between the station you're listening to and your location end up heading straight into your speakers. Still, the world of shortwave doesn't slow down because of a little rain. There's lot going on -- even if it is a little hearder to hear it sometimes.

Let's start off with something nice - and free. **Radio France International has introduced French lessons** called *Parcours* on their 1600 UTC transmissions.

That particular broadcast is the popular *Paris Calling Africa* transmission, designed to keep France in touch with its former colonies in Africa -- and shortwave listeners in touch with France and the Third World. *Parcours* is one of the features -- just started -- on the Saturday edition at 1635 UTC.

Paris Calling Africa isn't the easiest, or the hardest to hear. It's a kind of "middling" catch. Here are the frequencies: 6175, 11705, 17620 and 17795.

Other programs on the transmission follow the following schedule:

Mondays: Review of the French weekly press and sports.
Tuesdays: *Development Magazine, In France Today* and *Top French Pops,* which alternates with *Turntable.*
Wednesdays: *The Press on Africa, Arts in France* and *Latin America Notes.*
Thursdays: *Made in France, Land of France, Economy, Sports special.*
Fridays: All of Friday's programs alternate on an every other week basis. You'll find *Drumbeat* or *Anniversaries*; literature or cinema, a guest interview or the women's magazine.
Saturday: The excellent *Spotlight on Africa, Focus on France* and *Parcours.*
Sunday: *"POB"* (listeners letters), *Latin America Magazine* and, on the last Sunday of every month, *Insight,* a program of "the news behind the news."

And oh, yes. The freebie. You can write to RFI for a free booklet of French lessons at P.O. Box 9516, Paris, France. Tell 'em *Monitoring Times* sent you.

The idea of taking some French lessons may or may not turn you on -- until you think about how important linguistics are to DXing. Try DXing Africa, for example, without knowing any French.

That's not to say that you should sit down with the intent of mastering every language from German to Javanese, but it sure would be helpful if you could at least *recognize* some of them.

According to the book, *Shortwave Listening with the Experts,* **there are some 4,000 languages in use in today's world.** And while only about one-tenth of them are in use on shortwave, that still leaves the mono-lingual among us with a lot to learn.

One way to do this is to listen to things like RFI's French lessons. Another is to get yourself a set of inexpensive language tutorial tapes. Again, you don't have to have mastery as your goal; simply recognition. And another way is to kind of "reverse" research. The best way to do this is with your handy *Radio Database International* book. When you hear a language you don't recognize, simply cross reference it -- look up the frequency and time in the RDI, and look at the language listed. You might even want to tape snippets of it for future reference in case you hear the language again. You'll undoubtedly increase your success rate at DXing if you take a little time to learn to recognize some of the languages you hear on shortwave. Bonne ecoute!

For those of us satisfied with the fairly wide range of English broadcasts on shortwave -- but who still savor a good DX challenge, **try for a little-reported fifteen minute English broadcast on the Voice of the Revolution, Cotonou, Benin.** Try for it at 2000 UTC on 4870 kHz. This isn't on everyday, only irregularly and that makes this one even more challenging.

There is a lot of good news for shortwave listeners this month.

First, let's go back a couple of years to a time when things weren't so good for **Radio Portugal**. There were financial cutbacks which resulted in the current weekday schedule as opposed to a full 7 day one.

Well, it seems that Portugal's parent organization, Radiodifusao Portuguesa [RDP] earned itself a handsome profit in 1986 -- some 117 million escudos and a 95 percent increase over the previous year. And what are the good people at RDP going to do with this money? Use it to re-vamp the shortwave service.

According to station officials, they already have a number of projects underway to change the service, making it more effective in projecting the image of Portugal and Portuguese communities around the world. So, look for some positive changes with Radio Portugual.

You've probably heard that **Finland** made some major investments in shortwave. In fact, their new shortwave transmitting facility at Pori has now become fully operational. There's three 500 kW, one 250 kW and one 100 kW transmitter. There have been some technical and labor problems, but Finland's signals are definitely sounding better.

Probably the best news is that our speculation about the recent **Spain-Costa Rica** relay agreement has come true. After a couple of years of rumor, it was announced a short time ago that the two countries had signed an agreement whereby Spain would locate a shortwave relay station in that central American country. But, the question remained, would Costa Rica get some airtime on the facility or would this simply be a transmitter that relayed Radio Exterior de Espana programs?

The answer is better than you might have hoped for. The new shortwave facility will be called Radio International *de Costa Rica* . The equipment was *donated* by Spain. So, Costa Rica will begin broadcasting its own programs on shortwave as well as those of Spain.

This is more than a relay station as it was first thought. Hope they think of us non-Spanish speaking Yanquis up north and consider some English programs.

There is no shortage of shortwave stations already on the air in Costa Rica. Newest is Radio for Peace. (See previous *Monitoring Post* columns for details.) So this has turned into a hoppin' country! We'll have an article on DXing Costa Rica in a future *MT*.

Speaking of *MT*, work among a growing number of shortwave listeners goes on at a frantic pace at the **Foundation for International Broadcasting** (See the June issue of *MT* for an interview with the Board of this exciting, new non-profit shortwave organization.). The Foundation, which is designed to promote shortwave listening and which publishes *World Radio Report*, has announced that it has a new business office and a new Executive Director. He's someone *MT* readers know well. His name is Mike Mitchell and he took over the top-slot of FIBI in June.

Mitchell's credentials are impressive indeed. He's a lifetime shortwave listener and has been a communications and electronics professional since 1959. His experiences include running radio stations in the Pacific and Arctic and working with the U.S. Navy in cryptology. In business, he was a member of the Presidential Task Force on Small Business under the Carter Administration and he is currently the president of the nonprofit Emergency Medical Foundation, Secretary of the North Seattle Amateur Radio Club, among others, and a respected editor, writer and author.

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Also on board is *MT* contributor Jock Elliott, who will help handle public relations duties and myself, who will edit *World Radio Report* when it returns in late August.

There's plenty to do. See how you can get involved in the Foundation. Write for a free copy of the Foundation's brochure at their new address: P.O. Box 20578, Seattle, Washington, 98102.

Let's leap back to Central America for a second and tune in the radio to 6950 kHz. Yep. There it is. That new Guatermalan clandestine. Listen: "From the Mountains of the Sierra Madre, you are listening to La Voz Popular." And with that, another Central American voice has signed on the air. This clandestine station, operating on 6950 kHz, is reportedly run by a group called Guatemalan National Revolution Unity and its schedule seems to be somewhat erratic, although the broadcasts generally start around 0015 UTC. Occasional English IDs have been heard although most of the programming is, as you might suspect, in Spanish.

Libya has reactivated 9890 kHz from Tripoli during the 1000 to 1300 UTC period. Look also for the station, in Arabic, on 6185, 7245, 9600, 15415 and 21645 kHz.

Citing the addition of a new West German-dontated, shortwave transmitter as a "sign of progress," the African nation of **Niger** signed on its new 100 kW unit. Niger previously had a 4, a 20, and a 100 kW transmitter; assume some of the programming on the 4 kW unit will be upgraded to the new 100 kW transmitter. That includes the Voice of the Sahel programs. Frequencies? Try 3260, which signs off at 2200 UTC; Saturdays at 2300. Another possibility might be 5020 kHz; the others are extremely difficult.

Also the recipient of a transmitter hand-out is **People's Democratic Yemen**. According to the BBC Monitoring Service, that country and the Soviets have penned a deal that will have the Ruskies building a new 250 kW shortwave transmitter for this unusual little Arab country.

Look for Radio Station **Soviet Belorussia** from 1730-1800 UTC on 7330 and 9560 kHz and again from 2030 to 2100 UTC on 6185 and 7205 kHz. Those broadcasts are in Belorussian. (Speaking of languages, how's your Belorussian these days?)

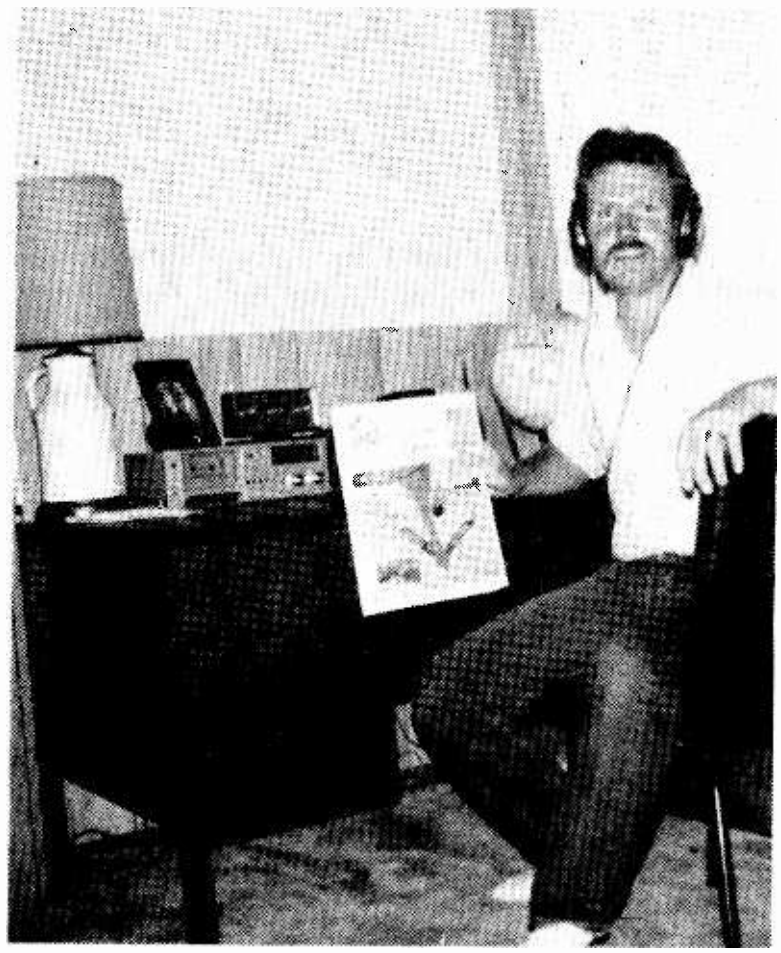
Stephen Newlyn of the **Southern Cross DX Club in Australia** checks in with an interesting list of prices for shortwave radios down under. Look at this:

ICOM R-71 $1,700.00
ICOM IC-R7000 $2,000.00
Japan Radio NRD-525 $2,300.00
Kenwood R-5000 $1,200.00
Realistic PRO-2004 $650.00
Sony ICF-2001/D $700.00
Yaesu FRG-8800 $1,100.00
Yaesu FRG-9600 $1,200.00

In Stephen's bulletin, *"DX Post,"* (AUS$28.00 a year to GPO Box 1487, Adelaide S.A. 5001, Australia), there's all kinds of Pacific monitoring information from members and an editorial wondering why there isn't a single organization devoted to promoting shortwave listening in Australia. Maybe they should hook up with the Foundation! Here's a sample:

DX POST SHORTWAVE SURVEY

FREQ	UTC	CNTRY	STATION & DETAILS	SIO	LAN	INT
9940	0622	HOND	Voz Del Cid, id 0658	333	SS	RBG
9955	2150	TAIWAN	WYFR Relay via VOF China, relg ppm tlk 2154, group vcls, id, hymns, s/off 2200	433	CC	LHW
9977	1040	N KOR	R PYONGYANG, PGM FOR SE ASIA, S/OFF 1048 W ANTHEM //9715 8/4	353	KK	JQE
11755	0717	FINLAN	R FINLAND 'FINLAND'S TWO LANGUAGES'	433	EE	RBG
11761	0748	CK ISL	R COOK ISLANDS, island vcls, MA 20/4. Sgnl better 1 hr later.	322	LL	JVL
11780	0400	N Zeal	R New Zealand, ID then news 20/4	434	EE	PJH
11805	0645	GREECE	VOA KAVALA RELAY, COMTY ON COFFEE EXPORTEWRS, FA S/B QRM, 0700 S/OFF 11/4	343	EE	JTR



Pete Wahlquist of Reseda, California, is one of MT's regular monitors. You can be, too! See page 16 for details.

People who follow the **clandestine radio** scene can often get an inside glimpse at what's happening by listening to the rise and fall of this type of stations. When country A drops its support for a clandestine station broadcasting against country B, it's usually a good sign of a warming of relations between country A and B.

And that was the thinking when two reportedly Soviet-sponsored anti-Chinese clandestines signed off the air back about this time in 1985. Those two stations, October Storm and Voice of the PLA (People's Liberation Army) have, surprisingly, returned to the air. They're longshots, but look for Voice of the PLA on 7185 kHz and October Storm on 9270 kHz around 1400 UTC.

And, though there's been a lot of very positive developments to report this month, there are some dark clouds as well. **Citizens in Kenya are complaining about the poor quality of radio and TV programs in their country.** Even the producers at the stations are joining in. Seems that broadcasting services are a little short of cash.

Meanwhile, closer to home, **Radio Earth -- which announced last month that it was taking a "vacationing" in June -- will apparently not be returning to the airwaves** -- at least not with a regular schedule. According to Mike and Suzanne Poulos, the hosts of the program (last broadcast over WHRI), they'll be leaving the airwaves to concentrate instead on getting their long-awaited Curacao shortwave facility on the air. While there may be a weekly broadcast, it's been well known that the Poulos' faced considerable financial problems in keeping Radio Earth on the air. The loss of regular host Jeff White some time ago exacerbated the problems and the station never really recovered from his departure.

I think that the Polous' and the entire staff -- past and present -- of Radio Earth deserve a standing ovation. They are a group of people who had a dream and chased it. They gave listeners a view of shortwave programming as it could be, weren't afraid to experiment and most importantly, refused to give up. I raise my glass of beer to these shortwave pioneers... which we quickly follow with **a toast to the MT readers who have submitted the following logs . . .**

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RADIO ROUNDUP: Broadcast Loggings

0000 UTC on 11855 kHz
Brazil: Radio Aparecida in Portuguese. Brazilian ballad program. Heavy interference from Asian on 11855. (Fred Carlisle, Tumwater, WA)

0009 UTC on 7470 kHz
Clandestine: Radio Caiman in Spanish. Clear "Radio Caiman" ID and talk about Cuban involvement in Angola. (Carl Volz, Valparaiso, IN)

0014 UTC on 15140 kHz
Chile: Radio Sistema Nacional, Santiago in Spanish. IDs as "Santiago." Correspondents with reports on Catholic church's role in Colombia and Nicaragua. Fair signal. (Carl Volz, Valparaiso, IN)

0015 UTC on 15190 kHz
Brazil: Radio Inconfidencia in Portuguese. Two announcers conduct sports interview followed by live-soccer coverage.

0015 UTC on 9630 kHz
Spain: Spanish Foreign Radio in English. Feature on recent archeological find in Tampa, Florida. Spanish guitar ballads and commentary on relations with Australia. (Wayne Bekins, San Antonio, TX)

0036 UTC on 4864 kHz
Bolivia: Radio Emisora 16 de Marzo in Spanish. Two clear IDs at 0038 and 0101 UTC. Very good signal but not usable the next night. (John Tuchscherer, Neenah, WI) John is one of the "experts" in the *Shortwave Listening with the Experts* book. Welcome, John. --ed.

0050 UTC on 11926 kHz
Brazil: Radio Bandeirantes in Portuguese. Announcer with station ID followed by Brazilian pop music. (Fred Carlisle, Tumwater, WA)

0115 UTC on 5040 kHz
Ecuador: La Voz del Upano in Spanish. Singing station IDs plus Andean folk music. Slight fading. (Mark Gibson, Memphis, TN)

0125 UTC on 4985 kHz
Brazil: Radio Brazil Central in Portuguese. Usual rapid-fire sports commentary. Clear signal with only occasional fading.

0130 UTC on 17815 kHz
Brazil: Radio Cultura Sao Paulo in Portuguese. Fading signal and very weak. Audible ID at 0130 and into Brazilian pop music.

0135 UTC on 4805 kHz
Brazil: Radio Dif. do Amazonas in Portuguese. Excited soccer coverage with long "goooooooal!" after each point scored. Brief break for ID.

0145 UTC on 4845 kHz
Brazil: Radio Nacional, Manaus in Portuguese. Live soccer coverage (sounded like the same game and announcers as Radio Dif. do Amazonas (see 0135 UTC logging). Occasional ad break and Nacional ID at 0201 followed by more soccer.

0205 UTC on 4885 kHz
Brazil: Radio Clube do Para in Portuguese. Interview, ID and sports coverage -- but not soccer!

0220 UTC on 11745 kHz
Brazil: Radio Nacional do Brasil in English. Popular Brazilian rock stars sing plus feature on "Contemporary Brasil."

0230 UTC on 5095 kHz
Colombia: Radio Sutatenza in Spanish. Slight fade as ID was given by announcer. Local music between Latin vocals.

0255 UTC on 15150 kHz
New Zealand: Radio New Zealand International in English. Time check as "it's one and a half minutes till three." Short classical music interlude and time check at 0300 UTC. ID as "Wellington" followed by comedy routines for a half hour. Another ID at 0330 and music from Englebert Humperdink. (Carl Volz, Valparaiso, IN).

0320 UTC on 8515 kHz
Peru: Radio Amistad in Spanish. Romantic Spanish ballads and Peruvian folk music. Heard clear "Amistad" at 0406 UTC. Heavy utility interference, as usual. Logging tentative. (Fred Carlisle, Tumwater, WA)

0324 UTC on 6150 kHz
Costa Rica: Radio Impacto in Spanish. Talk about Cuba and mention of Batista and the history of the revolution. ID given as "Impacto." (Carl Volz, Valparaiso, IN)

0345 UTC on 6282 kHz
Peru: Radio Huancabamba in Spanish. Fast-talking male with ID and station location at 0400 UTC. Peruvian "campesino" music. Recheck found station on until a 0504 UTC sign off (local Peruvian midnight). Some utility and heterodyne interference. (Fred Carlisle, Tumwater, WA)

0349 UTC on 5930 kHz
Czechoslovakia: Radio Prague in English. Two lady announcers discussing how to cook pancakes. Announcer joked that the dough was heavy enough to sink a ship. Really a silly show! (Carl Volz, Valparaiso, IN)

0405 UTC on 4850 kHz
Cameroon: Radio Nacional in French. Fast-talking announcer with African pop music. No ID heard and station listed as tentative. (Fred Carlisle, Tumwater, WA)

0410 UTC on 3220 kHz
Ecuador: HCJB. Wait. This isn't just another HCJB logging. This is HCJB's 10 kw domestic service in Spanish. Very easy to hear. (Carl Volz, Valparaiso, IN)

0442 UTC on 6115 kHz
Mexico: Radio Universidad in Spanish. ID at 0503 and Latin pop music. Several mentions of Hermosillo. Interference from Radio Union, Peru. (Fred Carlisle, Tumwater, WA)

0510 UTC on 4830 kHz
Gabon: Africa No. 1 in French. ID from announcer as "Music on Africa No. 1" at 0517. African pop music followed. (Fred Carlisle, Tumwater, WA)

0520 UTC on 4904 kHz
Chad: Radio Dif. Nationale, Ndjamena in French. DJ chatter with program of French-African hi-life music. Signal buried by a strong jammer at 0540 UTC. Never heard a positive ID. Submitted as tentative. (Carl Volz, Valparaiso, IN)

0520 UTC on 11825 kHz
Tahiti: Radio Tahiti in French and Polynesian. Nice mix of music island and current music; great programming. (Carl Volz, Valparaiso, IN)

0540 UTC on 7245 kHz
Angola: Radio Nacional, Luanda. Announcer in local African language with "Radio Nacional" ID followed by presumed news program at 0600 UTC. A poor signal with distorted audio. (Fred Carlisle, Tumwater, WA)

0545 UTC on 4000 kHz
Cameroon: Radio Bafoussam, in French. Extremely weak and fading signal. Religious music sung in French. No ID observed but definite African accent by announcer. Submitted as tentative. (Carl Volz, Valparaiso, IN)

0545 UTC on 4945 kHz
Colombia: Caracol Neiva in Spanish. Announcers interviewing a guest in the studio. Station promo and "Caracol" ID at 0600 UTC with Latin American newscast following. (Carl Volz, Valparaiso, IN)

0545 UTC on 3340 kHz
Tanzania: Radio Tanzania-Zanzibar in Swahili. Talk from announcer was definitely Swahili but interference prohibited me from picking up any full sentences. Weak signal with pop music and voice breaks. No IDs heard. Reception on this night was good. (Carl Volz, Valparaiso, IN) Another tentative I'd bet on. --ed.

0552 UTC on 4770 kHz
Nigeria: Radio Nigeria, Kaduna in a local language. ID as "Radio Nigeria" at 0600 after going into English for a newscast. (Fred Carlisle, Tumwater, WA)

0658 UTC on 7215 kHz
Ivory Coast: RTV Iviorienne, Abidjan in French. Radio Drama followed by ID and time check at 0700 UTC then into newscast. Top story was the Iran scandal. (also known as "Gippergate.") (Carl Volz, Valparaiso, IN)

0715 UTC on 9655 kHz
Australia: Radio Australia in English. DX program call "Radio Waves from the South Pacific." Gave report on Radio Cook Islands and Radio Tahiti. (Carl Volz, Valparaiso, IN)

0750 UTC on 11705 kHz
Japan: Radio Japan in English. Weak signal. Commentary on the economy of Japan and how they will survive the oil crisis. (Carl Volz, Valparaiso, IN)

0950 UTC on 4945 kHz
Brazil: Radio Nacional Porto Velho, in Portuguese. Easy-listening Portuguese music and several Nacional IDs at 1000 UTC. News briefs and local announcements. (Kevin Burdette, Arlington, TX)

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1015 UTC on 6175 kHz
Costa Rica: Faro del Caribe in Spanish. Male announcer with station ID and location at 1015 UTC. Latin pop music and interference from WYFR. Station's signal was temporarily in the clear with a 1045 UTC sign off. (Fred Carlisle, Tumwater, WA)

1045 UTC on 4864 kHz
Colombia: La Voz de Cinaruco in Spanish. Male announcer with ID and Latin pop music. (Fred Carlisle, Tumwater, WA)

1155 UTC on 9535 kHz
China: Radio Beijing in English. Just caught the sign-off announcement, but heard closing for the North America Service and frequency schedule. Announcer gave his name, ID and "thanks for listening." (Carl Volz, Valparaiso, IN)

1158 UTC on 15575 kHz
South Korea: Radio Korea in English. Listener's questions, like, "How many sports at the 1988 Olympics?" (Carl Volz, Valparaiso, IN) Including gas bomb tossing? -- ed.

1215 UTC on 9715 kHz
North Korea: Radio Pyongyang in English. Korean folk music, the usual feature on reunification of North and South and -- are you ready for this -- rock music. (Kevin Burdette, Arlington, TX)

1245 UTC on 9940 kHz
Clandestine: La Voz de CID in Spanish. Spanish guitar ballads from male singer. Slight fading during "La Voz de CID" ID. Discussion about Cuba with continuing Latin style music.

1245 UTC on 11937 UTC
Kampuchea: Voice of the People of Kampuchea in Lao/Viet dialect. March music follwed by English ID at 1300 UTC. Many mentions of Kampuchea. Asian music and sign off at 1318 UTC. Reception down after 1300 UTC but still audible. (Fred Carlisle, Tumwater, WA)

1245 UTC on 3395 kHz
Papua New Guinea: Radio Eastern Highlands in Pidgin. Male announcer with native island drum music and English pop. Papua New Guinea mentioned but no definite ID heard. (Fred Carlisle, Tumwater, WA)

1250 UTC on 2325 kHz
Australia: ABC, Tennant Creek. Good reception with strong signal. Featuring pop music and news at 1300 UTC. Usual ID at 1230 followed by "cry in your beer" music from Bill Anderson. Parallel 2310 not heard so well. (Fred Carlisle, Tumwater, WA)

1250 UTC on 3375 kHz
Papua New Guinea: Radio Western Highlands in Pidgin and English. Heard mentions of Papua New Guinea at 1301 but no ID. Male preacher with English religious sermon. Station abruptly off at 1325 UTC but no formal sign off. (Fred Carlisle, Tumwater, WA)

1325 UTC on 4450 kHz
Afghanistan: Radio Kabul via the Dushanbe, USSR relay. Program of Arabic and Asian music in presumed Kabul. Afghanistan mentioned by female announcer at 1333 UTC. Signal degrading somewhat by 1350 UTC with occasional fading. Some utility QRM also. (Fred Carlisle, Tumwater, WA) -- Based on these details, let's call this a tentative logging. -- ed.

1325 UTC on ???
Philippines: Maharlika Broadcasting System - Radio NG Bayan in English and unknown Asian dialect. Male announcer with sports reports and station ID as "This is your all sports radio network, up to date '78!" Announcer also ID'd on the hour as "Radio Bayan" (heard no mention of NG). U.S. pop music and world news at 1400 UTC by female announcer. (Fred Carlisle, Tumwater, WA) Great catch, Fred! -- ed. [Agreed. A fantastic catch. But it would be even better if we had a frequency here, folks. --Miller]

1325 UTC on 9775 kHz
Bangladesh: Radio Bangladesh in presumed Nepalese. Fair reception of great sub-continental music. "Radio Bangladesh" ID at 1345 with a sign-off by female announcer. Radio Bangladesh back on for unscheduled broadcast at 1400-1500 UTC with same programming. (Fred Carlisle, Tumwater, WA) Extended broadcast because of religious holiday, Ramadan. -- ed.

1345 UTC on 3275 kHz
Papua New Guinea: Radio Southern Highlands in Pidgin. U.S. pop music and no ID but two mentions of Papua New Guinea at 1400 UTC.

Send your loggings to Gayle Van Horn, 160 Lester Drive, Orange Park, Florida 32073 USA. All loggings are of English broadcasts unless otherwise noted.

National anthem and sign off at 1402 UTC. (Fred Carlisle, Tumwater, WA)

1423 UTC on 9820 kHz
Guam: KTWR (Trans World Radio) in Tamil. Talk from announcer with ID and sign-off in English with frequency and station announcement at 1440 UTC. (Fred Carlisle, Tumwater, WA)

1519 UTC on 11900 kHz
Northern Marianas Islands: KYOI in English. Suprised to hear KYOI still on the air with plenty of IDs and rock/pop music by the Eagles, ELO, and Billy Joel. (James Kline, Santa Monica, CA)

1525 UTC on 11940 kHz
Iran: Voice of the Islamic Republic of Iran in Arabic. Talk by two announcers with Arabic music. English ID at 1601 UTC. Some interference. (Fred Carlisle, Tumwater, WA)

1605 UTC on 11615 kHz
Pakistan: Radio Pakistan in English. World news report and ID followed by local news. Sign off at 1630 UTC. 9465 kHz frequency not heard. (Fred Carlisle, Tumwater, WA)

1730 UTC on 15505 kHz
Kuwait: Radio Kuwait in Arabic. Presumed newscast amd Arabic music. "Hua al Kuwait" ID at 1801 UTC. Fred Carlisle, Tumwater, WA)

1745 UTC on 15145 kHz
East Germany: Radio Berlin International in English. This is reported to be their Africa Service, but is heard clearly on the west coast of North America. Program of music and listener's letters. Good signal. (James Kline, Santa Monica, CA)

1850 UTC on 21685 kHz
Netherlands: Radio Netherland in English. Interviews and discussion on the increasing problems of the aging in Kenya and the Christian organizations that assist them. Parallel 17605 kHz.

1856 UTC on 15045 kHz
Dominican Republic: Radio Discovery in English and Spanish. IDs in both languages with several station promotions. Spanish pop music and more IDs. Very good signal strength in Florida.

2040 UTC on 11920 kHz
Morocco: RTM Morocco in Arabic. Uninterupted Arabic music for over 30 minutes. One brief break at 2100 UTC with a possible ID and into more Arabic music. Submitted as tentative. (Y. Lee Kyotee, Yuma, AZ)

2112 UTC on 9675 kHz
Belgium: BRT in English. Talk of how Ramadan is celebrated in Belgium, followed by discussion on the South African Council of Churches. (Carl Volz, Valparaiso, IN)

2115 UTC on 7245 kHz
Libya: Radio Jamahiriya in English. Signal barely audible as two announcers spoke of the "computerized, institutionalized system in the U.S. that causes psychological terror." Huh? Anyone know what they're talking about? (Carl Volz, Valparaiso, IN) I'd like to discuss it with you but I'm putting my *MT* column into the computer and worrying about making the deadline. --ed.

2200 UTC on 15365 kHz
Canary Islands: Radio Nacional de Espana in Spanish. ID as "Radio Nacional Espana en Canarias." News briefs and announcements followed by excerpts from a speech. Occasional Spanish instrumental music. -- I'm really curious about this. There's no external service from the Canary Islands although there is a Spanish Foreign Radio relay there. The ID you heard, however, was for the mediumwave-AM Canary Islands national service. Could bear watching. -- ed.

2235 UTC on 4870 kHz
Benin: La Vox de la Revolution in French. French and native African music on drums and flutes. Chit-chat between two male announcers and a drum roll introducing each new portion of the program. Closing ID and station announcements with national anthem. Sign-off at 2300 UTC. (John Bonet, Lafayette, LA)

2320 UTC on 4783 kHz
Mali: RTV Malienne in French. French and African music and many local station features. ID with frequency, closing announcements and martial national anthem. Sign off at 0000 UTC. (Wayne Bekins, San Antonio, TX) ■

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RADIO ROUNDUP: Communications

Bob Grove, WA4PYQ

P.O. Box 98
Brasstown, NC 28902

California now requires cellular labeling! In what might prove to be a landmark decision, the California state Public Utilities Commission has enacted legislation requiring that cellular distributors send with this month's billings a warning sticker for each phone which says, "Conversations with a cellular telephone may not be private." Next month California companies are required to explain the lack of privacy and indicate the availability of scramblers.

The California decision comes six months after embattled federal legislators struggled with testimony in Congress that the Electronic Communications Privacy Act of 1986 which outlaws telephone monitoring on scanners would not be enough to assure privacy.

However, the FCC says "no" to cellular telephone labeling. Robert Horvitz of the Association of North American Radio Clubs (ANARC) has advised us that a mandatory labeling proposal by the Washington Legal Foundation, apprising cellular mobile telephone users of their vulnerability to unauthorized reception, has been turned down by the Federal Communications Commission.

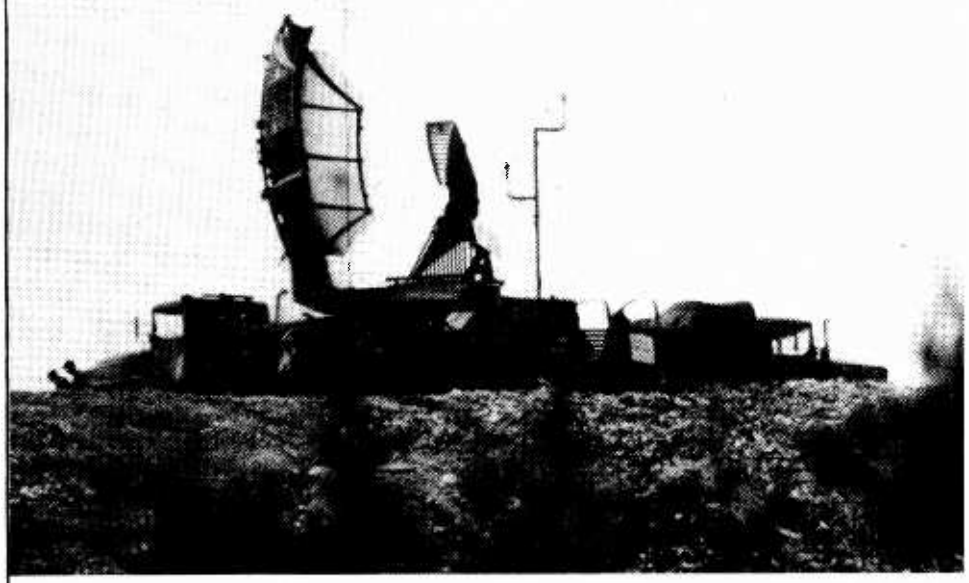
Following the innovation of cordless telephones, are you prepared for wireless? A Philadelphia company, International Mobile Machines Corporation, is planning imminent production of their "Ultraphones" and base units, designed for use in rural areas where radio intercommunication with the telephone exchange would be more cost effective than hard wire.

Equipment trials last September were held in Wyoming, offering some remote ranchers their first taste of telephone service. Additional trial sites include rural areas in Kansas, Mississippi and Texas.

Of interest to communications hobbyists, tests are also underway by the Department of Defense in Washington, DC. IMM assures its prospective customers that the digital signal is easily scrambled. *(Sent in by George Primavera, South Hersey, NJ)*

The 220 MHz amateur band is still under seige. Commercial interests are petitioning the FCC to withdraw the first two megahertz of the "underused" 220-225 MHz ham band for the land mobile services. Most recently, SEA, Inc., and Aerotron, prominent manufacturers of ACSB (amplitude compandered sideband) voice communications equipment, have filed comments with the FCC to promote their cause.

Briefly, the comments highlight the following observations: While hams presently have shared use of 220-225 MHz, under the proposal they would have exclusive use of 222-225 MHz; only minor amateur use of 220-222 MHz has been noted and the loss would be hardly noticeable while the need for this new spectrum is vital to the exploding land mobile services; amateurs now have 1.62 MHz of VHF spectrum per 10,000 users whereas commercial licensees have only 0.11 MHz per 10,000 users.



U.S. Army exercise "Operation Solid Shield 1987" was recently conducted on top of the South Dade, Florida, garbage dump! Communications whips, discones and radar antennas decorated the site.

The FCC, in an effort to simplify regulations and records keeping on the aeronautical radio service, has made a number of changes of note. Aeronautical advisory stations (UNICOM) may now exist in numbers greater than one per airport; the distinction between heliport and fixed wing airport frequencies has been removed; 25 kHz spacing for 108-118 MHz UNICOM channels now follows the 118-136 MHz voice channel spacing.

The frequencies 122.775 and 122.850 MHz can now be used for both ground and airborne aviation support (training, balloons, soaring, and service stations. Civil Air Patrol wings will now be granted fleet licenses for units under their jurisdiction rather than individual licenses for members.

Spy-proof construction is now a priority for government buildings. With all the recent attention given to the eavesdropping vulnerability of the new American Embassy in Moscow, it comes as no surprise that special consideration is now provided during the construction of security buildings in this country. The new General Electric "SCIF" (Secure Compartmentalized Information Facility) now being completed in Reston, Virginia, is a good example.

Standing at 12310 Sunrise Valley Drive, GE's special four-story office buildings are completely enclosed with sheets of galvanized steel to prevent light, sound or electromagnetic signals from getting in or out.

Previously, only sections of the CIA building at Langley and the Pentagon were completely shielded according to an industry official and it's expensive--$150-$250 per square foot as compared to $80-$200 for an unshielded building.

Reston civic and zoning officials are concerned about the new facility, especially since representatives of the new construction are reluctant to answer questions about it. Citizens are fighting a plan by the CIA to erect a fence around the site and previously fought the construction by the CIA of a radio tower near Herndon.

CIA/NSA admits bugging U.S. officials: Former national security adviser Robert McFarlane was understandably irritated when an active listening device was uncovered during an electronic "sweep" of his Bethesda, Maryland, home.

Unidentified intelligence sources are reported to have admitted that telephone conversations of senior U.S. officials are recorded for "archival purposes by the Pentagon and the CIA and for communication security by NSA".

While it is generally recognized that the monitoring of top-level officials is commonly practiced in the interest of national security, McFarlane states that he was under the impression that his listening equipment had been deactivated upon his leaving the White House staff. *(From Mel Pratt, Baltimore, MD)*

Residents of a Washington neighborhood find the Ethiopian embassy's antenna irritating. The Sheridan-Kalorama section of northwest Washington, DC, is an attractive neighborhood with strict zoning. Over a recent weekend, workers at the Ethiopian chancery at 2134 Kalorama Rd. NW, erected a huge log-periodic dipole array, an enormous, rotatable beam antenna designed to allow HF (high frequency--shortwave) communications with their African homeland.

Although Ethiopian representatives originally agreed to abide by local zoning ordinances, embassies are considered sovereign territory, essentially immune from prosecution for local laws. *(Washington Post article sent in by Bill Black, Washington, DC)*

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A posthumous award was given to a prominent WW II codebreaker. At the battle of Midway it was the late Captain Joseph Rochefort of the U.S. Navy that provided the key to the events which led to an overwhelming allied victory. Yet Rochefort, who died in 1976, was twice denied the Distinguised Service Medal for his dedication as head of a codebreaking station at Pearl harbor.

Recently, President Reagan, accompanied by top national security officials and White House cabinet members, presented the medal by special order of Navy Secretary John Lehman jointly to Rochefort's son, retired Army Colonel Joseph Rochefort, Jr., and his daughter, Janet Rochefort Elerding.

A hijack was recently foiled by ham radio... Neil Coulston, KB4CCW, pilots a twin engine Grumman "Mallard" seaplane in shuttle service between St. Thomas and St. Croix, Virgin Islands, and Puerto Rico. On the evening of June 5th, as Coulston was approaching San Juan, a male passenger intruded into the cockpit saying that he would blow up the plane unless he was flown to Cuba.

Coulston told the hijacker he would have to refuel to make the trip, then alerted San Juan airport authorities by radio with a special transponder code that there was an emergency on board. After landing, the hijacker released the other 17 passengers and, as the pilot pretended to go out to pay for the fuel, security personnel surrounded the aircraft to initiate negotiations with the sole occupant who claimed to have enough dynamite in his brief case to blow up the plane and the terminal.

The local two-meter amateur repeater came alive as Coulston, his wife Mary Lou (KV4KD) and Herb Schoenbohm (KF4FZ), Chief of Communications for the U.S. Virgin Islands police department, carried out tactical communications at the request of the FBI.

It was soon determined that the hijacker was a Vietnam veteran suffering from Post-Vietnam Shock Syndrome. A sharpshooter team was deployed but the disoriented passenger finally gave up.

...as a jammer disrupts emergency communications. During the first part of the emergency communications, catcalls and shouting were endured in spite of pleas to the offender that a serious situation was evolving. The jammer, who persisted in his deliberate interference, was identified as David G. Ackley, W4UWH, of St. Thomas.

