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MONITORING TIMES

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BRASSTOWN, NORTH CAROLINA 28902

April, 1986

NEWSFLASH!

MONITORING TIMES COMBINES WITH INTERNATIONAL RADIO

Now we have it all. For years, MT has enjoyed a reputation as the world's leading utilities publication, but short wave broadcasting has always taken a back seat. Now International Radio (formerly Shortwave Guide) and publisher Larry Miller have joined forces with Monitoring Times to produce the largest, most accurate and timely journal covering all aspects of listening throughout the radio spectrum.

Beginning with the

July issue and at no sacrifice in utilities monitoring, the international broadcasting scene will be enlarged enormously, with up-to-date program schedules, time and frequency lists, and broadcasting insights unavailable in any other publication.

But there's even more good news. MT will soon be investing in a modern, computer-controlled laser printer; this, coupled with an improved paper stock, will make MT easier to read and better illustrated.

Following the President

by Mark Edward Springer, WL7BCT

Once again MONITORING TIMES readers have proven that they don't just read the articles and file them away. They'll sit right down and bang off letters to the authors, and let me tell you, it sure is a pleasant surprise to get mail from you folks.

Because of a change in QTH, I missed a couple of

issues of MT, and the first clue that my article (Dec 85 MT) had been published came when I began getting mail forwarded to me concerning the article.

The response has been very kind--and informative! Let me share with the rest of you some of what I have learned.

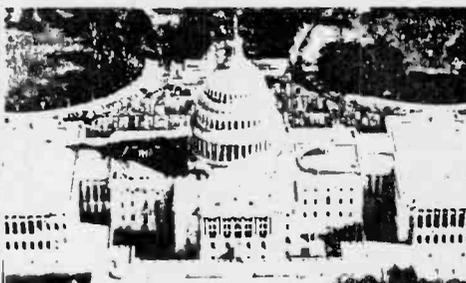
The first letter I got came from a reader who, for

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HOW MANY SECRET SERVICE GUYS CAN FIT IN A PHONE BOOTH?: There are at least 16 in and out of "HALFBACK" in this photo as it pulls onto the University of Alaska campus. (Fairbanks Daily News-Miner, Eric Muehling)

The view from the Capitol...



Newsbreak Washington:

JUSTICE DEPT OPPOSES HR3378

Robert Horvitz, Government Affairs Liaison for ANARC (Association of North American Radio Clubs), has just notified MT of a later-breaking story from Washington concerning the progress of the Electronic Communications Privacy Act of 1985 in the House of Representatives.

In a hearing held March 5, 1986, two witnesses representing the Department of Justice provided testimony in which they stated that "the whole notion of expanding Title 3 (relating to wiretaps) to cover electronic communications is inappropriate."

The formal presentation was made by Assistant Attorney General James Knapp who recommended that Title 3 be extended to cover "new technology that is so similar to traditional telephonic communication that it belongs within the framework of Title 3...with respect to other types of technological development, such as electronic mail and computer transmissions using wire facilities. It is the Department's position that a new statute should be developed to address this enhanced technology."

The Justice Department objects to lumping all of the new electronics media under the general term, "electronic communications" and argued that a distinction must be preserved between wired and wireless portions of communication.

Justice's testimony radically changes the

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complexion of debate which had formerly been between the communications industry and ANARC; that polarity has been dwarfed by the Department's opposition to the bill as presently drafted.

Justice does, however, see cellular telephone as being different from all other forms of mobile radio-telephone systems and they are prepared to support legislation that would criminalize certain kinds of interception of cellular radiotelephone calls.

"Further," Knapp continued, "we believe devices should be outlawed which are manufactured for the purpose of intercepting cellular communications and conversations."

"We do think, however, that citizens scanning for recreation purposes should not incur criminal or civil liability. To forestall that result, we feel that the bill should contain a provision that a citizen will only incur criminal or civil liability where the citizen

Please turn to p.3



MONITORING TIMES

Bob Grove.....Editor

Judy Grove.....Publisher &

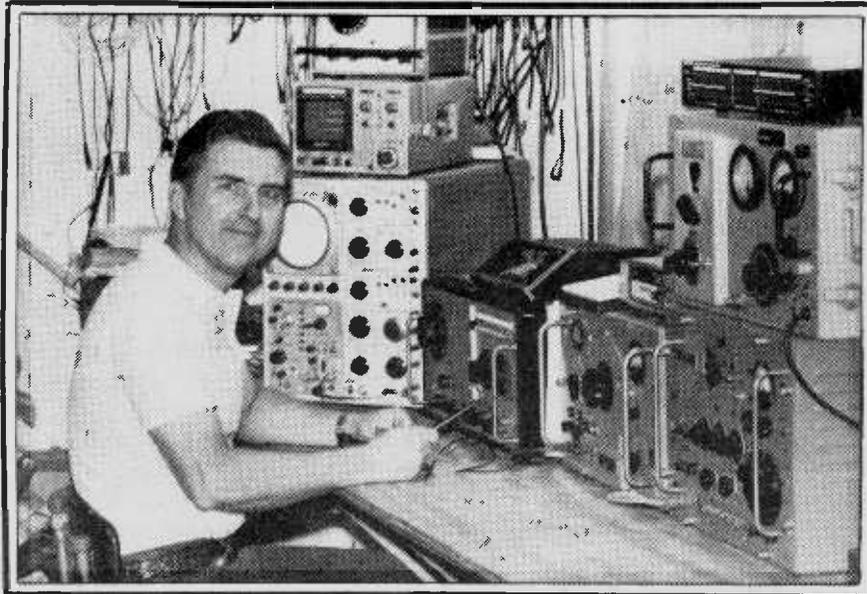
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FROM THE EDITOR



To Invent or Not to Invent...

That is the Question

Each of us has his own notion of what the ideal monitoring post should consist of, and your picture is different from mine. Much of our predisposition toward certain products is based on previous exposure, the advice of others, the kinds of listening we do, our budgets, what we have read, advertising, and our imaginations.

We are all, however, limited by one common denominator: unfamiliarity. The merchandise which we see advertised in our hobby newsletters and commercial publications is limited to the mass market. What about those of us who wish to upgrade?

Years ago, several manufacturers offered pan-adaptors, special cathode ray tube displays which would show all the signals present over a band of frequencies, whether or not the receiver was tuned to one of them. When a "pip" (signal) appeared on screen, the operator quickly tuned his receiver until the signal was in the middle of the scope display and he would hear it through his speaker.

Grove Enterprises has been working on at least two versions of a panadaptor, or SDU (spectrum display unit) as it is referred to by the surveillance industry, military and government agencies who use them. But how many

hobbyists would want one even if the price were reasonable?

How about a tunable VHF/UHF receiver--small, inexpensive, continuous tuning from, say, 30 to 512 or even 960 megahertz, perhaps even including an SDU, but without memory, scan, search and all the other trappings that add pizzazz and color and cost. With the one knob you could rapidly search for signals and, with the SDU, you would know immediately where to tune rather than depend on the slow, regimented search of a pre-programmed scanner.

Of course, as time went on and a product like that proved successful, there could be a follow-up receiver with all sorts of flexible "bells and whistles" like memory, auto-search, multimode reception, extended frequency coverage, and so on.

For the short wave listener, how about a compact, roof-mounted directional antenna? It could be electrically rotated rapidly to notch out interfering signals or identify the compass bearing of an unknown signal for radio direction finding applications? Sound good?

Would you like a low cost weather satellite receiving station which could pick up wide area transmissions from space and



Viewpoint

ECSS SCHEMATICS?

I am writing to ask for some technical help from any of the readers. I do a lot of DXing on the BCB and SW bands but I also enjoy listening to good quality audio during music programming. Much has been written about great benefits of ECSS synchronous detection methods. About the only articles written about it have come about, in most recent years, in the WRTVH. There seems to be one product made by Sherwood Engineering but it is very expensive.

Is there anyone that has a circuit that can convert a SW receiver to synchronous detection? Or could Monitoring Times run a series of technical articles describing construction of such a device? It would also be very useful for us experimenters/hobbyists that would enjoy constructing converters to receive stereo broadcasts.

Since at least a few SW broadcasters are also considering adding stereo programming, I think alternative detection methods is a neglected area whose time has come.

I would like for anyone who has any circuit information to please write me at the address below since I have come up with nothing but dead ends. Anyone can contact me at: P.O. Box 13684, El Paso, TX 79913.

Terry Funk

A REAL DEAL!

Everybody is advertising the ICOM R7000 at \$799--buy nobody has any in stock for immediate shipping!?

display them on a screen or print them out for permanent display? Such a package could be used on boats, farms, ranches, by radio and TV broadcasters, by just about anyone who needs or wants immediate or continuous meteorological information and the local weather service broadcast simply isn't good enough.

These and other products as well are examples of ongoing research and development at Grove Enterprises. So why aren't they on the market? Because we aren't sure there is a market. And we're darn sure not going to dump the thousands of dollars into R&D just for the exercise! We need to KNOW that an eager public awaits these major concepts.