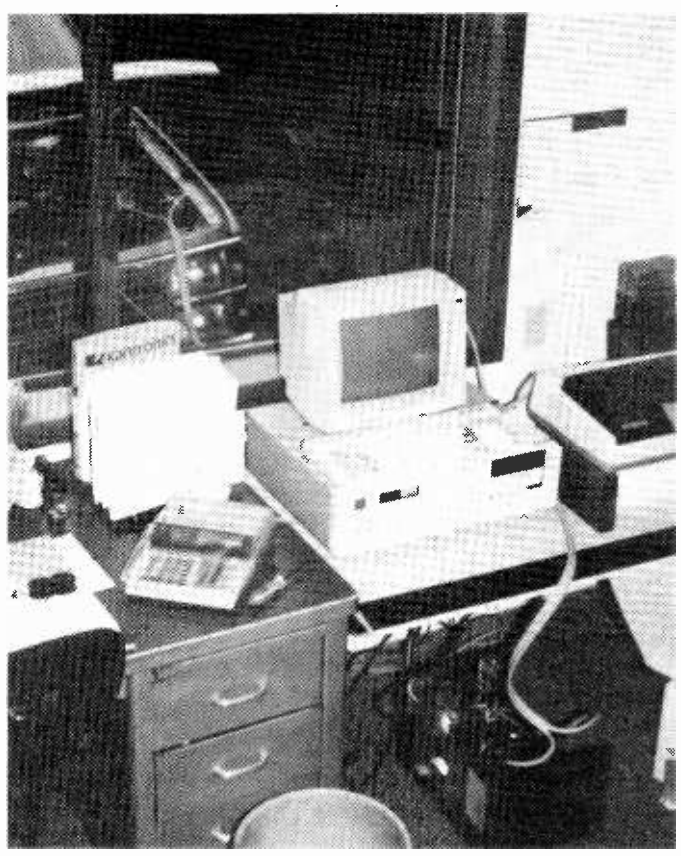
Ackley, already facing a fine for previous jamming incidents, now faces felony charges by the FBI for deliberate and malicious interference with two-way communications during a bona fide emergency. *(From the W5YI Report)*

In San Diego, Jerry Edward Gastil, 47, has been formally arraigned by the U. S. Justice Department on charges stemming from a series of incidents between April 1-10 when the local FBI *radio system was deliberately jammed* by an intruder playing music and making other noises to disrupt lawful communications.

Gastil was booked into a federal corrections center on April 11 where he spent three days until his release under $150,000 bond. He has been formally charged with a two-count complaint of willful and malicious interference with a working communications system of the FBI.

FCC analysis showed that the signals were of a mobile origin and that the interference was being caused by a knowledgeable person. Gastil is employed as an electronics technician by an Escondido firm.

Monitored by an FBI electronic technician and FCC electronic engineers, the defendant was seen driving up to the top of a hill and then down again during which radio direction finding equipment "found signals in a manner consistent with the movement of his vehicle".



We prove our dedication:

Last month in the wake of an electrical stormthat left a three-county area without electricity, Bob and Judy Grove ran MT labels 'til nearly dawn powered by jumper cables from the Grove Caravan!

Last fall Gastil was fined $750 by the FCC on civil charges for operating a pirate broadcasting station near 7.4 MHz. Indicted now by the grand jury of San Diego, Gastil faces eight felony counts, each carrying a maximum sentence of $250,000 fine and 10 years in prison for violating Title 18 of the U.S. Code.

Monitoring Times has enjoyed a record 42 percent increase in subscriptions over the last year, with some months showing subscription renewals as high as 71 percent, reinforcing the comments which arrive daily at *MT* headquarters citing the publication for its accuracy and timeliness.

MT is found not only on the desks of serious SWLs and scanner listeners, but is circulated by the nation's top security agencies where it is quoted in classified interdepartmental memos because of its high credibility.

Word has reached MT of the death of Elmer Osterhoudt, founder and proprietor of Modern Radio Labs. According to a note being returned to prospective customers with their unopened injuries sustained from a serious automobile accident led to his death.

Modern Radio Labs catered to the classical radio experimenter, the stalwart soul who was looking for tuning capacitors and coils, kits for homebuilding and other hallmarks of the home builder. Elmer's painstaking consideration of his customers and their projects will be sorely missed in an era now dominated by the impersonal and uninformed sales clerk.

Osterhoudt family members are considering selling the business to a qualified individual who will maintain the integrity and experience that Elmer had earned over his years of devoted service to the radio fraternity.

While U.S. railways are on the decline, the Swiss are outfitting their railways with two-way radio for the first time. Locomotives of the Swiss Federal Railways will be in constant voice contact with up to 400 base stations stationed every 3-5 miles.

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Scanning on the Eastern Seaboard

VIENNA SCANNING PROFILE

contributed by
Richard Rowland
Richmond, VA

Virginia State Police

Base	Mobile	
159.000	154.935	Richmond-SW, Wytheville-E, Salem-N
158.985	154.905	Richmond-NE, Salem-S
159.165	155.445	Appomattox-S, Culpepper, Chesapeake-NE, Wytheville-W
159.135	155.460	Appomattox-N, Chesapeake-SW, Fairfax, Melfa (E.Shore)
155.895	155.895	Emergency Ops Center (Richmond)
	154.665	Tac car-car
	154.695	Tac car-car, surveillance
	458.350	Hand-helds, vehicular rptr

State Police Signal Codes

Sig 02	Contact HQ by teletype, I-Immediately
Sig 13	Officer needs assistance
Sig 16	Radar with chase car
Sig 17	Vehicle mounted radar
Sig 18	Plane crash
Sig 21	FCC call sign, stn id
Sig 22	Signal check
Sig 25	Turn on mobile relay
Sig 26	Turn off mobile relay
Sig 31	Switch to surveillance freq

Ten Codes

(standard except following)

10-40	Bomb threat
10-43	Suspicious vehicle
10-44	Suspicious person
10-45	Stopping suspicious vehicle
10-47	Chase
10-48	Wanted or stolen indicated

Chesterfield Co

46.46	Fire
46.34	Fire
	Police:
153.965	Countywide
154.875	North section of co.
155.565	South section
155.625	Car-car
155.070	Surveillance
154.755	Sheriff

New 800 MHz

Base	Mobile	
856.2125	811.2125	
856.2375	811.2375	
857.2125	812.2125	
857.2375	812.2375	Mobile telephones
858.2125	813.2125	
858.2375	813.2375	
859.2125	814.2125	
859.2375	814.2375	Mobile telephones
860.2125	815.2125	
860.2375	815.2375	

800 MHz trunking for:

Virginia Beach, VA

Base	Mobile
856.4625	811.4625
856.4875	811.4875
156.7125	811.7125
856.7375	811.7375
857.4625	812.4625
857.4875	812.4875
857.7125	812.7125
857.7375	812.7375
858.4625	813.4625
858.4875	812.4875
858.7125	812.7125
858.7375	812.7375
859.4625	814.4625
859.4875	814.4875
859.7125	814.7125
859.7375	814.7375
860.4625	815.4625
860.4875	815.4875
860.7125	815.7125
860.7375	815.7375

Alexandria, VA

Base	Mobile
856.8375	811.8375
857.8375	812.8375
858.8375	813.8375
859.8375	814.8375
860.8375	815.8375

Portsmouth, VA

Base	Mobile
856.2125	811.2125
856.9625	811.9625
857.2125	812.2125
857.9625	812.9625
858.2125	813.2125
858.9625	813.9625
859.2125	814.2125
959.9625	814.9625
860.2125	815.2125
860.9625	815.9625

Newport News, VA

Base	Mobile
856.2625	811.2625
857.2625	812.2625
858.2625	813.2625
860.2625	815.2625

Fairfax County, VA

Base	Mobile
856.2625	811.2625
857.2625	812.2625
858.2625	813.2625
859.2625	814.2625
860.2625	815.2625

SOUTHERN NEW JERSEY PUBLIC SERVICE FREQS

contributed by
George Primavera
Cherry Hill, NJ

Camden Co

154.430	F1 Fire dispatch
154.385	F2 Fireground
154.160	F3 Fireground
155.085	F4 Command
155.235	EMS Ambulance
155.340	EMS Hospitals 146.895 Races

Burlington Co

154.220	F1 Fire
154.190	F2 Fire
154.400	F3 Fire
147.150	Races

Gloucester Co

154.130	F1 Fire
154.355	F2 Fire
155.280	EMS
147.180	Races

State Police Emergency Net

154.680	SPEN1 - Statewide
155.475	SPEN2 - National
154.725	SPEN3
153.785	SPEN4 - emerg serv, Civil Defense, fire
159.375	NJ State Forest Fire
154.265	South Jersey inter-county fire net

MID-ATLANTIC HAM REPEATERS

Output	Location
Delaware	
147.180	Bethany Beach
444.650	Bethany Beach
29.660	Claymont
224.040	Delaware City
146.970	Dover
147.195	Dover
444.500	Dover
146.925	Laurel
147.075	Millsboro
145.170	Milford
146.700	Newark
146.955	Newark
224.540	Newark
147.300	Seaford
147.390	Seaford
224.000	Wilmington
443.400	Wilmington
444.950	Wilmington
147.225	Wilmington
146.730	Wilmington
444.425	Wyoming
Maryland	
145.370	Adelphi
224.080	Arnold
147.000	Ashton
443.150	Ashton
146.625	Baltimore
223.620	Baltimore
443.250	Baltimore
29.640	Baltimore
147.030	Baltimore
443.400	Baltimore
146.670	Baltimore
147.285	Baltimore
426.250	Baltimore
146.940	Baltimore
147.240	E.Baltimore
449.575	E.Baltimore
449.325	N.Baltimore
223.840	NE Baltimore
53.150	NW Baltimore
449.625	N.Baltimore
224.240	N.Baltimore
145.130	NW Baltimore
224.800	NW Baltimore
443.350	NW Baltimore
443.200	W.Baltimore
147.345	W.Baltimore
224.680	W.Baltimore
224.940	W.Baltimore
224.380	W.Baltimore
443.550	S.Baltimore
449.775	Bel Air
146.775	Bel Air
147.120	Bel Air
444.225	Bel Air
447.925	Bethesda
145.290	Bethesda
443.650	Burtonsville
147.150	Cheltenham
146.985	Chesapeake Beach
146.610	Cheverly
145.490	College Park
443.000	Colora
224.860	Columbia
147.135	Columbia
147.390	Columbia
146.805	Crownsville
145.450	Cumberland
146.880	Cumberland
444.000	Cumberland
224.580	Damascus
224.540	Damascus
147.105	Davidsonville
223.880	Davidsonville
147.045	Easton
146.730	Frederick
444.800	Frederick
147.060	Frederick
448.750	Frederick
29.620	Freeland
147.390	Frostburg
29.660	Gaithersburg
444.025	Gaithersburg
919.100	Gambrills
447.125	Gambrills
146.955	Germantown
449.675	Germantown
223.660	Germantown
147.075	Glen Burnie
146.835	Greenbelt
146.880	Greenbelt
146.940	Hagerstown
147.090	Hagerstown
447.975	Hagerstown
443.950	Harmans
146.850	Havre de Grace
443.100	Havre de Grace
145.390	Hughesville
146.760	Jessup
223.760	Jessup
444.100	Jessup

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We would like to solicit more shortwave utility loggings to include in this monthly report, since they have greater potential for being heard by other readers. Send to Bob Grove, P.O. Box 98, Brasstown, NC 28902.

146.640	Lexington Park
146.865	Lexington Park
443.050	Lexington Park
145.210	Lutherville
146.895	Lutherville
147.180	Ocean City
443.450	Ocean City
444.700	Odenton
449.275	Owings Mills
147.270	Potomac
146.640	Rockville
145.250	Rockville
146.625	Salisbury
146.925	Salisbury
444.050	Salisbury
449.375	Shawsville
145.330	Shawsville
29.660	Silver Spring
147.180	Silver Spring
443.450	Silver Spring
448.275	Silver Spring
145.410	Westminister
43.250	Wheaton
144.950	Wheaton
144.950	Wheaton
145.170	Wheaton

Virginia

53.130	Alexandria
224.820	Alexandria
147.315	Alexandria
444.600	Alexandria
145.310	Alexandria
146.655	Alexandria
426.250	Alexandria
144.970	Alexandria
145.470	Arlington
147.045	Arlington
147.300	Bluemont
449.925	Bluemont
147.120	Culpepper
448.725	Fairfax
146.790	Fairfax
224.100	Fairfax
52.480	Fairfax Co
444.300	Falls Church
145.350	Falls Church
224.980	Falls Church
147.015	Fredricksburg
443.800	Independence Hill
147.390	Madison
146.970	Manassas
443.300	Manassas
147.210	McLean
146.625	New Market
223.720	Sterling
29.680	Sterling
146.715	Sterling
146.910	Tysons Corner
224.720	Tysons Corner
443.500	Tysons Corner
444.750	Tysons Corner
146.685	Vienna
147.165	Warrenton
146.820	Winchester
442.000	Winchester
147.240	Woodbridge
449.900	Woodbridge
448.975	Woodbridge

District of Columbia

145.110	Washington
145.190	Washington
147.360	Washington
223.820	Washington
224.500	Washington
449.975	Washington
449.500	Washington
448.875	Washington

West Virginia

147.255	Charlestown
145.150	Martinsburg

CONNECTICUT SCANNING

contributed by John Klaff Stratford, CT

32.45	USN New Haven
33.56	Fire Trumbull
33.86	Fire Trumbull
34.15	USAF ANG
34.75	USAF ANG
36.55	USN New Haven
36.90	Mil/Tower Sikorskys-Stratford
38.50	Army Nat Guard
38.90	Army Nat Guard
39.10	Bridgeport emerg. net
39.46	Hotline, Fairfield Co.
40.10	Army Nat Guard
40.65	USAF ANG
49.90	Army Nat Guard
41.10	Mil/Tower Sikorskys-Stratford
41.90	USAF ANG "Fury Ops)
42.04	State PD Troop G
42.18	State PD Troop G Drug Task Force
42.20	State PD Troop G Radar
42.24	State PD Troop G Radar
42.58	State PD Troop G Tactical
44.68	DEP statewide
45.70	Civil Defense statewide
45.86	Hotline New Haven Co
45.96	Ambulance Bridgeport
46.06	Fire Fairfield
47.30	State Hwy Dep Fairfield Co
47.42	Red Cross statewide
48.26	United Illuminating, Bpt
151.355	Sheriff Bridgeport
153.05	Security AVCO Lycoming-Stratford
153.38	Security Haddem Neck Nuclear Plant
153.77	Fire Bridgeport
153.98	Local Gov't Stratford
154.10	Hotline Fairfield Co (Also Bridgeport PD Tac)
154.31	Fire Stratford
154.34	Fire Milford
154.665	State PD Troop G - Emerg/aircraft
154.725	PD Bpt, E.side dispatch
154.86	Bpt Correctional Center
155.04	School Security New Haven
155.22	Ace Ambulance Fairfield
155.34	Host/Amb statewide
155.475	PD emergency statewide (future use)
155.775	Security Mental Health Ctr Bridgeport
155.805	EMS, Trubull
156.00	PD Tac Bridgeport
157.075	USCG New Haven
157.10	USCG New Haven
159.09	PD Fairfield
161.22	Conrail PD New Haven
161.295	Amtrak PD New Haven
161.64	Action & News New Haven
161.70	WICC Flight Watch, Bpt
451.30	SNET Stratford
453.025	Bpt Hosp paging
453.55	DEP (emerg) statewide
453.95	Greater Bpt Transit
460.10	PD (detectives) New Haven
460.15	Hotline New Haven Co
460.325	PD Stratford
460.375	PD Milford
460.405	PD Milford
460.60	Fire Fairfield
461.025	Yale Univ PD New Haven
462.025	Carpenter Steel Security Bpt
462.95	SW C-Med Disp Fairfield Co
462.975	SW C-Med Disp Fairfield Co
463.275	Univ of Bpt Security
464.225	Bpt Hosp Security (new freq - repeaterized)
464.575	Fairfield Univ PD
464.825	Sacred Heart Univ PD Bpt
851.0125	Fire New Haven
851.3125	Fire New Haven
851.5375	Cablevision Co Bpt
857.2625	PD Trumbull

■

John Palumbo's cozy listening post includes an Icom R71A, GE World Monitor and Radio Shack DX200.

Larry Lundberg, 73, in his DX Den near Minneapolis. His equipment: a Panasonic RF-2900, Realistic DX-400, Drake SW-4A, Hammarlund HQ One Eighty, Hallicrafter SX-28A, and a 1939 Philco.

www.americanradiohistory.com

Jean Baker, KIN9DD
213 W. Troy Ave. 4C
Indianapolis, IN 46228

Controlling the Skies - The ARTCC

Anyone who has ever lived within 25 miles or so of a major international airport knows just how busy the skies can get. The one-after-the-other roars of jet engines, straining to break the bonds of gravity as they soar upwards, punctuate the air at all too often intervals. And as those planes leave places like Philadelphia International, Boston's Logan or any one of dozens of other airports around the country, they are guided in their efforts by controller at the point of departure.

But who guides the hundreds of vehicles once they're out of range of their departing airport -- and before they reach their destination? The answer is ARTCC's or Air Route Traffic Control Centers.

There are 22 ARTCCs on the mainland United States plus one each in Alaska, Hawaii and Puerto Rico. All are under the auspices of the U.S. Federal Aviation Authority. Each is responsible for controlling all IFR (Instrument Flight Rules filed) and some VFR (Visual Flight Rules filed) aircraft from the time a plane leaves the immediate vicinity of its departure airport until the time it reaches the vicinity of its destination airport.

In order to handle this task safely and efficiently, the federal government has divided the U.S. into regions. Many are divided by natural boundaries and/or along by state or political lines. Each has its own Air Route Traffic Control Center and these are the "brains" of the Air Traffic Control (ATC) region.

Still, this is an incredible area to cover with each center handling as much as 100,000 square miles. Thus, each region is again broken down into sectors, each served by a remotely-controlled transmitter which is installed underground.

Each sector within a Center is connected via computer, as well as by land lines. When an aircraft is passing from one sector's boundary into another's -- or from one ARTCC to another -- it is "handed off" via computer (when both sectors' or Centers' computers are in this mode). It can also be handed off via telephone linkage from the Air Traffic Controller whose sector it is leaving to the receiving Controller.

Aircraft is tracked on radar screens within the Air Route Traffic Control System by means of radar as the aircraft flies through its airspace. The enroute radar can track aircraft from about nine to ten thousand feet (after it leaves departure control's radar facilities) up to the limit of controlled airspace or about sixty thousand feet. Above that altitude is occupied by military aircraft and the occasional supersonic civil flight, the latter usually over an oceanic area.

CLEVELAND ARTCC

Portions of Ohio, Michigan, Pennsylvania, West Virginia, New York

ARTCC Low Altitude Frequency Listings (Flight level 23.0 and below)
VHF and Paired UHF Frequencies

128.65/338.3	120.4 /379.1	121.2 /299.0
120.6 /307.2	128.15/348.7	119.95/269.5
125.2 /263.1	124.4 /327.1	125.6 /363.0
132.4 /323.2	134.65/343.8	128.25/335.3
121.4 /317.4	127.75/353.6	127.3 /357.6
135.1 /327.0	120.45/360.7	123.9 /379.2
132.25/269.2	134.9 /317.7	128.45/307.1
127.7 /307.8	125.1 /239.3	121.2 /299.2
		127.5 /306.3

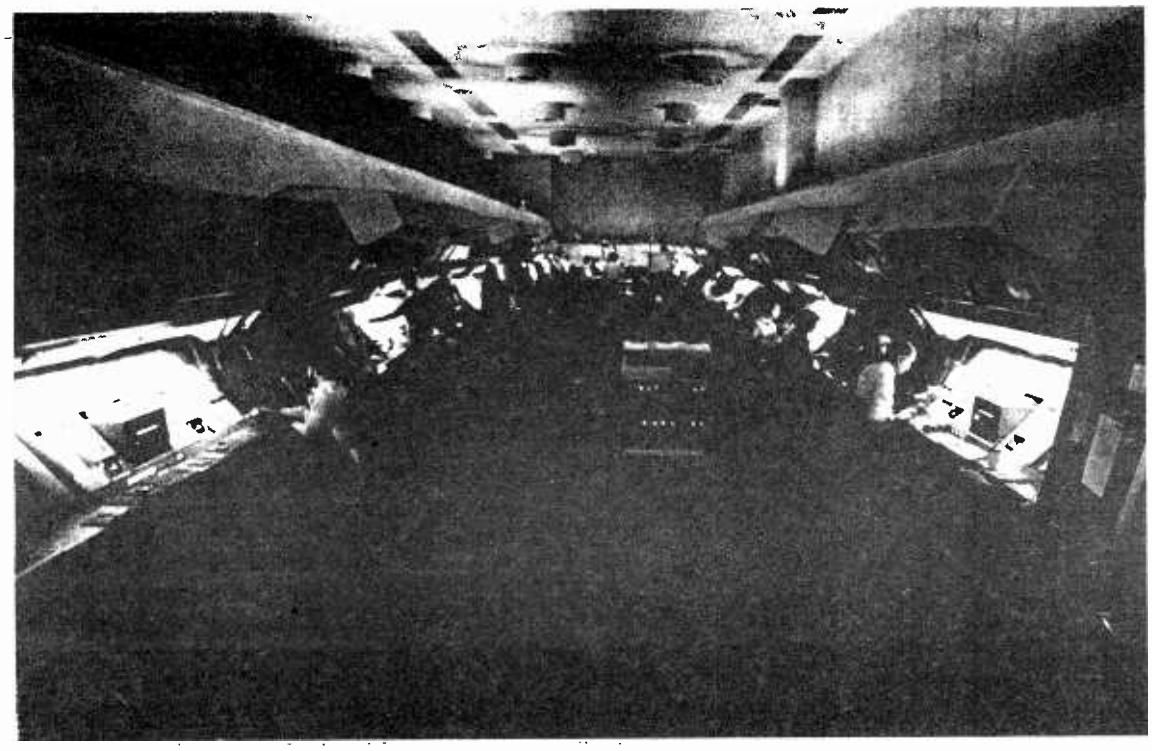
KANSAS CITY ARTCC

Portions of Missouri, Kansas, a very small corner of Texas, Oklahoma

Kansas City ARTCC Low Altitude Frequency Listings
(Flight level 23.0 and below)
VHF and Paired UHF Frequencies

125.2 /269.4	124.4 /322.4	134.9 /363.2
123.8 /343.7	127.9 /251.1	132.6 /370.9
133.15/319.9	118.8 /337.4	120.6 /323.2
120.5 /290.2	125.25/381.5	132.1 /281.5
128.1 /351.9	125.55/327.0	119.65/285.6
118.4 /299.2	121.25/269.6	124.1 /353.7
127.7 /317.7	118.8 /337.4	127.8 /380.2
128.6 /343.9	133.8 /317.5	133.4 /323.1
125.3 /269.5	132.65/307.8	134.0 /290.8
118.35/344.8	127.5 /269.4	132.9 /290.5
128.4 /291.7	125.5 /307.8	126.95/379.2
128.3 /291.7	128.8 /354.1	

While these frequencies are not found on all receivers -- they are on the Sony ICF-2010, for example -- you might check yours to make sure you don't miss out on this exciting aspect of communications monitoring.



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ARTCC High and Super-High Altitude Frequencies

Allegheny	135.175/291.6
Bellaire	132.45/281.5
Brecksville	135.6/306.9
Clarksburg	134.475/227.8
Dansville	133.775/284.6
Detroit	135.725/277.4
Franklin	133.075/236.1
Hudson	134.775/354.1
Imperial	132.075/353.8
Jamestown	132.925/267.3
Lorain	133.525/261.5
Niagara	133.95/353.7
Peck	133.875/351.9
Ravenna	133.375/350.2
Sandusky	127.9/288.3
Warren	134.125/316.1
Wayne	128.35/319.9

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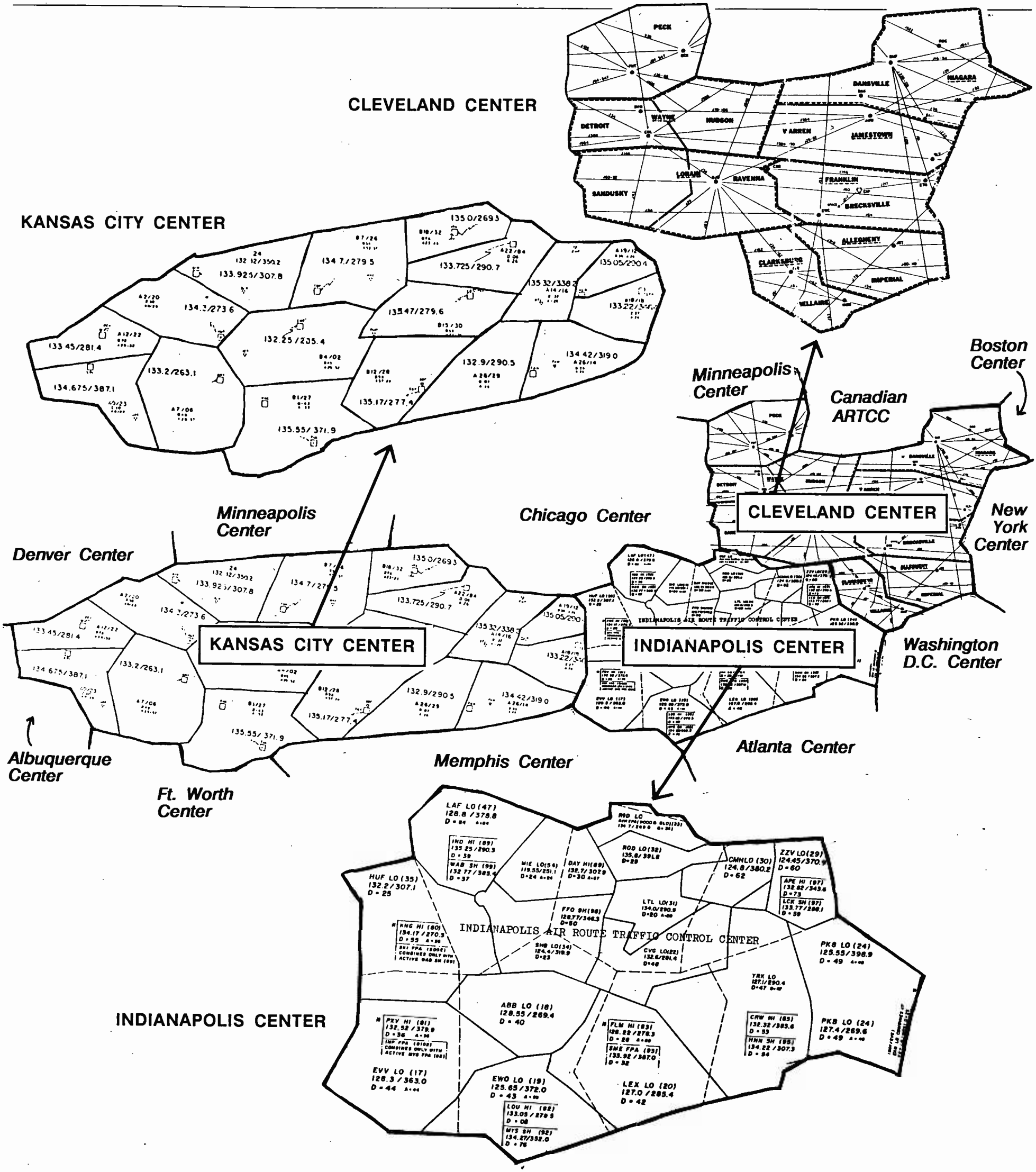
U.S. FAA ARTCC Boundaries

(As of May, 1987)



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UTILITY INTRIGUE

Don Schimmel
516 Kingsley Road SW
Vienna, VA 22180

Good Books

Looking at our bookshelf, Ken Stryker says that he'll have a supplement ready for his popular *Beacon Guide*. Both *Beacon Guide* and its supplement will be available this fall from most *MT* advertisers.

Patrick Sullivan of California writes in to ask about a source of information on non-standard RTTY shifts. I suggest the *List of Special RTTY and CW Alphabets and Codes* by Joerg Klingenfuss. It might provide the answers you are seeking and it is also available from most *MT* advertisers.

Coming to Terms

If you enjoy monitoring military communications, it's easy to get confused by all of the terms used on the air. So let's take a brief look at some of the some of the ones you might encounter while monitoring military activities.

Pacer Bounce

This program was a 1985 upgrade of Air Force low power HF communications equipment.

Scope Signal

Upgrade program for the Air Force high power HF equipment which supports *Mystic Star* (Presidential/VIP comms), *Giant Talk* GCCS, and *Commando Escort* stations, DCS HF entry facilities, weather broadcast and several command/theatre unique requirements.

This program has five phases. Phase I closed the TAC Coronet Claymore command control net and transferred its mission to the GCCS. Phase II is the upgrade for the Pacific area stations. Phase III upgrades the SAC Giant Talk system. Phase IV is the upgrade for the European area stations. Phase V is the western hemisphere upgrade.

SITFA

The Interamerican (Air Forces) HF, Voice and Teletype network of SICOFAA, System of Cooperation Among American Air Forces, is supervised jointly by the American Air Forces Chiefs and provides interconnecting communications channels between those chiefs to promote hemispheric solidarity.

Spanish is the primary language with English being the alternate. The two U.S. Air Force stations are located at Albrook Air Force Base in Panama and Andrews Air Force Base in Maryland.

Still need more information? Then you'll definitely want to pick up a copy of the Department of Defense's newly available *Dictionary of Military and Associated Terms*. The volume, which incorporates both the NATO and IADB dictionaries, contains over 6,000 definitions and will surely become one of the most often consulted references for milcom listeners. It can be purchased for $15.00 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The catalogue number is S/N 008-004-00024-2.

Bulletin Boards for Utes

If you would like to get the latest HF propagation information on a daily basis, it's now only as far away as your computer. The NOAA Space Environment Services Center (SESC), located in Boulder, Colorado, now has a microcomputer public bulletin board system (PBBS) which offers such data as forecasts. These forecasts are up dated every six hours.

The bulletin board is in operation 24 hours a day and can be accessed at 303-497-5000. The protocol is the standard 8-bit data word with 1 stop bit and no parity. The board accepts both 300 and 1200 baud rates.

Special Interest Items

6225.8 kHz CW

This traffic was in 5L groups of cut numbers. The signal was quite good and the transmission was automatic sent. The cut number system in use was with the figures 1-0 being represented by letters A N D U W R I G M T.

7484.7 KHZ various

Two OM/EE were involved with checking out some type of equipment. One operator was directing the other one to transmit in various modes. They checked operation in USB, LSB, ISB, and AM. Then they went to CW and finally to FSK. At this point, control told the other station to go to the next transmitter and nothing further was heard on this frequency.

7527 kHz CW

5L groups were automatically sent in the same cut number system observed on 6225.8 kHz. Upon completion of the message, the message AR AR AR SK SK SK T (followed by a short data burst) was sent and then silence.

14396.6 kHz CW

This traffic was sent by an operator using a speed key. He had a very good fist and was sending at a very fast rate. The groups were 5F and the operator sent the letter "R" after every ten groups and then into the next ten groups.

He cut zero to "T" and after 100 groups, sent GR 101 R and immediately into the text again. I watched this frequency for quite a long time and the operator was still passing traffic an hour later. I noted that simultaneous keying was taking place on 14445.7 kHz but the audiotone was not as sharp and clean as the one on the lower frequency.

14419.9 kHz USB/LSB

There were two separate (although perhaps related) activities on this frequency. There was a somewhat weak conversation on LSB which appeared to be in Portuguese. On USB, there was a Spanish net with stations using callsigns like 430 and 205. An adjacent station caused severe interference to these signals so it was not possible to learn more about this particular communication.

14432.6 kHz RTTY 50-425

Extremely long messages were being passed on this link. It was operating apparently in the duplex mode because I did not hear any transmissions from the other end. The traffic was 5L groups but the message headings were composed of 5F groups like this sample heading: 11177 00172 64299 21169 05089. At this point the text began.

I had been listening to this traffic for quite some time before I heard a message heading. Thus, it was evident that the preceding message had to run to several hundred groups. The carrier went off the air at 2108.

14763.6 kHz CW

This is the second time I have run across this type of traffic. The message was in 5L groups but instead of the usual pause at the completion of every ten groups, this link transmission, which was automatic sent, paused after each eight groups, then continued with the next eight groups. The transmission, which began at 1653, ended at 1727. ■

MAY 1987 LOGGINGS

KHZ	DTOI	MODE/IDENTIFICATION/COMMENTS
3422	190716	CW/Unid stns/QSL sent for msg NR1219 RAP GR 300
3455	190715	AM/YL-SS with 5F grps
3377	190723	CW/Unid stn asking for grp repeats, other end not hrd
3380	190720	CW/WGY912, FEMA stn with 5L grps
4188	190734	CW/JCOI, 7LYVO/ Japanese ships
4607	222316	CW/970MR DE 970QZ/Poss Spain naval net
4610	190743	CW/Unid stn with 5L grps, auto sent; also hrd with tfc on 182350Z
4782	190744	CW/WGY912, FEMA stn with 5L grps
6102.5	191343	CW/DE V40 VV V (rpts over and over), still sending marker at 191603Z
6283.7	182329	CW/? DE UBLY, Soviet ship, vy weak sig
6352.1	182335	CW/No calls/ Appears to be French Naval tfc
6407.1	182339	CW/DE GKC, Portishead, England
6430	201338	CW/Prob CFH Maritime Command RDO, Halifax, NS, Can wwith iceberg msg
6576.5	231252	USB/Easter 947 calls (poss Miami) with Selcall check
6604	231250	USB/New York Rdo complete WX Bcst followed immed by Gander with WX
7357	120003	CW/"P" Beacon
7707	120022	MCW/Offshore Marine forecast from Natl WX Svc New Orleans
7750.7	211313	RTTY 50-850/Poss WFA57 New York with Quick Brown Fox tape
8878.7	231259	USB/Gander wkg unid stn re VHF freq at Goose Bay
10459.7	240107	USB/YL-GG with 5F grps, rpts eachgrp twice, bad QRM on freq
10588.8	2202246	RTTY 45-425/RY's foll by Spanish chatter. Prob Havana/Angola Mil link
10854	201717	CW/No calls/5L grps, 4 spec charac noted, OE OT AA IM
12617.8	231245	CW/Unid stn clg XSG Shanghai, PRC
12952.4	231242	CW/DE VIS Sydney, NSW, Australia
13069	231239	CW/CQ DE JOS Nagasaki, Japan
13270	231235	USB/WSY70 New York with Air WX for various US cities
13369.7	181325	RTTY 75-850/DE NBA, US Navy, Panama with RY's
13370	181327	CW/Unid stn sending cut nbre tfc, vy weak signal
13386	221403	RTTY 50-170/No calls/5F grps, not good copy due pronounced fading
13638	231226	CW/Two tones, each three dashes, one set of dashes sent slightly faster than other set
13858	111905	MCW/Sends 624 624 624 TTT over & over then into 5F grps
13934	111847	CW/CLP23 (?) DE CLP1 Havana/Spanish chatter/CLP1 moves down to 13914.6
14432	212330	CW/Uniden stn sends 5f grps, speed key, good fist, slight fading
14475.6	211323	CW/"K" Beacon
14496.5	231219	RTTY 50-170/Coded WX
14520	132108	CW/Uniden stn with 5F grps, auto sent, cuts zero as latter T
14595	23122	RTTY/Piccolo?
18104.5	201654	RTTY 50-170/Coded WX
18162.9	181317	RTTY 50-170/STK Khartoum Air, Sudan with RY's
18167	181320	RTTY/Piccolo?
18736.5	221740	CW/Uniden stn sends DB4N 6DVB over & over/Stn went down at 1741Z
18783.4	221739	RTTY 50-425/Press in French
19403.5	221735	RTTY TOR-ARQ 170/No ident, Spanish PT opr chatter
19454.3	221646	CW/Stn believed be CLP1 Havana, tells unhrd stn to QSY
19503.4	201355	RTTY 50-425/QRA DE RCD 36 19505 kHz, RWN72 18600 kHz desde Moscu URSS. With Quick Brown Fox and RY's
19654	222002	CW/CLP1 Havana DE CLP45 Luanda, Angola/tells CLP1 to QSY 18275. Stns then exchange Spanish PT chatter
19699.6	201352	FSK CW/QRS Y7A78 VVV, Berlin, GDR
21394.8	240114	CW/RMBU Soviet ship DE CMU967 Santiago Naval Rdo, Cuba
21398	240112	USB/Two OM-EE Hams talking about the tornado that hit town in Texas

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INTERPOL

A Model of International Cooperation

by Don de Neuf WA1SPM

The International Police Crime Commission was founded in 1923 on the recommendation of International Congress of Criminal Police. To deal with crime on an international basis it was necessary to create a united front which they called INTERPOL.

The headquarters were originally established in Vienna because at that time the police authorities in Austria were the only organization which specialized in files on international criminals.

By 1930 Interpol provided five basic services for its worldwide police department members: A bureau for the suppression of counterfeiting and passport forging; an international crime record office; a fingerprinting record and photographic service; and a regular information bulletin service.

In 1934 an international radiotelegraph (Morse code) network was established between a number of countries for the speedy handling of requests and information.

The organization virtually ceased to exist during WW2 after Austria came under German control, but in 1946 Interpol was re-established in Paris with a new, large radiotelegraph station on a site some 50 km outside the city.

Within ten years this station was exchanging some 200 messages a day with other Interpol stations around the globe. Today, traffic loads are much higher and constant contact is maintained with most of the principal cities of the world.

Little is read or heard about Interpol but it is credited, among other things, with the quiet apprehension of many fugitives within a few hours after leaving a country by highspeed aircraft. *(Thanks go to J.F. Ross for information)*

Royal Canadian Mounted Police

North American communications are provided by the Royal Canadian Mounted Police. These frequencies are mostly RTTY with some SSB; some are gradually being phased out. (Excerpted from the Shortwave Directory).

kHz	Province	kHz	Province
2788	Alberta NWT	9105	NWT Alta Ont NB
4765	night freq		
4776.5	NWT Alberta Nfld		NS Nfld Paris
4785	Yukon NWT BC	9200	Paris
	Alta Man Ont PQ	10390	Paris
	NS WashDC	14620	Yukon,NWT,Alta,
4798.5	BC Manitoba		Man,Ont,PQ,NB,
4812.5	Sask		NS,Nfld
5445	Alta Sask Man	14817.5	Paris
	Ont PQ	19130	"
6792	Paris	19360	"
7780	Yukon NWT BC Alt	21785	"
	Sask Man Ont PQ	21807.5	"
	NB NS Nfld Paris	24110	"

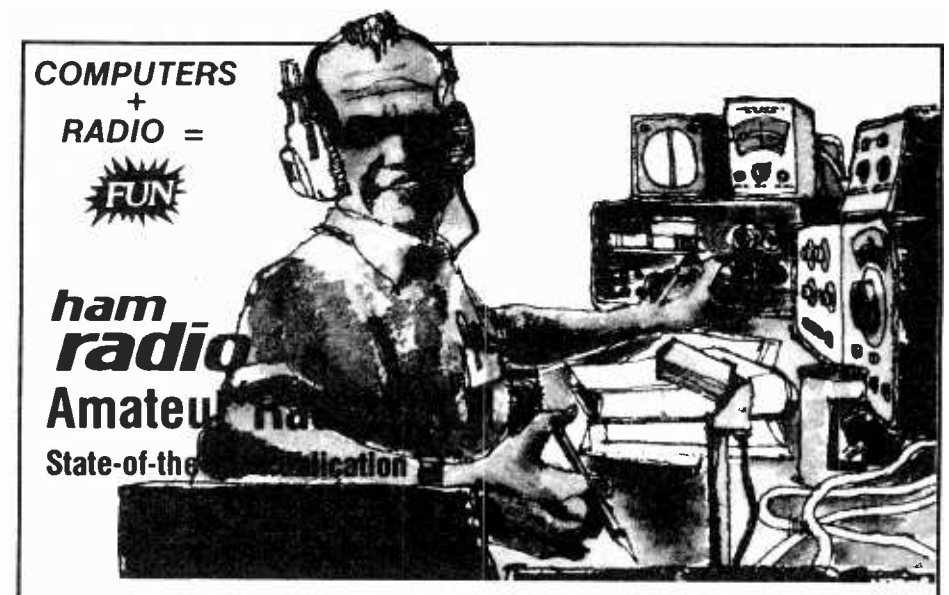
INTERPOL Frequencies

Excerpted from the Shortwave Directory by Bob Grove
Underlined frequencies most frequently reported.

2593	4855.5	7532	9285	13820	15684	21785
2840	5104	7832	9821	14607.5	15738	21807.5
3593	5208	7906	10295	14707	18190	24072
3705	5305.5	8038	10390(Pri)	14817.5	18380(Pri)	24110
3714	5895	8045	11538	14827	19130	27845
4444	6792	9105	13520	15502.5	19360	
4632.5	6905	9200(Pri)	13747	15592	19405	
4837.5	7401					

Alphabetic Callsign List - National Central Bureaus

Callsign	Station-Bureau
AVD204	Ranchi, Argentina
AYA47	Buenos Aires, Arg.
CNP/CNT	Rabat, Morocco
CSJ26	Lisbon, Portugal
DHA33/DEB	Wiesbaden, FDR
DUN356	Manila, Phillipines
EEQ	Madrid, Spain
EEQ20	Las Palmas, Canary Is
EP5X	Tehran, Iran
FSB57	HQ Paris, France
GMP	West Wickam, Eng.
HEP39/58	Zurich, Switzerland
HMA22	Seoul, Korea
HK3M-TI	Bogota, Colombia
HSQ	Bangkok, Thailand
IUV81	Rome, Italy
JPA21-27	Tokyo, Japan
JPA56	Nagoya, Japan
LJP20	Oslo, Norway
LXF50	Luxembourg
LZH7	Sofia, Bulgaria
OAV84-87	Lima, Peru
ODW22	Beirut, Lebanon
OEO35	Vienna, Austria
OGX	Helsinki, Finland
ONA20	Brussels, Belgium
OWS4	Copenhagen, Denmark
PDB2	Utrecht, Holland
PPC55/PYZ2	Brasilia, Brazil
SHX	Stockholm, Sweden
SUA81	Cairo, Egypt
SXP	Athens, Greece
TCC2	Ankara, Turkey
TTR103-148	N'Djemena, Chad
TUW220	Abidjan, Ivory Coast
VRD	Hong Kong
XJD48	Ottawa, Canada
XJE57	Almonte, Can (RCMP)
YO99	Bucharest, Rumania
YVZ32	Caracas, Venezuela
ZPZ	Asuncion, Paraguay
3VA	Tunis, Tunisia
4NX7-25	Belgrade, Yugoslavia
4XP41	Tel Aviv, Israel
4XP63	Jerusalem, Israel
5BP6	Nicosia, Cyprus
50P25	Lagos, Nigeria
5TP25	Nouakchott, Mauritania
5YG	Nairobi, Kenya
7RA20	Algiers, Algeria
8UF75	New Delhi, India
9TK21	Kinshasa, Zaire
EEQ21	Santa Cruz, Canary Is



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Ham Radio gives you more technical articles and the very best technical articles of the Amateur journals. Transmitters, receivers, antennas, as well as state-of-the-art design theory and practical articles. Ham Radio has got it all! In May there's our annual Antenna Issue — chock full of all kinds of antenna design ideas and projects. November brings the Receiver Issue — the very latest in receiver technology for the Radio Amateur. Many consider these two issues alone worth the price of a year's subscription.

And there's more! Monthly columns by: Joe Carr, K4IPV on the ins and outs of repairing and troubleshooting your radio; Bill Orr, W6SAI on antennas and antenna technology plus a lot more; noted HF/VHF operator and DX'er Joe Reisert, W1JR's world of VHF and UHF technology; and noted government propagation expert Garth Stonehocker, KØRYW on propagation.

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Larry Van Horn
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Orange Park, FL 32073

Space News Roundup

Soviets Test Massive New Booster

After years of development, several false starts and three failures, the Soviet Union has successfully tested its "Energia" heavy lift launch vehicle.

The Saturn 5-class launcher is a two-stage liquid hydrogen/oxygen system that weighs 4.4 million pounds at liftoff, develops 6.6 million pounds of thrust and is designed to loft 220,000 pounds into orbit in a piggyback cargo container.

Liftoff was on May 15th, less than 24 hours after the Russians broke years of secrecy on the project and announced it was about to test "a new powerful rocket that could put in orbit reusable spacecraft and other heavy space vehicles." The announcement in advance of a high-risk Soviet space test was unprecedented. After launch, the Soviets even released television views of the Energia and its liftoff in darkness at 2130 Moscow time.

Soviet Pictures Confirm Recon

The pictures confirmed earlier U.S. recon satellite imagery that showed the new booster uses a large core element, resembling the large external tank used by the U.S. space shuttle. Unlike the U.S. version, however, the Energia has four large engines in its base. Attached around the central core are four large liquid-fueled strap-on boosters.

Mounted piggyback on the core section between two sets of boosters is a large cargo pod. This large pod will be used to lift unmanned payloads into orbit. U.S. intelligence officials indicate that the Energia could be used to lift payloads as heavy as 300,000 lbs.. For manned missions, the pods will be replaced by the Soviet space shuttle. Unlike the U.S. shuttle, however, all all of the boosters and the main engines for the Soviet shuttle are mounted on the Energia, so the May 15th test proved the Soviet space shuttle propulsion system in flight.

U.S. recon satellites also photographed a Soviet shuttle/booster mating test several months earlier, before Energia's reconfiguration for its first flight in the unmanned mode.

After liftoff from Tyuratam, Energia was powered through Mach 4-6 by the strap-on boosters and the core. The strap-on boosters then separated and the core vehicle with its cargo continued the ascent.

Payload Malfunction

The core vehicle achieved its propulsion and guidance objectives, shut down four engines and then separated the payload complex. The payload was supposed to ignite its own rocket engines and continue into orbit, but a serious payload malfunction occurred, unrelated to the Energia booster.

"The satellite model was supposed to be put into orbit by its own engine," said a Soviet official. "However, it failed to go into orbit because of inadequate performance of on-board equipment and landed in the Pacific."

The Soviets stressed that the payload was a "full size and weight mock-up of a satellite."

The mission of the payload was unknown but it was complex enough to have its own large propulsion system. The Soviet statement that the payload had "various problems" can be interpreted as another indication of satellite complexity. Using TRW missile early warning satellites over the Pacific, USAF Space Command was able to observe its re-entry. Data showed the payload as an "intense" hot object for an unusually long period of time as the satellite re-entered the atmosphere. This could be an indication that the vehicle may have a shallow re-entry angle. In addition, it could also indicate a significant mass or large propellant load caused the unusually bright and lengthy fireball.

Monitoring Times readers should listen to Radio Moscow, check this column and other sources for the announcement of the first Soviet Space Shuttle launch. I fully expect the Soviet Shuttle to be launched before the end of 1987.

Mir Space Station News

The Soviet Mir space station has developed an electrical power shortage that is affecting space science and materials processing activities on board the facility. The shortage is not related to a malfunction but rather the management of power consumption compared with the amount of electricity that can be generated by the station's solar arrays and then stored in batteries.

The Soviets hope to clear up the problem by installing an additional solar array atop Mir. As of this writing, the Mir is now more than 100 ft. long. Progress 30 increased the length of the station when it docked to the back of the Kvant Astrophysics module on May 21st.

Reader John Biro has reported a possible frequency for the Kvant module. John has monitored telemetry on 166.140 MHz. More details as they become available.

Rock 'n Roll on Mir?!

Voice transmissions on 143.625 MHz continue to be reported by a variety of monitors. As noted previously, 143.625 is the downlink frequency for the stations duplex voice Comm system.

Recently, reader Jack Sullivan noted an interesting intercept while monitoring the downlink.

From Jack's letter:

An interesting Mir intercept was good old fashioned decadent imperialist rock 'n roll being played on the space station while the cosmonauts talked with the ground--'I Will Survive' by Gloria Gaynore (1978)!

Three foreign cosmonaut crews are training in the Soviet Union for upcoming flights planned on the Mir. Cosmonauts from Syria, Bulgaria and France are training for flights planned in the 1987-88 period.

Syrian Cosmonaut on Board

A Syrian cosmonaut is expected to have completed his mission aboard the Mir by this month. A Bulgarian is expected to follow in June 1988 for an 8-10 day flight.

The most ambitious mission, however, is planned for the French cosmonaut who is expected to be aboard the Mir for a one month flight. The French mission is planned for the second half of 1988.

Soviet officials recently indicated they plan to dock the second large building-block module to the Mir by the time the French cosmonaut arrives in space.

According to French space officials, the two Soviet cosmonauts currently on Mir -- Yuri Romanenko and Alexander Laveikin -- should remain on the station for the remainder of 1987.

Soviet Hams-in-Space

There are indications that a ham radio station will shortly be arriving at the space station. Sources tell me that this could come as soon as August. I hope I have more details as they become available.

Sputnik-9 Launch Expected

The launch of Sputnik-9 (RS) is expected at any time now. Formerly called RS-10 until the original RS-9 was "postponed indefinitely" for unspecified reasons. The new RS-9 will contain four models: A, K, T and Robot T. Frequencies for these modes are believed to be as follows:

Mode	Frequencies MHz
Mode A	145.960--146.000 uplink 29.460-- 29.500 downlink
Beacon	29.457 or 29.503
Mode K	21.260-- 21.300 uplink 29.460-- 29.500 downlink
Mode T	21.260-- 21.300 uplink 145.960--146.000 downlink
Beacon	145.957 MHz

AMSAT Phase 3C Launch Near

Arianespace released its new manifest Friday, late in the Spring. It shows that AMSAT's phase 3C satellite will be launched early next year on flight V-22. There are several caveats attached to this date, however. The manifest notes the possibility of launching as early as November 1987 if V-22 can be interspersed between V-20 and V-21. This will depend on many factors including the ability to modify the launch pad to accommodate the new, larger Ariane 4 launcher which will carry Phase 3C.

AMSAT now believes there is a reasonable chance Phase 3C will be launched in the first quarter of 1988. But Arianespace points out the entire schedule presumes the V-19 mission is launched in August. Achieving this depends on acceptance of the V-19 third stage engine which has not yet been accomplished.

In a related development, AMSAT DL has released preliminary plans for a new Phase 3C satellite, Phase 3D. It would be a scaled-up version of Phase 3C with a very powerful (250 watt PEP) mode JL transponder aboard. Weighing 400 kg at launch, the satellite would be launched to a Molniya orbit in the 1990-1991 time frame according to AMSAT DL. (Information from the AMSAT news service.) ■

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Improved Reception and Wider Range for Minimum Bucks

by Larry Wiland

Getting better reception on your antenna and extending your frequency coverage to 800 MHz is possible without spending megabucks ... but the sources may be drying up fast.

The Great Antenna Swap

O.K. So maybe you're not into listening to Air Force One or the local office of the F.B.I. or Secret Service. But still, you do own a scanner and want a little improved performance without a monster dollar expenditure.

Maybe you just want to listen to the local police or fire company where you live, or maybe you're a member of the local "Townwatch" group who wants to know what's going on in the neighborhood. And by golly, that little whip antenna on your scanner just isn't cutting the mustard. What to do? What to do?

Well, you'd be surprised at what you can do. And for only $20.00!

If you want a dedicated mobile scanner antenna, you may consider buying either a one-piece standard AM/FM auto antenna or one of the telescoping ones, and mounting it on the car in a convenient place for VHF/UHF reception. For receiving purposes these little guys do as good as the more expensive mobile scanner antennas. And the whole deal will cost you about $5.00 for the antenna plus another $5.00 for an extension cable to lengthen the rather short cable furnished on the antenna.

A good, low-band mobile scanner antenna can be fashioned from an old full-wave C.B. whip by simply cutting it to the resonant frequency you wish to monitor. Keep in mind that this is only practical with a full-wave CB antenna -- not fiberglass or short, abbreviated versions commonly available today.

For a cheap base monitor antenna, consider the Radio Shack $14.95 ground-plane antenna (part # 20-176). It does a fine job on VHF-Hi band and very well on UHF, too. It, too, can be pruned right up into the 800 MHz range with excellent results.

Local low-band stations also come booming in on this little jewel even though it is not really designed for this range. For an additional $12.00, a decent run of coax and hardware can be added. Not a bad deal with commercial all-band monitor antennas going for almost $90.00!

Last, but not least, do not discount the marine antennas which do not require a ground plane. They adapt perfectly to a base environment for both transmit and receive usage for both CB and VHF. Inexpensive ham antennas can also do the job, providing you pick the proper one to match the bands your listening to. So whoever said scanning was an expensive hobby obviously didn't master all the possibilities!

Converting to 800 Megs

If you listed the top five questions most likely to be asked by scanner enthusiasts, one will undoubtedly concern the effectiveness of the various scanner "converters" for the 800 to 900 MHz bands.

In the past, you may have seen advertisements for one of these converters manufactured by a firm called GRE. More recently, it's unlikely that you will, thanks the good old Electronic Communication Privacy Act. Since then, nothing has been seen or heard from them. But more about that in a second. First, let's take a look at what a scanner converters does.

Scanner converters are devices which, when connected to the antenna input of a scanner (as well as a low-voltage DC power source), enable the radios to receive band coverage or frequency coverage that the scanner was not originally intended to receive.

It connects "inline" and contains an oscillator and various other circuitry which "tricks" the scanner into reception of frequencies higher or lower than the designed in-band limitations possessed by the radio. And what that trickery can do for a radio!

Being curious about these little marvels, and especially GRE, I decided to contact them in hopes of obtaining one of these gems. I was also curious as to why I no longer saw ads for the products anymore. Could it have something to do with the ECPA?

I telephoned GRE and spoke to a friendly female voice on the other end. Asking first if the model 8001 converters were still available, she replied, "yes..." though I was warned that they were no longer in production.

Further conversation brought forth the explanation. Some time ago, after passage of the ECPA, GRE was contacted by the Federal Communications Commission which advised them that they could no longer produce or sell the '8001 because of their ability to monitor cellular phones.

After some "court battles," the voice on the phone said that the F.C.C. eventually agreed to a compromise. GRE would be allowed to sell off the remaining stock of these units providing that a warning label was affixed to each one sold. That way, explained the Commission, the government could be assured that each purchased converter would not be used for illegal purposes and that the owner would be duly informed that the ECPA was, indeed, in effect.

The voice went on to explain that there were "several hundred left in stock and still available" but that "when they're gone... they're *gone*."

In case you're worrying about GRE itself, fear not. When the converters are "*gone*", the GRE won't be. They also make the Pro-Series scanners for the Tandy Corporation (a.k.a. Radio Shack).

In any case, the '8001 converter itself enables your scanner to cover 806 to 912 MHz by "adding" 400 MHz to the scanner's UHF band, and allowing you to "copy" radio traffic in this band. It does not give direct frequency readout on your scanner's LED/LCD display, but converting the displayed frequency to the converted frequency involves nothing more than mentally adding 400 MHz to the displayed frequency. For example, if the frequency being received is 812.500 MHz, the scanner's LED/LCD display will show 412.500. Easy, eh?

The '8001 is housed in a well-made, attractive black metal casing, and is about the overall size of a large pack of cigarettes and has an on-off switch, a "power on" indicator LED on its face.

It's shipped with a small, 800 MHz antenna and has a Motorola plug on the cable made into the unit (which plugs into the external antenna jack on the rear of your scanner. A standard 9 volt transistor radio battery furnishes the needed power although a 9-volt/25 to 100 Ma all-mount power supply (with negative tip polarity on the connector) does a better job and lasts much longer.

You merely plug the little 800 MHz antenna into the '8001, install the battery into the chassis, plug the converter's cable into the external antenna jack on the rear of your scanner and you're ready to go!

And how does it work? Well, the only indication that my Pro-2021 does not have built in 800 and 900 MHz coverage is the frequency display on the LCD readout. Some of the 800 MHz business repeaters come through better than the local sheriff department's megawatt transmitter located a mere 4 blocks away from my house. And, as channel spacing in the 800 MHz business band coincides with the 12.5 kHz channel spacing in the "standard" 400-500 MHz UHF band (common to nearly all current scanners), the displayed channels are exactly on center.

Even splinter channels or channels "within ∓ 5 kHz" come in loud and clear. If you do not have a scanner with 800 MHz capabilities, then I do suggest this converter to "expand your listening horizons" into this area of the spectrum. Best of all, it is a lot cheaper than popping mega bucks for another scanner capable of 800 MHz reception when you can do the same thing for less money.

But you better hurry, cause, as the female voice on the other end of the phone said, "When they're gone...." In fact, they may already be!

The GRE model '8001 is available from GRE America, 425 Harbor Blvd., Belmont, CA 94002. Their toll-free order desk is 1-800-233-5973. for technical questions and the like, call 1-415-591-1400.

Cost is an incredible $59.95 plus $4.00 shipping/handling (and an additional $1.00 for C.O.D. if you wish it sent this way). The company also takes Visa and Mastercard.

Where can you buy an 800 MHz scanner for this price? My 200 channel Pro-2012 attests to how you can make a good thing better for a price we all can afford. And a 200 channel, 800 MHz scanner for $265 total costs is a helluva bargain in anyone's book! ■

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ON THE HAM BANDS

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THE HISTORY CONTINUES - The 1940s and 1950s

On The Air Again

Last month we saw that the war stopped all ham activities for the duration. But the good news was the improvement in the quality of equipment which came about as a result of the needs of the military. Immediately after the war, some really first rate commercial equipment (for its time) was available.

Designations like SX-28, HQ-129X, NC-24D, RME-45, etc. quickly became familiar to hams after the war. And surplus -- boy did we have surplus! Designations like ARC-5, ART-13, SCR-522, Command Series, etc. were also very familiar to hams during that period and well into the '50s.

One of the big winners was mobile operation. Motor generators, such as the PE-103, were readily available for use in the trunk of the car. An extra battery or two, a heavy duty generator and away we go!

Ten meters, and to some extent 6 meters, were the most active bands for the local mobile crowd. Bunny (hidden transmitter) hunts were regular Saturday morning entertainment and as we went into the '50s, 6 meters became more popular.

The long whips in use for 10 meters made us look like highway patrol or sheriffs cars. Other drivers, unsure just what we were, stayed within the speed limits around us.

While amateurs were on the air with limited bands within 4 days after the end of the war, it took several months to regain most of the bands as the Army and Navy wound down their wartime activities around the world. The final band segments were released 15 months after war's end.

Most ham activities continued as they were before the war. DX, rag chewing, traffic handling, emergency communications, etc. But the number of hams grew like the proverbial weed.

After the war, amateur radio, thanks to years of pre-planning and work by the ARRL staff, picked up a lot of additional spectrum in the UHF and microwave regions. And after the international radio conference in 1947, 15 meters was added to the amateur bands.

Donald Duck And Uncle Miltie

The really big news in amateur radio after the war and into the '50s was Single Sideband (SSB) and Television Interference (TVI). The former was a great advance, the latter a pain in the ...!

TVI continued to be a *major* problem until the late '50s or early '60s (depending upon where you lived) by which time most TV stations had raised their ERP to the maximum allowed and put up better and higher antennas. TV set quality improved a lot too, but not enough. The problem still exists, but nothing like in the early days.

The FCC realized it was basically not a ham caused problem, but we still had to live with our neighbors who, for some strange reason, did not want to hear "CQ, CQ, CQ, DE Etc." over Milton Berle's jokes!

Single sideband was around before the war, but its popularity started to build during 1948 after a few years of pushing by a few experts and some major articles on the subject in *QST*.

The AM ("Ancient Modulation") crowd were not amused with the SSB group (the "Donald Ducks"). They fought SSB like hell right into the '50s (and a few are still at it!!), but it was a losing battle. The advantages of SSB overcame the AM'ers and SSB became the mode of choice on HF.

The Radio Regulations And Mode Wars

The SSB battles were so fierce that separate organizations (in opposition to the ARRL) were founded to fight both SSB and the expansion of the phone segments on the bands (the latter opposed by CW types). So with the ARRL in the middle of the road (mainstream) and the AM and CW groups at the extremes, we fought with the FCC over the band allocations.

In addition to the band allocations, the various license classes were up for major changes. The battle swayed back and forth for over a year with lots of meetings between the belligerents, some compromising, etc., but on January 31, 1951, the FCC ruled.

CONVENTION CALENDAR

Date	Location	Club/Contact Person
Aug 1-2	CedarRapids,IA	Cedar Valley ARC/ Tom Zuber WN0DRC 4201 Dalewood Ave, SE Cedar Rapids, IA 52403
Aug 1-2	Asheville, NC	West Carolina ARS/ Earl Elliott KI4UO 17 Emmary Rd, Asheville, NC 28806
Aug 1-2	Jacksonvile,FL	N.Fla. Section Conv./ Wayne Oehlman WB3DBE 11649 Mand.Terr.Rd., Jacksonville, FL 32223
Aug 2	W. Mifflin,PA	South Hills Brass ARC/ Doug Wilson WA3ZNP 185 Orchard Ave, Emsworth, PA 15202
Aug 2	Berryville, PA	Shenandoah Valley ARC/ Rob Kinsley NT4S P.O. Box 139, Winchester, VA 22601 Talk-in 146.22/.82 and .52 simplex
Aug 7-9	Austin, TX	West Gulf Div.Conv./ Joe Makeever 8609 Tallwood Dr, Austin, TX 78759
Aug 8	Ripley, WV	Jackson Co ARC/ Geneal Bailey NK8P Ripley, WV 25271
Aug 8-9	Hays, KS	Hays ARC/ Robert Pletcher, NN0N 1104-C E. 17th St., Hays, KS 67601
Aug 9	Marion, IN	Grant Co ARC/ Wm.Brooks Clark 2202 So. Boots, Marion, IN 46953
Aug 9	Warrington,PA	Mid Atlanta ARC/ John Bartholomew WB3ELA 203 2nd Ave, Broomall, PA 19008
Aug 9	Indianapls,IN	Shadow of the Pyramids ARC/ Dave Johnston Indianapolis, IN 46268
Aug 9	Willow Spgs,IL	Hamfesters RC/ John Schipitsch W9BNR 13058 Finch Court, Lockport, IL 60441
Aug 9	Georgetown, KY	Bluegrass ARS/ Scott Hackney KI4LE 629 Craig Lane, Georgetown, KY 40324
Aug 15-16	Huntsville,AL	Alabama State Conv/ Jim Brashear 3002 Boswell Drive, Huntsville, AL 35811
Aug 15	Springfield,MO	SW Missouri ARC/ Dave Christiano NE0B 2511 E. Grand, Springfield, MO 65804
Aug 16	Georgetown, DE	Sussex ARA/ John Low K3JL Rt 2, Box 244G, Georgetown, DE 19947
Aug 16	Warren, OH	Warren ARA/ Sandy Melton KC8RM 4595 Bonnie Dr, Warren, OH 44485
Aug 22	Oakland, NJ	Ramapo Mt ARC/ Sol Silverman KA2VBZ 800 Godwin Rd, Paramus, NJ 07652
Aug 22	Victoria, TX	Victoria & Pt Lavaca RC/ Carroll Paschall 1709 Poplar, Victoria, TX 77901
Aug 22-23	Madison, GA	Confederate Signal Corps/ Roy Jordan WB4ILR 1146 Shoreham Dr, College Park, GA 30349
Aug 22-23	Tacoma, WA	NW Division Conv/ Jerry Seligman W7BUN 12306 80th Ave, East Puyallup, WA 98373
Aug 23	Mullica Hll,NJ	Glouster Co ARC/ Michael Black N2FIZ Mullica Hill, NJ 08062
Aug 23	Marysville, OH	Union Co ARC/ Gene Kirby W8BJN 13613 US 36, Marysville, OH 43040
Aug 29-30	Saginaw, MI	Great Lakes Div Conv/ Joseph Turner 423 N. Granger St., Saginaw, MI 48602
Aug 29-30	Melbourne, FL	Platinum Coast ARS/ George Levingston 720 S. Dorsey Pl., Melbourne, FL 32935
Aug 30	Bluefield, WV	East River ARC/ Charles Gatchell KE8EI 24 Fairfield Place, Princeton, WV 24740
Aug 30	Danville, IL	Vermilion Co ARA/ Chris Stonecipher KA9VMN Danville, IL 61832
Sep 5-6	Shelby, NC	Shelby ARC/ Dale Mauney WA4BBN 1158 E Marion St, Shelby, NC 28150
Sep 12	Niagara Fls,NY	Tonawandas ARA/ Bert Jone W2CUU 143 Orchard St, Kenmore, NY 14223
Sep 12	Windsor, ME	Augusta Emergency ARU/ Phillip Young W1JTH 47 Longwood Ave, Augusta, ME 04330
Sep 12	Ballstn Spa,NY	Saratoga Co ARC/ David Atwell N2FEP Ballston Spa, NY 12020
Sep 12-13	Mobile, AL	Mobile ARC/ Warren McCarty KB4JET Rte 4 Box 514, Grand Bay, AL 36541
Sep 13	Butler, PA	Butler Co ARA/ John Varljen K3HJH 174 Oak Hills Hts, Butler, PA 16001
Sep 13	Danbury, CT	Candlewood ARA/ E.L. Marino W1IDH 31 Valley View Dr Rd, Newtown, CT 06470
Sep 13	Gaithersbrg,MD	Foundation for Am Rad/ Robert Moore N3CKD 9449 Mayflower Ct, Laurel, MD 20707
Sep 13	Willow Spgs,IL	Bollingbrook ARS/ Ed Weinstein WD9AYR 7511 Walnut Ave, Woodbridge, IL 60123
Sep 18-19	Watertown, SD	Dakota Div Conv/ Darwin J. Hegg RR3 Box 96, Watertown, SC 57201
Sep 19	Sobastopol,CA	Sonoma Co ARC/ Alan Bloom N1AL 1578 Los Alamor Rd, Santa Rosa, CA 95405
Sep 20	Old Westbry,NY	Long Island Mobile ARC/ Henry Wener 53 Sherrard St, East Hills, NY 11577
Sep 20	Mt Clemens, MI	L'Anse Creuse ARC/ Robt Macauley WB8WVF 21216 Danbury, Mt Clemens, MI 48043
Sep 26-27	Walla Walla,WA	Walla Walla Valley RAC/ B.Frazier WA7CBX 610 S First, Walla Walla, WA 99362
Sep 26-27	Des Moines, IA	Midwest Division/ Bob McCaffrey K-CY 3913 29th, Des Moines, IA 50310
Sep 26-27	York, PA	Hilltop Transmitting Soc/ Wm. Boyer W3AMQ 21 S. Findlay St, York, PA 17402
Sep 27	Berea, OH	Cleveland Hamfest Assoc/ Glenn Williams AF8C 513 Kenellwith Rd, Bay Village, OH 44140
Sep 27	Willimantic,CT	Natchaug ARM/ Richard Grillo KB1XL 393 Prospect St, Willimantic, CT 06226
Sep 27	Cafield, OH	Twenty-Over Nine ARC/ John Tarr N8GUB 3452 Lenox Ave, Youngstown, OH 44502
Sep 27	Watertown, CT	Waterbury ARC/ Gary Firtick K1EB 589 Hamilton Ave, Watertown, CT 06795

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.

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As the dust settled, we found that we had the license classes we still have today (except the Conditional, a General class license by mail now long gone). The privileges were a little different than they are now, but it was along the same lines. If there was a winner in all this bickering, it was probably the average ham.

In addition to the above, RTTY and narrow FM was given some band space. Other improvements in band allocations were also made

Legal battles of another kind also surfaced during the early '50s. Antenna structures came under attack, but the ARRL counsel fought the battles for us and won the point that we have a right to an antenna structure in connection with an amateur radio station as a use "customarily incidental to residential use of property." This was, and continues to be, a significant legal point in our favor (of course PRB-1 doesn't hurt either!).

VHF was very popular after the war and more so in the early '50s. A fellow from Brooklyn named Wayne Green, W2NSD, and a few of his friends were doing some interesting things with VHF repeaters, RTTY and the like (I wonder what ever became of him? He always seemed to be a little ahead of his time!).

Crystal lattice filters, electronic keyers, beam antennas with traps, highly selective and stable receivers for SSB, good commercial SSB transmitters and last, but not least, semiconductor gear and designs were some of the technical gains of the '50s.

But perhaps the most interesting development was commercial rigs from major companies being offered either pre-wired or as a kit. Heath, Johnson, and others started a trend that has lasted up to today, though it has tapered off somewhat in the '80s.

There was a little "Police Action" in Korea during the early years of the '50s. Many hams re-upped and served with the same distinction that they did in World War II. One result was additional surplus equipment on the market after the fighting was over.

By the end of the '50s, there were 200,000+ amateurs. Over 100% growth during the decade. DX was still the second most popular activity, following, by quite a bit, the most favorite activity in hamming . . . **rag chewing!**

Next Month: The 1960s, 1970s, and 1980s . . . The History Ends!

PACKET RADIO - Part 2 Packetese for Beginners!

Last month I covered what packet is and some of the technical aspects. At least as much as I can cover it in a column like this. I also recommended a good beginners book, *Get Connected*, that will get you into it enough to choose a TNC and take it from there. Most TNCs come with a rather extensive educational manual since it's a new technology. Read your manual carefully and completely when you get your TNC.

This month I will cover some of the operating side of things in order to give you a feel for what it's like. Because packet does a lot of computerlike things, you can use it and a home computer or dumb terminal to get into computers (if you're not already into them). But it is really very simple to learn and do and if you don't have an interest in computers, you will find you don't have to be computer oriented to do well at it.

Operational Parameters

Operationally, packet is usually found on 144, 220, and 440 MHz. A common 2 meter frequency is 145.01 MHz and just above that if 145.01 is crowded. Occasional crossbanding to HF is found in some areas. Crossbanding above two meters is also common in urban areas.

Some of the crossbanding mentioned above is for networking purposes. All TNC/transceiver setups will also act as digital repeaters (digipeaters) and even though they run at 1200 baud, in busy areas that is not enough. So in some areas higher speed digipeaters are run at, say 440 MHz, to trunk the traffic around the major legs of the net.

And while we're mentioning digipeating, if you want to talk with someone who is not within your direct range, you can send your packets to another station(s) which can talk to both of you and the target station and the intermediate station will automatically retransmit (repeat) the signal from its location to be picked up by the person you want to talk to. Neat, isn't it?!

Again, the reason all this is possible is the speed at which packet works. With two people typing as fast as they can in a QSO, the circuit they are on will be quiet (empty) 98% of the time. Since the TNC notes when the circuit is clear for use, sharing is easy.

When you are not using your packet system, you can leave it on to help others get their messages around the net if you have a good location. Except for the major high located net/trunk digipeaters, digipeaters need not be coordinated.

You Give It A Try

So now let's assume you dashed out to your nearest ham store and bought a TNC. There are several manufacturers with models especially designed for either one computer type (e.g. Commodore 64) or a group with similar data I/O (e.g. RS-232) etc. In any case you've got one, you've got it all connected and you're ready to sit down and use it.

The first thing you will learn as you read the manual is that packet has two basic modes, "Command" and "Conversation." While in the Command mode you tell it what you want it to do and within what parameters (limits). When you switch to Conversation Mode it communicates with other TNCs whatever you type into it and displays whatever comes into it for you or what it hears while monitoring.

When you first start out, you will have to tell the TNC your call, the time delay to wait after keying your transceiver before sending data, and the baud rate to use between your TNC and your terminal (which can be a different rate from the rate at which the TNC talks to other TNCs). After getting the TNC straight as to what to do, you tune your transceiver (which can be a hand-held or desk or mobile unit) to a packet frequency and watch (you did put it into Conversation mode didn't you?).

For awhile, as you hear the little "Brrrip" "Brrrip" sounds you see words appear on the monitor screen of your terminal/computer. Two QSOs are in progress and one person is sending a computer program to another. The mode you are in is called Unconnected.

You can also send in this mode, but whether receiving or transmitting, your TNC will not transmit, or expect to receive, Acknowledgment (Ack) messages indicating error free reception. When SWLs monitor packet they, too, operate in the unconnected mode.

After awhile, you want to try sending to someone and since it's your first time, you call your friend (who has packet) on the phone and ask him to come up on the frequency. You switch to command mode and type "CONNECT W7WHT." Your transmitter keys, releases and you hear Brrrip and your screen says "*** CONNECTED TO W7WHT."

Your TNC sent a call to W7WHT and signed your call to it (you told the TNC what your call was, remember?). W7WHTs TNC sent back the info that it was not busy and ready for a QSO with you (by its answer to your call) and then switched itself into Connected Conversation mode. Your TNC switched to the same mode and told you that you were connected.

Now you start telling your friend how much you like this packet stuff. Each time you hit a carriage return (CR) or reach 128 characters (a typical standard), your TNC sends them to W7WHT. Until they are sent, you can make corrections to your spelling just like on any computer.

Meanwhile, another friend who expected you to be on the air today calls you. He will receive an answer from your TNC saying you are connected to someone else--Packet's version of the telephone busy signal.

Almost immediately after that W7WHT sends you a packet. He was typing at the same time as you, but he got to a CR before you did. Your TNC Acknowledges it and holds it in memory until you reach a CR or 128 characters. Then as it sends your packet, it displays the incoming one (you can insert a command that results in immediate display of any incoming packet if you wish).

You finish your QSO with W7WHT just in time, as it's time for dinner. You go to your meal with a happy heart and bore the family with tales of packet adventure and the fact that it's a breeze! Wow! More fun in your favorite hobby.

Packet Is For You

Well there you are. It *is* a breeze. It *is* fun. And most likely, it *is* for *you*! Visit your ham dealer for a look at the TNCs available. Compare what's available for your type of computer or terminal. If you don't have one your best bet, if you don't want to get into computers, might be a terminal.

There are plenty of good used ones available rather cheap at computer or ham stores, hamfests, etc. But you also might consider an inexpensive computer like a Commodore 64; however, of all the computers available remember that it is not RS-232 compatible. There are TNCs which have a converter for the C-64 built into them.

And For SWLs Too

For you SWLs, be sure to check out the AEA PK-232 (it's good for hams too!). It provides for six digital modes of interest to SWLs, Morse Code, Baudot (RTTY), ASCII, AMTOR, Packet and Weather Fax. Quite simply, for a net price of $319.95 it does it all. See the review in an upcoming *MT*.

Even better, AEA is coming out with a new control program called PC-PAKRATT for the PK-232 this month and it has a special mode of special interest to SWLs. The mode is called SIAM and it identifies utility signals including baud rate, synchronous, asynchronous, etc. It's fantastic and easy to use with either a terminal or computer. See the review on that in *MT* too (same review as the PK-232). Check it out!!

Next Month: Contesting - All the inside scoop on how to get into it. Keep those cards and letters coming. Do it today! ■

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Advances in Video FAX Equipment

This issue marks a change in focus. Over the past year, there have been many new advances in video facsimile. And during this time, APT Associates has been actively involved in not only installing these devices, but also sampling and reviewing them for our customers.

The WRAASE FX666

Probably the most useful device in the U.S. market today is the Wraase FX666. If you are looking for a sturdy video FAX display capable of non-stop, day in and day out use, this unit is for you. It produces 512 x 512 razor-sharp images capable of running GOES prints side-by-side TIROS or full-frame visible or IR as well as shortwave NAFAX and Press. Also useful is the fact that it is completely portable as is the MR-137 companion satellite receiver. All that is then needed is a portable monitor such as the Sanyo CD-3235 and there you have it, a complete video FAX receiving system under 30 pounds -- including monitor.

The FX666 produces 64 shades of grey in composite black and white format. Also included is a RGB (analogue), which produces false color images that the user can control via three pots in the back. Front controls include "zoom," a switch for visible IR, speeds of 240 and 120, plus red and green blinking indicators for brightness and contrast. There's also separate controls for same line rate control. Front panel switchable resolution of 256 or 512, for TIROS, a northbound-southbound switch, a switch for recording or live reception, and an animation switch to cover 4 position 3 megabyte memory.

Despite all the options, this device is completely user friendly. After an hour or so, anyone can master it. It retails for $1,535.00 and includes customs and delivery to your door. It also comes with a year's guarantee.

Timestep Frame Store

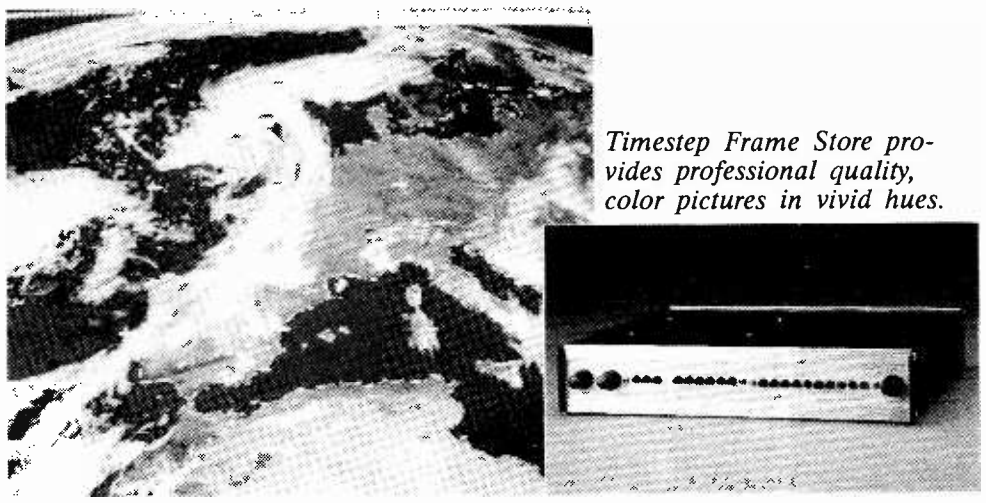
There has risen out of the U.K. a device called the Timestep Frame Store. It boasts 64 levels of grey plus false color RGB out with a 256 resolution. It also has a companion scanning receiver and is capable of receiving and displaying TIROS and GEOS signals. It is not shortwave compatible. Like the Wraase, great attention is paid to detail both inside and out. Built for educators in Earth Science, it is also extremely user-friendly. The colors blue for the sea, green for land, and white for clouds. This is a very fine unit.

A $760 Video Display

A San Diego firm called Sea Loutions provides offers a compact video display designed for shortwave use. It is a single speed (120) and is designed to give WX charts in video format. It will hold four separate charts in memory. It has no satellite capability. In general, resolution is acceptable although not competitive with the aforementioned units but it is compact, extremely simple to operate and costs only about $760.00.

The MFX-1

Another device on the market today is the MFX-1, a video computer FAX unit. If you find one, be sure to order it with the Hi Res 256 x 256 board included. It is meant to drive a COCO computer and gives good resolution on HF press, NOAA and GOES satellites. It is also capable of displaying analogue radar images providing one has a signal source. It has been out of production for some time now but they do pop up occasionally and can be a good starter kit in video FAX. It is a versatile unit and is capable of enhancement. All programs are in cassette form. There are many programs for polar orbit, GOES -- high resolution, etc. It does generate some RF interference, so that should be taken into account.



Timestep Frame Store provides professional quality, color pictures in vivid hues.

Attention Apple IIe and IBM PC Users

For those of you with Apple IIe and ABM PC computers, Electro Service-Comfax Division produces video FAX cards for insertion into these units. The images are rated at 640 x 400 res and will store 3 pictures in memory with animation of memory images. It will also file on disk. There are many options available for this interesting card, including an outboard device for the IIe.

Northern Video Graphics

For years now, Northern Video Graphics has manufactured extremely versatile, highly reliable video units for display of WEFAX, GEOS TAP and TIROS images. Having used these while doing WX radar research, I can tell you that they are superb, with all the options most WX personnel would want.