Visit the Grove's at the Dayton Hamvention

Booths 333 & 334

Come enjoy the seminars, entertainment, and gigantic flea market April 25, 26, 27 at Hara Arena and Exhibition Center in Dayton, Ohio. For more information write Box 44, Dayton, OH 45401 or phone (513)433-7720. Drop by and see us!

Reminds me of the two butcher shops both advertising hamburger for sale--one shop advertises hamburger for \$1.00 a pound and the other shop advertises hamburger for 49¢ a pound--but never has any in the shop! And when the first shop was asked why the price difference, the butcher said, "When I don't have any hamburger, I also advertise it at 49¢ a pound!"

Richard Krepps
Houston, TX

HR-3378/S-1667

Thank you for your memo of January 27 regarding HR-3378 and S-1667.

This proposed legislation is ludicrous. How would it be enforced? What if I listen to a Norwegian ship talking to a coast station in Venezuela? Who is going to know which is illegal and which is not? This is the kind of stuff our legislators get involved in and waste all their time on, rather than get to the important issues like reducing the horrendous deficit we have...

B.A. Thunman
Augusta, MI

I've been in a "head-spin" about Congressional Bill HR #3378 and Senate Bill S #1667, that they are trying to pass, not knowing if one of these days my favorite hobby--"Shortwave Listening," of course, could someday become illegal. I would be heartbroken to see about two thousand dollars worth of equipment go down the tubes; I've been a listener since "knee high."

Now, getting down to business, we've all been in some sort of mental despair



NEED TECHNICAL HELP?

We are always pleased to offer assistance to our readers who need more information about our products and services. All we ask is that you include a self-addressed stamped envelope to help offset the cost of return postage. Please add \$1.50 for article reprints.

If you would like to speak with Bob Grove directly, call 1-704-837-9200 Monday through Friday, 3am-5pm.

VIEWPOINT cont'd

over the Space Shuttle tragedy and I know that thousands of ute shortwave listeners besides myself were eavesdropping on communications between the Navy, Coast Guard and N.A.S.A. on HF frequencies. Are the ute shortwave listeners aware of confidential disclosure of military communications? You, I and others are, yet there are some that are not, and are careless.

January 31, 1986, I was at work and it was 12 noon, lunchtime. We have a TV in our cafeteria and we were all watching the updates for the search of the Challenger wreckage on a local Boston TV station. An interview came on from a shortwave listener in South Suburban Boston (not mentioning his name or the town he lives in). Live on TV they had interviewed him in his shack.

Now to get to the point! This guy had SPILLED HIS GUTS to the news media to what he'd heard. In fact, he had his rig turned on during the interview to that frequency and the TV cameras had closed in on his receiver while communications were being passed back and forth between the Navy and Coast Guard. On top of that, he had also advertised the frequency they were on, and so did the reporter for the news media.

Now I know that a lot of us say "The airwaves are free," but isn't that blowing it totally out of proportion. There I sat, in front of the TV, eating my lunch with a turned stomach in disgust after seeing this.

I couldn't believe this person had actually done that. Doesn't he know that he had violated FCC law, and also that revealing military communications to the public is a felony? Should he be TARRED AND FEATHERED and put on display to the shortwave listening public? I think so, because that answered my question of why these bills are trying to be passed.

All I can say is that one person being glamorous and trying to impress others on TV, and getting personal satisfaction out of it, could help RUIN a hobby that you, I, and thousands of others enjoy. Bob, if you publish this letter in MT--I HOPE THAT CERTAIN PERSON IS READING THIS!

Abe Lewkowicz
S. Weymouth, MA

I have been re-reading in the Jan 86 issue of MT your feature article "Your Right to Listen May be Outlawed" and it is amazing how it parallels the firearms legislation, both present and proposed which we have at various levels of government. For the most part the criminal element will ignore them and the law-abiding citizen is hindered by such laws which don't prevent much crime anyway.

Frank Evenden
Ulster, PA

TIPS FROM A NEW HX1200 OWNER

I recently discussed with you on the phone and subsequently ordered a Regency HX-1200 hand held programmable VHF/UHF receiver. I am quite pleased with its sensitivity and flexibility, especially the aircraft band.

I though you might be interested in a couple of things I have found out about it that you might want to know about.

First, you advertise the radio as covering 118-176 and 405-520 MHz. I have found that the version I have will not program any frequencies between 137-138 MHz and 420-440 MHz.

(You're partly right; see Apr Helpful Hints...Bob)

Second, reading the instructions indicates that the rechargeable batteries should be charged for at least six hours. Figuring when I got the radio it would need a good charge before I used it, I left it on charge for about 7 hours. When I disconnected it I discovered the radio case was quite hot--usual sign of overcharge!

Checking the charger specs I discovered that the charger is rated at 200ma. Basing calculations for 500ma/hr batteries at the standard charge requirement of 1.4 times the ampere/hour capacity would work out to only 3.5 hours. As you can see, following the instructions would cause the batteries to be overcharged every time they were plugged in for the required six hours. This would surely damage the cells and shorten their lifespan.

Arthur Rae, VE3AKJ
Windsor, Ontario

REQUEST FOR RE-ISSUE

I believe that you should make your SOUNDS OF SHORTWAVE cassette available again. I am familiar with short wave and have some questions on the miscellaneous sounds out there on the SW bands.

One-half hour to one hour of such audio information would be an excellent addition to the purchase of a new short wave radio. It'd be an excellent educational tool that perhaps should be included with new SW radios as due course, as descriptive books already are.

Bill Romberg
Milwaukee, WI

JUSTICE DEPT from p.1

both intercepts and divulges the communications under circumstances in which the interception and divulgence are illegal, tortious or for commercial gain.

"We feel that this would provide a proper balance between the needs of law enforcement and the rights of ordinary citizens. However, to address the

FOLLOWING THE PRES from p.1

very good reason, wishes to remain anonymous. He was employed by a large hotel working with audio-visual equipment. "One day," he writes, "two large U-Haul trucks and a bunch of rent-a-cars and vans with magnetic mount VHF whips showed up at the hotel.

"Within five minutes the group of people in the cars and vans were unloading large, aluminum road cases from the trucks and into the hotel.

"They (the cases) were marked 'shredder,' 'PBX,' 'transponder,' etc. Some of the crates were huge, maybe 4' x 4'!

"All of the equipment was taken to the 2nd and 15th floors of the 15 story tower portion of the hotel. The second floor consists of meeting rooms; half of this floor was marked 'OFF LIMITS' and large curtains were hung from the ceiling.

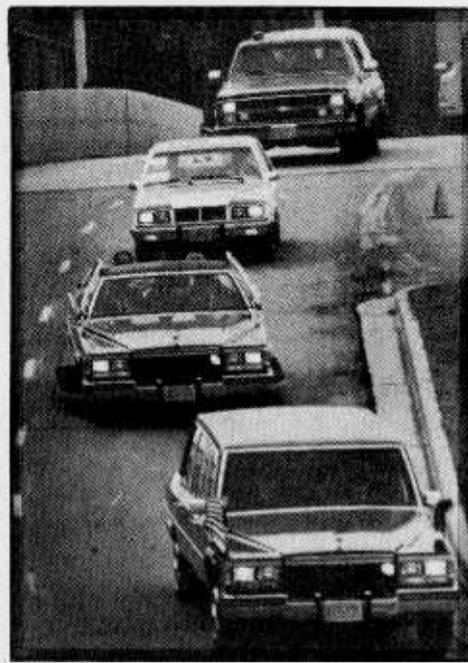
"Peeking through the curtains and a half-closed door I could see many Motorola base radio-remote units on a long table.

"There were three or four local telco trucks out front and five or six phone men running around the hotel. They installed a large 2-1/2 inch diameter cable to the second floor. I heard two of them discussing a newly-installed phone number, and I went back to my office to call it. A man answered it, identifying

problem of citizen interception, we think that consideration should be given to outlawing devices manufactured in the future that are used to intercept cellular telephone conversations, at least where they are primarily designed for that purpose."

At this writing, the current plan is that a new draft of the bill be introduced March 25th to begin markup in public session. Principal sponsors of the bill are Robert Kastenmeier (D-WI) and Carlos Moorehead (R-CA).

Readers should concentrate their letter-writing efforts on Moorehead who was visibly exasperated at the outcome of the hearings and would characteristically ignore dissident testimony. It is a matter of conjecture what his vested interest is in cellular radio, but letters directed to him should encourage support of the compromise ANARC proposal and its eloquent supplemental statement presented to the subcommittee March 3, 1986.



"SIGNAL DEPART, SIGNAL DEPART": The Presidential motorcade leaves the University of Alaska Fairbanks campus on May 1, 1984. The bulletproof Cadillac limousine, codenamed "STAGE-COACH," is followed by "HALFBACK," the back-up car, another Secret Service vehicle and a panel truck carrying a Secret Service tactical response unit. (Fairbanks Daily News-Miner, Barbara Kelly)

himself as 'Secret Service Agent so and so.' I quickly hung up the phone.

"There was some type of array antenna set up near the outside window in the second floor room with the equipment. (I just wish I had the guts to take some pictures!)"

AUTHOR'S NOTE: A bit of advice to anyone who gets the chance to nose around during an event like this. I had a member of the White House Press staff point out to me that communications operations centers contain HIGHLY CLASSIFIED materiel--not the radios, but paperwork and stuff (remember, the President is Commander-in-Chief of the Armed Forces), so taking pictures is NOT RECOMMENDED. I had an extremely well-placed source inform me that he came face to face with a 0.45 when he went into the wrong area, so BE COOL!!

And now back to this great letter:

"Most of the people were in their twenties and early thirties. They were set up for the next couple of days, and there were more men with crew-cuts and three-piece suits than I had ever seen in the hotel before!

"This was the communications advance team from the White House Communications Agency for the President's Chicago-area visits in late 1984."

Radio activity was

monitored on 166.5125 (SIERRA), ID'ing as "St. Charles Base"; Paging on 167.025 (WHISKY, formerly called NOVEMBER) and voice on 166.700 (NOVEMBER). This frequency is used by WHCA technicians. There was also activity on CHARLES (165.375) and BAKER (165.7875).

Thanks for this fine report! By now you'll have received a personal reply from me.

● A couple of other letters of note included one from active fed monitor Richard Kramer in Pennsylvania who included a fine list of VHF and UHF frequencies used by the Secret Service, WHCA and the Air Force for Presidential support.

Rich also sent an extensive list of codenames used on USSS/WHCA networks. Would you believe "COPPERTONE" for Rose Kennedy?!

He reports he's running an FRG 7 for HF, a Bearcat 300, PRO-30 and PRO-2 for VHF/UHF and a Grove Scanner.

"Even with my antennas in the basement here I still monitor much FM traffic when AF1 or 2 or any other SAM (Special Air Mission) flights are airborne," he said.

"The last big scale monitoring of AF1 was on the departure for Geneva, Switzerland. I monitored FM frequencies for about an hour until the signals faded out.

"HF was very active with a phone patch (from



HISTORIC MEETING: President Reagan and Pope John Paul 2 share a private moment in a room at Fairbanks International Airport on May 2, 1984. The two men met for the first time in the Alaskan city. (Fairbanks Daily News-Miner, Eric Muehling)

Larry Speakes) from the White House to the plane. Also a UPI correspondent gave the front-page story over HF to a colleague in Washington.

"I monitored the flight until touchdown in Geneva--some eight hours worth of listening."

Rich said he has traveled to two appearances by President Reagan, once packing his PRO-30.

"The radio was in plain view of the State Police and Secret Service agents, but no problems were encountered in monitoring," he pointed out.

In fact, your best bet is to always keep the radio up front--the security officers are used to us listening to them; in fact, there

is a famous quote of that very subject that I am trying to locate and will bring to you.

Rich is in correspondence with other monitors and says that the current project is to identify UHF-FM links used by AF1 and 2 and clear-voice MILSATCOM channels.

We'll keep you informed of this progress.

Massachusetts news photographer Bob Stella had a couple of good monitoring opportunities. One time he listened to his scanner while watching TV coverage of a Boston appearance by the President.

He reports codenames used included "THE COPPERBALL" for Reagan; "HANDBAG" for the limo and "HAWKEYE TEAMS" signed for helicopter ops.

"I was surprised at the amount of information they gave out over the radio," he says.

"When I covered President Carter's trip to Boston I was assigned to stay at the airport. For five hours I babysat Air Force 1. The Secret Service kept the photos so far back that you had to use a 300mm lens to get any kind of pictures.

"While I was out there I started to talk to the Secret Service Agents and I told one of them that this was the first time I was assigned to shoot, or should I say photograph, the President. I asked him if I would get closer. After a while he agreed on the condition that I stay with him so he could keep an eye on me.

"He got me so close that I had to use an 18mm lens and I even got to shake the President's hand.

"The feds aren't that bad after all!"

● Well, it's pretty clear that there are some serious fed monitors out there. The Secret Service is just one area. There's the FBI, the Department of Energy, the Department of State; the list goes on.

Maybe MT needs a regular column to serve you. But it can't work without your support. It will need monitoring reports, frequency information, the whole bit. It will also require some soul-searching (should active DEA surveillance channels be published?? Why or why not??).

Let's hear from you. By the way, the new QTH is: General Delivery, Manley Hot Springs, Alaska 99756.

73's & good listening.●

USSS/WHCA RADIO CODENAMES

BLACKBOARD	Protective Intelligence Division	COACH HOUSE	Dulles Airport
BLOWTORCH	EPS/Uniformed Division CP	CURBSIDE	Wash Nat'l Airpt Room
BLUEPRINT	Tech Security Div	CEMENT MIXER	WH Situation
BOARDWALK	Uniformed Div Foreign Mission Detail	FALCON	Pres Tactical Cover Unit
BOOKSTORE	WH Commo Center	FIRESIDE	Sec of State res
BUCKEYE	Pres residence at Camp David	FOGHORN	State Dept Secur Div Comm Center
BUCKSHOT	Spec Coord Ctr	HALFBACK	Pres Follow-Up vehicle
BULLDOG	Dignitary Protection Division	HEADLIGHT	USSS Garage
CALIBER	Portable Communications Package	HERCULES	Counter-Sniper Response Team
CANONBALL	Adm. Chaney, JCS	HORSEPOWER	Protective Div WH CP
CARAVAN	VP Follow-Up veh	HOT SHOT	White House
CARGO	First Lady veh	HUNTSMAN	Surveillance Helo
CAROUSEL	SAM 26000/AF2	PATROLLER	Empty VP Helo
CARPET	US Army WH Garage	TIMBERWOLF	George Bush
CHALLENGER	Pres nightwatch	SNOWBANK	Barbara Bush
CHANDELIER	State Department	RAWHIDE	Ronald Reagan
CHARIOT	VP vehicle	RAINBOW	Nancy Reagan
CLOVERLEAF	VP Residence, US Naval Observatory	ANGEL	SAM 27000/AF1
COMPANION	Blair House	STAGECOACH	Presidential Limo
CROWN	WHCA (White House Communications Agency) comm centr	ACROBAT	Andrews AFB
CACTUS	Camp David	PUNCHBOWL	US Capitol
		FLAG DAY	Tip O'Neill
		SNAPSHOT	Sen. Baker
		ROADRUNNER	WHCA Mobile CP
		COBWEB	VP Office
		PACEMAKER	VP Staff radio net



HALFBACK: The Presidential back-up car follows "STAGECOACH" into the University of Alaska, Fairbanks Wood Center, where President and Mrs. Reagan joined a luncheon gathering. Note the rails and footplates Secret Service agents hold onto. The agent in sunglasses facing the photographer is believed to be carrying an Uzi submachine-gun. "HALFBACK" is also called by agents, the "War Wagon." (Fairbanks Daily News-Miner, Barbara Kelly)

Like to listen to the feds? Better be ready for...

A VISIT FROM THE S.W.A.T. TEAM

Todd Shideler, a scanner buff and circulation sales employee of the Las Vegas Review-Journal, received an unexpected visit from the metro S.W.A.T. team, guns drawn, during a recent stop-over by Vice President Bush. Todd tells us of his frightening experience here in his own words.

Scanner listeners have always known that they can find action and adventure at a push of a button; what I didn't know was that a push of a button on the same scanner could bring that adventure to your front door as well.

On a recent trip by Vice President Bush to Las Vegas I was at home listening to his travels on the Secret Service frequencies when two metro SWAT officers paid me a visit. They searched me and the house, and looked through all my notes, papers and books that related to scanners.

They spent about forty-five minutes asking me questions about my notes, scanner, how it worked, what I could/did hear and, even though I have none, a whole

lot of questions about descrambling and descrambling equipment.

After that they called for I.D. who took pictures of my house, scanner, tape recorder and books, magazines and notes. They also confiscated all my notes, lists and books which had anything in them about the Secret Service, White House, presidents, or vice presidents.

While they were here they let me call a local TV station who confirmed that I was listening to the Secret Service channels for them and that they often used information from me in the news stories. After this call both SWAT officers became more polite to me and stopped asking me so many questions.

When they finally departed, they did leave all of my equipment and most of my scanner frequencies, except those relating to the Secret Service.

They also left me one other thing: For the duration of the Vice President's visit I had two plainclothes officers watching my house!

Broward County (just north of Miami) where "machine guns, other weapons, a variety of newspaper clippings and unclassified documents describing Federal drug enforcement equipment and capabilities, and maps and other documents detailing recent drug smuggling operations" were found.

Among these items, "a list of a wide range of sensitive Government radio frequencies, including those used by military aircraft, domestic law-enforcement agencies and Air Force One" was discovered.