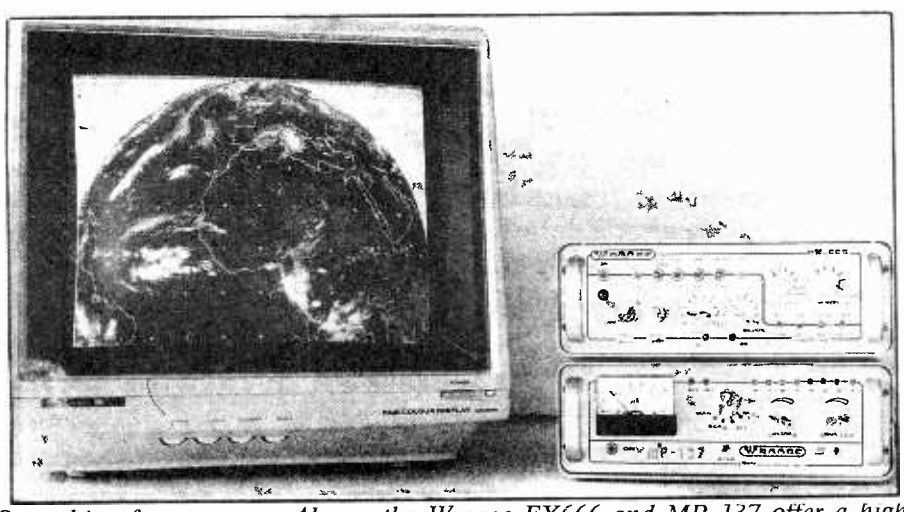
The black and white devices, however, are priced where only universities or government agencies would be able to afford them. If you ever find one second hand, though, snap it up!

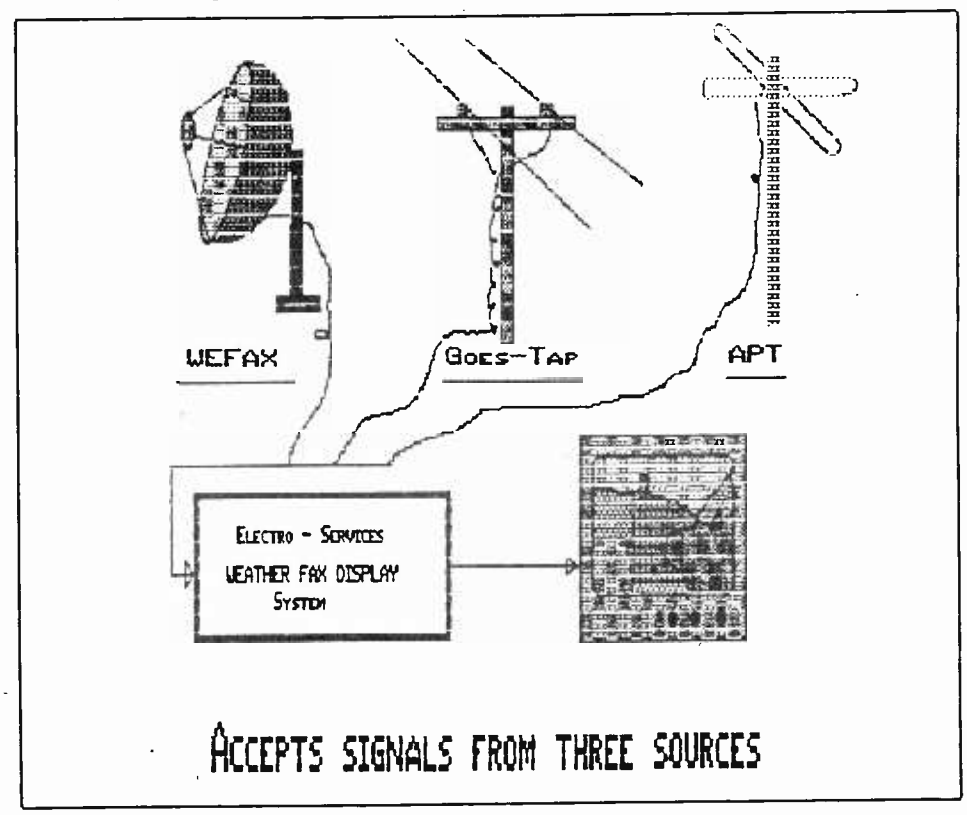
Alden Electronics has just completed their S.W.I.S.S. weather FAX system for the federal government. It is ultra-high resolution with detailed enhancement and animation features. This device is a real marvel, but again, unless you happen to live the lifestyle of the rich and famous, you won't be able to afford this one either.

Digiview of Kansas

Digiview of Kansas makes a high resolution board device for the Amiga computer which gives high quality displays. This is a new product which has some real possibilities as the Amiga computer becomes more popular.

These products represent some of the best in video FAX today. If you need more details, call me at 916-364-1572. ■





Something for everyone: Above, the Wraase FX666 and MR-137 offer a high-quality, integrated system; Right, Electro-Services offers video FAX cards for the Apple IIe and ABM PC.

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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.

The MT Monitoring Team

Greg Jordan, NC Rich Foerster, NE
Joe Hanlon, PA

Honorary Monitors

Our apologies for failing to acknowledge these monitors who contributed to the July loggings:

Gary Fiedler, Mott, ND
James Kline, Santa Monica, CA
Frank Suopis, Hemet, CA
Bill Marple, Harbor City, CA
Everett Spates, Houston, TX
Dennis Savage, Machias, ME
David Sheley, Gosnell, AR
Anthony Pannone, East Haven, CT
Edward Cichorek, Somerset, NJ
Max Thomas, Indianapolis, IN
John Barkroot, Euclid, OH
and a special commendation to...
Nicholas Peter Adams, Newark, NJ

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

0000-0015	Voice of People of Kampuchea	9693, 11938
0000-0025	Kol Israel	**9435, 9855** **11610**
0000-0030	BBC, England	**5975, 6005** **6120, 6175** **7325, 9515** **9590, 9915** **12095, 15435** **17710**
0000-0030	Radio Berlin International	**6080, 9730**
0000-0030	Radio Canada International	**5960, 9755**
0000-0030 M	Radio Norway International	**9580, 9605**
0000-0045	WYFR, Florida	**11855**
0000-0050	Radio Pyongyang,North Korea	15140, 15160
0000-0100	Armed Forces Radio and TV	**6030, 15345**
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, 15320** **15395, 15140** **17795**
0000-0100	Radio Baghdad, Iraq	**11705**
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, 9655**
0000-0100	Radio Moscow	**9530, 9685** **9700, 9720** **9765, 9865** **11710, 11750** **12060, 13605** **15425**
0000-0100	Radio Moscow World Serv	**11845, 12000** **17675, 17850** **17860, 17880**
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, 6130, 9455** 9650, **9775** **9815, 11580** **11695, 11740** **15205**
0000-0100v	Voice of Nicaragua	6015
0000-0100	WCSN, Boston, MA	**7365**
0000-0100	WINB, Pennsylvania	15145
0000-0100	WHRI, Indiana	**11770**
0000-0100	WRNO Worldwide	**7355**
0015-0100	AWR, Costa Rica	15460
0030-0100	BBC, England	**5975, 6005** 6075, **6120** **6175, 7325** 9515, **9590** **9915**
0030-0100	HCJB, Ecuador	**9870, 11775** **11910, 15155**
0030-0100	Radio Belize	3285
0030-0100 W,A	Radio Budapest Hungary	9835, **11910**
0030-0100 S,M	Radio Canada International	**5960, 9755**
0030-0100 T-A	Radio Portugal	**9680**
0030-0100	SLBC, Sri Lanka	6005, 9720 15425
0045-0100 M	Radio Cultural, Guatemala	3300, 5955
0045-0100	Radio Korea World News Svc	7275
0050-0100	Vatican Radio	**6030, 9645** **11780**

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

0100-0115	All India Radio	6035, 7215 9595
0100-0115	Vatican Radio	6030, **9645** 11780
0100-0120	RAI, Italy	9575, **11800**
0100-0124	Kol Israel	**9435, 9855** **11610**
0100-0130	HCJB, Ecuador	**9870, 11775** **11910, 15155**
0100-0130 T-A	Radio Budapest, Hungary	**6025, 9520** **9835, 11910**
0100-0130	Radio Japan General Service	15280, 17845
0100-0130	Radio Vientiane, Laos	7112v
0100-0130	WINB, Pennsylvania	**15145**
0100-0145	Radio Baghdad, Iraq	**11705**
0100-0145	Radio New Zealand Int'l	15150, 17705
0100-0150	Deutsche Welle, West Germany	**6040, 6085** **6145, 9545** **9565, 9605** **11785** 15425
0100-0200	ABC, Perth, Australia	**6030, 15345**
0100-0200	Armed Forces Radio and TV	**5975, 6005** **6120, 6175** **7325, 9515** **9590, 9915**
0100-0200	BBC, England	**6195**
0100-0200	CBC Northern Quebec Srvc	6005
0100-0200	CFCX, Montreal, Canada	6070
0100-0200	CFRX, Toronto, Canada	6030
0100-0200	CFVP, Calgary, Canada	6130
0100-0200	CHNX, Halifax, Canada	6080
0100-0200	CKFX, Vancouver, Canada	15315, 21475
0100-0200	FEBC, Manila, Philippines	11910
0100-0200	KCBI, Texas	15115
0100-0200	KSDA, Guam (AWR)	**9495**
0100-0200	KVOH, California	15405
0100-0200	KYOI, Saipan	**15160, 15320** **15395, 17795**
0100-0200	Radio Australia	3285
0100-0200	Radio Belize	**5960, 9535** **9755, 11845** **9535, 11940**
0100-0200	Radio Canada International	5955
0100-0200 M	Radio Cultural, Guatemala	6910
0100-0200v	Radio Dublin International	**6090, 9655**
0100-0200	Radio Havana Cuba	**15575**
0100-0200	Radio Korea, South	**9600, 9685** **9700, 9720** **9765, 9865** **11710, 11750** **12060, 15425**
0100-0200	Radio Moscow	
0100-0200	Radio Moscow World Service	**12000, 17676** 17850, **17860** 11845
0100-0200	Radio Prague, Czechoslovakia	**5930, 6055** **7345, 9540** **9740, 11990**
0100-0200	Radio Thailand	**9665**, 11905
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	**9680, 11855**
0115-0200	Radio Berlin International	6080, **9730**
0130-0140	Voice of Greece	**7430, 9395** **9420**
0130-0200	HCJB, Ecuador	**9870, 11775** **15155**
0130-0200	Radio Austria International	**9550**
0130-0200	Radio Veritas Asia,Philipp	15135, 15360
0130-0200	WINB, Pennsylvania	15145
0145-0200	Radio Berlin International	**6125**

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

0200-0210	Radio France Int'l	**5950, 6115** **9715, 9790**
0200-0215 S	Radio Austria Int'l	**9550**
0200-0215	Radio Budapest, Hungary	**6025, 9520** **9585, 9835** **11910**
0200-0230	BBC, England	**5975, 6005** **6120, 6175** **7135, 7325** **9410, 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	Radio Kiev, Ukraine SSR	**7260, 9640** **9800, 13645**
0200-0230	Swiss Radio International	**5965, 6135** **9725, 9885** **12035**
0200-0230 T-A	Voice of Nicaragua	6015
0200-0250	Deutsche Welle, W. Germany	**7285**
0200-0256	Radio RSA, South Africa	**6010**
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	**6205, 9870** **11775**
0200-0300	KSDA, Guam (AWR)	15115
0200-0300	KVOH, California	9495
0200-0300	KYOI, Saipan	15405

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frequency SECTION

0200-0300	Radio Australia.....	15240, 15180 17705, 17715 **17795**
0200-0300	Radio Belize.....	3285
0200-0300	Radio Bras, Brazil.....	**11745**
0200-0300	Radio Bucharest, Romania....	**5990, 9570** **11940**
0200-0300	Radio Cairo, Egypt.....	**9475, 9675**
0200-0300 T-A	Radio Canada International..	**5960**, 9755
0200-0300 T-S	Radio Dublin International..	6910
0200-0300	Radio Havana Cuba.....	**6140, 9655**
0200-0300	Radio Moscow, U.S.S.R.....	**7165, 9600** **9685, 9865** **9700, 9765** **11710, 11750** **12060**, 12050 **13605**, 15425
0200-0300	Radio Moscow World Service	**11670, 17675** **12000, 17850** **17860**
0200-0300	Radio New Zealand Int'l....	**15150**
0200-0300	Radio Polonia, Poland.....	**7145, 7270** **9525, 15120**
0200-0300	Radio Thailand.....	9665, 11905
0200-0300	Radio Veritas, Philippines.	9740, 15195
0200-0300	RAE, Argentina.....	**9690**
0200-0300	SBC Radio 1, Singapore.....	11940
0200-0300	Sri Lanka Broadcasting Corp.	6005, 9720 15425
0200-0300	Voice of America.....	**5995, 6130** **7205**, 9455 **9650, 9775** **11580, 15205**
0200-0300	Voice of Free China, Taiwan.	**5985, 9680** **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**
0200-0300	WYFR, Florida.....	**11805**
0215-0220	Radio Nepal.....	5005
0230-0300	BBC, England.....	**5975, 6005** **6120, 6175** **7325, 9410** **9515, 9915** **6020, 6165**
0230-0300	Radio Netherlands.....	**9590, 11730**
0230-0245	Radio Pakistan.....	5905, 7315 11745, 15115 15580, 17660
0230-0300	Radio Sweden Int'l.....	**9695**
0230-0300	Radio Tirana Albania.....	**7065, 9755**
0230-0300	SLBC, Sri Lanka.....	9720
0240-0250	All India Radio.....	6110, 9545 9610
0250-0259	Radio Yerevan, Armenian SSR	11790, 11875 **13645**

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

0300-0310	CBC Northern Quebec Service.	**6195**
0300-0315 W,A	Radio Budapest.....	**6025, 9520** **9835, 11910**
0300-0325	Radio Netherland.....	**6020, 6165** **9590, 11730**
0300-0330	BBC, England.....	**5975, 6005** **6120, 6175** **6195, 7185** **7325, 9410** **9515, 9915** **12095**
0300-0330	Radio Cairo, Egypt.....	**9475, 9675**
0300-0330	Radio Japan General Service	11870, 17825
0300-0330 T-A	Radio Portugal.....	**9705**
0300-0350	Deutsche Welle, West Germany	**6010, 6045** **9545, 9565** **9560**
0300-0350	Voice of Turkey.....	
0300-0400	Armed Forces Radio and TV...	**6030, 15345**
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.....	**6205, 9870** **11775**
0300-0400	KYOI, Saipan.....	**17775**
0300-0400 M	La Voz Evangelica, Honduras	**4820**
0300-0400	Radio Australia.....	11945, **15160** 15240, **15320** 15395, **17715** 17750, **17795**
0300-0400	Radio Beijing, China.....	**11980, 15180** **15280**
0300-0400	Radio Belize.....	3285
0300-0400	Radio Cultural, Guatemala...	5955
0300-0400 T-S	Radio Dublin International..	6910
0300-0400	WHRI, Indiana.....	**7355**
0300-0400	Radio Havana Cuba.....	**6140, 9655**
0300-0400	Radio Japan.....	**5960**
0300-0400	Radio Moscow.....	**7165, 9600** **9640, 9685** **9765, 11670** **11710, 11790** **11845, 12000** **12070, 13605** **13645, 15230** **15425, 15540** **17675, 17850**
0300-0400	Radio New Zealand Int'l....	11780, 15150
0300-0400	Radio Polonia, Poland.....	**7145, 7270** **9525, 11815**
0300-0400	Radio Prague, Czechoslovakia	**15120** **5930, 7345** **9540, 11990**
0300-0400	Radio RSA, South Africa.....	**3230, 7270** **9585**
0300-0400	Radio Sofia Bulgaria.....	**11750**
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.....	**6035, 7200** **9575, 9715**
0300-0400	Voice of Free China, Taiwan.	**5985, 9680**
0300-0400	Voz Evengelica, Honduras....	4820
0300-0400	WCSN, Boston, Mass.....	**9815**
0300-0400	WINB, Pennsylvania.....	15154
0300-0400 S-F	WMLK, Pennsylvania.....	9455
0300-0400 M	World Music Radio.....	6910
0300-0400	WRNO Worldwide.....	**6185**
0300-0400	WYFR, Florida.....	**15440**
0310-0330	Vatican Radio.....	6150
0330-0400	Radio France International..	**6055, 7135** 7175, 9535 **9790, 9800** **11700**
0330-0400 M	CBC Northern Quebec Service.	**6195, 9625**
0330-0400	BBC, England.....	**3955, 5975** **6175, 9410** **9600**
0330-0400	Radio Berlin International..	**9560, 9620**
0330-0400	Radio Havana Cuba.....	**6140, 9655**
0330-0400	Radio Sweden International.	**11705**
0330-0400	Radio Tanzania.....	5985
0330-0400	Radio Tirana Albania.....	**7065, 9760**
0330-0400	UAE Radio, Dubai.....	**9640, 11940** **15435, 17890**
0335-0340	All India Radio.....	3905, 4860 7105, 9545 9610, 11830 11895, 11940
0340-0400	Voice of Greece.....	**7430, 9395** **9420**
0345-0400	Radio New Zealand Int'l....	**11780**

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

0400-0405	RAI, Italy.....	**9710, 11910**
0400-0410	Voice of Kenya.....	6090
0400-0415	Kol Israel.....	**9435** **9815, 9855** **11585**
0400-0415	Radio Berlin Int'l,E.Germany	**9560, 9620**
0400-0415	Radio Cultural, Guatemala...	**3300**
0400-0425	Radio Netherlands.....	**7175, 9895**
0400-0425	Radio RSA, South Africa.....	**3230, 7270** **9585**
0400-0430	BBC, London, England.....	**3955, 5975** **6005, 6175** **6195, 7160** **7185, 9410** **12095**
0400-0430	Radio Bucharest, Romania....	**9510, 9570** **11810, 11940**
0400-0430 M	Radio Norway International..	**9650, 11735**
0400-0430	Swiss Radio International...	**6135, 9725** **9885, 12035**
0400-0430	Trans World Radio, Bonaire..	**9535**
0400-0500	ABC, Perth, Australia.....	15425
0400-0500	Armed Forces Radio and TV...	**6030, 15345**
0400-0500	Capital Radio, South Africa.	3927, 3930 7149
0400-0500	CBC Northern Quebec Service.	**6195, 9625**
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.....	**6205, 9870** **11775**
0400-0500	Radio Australia.....	**11910, 11945** **15160, 15240** **15320**
0400-0500	Radio Belize.....	**3285**
0400-0500 T-S	Radio Dublin International..	6910
0400-0500	Radio Havana Cuba.....	**5965, 6035** **6090, 6140** **9655**
0400-0500	Radio Moscow.....	**11845**
0400-0500	Radio Moscow World Service.	**7165, 9640** **9600, 9685** **9765, 11670**
0400-0500	Radio New Zealand.....	**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, Waneroom, Australia	15425
0400-0500	Voice of America.....	**3990, 5995** **7170, 7200** **7280, 9575** **9670**
0400-0500	WCSN, Boston, Mass.....	**9465**
0400-0500	WHRI, Indiana.....	**7400**
0400-0500v M	World Music Radio.....	6910
0400-0500	WRNO Worldwide.....	**6185**
0415-0430	Radio France International..	**6055, 7135** **7175, 7280** **9550, 9790** **9800, 11700** **11995**
0425-0440	RAI, Italy.....	5980, **7275**
0430-0500	BBC, London, England.....	**5975, 6195** **7160, 7185** **9410, 9510** **12095**
0430-0455	Radio Tirana Albania.....	**9480**, 11835
0430-0500	Deutsche Welle, W. Germany..	**7150, 7225** **9565, 9765**
0430-0500	Radio Austria International.	6155, **9550** **11805**
0430-0500	Radio Finland.....	**6120, 11715** **11755**
0430-0500	Radio Truth, S. Africa.....	5015
0430-0500	TWR, Swaziland.....	**7210**

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

0500-0505	Radio Belize.....	3285
0500-0510	CBC Northern Quebec Service	**6195, 9625**
0500-0510	Radio Lesotho.....	4800
0500-0515	Vatican Radio.....	**9645, 15190**
0500-0530	BBC, London.....	**5950, 5975** **6005, 6190** **6195, 7160** **7185, 9410** **9510, 9580** **9600, 12095**
0500-0530	Capital Radio, S. Africa....	3927.5
0500-0530 M	Radio Norway International.	**11735**, 15180
0500-0530 S,M	Trans World Radio, Bonaire..	**9535**
0500-0550	Deutsche Welle.....	**5960, 6120** **6130, 9635** **9700**
0500-0600	ABC, Melbourne, Australia..	15330
0500-0600	ABC, Perth, Australia.....	15425
0500-0600	Armed Forces Radio and TV...	**6030, 11790** **15330, 15345** **17765**
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.....	**6205, 9870** **11775**
0500-0600	KYOI, Saipan.....	15190
0500-0600	Radio Australia.....	**11910, 15160** **15240**
0500-0600v	Radio Dublin International..	6910
0500-0600	Radio Havana Cuba.....	**5965, 6035** **9655**
0500-0600	Radio Japan General Service	11705, 15235 15280, 17810
0500-0600	Radio Moscow.....	**9640, 9765** **9865, 12010**
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**

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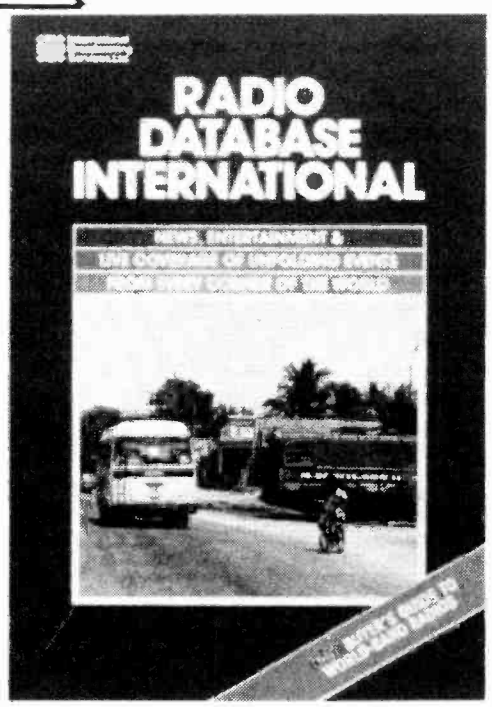

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frequency SECTION

0500-0600		TWR, Swaziland.....	7210
0500-0600		VLW 15, Lyndhurst,Australia	15230
0500-0600		VLW 15, Waneroo, Australia.	15425
0500-0600		Voice of America.....	**5995, 6035**
			7200, 7280
			9575, 9670
			9760
0500-0600		Voice of Nicaragua.....	6015
0500-0600		Voice of Nigeria, Lagos.....	**7255**
0500-0600		WCSN, Boston, Mass.....	**9465**
0500-0600		WHRI, Indiana.....	**7400**
0500-0600v	M	World Music Radio.....	6910
0500-0600	S	WRNO Worldwide.....	**6185**
0515-0530		Radio Canada Int'l,Montreal	**6050, 6140**
			7295, 9750
			11840, 15180
0530-0600		BBC, London.....	**5950, 5975**
			6190, 7160
			9410, 9510
			9580, 12005
0530-0600		Radio Cameroon.....	4850
0530-0600		Radio Netherland.....	**6165, 9715**
0530-0600		UAE Radio, Dubai.....	17775, 17830
			21700
0530-0600		WSZO, Marshal Island.....	4970
0545-0600	M-F	Radio Canada Int'l,Montreal	**6050, 6140**
			7295, 9750
			11840

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

0600-0610		Ghana Radio.....	**4915**
0600-0610		Voice of Kenya.....	4808, 6090
0620 0630		Vatican Radio.....	**6185, 9645**
0600-0625		Radio Netherland.....	**6165, 9715**
0600-0630		Radio Australia.....	**11910, 11945**
			15160, 15315
			15395, 17795
0600-0645		WYFR, Florida.....	**6065, 7355**
			9680, 9852
0600-0700		Armed Forces Radio and TV...	**6030**
0600-0700		BBC, London.....	3975, **5900**
			5950, 5975
			6050, 6195
			7105, 7150
			7185, 9410
			9515, **9600**
			9640, 11760
			12095
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.....	**6205, 9870**
			11775
0600-0700		King of Hope, Lebanon.....	6280
0600-0700		KVOH, California.....	6005
0600-0700		KYOI, Saipan.....	15190
0600-0700		Radio Cook Islands.....	11760
0600-0700		Radio Havana Cuba.....	**9525**
0600-0700		Radio Korea, South.....	9570, A ****
0600-0700		Radio Moscow.....	**9765**
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.....	**5995, 6080**
			6125, 7170
			7200, **7325**
			9530, 9550
			9670
0600-0700		Voice of Asia, Taiwan.....	7285
0600-0700		Voice of Malaysia.....	6175, 9750
			15295
0600-0700		WCSN, Boston, Mass.....	**9465**
0600-0700		WHRI, Indiana.....	**9620**
0600-0700	S	WRNO Worldwide.....	**6185**
0600-0700		WSZO, Marsall Island.....	4970
0600-0700	S	World Music Radio.....	6910
0615-0700		Deutsche Welle, W. Germany..	**9625, 9700**
			11765
0620-0630		Vatican Radio.....	**6248, 9645**
0625-0700		TWR, Monaco.....	**7105**
0630-0700		Radio Australia.....	**11945, 15160**
			15240, 15315
			15395, 17715
			17750
0630-0655		Radio Finland.....	6120, **9560**
			11755
0630-0700		Radio Polonia.....	**9675**
0630-0700		Radio RSA, South Africa.....	5980, **9585**
			11900
0630-0700		Radio Sofia, Bulgaria.....	9700, **11720**
0630-0700		Radio Tirana.....	7065
0630-0700		Swiss Radio International...	**6165, 9535**
0645-0700	M-F	HCJB, Quito, Ecuador.....	**9845**

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
			9410, 9600
			9640, 11860
			12095
0700-0730		Radio Australia.....	**5995, 9655**
			15160, 15240
			15395, 17715
			17750
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, 9745**
			9845, 11925
			11835
0700-0800		King of Hope, Lebanon.....	6280
0700-0800		KYOI, Saipan.....	15190
0700-0800		NBC, Papua New Guinea.....	4890
0700-0800		Radio Havana Cuba.....	**9525**
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 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.....	**4940**
0715-0730	M-A	Vatican Radio.....	**11725,** 15190
0715-0800	S	FEBA Radio, Seychelles.....	15120, 17795
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.....	**9410, 9600**
			9640, 11860
			12095
0730-0800	S	CPBS, China.....	11330
0735-0800	M-H	KTWR, Guam.....	**11715**
0730-0800		Radio Australia.....	**5995, 9655**
			11720, 15240
			15395, 17715
			17750
0730-0800		Radio Netherlands.....	**9630, 9715**

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

0800-0805		GBC, Accra, Ghana.....	3366
0800-0825	M-F	BRT, Belgium.....	**9880**
0800-0825		Radio Netherlands.....	**9630, 9715**
0800-0825		Voice of Malaysia.....	6175, 9750
			15295
0800-0830		Voice of Islam,Bangladesh..	12030, 15525
0800-0830		HCJB, Quito, Ecuador.....	**6130, 9745**
			9845, 11835
			11925
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**
			9410, 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		King of Hope, Lebanon.....	6280
0800-0900		KNLS, Anchor Point, Alaska.	5960
0800-0900		KYOI, Saipan.....	**11900**
0800-0900		Radio Australia.....	**9580, 9655**
			11720, 15395
			17715, 17750
0800-0900		Radio Korea World News Svc..	7275
0800-0900		Radio Kuwait.....	9750
0800-0900		Radio Moscow.....	9795
0800-0900		Radio new Zealand Int'l....	**9450, 11780**
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		WCSN, Boston.....	**9465**
0800-0900		WHRI, Indiana.....	**7355**
0800-0900	S	WRNO Worldwide.....	**6185**
0800-0900		WSZO, Marsall Island.....	**4940**
0815-0845		Voice of America, Washington	**7175, 9575**
			9750
0830-0840		All India Radio.....	5960, 5970
			5990, 6010
			6020, 6050
			6100, 7110
			7125
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
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**
			11860, 12095
			15070, 15400
			17790, 18080
0900-0925		Radio Netherlands.....	17575, 21485
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		AFRTS.....	**6030, 9530**
0900-1000		CFRX, Toronto.....	**6070**
0900-1000		Deutsche Welle.....	6160, **9690**
			9720
0900-1000		FEBC, Manila.....	11890, 21475
0900-1000		FEN, Tokyo.....	6155
0900-1000		HCJB, Quito, Ecuador.....	**6130, 9745**
			11925

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0900-1000 King of Hope, Lebanon..... 6280
0900-1000 KNLS, Alaska..... 5960
0900-1000 KSDA, Guam..... 15440
0900-1000 KYOI, Saipan..... **11900**
0900-1000 Radio Afghanistan..... 6085, 9590
15255, 17655
0900-1000 Radio Japan..... 9675, 11875
11955, 15235
17810
0900-1000 Radio Moscow..... 9795, **11790**
11850, 13680
15375
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 WCSN, Boston..... **9465**
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..... **11910**
0930-0940 M-F Radio Canada Int'l,Montreal **5960, 9755**
0930-1000 Radio New Zealand..... **6100, 9540**

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**, 11605
15095, **15640**
15650, 17630
17815
1000-1030 Radio Australia..... **5995, 9580**
9655, 9770
1000-1030 S Radio Norway International. **11870, 15170**
15175, 15230
1000-1030 Swiss Radio Int'l..... **9560, 9885**
11905, 15570
1000-1030 Voice of Vietnam..... 9755, 9765
12035
1000-1100 ABC, Perth, Australia..... **9610**
1000-1100 AFRTS..... **6030**, 6125
9530, 9700
1000-1100 All India Radio..... 11705, 11810
15320, 15335
17387, 17875
1000-1100 BBC, London.....
9740, 9750
9760, 12095
15070, 15400
17705, 17790
18080
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, 9745**
11925
1000-1100 KNLS, Alaska..... **11930**
1000-1100 KYOI, Saipan..... **11900**
1000-1100 Radio Honaire, Soloman Ils.. 5020
1000-1100 Radio Moscow..... **9540, 9600**
11790, 11850
15375, 17820
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 WCSN, Massachusetts..... **17640**
1000-1100 WHRI, Indiana..... **7355**
1000-1100 S WRNO Worldwide..... 6185
1005-1010 Radio Pakistan..... 15605, 17660
1030-1040 Voice of Asia, Taiwan..... 5980
1030-1100 Radio Australia..... **9580, 9770**
1030-1100 Radio Netherland..... **6020, 9650**
1030-1100 Sri Lanka Broadcasting Corp 11835, 15120
17850
1030-1100 UAE Radio, Dubai..... **15435**, 17775
17865, 21605
1045-1100 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, 7225
9835, **11910**
17710

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

1100-1115 Radio Pakistan..... 15605, 17660
1100-1120 Radio Budapest, Hungary..... 6025, 6175
7225, 9790
9805, **9835**
11910, 15365
15425, 17710
17720, 17850
21620
1100-1120 Radio France Int'l, Paris.. **9790, 11670**
11845, 15300
15315, 15365
17620, 17850
1100-1125 Radio Netherland..... **6020, 9650**
1100-1130 Radio Australia..... 5995, 6080
7215, 9580
9645, 9710
9770, 11705
11800
1100-1130 M-A Radio Finland..... **11945, 15400**
1100-1130 Radio Japan General Service. 5990, **6120**
17810
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.. **11795, 15570**
15585, 17830
1100-1130 Voice of America..... **9760, 11715**
15160, 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, 9700**
15430
1100-1200 BBC, London..... **5965, 6195**
9510, 9750
9760, **11775**
12095, 15070
17705, 17790
18080
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 KYOI, Saipan..... **11900**
1100-1200 Radio Beijing..... **9535**
1100-1200 Radio Korea..... 7275, 15575
1100-1200 Radio Malaysia, Sarawak..... 4950
1100-1200 Radio Moscow..... 6000, **9600**
11790, 11850
11950, **13710**
15375, 15490
15530, 15540
15595, 17645
17665, 17820
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 Voice of Asia, Taiwan..... 5980, 7445
1100-1200 Voice of Nigeria..... 7255, 15120
1100-1200 WCSN, Massachusetts..... **17640**
1100-1200 WHRI, Indiana..... **5995**
1100-1200 S WRNO Worldwide..... 9715
1100-1200 WYFR, Florida..... 5985, **9680**
11675
1115-1200 Radio Berlin International. **21465, 21540**
1115-1130 Vatican Radio..... **17840, 21485**
1115-1200 Voice of Islamic Rep. Iran. 11790
1130-1200 Deutsche Welle,W.Germany... **15410, 17765**
17800, 21600
1130-1200 HCJB, Quito, Ecuador..... 11740
1130-1200 Radio Australia..... 6060, 6080
7215, **9580**
9645, **9710**
9770
1130-1200 Radio Netherland..... **9715, 15560**
17605
1130-1200 Radio Thailand..... 9655, 11905
1130-1200 Trans World Radio Bonaire.. **11815**
1145-1200 Radio Berlin Intl..... **15240**

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

1200-1210 Voice of Is.Rep.of Iran.... 11790, 15084
1200-1215 Radio New Zealand..... **9540**
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... **11740**, 15345
1200-1225 Radio Netherland..... 5955, 9715
15560, 17575
17605, 21480
1200-1225 Radio Polonia..... 6095, 7285
1200-1230 HCJB, Quito, Ecuador..... **6075**
1200-1230 Radio Australia..... **6060, 7205**
7215, 9580
9710, 9770
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... **9977**
1200-1300 4VEH, Haiti..... 4930
1200-1300 ABC, Wanneroo, Australia.... 6140, **9610**
1200-1300 ABC, Brisbane..... 4920
1200-1300 AFRTS..... **6030, 9700**
15430
1200-1300 BBC, London..... **6195, 9510**
9750, **11775**
12095, 15070
17705, 18080
1200-1300 B.S. Kingdom Saudi Arabia.. 11855v
1200-1300 CBC Northern Quebec Service. **6065, 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
1200-1200 Radio Moscow..... **9600, 11790**
11850, 13680
13710, 15360
15375, 15475
15490, 17665
17645, 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..... **9760, 11715**
15425
1200-1300 WHRI, Indiana..... **5995**
1200-1300 S WRNO Worldwide..... 9715
1200-1300 WYFR, USA..... **11830**
1210-1300 Voice of Nigeria..... 7255, 15120
1215-1300 Radio Cairo..... 17675
1215-1245 Radio Japan Regional Serv.. 11875, 15300
1230-1300 Radio Austria International **15320**
1230-1300 Radio Australia..... **6060, 7205**
7215, 9580
1230-1300 Radio Bangladesh..... 15525, 12030
1230-1300 Radio Berlin Int'l..... 21465
1230-1300 Radio Jordan..... 9560
1230-1300 Radio Polonia..... 15190, 15430
1230-1300 Radio Sweden Int'l..... **15190, 17785**
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
1245-1300 Radio Korea, South..... **15575**
1255-1300 M-A Radio Ulan Bator Mongolia... 7235, 9575
15305
1255-1300 TWR, Sri Lanka..... 11825
1255-1330 A-S TWR, Bonaire..... **11815**

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1300 UTC [9:00 AM EDT/6:00 AM PDT]

1300-1315		Radio Berlin International.	21465
1300-1330		BBC, London.....	9510, 11775
			15070, 17705
			17780, 17790
1300-1330		Radio Australia.....	5995, 6060
			6080, **7205**
			9580
1300-1330		Radio Bucharest, Romania...	11940, 15250
1300-1330		Radio Finland.....	15400, 11945
1300-1330	S	Radio Norway International.	**15310, 17760**
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, 15430**
1300-1400		B.S. Kingdom Saudi Arabia..	11855v
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**
			17890
1300-1400		NBC, Port Moresby, Papua New Guinea.....	4890
1300-1400		Radio Beijing.....	**9730**
1300-1400	S	Radio Canada Int'l.....	**11955, 15440**
1300-1400		Radio Jordan.....	**9560**
1300-1400		Radio Korea.....	**9570, 9750**
1300-1400		Radio Moscow.....	**11840, 15375**
			15475, 15585
1300-1400		Radio RSA, South Africa....	15220, 21535
			21590
1300-1400		SBC Radio 1, Singapore.....	5010, **5052**
			11940
1300-1400		Sri Lanka Broadcasting Corp.	6075, 9720
			15425
1300-1400		TWR, Sri Lanka.....	**11825**
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.....	**5985**, 11830
			11875, **15055**
1315-1400		Radio Berlin Int'l.....	11795, 15445
			17700
1330-1400		All India Radio.....	11810, 15335
1330-1400		Laotian National Radio.....	7113v
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		Radio Australia.....	5995, 6060
			6080, **7135**
			9580
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.....	**15435, 17865**
			21605
1330-1400		Voice of Vietnam.....	**9755, 9840**
			12020, 12035
1330-1400	S	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.....	**5995, 6080**
			7135, 9580
1400-1430		Radio Finland.....	15400
1400-1430		Radio Japan General Service	**11870**
1400-1430	S	Radio Norway International.	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.....	**11740, 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 Moscow.....	**11840, 13680**
			11950, 15375
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		TWR, Sri Lanka.....	**11825**
1400-1500		Voice of America.....	6110, 7230
			9760, 11715
1400-1500		WHRI, Indiana.....	**11790**
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.....	**9840**
1430-1500		Radio Australia.....	5995, 6060
			6035, 6080
			7205, **9580**
1430-1500	M-A	Radio Budapest Hungary.....	**11910**, 15055
			15220, 17710
			21525, 21665
1430-1500		Radio Korea, South.....	**9750, 15575**
1430-1500		Radio Netherland.....	5955, 11735
			13770, 15560
			17575
1430-1500		Radio Yugoslavia.....	9620, 15240
1430-1500		WYFR, USA.....	**9535, 11830**
			11875, 15055
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
1500-1525		TWR, Sri Lanka.....	**11825**
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....	17780, 21590
1500-1600		AFRTS.....	9700, **15330**
1500-1600		BBC, London.....	**12095, 15070**
1500-1600	A,S	BBC, London.....	**11775, 15260**
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.....	9840
1500-1600		Radio Australia.....	5995, 6060
			6080, 6035
			7205, **7215**
			9580
1500-1600	S	Radio Canada International.	9625, **11720**
			11955, 15440
1500-1600		Radio Japan General Service.	9695, 21700
1500-1600		Radio Jordan.....	9560
1500-1600		Radio Moscow.....	**11790, 11840**
			11850, **11860**
			11950, **13680**
			15375
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.....	**11965**
1500-1600		WYFR, Florida.....	**9535**, 11550
			11830, 11875
			15170
1513-1600	F-S	FEBC, Seychelles.....	11820
1530-1600		KNLS, Alaska.....	**7355**
1530-1545		Radio Bangladesh.....	7195
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.	**15180, 17840**
1600-1630	M-F	Radio Portugal.....	15105
1600-1630		Radio Sweden Int'l.....	**15110**
1600-1630		Voice of Vietnam.....	9755, 9840
			12020, 12035
1600-1640		UAE Radio.....	9640, **11730**
			15320, 17775
1600-1645		TWR, Swaziland.....	3200
1600-1700		AFRTS.....	9700, 15330
			15430
1600-1700		BBC, London.....	**11775**, 12095
			15070, **15260**
			15400, 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.....	**5995, 7205**
			7215, 9580
1600-1700		Radio Beijing.....	**9570, 11600**
1600-1700		Radio France International.	**6175, 9860**
			11705, 11845
			17620, 17795
1600-1700		Radio Jordan.....	9560
1600-1700		Radio Korea.....	5975, 9870
1600-1700		Radio Malawi.....	3380, 5995
1600-1700		Radio Moscow.....	**11840, 11850**
			11860, 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		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		WMLK, Pennsylvania.....	9455
1600-1700		WRNO Worldwide.....	**11965**
1600-1700		WYFR, Florida.....	**9535**, 11830
			11875, 15170
			15440, 17845
			21525
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