The warehouse, which was used by drug smugglers who have connections with the M-19, possessed a frequency list that contained frequencies used by the U.S. Army and Air Force, the Coast Guard, the FBI, and the DEA (Drug Enforcement Administration), as well as other Federal agencies like the President's Secret Services.

Most DX'ers would think that this info is easy to get (except for the Secret Service frequencies), with books such as the Confidential Frequency List (by the late Oliver P. Ferrell), and The Federal Frequency Directory and Shortwave Directory (by the present Bob Grove) which publish the SW frequencies and modes used by those agencies.

But according to U.S. Congress Representative Glenn English (D-Oklahoma), the frequencies list found at that warehouse during the raid had more detailed info than the above publications, since "these publications lack some of the descriptive information seized from the smuggler's warehouse."

English added in a recent letter to Bob Grove concerning this issue, "...that some of the frequencies which were on the list taken from the smugglers were not used for clear voice at all, but rather were dedicated to transmission of coded, digitized national security data." English was "assured by experts that to have identified the user agency, the source, the nature and purpose of the data, and other descriptive information that was on the list, would have been far beyond the capability of any casual or amateur listener."

English, Senator Dennis DeConcini (D-Arizona)-- another member of Congress-- as well as the Secret Service are raising serious questions about the security of vital radio communications. The Secret Service is particularly concerned about the 62 page frequency list



Palace of Justice under siege.

that was found in the raid because, among the sophisticated radio equipment and the list, were frequencies that the Secret Service agents used when "communicating with each other while protecting the President. The frequencies, some of which are changed occasionally, were current at the time of the seizure." Frequencies used by the CIA and the Defense Investigative Service were also found.

It is obvious why the M-19 affiliated smugglers would want to know the frequencies for agencies like the DEA (which can be heard on 14,686 kHz and 18,666 kHz USB during local daylight hours; and on reported night-time frequencies of 3120 kHz; 5692 kHz; and 6760 kHz USB, using such code names as "Atlas," "Panther," "Latchpin," etc.

During one recent DEA broadcast anyone could have heard code names such as "Atlas 74," "Woodland" and other codes being passed off by male and female operators, mentioning that some IR-144 aircraft was taking off, completing what was code named "Operation Zulu." It would have been "child's play" for the smugglers to hear these broadcasts and use what information they'd overhear to their advantage.

U.S. SECURITY CONCERNS

Congress members English and DeConcini have also learned from U.S. intelligence sources that M-19 guerrillas had tapped the phone lines of the justices of Colombia's Supreme Court before they raided Bogotá's Palace of Justice last November. Since the M-19 have their hands on these radio frequencies, Rep. English feels that: "This raises some very serious

Guerrillas Use Shortwave Radio

Colombian Subversives Endanger U.S. Security

by Vito Echevarria

It is sometimes said that clandestine radio stations act as political barometers in the country where the stations are broadcasting from or transmitting to. Colombia became one of those nations in 1985, where political problems became critical. Although Colombian President Belisario Betancur had negotiated a truce between his government and the leftist guerrilla groups who have been plaguing the nation with violence since the 1950's, the political (and drug-related) violence continues.

Out of the various leftist groups in Colombia, there are two large guerrilla groups that have been causing the most trouble for Colombia. The first group is the "M-19 group" (the April 19th Movement), a Marxist group that was formed in response to allegedly-rigged elections in 1970. M-19's guerrillas were responsible for the siege of the Palace of Justice in downtown Bogotá on November 6, 1985.

The Colombian Army ruthlessly stormed the Palace with tanks and



Army tank shoots its way into Bogota court building.

armored cars, resulting in the deaths of twelve Supreme Court judges, the forty M-19 guerrillas who took part in the siege, as well as over fifty innocent bystanders. Because of that incident, M-19's guerrillas are once again at odds with the Betancur administration, and especially the military, who have been long-time targets of M-19's attacks.

SENSITIVE FREQUENCIES FOUND

Lately, M-19 guerrillas have been using the shortwave spectrum for subversive means. According to the New York Times (11/19/85 issue, p.1), on September 13, 1985, a warehouse was raided by Florida law officers in

GUERRILLAS USE SW cont'd

security questions about what their next move might be in the United States."

According to Sen. DeConcini: "This not only affects drug trafficking, but the security of our nation's leaders. We have to assume that the M-19 has this information because they want to use it."

Apparently, the seized frequency list was so detailed that it also had the frequency used "for telephone communications with the President's limousine." So far, the Customs Service has spent \$18 million since 1982 to improve communication security. Says Customs Service spokesman Dennis Murphy, "Communications is an area where not all the remedies are in place yet. But we know where the problems are, and we are working on them."

However, Rep. English had stated to Bob Grove recently by mail that:

"The Congress has appropriated funds for law enforcement voice privacy systems. This administration has not seen fit to allow all of the money to be spent. Just this year the Office of Management and Budget cut more than



Survivors are led away.

\$5.4 million from the Customs Service that was specifically earmarked for voice privacy radios. Early indications are that all such funds have been cut for next year. The result is that Customs officers who are chasing drug smuggler boats and aircraft have to announce their activity for all the world to hear."

English and DeConcini, who are very concerned about M-19's possession of these frequencies and the group's intended use of such info, want to see Mr. Reagan "broaden that effort."

With the M-19-connected drug smugglers still at large, a lot of unanswered questions still need to be addressed. Since they were

allegedly involved in drug smuggling (possible to raise money for arms), it is rather obvious by now why they'd want access to DEA, Customs, Coast Guard, and military frequencies. But why would they want access to Secret Service and Presidential frequencies?

This scenario is the makings of a good episode of "Miami Vice," with Crockett and Tubbs and the DEA figuring that for whatever the reasons are, it appears that the holders of that frequency list had more than just drug smuggling on their minds, and thinking that perhaps other drug rings may have the same or similar info that this ring had.

MORE GUERRILLA ACTIVITY

Meanwhile, the other guerrilla group that was destabilizing Colombia is the FARC (Revolutionary Armed Forces of Colombia). The pro-Moscow FARC, consisting of over 2,000 active guerrillas and 5,000 "reserve" fighters, has been in existence since the 1950's, and is active from Colombia's main cities to its jungles in the southern and eastern sectors of the country, qualifying Colombia as "unsafe" for tourists.

In the early weeks of April 1985 South Florida-based DX'ers spotted "Radio Marquetalia/La Voz de las Fuerzas Armadas Revolucionarias de Colombia (FARC)" on 10,544 kHz from 1200-1300 UTC and 2100-2200 UTC in Spanish. The DX'ers, including David Crawford, Robert and Larry Wilkner of DX South Florida, and Terry Krueger, reported in Review of International Broadcasting that the Colombian clandestine was broadcasting anti-USA commentaries attacking, among others, President Reagan for the U.S. invasion of "Granada," advocating "la guerra en

este pais" for the "trabajadores colombianos" (the war in this country for the Colombian workers).

The station, probably located in Colombia's remote southwestern jungle regions, went off the air during the middle of April and hasn't been heard of since then.

The FARC, unlike the M-19, has respected the 21-month-old truce with the government (despite its brief debut on clandestine radio) and is fielding a presidential candidate for the May 1986 elections (something that would be unlikely to happen in El Salvador). However, the M-19, who still have scores to settle with the military, feel that political conflict is far from over, and those same DX'ers from South Florida--or even one of you MT readers--may hear "La Voz del M-19" in the near future.



by
Don Schimmel
516 Kingsley Rd SW
Vienna, VA 22180

The information I am outlining here will allow you to do some detective work in connection with an activity intercepted 16 January at 1550Z on 19602 kHz. The unidentified CW station sent a 5F group message originated by COYOTE and which had a precedence of URGENTE (urgent).

After every 50 characters he sent AA and, upon receiving a go-ahead from the other end (unheard), he would proceed with another 50 characters. Each line would begin with NR. Repeats were requested by indicating the group number 1-10 followed by the LINEA (line) number. In addition to COYOTE, other address indicators seen were COBRA and JAGUAR.

Upon completion of the traffic handling, the station sent VAMOS A FI and shortly thereafter a RTTY (50-425) signal appeared on the frequency. RY's were sent but no call sign or identification was observed.

On 27 January at 1515Z the activity was again monitored on 19602 kHz and this time the other end was dis-

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Worry Beads Give Cause to Worry

Throughout the Middle East, "worry beads" may be seen adorning citizens virtually everywhere--in the home, shopping, going to work, even while conducting business. Now it has been discovered that microtransmitters have been installed in some sets of beads to enable eavesdroppers to listen in on every private aspect of the wearer's day!

A wireless mike is built into the largest bead, capable of transmitting conversations a half mile or more where they can be monitored and recorded.



UTILITY INTRIGUE cont'd

covered on 19640 kHz. Some 5F traffic was passed and then both stations shifted to RTTY operation. Over a span of several hours, many RTTY transmissions took place and it was noticed that this traffic utilized a multi-repeated letter (Z) as a separator for portions of the messages just as was the case for an activity discussed in UTILITY INTRIGUE September 1985. (Corrected Cipher/Plain alphabets appeared in the November 1985 column).

For new readers the alphabets are reprinted here:

Cipher
A B C D E F G H I J K L M N
Plain
Z I A M Y D O Q K V R S J B

O P Q R S T U V W X Y Z
G P U T C F H L W X N E

Using the above, the portion between the Z's would be found to contain the message heading: Message number, Precedence, Originator, and Addressee. Here is one you can check out for yourself:

YKZSBYRGZSQCRKGGSUYRCZEZQYG
 ZQKOYRZVFVZSGNKCZCVZMCOQCKZ
 PRGZ.

By the way, the Z's within the section serve as word separators and the abbreviation PTO which turns up stands for PUNTO (period). When you finish and compare the method/system with the one described in the September column, I suspect you will come to the same conclusion as I have concerning the true sponsorship of this communications net.

The latest flyer from Electrovalue came in the mail and I immediately took advantage of a terrific deal being offered on diskettes. I know some of you SWLs are also computer buffs so here is the information.

Electrovalue picked up the excess inventory of some software packages. The diskettes have been degaussed but require the labels peeled off and the write protect notches punched. The price is \$12.00 for a pack of 20. If you purchase 100 or more, the price is \$10.00 per pack of 20. UPS is \$2.00 minimum and 100 disks weigh approximately 5 lbs.

If you need a diskette notcher, they have one available for \$4.00. Purchase 100 disks and you can get a notcher for only \$2.50. The complete address for ordering is: Electrovalue Industrial Inc., P.O.

Box 376-F12, Morris Plains, NJ 07950. The disks are double sided, double density, 5-1/4" disks.

Electrovalue offers other products also of interest to computer and electronic hobbyists. Ask for a copy of the latest flyer.

Please do not forget to write your Senator and your Congressman indicating your disapproval of HR3378 and S1667. I have sent off several copies of articles relating to this matter and I have another packet just about ready to mail with some additional material which outlines just how bad these bills are.

It is necessary to state again that I am delighted to answer your questions but please, when you write, include an SASE (self-addressed, stamped envelope). Thanks.

The notice about the Dayton HAMFEST was just received and this year I hope to be able to spend two full days there walking around to view the numerous equipment demonstrations and to look over the offerings in the flea market. It is nice to be able to say hello to individuals with whom I correspond but seldom see except at the Dayton HAMFEST.

Allow me to again remind readers to fill in and mail the response form in the November 1985 MT relating to the possibility of holding a "SW LISTENFEST" in 1986.

Ex-Navy Intercept personnel will be interested in a new book which has just come to my attention. "INTERCEPT STATION 'C'" covers the history of this unit for the period of 1929-1942. The group was evacuated from Corregidor Island in the Philippines by submarine just ahead of the invading Japanese forces. The cost of the book is \$6.50 (postpaid) and can be obtained from the Navy Cryptologic Veterans Association, 593 Clarmar Drive NE, Salem, OR 97301.

HAM BAND HEADACHES

Amateur radio operators have suffered their share of abuses in their allocated bands over the years. The FCC has targeted several amateurs in certain geographical areas for concentrated enforcement efforts.

Frequencies specifically falling heir to the problems are in the 75 meter SSB band: 3853, 3895 and 3927 kHz.

LOGGED JANUARY 1986		
KHZ	DTOI	MODE/IDENTIFICATION/COMMENTS
340	120044	MCW/BQG Woodbridge, VA Beacon
353	051253	MCW/FME Ft. Meade, MD (Tipton AAF)Beacn
360	051251	MCW/RW Camp Springs, MD (Andrews AFB-Kirby) Beacon
385	051243	MCW/GAI Gaithersburg, MD (Montgomery County) Beacon
404	090700	MCW/IUB Baltimore, MD Beacon
414	090715	MCW/BC Baie Comeau, Canada Beacon
482	090725	CW/WSC West Creek, NJ/Tfc list
3484.6	051232	USB/WX Broadcast, Midwestern Cities
4465.4	222219	USB/KEYSTONE 106 and other KEYSTONE Stns handling msg re Training Schedule This is Civil Air Patrol activity, Pennsylvania Wing net (Northeast Reg.)
4577.8	222219	USB/2 OM talking about circuit design for some uniden equipment.
6252	180136	RTTY 75-850/&'EAL DE 72JKL (SPAIN) Sends RY's and SG's.
6283.6	221428	CW/UDE2 DE ULCY USSR alloc.
6516.2	222215	CW/SVB 5 6 Athens, Greece/calltape
6521.7	222216	USB/Barge tfc, 2 OM talking about crew change, another barge asks if there is load for him.
6693.5	201848	USB/WX Broadcast by OM/EE
10590	120028	RTTY 50-425/No calls/Portuguese PT
12536	151930	USB/2 OM conversing in Oriental Lang.
12545	191933	CW/PRO DE PPXH Olinda, Brazil from Brazilian ship.
13019.5	251336	CW/DE GKC Portishead, England/Calltape
13045.9	161224	CW/DE PZN Paramaribo, Suriname calls Liberia indicating Paramaribo has Rdo Telephone traffic.
13065	161232	CW/DE 6YI Kingston, Jamaica/Indicates holding tfc for Panamanian ship.
13128.5	161236	USB/2 nd OM/SS followed by YL & OM conversing in Spanish.
13156.1	161242	CW/No calls/5L grps, spec charac IM OE AA OT. Signal has pronounced echo.
13190.4	222129	USB/WOM Miami, FL High Seas to Norway (ship) with phone patch. Other end on 12419.9 KHZ.

MONITOR

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736RMT

73: Amateur Radio's Technical Journal, PO Box 931 Farmingdale NY 11737

13262	201936	USB/2 OM/SS, sending 5L phoneticized groups.
13339.7	211746	USB/OM giving temperature readings in Spanish.
13390	101403	CW/CLP55 DE CLPI GT Guyana from Havana, shifts to RTTY 50-425 & sends 5F grps.
13574	151922	RTTY 75-850/Enciphered transmission
13624	151919	RTTY 75-850/WBR70 Miami, FL/5F groups, coded WX.
13720.7	201911	USB/Stn sending PT Spanish msg re rehab work to be performed on aircraft, msg signed by Peruvian AF Officer.
13831	201921	CW/DE FDY Orleans Air, France/calltape
13902	201925	USB/OM conversing with YL in Spanish
14421.8	161256	RTTY 50-425/Arabic text.
14422.5	171954	CW/Uniden stn sending 5F groups
14429.7	171405	USB/Uniden stn sends msg addressed to Inter American Defense, Washington DC
14461.5	171350	CW/5F groups, cuts zero as T
14470	161258	RTTY 50-425/Press in English (TASS) Soviet News Agency
14556	201513	CW/UXYK DE RIW Soviet ship from Khiva Naval Radio, Uzbek SSR/5F groups
14560	251419	RTTY 50-425/Arabic text
14605	161310	RTTY 50-425/5L grps followed by msgs in German plaintext.
15896	251446	RTTY 50-425/CTK Czechoslovakian News Agency/RV's
16865	251407	CW/DE UJY Kaliningrad, USSR/calltape
16928	251411	CW/LKHD DE LFX784 Norwegian ship from Rogaland, Norway.
16944	251415	CW/DE YUR Rijeka, Yugoslavia/calltape
18242	201941	RTTY 75-425/5F groups, coded WX

C.F.E. Light & Power	158.000	158.000
Mexican Customs	165.325	165.325
Pacifico Rail Road	167.100	167.100
Pacifico Rail Road	167.150	167.150

Hermosillo

Amateur Radio Club	146.760	146.160
Hermosillo Police Department	152.825	152.825
Sonora State Judicial Police	152.840	152.840
Federal Highway Police	154.700	154.700
C.F.E. Light & Power	158.000	158.000
Mexican Red Cross	159.925	159.925
Pacifico Rail Road	167.150	167.150
Federal Judicial Police	172.000	172.850

Tijuana

Baja Judicial Police	162.050	162.575
Tijuana Police (Downtown)	166.125	169.050
Tijuana Police (La Mesa)	166.300	169.225
Tijuana Police (Tactical)	166.425	169.325
Tijuana Police (Beaches)	166.525	169.550
Tijuana Police (Captains)	166.650	169.650
Tijuana Fire Department	151.400	151.400
Mexican Red Cross Ambulances	148.125	148.125
Baja Public Works	148.175	148.175
Tijuana Public Works	151.460	151.460
Cesptt Water Department	160.260	161.000
Hospital Mexico-America	148.925	148.925
Servicio Organizado (mobile telephone)	143.275	138.015

There are many additional Mexican frequencies that we have identified in our files. However, in order to get more input, I include the following list of unidentified Mexican frequencies.