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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.....	9460, 11585
			13750, 15095
1700-1720		Radio Netherland.....	6020, **9515**
1700-1730		Radio Australia.....	**5995**, 6035
			6060, **6080**
			7205, **7215**
1700-1730		Radio Berlin Int'l.....	**9580**, 9730
1700-1730		Radio Japan.....	5990, **9695**
1700-1730	S	Radio Norway International.	**9655, 11925**
			15310
1700-1745		BBC, England.....	**11775, 12095**
			15070, 15260
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 Havana Cuba.....	**9695, 9730**
			11950, 11755
			11850, 15270
1700-1800		Radio Korea, South.....	5975, 15575
1700-1800		Radio Moscow.....	**11840, 11860**
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.....	**15600, 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.....	**9535, 11580**
			11830, 11875
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 Prague, Czechoslovkia	**5930, 7270**
			734, 9605
			9725, 11690
			11990, 15190
1730-1800		Radio Surinam.....	17755
1745-1800		BBC, London.....	**12095, 15070**
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 Mozambique.....	3340, 9620
1800-1830		Radio Prague, Czechoslovakia	**5930, 7290**
			7345, 9605
			9725, 11690
			11990, 15190
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, 6060
			6035, 6080
			7205, 7215
			9580
1800-1900	A,S	Radio Canada International.	**15260, 17820**
1800-1900		Radio Korea.....	5975, 15575
1800-1900		Radio Maputo, Mozambique....	9620
1800-1900		Radio Moscow.....	**11780, 11840**
			11850, 11860
			11950
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.....	**9750, 15205**
			15445, 15580
			17870, 25600
1800-1900		WCSN, Boston, Mass.....	**15230**
1800-1900		WHRI, Indiana.....	**15105**
1800-1900		WINB, Pennsylvania.....	15400
1800-1900		WMLK, Bethel, PA.....	**9455**
1800-1900		WRNO Worldwide.....	**15420**
1800-1900		WYFR.....	**9535, 11580**
			11830, 11875
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.....	**11845**
1830-1900		Radio Tirana.....	7065, 9480
1830-1900		Swiss Radio International...	6165, 9535
			9885, 11955
1830-1900		Radio Netherlands.....	9540, **17605**
			21685
1830-1900		Radio Sofia, Bulgaria.....	9700, 11720
1830-1900		Spanish Foreign Radio.....	7275, **9745**
			9765, **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	**11610, 11655**
1900-1930		Kol Israel.....	**12077, 13725**
1900-1930		Radio Afghanistan, Kabul....	7160, 9530
1900-1930		Radio Berlin Int'l.....	**11750, 15170**
1900-1930		Radio Budapest Hungary.....	**9835, 11910**
			12000
1900-1930		Radio Japan.....	**11705**
1900-1930		Radio Kiev, Ukrainian SSR...	7230, 6010
			6090, 6165
1900-1930	S	Radio Norway Int'l.....	**11925, 15310**
1900-1930		Radio Yugoslavia.....	6100, 7240
			9620
1900-1930		Spanish Foreign Radio.....	**7275, 9745**
			9765, 15375
1900-1930		TWR, Monte Carlo.....	**11635**
1900-1930		Voice of Vietnam.....	9755, 9840
			12020, 12035
1900-2000		4VEH, Haiti.....	4930
1900-2000		AFRTS.....	**15330, 15430**
1900-2000		All India Radio.....	7150, 9665
			11620, 11845
			15265
1900-2000		BBC, London.....	**9410, 9515**
			12095, 15070
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	M-F	KVOH, California.....	**17775**
1900-2000		Radio Algiers.....	9510, 9685
			15160, 17745
1900-2000		Radio Australia.....	6060, 6035
			6080, 7205
			7215, 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.....	**11780, 11840**
			11850, 11860
1900-2000	MWF	Radio Nacional,Eq.Guinea....	9553
1900-2000		Voice of America.....	**9760, 15205**
			15445, 15580
			17800, 17870
1900-2000		Voice of Nigeria.....	7255, 11770
1900-2000		WCSN, Boston, Mass.....	**15395**
1900-2000		WHRI, Indiana.....	**15105**
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..	**9535, 15566**
			21615
1910-1920		Radio Botswana.....	3355, 4820
1920-1930	M-A	Voice of Greece.....	9395, 9420
			9425
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.....	**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....	**9690, 11940**
2000-2025	M-H	Radio Polonia.....	7125, 7145
			9525, 9695
2000-2030		Radio Australia.....	**7205, 7215**
2000-2030		Radio Algiers, Algeria.....	17745
2000-2030		Radio Budapest, Hungary.....	6110, 7225
			9585, 9835
			11910
2000-2030	M-F	Radio Canada International.	**11945, 15325**
			17820, 17875
2000-2030	S	Radio Norway International..	**9590, 11865**
			15310
2000-2030		Voice of Islamic Rep. Iran..	**9022**, 11930
2000-2030		WRNO Worldwide.....	**15420**
2000-2045		All India Radio.....	7160, 9665
			9755, **9910**
			11620, 11865
20000-2050		Voice ofTurkey.....	7125
2000-2100		AFRTS.....	**15330, 15345**
			15430
2000-2100		BBC, London.....	**7325, 9410**
			12095, 15070
			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

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2000-2100	CKFX, Vancouver, Canada.....	6080
2000-2100	CKZV, Canada.....	6160
2000-2100	King of Hope, Lebanon.....	6280
2000-2100	KVOH, California.....	**17775**
2000-2100	KYOI, Saipan.....	9670
2000-2100	Radio Baghdad, Iraq.....	**9875**
2000-2100 A,S	Radio Canada Int'l.....	**11945, 15325**
		17820, 17875
2000-2100	Radio Kuwait.....	**11675**
2000-2100	Radio Moscow.....	**9530, 9830**
		11780, 11840
		11850, 11860
		11980, 12015
		13605, 15140
		15535
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**
		15205, 15410
		15445, 15580
		17800, 17785
		17870
2000-2199	WCSN, Boston, Mass.....	**15390**
2000-2100	WHRI, Indiana.....	9770
2000-2100	WINB, Pennsylvania.....	**15185**
2000-2100	WRNO, Worldwide.....	**15420**
2000-2100	WYFR, Okeechobee, Florida..	**9535, 11875**
		15566, 17750
		21525
2005-2100	Radio Damascus Syria.....	**9950, 12085**
		15020
2010-2100	Radio Havana Cuba.....	**15230**
2015-2100	ELWA, Liberia.....	**11830**
2015-2100	Radio Cairo, Egypt.....	**9670**
2025-2045	RAI, Italy.....	7235, 5990
		11800
2030-2100	Falkland Islands Bcast Svc..	2373
2030-2100	IBRA Radio.....	**6110**
2030-2100	Radio Australia.....	9580, 9620
2030-2100	Radio Beijing.....	**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.....	**9700, 11750**
2030-2100	Spanish Foreign Radio.....	**7275, 9765**
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
2045-2100	Vatican Radio.....	**9625, 11700**
		11760, 15120
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.....	**9670**
2100-2115	Radio New Zealand Int'l....	11780, 15150
2100-2220	ELWA, Liberia.....	**11830**
2100-2125	BRT, Belgium.....	**9675**
2100-2125 S-F	CBC Northern Quebec Service.	**9625, 11720**
2100-2125	Radio Beijing.....	9440, **11515**
2100-2125	Radio Netherland.....	**9715, 9895**
		11740
2100-2130	Radio Finland.....	**6120, 11945**
		15400
2100-2130	Radio Austria.....	**9585**
2100-2130	Radio Australia.....	**9620, 15160**
		15240, 15395
2100-2130	Radio Berlin International..	**6125**
2100-2130	Radio Japan General Service.	7280, 9695
		15195, 17755
2100-2130	Spanish Foreign Radio.....	7275, 9765
2100-2130	Swiss Radio Int'l.....	**9885, 12035**
		15570
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.....	**5980, 7270**
		9585
2100-2200	AFRTS.....	**15330, 15345**
		15430
2100-2200	All India Radio.....	**9910, 11620**
2100-2200	BBC, London.....	**6005, 6175**
		6180, 7325
		9410, 12095
		15070, 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	Equatorial Guinea.....	**9553**
2100-2200	Falkland Islands Bcast Svc..	2373
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**
2100-2200	Radio Canada Int'l.....	**11960, 15235**
2100-2200v	Radio Jamahiriya, Libya.....	**7245**
2100-2200	Radio Moscow.....	**9490, 9880**
		11675, 11750
		11840, 11860
		11980, 12060
		13605
2100-2200 M-A	Radio Nacional Angola.....	9535, 7245
2100-2200 F,A	Radio Zambia.....	9505
2100-2200	RTL, Luxembourg.....	**6090**
2100-2200	Voice of Africa (Cairo)....	15375
2100-2200	Voice of America.....	**6040, 6045**
		9620, 9760
		11760, 15410
		15580, 17785
		17800, 17870
2100-2200	Voice of Asia.....	7445, 9845
2100-2200	WCSN, Boston, Mass.....	**15390**
2100-2200	WHRI, Indiana.....	**9770**
2100-2200	WRNO, Louisiana.....	**11705**
2100-2200	WYFR, Okeechobee, Florida..	**9535, 15566**
		17750, 21525
2105-2200	Radio Damascus, Syria.....	**9950, 12085**
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.....	**15270, 17790**
2130-2200	KGEI, San Francisco, CA....	**15280**
2130-2200	Kol Israel.....	**9010, 9435**
		11610, 13725
2130-2200	Radio Australia.....	15160, 15240
		15395, 17795
2130-2200	Radio Canada International.	11945, 15150
2130-2200	Radio Prague.....	**6055**
2130-2200	Radio Sofia, Bulgaria.....	**9700, 11720**
2130-2200	Swiss Radio Int'l.....	**6190**

2200 UTC [6:00 PM EDT/3:00 PM PDT]

2200-2215	Voice of America.....	**9640, 11740**
		15120
2200-2210	Radio Sierra Leone.....	5980
2205-2225	Vatican Radio.....	**9615, 11830**
2200-2225	RAI, Italy.....	**5990, 9710**
2200-2230	All India Radio.....	7160, 9550
		9665, **9910**
		11620
2200-2230 S-F	CBC Northern Quebec Service	**9625**, 11720
2200-2245	Radio Berlin Int'l.....	**6165, 6125**
		11750
2200-2230	Radio Canada International..	**5960, 9755**
2200-2230 S	Radio Norway International.	**9605, 11930**
		15165
2200-2230	Radio Sofia, Bulgaria.....	**9700, 11720**
2200-2230	WRNO Worldwide.....	**11705**
2200-2300	AFRTS.....	**6030, 15345**
		15430
2200-2300	BBC, London.....	**5975, 6005**
		6120, 6175
		6180, 7325
		9410, 9515
		9590, 9915
		12095, 15070
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..	2373
2200-2300	King of Hope, Lebanon.....	6280
2200-2300	KVOH, California.....	17775
2200-2300	KYOI, Saipan.....	**15405**
2200-2300	Radio Australia.....	15160, 15240
		15320, 15395
		17795
2200-2300	Radio Moscow.....	**7195, 9685**
		9720, 9765
		9865, 11710
		11750, 11850
		12060, 13605
		15425
2200-2300	Radio Moscow World Service	**9490, 12000**
2200-2300	Radio Pyongyang, N.Korea...	11735
2200-2300	R. Vilnius, Lithuanian SSR..	**7260, 9640**
		11875, 13645
2200-2300	Voice of Free China, Taiwan	**15440, 17845**
		9955
2200-2300	Voice of Turkey.....	**9505, 9560**
		17760
2200-2300	WCSN, Boston, Mass.....	**15300**
2200-2300	WHRI, Indiana.....	**9770**
2200-2300	WRNO Worldwide.....	**11705**
2200-2300	WYFR, Florida.....	**9535, 11830**
		21525
2230-2300 S	CBC Northern Quebec Service.	**9625, 11720**
2230-2300	WRNO Worldwide.....	**9852.5**
2245-2300	All India Radio.....	6035, 7215
		9595, **9912**
		11765
2245-2300	GBC1 Ghana.....	4915
2245-2300	Radio Korea, South.....	**15575**

2300 UTC [7:00 PM EDT/4:00 PM PDT]

2300-2330	BBC, London.....	**5975, 6005**
		6120, 6175
		6180, 7325
		9410, 9590
		9915, 9515
		12095, 15395
2300-2330	Kol Israel.....	**9435, 9855**
		11610
2300-2330	Radio Canada International..	**9755, 11710**
2300-2330	Radio Sweden International..	**9695, 11705**
2300-2345	Radio Berlin International..	**9730**
2300-0000	AFRTS.....	**6030, 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..	2373
2300-0000	FEBC, Manila.....	15320
2300-0000	KVOH, California.....	**17775**
2300-0000	KYOI, Saipan.....	**15405**
2300-0000	Radio Australia.....	**15160, 15240**
		15320, 15395
		17795
2300-0000	Radio Japan.....	9695, **11800**
		15195, 15280
		15300
2300-0000	Radio Korea, South.....	**15575**
2300-0000	Radio Moscow, U.S.S.R.....	**9530, 9685**
		9720, 9765
		9865, 9880
		11710, 11750
		12060, 13605
		15425
2300-0000	Radio Moscow World Service	**12000, 17850**
2300-0000	Radio Sofia Bulgaria.....	**9700, 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.....	**15300**
2300-0000	WHRI, Indiana.....	11770
2300-0000	WRNO Worldwide.....	**9852.5**
2300-0000	WYFR, Florida.....	9680, **11580**
		11855, 15170
		15440
2330-2355	BRT Belgium.....	**9790**, 9925
2330-0000	BBC, London.....	**5975, 6005**
		6120, 6175
		7325, 9410
		9515, 9590
		9915
2330-0000 S-F	Radio Canada International..	**5960, 9755**
2330-0000	Radio Kiev, Ukrainian SSR...	**7260, 9640**
		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**

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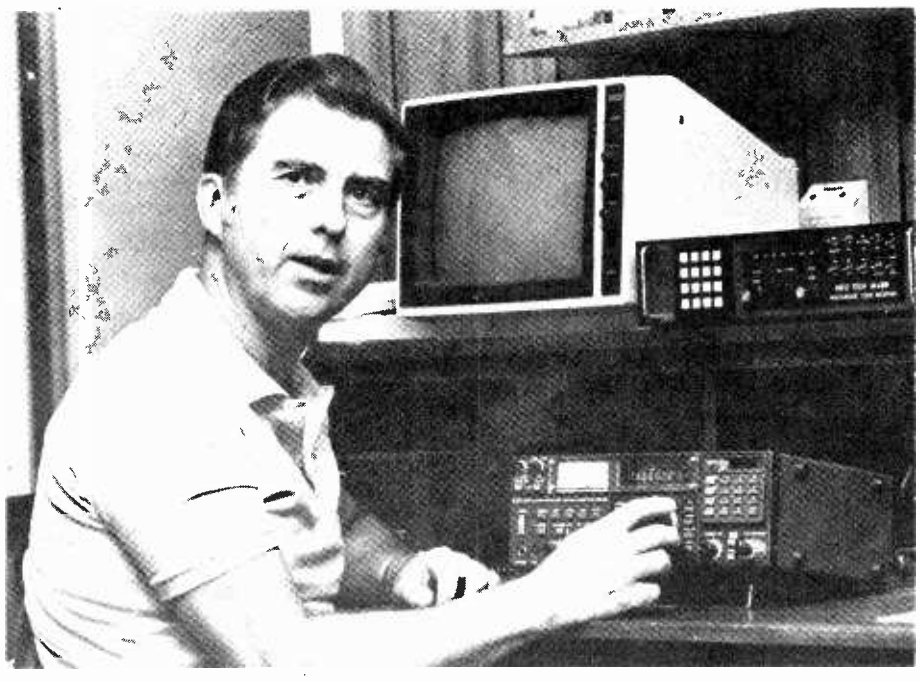
ICOM's State-of-the-Art 'Compatibles': New R7000 Joins World Famous R-71A



"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."

—Bob Grove

ICOM R-71A Sets Industry Standards For Power, Quality

We've said it before and we'll say it again: the R-71A is the most powerful general coverage receiver ever made available to the general public. It is also straightforward to operate and feels the way a receiver should.

Continuous tuning from 100 kHz-30 MHz with signal resolution of 10 Hz eliminates the need for RIT, even on SSB or RTTY.

The brilliant fluorescent display provides frequency information down to tenths of a kilohertz and alerts the listener to other dial settings (mode, memory channel, VFO). A 32-channel memory (plus 2 independent VFO's) stores both frequency and mode and may be scanned or searched. Additionally, the squelch works on the scan mode (as well as normal reception), stopping automatically on a busy channel for monitoring! A real bonus with add-on frequency converters.

An effective noise blanker has adjustable controls for optimum reduction of a wide variety of impulse noises, from power line hash to the Russian woodpecker. An internal speaker produces good audio and a tone control adjusts sound to comfort.

Outstanding sensitivity of 0.15-0.5 uV (from 1.6-30 MHz with internal preamp on). Many accessories are available for this first-class unit. **Order RCV6**

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R7000: In a Word, Superb.

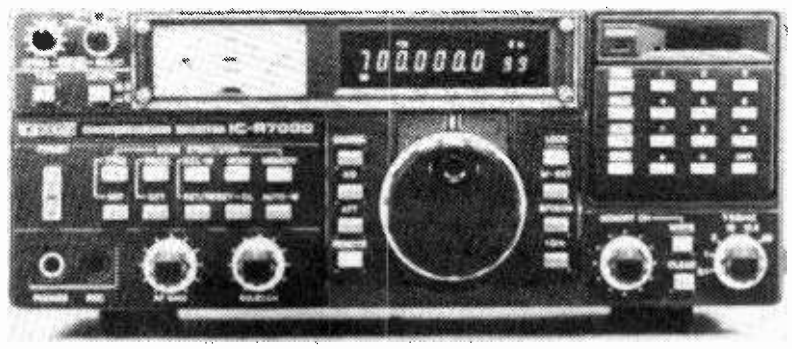
Yes, the new ICOM R7000 follows the reputation of its companion, the world-famous R-71A short wave receiver, but is fully compatible with that unit due to its total spectrum 25-1300 MHz frequency coverage (up to 2000 MHz with slightly degraded performance)!

Add to this enormous tuning range 99 memory channels with priority function, keyboard entry or dial tuning, FM/AM/SSB modes, five tuning speeds, S-meter/center tuning meter, narrow/wide filter selection, noise blanker, and adjustable scanning speed (1-5 channels/sec.) with selectable delay, and you have the most advanced scanning receiver ever designed for the serious VHF/UHF listener.

The R7000 covers aircraft, marine, business, ham (amateur radio), emergency services, government and television bands—all for a remarkably low price. For simplified operation, this receiver offers direct keyboard entry. Precise frequencies can be selected by pushing the digit keys in sequence of the frequency. The frequency will be automatically entered without changing the main tuning knob.

Memory channels may be called up by pressing the Memory switch, then keying in the memory channel number from 1 to 99. All memories are backed up by a lithium battery.

But the features don't stop here. Optional accessories include the RC-12 remote controller, a voice synthesizer to announce frequency settings, and even a serial interface for external computer control!



The tradition of ICOM's equipment superiority is only enhanced by this state-of-the-art scanner. You simply can't do better than the "best there is."

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Specifications

- Scanning: memory, mode, select memory scan, priority, or programmable frequency limits.
- Narrow/wide filter selection.
- Six tuning speeds: 0.1, 1.0, 5, 10, 12.5 or 25 kHz.
- Compact size: 4⅜" x 11¼" x 10⅞".
- Weight: 16.5 lbs.
- Typical sensitivity: 0.25 uV.
- Selectivity: 2.8, 9, 15 and 150 kHz @ -6 dB.

Order SCN 4

- Image rejection: better than 60 dB.
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- Dial lock.
- Noise blanker.
- Combined S-meter, center meter.
- Fluorescent display with dimmer switch.
- Optional RC-12 infrared remote controller.
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- AC or DC operated.
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Satellites You Can Hear

Part II: Equipment

by Larry Van Horn

"What equipment do I need to hear satellites? What is the best receiver and antenna for satellite listening?"

As *MT*'s resident satellite columnist, my mailbox is filled with questions like these every month. Last month I gave you a peek at the satellite frequency spectrum; now you must decide what your level of involvement in the hobby will be and how much you are going to spend on your equipment.

Opinions on satellite monitoring equipment are like opinions in general: everybody has one. I will give you my opinions based on my 21 years' experience in the hobby. I am sure there will be more than a few that will argue my selections.

HF Receivers

To hear the bulk of HF satellites, you only have to concern yourself with three frequency ranges: the 10- and 15-meter amateur bands and 18.0 to 20.5 MHz.

The smart monitor will purchase the best general coverage receiver he can buy for general monitoring as well as satellite sleuthing -- a stable receiver with sharp selectivity, selectable modes, digital frequency readout, and high sensitivity.

Receiver stability is very important for accurate doppler determination and telemetry analysis. If the receiver drifts these important tools cannot be used.

The HF bands are very crowded and to hear a weak satellite signal on crowded frequencies can be difficult at best. The receiver needs to be selective as well as sensitive in order to hear and separate satellite signals mixed with earthbound signals.

A choice of modes is also very important. Monitoring an SSB satellite signal in FM will not yield any intelligence for the monitor. I have found that USB/LSB/CW selectable type rigs perform better overall than BFO product-detecting receivers.

Digital readout is very important to getting you on the right frequency to hear a satellite's signal. Without an accurate means of determining your frequency, you will have to perform band sweeps. These work fine for finding new satellite frequencies, but not for monitoring known channels. Another good reason for digital readout is to aid in reporting accurately your catch to *MT*'s Signals from Space column!

To make an intelligent choice of a receiver check back issues of *Monitoring Times*; also read Larry Magne's *White Paper* receiver reviews and Rainer Lichte's *Radio Receiver; chance or choice*, both available from Imprime (Box 241 Radnor Station, Radnor, PA 19087).

VHF/UHF Receivers

Most scanner buffs are usually pretty satisfied with their programmable scanners. They get the usual police, fire and ambulance calls. However, I am constantly asked, "How come I can't hear any satellites on my Bearcat 210 or Radio Shack Pro-30 scanner?"

Well, folks, these scanners just don't cut the mustard as satellite receivers. The bulk of satellite activity today starts at 136 MHz and up. When selecting a VHF/UHF satellite receiver or scanner look for high sensitivity, low noise figure, selectable modes, and wide frequency coverage.

The monitor must strive for every bit of noise-free signal his receiver can muster. Self-generated receiver noise is the most predominate type; if your scanner is plagued with microprocessor noise, weak satellite signals will not make it to the speaker.

Manually-selectable modes are a must. If your scanner predetermines mode selection based upon frequency, you will not be a successful satellite monitor. Try to obtain one of the newer VHF/UHF tunable receivers. The single sideband modes they offer can be crucial in detecting some satellite downlinks.

Get the widest frequency-coverage receiver your budget will allow. For instance, if milsat monitoring is your aim, 225-400 MHz coverage is essential. The more frequencies you can cover, the more satellites you can monitor.

One additional consideration in this large equation is the rig's search and scan speeds as well as memory channel storage. Fast speeds and large memory capacity make satellite hunting more successful.

Before You Buy

Listen for the Russian NAVSAT channels on the following frequencies: 149.910 149.940 149.97 150.000 150.030 MHz. If you haven't heard any RTTY-sounding signals on any of these channels after a couple of hours, pass the receiver by. These downlinks are easily heard on modified amateur radio HT's with rubber ducks; they are an easy way to measure a radio's satellite sensitivity.

The best VHF/UHF radios today for satellite listening are the Icom R-7000 and the Yaesu FRG-9600. The 7000 seems to have the better track record in reviews but is more expensive. The FRG-9600 has had mixed reviews; some obtain good results while other achieve no results at all.

As always, you have the surplus radio gear option. Some of the stuff is highly suited for satellite work because it was made for satellite telemetry reception in the first place. Take your time and know what you are buying and the condition of the gear. Nothing impresses your wife more than that 300 pound boat anchor you just brought home that doesn't work.

Most ham magazines list ads by surplus dealers. This is always a great place to start. Hamfests can be another great place for bargains. But remember, know what you want to listen to and what frequency and modes the satellite(s) operate on, then make your purchase accordingly.

Antennas

There are two ways to go with antennas: design/build your own, or commercially made antennas. I will briefly discuss both options as well as the two basic antenna designs you should consider when putting your station together: omnidirectional and directional antennas.

Omnidirectional Antennas

These types of antennas are satisfactory for general satellite work. Chances are your first reception will be on an omni-type antenna and you can concentrate on receiving the satellite signal without having to worry about accurate tracking and pointing of a directional antenna.

The main drawback to the omni is the lack of gain needed to hear weaker satellite signals. This situation can be improved through the use of a low noise, wideband preamplifier, almost a must at the higher frequencies.

One word of caution here is the use of indoor antennas such as tabletop and back-of-the-set whip antennas. For satellite use these will give poor results at best. You might be able to hear the powerful Russian navigation satellites on 150 MHz and the local police department but it will not pull in a weak Fleetsatcom wideband transponder.

Directional Antennas

This is probably the best way to go for satellite antennas. Yes, there are some additional headaches and more expense, but the results will be more rewarding.

Probably the best choice in a directional antenna is the log periodic design like the popular Grove Scanner Beam. You will get a wide frequency coverage with just one antenna.

If, however, you want to listen to one specific area, say, 240-270 MHz, then you might want to consider a Yagi style antenna. Several of my readers report excellent results with commercial 220 MHz amateur radio antennas that have been cut down and modified for this frequency range.

By concentrating on a more limited frequency range for your antenna you will also find it easier to buy or make narrowband preamplifiers that are more sensitive and have lower noise figures than wideband units.

"All this is well and good, Larry, but I have two left thumbs and can't build anything. What about me?"

Well, folks, there are two different commercial systems I can recommend. If you absolutely do not want to track satellites using the beam concept then the Icom AH7000 discone antenna is probably your best bet.

The AH7000 consists of 16 rugged, stainless steel elements arranged on a 24-inch support pipe equipped with two mounting brackets. The frequency coverage is from 25 to 1300 MHz. Also included is a 40-foot length of low-loss, 50 ohm coaxial cable with N connectors.

"Do I need a big dish to hear satellites?" No.

"Can I use the whip that came with my scanner?" Sometimes.

Larry's Best Bets

After much study, analysis and use, these are my best bet picks for utility satellite monitoring. If properly installed and with a suitable antenna these receivers and scanners should perform well for a utility satellite monitoring station.

HF

Kenwood	Icom
R5000	ICR-71A
R2000	ICR-70
JRC	**Yaesu**
NRD-525	FRG-8800
NRD-515	FRG-7700
NRD-505	

VHF

Regency	Icom
MX-7000*	R7000
MX-5000*	
Radio Shack	**Yaesu**
Pro-2004	FRG-9600

* denotes AM/FM wide and narrow modes only (selectable)

This antenna should serve the beginning satellite monitor very well, especially if a preamp is added to the setup.

A preamp that I have found works well is the Radio Shack inline coax preamp (Catalog #15-1117). The cost is very reasonable, $14.95. Another preamp that performs well is the Grove Power Ant III. Its price is only $39.00 plus shipping. Check the latest Grove catalog for more information.

The second installation worth mentioning is a Grove Enterprises product, the Grove Scanner Beam. This antenna coupled with a rotator will give the listener up to 8 dB gain over other types of antennas. It is a log periodic design and covers 25-1300 MHz. I use one on my roof and it really drags in those weak Fleetsatcom channels that are hard to hear when the wideband channel gets saturated with a lot of users. I use the Radio Shack preamp mentioned above to boost weak satellite signals. Both the AH7000 and Scanner Beam are available from Grove Enterprises (P.O. Box 98, Brasstown, NC 28902).

Finally, to close out this last part of "Satellites You Can Hear," I must remind all of you that patience is the name of the game. You will not be able to turn on your receiver and have it fill your speaker with a satellite signal. There are no schedules, no guarantees and only those with patience will be rewarded.

Satellite monitoring represents the new frontier for radio enthusiasts. As more and more radio services discover the benefit of satellites, they will continue to disappear from the traditional haunt for most of us -- shortwave radio. The experimenter, the DXer and the utility specialist all can find a home in this new frontier. ■

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Paul Swearingen
P.O. Box 4812
Panorama City, CA 91412

Trash or Treasure – *Big Radios for Little Bucks*

The weekend rolls around ... you're cruisin' down the boulevard, when suddenly a crude, hand-written sign catches your eye. You read the magic words, your hands twitch on the wheel. You can't resist: your foot caresses the brake pedal and you make a sudden turn to the right and come to a halt behind a line of cars. You're not sure what you're in for this time, but the crowd parts in front of you as you make your way to the tables. Your breath quickens, your fingers twitch and your nostrils flare as you recall the words on the sign which brought you here: YARD SALE TODAY!

This is the time of the year that you're most likely to stumble across real bargains at yard and garage sales, auctions, flea markets, pawn shops and used bargain/charity/antique stores. With a little caution, you can bring home true bargains that won't end up as space takers next month.

I suspect it's true that August's yard sales consist mostly of junk that people bought in June and July, but you can still find bargains for a minimum investment if you shop carefully, pre-set a maximum spending limit and carry home only items that you plan to use and not store in the garage.

Sometimes you don't have to worry about blowing your wad. I bought these items at a single yard sale just a block from my house: an older Sony cassette deck, $20.00 (necessary maintenance when I got home: cleaning, demagnetize heads); Sony AM clock radio: 50 cents (scrape paint off top, spray tuner cleaner in volume control): RCA AM/FM/clock/B&W 5 inch TV combo, $3.00 (clean, spray tuner cleaner, add one knob). And all three work perfectly.

Now is the time, too, to look for older receivers to use as either main or backup rigs. Many DXers who have graduated to solid state gear and relegated to their garage or attic their tube-type boat anchors will be under strict orders from their wives to "clean that %&$#! junk out of there" and they may be willing to settle for less than full market value just to keep peace in the family.

If you live in an area that routinely has auctions, watch for communications, "ham", or "CB" equipment to be erroneously advertised. Chances are a communications RX will be among the gear, too. And almost invariably a camera collector will have picked up radios, too, although the auction ad will usually stress the photo gear.

Shopping Around

Should you pounce on a receiver you spot in a local shop? Perhaps not; the price of tube-type receivers are in a decline. The HQ-180 priced at $300 ten years ago may barely fetch $175 now. Don't be afraid to bargain with the shop owner; if he's not inclined to "work with you" on used equipment, find another shop. Leave your name, phone number and price you'd be willing to pay with him and walk out; you might just get a phone call if he has had a bad week and has to pay the rent. Visit him a couple of weeks later and repeat your offer; he may just be inclined to agree that your price is fair.

What tube-type receivers should you be looking for? A very limited list might include the Hammarlund HQ-180, 180A, 129-X, and SP-600; the various military receivers such as the R-390A/URR, the Collins 51J3 or its military equivalent, the R-388/URR, some Hallicrafters receivers such as the SX-100, Nationals, and many others.

An excellent guide is the two-volume set titled *Ham Equipment Buyer's Guide*, covering receivers, transmitters, transceivers and amplifiers manufactured between 1945-75. It's available through H.L. Brand's *Ham Trader Yellow Sheets*, themselves an excellent source of used equipment. Query for the latest price by sending an SASE to Ham Trader at P.O. Box 20057, Glen Ellyn, IL 60138.

Although the original list price is usually the only one listed, you can match equipment to prices of equipment offered in the *Ham Trader* for a good idea of the current market value. For example, two recent issues listed the following: R-390A, $150; SP-600, $100; SX-117, $85; HRO-50, $190; 51S1, $400; SX-111, $110; Sky Buddy II, $65.

Have fun with your new toys, if you find something you just can't do without. And...take heart if you don't have room for it. There's nothing stopping you from having you own garage sale next weekend, now, is there?

New Stations

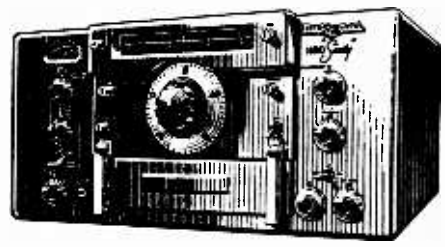
Let's take a look at new stations slated to come on the air...first, FM action. The educational band (88-92 MHz) has been active as stations continue reacting to the FCC's mandate requiring minimum power requirements for stations to serve their communities, up from 10-watt fleapowers once common to college stations. Bruce Elving lists an unusual share-time duo station grant in *VHF-UHF Digest* in Phoenix on 88.3 MHz, with 25,000 watts vertical/100,000 w. horizontal. One is owned by Family Stations, Inc., the other by National Farm Workers Service Center.

Look for others: Palm City, FL--89.9, 100,000 h,v polarization: Kingston, NY--90.9, 940 h,v; Fairfield, IA--90.5, 3000; Holly Spring, MS--88.1, 3000; Dickinson, ND--89.9, 12,500. Even with increased powers and the lower FM band filling up, E-skip can bring these and others from over a thousand miles to your tuner under the right conditions, right over semi-locals.

Next, TV: Most activity, of course, is on UHF, but a few VHFers continue to be granted construction permits, such as Morehead City, NC--8; Sonora, TX--11; and Lihue, HI--3. Many of the UHF grants are for low-power translators, designed to serve only a very limited area, but these also are subject to tropospheric enhancement, which can carry a signal over a thousand miles.

New stations slated for AM include: 650--Rancho Cordova, CA (5000 day, 5000 night, directional); 1230--Houston (600/600 non-directional and synchronous with KNUZ; 680--E. Helena, MT (5000 d); 1290--Garrisonville, VA.

Thanks to Jerry Starr, NRC; Greg Monti, IRCA, Pete Nolan, *Radio*Philes*, and Bill Fahberm WTFDA for some of these listings.



Tube-type receivers such as this National HRO-60 may be a real bargain for the savvy shopper.

Bill is the editor of the just-released *WTFDA NA TV Data Base.*

Gene Martin, Denver, predicts the decline and failure of some marginal religious stations, with the revelations of scandal and consequential loss of donated income to stations. I'm inclined to agree with him, but feel that he may be too conservative. I wouldn't be surprised if the problems with dollar-oriented operations, including 24-hour merchandising TV stations, are also just beginning. With some AM stations even being donated to non-profit organizations, or just shut down because the tax writeoff is greater than the anticipated selling price, we all may be able to invest in a failing broadcast property--cheap. Let's hope not. ■

Your important newspaper . . .

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✓ **Computers & Technology.** What computers does the FBI have to keep track of you with? What are their plans for using artificial intelligence? High-tech spying: is the data in your computer safe? A $250,000 fine and 2 years in jail just for listening to the wrong radio station! Full Disclosure keeps an eye on technology for you.

✓ **Legal Advisor Update.** Written for police departments. When can the police search your car? What if the VIN isn't visible from outside? Can they stop you, if you're merely acting suspiciously? Many issues involving your rights are discussed in this column. Can you afford not to be up to date on your rights?

✓ **Members of Congress...** do they represent you or the executive branch? Full Disclosure exposed a situation where a Congressman was being loyal to the FBI, not his constituents.

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"Excellent newspaper." Bob Banner, Editor, Critique Magazine

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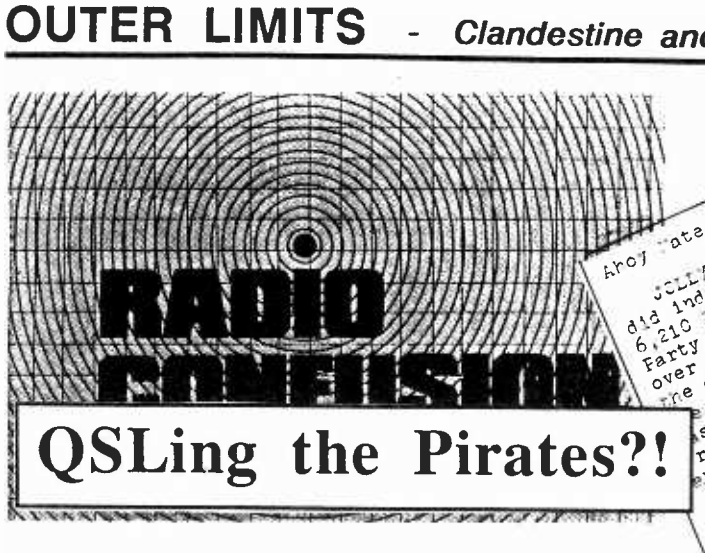

QSLing the Pirates?!

It's about 0400 UTC. The bands are thundering with the voices of those international powerhouses we're all familiar with: the BBC, Voice of America, Deutsche Welle and Radio Moscow. Over there is Radio Havana. Just a slight twist down the dial, something in Spanish. And over here... Hold it. It might be English. There's U.S. rock music and, yes, I think that is English.

There, at an obscure spot on the dial you hear it. A faint signal awash in static. You race across the room, pull down your copy of *Radio Database International* and look up the frequency. But wait. There's no one supposed to be on this frequency at this time. This must be... a pirate!

You've finally managed to log a pirate. And you'd love to add their QSL card to your collection. The first question that pops into your head is, "Where in the world can I write to a pirate?" After all, these are illegal broadcasters. Only a real fool would give out his home address on the air, knowing full well that it would lead a very unhappy FCC enforcement officer right to his transmitter.

Well, pirates do QSL. But they use a "drop box," usually a post office box taken out by a third party who then forwards the reception reports to the pirate broadcaster.

Pirate QSLs range from simple photocopied form letters to professionally designed and printed cards. A few stations have even sent bumper stickers and pennants to lucky listeners.

Here is a list of pirate mail drops and the stations they serve.

P.O. Box 5074
Hilo, Hawaii 96720:
KFAT, KQSB, WKUE, WYMN, WQTU, Secret Mountain Laboratory, Tangerine Radio, Medieval Radio, Radio Ohm, Radio USA, Union City Radio, The Voice of Bob, The Voice of the Rainbow, Radio North Coast International.

P.O. Box 982
Battle Creek, Michigan 49016:
KNBS, KTGR, Radio America, Radio Clandestine, Razorback Radio, The Voice of Laryngitis, The Voice of Democracy, WCPU-Silicon Valley Radio, WPBR-Pig Boy Radio.

P.O. Box 245
Moorehead, Minnesota 56560:
KROK, Radio Nova, WDX, WMTV, Zeppelin Radio Worldwide.

P.O. Box 40554
Washington, D.C. 20016:
Pirate Radio New England, Radio Bag, Radio Lymph Node International, WBST.