Freq	Call	Location
29.730	?	Piedras, Ngras
29.800	X3 BOA	Monclova, Coah
29.900	X6 BJB	Monterey, NL
29.910	XBN 266	Monterey, NL
29.910	XBC 338	Torreón, Coah
30.150	XBD 417	Mexico, DF
30.150	X8 BPP	S. Gatarina, NL
30.250	XB HA8	Lospinos, DF
30.250	XBL 34	Tijuana, BC
30.400	X6 BJK	Tijuana, BC
30.460	X7 BKW	Villahermosa
30.520	XBD 304	Mexico, DF
30.570	?	Tecate, BC
30.670	X8 BLW	Nogales, Son
30.760	XBE 32	Queretaro, Oro
30.940	XBD 451	Mexico, DF
31.180	XBGYA	Aguascalientes
31.180	XBV 427	Coatzacoalcos
31.220	XBD 452	Mexico, DF
31.260	XBV 428	Veracruz, Ver
31.340	XBB 349	Mexicali, BC
31.340	XBB 407	Mexicali, BC
31.340	XBD 453	Mexico, DF
31.340	XBE 335	Mexico, DF
31.340	XBS 419	San Luis Colorado
31.700	XZBLS	Mexico, DF
31.700	XBLP	Mexico, DF
31.760	XBKVO	CD Obregón, Sonora
31.760	XBKV 5	"
31.760	X2 BOX	Chihuahua, Chi
31.760	X2 BMC	Durango, Dgo

The following frequencies and call signs on this list have been listed as belonging to the Director General of Telecommunications:

29.730	No call listed
30.400	X6 BJK
30.460	X7 BKW
30.670	XB BLW
31.760	X2 BOX
31.760	X2 BMC

Perhaps some of these partially identified frequencies can be monitored to determine their exact uses and by whom. Are they used for two way communications, repeater inputs or outputs, or paging? Are they used by private businesses or governmental agencies, and if so who are they?

If you have any answers to these questions just send them to me at the above address and I will share them with the rest of the MT readers. Until next time-- Good monitoring.

Lafayette Radio Fades into History

It hasn't been too many years ago that Lafayette Radio Electronics stores peppered the nation, as omnipresent as Radio Shack stores. But Lafayette fell on hard times and, in 1981, merged with Circuit City.

Now, the new parent company has announced that it will be closing the remaining 15 stores in the New York area immediately.

Time will tell whether prospective buyers may be inclined to preserve the Lafayette name, but at least for the present time, that eventuality appears unlikely.

Remember Hallicrafters, National, Gonset, Hammarlund...and Lafayette?

We would like to thank MT reader Bob Turner for sending this interesting news clipping to us.

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SCANNING

with **NORM SCHREIN**

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This month we are going to take a look at frequencies in Mexico. The first group of frequencies have been identified; the second group are frequencies your help would be appreciated in identifying.

Licensee	Base	Mobile
Mexicali		
Police Department	166.500	169.600
Police Department	166.275	169.375
Police Department	166.700	169.800
Police Department	166.800	169.700
Fire Department	166.075	169.075
Public Works Department	166.475	169.450
Highway Patrol	151.825	150.825
Federal Highway Police	154.700	154.700
Federal Highway Police	154.730	154.730
Mexican Red Cross Ambulances	158.780	
San Luis Rio Colorado		
San Luis Rescue Brigade	146.390	146.390
San Luis Police Department	149.775	149.775
Sonora State Judicial Police	152.840	152.840
Federal Highway Police	154.700	154.700
Social Security Hospital	157.600	157.600
C.F.E. Light & Power	157.700	158.100
Mexican Customs	165.325	165.325
Federal Judicial Police	172.000	172.000
Caborca		
Caborca Amateur Radio Club	146.600	146.000
Mexican Red Cross Ambulances	147.970	147.970
Sonora State Judicial Police	152.840	152.840
Caborca Police Department	168.550	171.900
Sonora Baja California RR	167.100	167.100
Sonora Baja California RR	167.625	167.150
Nogales		
Ferrocarril del Pacifico RR	167.100	167.100
Ferrocarril del Pacifico RR	167.150	167.150
Mexican Customs	165.325	166.275
Nogales Police Department	461.1625	466.162
Agua Prieta		
Agua Prieta Police Department	151.250	151.250
Sonora State Judicial Police	152.840	152.840

"Hear 'TIS"

DX'ing the Travelers' Information Service

by Bob Parnass, AJ9S

Ever notice those signs saying: "Tune Radio to 530 for Road Information" by the side of the highway?

Here is a list of 321 stations that provide the general public with traffic, weather, and other special purpose information. These AM stations usually run 10 watts or less, and the most popular frequencies are at either end of the AM broadcast band: 530 and 1610 kHz.

Stations run under the auspices of local governments are licensed by the FCC. The federal government also maintains radio stations for this purpose, coordinating allocations

through IRAC. Unfortunately, IRAC allocations are no longer divulged to the public.

The following list is sorted by licensee. Abbreviations, like IL and US, are used to denote licensee name. IL:, for example, means that the licensee is the State of Illinois, whereas US: means a station operated by the United States federal government. The city and state in which the transmitter is located are enclosed within square brackets [], and exact transmitter locations are included where known. The source of the information for each entry is specified within parentheses ().