P.O. Box 20039
Ferndale, Michigan 48220:
The Voice of Tomorrow.

Most of the stations on this list, when sent an accurate, complete reception report with the proper return postage, will send a QSL.

So what does a "complete" pirate reception report consist of? In many respects, the answer is no different for pirates than it is for any other station you'd want to QSL. Some other aspects are unique to pirate broadcasters so bear this in mind when writing.

Include the date, time, and frequency of reception. Give the date and time in UTC, and the frequency in kilohertz as accurately as your receiver will permit. You may also give local date and time, but be sure to specify that fact.

Report the quality of reception. Using the widely known SINPO (or SINFO) code is okay, but it's better to give a detailed description. What was the signal strength on your receiver's "S" meter? If there was any interference, what was it from? A typical signal report might go like this: "Your signal was fairly strong, reading S-8 on my meter, but it suffered from moderate interference from an RTTY signal 2 kHz above your frequency. Slight static was heard, along with moderate fading. Overall, reception was fair; SINPO = 43433.

List some program details. Not the standard, "Music, talk by man and abrupt sign off." This doesn't prove a thing, certainly not that you heard the station, and least of all any creativity on your part. Give song titles, or at least the type of song if you don't know the title. Quote some lyrics. Give quotes from the announcer, especially station identification announcements. Remember that your program details will have to prove to the station that you heard their signal.

Tell the station what your receiving equipment is. Give information about your receiver and antenna. Also, any extra equipment you used, such as audio filters or antenna tuners.

Give a report on audio quality. Pirates usually aren't using transmitters designed to broadcast music -- they're usually nothing more than ham transmitters. Obviously, the sound is then not what is should be. Tell the station what their audio sounded like to you. Was it clean and crisp or mushy and muffled? Was it distorted? The pirate will appreciate your evaluation.

Give your opinion of the program. Did you enjoy it? If you did, tell which segments you liked best. If you did not enjoy it, tell the station what you think they could do to improve their programming. Be honest; don't be blunt. Not everyone enjoys being insulted.

Also, give some personal information, such as age, occupation, how long you've been an SWL, how many other pirates you've heard and so forth. Again, don't go overboard. No one wants to read a 60 page letter documenting your life's history. But a few details make your reports more interesting and will help the station evaluate its audience.

Finally, request the QSL. Be certain to meet the station's requirement for return postage. Usually, the requirement is three first-class stamps. This may seem a little greedy at first glance, but keep in mind that your letter must get from the drop box to the pirate and then your QSL must go from the pirate to you. And as you can guess, pirates rarely carry any advertising so revenue is non existent! Three stamps just covers postage costs.

Your report should be neatly written, or, better yet, typed, on a standard 8 1/2 by 11 inch piece of paper. And be sure to get that report into the mail promptly! A report that arrives a couple of months after the broadcast isn't as interesting to the pirate as a timely one.

Using the above guidelines, you should find that most pirates you report to will indeed send you a QSL. You can do other things that will make your report stand out from the rest -- use your imagination! A photo of you in your shack, postcards of your area, a bumper sticker from a local radio station... enclosing any of these with your report will draw attention to it.

If you made a cassette recording of the broadcast, send along a copy and make sure to toss in a couple of more stamps if you want the cassette back. There's no better way for a station operator to evaluate his signal than to hear an actual recording of it taken right off the air. Sometimes the sender of such a cassette will be "rewarded" with a studio quality recording of the station.

Pirate DXing isn't easy. The stations don't broadcast on regular schedules. They don't use high power. So if you've been able to catch one, make sure to follow the above guidelines. After all, when you've gotten this far, don't blow it by forgetting the stamps! ■

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SUMMER CES '87

A walk-through by Michael Perlman

Marketing has come to the trade show; electronic gadgets are not the only "models" examined in detail!

The 1987 International Summer Consumer Electronics show was held in Chicago from May 30th to June 2nd. This 21st summer extravaganza of electronic goodies spread over nearly 750,000 square feet of exposition space in two main buildings and two satellite buildings at the newly-expanded McCormick Place on Chicago's lakefront. More than 100,000 people were expected to attend to view the offerings of about 1400 exhibitors.

A scheduling change that had the show opening on a Saturday (rather than running entirely on weekdays) made it possible for a more leisurely visit to see what the state of the electronic arts will have to offer in the near future.

Some trends and random observations that were noted while strolling the aisles for a couple of hours:

• The continuing miniaturization of all product lines. Manufacturers are getting more features packed into smaller packages.

• The movie "Top Gun" seemed to be the video tape/disc of choice for manufacturers to show off their various video products! Standing in the midst of the video manufacturers area one could see no less than a dozen pictures of F-14 fighters performing aerobatics.

• Digital and Compact discs are still hot news, especially in the video market. Panasonic was showing off its Digital Audio Tape (DAT) and Sony was showing a video recorder/playback unit, complete with screen, that was about the size of a large paperback book. A good example of the miniaturization trend.

• Everyone has computers and you can't tell the players without a scorecard. Many major manufacturers outside of the computer industry had computer lines displayed with their video products.

• Taiwan and Korea have arrived. Major manufacturers such as Samsung and Goldstar had large displays of diverse product lines. They are definitely giving the Japanese a run with quality products and competitive prices.

• There is an interesting technological backlash developing. Both a representative of Regency (more about this below) and one of the major video manufacturers indicated that they were featuring products with only one or two "high tech" features and appealing to the "average" consumer, rather than loading up models with all manner of high tech goodies.

• Finally, marketing has come even to these jaded trade show participants. More exhibitors are using song and dance teams, attractive young ladies and fast-talking demonstrators to promote their products and exhibits. Shades of the famous Chicago Auto Show -- where the vehicles are not the only "models" that are examined in detail.

Sharp Electronics had a young lady in a revealing swim suit sitting in a sand box (to resemble a beach) promoting video cameras. Passers-by could test the camera by taking pictures of the young lady and see the results on conveniently-placed monitors.

Slim Pickings for the Hobbyist

As for the hobby radio industry, only a few manufacturers showed products of interest to the monitoring enthusiasts. Some manufacturers, such as Kenwood, show only their "consumer audio" lines and do not have any of their fine receivers available.

Uniden had no major new products on display. There was a fair amount of interest in their newer hand-held scanners, which again demonstrated more features in a smaller package.

Regency had its line of "Turbo" scanners on display. Both the TS-2 and the TS-1 have been profiled briefly in recent issues of *Monitoring Times*. On quick inspection, they seem like quality products. On a personal level, I prefer the currently-used rubber keypad to the old touch-sensitive membrane that Regency had used extensively in its line.

As mentioned earlier, Regency is also appealing to the unsophisticated user. They have named one scanner series "Informer" and everything you could possibly want is pre-programmed. With one button you can select the service you are interested in, while another button selects the state for which you wish to monitor that service. In that way it resembles the old Bearcat 300 (and the more recent Regency D-810) scanner with separate buttons for each service frequency range.

Cobra Enters the Scanner Market

Perhaps the biggest news on the scanner scene was that Cobra seems to be seriously entering the scanner market. They were displaying a complete line of scanners covering the spectrum, apparently Bearcats in Cobra wrappings.

The most exciting of the line was a brand new, truly pocket-size scanner, the SR-15. It features five bands with 100-channel capacity, 11 band coverage including aircraft and military as well as the expected public service bands.

All the functions you would want on a quality product are in this small package, including channel lockout, priority, selective scan delay, channel hold and manual scan. A large backlit six-digit LCD display shows the channel position, frequency, and the status of priority, lockout and delay.

The entire package is only six inches high and 2-3/4 inches wide and slim. It is truly pocket size -- I slipped it into my shirt pocket along with my sunglasses case -- a good fit (I would not have unslipped it had not the helpful gentleman from Cobra been talking with me at the time).

The "mob scene" at Summer CES 1987

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The case is anodized aluminum and ABS plastic and has a good feel to it. Suggested retail price is $299.95 and includes a flexible rubber antenna (BNC connector), rechargeable nicad battery pack, AC adapter/charger, earphone, and carrying case.

A very limited test showed that the unit worked well and in the high noise environment of an electronics show that is held in a steel and concrete building it did a decent job of pulling in local signals. The only complaint is that the speaker sounded slightly tinny -- perhaps a factor of the small size and noisy environment.

Cellular Evolution -- even as we watch!

Finally, a brief mention of cellular telephones. I know -- we must not listen -- but you may be interested in this rapidly-evolving segment of the market. NEC has entered the cellular wars in a big way and their products and statements typify the thinking in the industry.

The days of permanently-mounted phones in cars is coming rapidly to an end. More and more manufacturers are offering combination units that will easily convert from auto use to full-power portables.

NEC has a cellular line that consists of control units, transceivers, battery packs, and mounting plates with portable antennas. All the pieces snap together easily and offer a wide variety of placement in cars as well as portable configurations.

But even this is viewed as an interim step. The true one-piece portable is seen as the final step. Motorola, from the beginning of their cellular offerings, had a fairly large, totally-portable unit. NEC has refined this concept to a small hand-held that is no bigger than the headset of a cordless phone.

The model P9000 comes in three configurations, all of which are 2.5 inches wide by 1.5 inches deep by 7.5 inches long and have a fully retractable antenna. They come with a table model charger and auto charger/converter that allows you to increase the output power and use an external antenna installed on a car.

After several hours of strolling the aisles of McCormick Place, I staggered into the 90° heat and 90% humidity loaded down with literature to drool over at my leisure. The electronics industry seems strong, and as the products shown at the exhibits make their way to the store shelves this fall, we can all save our nickels and dimes and buy that new scanner we have always wanted.

One final observation: I don't know what it says about the electronics industry, but by far the biggest crowd was around the *Penthouse Magazine* booth where free copies of the current issue were being handed out! ■

NEXT MONTH:
MT reviews the new Sony PRO-80

The new Cobra SR-15 -- a true pocket programmable

Nope, not a cordless telephone, but NEC's new cellular phone!

TRANSMITTER HUNTING: Radio Direction Finding Simplified

by Joseph Moell and Thomas Curlee (325 pages, 7-1/4" x 9-1/4", perfect bound paperback; $17.95 from TAB Books, PO Box 40, Dept MT, Blue Ridge Summit, PA 17214)

Comprehensive, well written, liberally illustrated, authoritative--all of these commendations apply to this definitive work on direction finding equipment and techniques.

Although intended for the amateur radio operator and with a slant toward hidden transmitter hunts, adequate coverage is given to finding jammers, illegal transmitters, distant signals, and emergency beacons.

The text itself is very professionally composed and edited, easy to understand, yet technically informative as well. Illustrations are of high quality and supportive text simple to follow.

A total of 23 chapters are arranged into topics which include a brief history of RDF, mobile and portable techniques and mountings, signal strength and direction meters, attenuators and preamplifiers, fixed RDF installations for the hobbyist as well as the government and military, Doppler systems, loops and Adcocks, home built systems and commercial gear, Wullenweber arrays, catching offenders and legal ramifications, and a computerized triangulation program.

It is not our policy to endorse any products or publications, but this treatise on radio direction finding by Moell and Curlee deserves a front row, center, seat on every radio experimenter's bookshelf.

SHORTWAVE LISTENING HANDBOOK

by Harry L. Helms (243 pages, 6" x 9", paperbound; published by Prentice Hall, Englewood Cliffs, NJ 07632; $17.95 plus $1.50 shipping from Grove Enterprises and other MT advertisers)

Few names in the SWL hobby are as familiar as Harry Helms, a veteran listener and writer. For decades Helms' name has appeared on bylines of articles and books worldwide; now his collective expertise is published in one work designed to inform the newcomer and experienced listener alike.

Eleven chapters cover such topics as users of the spectrum, how to select a shortwave receiver, antennas and accessories, radio signal propagation, international and domestic broadcasters, utilities and mysterious radio stations, and QSLing.

An appendix contains lists of worldwide call sign allocations, Q signals and abbreviations commonly heard, lists of SWL clubs and publications, and a small sampling of equipment suppliers and reference books.

Helms' book is a handy nugget of rudimentary information about international broadcasting (with a sprinkling of utilities) primarily targeted toward the beginner in shortwave listening.

POCKET GUIDE TO RAILROAD RADIO FREQUENCIES

1987 edition by Bruce K. Heald (4-1/4" x 11", approximately 95 pages, staple bound; $8.95 postpaid from the author, 1905 Johnson Mill Rd., Dept. MT, North Branch, MI 48461)

Last weekend I had a real treat. My wife surprised me with two tickets to ride an old steam engine train which was making an historic run from Asheville to Old Fort, North Carolina, and back. I grew up alongside the tracks and happily remember chasing the steam engines, running in their effusive mist.

Quite happily, the realization was even better than the expectation and, as the old steam engine chugged from the station, I was lost in nostalgia...except for one modern punctuation...I brought a hand-held scanner! "Historic Express to stationmaster," the speaker barked. I was tuned in to a faded era.

There are many railroad fans among scanner listeners and even though some directories carry local railway frequencies, it has been nearly impossible to find a publication with comprehensive listings. Until now.

Author Heald has chosen to divide his directory into six distinct chapters: a general introduction containing common frequencies and a key of abbreviations; a list of railroads and their frequencies; a list of commuter railways and their frequencies; a separate AMTRAK section; a list of railroads not known to use radio; and a frequency cross reference. ■

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Lawrence Magne
Editor-in-Chief
Radio Database International

The Grundig Satellit 400

As we reported earlier, Grundig is back in North America beating the bushes selling world band receivers. Nowadays, you can see them advertising shortwave radios regularly over the Cable News Network, which is a virtually revolutionary idea, considering that most manufacturers treat their world band radio lines like some sort of high-level corporate secret.

The problem with Grundig is that their main receiver, the Satellit 650, costs some $1,000 or so in the US. It's a fine unit, but for most of us $1,000 is a little tough to digest for a radio. The '650 is also too large and heavy to use for traveling.

Smaller Radio Rounds Out Grundig Line

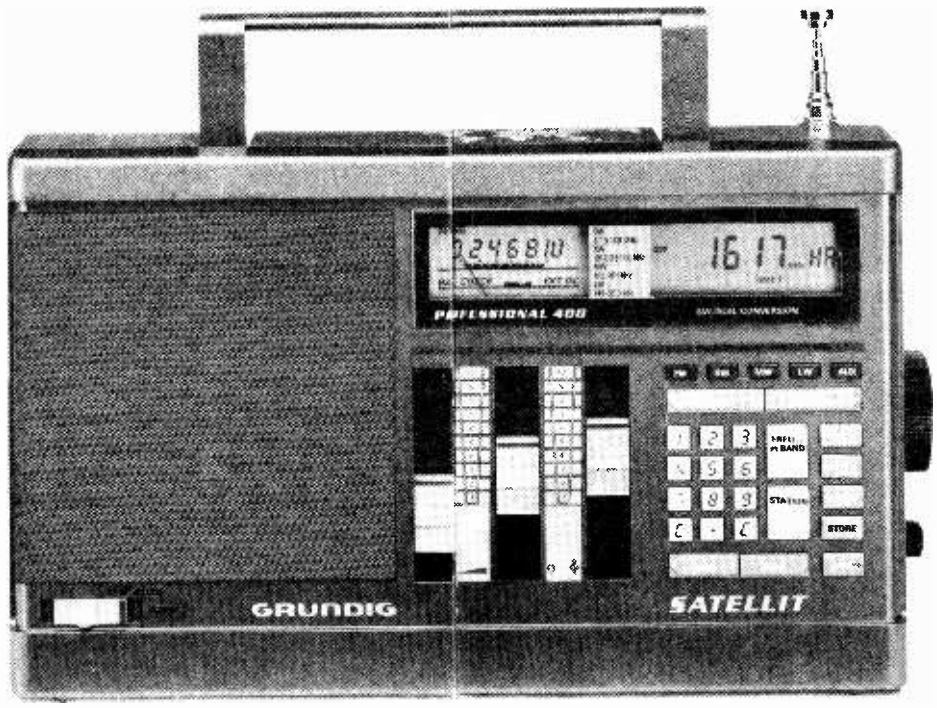
So, to round out the line in North America, Grundig is also marketing the much smaller and lighter Satellit 400. It doesn't look at all like the '650 -- although both are made in Portugal. And, at $399, the '400 costs less than half what the '650 does. So we've put this through the *RDI* hoops and hurdles for the past few weeks to see how it stacks up against the Asian competition.

The first thing you notice about the '400 is that it doesn't look at all like any other model on the market. In fact, its design is similar to 1930's Art Deco. Fortunately, it doesn't perform like a 1930's receiver. It's fully state-of-the-art, even if it's not quite in the high-tech league of Sony's innovative ICF-2010.

Tuning up? You've Got a Choice

The '400 covers the longwave, mediumwave AM, FM and world radio shortwave bands with double-conversion synthesized tuning. It uses a knob to tune stations, and a nice aspect of this is that the knob provides one tactile click for every one kilohertz tuned. You can actually "tune by feel", which is handy if you're visually impaired... or trying to bandscan in the dark.

Of course, a knob isn't the only way you can tune the '400. There's also an easy-to-use keypad for direct frequency entry, plus a scanner and fully 24 programmable channel memories to store your most listened-to stations. Additionally, there are up/down band slewing buttons for shortwave that second as a signal seeker in other bands.



Grundig's Satellit 400 - Looks like 1930's Art Deco, but performs like state-of-the-art

Travel Features

For traveling, there's a nice, solid flip-up handle that's the best and most comfortable of any on the market. The fused ac power supply is dual-voltage and built-in so you can use it in nearly any part of the world. In North America, the '400 comes with an ac plug adapter that allows the set to be operated from the most popular types of wall sockets in most countries.

The '400 incorporates two clocks and a timer, which is handy for making sure you get up in time when you're in a hotel with Samantha Sonnambula at the switchboard. But the clocks and frequency share the same digital display, so you can see only one of these three at any given moment.

Other features include a panel to angle the set towards the listener. And if you're listening at night, you'll be pleased to find that it has a light that illuminates both the digital frequency readout and the large analog signal-strength and battery check meter.

Single Sideband?

The '400 is a big improvement over Grundig's earlier, but similar looking, Satellit 300. The '300 was insensitive, unselective and produced all kinds of spurious signals. The '400, in comparison, performs quite well. In all, for listening to shortwave broadcasts, it's in a league second only to the Sony ICF-2010. The '2010 is better because of its advanced synchronous detection system, plus the '2010 is much better than the '400 in handling single-sideband signals. In fact, below 9 MHz single-sideband reception on the '400 suffers severely from synthesizer instability to the point where it's all but useless. Obviously, this isn't a set for utility DXers or hams.

In fact, if you listen very carefully you can even hear the synthesizer whooshing back and forth softly in the background with the single-sideband mode switched off.

Audio Quality and FM Performance

Where the '400 is superior to the '2010 is in audio quality. The '2010 doesn't even have proper tone controls, and its audio quality is only so-so. But the '400 has separate bass and treble controls, plus a higher-quality audio stage and speaker, so it sounds quite good. Its FM performance -- especially its capture ratio -- is also much better.

At our *Radio Database International* listening post located between New York and Philadelphia, you can place the '400 on a single FM channel and find two or three stations popping in separately and clearly simply by rotating the antenna. Another difference is that the '2010 also comes equipped to operate only off 120 volts ac with North-American-type ac sockets. So you can't use it in most other parts of the world without buying an accessory transformer.

Verstehen Sie?

A final note is that the printed material that comes with the '400 emanates from the "why - make - something - clear - when - you - can - make - it - incomprehensible" school. For example, under "Antennas" it reads:

> "The strongest abatement of an interfering station will be achieved by means of aligning the reception minimum of an antenna with half wavelength or less to this particular station".

So, in all, this offering from Grundig is really designed for pleasant listening to programs, rather than DXing. It's also a good travel receiver, even though there are other models that are smaller and lighter. In the US, Lextronix, Grundig's representative, now has a toll-free number: 800-872-2228. Elsewhere, you can dial 415-361-1611. ■

You can hear Larry Magne's equipment reviews, along with reports from Radio Database International's Don Jensen and Tony Jones, the first Saturday night each month over Radio Canada International's "SWL Digest" at 8:10 PM Eastern Time on 5960 and 9755 kHz. Larry's "What's New in Equipment" is also featured over "SWL Digest" various other Saturdays throughout the month.

In the US, RDI White Papers are carried by Electronic Equipment Bank, Imprime and Universal Shortwave. A free catalogue of the latest editions of all available RDI White Papers, including those covering the best in communications receivers and antennas, may be obtained by sending a self-addressed stamped envelope to Publications Information, Radio Database International, Box 300, Penn's Park PA 18943 USA.

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GTI Spectra-Display

One of the most helpful accessories available to the listener is the spectrum display unit, an image display which shows graphically the presence of signals over a wide bandwidth, typically from several hundred kilohertz to as much as several megahertz.

A horizontal line across the display represents the frequency band; if a signal should come on the air, the 'scope will show its presence as a "pip" or "spike"--a bump which rises from the line.

Spectrum display units--SDUs--were popular amateur accessories, called panadaptors or panoramic displays, until the 1950s and 1960s, after which they gradually disappeared from the consumer marketplace. They are still the mainstays of government, laboratory and military receivers, however, often emerging as spectrum analyzers and service monitors.

Unfortunately, such commercial and mil-spec equipment is of exorbitant cost when compared to scanners and shortwave radios, offering precision and flexibility but costing $10,000-$50,000!

With the advent of wide-frequency-coverage VHF/UHF receivers -- particularly the ICOM R7000 -- a resurgent interest has grown regarding spectrum display capabilities on receivers and one commercial firm is actively developing a low cost VHF/UHF receiver with a built-in SDU for the consumer market.

In the meantime, GTI Electronics has released their "Spectra-Display", a self-contained adaptor which, when connected between an oscilloscope and an ICOM R7000, provides visual representation of signals on the air over a range of several megahertz. We recently purchased one for use at our monitoring post and present our findings here.

Connecting it up

The Spectra-Display plugs directly into 120 VAC for its source of power and has four RCA phono plugs on the rear apron for interconnecting the 'scope and R7000 (cables are provided). It receives its signal information from the 10.7 MHz IF output jack on the rear of the R7000, then sends the video representation to any oscilloscope which allows external triggering. A 12 volt DC terminal provides power for an accessory like the GTI 1000P wideband preamplifier which will be reviewed separately.

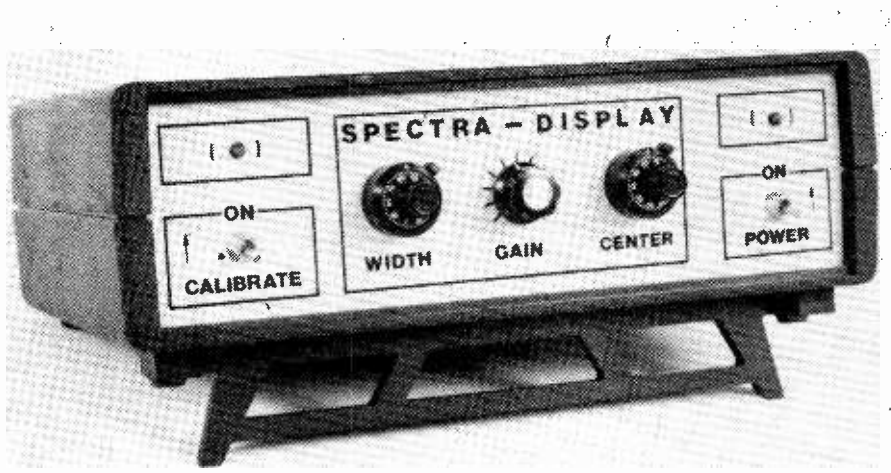
Setting it up

A set of easy-to-follow instructions comes with the Spectra-Display and initial calibration is quite simple. A built-in 1 MHz crystal calibrator allows the user to set the sweep to represent any convenient bandwidth from a few tens of kilohertz through ten megahertz. The wider dispersion is used to search the spectrum for signal presence while the narrow bandwidth is used to analyze a single signal.

The Spectra-Display requires no extended warmup time after being switched on. Connected to an inexpensive Tenma oscilloscope, the smooth, vernier-drive width and centering controls were alternately adjusted to provide a 10-MHz-wide display window of the 150-160 MHz range on our R7000.

Advancing the gain control we instantly saw the tell-tale "spikes" of signals popping up and down, revealing two-way users as they keyed their transmitters. When a new signal came up, we quickly rotated the receiver's tuning dial until the "pip" centered itself on the display to be identified by the audible signal heard through the radio's speaker.

The gain controls on the Spectra-Display and the oscilloscope were adjusted for an optimum combination leaving the desired signals present while reducing the spurious noise spikes below the noise floor ("grass") at the baseline of the display.



Running it through its paces

Although the narrow spikes would not show modulation patterns, nor could we see spikes representing the very weakest signals on the 10 MHz sweep, readjusting the Spectra-Scan for narrow dispersion (about 1 MHz sweep width) revealed modulation patterns on the pip traces as well as the presence of very weak signals (S-1 on the R7000 S-meter).

One drawback of an add-on SDU scheme is that the receiver's AGC (automatic gain control) circuitry will substantially reduce signal levels when a strong signal is being received, often driving a strong spike down below the noise floor of the display.

We worked around this problem, however, by setting the tuning dial just off frequency so that the signal was not passing through the R7000's IF stages where the AGC voltage would have been generated; the weak signal was still being received and displayed full height.

Mode setting of the receiver (FM wide, FM narrow, AM, SSB) has no effect on the trace since it is shown before it is demodulated by the receiver's detector. The manufacturer claims flatness of the display to be within 1 dB across the band as it sweeps 10 MHz in 20 milliseconds.

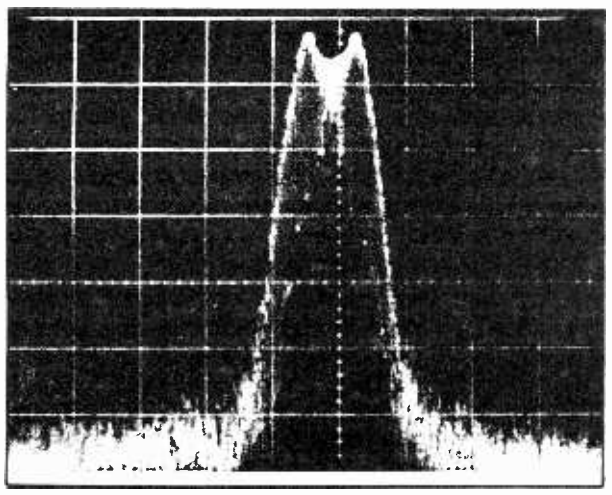
Strong harmonics of the Spectra-Display's 50 MHz local oscillator were prominent through 1 GHz and detectable to 1.7 GHz, appearing as vertical traces on the screen.

At night, clusters of international broadcast stations appeared as stationary spikes on the screen regardless of dial setting on the R7000. These phantom pips, picked up by the poorly-shielded audio cable that comes with the unit, were virtually eliminated by substituting a length of well-shielded coax, RCA phono plugs installed as connectors, for the IF interconnect cable.

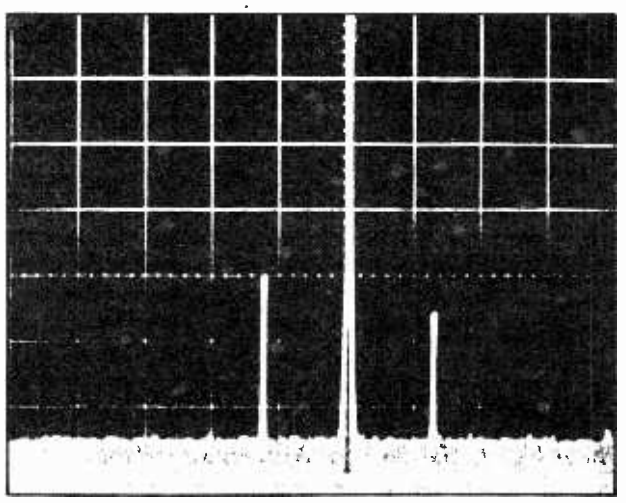
We would have preferred a higher synchronization voltage output for our oscilloscope; a stable setting was very touchy and, as the box warmed up, occasional resetting was necessary to keep the display from drifting out of synch.

While some purists may feel that a separate oscilloscope and display unit comprise a cumbersome method for spectrum display, the system is inexpensive compared to the alternatives and it works well.

[Spectra-Display, $349.95 including shipping from GTI Electronics, RD 1 Box 272, Dept. MT, Lehighton, PA 18235; ph. 717-386-4032]



A single signal can be studied for modulation properties at minimum dispersion.



On maximum dispersion, signals pop up as "spikes" or "pips" across the display.

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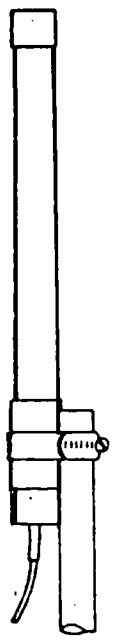
LF Engineering

VLF Active Antenna/Converter



LF Engineering, a small but innovative company dedicated to receiving signals below 500 kilohertz, has announced their new L-101S "receiving system," a small package consisting of a two-foot active antenna probe coupled to an up-converter via 50 feet of RG-174/U miniature coax.

As seen from the illustration, the PVC probe assembly may be mounted on a convenient mastpipe; a universal hose connector is provided to affix the probe to the mount. The probe is watertight, sealed with epoxy cement and tested to two atmospheres, equivalent to submersion in water to a depth of 66 feet. That should resist the most persistent storm! Temperature tolerance is -20 to +120 degrees Fahrenheit.

Internally, the probe assembly houses a high-impedance lowpass filter which removes signals above 500 kilohertz from the integral whip before they arrive at the 20 dB preamplifier which is DC-powered via the coax line from batteries in the converter.

The lowpass filter is flat within 6 dB from 10-500 kHz and attenuates unwanted broadcast stations by as much as 100 dB at 1 MHz. With local medium wave broadcast intermod especially severe at VLF, this level of rejection is most welcome.

With the probe located as high as possible and away from electrical wiring, the cable is run down to the converter module at the listening position. The converter, mounted in a small utility box, consists of two FETs in a simple oscillator/mixer configuration. It is crystal controlled (+/- 0.01% maximum tolerance) and may be ordered for either 3.5-4.0 or 4.0-4.5 MHz up-conversion.

The converter is powered by two internal nine-volt batteries (not provided) and an LED indicator reminds the user that the unit has been switched on. Cross-polarized diodes in the signal input line protect the FETs from burnout due to lightning-induced transient voltages.

RCA phono plugs are used for input and output connection, acceptable for these low frequencies. Since the connections are all at the radio position there is no problem of weathering.

The Test

There is certainly nothing to hooking the pair up; it seems barely necessary to read the instructions other than to become familiar with the theory of operation. With the probe about 8 feet above ground (the minimum elevation recommended by the instructions) on a shelf in the radio room and the converter plugged into the antenna connector on a Yaesu FRG7700 general coverage receiver, we were ready to go.

We chose the 4.0-4.5 MHz conversion scheme so that no mental arithmetic was necessary to read the actual receive frequency. Simply by ignoring the 4 megahertz, the VLF frequency was displayed as the kilohertz readout on the dial; i.e., 4.100 MHz was 100 kilohertz, 4.028 translated as 28 kilohertz and so on.

The first thing we noticed was the presence of harmonics from a nearby television set; from 15 kHz on up, prominent sweep noise interfered with reception. The set was switched off (much to the displeasure of its teenaged addict) and the noise disappeared, revealing a variety of signals beneath.

True to the manufacturer's claim, I copied signals ranging from Omega navigational beacons (12 kHz) through the non-directional beacon (NDB) band (200-400 kHz) and upward toward 500 kHz. Powerline carriers (PLCs) and the characteristic "diddle-diddle" of power load telemetry signals was prevalent in the 180-190 kHz portion of the spectrum.

It seemed to matter little what the orientation of the probe was; vertical or horizontal, the signals sounded the same. Even when the probe was permanently mounted on the roof about 15 feet above ground level there seemed little difference in apparent signal strengths.

Conclusion

LF Engineering products may be hand made, but they are done so with care and utilizing high quality design practices. Performance and durability are two key indicators of quality and the L-101S passes these criteria with flying colors.

For further information on the L-101S and other VLF products, write to LF Engineering, 17 Jeffry Road, Dept. MT, East Haven, CT 06512.

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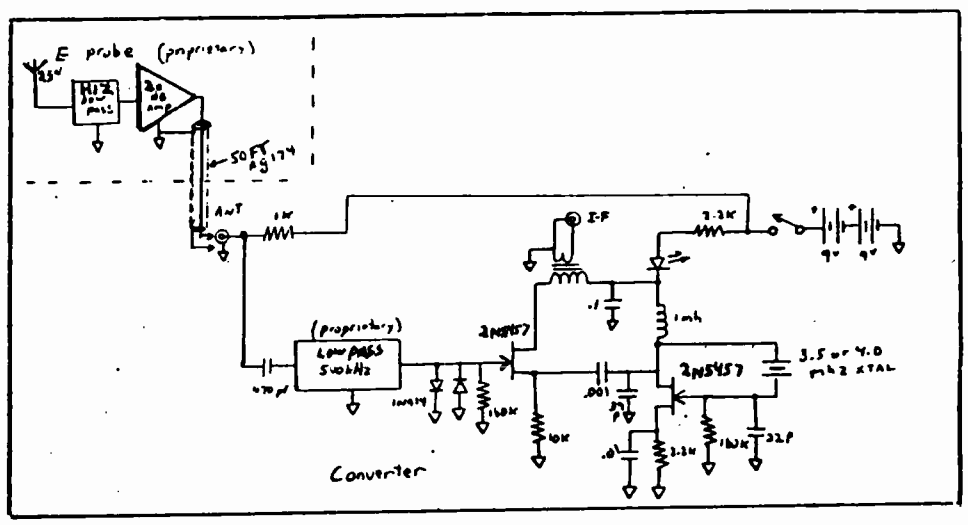

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Shortwave Accessories:

Sometimes You Need 'Em; Sometimes You Don't

Radio hobbyists, in their constant and enthusiastic search to hear weak signals, often add various signal enhancing devices to their receivers. Frequently, a particular add-on will be the answer to one SWL's prayer while another user may obtain no value whatsoever from the same device.

This month, we'll take a look at some of the popular add-ons. We'll try to weigh the pros and cons of each. We'll tell you when you need them and when you don't.

A Pain in the Ear

Of all the add-on devices, few are as often overlooked yet useful as a good speaker.

In an effort to save money and space, almost all receiver manufacturers -- whether they're making $1,000 table radios or $99.00 portables -- install cheap speakers. The result is tinny, distorted and annoying audio. A bad speaker can make even the best receiver sound mediocre and average stations sound terrible. Hook up a good speaker, and even weak signals can be heard clearly.

Choosing a good external speaker is not all that difficult. But you must get one that matches the output impedance of your receiver.

Most modern receivers have an output impedance of 8 ohms while older units may require 4 or 500 ohm speakers. In the case of a 4 ohm requirement, an 8 ohm speaker will work well.

If your receiver requires the 500 ohm (or higher) speaker, the easy solution is to connect an audio output transformer of the proper impedance across the receiver's output. Audio output transformers for these values (for example, 500 to 8 ohm) are readily available from your local Radio Shack store or parts house and require virtually no electronics expertise to install. Once completed, you can now use a modern, high quality 8 ohm speaker on your old, 500 ohm receiver.

Opinion about what constitutes a good speaker varies. Some experts recommend a simple 3 to 5 inch replacement speaker while other equally adept listeners suggest a small hi-fi speaker.

The argument in favor of a "simple speaker" says that hi-fi devices are sensitive to a wide range of frequencies and will amplify noise as well as the intended signal, hence making the target signal harder to hear.

I use the "Realistic Minimus" speaker from Radio Shack with excellent results on both shortwave broadcast stations and utilities. In fact, the hi-fi speaker enhances utes and makes them easier to listen to for extended periods of time. If you use a small (4 to 6 inch) hi-fi speaker for even a short time, chances are you'll never go back.

Remember that it is ok to use a higher impedance speaker than called for, but never a lower impedance than specified. In other words, it's all right to use 8 ohm when 4 is specified but never 8 ohm when 500 is called for. To do so could damage your receiver.

The Other End

Everyone knows that the antenna is the business end of a radio. Consequently, if the antenna is lacking, the entire radio suffers. In an effort to minimize all this suffering, radio buffs have been building and buying doo-dads to make their antennas perform better -- or at least make the receiver think the antenna is performing better.

Preamplifiers

A preamplifier is a device that amplifies the signals from the antenna. It is installed between the antenna and the receiver. There are two types of preamplifiers, one is installed at the receiver; the other on the antenna.

The advantage of the antenna-installed preamp is that it amplifies the signal before it is attenuated by the feedline. This is most important at VHF and UHF frequencies where feedline loss can be extremely high. The receiver mounted unit is quite satisfactory for frequencies up to 30 MHz.

Most modern receivers do a satisfactory job up to about 20 MHz or so and then their ability to hear signals starts to drop off (especially in a less expensive receiver). You can easily determine if your receiver would improve with a preamp by doing the following test.

A Simple Test:

Tune the radio to about 25 MHz, then disconnect the antenna. If you have RF gain control, turn it up.

After the antenna is disconnected, the receiver noise should drop sharply. If the noise doesn't drop off very much or not at all, then chances are a preamp will be a worthwhile investment.

Sometimes a preamplifier will cause more problems than they cure. Because this type of unit is very broadband, they amplify everything coming into the antenna and can produce images or birdies (out of band signals).

One of the better preamplifiers available for the shortwave broadcast bands is the Palomar Engineers model P-308. It's available from a wide range of shortwave stores, including many of those who advertise in *MT*. The cost is generally under $100.00.

Preselectors

Should you encounter problems with a preamp, they can usually be cured with a device called a preselector. A preselector is a tuned amplifier with a very narrow bandwidth. Preselectors must be tuned to the precise frequency in use. When tuned, the preselector eliminates images and provides a much higher gain than the average broadband preamp.

Most preselectors have a bandwidth much like your receiver's and a tuning control that must be set close to the frequency you wish to listen to. While this may be a disadvantage in some respects, the amplified preselector is a far superior device to the broadband preamp for weak signal enhancement.

When shopping for a preamp or a preselector, remember that "you get what you pay for." I suggest that you check the ads in *Monitoring Times* or spring for a call to the various supply houses (When requesting prices and information, remember to call the business' local number. The toll-free numbers are almost always used exclusively for orders only and the operators may not be well-versed in the technical information you need.)

Antenna Tuners

In order for an antenna to provide an efficient signal to the receiver, the impedance of the antenna must match the impedance of the receiver. Most antennas are efficient over a very narrow band. As you tune the receiver above or below this optimum range, the characteristic impedance of the antenna will change and signals will be attenuated.

An antenna tuner or antenna matcher will correct this problem by allowing the operator to make the antenna's impedance match the input of the receiver across a wide range of frequencies. This is, of course, very good for the person who can erect only one antenna.

Morse Offer Extended

Due to the excellent response to June's column on learning Morse code, Ike Kerschner is extending his offer of a free code training course for use on the Apple II series of computers. You can get your copy by sending Ike a blank 5 1/4 inch disk and return postage. Ike's address is found at the beginning of this column.

Ike also tells us he will be leaving Mechanicsburg August 22 on an MS bike-a-thon. His destination -- 150 miles to Harper's Ferry, West Virginia. Write him if you'd like to add your support.