Atlanta: Dept of Aviation, TIS, Fed Intst 85 & off ramp to Sylvan Rd, Atlanta Intl Apt [Atlanta, GA] 0.5300 WRD955 (govt recds)	CA: TIS, Area-op: Los Angeles Orange Cts, temporary base [California] 0.5300 KNEC996 (govt recds)	CA: TIS, DOT Maintenance Station, Nevada City, CA [Truckee, CA] 0.5300 KNEU564 (govt recds)	CA: TIS, xmtr located at DOT Maint. Station [Placerville, CA] 0.5300 KNIG427 (govt recds)	Cleveland: TIS, Cleveland Hopkins International Apt [Cleveland, OH] 1.6100 KNEB723 (B. Parnass)	Columbus (OH): TIS, Port Columbus International Airport, 4600 E 17th Ave [Columbus, OH] 0.5300 KQP833 (others)	Cook County (IL): TIS, near south gate of Brookfield Zoo [Brookfield, IL] 1.6100 KNCC957 (B. Parnass)	Coronado: TIS, xmtr located Coronado PD, 578 Orange Ave [Coronado, CA] 0.5300 WNA6556 (govt recds)	Custer State Park, TIS, 15 miles SW of... [Hermosa, SD] 1.6100 KNDG614 (govt recds)	Denver, City and County of: TIS, Stapleton Intl Apt [Denver, CO] 0.5300 KNID798 (govt recds)	Dillard (GA): TIS, Int US441 & Bettys Creek immediately S of Dillard City limit [Dillard, GA] 0.5300 KNGG752 (govt recds)	Foothill Deansa Community College Dist, TIS, xmtr located at 12345 Elmonte Rd [Los Altos, CA] 1.6100 KNIP553 (govt recds)	GA: TIS, 2000 feet east I-20 / SR70 Interchange [Atlanta, GA] 0.5300 WYG263 (govt recds)	GA: TIS, Farmers Market on Old 41 Hwy [Forest Park, GA] 0.5300 WRD948 (govt recds)	GA: TIS, I-20, I-285 Interchange [Decatur, GA] 0.5300 WRD947 (govt recds)	GA: TIS, I-95, 4 miles S of US 84 at State Wel... [Brunswick, GA] 0.5300 WRD945 (govt recds)	GA: TIS, I-95 GA 99 Interchange [Brunswick, GA] 0.5300 WRD946 (govt recds)	GA: TIS, 175 I285 Interchange [Smyrna, GA] 0.5300 WRD944 (govt recds)	GA: TIS, in rest area of Welcome Ctr on Hwy 195 near Kingsland [Kingsland, GA] 0.5300 KNGU520 (govt recds)	GA: TIS, on Hwy 16 eastbound at last overpass before I95 [Garden City, GA] 0.5300 KNGU519 (govt recds)	GA: TIS, Stone Mountain Park [Stone Mountain, GA] 0.5300 WXB219 (govt recds)	GA: TIS, W Welcome Ctr off Hwy 95 [Monticeth, GA] 0.5300 KNGU518 (govt recds)	Gatlinburg (TN): TIS, 1400 feet NE Rt 441 on Gatlinburg Go... [Gatlinburg, TN] 0.5300 WYZ272 (govt recds)	Gatlinburg (TN): TIS, 300 feet NW intersection Fed Inst 40 & Rt6 [Gatlinburg, TN] 0.5300 WYZ274 (govt recds)	Gatlinburg (TN): TIS, approx 200 feet W of Bridge Crossing... [Gatlinburg, TN] 0.5300 WYZ273 (govt recds)	Gatlinburg (TN): TIS, approx 250 feet SE intersection of US 4 [Gatlinburg, TN] 0.5300 WYZ271 (govt recds)	Gatlinburg: TIS, 300 feet NW Fed Interstate 40 & Rt 66 [Gatlinburg, TN] 1.6100 WYZ275 (govt recds)	Hillsborough County Aviation Authority: TIS, Tampa International Airport [Tampa, FL] 1.6100 WYZ235 (govt recds)	IA: TIS, 5 miles w of Middle Road, Area-op: within .5 mile of Daven... [Davenport, IA] 1.6100 KJJ386 (govt recds)	IA: TIS [Walnut, IA] 1.6100 WYR522 (govt recds)	ID: Bureau of Comm: TIS, Raft River Interchange I-86 [Raft River, ID] 1.6100 KNAV733 (govt recds)	ID: Bureau of Comm: TIS, Register Rock State Park I-86 [American Falls, ID] 1.6100 KNAV734 (govt recds)	IL: TIS, I-94, median at Kil... [Chicago] 1.6100 KMB824 (B. Parnass)	IL: TIS, junction interstate 290 & Illinois Rt 5 [Chicago] 1.6100 KNIG425 (others)	IL: TIS, SW corner junction 290 & Nordic Rd [Chicago] 1.6100 KNIG426 (B. Parnass)	IL: TIS, SW corner Van Buren St & Des Plaines, 6A3 @ 1w [Chicago] 1.6100 KNAP828 (B. Parnass)	IL: TIS, West Frontage Rd I-94 .3 miles south of Winnetka Ave [Northfield, IL] 1.6100 KMH441 (B. Parnass)	IN: TIS, xmtr located at Brown County State Park office [Nashville, IN] 1.6100 KNIJ419 (govt recds)	Independence: TIS, US hwy 24 and Spring St [Independence, MO] 1.6100 KNFA366 (govt recds)	Kansas City: TIS, Bern St & Cookingham [Kansas City, MO] 1.6100 WQI284 (govt recds)	Kenton County Airport Board, TIS, Greater Cincinnati Apt [Hebron, KY] 1.6100 WZM835 (govt recds)	Kenton County Airport Board, TIS, Terminal A Greater Cincinnati Apt Room 228 [Cincinnati, OH] 1.6100 WXT613 (govt recds)
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Kingman: TIS, xmtr located at 3225 Shangrila Dr, control pt at Area Chamber of Commerce jct US Hwy 66 93 [Kingman, AZ] 0.5300 KNJX793 (govt recds)	KY: TIS, NE intersection US 264 IN NE on/off ramp [Louisville, KY] 0.5300 KR772 (govt recds)	KY: TIS, SE Federal Int 65 Kennedy Bridge [Louisville, KY] 0.5300 KR785 (govt recds)	KY: TIS [Clark County, IN] 0.5300 KR779 (govt recds)	Los Angeles: TIS, control pt: 1 World Way, Los Angeles, 6A3 @ 20w [Los Angeles, CA] 0.5300 WY2301 (govt recds)	Los Angeles: TIS, El Marino Park Berryman Ave & Patom [Culver City, CA] 0.5300 KR984 (govt recds)	Los Angeles: TIS, xmtr located at intersection of 96th St and Skyway [Los Angeles, CA] 0.5300 WY2301 (govt recds)	Los Angeles: TIS, xmtr located at intersection of Century and Airport [Los Angeles, CA] 0.5300 WY2301 (govt recds)	Los Angeles: TIS, xmtr located at intersection of Sepulveda S of Century at base of lighted sign [Los Angeles, CA] 0.5300 WY2301 (govt recds)	MD: TIS, location unknown [MD] 0.5300 KNJX865 (govt recds)	MD: TIS, xmtr located at Rt 70 and Rt 695, Baltimore [Baltimore, MD] 0.5300 WNAL785 (govt recds)	MD: TIS, xmtr located at US Rt 50 Kent Island [Kent Narrows, MD] 0.5300 WNAL786 (govt recds)	Minneapolis Saint Paul Metro Apts Commission: TIS, Wold Chamberlain Field, control pt: Blue Concourse Public Passenger Terminal [Minneapolis, MN] 0.5300 KNHW885 (govt recds)	MN: TIS, along hwy I-35W [Richfield, MN] 1.6100 WZM832 (govt recds)	MN: TIS, Lowry Hill Tunnel [Minneapolis, MN] 0.5300 WQH716 (govt recds)	MN: TIS, Washington Ave Bridge [Minneapolis, MN] 0.5300 WQH716 (govt recds)	MN: TIS, xmtr located at 1550 feet northeast of intersection of Main St & RM R railroad [Calumet, MN] 1.6100 WNA941 (govt recds)	MN: TIS, xmtr located at Grand Rapids Visitors Center 1 NW 3rd Street [Eveleth, MN] 1.6100 WNAZ542 (govt recds)	MN: TIS, xmtr located at Hwy 169 0.5 miles SW... [Chisom, MN] 1.6100 WNA940 (govt recds)	MN: TIS, xmtr located at State Hwy 53 2.25 miles S... [Eveleth, MN] 1.6100 WNAZ542 (govt recds)	MO: TIS, adjacent to hwy 76, 6.75 miles nw of... [Branson, MO] 1.6100 KNEM463 (govt recds)	Mobile (AL): TIS, xmtr located at Bates Field Airport [Mobile, AL] 1.6100 WNB743 (govt recds)	NC: TIS, intersection of I40 & US 421 [Winston-Salem, NC] 0.5300 WQX207 (govt recds)	NC: TIS, intersection of I40 US 158-421 & SR 2494 [Winston-Salem, NC] 0.5300 WQX207 (govt recds)	NC: TIS, Raleigh-Durham Apt [Morrisville, NC] 1.6100 WGW849 (others)	NH: TIS, xmtr located at 0.5 miles north bound of exit 32 on 193 [Linton, NH] 1.6100 WNC831 (govt recds)	NH: TIS, xmtr located at 2 miles south bound of exit 36 on 193 [Franconia, NH] 1.6100 WNC832 (govt recds)	NJ: TIS, I80 milepost 28.97 westbound [Roxbury, NJ] 0.5300 KNIE436 (govt recds)	Norfolk Port & Industrial Authority: TIS, xmtr located at Satellite Parking lot 400' north int Military Hwy & Robin Hood Rd [Norfolk, VA] 0.5300 WNAZ307 (govt recds)
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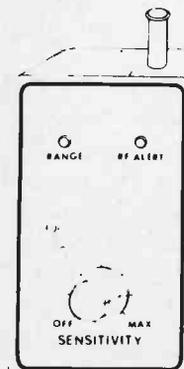
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NY and NJ Port Authority: TIS, Port Authority Adm Bldg (141), JF Kennedy Intl Apt
 [New York, NY] 0.5270 KNA585 (govt recds)

Ohio State University: TIS, Howlett Hall 2001 Fyffe Court, used during football games, during freshmen intro week, and at the beginning of school quarters
 [Columbus, OH] 0.5300 WQF465 (others)

OK: Dept of Transportation, TIS, 1.4 miles NW of town of ..., area-op:Tulsa
 [Turley, OK] 1.6100 WSQ964 (govt recds)

Peoria Park District, TIS, Wildlife Prairie Park
 [Peoria, IL] 0.5300 KTM232 (govt recds)

Phoenix AZ: TIS, 3400 Sky Harbor Blvd
 [Phoenix, AZ] 1.6100 WXX790 (govt recds)

Port Authority of NY & NJ: TIS, lower level mid river turnaround George Washington Bridge
 [New York, NY] 0.5300 WSB887 (govt recds)

Prince William County: TIS, xmtr located at 14500 Telegraph Rd
 [Potomac Mill, VA] 0.5300 WNB2973 (govt recds)

Raleigh Durham Airport Authority: TIS, xmtr located at Raleigh Durham Airport
 [Morrisville, NC] 1.6100 WNB326 (govt recds)

San Antonio: TIS, San Antonio International Apt
 [San Antonio, TX] 1.6100 KNDX476 (govt recds)

Seattle, Port of: TIS, intersection of Macadam Rd 1405 exit
 [Seattle, WA] 0.5300 KNCL518 (govt recds)

St Petersburg, FL: TIS, 551 19th St N
 [St Petersburg, FL] 1.6100 KNFH965 (govt recds)

Tacoma (WA): TIS, xmtr located at Port of Tacoma Road and I-5 interchange
 [Tacoma, WA] 1.6100 WNAN648 (govt recds)

Tacoma (WA): TIS, xmtr located at S 56th St & Interstate 5 interchange
 [Tacoma, WA] 0.5300 WNAN648 (govt recds)

The Dalles OR, Port of, TIS, West end of Port of The Dalles
 [The Dalles, OR] 1.6100 KNAX787 (govt recds)

TN: Dept of Transportation, TIS, Callahan exit of I-75N
 [Knoxville, TN] 0.5300 WQI249 (govt recds)

TN: Dept of Transportation, TIS, Westhills exit of I-75/40
 [Knoxville, TN] 0.5300 WQI250 (govt recds)

TN: TIS, 5th Avenue exit of I-75
 [Knoxville, TN] 0.5300 WQI248 (govt recds)