In addition to allowing the operator to use one antenna over a wide range of frequencies, the antenna tuner is basically an unamplified preselector and will correct the same problems of images and intermod as we mentioned earlier.

Two Types of Tuners:

There are two types of antenna tuner in use. The first is called the random wire tuner which is designed to be used with a single, end-fed long wire. It cannot be used with dipoles or beam type antennas.

The second and preferred unit is called a universal transmatch. It will allow the operator to tune any type of antenna over a very wide frequency range. The cost of the random wire tuner usually runs about $40.00 while the universal tuner is about $60.00. Unless you never intend to use any antenna except an end-fed wire, buy the universal tuner!

In use, the receiver is set to the frequency range you want to tune to and then the inductance switch on the tuner is set to the point that produces the highest noise in the receiver. Then both tuning controls (capacitors) are carefully peaked for optimum noise or signal.

Depending on the type of antenna being used, it should be possible to cover about 200 kHz or more before repeaking the tuning controls becomes necessary.

The universal tuner I use is made by Heathkit and is called the HFT-9. It is an excellent tuner that comes in kit form and the cost is $49.95. Perhaps the best buy on the market is the MFJ-901B, which checks in at a price of about $59.95, assembled. Both units function with any antenna from about 1.5 to 30 MHz. ■

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Auction Expertise

by Paul Swearingen

If you've never bid at an auction for fear of taking home more than you could afford, here are a few tips to help out. Take cash with you, or call the auctioneer to see if he will accept your personal check. Arrive about an hour before the auction in time to survey the items offered. Examine them; if electricity is available, ask permission to check out the equipment, and if you can't get something to fire up, call it to the attention of the auctioneer or his assistant; an honest one will not attempt to oversell broken gear, as many will indeed take back misrepresented items if the selling price is out of line. Take notes; write down the maximum price you'd be willing to pay for each item which interests you.

When the auction starts, listen carefully for the pattern the auctioneer establishes. Usually, the figure he is calling out is the asking bid; as each person bids (by nod, raising a numbered card, calling out, etc.) the auctioneer will instantly shift to a higher asked bid price. Each has a slightly different style which takes a little getting used to.

Once you feel comfortable and have successfully bid on some items, you may want to attempt some techniques I've found useful in controlling the situation.

Try not to make the first bid; the auctioneer often will ask for a first bid higher than the selling price, although he'll usually accept an opening bid of a few dollars just to get things going.

If you suspect that someone is attempting to bid up the item; that is, to bid only to raise the price, not to purchase, throw in a verbal bid of double the increment. For example, if the auctioneer has been adding five dollars each time and is up to, say, fifty-five dollars, yell "Sixty!" assuming that you're still under your highest limit. Most of the time you'll silence casual bidders. But fair play--if you're at a club or charity auction, remember that the purpose of your being there is to help raise money for a good cause. Don't use this technique too often, either, as you may find it difficult to catch the bidder's eye if he knows you're trying to underbid what he feels is a fair price for the item.

Know what you're bidding on; be ready to bid on items you've missed during your preliminary survey; be able to decide whether or not you'd be willing to lug home the junk and white elephants some auctioneers will group with more desirable items just to clear the tables; watch for pieces that fall off when the auctioneer's helper lifts the items off the table; if the items stay on the table rather than being passed to you, keep an eye on them so that when people start removing them you can remember what now belongs to you. ■

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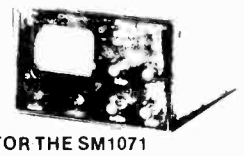

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Fishing for Frequencies with a Handheld Counter

by Dave Beauvais

David Epp of Lincoln, Nebraska, recently described his somewhat frustrating experience in attempting to use a Heathkit handheld frequency counter to capture the frequencies of unknown transmitters in the field (*MT*, Feb 1987, p.56). Since I've had basically *very good* experience using the Heath IM-2400 handheld counter for this purpose, I thought it might be helpful to *MT* readers if I shared some of the techniques that have worked well for me.

To begin with, I'll say categorically that a portable frequency counter is one of the most indispensable tools a serious monitor can own. Having used mine for about two years, I can't imagine taking to the field without it, and I certainly can't fathom what I ever did before I had it!

There are two types of situations where the counter has proved invaluable: rolling down the highway and attending outdoor (sometimes indoor) music, sports or political events. Each application has its own unique opportunities and problems.

Mobile Use

On the road, I keep the unit next to my MX-5000, with a "Y" cable connecting it to the scanner antenna (a high-band Larsen 5/8 whip). Whenever I find myself in traffic next to a car or truck whose driver is talking into a microphone, I simply hit the "ON" switch, read the frequency, key the digits into the MX-5000, and plug into whatever is going on! It works amazingly well and it's given me access to more interesting stuff than I thought possible. There is simply no other way to capture an unknown frequency on the road where a laborious search of an entire band is out of the question.

The performance of this antenna is somewhat less adequate on UHF, where the sensitivity of both antenna and counter tends predictably to drop off. A possible way to skirt this problem would be to employ separate VHF and UHF antennas on the vehicle, with a rotary coaxial switch to choose the optimum antenna for the band that you think you may be in use in the target vehicle, or you might substitute a good, all-band mobile scanner antenna.

I simply can't emphasize strongly enough how much better the portable counter will work with a substantial mobile whip than it will with a basic rubber duck or a small telescopic whip. On VHF low and high bands, our counter-and-whip combo will capture a moderately-powered base station at a distance of up to 200 feet; It will capture a mobile unit or handheld walkie-talkie at a distance of up to 75 or 100 feet.

If you want to talk about commercial FM broadcast stations, distances of up to a mile are quite common -- We once had the unit's display lock onto a powerful commercial FM station which was located on a hilltop some six miles away!

Making the best of it

If you must use a rubber duck or telescopic whip with your counter, here are some hints to optimize its performance. First: if you've chosen a telescopic whip, try to use one which has a full 36" (or more) extension (The Grove ANT8 46" whip is ideal for handheld counter use). A long telescopic antenna will work moderately well on both low- and high-band VHF. For UHF captures, lower the antenna to about 12-15" and try fine tuning it -- moving it up or down an inch at a time until the display locks onto the transmitter.

If you choose to use a rubber duck, you should be aware that the rubber antenna's efficiency (according to recently published tests) is only about 7% that of a reference half-wave dipole. Since we're dealing with a fairly "deaf" signal threshhold on the counter to begin with, an inefficient antenna puts us at a great disadvantage.

Actual field tests have shown us that our Heathkit with a "duck" will capture a handheld at a distance of 30 feet with ease -- *if* the rubber duck on the counter matches the band in use by the walkie-talkie! In other words, a low- or high-band VHF rubber duck will perform very, very poorly on UHF captures. I've actually stood right behind a security guard who was using a UHF handheld, and I couldn't capture his frequency at a distance of five feet using a VHF rubber duck!

The moral of this story is clear: Try to build a collection of high-performance ducks, and choose the one for your counter which seems to match the one in use on the walkie-talkie (or vehicle) that you're attempting to capture (Refer to "Behind the Dials," *MT*, Feb 1987, p.50, for a discussion of high-performance antennas that should work well with your handheld counter). The real problem is with 450 MHz signals. It *is* possible to obtain adequate UHF performance from this counter -- but you've got to pick your stick with care!

I had a nice illustration of this phenomenon during a protest at the Vermont Yankee nuclear power plant last year. I was using a custom-built multi-band rubber duck on the Heathkit counter, and I was very interested in grabbing the frequency of the security guards manning the gates of the plant. After several fruitless attempts, I tried running my fingers up and down the length of the duck, to fine-tune its impedance match to the counter. At one precise point about two-and-a-half inches from the base of the antenna, the display finally "locked" on a frequency - 451.125 MHz. That was it!

The capture took place at a distance of about 25 feet -- and this was really pushing the UHF sensitivity of the unit to the max. An actual UHF duck might have worked better. But a straight VHF duck was simply useless in this situation. A 17" whip also failed to capture the UHF handheld.

Public Gatherings

This tale, at least, had a happy outcome. It also serves as a fitting introduction to the second major situation where my frequency counter had paid for itself many times over in valuable service. If you're a dedicated radio hobbyist who attends outdoor sporting, musical or even political rally events, you've undoubtedly experienced the frustration of trying to search out the operating frequency of the security guards or stage crew on your pocket scanner. With short transmissions and three huge bands to over, the task is almost impossible.

And it's not made any easier by the fact that in many cases, the handheld units could be rented from a radio supply shop or owned by a guard service whose FCC license is held by the main headquarters of the service, sometime hundreds of miles away. In either case, the frequency listing is not likely to show up in any scanner directory under the town or city where the event is taking place. Your only chance is to get close enough to grab it for yourself.

This you can do, *if* you practice a little friendly diplomacy and savvy human relations. Highly-charged political protests may be a difficult nut to crack. But we've found that at most sporting and artistic events, at least one of the security personnel can be coaxed into a friendly discussion of his or her radio.

One neat trick is to tell a friendly-looking radio-toting person that you're a radio ham with a keen interest in high-performance radios (true, in my case), then offer your handheld scanner for examination, asking if you can look at their radio to compare it. As you turn it over and scrutinize it admiringly, you might just happen to "hit" the transmit button for a second, and observe the readout on the frequency counter that you're holding in your other hand!

Another approach, after making friendly conversation, is to show the security person precisely what the frequency counter is, and how it works. It's been my experience that they'll be amused by the display -- and you'll get what you're looking for with no pain or strain!

One word of caution: none of the above works with bona fide police officers! Intensely suspicious by nature, they are very wary of anyone touching *any* of their equipment. Your best bet is simply to hang out and wait for a transmission at whatever distance feels comfortable to you. And remember that the transmit frequency may actually be one side of a repeater offset. Especially on UHF, check 5 MHz down from the transmit frequency to see if the handheld is keying a repeater output.

I made another surprising discovery: Walking through a ticket gate with a walkie-talkie (or frequency counter) in hand sometimes -- though by no means always -- yields a free admission to the event!! I found this by accident once, when I approached the gate of a concert and was waved through with a smile! Everyone seems to assume that you're working security or functioning in some other official capacity.

Losing Charge

One last helpful tip on managing the Heathkit counter: A major problem we encountered, and resolved, was the tendency of the internal ni-cad pack to turn up dead just when we needed it most. Over a period of a month or more, the pack discharges slowly, so that when you find yourself in need of an instant frequency grab, you're very like to hit the power switch and get...zippo!

Having been foiled in the clutch by this failure once too often, we simply snipped the leads on the internal ni-cad pack and fitted the counter's leads with a set of snap-type connectors (the type that mate with a

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rectangular 9-volt transistor radio battery). Take care that you connect the counter's positive lead to the *flanged* snap, and the counter's negative lead to the *smooth* snap. Then simply plug a heavy-duty 9-volt alkaline radio battery into the counter's snaps.

We've found that a top-quality alkaline battery will run the counter for up to two hours of continuous duty, which translates into a month or more of intermittent use, and the shelf life of an alkaline battery is measured in years, not weeks! This means you'll always have the power to the counter when you need it, even after it's been sitting for a month. And should you ever come up with a dead battery, you can replace it quickly.

You also can fit out your removed nicad pack with a set of snaps, taking care to observe polarity so that the plus snap on the pack (smooth) will mate with the plus snap on the counter (flanged). Now you can use your rechargeables at will, or just remove them if they turn up dead and plug in an alkaline! (The nine-volt battery output does not seem to bother the counter at all -- it fairly thrives on the extra juice!).

By the way, Heath is not the only manufacturer of handheld frequency counters. OptoElectronics, Inc. offers a series of counters priced between $100 and $150, with high-end coverage of 1.2 GHz for the lower priced models, and 1.3 GHz for their top-of-the-line. Excellent sensitivity is claimed (high enough to locate flea-powered "room bugs"), and the counters will work in the 800 MHz trunking and cellular frequency ranges. Contact OptoElectronics at 5821 N.E. 14th Avenue, Ft. Lauderdale, FL 33334 for more information about their counters. ■

R71A Power Switch Damage

An interesting item which appeared in *The Canadian Amateur* as reported by the *ANARC Marketplace* warns of a possible failure which can be caused by rapid on/off pressing of the AC power switch on the ICOM R71A receiver as well as similar ICOM transceivers, the IC-751, 751A and 745.

Though not a problem we have encountered, apparently it is possible to burn out the multivibrator which illuminates the vacuum fluorescent display and will destroy the audio output as well. ■

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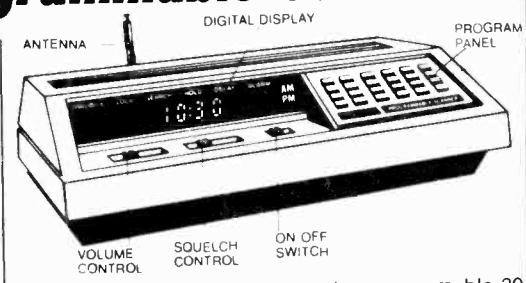

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Special Applications

High, Clear and Long: The Perfect Antenna Rule?

Last month we talked about the idea of HCL -- that antennas should be "high," in the "clear," and "long." This is generally good advice. Keep in mind, however, that there's...

An Exception to Every Rule

Let's consider the first rule: "the higher, the better." For most situations, this is indeed a good rule. The higher the antenna, the more it will be in the clear, with an unobstructed chance to emit and/or receiver electromagnetic waves. In the case of line-of-sight communications, being higher also increases the distance across which your antenna can "see" other antennas operating with which you wish to communicate. Seldom will you go wrong by using the "higher is better" rule.

There are times, however, when you can put an antenna too high for the task you are asking it to perform. Consider the following example. A few HF communications links depend on *high* angle radiation being reflected from the ionosphere and bouncing back down to nearby stations. We usually think of ionospheric reflection in terms of *low* angle radiation and long distance communications links. But in certain very hilly areas, or in areas of intense vegetation, short-haul HF communications may also depend on ionospheric reflection. This is because ground waves dissipate quickly under these circumstances and line-of-sight circuits are very short. This mode of communication, functioning as it does *beyond* the short limitations of line-of-sight in such situations, is called BLOS (Beyond Line-of-Sight). At appropriate frequency, namely 2 to 4 MHz, BLOS can provide reliable daytime, and even night time HF communications.

BLOS Communications

A horizontal wire antenna used in BLOS communications emits radio waves in all directions. Some waves hit the ground below and are reflected back up past the antenna to join others which are being emitted skyward. And due to the manner in which radio waves combine, it is possible to adjust the height of the antenna above grounds so that these waves either add their strength together or tend to cancel one another out.

Thus, since it is the high-angle (skyward) radiation which provides the circuit we desire in BLOS communication, we must have an antenna at optimum height above the ground so that these two waves combine for maximum strength. As the antenna goes above or below this optimum height, short-haul communications suffer. So, higher antennas are not *always* better. It depends on what you seek.

In the case of VHF or UHF, the ground's function is sometimes taken over by the ground-plane or other portion of the antenna. When this is the case, raising the VHF or UHF antenna higher primarily affects the line-of-sight factor, giving greater coverage with increased height. But, again, we find exceptions to even this rule.

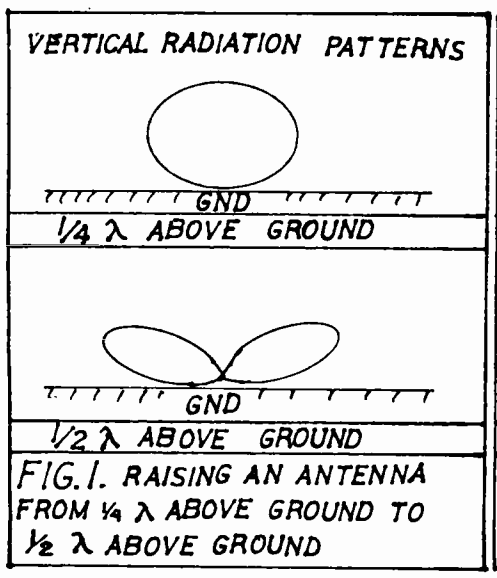

FIG. 1. RAISING AN ANTENNA FROM ¼ λ ABOVE GROUND TO ½ λ ABOVE GROUND

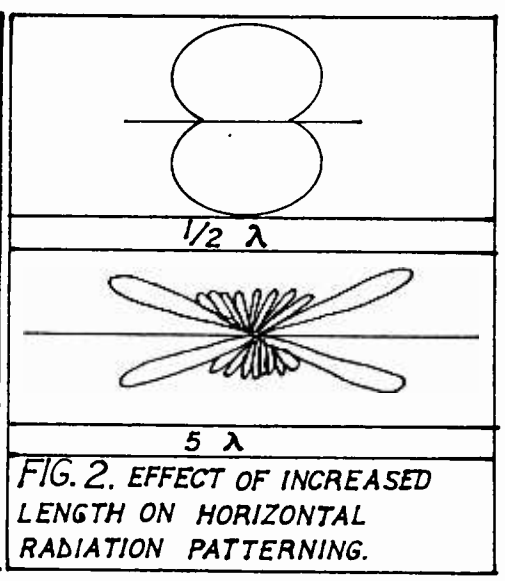

FIG. 2. EFFECT OF INCREASED LENGTH ON HORIZONTAL RADIATION PATTERNING.

Another Exception

One exception is that if you already have your VHF-UHF antenna high enough to be clear of local obstructions, it may be unwise to raise it higher. The reason for this is that your feedline introduces significant losses at VHF-UHF. And increased feedline loss, due to greater feedline length, may be greater than the increase in signal strength due to raising the antenna!

With a Clear View,

...You Can See Forever. I can't think of a single exception to the "clear" rule. When your antenna is in the clear, signals have an unimpeded path to and from the antenna. So choose your antenna site to be as clear of obstructions (buildings, trees, etc,) as possible in the direction of reception of radiation.

But Longer is Better,

Isn't it?... How many times have you read that a long wire -- and the longer, the better -- is your best general listening HF antenna? And often this is true, partly because the longest antenna most of us can manage is probably something like 50 to 75 feet or so. But if the person erecting the antenna lives in a location where they have a larger than normal area to use for siting, they may be able to put up a wire hundreds, or even thousands, of feet long. This sort of antenna is very good for some purposes, but as you may already suspect, bad for some others.

For Instance... Wires several hundred feet long can be a large number of wavelengths long -- even at frequencies as low as the HF portion of the spectrum. But straight wires many wavelengths long are *so* directional that they actually be called beams! Thus, really long wires may receive or transmit very well from certain directions. But depending on the frequency you use and how they are mounted, they may have very deep nulls (very poor response) from other directions.

So, if a good nondirectional antenna is what you really want, a *really* long wire is usually not what you want. For all practical purposes, a wire 1/2 wavelength long is close to nondirectional and in practical sites, its nulls are no problem. Beyond that, the longer wires, (in terms of wavelengths), you may find deeper and deep nulls and more directions from which communication will be difficult.

In addition, very long wires may be especially responsive to local broadcast stations, or other strong off-frequency signals and intermodulation can become a problem. This, as you may know, can give much frustrating interference to the signals you desire.

So, although longwires have long given, and will long continue to give good service in a multitude of applications, and although they are among the most time-honored general use antennas, it is possible to get too much of a good thing in certain situations.

Another Rule of Thumb

Marconi was the original wireless engineer. And he developed many of the basic rules of radio communication in use even today. Maclairen, in his *Invention and Innovation in the Radio Industry*, writes that "With the apparatus used from 1896 to 1898, Marconi had found that if he doubled the height of the aerial, the range of possible communication would be four times greater." Jim Kyke, in his *UHF Antenna Handbook*, gives the current rule-of-thumb form of the Marconi rule: "...doubling the antenna height adds 6db of signal strength." As 6 db is an increase in power by a factor of four, the old Marconi rule is the same as the current rule of thumb.

In Summary

Since rules-of-thumb are usually "quick and easy" simplifications of more complex principles, it is not surprising the rules of thumb must be mixed with a bit of understanding as to how radio waves behave. And so, the best rule-of-thumb for antennas may just be one that was published in a 1984 *QST* article. It says, "What you don't have in your final amplifier, you must have in your antenna system and between your ears."

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"What you don't have in your final amplifier, you must have in your antenna system and between your ears" - QST

RADIO RIDDLES

Last Month's Riddle:

Last month I asked why an entomologist who is reading about the anatomy of a bug is like a radio buff who reads this column. Well, an entomologist is an insect specialist, and, when reading about bug anatomy, one thing they would study is bug "whiskers" or "feelers" called antennae. And of course, in this column, we read about antennas, so-named due to their resemblance to the feelers or antennae, of an insect.

By the bye, I've read reports that certain parts of some insect skeletons are responsive to microwaves. There was even speculation that this allowed the insect to respond to certain naturally occurring microwave signals. I should have mentioned that in my article about odd and unusual antennas!

This Month's Riddle:

Let us say that you are a radio operator with a sensitive receiver and a powerful transmitter at your station. You also have a highly directional beam antenna that receives from the front and back directions equally well. One day you sit down to your transmitter and tune the receiver and transmitter to the same frequency. Then you tap once on the radiotelegraph key sitting on your operating desk.

About 1/7 of a second later, you hear the faint dit of a Morse code in your headphones. You sit there quietly, listening intently, and in about another 1/7 of a second, you hear an even fainter "dit" repeated again. What is this strange "dit." Are you getting alien response from outer space? Or is some wise guy sitting on your frequency and mimicking you, or what?

Tune in next month for the answer. Meanwhile, don't forget to send me descriptions and drawings, or pictures, of the antennas which you are using. I'll want to know your use for the antenna (utility monitoring, SWLing, etc.), and for what frequency or bands. Also, tell me a bit about how they perform. We'll feature some of them in a future column. ■

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Bands: 30-50, 88-108, 118-136, 144-174, 440-512 MHz.
The *Regency* Z60 covers all the public service bands plus aircraft and FM music for a total of eight bands. The Z60 also features an alarm clock and priority control as well as AC/DC operation. Order today.

Regency® Z45-MA

List price $259.95/**CE price $159.95/SPECIAL**
7-Band, 45 Channel • No-crystal scanner
Bands: 30-50, 118-136, 144-174, 440-512 MHz.
The *Regency* Z45 is very similar to the Z60 model listed above however it does not have the commercial FM broadcast band. The Z45, now at a special price from Communications Electronics.

Regency® RH250B-MA

List price $699.95/**CE price $329.95/SPECIAL**
10 Channel • 25 Watt Transceiver • Priority
The *Regency* RH250B is a ten-channel VHF land mobile transceiver designed to cover any frequency between 150 to 162 MHz. Since this radio is synthesized, no expensive crystals are needed to store up to ten frequencies without battery backup. All radios come with CTCSS tone and scanning capabilities. A monitor and night/day switch is also standard. This transceiver even has a priority function. The RH250 makes an ideal radio for any police or fire department volunteer because of its low cost and high performance. A *60 Watt* VHF 150-162 MHz. version called the **RH600B-MA** is available for $439.95. A UHF 15 watt version of this radio called the **RU150B-MA** is also available and covers 450-482 MHz. but the cost is $439.95.

Bearcat® 50XL-MA

List price $199.95/**CE price $114.95/SPECIAL**
10-Band, 10 Channel • Handheld scanner
Bands: 29.7-54, 136-174, 406-512 MHz.
The *Uniden Bearcat* 50XL is an economical, handheld scanner with 10 channels covering ten frequency bands. It features a keyboard lock switch to prevent accidental entry and more. Also order the new double-long life rechargeable battery pack part # **BP55** for $29.95, a plug-in wall charger, part # **AD100** for $14.95, a carrying case part # **VC001** for $14.95 and also order optional cigarette lighter cable part # **PS001** for $14.95.

NEW! Scanner Frequency Listings

The new Fox scanner frequency directories will help you find all the action your scanner can listen to. These new listings include police, fire, ambulances & rescue squads, local government, private police agencies, hospitals, emergency medical channels, news media, forestry radio service, railroads, weather stations, radio common carriers, AT&T mobile telephone, utility companies, general mobile radio service, marine radio service, taxi cab companies, tow truck companies, trucking companies, business repeaters, business radio (simplex) federal government, funeral directors, veterinarians, buses, aircraft, space satellites, amateur radio, broadcasters and more. Fox frequency listings feature call letter cross reference as well as alphabetical listing by licensee name, police codes and signals. These Fox directories are $14.95 each plus $3.00 shipping. State of Alaska–**RL019-1**; State of Arizona–**RL025-1**; Buffalo, NY/ Erie, PA–**RL009-2**; Chicago, IL–**RL014-1**; Cincinnati/ Dayton, OH–**RL006-2**; Cleveland, OH–**RL017-1**; Columbus, OH–**RL003-2**; Dallas/Ft. Worth, TX–**RL013-1**; Denver/Colorado Springs, CO–**RL027-1**, Detroit, MI/ Windsor, ON–**RL008-2**; Fort Wayne, IN/Lima, OH– **RL001-1**; Hawaii/Guam–**RL015-1**; Indianapolis, IN–**RL022-1**; Kansas City, MO/ KS–**RL011-2**; Long Island, NY–**RL026-1**; Louisville/Lexington, KY–**RL007-1**; Milwaukee, WI/Waukegan, IL–**RL021-1**; Minneapolis/St. Paul, MN–**RL010-2**; Nevada/E. Central CA–**RL028-1**; Oklahoma City/ Lawton, OK–**RL005-2**; Orlando/Daytona Beach, FL–**RL012-1**; Rochester/Syracuse, NY–**RL020-1**; San Diego, CA–**RL018-1**; Tampa/St. Petersburg, FL– **RL004-2**; Toledo, OH–**RL002-3**. Regional directories which cover police, fire ambulance & rescue squads, local government, forestry, marine radio, mobile phone, aircraft and NOAA weather are available for $19.95 each. **RD001-1** covers AL, AR, FL, GA, LA, MS, NC, PR, SC, TN & VI. **RD002-1** covers IL, IN, KY, MI, OH & WI. For an area not shown above call Fox at 800-543-7892 or in Ohio 800-621-2513.

Regency® HX1500-MA

List price $369.95/**CE price $218.95**
11-Band, 55 Channel • Handheld/Portable Search • Lockout • Priority • Bank Select Sidelit liquid crystal display • EAROM Memory Direct Channel Access Feature • Scan delay
Bands: 29-54, 118-136, 144-174, 406-420, 440-512 MHz.
The new handheld *Regency* HX1500 scanner is fully keyboard programmable for the ultimate in versatility. You can scan up to 55 channels at the same time including the AM aircraft band. The LCD display is even sidelit for night use. Includes belt clip, flexible antenna and earphone. Operates on 8 1.2 Volt rechargeable Ni-cad batteries (not included). Be sure to order batteries and battery charger from the accessory list in this ad.

Bearcat® 100XL-MA

List price $349.95/**CE price $178.95/SPECIAL**
9-Band, 16 Channel • Priority • Scan Delay Search • Limit • Hold • Lockout • AC/DC
Frequency range: 30-50, 118-174, 406-512 MHz.
Included in our low CE price is a sturdy carrying case, earphone, battery charger/AC adapter, six AA ni-cad batteries and flexible antenna. Order your scanner now.

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Save even more with this special coupon. As long as your order is **prepaid by money order**, you'll get extra special pricing on items listed in this coupon. In addition, if you order a *Bearcat* 50XL or *Regency* HX1500 scanner with this coupon, you'll get a free set of *Duracell* batteries which we recommend for best performance. If you buy a *Regency* Z60 or Z45 scanner using this coupon, you'll get a free Fox frequency directory worth $14.95. This coupon must be included with your *prepaid* order. *Credit cards and quantity discounts are excluded from this offer.* Offer valid only on prepaid orders mailed directly to Communications Electronics Inc., P.O. Box 1045 - Dept. M3, Ann Arbor, Michigan 48106-1045 U.S.A. Coupon expires July 31, 1987. Coupon may not be used in conjunction with any other offer from Communications Electronics Inc. Be sure to add shipping & handling fees listed in this ad (add $3.00 for shipping free books or batteries).

RH250B-M3 *Regency* 25 W. VHF Transceiver	$299.95
RH600B-M3 *Regency* 60 W. VHF Transceiver	$388.95
RU150B-M3 *Regency* 15 W. UHF Transceiver	$399.95
UC102-M3 *Regency* 1 W. VHF 2 channel trans.	$119.95
HX1500-M3 *Regency* 55 channel scanner	$217.95
Z60-M3 *Regency* 60 channel scanner	$158.95
Z45-M3 *Regency* 45 channel scanner	$148.95
BC100XL-M3 *Bearcat* 16 channel scanner	$177.95
BC800XLT-M3 *Bearcat* 40 channel scanner	$278.95
INF1-M3 *Regency* Informant scanner	$249.95
BC210XW-M3 *Bearcat* 20 channel scanner	$168.95
BC50XL-M3 *Bearcat* 10 channel scanner	$113.95
RD55-M3 *Uniden* Radar Detector	$97.95

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Bearcat® 800XLT-MA

List price $499.95/**CE price $289.95/SPECIAL**
12-Band, 40 Channel • No-crystal scanner Priority control • Search/Scan • AC/DC
Bands: 29-54, 118-174, 406-512, 806-912 MHz.
The Uniden 800XLT receives 40 channels in two banks. Scans 15 channels per second. Size 9¼" x 4½" x 12½."

OTHER RADIOS AND ACCESSORIES

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RD55-MA *Uniden* Visor mount Radar Detector	$98.95
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BC 140-MA *Bearcat* 10 channel scanner	$89.95
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***NEW!* R1090-MA** *Regency* 45 channel scanner	$148.95
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SMMX7000-MA Svc. man. for MX7000 & MX5000	$19.95
B-4-MA 1.2 V AAA Ni-Cad batteries (set of four)	$9.95
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FB-E-MA Frequency Directory for Eastern U.S.A.	$14.95
FB-W-MA Frequency Directory for Western U.S.A.	$14.95
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Add $3.00 shipping for all accessories ordered at the same time.
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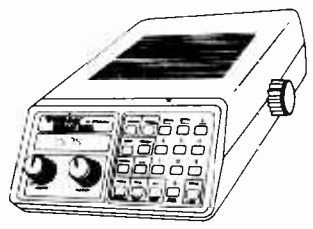
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Terry Staudt, L.P.E., WØWUZ
716 N. Roosevelt
Loveland, CO 80537

A Simple Audio Processor

How many times have you wished you could reduce harsh high frequency noises, tones and hiss coming through the speaker of your shortwave or scanning receiver? Bob Ferretti of Donora, Pennsylvania, comes to the rescue with a simple circuit used alone or in combination with the Radio Shack stereo synthesizer (15-1278, $89.95) for even greater flexibility.

Two independent single-pole, double-throw switches (S1 and S2) allow four possible combinations of the external components: the inductor alone, the capacitor alone, the combination inductor/capacitor L-filter, or no filter at all (as shown in illustration A).

Bob adds that by connecting the stereo synthesizer outputs to the tape monitor (or similar) inputs of your stereo system, you can process FM, records and tapes as well as contouring the audio coming from the external speaker or 'phone jack on your receiver or scanner (illustration B).

The Parts

The trick may be finding appropriate component values to duplicate Bob's circuit. Actually, parts values close to those shown in the circuit should work fine. Some experimentation may be necessary to find just the right combination for your particular application.

For example, the two electrolytic filter capacitors (virtually any voltage rating) are series connected in reverse polarity to create one non-polarized value of half the capacity of one unit. Try values from 50 to 470 microfarads.

The inductor (500 millihenry) is also not a typical parts catalog item; try various substitutes including small audio and power transformer windings if a single choke coil is unavailable.

The two resistors should be rated at one watt each to absorb any heat dissipation from high audio levels. Their purpose in the circuit is to establish a low impedance load to match the nominal 8-ohm audio output of the receiver or scanner.

Even without the stereo synthesizer the switched inductor/capacitor circuit can be used alone in series with a speaker or headphones; expect some loss in audio level, however, due to the series resistance offered by the wire in the coil as well as the load resistors.

If you intend to couple the simple filter to the Radio Shack stereo synthesizer, the output of the filter is connected to the VCR input jack. The synthesizer's left and right outputs can then be fed individually to the matching inputs of a stereo amplifier.

CW operators may wish to try yet one other configuration: put the inductor and capacitor in series between the receiver output jack and the headphones or speaker (or synthesizer input) to produce the audio bandpass filter as configured in illustration C. Again, experiment with component values to determine the best characteristic for your application. ■

Resonance

by Terry Staudt

Paul Alves has an Icom R-71A receiver and a name-brand loop antenna. Reception on standard broadcast -- well, let's just say it's a vacuum phenomenon.

As a result, I am going to do what I vowed to do at least four times a year: stress resonance.

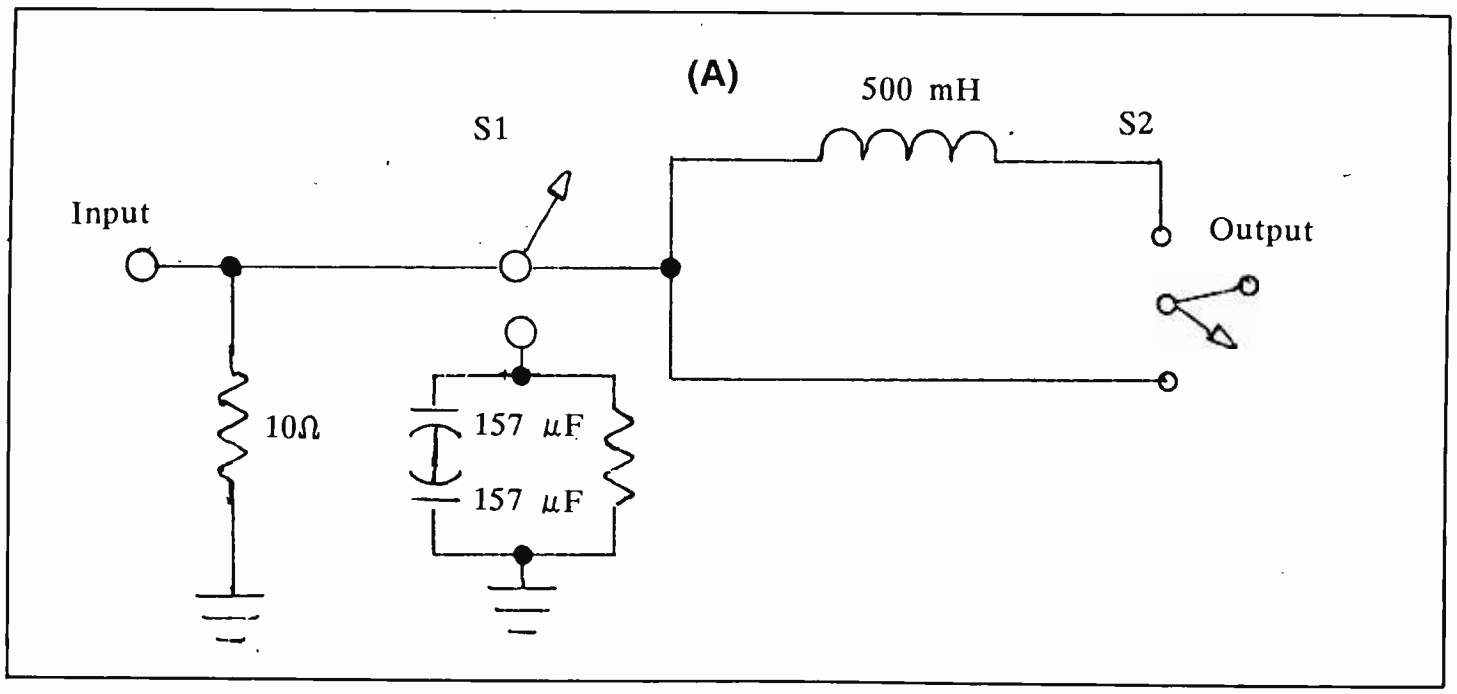
Do you remember your 7th grade science class when the teacher had two tuning forks on the same frequency? If you recall, he or she struck one on the edge of the table, then held the other one next to it, but not touching. What happened was that the second tuning fork began to vibrate in sympathy with the other. By the same token, a tuning fork of another frequency would have stayed as dead as a roach! Antennas work exactly the same way using an electrical analogy.

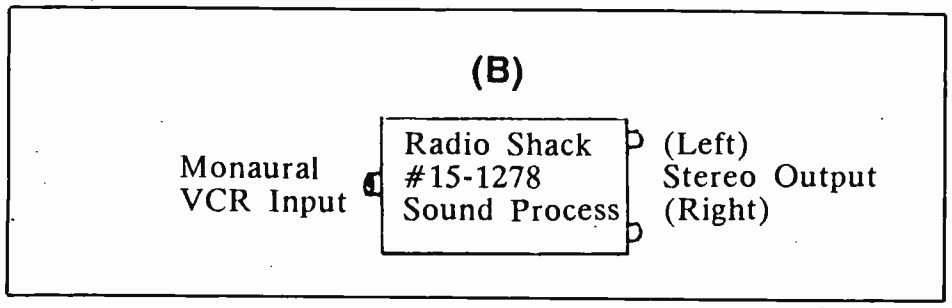
Now, to the point at hand. The length of a half-wave dipole is 468/F MHz. It's rather apparent that the formula works out to 468 feet at 1 MHz. You'd need a country estate for that sort of thing.

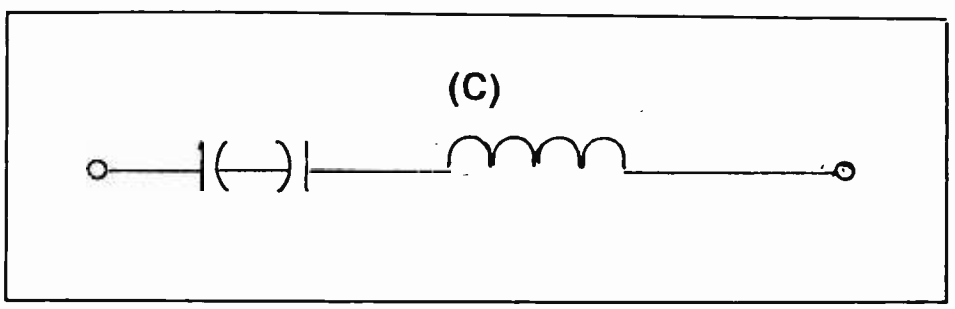
A quarter-wave antenna, however, is just 234 feet and has the advantage of having a 50 ohm impedance at the end.

Still a lot? Not really when compared to the ratty performance of an antenna 1/100 or smaller. It may be zig-zagged all over the place, or wrapped around a garage. You just need a banana plug from Radio Shack to stick the end into the center of your coax jack.

So, to the standard broadcast DXer I say, you won't hear Morocco at noon with a resonant antenna, but if the river don't rise and the cattle don't drown, you'll hear 'em at night!







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Need a Preamp?

Does your older receiver suffer from poor sensitivity? Have you a project under way that could benefit from a few extra dB of gain? Two inexpensive wideband preamplifiers from Digitrex may be the answer.

The PA-19 is designed for continuous 0.5-200 MHz applications, ideal for use as a shortwave booster. Measuring just over an inch square and built on an open circuit board, the PA-19 offers 19 dB gain at 50 ohms impedance when powered by 12 volts DC at 20 milliamperes.

Noise figure of the device is only 2.8 dB at 200 MHz and the specifications of the $9.95 (plus $1 shipping) unit will bring the sensitivity of a receiver down to a fraction of a microvolt.

The PA-20 is designed for continuous coverage from DC to 1000 MHz, making it ideal for scanner applications as well as long and short wave. Average gain is 17 dB and noise figure is less than 5 dB at 1000 MHz.

Operating from 12 VDC at 10 mA, the PA-20 costs $19.95 (plus $1 shipping).

For more information, write Digitrex direct at 1689 West Hamlin Rd., Rochester Hills, MI 48063 (ph. 313-853-3232).

Motorola Equipment Manuals

Curtis Harbin of Johnson City, Tennessee, has unselfishly donated a stack of Motorola equipment manuals for free distribution to fellow readers. To help cover the cost of postage, send $1 per manual to the *MT* office--first come, first serve! Order by these descriptions:

HT90 (136-174 MHz) service manual
HT90 (440-512 MHz) service manual
HT90 (403-430/440-512 MHz) service manual
HT440 (440-512 MHz) service manual
Spirit pager (132-174 MHz) owner's manual
Pageboy II (148-174 MHz) owner's manual
Dimension IV pager (132-174 MHz) owner's manual
Mitrek (403-420/450-512 MHz) owner's manual
MT500 Converta-Com console owner's manual
Battery charger for MX300 instructions
Battery charger for HT90/HT440 instructions
PA200 electronic siren instruction manual
Minitor alert monitor maintenance manual
Micor instruction manual revisions

We thank Curtis for sharing these information-packed manuals with flea-market addicts who may have picked up some of these units at a recent hamfest and don't know what to do with them!

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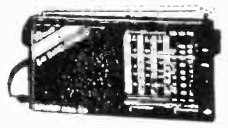

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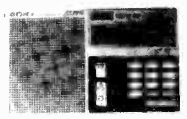

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CK-70: DC kit for VDC operation
CR-64: High stability oscillator
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EX310: Voice synthesizer
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FL63A: CW narrower filter (250 Hz)
RC-11: Infrared remote control

Service Manual SMR71A $30.00 + $4.00 UPS

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The Modified Windom Antenna

by Wilfred N. Caron

Antennas that are fed off-center are commonly known as the "Windom antenna." Loren Windom, 8GZ, has been given the credit for developing this antenna. Actually, it was developed by John Byrne, 8DKZ, and E. F. Brooke, 8DEM, under the guidance of W. L. Everett, their teacher and instructor. Windom was a student of Byrne who did most of the developmental work on the Windom antenna. Windom described the antenna in the September 1929 issue of *QST* and, since then, it has been dubbed the Windom antenna.

Off-center feeding an antenna plays a role of impedance-transformer. Off-set feeding has some effect on the radiation pattern but the impedance level changes greatly, rising as the feed point is moved off center.

The Windom antenna takes advantage of the fact that when it is resonant the characteristic impedance along the length of the antenna is a pure resistance which varies from 0 ohms at its center to over 4000 ohms at the ends. The magnitude of this impedance being a complex function of length-to-diameter ratio of them antenna element and, of course, its height above ground.

The antenna element is fed off-center by a single feed line at a point where the resistance equals the input resistance of the feed line. When this condition occurs, no standing wave exists on the feed line. This is illustrated in Figure 1.

The lack of a standing wave on the feed line does not preclude radiation from the feed line. Like the rhombic and terminated V -- antennas that have no standing waves -- strong radiation takes place in the absence of standing waves. Understandably, a standing wave on the line would increase the level of radiation from the line.

There are several reasons why the original Windom concept became obsolete:

- o A single feed point on the antenna causes a current to flow outwards in both directions thus creating nulls broadside to the antenna and asymmetrical radiation patterns;
- o Power is wasted by radiation from the feeder;
- o Power is lost in the ground return path because the feeder is functioning as a vertical radiator and the ground is its counterpoise;
- o No precise method for locating the offset feed point which is a function of the input impedance of the vertical section. Published feed point locations vary from 0.037 to 0.083 wavelength from center.

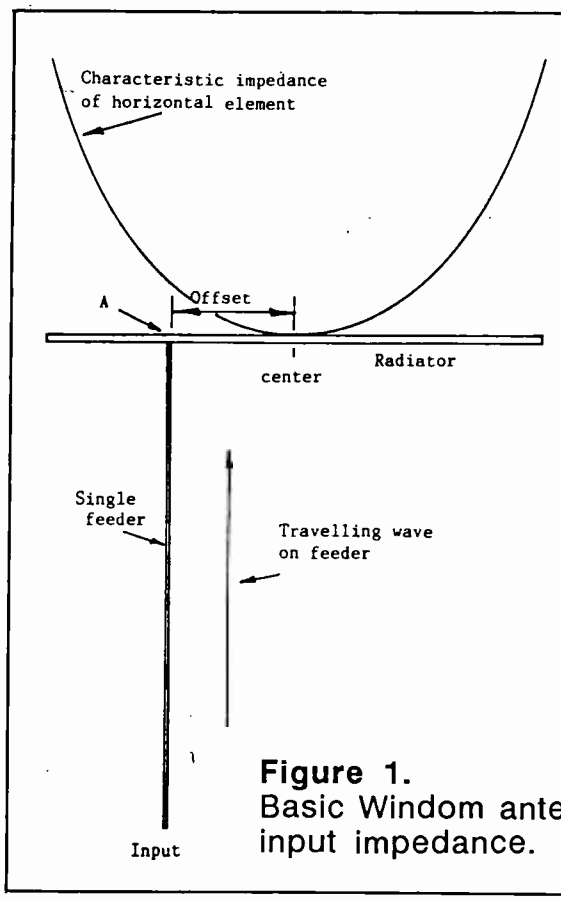

Figure 1.
Basic Windom antenna. Impedance at point A must equal input impedance.

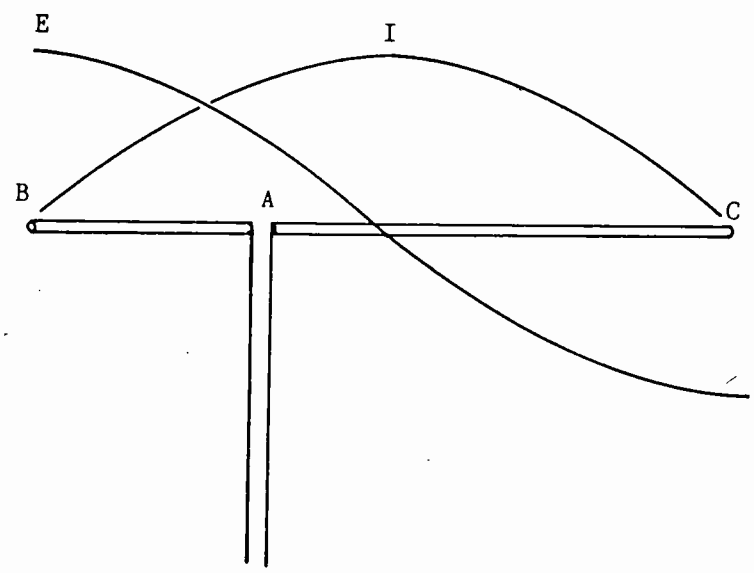

Figure 2.
Dipole fed off-center with balanced feeders.

It is possible to overcome the problems stated above by simply incorporating a balanced transmission line. Let us consider a half-wave antenna as shown in Figure 2, on which is shown stationary waves of current and voltage.

The balanced feeder is tapped at point A. We can see that section B-A is less than one-quarter wavelength and that section A-C is greater than one-quarter wavelength.

If we look at the reactance curve on Figure 3, we can see that wherever point A is located, the reactance of the antenna length B-A is almost equal and opposite to that of length A-C as referred to point A.

If point A is at the center of the antenna the reactances from both halves of the antenna will be equal and quite small. As point A is moved away from the center, the reactance of each section rises to a larger value, but at any feed point the effective reactance is almost zero, and thus we are constantly seeing an almost pure resistance regardless where point A is placed. This can be expressed mathematically as

$$Z_o = R - jX_{BA} + jX_{AC}$$

It remained for Jim MacIntosh, GM3IAA, to develop the "one-third tap" on the early Windom. MacIntosh's concept is incorporated in the modified Windom where the feed point is 22 feet from one end of a 66-foot horizontal antenna resonated at about 7.20 MHz.

To prevent feedline radiation and ground losses, two methods of feeding can be used: 1, a coaxial cable and balun arrangement and, 2, a two-conductor feeder (see Fig. 2).

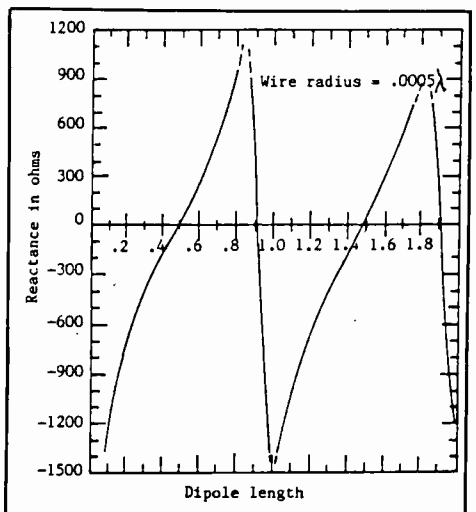

Figure 3.
Reactance of a dipole vs. dipole length.

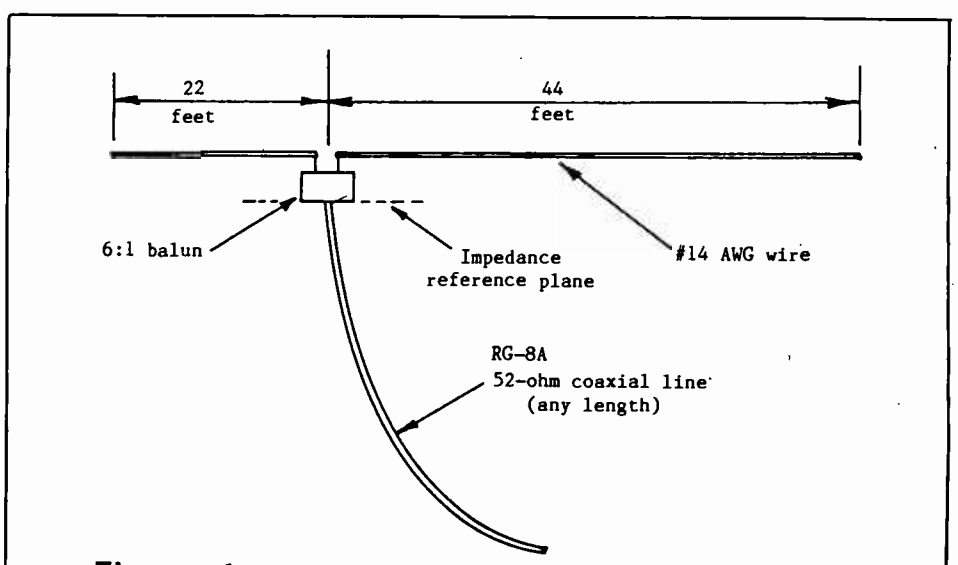

Figure 4.
The modified Windom antenna.

Wilfred N. Caron is the author of the Grove book, Antennas for Receiving, now out of print.

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The coaxial-balun arrangement was used to obtain the test data presented and is shown in Figure 4. The balun used is a 6:1 balun (Palomar Engineers Model PB-6) which matches the 52-ohm RG-8A to the 300-ohm feed point impedance of the antenna. The data presented is referenced at the balun input.

It can be seen from the Smith chart data (Fig. 5) that the worse case mismatch occurs at 7.0 MHz which is equivalent to a SWR of about 1.2:1. The performance in the 20-meter band is also shown. Worse case mismatch occurs at 14.0 MHz, equivalent to an SWR of about 2.2:1.

Radiation patterns at the second harmonic frequencies are expected to be different as compared to those of the fundamental frequencies due to current reversal on the full-wave element. The patterns should resemble a four-leaf clover.

The sloping V configuration of Figure 6 was also investigated because it represented an unknown area. The test results proved to be most interesting.

In the 7.0 to 7.4 MHz frequency range the worse case SWR is about 1.8:1. For the 14.0 to 14.4 MHz range the worse case appeared to be less than an SWR of 1.16:1. These test results are also presented in Figure 5.

The modified Windom antenna and, in particular, the modified Windom sloper V are, indeed, very interesting antennas that offer optimum radiation efficiency and performance. ■

References:

Historical comments obtained from: J.M. Haerle, *The Easy Way HF Antenna Systems*, page 57; Overtones, Inc., Denton, TX, 1984.

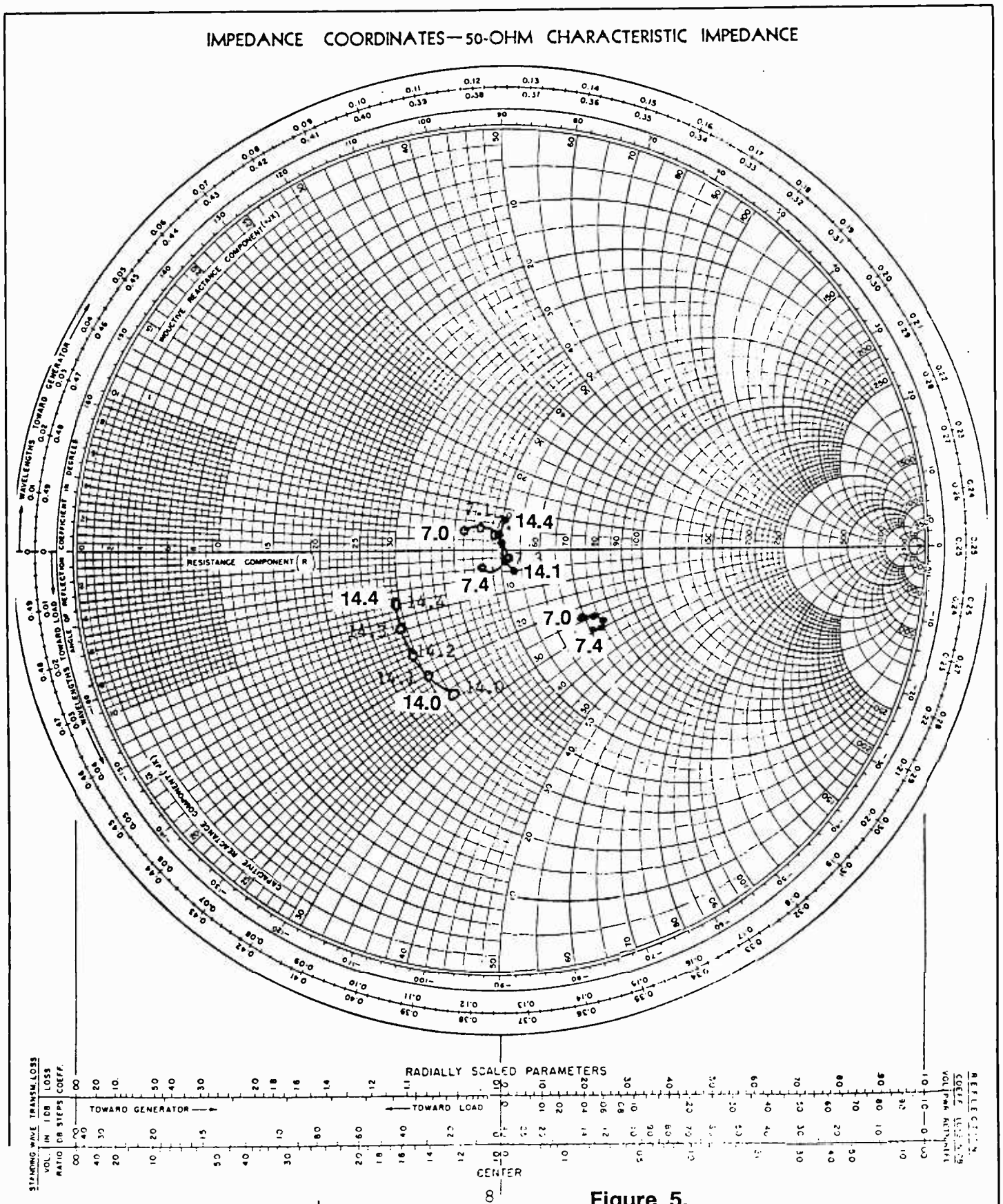

Figure 5.
o = The modified Windom
● = The modified Windom sloping V

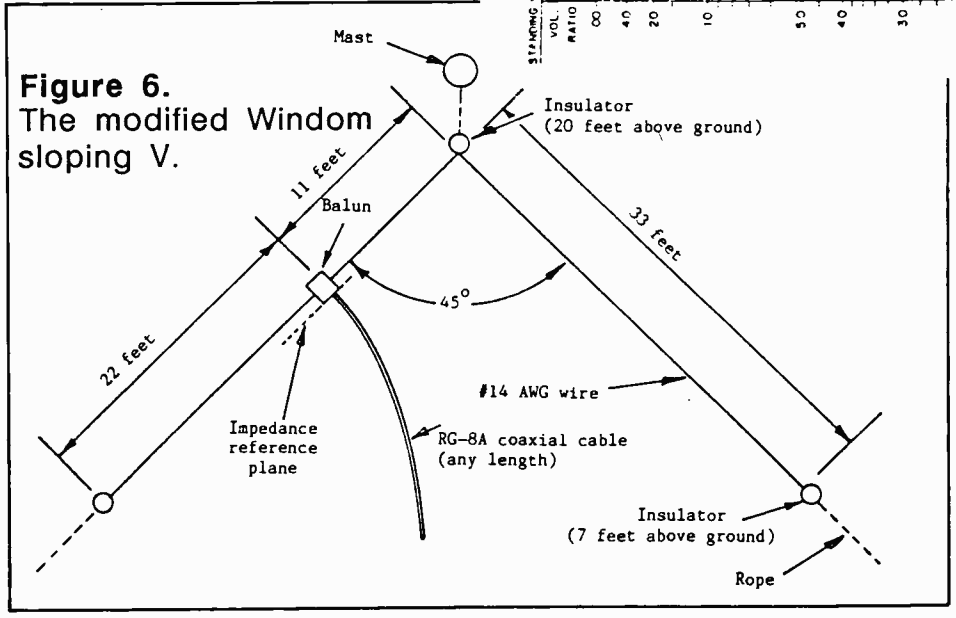

Figure 6.
The modified Windom sloping V.

R7000 Scan Delay Update

Last month's Experimenters Workshop detailed a method of making a real scanner out of the popular ICOM R7000 general coverage VHF/UHF receiver. Many experimenters have successfully tried the procedure and their constructive comments have been most informative.

Next month *MT* will present a special update showing the best way to make the conversion with minimum effort. It's well worth the wait!

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"ASK BOB"

Bob Grove, WA4PYQ
P.O. Box 98
Brasstown, NC 28902

Q. How high should I mount my outside antenna? (D.L., Rock Falls, IL)

A. Generally speaking, if your outside antenna has a clear view of the horizon, it is high enough. This rule of thumb may be altered by such large obstructions as nearby buildings, hills or mountain ranges and heavy woods. Then extra height is recommended.

If you are on flat terrain without nearby obstructions, you would have to increase the height of your antenna two to four times to observe any improvement in received signal strength.

Be sure that the antenna is as far as possible from electrical wiring and large metal surfaces like siding, sheet metal roofing and ductwork.

Q. My crystal-controlled scanner seems to be more sensitive to police signals near 154 MHz than our newspaper service near 173 MHz. How come? (M.T., Bristow, VA)?

A. Crystal-controlled scanners are factory aligned to favor the most popular portions of their receivable ranges, usually the police and fire frequencies in the 154-156 MHz swath of spectrum. Programmable scanners, on the other hand, are either wideband designed or capable of tracking each channel, electronically returning for best reception throughout the scanning sequence.

A number of options are worth considering in your case. Have a technician tune the receiver near the center of the band (164 MHz); Use an outside antenna to overcome signal loss from the compromise alignment; Acquire a second, inexpensive scanner for the other frequency; or simply buy a new programmable scanner--their performance is excellent and their prices are competitive with crystal models.

Q. When I plug an external speaker into the jack on the rear of my receiver the internal speaker cuts off; is there any way I can have both speakers working? (G.L., Tama, IA)

A. The jack has a built-in set of contacts which disengage when the plug is inserted, thus disconnecting the internal speaker. If you examine the jack you will find there are three solder lugs; two of them must be soldered together to defeat the disconnect.

With the external speaker plug inserted, you may wish to temporarily try various combinations, shorting them with a short wire with the radio on and at low volume, to determine the proper pair from the three connections.

DO NOT COME IN CONTACT WITH THE WIRING NEAR THE POWER CORD WHILE DOING THIS AT THE RISK OF POTENTIALLY FATAL ELECTRIC SHOCK!

An even easier solution would be to place a second external speaker near the scanner, operating at the same time as the remote speaker. Both speakers should be of the same impedance and wired in series so as not to overload the power rating of the audio output circuitry.

Q. Can the GTI Spectra Display and oscilloscope combination be used with receivers other than the ICOM R7000? (M. T. Ledoux, Chalfont, PA)

A. The Spectra Display will work with any receiver that has a 10.7 MHz intermediate frequency; of the general coverage receivers presently on the market, only the R7000 has that IF.

Q. Driving through Cape Hatteras, North Carolina, in June we heard a station on our FM dial sign, "Commerce, Texas." Isn't that a little far for skip on FM? (A. W. Oliver, Spring, Texas)

A. It sure is. While ducting (waveguiding by the atmosphere) can occur for hundreds of miles at VHF, true skip over this distance at 100 MHz is rare, but not impossible. It can be produced by meteor scatter, aurora borealis ("northern lights"), unusual solar influences, strong weather fronts, or you may have heard a tag at the end of the broadcast crediting the source of the program rather than the transmitter location.

Q. I enjoy monitoring RTTY with my Infotech M600 demodulator but I receive an irritating buzzing sound which disappears when I disconnect the video monitor. Is there something wrong with the monitor? (Jon Lawson, Philadelphia, PA)

A. If you have a good image, there is nothing wrong with the monitor; however, all low cost video monitors radiate harmonics of the 15.75 kHz horizontal sweep oscillator, some (such as yours) worse than others.

Be sure you are using a good grade of coaxial cable (not cheap, shielded audio cable) between the M600 and the monitor; make certain that the M600 is grounded to the receiver and to an actual ground lead, listening for reduction in interference.

In especially stubborn cases, you may have to disassemble the monitor, install bypass capacitors on the AC line and shield the yoke and cable harness. If all else fails, try another monitor!

Q. Is there a receiver or scanner manufactured which tunes 500 MHz to 25 GHz, or 500 MHz to 1 GHz, or 1 GHz to 25 GHz? (Walter von Schellenberg III, Largo, FL)

A. There are no scanners with any of those ranges at present. Several commercial companies manufacture extended, continuous range VHF/UHF receivers for scientific, military and laboratory use, however. These receivers average $10,000-$50,000. Names like Reaction Instruments and Watkins Johnson are commonly seen.

A number of spectrum analyzers. some with audio demodulation capability, cover these ranges as well and are in the same price range. IFR, Wavetek, Texscan, Hewlett Packard, Cushman, and others dominate the field.

Q. Is there any radioteletype to be heard in the VHF/UHF spectrum outside of the two meter ham band? (Bruce Deardorff, Anaheim, CA)

A. While it is dangerous to answer "yes" or "no" to a question like this, it is tempting to answer "no". A listener may encounter packet transmissions, both commercial and amateur, in the VHF/UHF spectrum, but virtually no common five-level Baudot RTTY.

Q. How does a listener convert UTC (UNIVERSAL Coordinated Time) to local time? (G.E. True, Fostoria, Ohio)

A. Basically, UTC (formerly GMT--Greencwich Mean Time) is nothing more than a way of saying that since a day has 24 hours, let's let the clock run to 24 (midnight) instead of letting it get to 12 twice (noon and midnight)! Thus, 1 PM is 1300 (13:00), 5 PM is 1700 (17:00), and so on until midnight when we start all over again at 0000 (00:00).

But the sun is at different places for different viewers; we have 24 time zones around the world, each separated by 15 degrees in longitude. Since early western world astronomical measurements were conducted at Greenwich Observatory (Greenwich, England), that is our starting point for time.

Here in the United States, the eastern seaboard may see the sun first, but it is still 5 hours after it rose over Greenwich; thus, when it is 7 AM (0700) EST it is already noon (1200) UTC.

There are four U.S. time zones: Eastern, Central, Mountain, and Pacific, each progressively earlier. For example, 1200 UTC (0700 EST) is 0600 Central, 0500 Mountain, and 0400 Pacific Standard time. For local standard time you must subtract 5 hours for Eastern, 6 for Central, 7 for Mountain, and 8 for Pacific. During summer savings time, subtract 4, 5, 6, or 7 hours for those zones.

You will now have local time in 24 hour time; this is fine up to 12:00 noon. If it is afternoon in your time zone, simply subtract 12 more hours from UTC after resolving your zone's offset from Greenwich to get your local time PM.

To change your local time to UTC, do the whole thing in reverse: Add the hours of offset from Greenwich; then, if it is afternoon, add 12 hours. ■

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Compliments on MT

I've got to hand it to you guys. Every time I think you've "hit the top" with *Monitoring Times*, the magazine gets better -- your July issue is a good example.

The wide coverage of communications topics and the timeliness -- especially the timeliness -- of the magazine makes all others, even your prettier competitors, pale by contrast. Apparently, the combination of Grove plus Miller equals magic! Keep up the good work.

Bill Berniman
New York, NY

Handle with Care

I like the page format you started last month, but the thinner page stock that is being used is creating a problem. It is not mailing as good as the previous issues, the edges are looking ragged before I even open it. I also find the pages are harder to turn as it feels as if I will rip it out if I don't turn them very carefully.

Eugene Krolak Jr.
Carleton, MI

(Anyone else having increased problems with postal damage to copies of MT? Please let us know...Bob)

Leveling Out

Some of the articles in *MT* are written at the entry level of intelligence for most of your readers and really are a waste of space. Material that is a rewrite of handouts from governmental agencies could be left out with no problem.

I am particularly interested in RTTY and FAX and would like to see more specific details on station schedules, frequencies, and signal characteristics.

Keep up the good work and remember that most of us out here know how to put up an antenna.

Henry Gorman
N. Palm Beach, FL

(Those articles that are written at entry level are directed to those who are just getting into the hobby; judging from the calls and letters we receive, they hit the mark. We are trying to find someone with RTTY expertise to do a regular column and invite anyone with that qualification to contact us...Bob)

Armed Forces Day Coverage

Congratulations to *Monitoring Times* on the excellent, complete listing in connection with Armed Forces Day! You carried the best listing of military stations available to work amateurs of any of the purely ham magazines such as *QST, CW, 73, Ham Radio* and *WorldRadio* -- call letters, frequencies, and modes of communication.

The military services are strong supporters of amateur radio and it is only proper for the ham magazines to list clearly and completely the military stations standing by to work the hams once a year. Besides, many amateurs like to work WAR, NPL, AIR, and the other big military stations and receive their unique QSLs.

Stuart D. Cowan, W2LX
Henniker, NH

[Thanks, Stu. Anyone get any good photos of this year's Armed Forces Day activities?]

Defense Info Address

Per Jack Sullivan's article, "Monitoring Military Aircraft" (*MT*, November 1986), the new address for Defense Mapping Agency publications such as the IFR supplements is: DMA Office of Distribution Services, Attention DOCS, Washington, DC 20315 (Phone 301-227-2495).

(Name withheld by request)

Frequency Correction

In the May issue of *MT* on page 35, "Mass Scanner Frequencies," the frequencies given for Woburn Police and Woburn Fire are incorrect. They should read:

Woburn Police 482.8125
Woburn Fire 46.38

As I have lived in Woburn for nine years and own three scanners, I assure you that my info is correct.

Robert Studely
Woburn, MA

The Federal File

I would like to add my comments on the "Federal File" on p.25 of the July issue. I have stopped on the beacons when I have been tuning around, and last noted beacons O, C, A, S. Have enjoyed the in-depth study done by K. Russell. As for my comments on them: I don't believe they are from the Soviet Union, but do believe they emanate from north of Canada, and do concur that they are measurements of possibly underwater currents and/or temperatures, etc.

Am building (attempting) an Adcock D/F, and would like some input from other readers.

David White
P.O. Box 43
Cherryfield, ME 04622

QSLing the U.S. Navy

Thanks for all the good articles you have been putting in *Monitoring Times*. I never fail to find interesting reading in every issue. "IDing and QSLing the U.S. Naval Vessels" by Michael Chabak in Oct. 86 was just great.

I am a Ship's Radio Officer on an oil tanker which is in and out of the Persian Gulf and with the aid of Mr. Chabak's article I am able to identify most of the Navy ships we see.

James Simms
Tucson, AZ

Maritime Monitoring

I was impressed by your "Utilities Sampler" (June *MT*, p. 13); the frequencies happen to be some of my favorites.

I want to mention a book that I purchased that is very helpful in keeping up with ships between ports, and locating where they are. It covers the Mississippi & Ohio Rivers, all the inland waterways, and the oceans. It is called *Distances between United States Ports*. It is put out by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration.

Bill Starkey

Viva Dave Rosenthal

It's about time someone gave Radio Earth's Dave Rosenthal the credit he deserves. His enthusiasm and natural ability on the radio makes him one of shortwave's rising stars. ...The only sad thing is that in the same issue, Larry Miller notes the "vacation" of Radio Earth. Well, it's past June and they're still not back on the air. So after all his hard work, where will Rosenthal land now?

[Rosenthal has recently been heard doing occasional reports on Radio Netherland. As for Radio Earth, they're still toying with the idea of doing a show once a week and you can be pretty sure that they'll want to keep their most popular feature a part of it...Larry]

Hate Pirates, eh?

If you dislike illegal pirate broadcasting as much as you indicate in your July editorial, why then, Mr. Editor, do you insist on promoting these mongrels of shortwave bands in your "Outer Limits" column? Practice what you preach and make it a rule to drop all mentions of pirates from *MT* -- unless, of course, the purpose of *MT* is to promote illegal activities.

Anonymous

Unfair Comparison

[In the July editorial] It was totally unfair to compare the drivel found on the so-called pirate bands with public access TV. There is indeed some fine programming found on public access TV.

Martin Fleishmann
Orlando, FL

TPBANAE Passes Sentence

This is to serve notice on *Monitoring Times* that board of directors of The Pirate Broadcaster's Association of the North America and Europe (TPBANAE) has voted to make editor Larry Miller persona non grata for the month of August. During this time, pirate stations around the world will carry programs denouncing Miller and his unacceptable stand on pirate radio. You have incurred the worldwide wrath of tens of thousands of pirate listeners.

R.F. Burns
Executive Director
TPBANAE

[Try tens of tens...Larry]

Cellular Fair Game

Grove's *Monitoring Times* said in an article a person shouldn't listen to the privacy law frequencies. The gov't can't do anything but threaten; the FCC said they won't enforce it ever; and anyone can listen to any frequency not coded, or scrambled

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Bob Grove, WA4PYQ
P.O. Box 98
Brasstown, NC 28902

anytime. They can't go to every home and check. It would take 100 years and more. If they did they couldn't prove anything ever. Please don't mislead everyone. Tell them the truth in *Monitoring Times.*

Gene Perryman
Kendrick, ID

(All of Mr. Perryman's points have been truthfully addressed in previous MT editorials and commentaries... Bob)

Anti-Scanner Law Unconstitutional?

The communications press reported recently that two scanner users in Indiana were arrested under a state statute which makes it a criminal offense to use a scanner in a motor vehicle or to carry a portable scanner on one's person. It seems to me that we really need a national task force to tackle head-on these completely unreasonable and unconstitutional state laws.

Federal preemption of laws governing the use of radio equipment has been established by recent court rulings in the matter of antenna zoning ordinacnes. It seems to me a strong case can be made that forbidding an American citizen to carry a radio receiver in a public place, with no criminal intent or purpose, is a blatant and broadly intrusive violation of our federal civil rights.

Are there any public-spirited lawyer/listeners out there willing to take on the challenge of fighting these preposterous and over-broad laws--beginning with the Indiana statute?

Dave Beauvais
Magic Media Services
Box 695, Amherst, MA 01004

Information Please

Need service info for the following. I will purchase or copy cost. Unicom Electronics Power Supply Model PS-11R, Tandy 64K color Computer II Model 26-3127, EMP/GTS Manual FMini Modem Model MM-101 (manufactured by Elec and Eltec Co. Hong Kong), Heathkit O'scop Calibrator Model IG-4505, Leader RF Signal Generator Model LSG-11, Garrard Turntable Model Lab 95B, Johnson Messenger CB Model 323, Apple IIe Pro System Duo-Disk Imagewriter Printer Monitor II, and Icom Model 735 Ham Transceiver. Mike Adams, Haney Vo-Tech Center, 3016 Hwy 77, Panama City, FL 32405, (904)769-2191.

Need the following. Please state price and/or condition in correspondence. Two (2) transistors MRF 455A; One (1) Antenna Tuner MFJ 962, 949C, 941D or 989; Five (5) Tubes 7868; Ten (10) Lamps #12 6V for Bogen PA Amps; One (1) Each Bandswitch for Panasonic RF 2800 reciever #RSR 98W or equivalent; One (1) printer and disk drive for the Tandy Color Computer II Model 26-3127 and One (1) each Z-80/CPM and Modem Board for the Apple IIe Pro System. Mike Adams, Haney Vo-Tech Center, 3016 Hwy 77, Panama City, FL 32405, (904)769-2191.

Anyone interested in exchanging stereo cassettes of Latin American FM bradcasters with commercials, music, etc.? I am willing to exchange copies of the FM broadcast cassettes that I have collected from Puerto Rico, El Salvador, Argentina and Brazel. Or will also send tape of any local broadcaster in the Baltimore and Washington, D.C., area if preferred. Please mail to Ulis Fleming, P.O. Box 122, Odenton, MD 21113.

Anyone interested in starting a scanner club in the Omaha, Nebraska, area please contact Denis "Skip" Okeefe, 7035 Country Club Rd, Omaha, NE 68152; 402-571-7111.

Help - Need information from anyone using a Tono Model #0-777 with a MacIntosh Plus or MacIntosh SE computer. I am looking for the hook-up configuration between the computer and the RTTY terminal unit. Dave Buda, WA2RYC, P.O. Box 7428, N. Bergen, NJ 07047, (201)667-7343 or CompuServe 73317,2445.

NASCAR NOTICE: Immediately following the May 24 Coca Cola 600 in Charlotte, NC, forward your '87 frequency list to: Radio Research, 10 Elf Lane, Greenville, SC 29611. All list will be consolidated ASAP and watch "MT" for the update.

I would like to correspond with someone who is familiar with broadband type receivers and their applications for advice. Write: Steve Sorenson, P.O. Box 53, New Prague, MN 56071.

Wanted: Schematic for SW receiver Lafayette Model HA-600. Will pay $5.00. Gerold Brecilli, 21583 Poinciana, Southfield, MI 48034.

Aspiring Authors:
DON'T READ THIS!

A recent article crossed our desk that really made our day. Its origin is obscure but it was seen reprinted in Quill Corporation's "pen pals" column.

A Spoof on the Rules for Aspiring Authors

1. Don't use no double negatives
2. Make each pronoun agree with their antecedent.
3. Join clauses good, like a conjunction should.
4. About those sentence fragments.
5. When dangling, watch your participles.
6. Verbs has to agree with their subjects.
7. Just between you and I, case is important, too.
8. Don't write run-on sentences they are hard to read.
9. Don't use commas, which aren't needed.
10. Try not to ever split infinitives.
11. Proofread your writing to see if you any words out.
12. Correct speling is esential.
13. Its important to use apostrophe's correctly.
14. A preposition is bad to end a sentence with.
15. All generalizations are usually false all the time.

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Wanted: HEATH HW-16 and HG-10B VFO working and in good condition with manuals. WA8ONU, P.O. Box 34, Miamiville, OH 45147.

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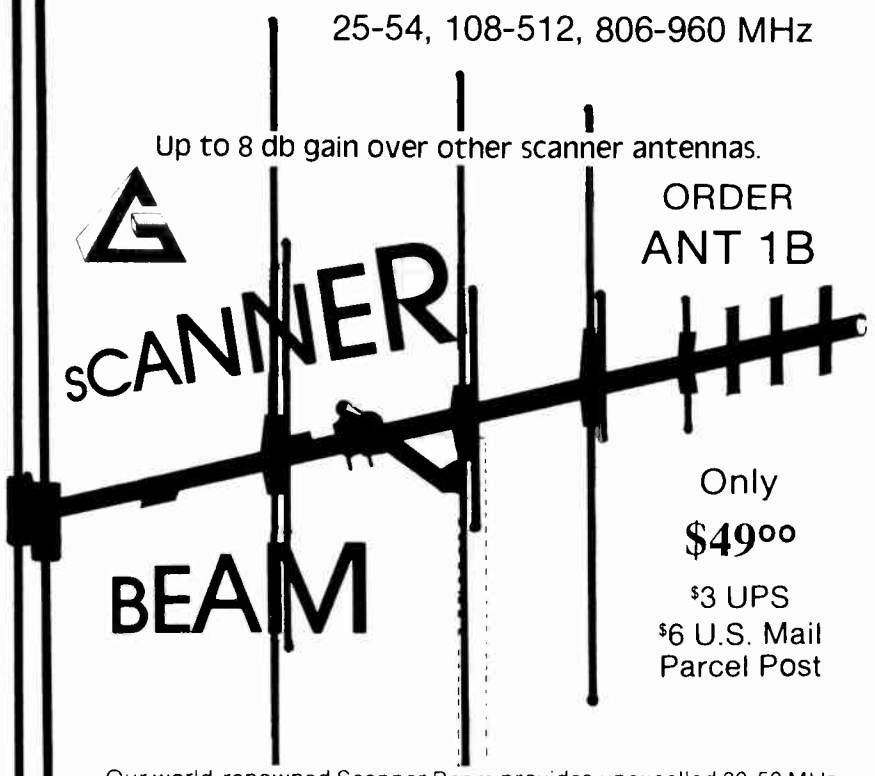

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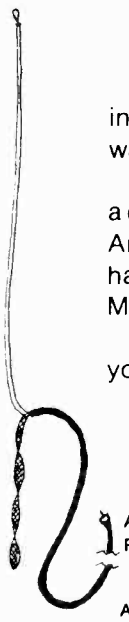

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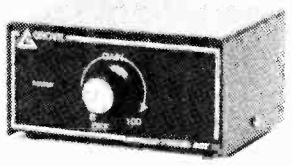

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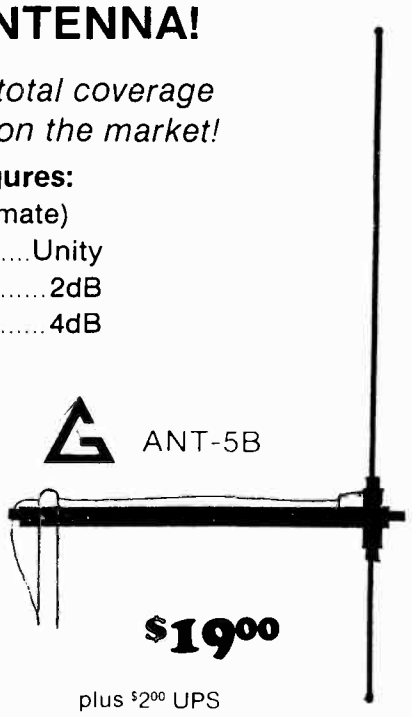

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