TN: TIS, Andrew Johnson Hwy exit I-40
 [Knoxville, TN] 0.5300 WQI246 (govt recds)

TN: TIS, Cherokee Trail exit of 129/73
 [Knoxville, TN] 0.5300 WQI245 (govt recds)

TN: TIS, Pelissippi exit of I-75/40
 [Knoxville, TN] 0.5300 WQI247 (govt recds)

Tucson Airport Authority: TIS, Tucson Intl Apt Terminal
 [Tucson, AZ] 0.5300 KNDL647 (govt recds)

Twining Water & Sanitation Dist, TIS, Taos Ski Valley Fire Station
 [New Mexico] 1.6100 KCR538 (govt recds)

unidentified: TIS, near Baltimore, MD
 [Reisterstowne, MD] 0.5300 call? (others)

Union County Apt Authority, TIS, xmtr located at 760 Clymer Rd
 [Marysville, OH] 1.6100 KNCK692 (govt recds)

Union County Apt Authority, TIS, xmtr located at Court St and W 5th St
 [Marysville, OH] 1.6100 KNCK692 (govt recds)

US: Agriculture, TIS, 10w
 [Blanchar, AR] 0.5300 call? (govt recds)
 [Boulder R, MT] 1.6100 call? (govt recds)
 [Bozeman, MT] 1.6100 call? (govt recds)
 [Bsqdlapc, NM] 1.6100 call? (govt recds)
 [Canyon Pt, AZ] 1.6100 KIF782 (govt recds)
 [Cle-Elum, WA] 0.5300 call? (govt recds)
 [Clodcrft, NM] 1.6100 KIF780 (govt recds)
 [Cook Cy, MT] 1.6100 call? (govt recds)
 [Eldon, AZ] 1.6100 KGD49 (govt recds)
 [Gardiner, MT] 1.6100 call? (govt recds)
 [Glenada, OR] 1.6100 KOQ226 (govt recds)
 [Gltm Canyon, MT] 1.6100 call? (govt recds)
 [Greenbas, NM] 1.6100 KID325 (govt recds)
 [Hallstrdg, OR] 1.6100 KCR834 (govt recds)
 [Hardnrdg, IN] 0.5300 KOQ212 (govt recds)
 [Hope, AK] 1.6100 KOQ221 (govt recds)
 [Hylt Canyon, MT] 1.6100 call? (govt recds)
 [Jacob L, AZ] 1.6100 KGD50 (govt recds)
 [Kinzuapt, PA] 1.6100 KSG225 (govt recds)
 [Laguna, CA] 1.6100 KGB528 (govt recds)
 [Mark Twain, MO] 1.6100 KOQ213 (govt recds)
 [Mayhill, NM] 1.6100 KID326 (govt recds)
 [Mdsnrvcn, MT] 1.6100 call? (govt recds)
 [Mountnvw, AR] 0.5300 call? (govt recds)
 [N Fork, ID] 1.6100 call? (govt recds)
 [Naches, WA] 1.6100 call? (govt recds)
 [No Bend, OR] 1.6100 KOQ227 (govt recds)
 [Palmer Mtn, CA] 1.6100 KGD44 (govt recds)
 [Portage, AK] 1.6100 KOQ222 (govt recds)
 [Reedsport, OR] 1.6100 KOQ228 (govt recds)
 [Ruidoso, NM] 1.6100 KGR403 (govt recds)
 [Sholow, AZ] 0.5300 KIF794 (govt recds)
 [Slrdrcanyon, AZ] 0.5300 KGD48 (govt recds)
 [Stanley, ID] 1.6100 call? (govt recds)
 [Sunsetpt, AZ] 0.5300 KGR402 (govt recds)
 [Targh Pass, MT] 1.6100 call? (govt recds)
 [Tmn Campgnd, MT] 1.6100 call? (govt recds)
 [Washington, WA] 0.5300 KOQ205 (govt recds)
 [Week, NM] 1.6100 KGR405 (govt recds)
 [Wnchsrhl, OR] 1.6100 KOQ229 (govt recds)
 [Yale, WA] 1.6100 KOQ206 (govt recds)
 [Ylwsn Valley, MT] 1.6100 call? (govt recds)

US: Air Force, TIS, 10w
 [Kennedy Space Ctr,] 1.6100 call? (govt recds)

US: Army, TIS, 10w
 [Bridgeport, WA] 1.6100 call? (govt recds)
 [White Sands Missil] 0.5300 call? (govt recds)
 [Wylie, TX] 0.5300 call? (govt recds)

US: Coast Guard, TIS, 10w
 [Kent Is, MD] 1.6100 call? (govt recds)
 [Washington, DC] 0.5300 call? (govt recds)

US: FAA, TIS, 10w
 [National Apt, VA] 0.5300 call? (govt recds)

US: Interior, TIS, 0.5w
 [Sanibeli, FL] 1.6100 KIE664 (govt recds)
 [Sanibeli, FL] 1.6100 KIE665 (govt recds)
 [Sanibeli, FL] 1.6100 KIE666 (govt recds)
 [Sanibeli, FL] 1.6100 KIE667 (govt recds)
 [Sanibeli, FL] 1.6100 KIE668 (govt recds)
 [Sanibeli, FL] 1.6100 KIE669 (govt recds)
 [Sanibeli, FL] 1.6100 KIE670 (govt recds)
 [Sanibeli, FL] 1.6100 KIE671 (govt recds)
 [Sanibeli, FL] 1.6100 KIE672 (govt recds)

US: Interior, TIS, 10w
 [Archrock, CA] 1.6100 KOP739 (govt recds)
 [Artistpt, WY] 1.6100 KOP713 (govt recds)
 [Ash Mtn, CA] 0.5300 KPB748 (govt recds)
 [Atspntpt, WY] 1.6100 KOP714 (govt recds)
 [Barstow, CA] 1.6100 KMC490 (govt recds)
 [Bass L, MI] 1.6100 KIE769 (govt recds)
 [Beaver Meadows, CO] 1.6100 KAF713 (govt recds)

[Bisctbsn, WY] 1.6100 KOP716 (govt recds)
 [Blackwoods, ME] 1.6100 KFB760 (govt recds)
 [Bodie I, NC] 1.6100 KPC711 (govt recds)
 [Breenbr, TN] 1.6100 KPB747 (govt recds)
 [Bridge, WY] 1.6100 KOP722 (govt recds)
 [Bryce, UT] 1.6100 KOP798 (govt recds)
 [Bssmrnd, WY] 1.6100 KOD454 (govt recds)
 [Buckhollow, MO] 1.6100 KAC779 (govt recds)
 [Buxton, NC] 1.6100 KPC713 (govt recds)
 [Cache, OK] 1.6100 KKF645 (govt recds)
 [Cadescope, TN] 1.6100 KIE722 (govt recds)
 [Cajonmtn, CA] 0.5300 KMC476 (govt recds)
 [Callicon, NY] 1.6100 KBF783 (govt recds)
 [Clgmsdm, NC] 1.6100 KIE730 (govt recds)
 [Cnyncampground, WY] 1.6100 KOP720 (govt recds)
 [Convoypt, FL] 0.5300 KID772 (govt recds)
 [Cosby, TN] 1.6100 KIE732 (govt recds)
 [Countryst, MO] 1.6100 KAC776 (govt recds)
 [Crsntcy, CA] 1.6100 KPB794 (govt recds)
 [Csrbtld, MT] 1.6100 KID776 (govt recds)
 [Deep Cr, NC] 0.5300 KID771 (govt recds)
 [Devilstowr, WY] 1.6100 KOP735 (govt recds)
 [Dolores, CO] 1.6100 KID761 (govt recds)
 [Dumntdms, CA] 1.6100 KMC487 (govt recds)
 [Duneclmb, MI] 1.6100 KIE770 (govt recds)
 [E Entrance, AZ] 1.6100 KOP738 (govt recds)
 [E Portal, CO] 1.6100 KAF721 (govt recds)
 [E Entrance, WY] 1.6100 KOP708 (govt recds)
 [Elk Cr, CO] 1.6100 KAF720 (govt recds)
 [Elkmont, TN] 1.6100 KIE734 (govt recds)
 [Emithill, AZ] 1.6100 KID762 (govt recds)
 [Essex, CA] 1.6100 KMC485 (govt recds)
 [Fireclgy, WY] 1.6100 KOP723 (govt recds)
 [Fireholl, WY] 1.6100 KOP712 (govt recds)
 [Flrrvps, CO] 0.5300 KAF712 (govt recds)
 [Fntnflts, WY] 1.6100 KOP719 (govt recds)
 [Frylcanyon, UT] 1.6100 KOJ777 (govt recds)
 [Fshbrdg, WY] 1.6100 KOP718 (govt recds)
 [Ft Laramie, WY] 1.6100 KOC745 (govt recds)
 [Gettysbrg, PA] 1.6100 KID774 (govt recds)
 [Glen Canyon, AZ] 1.6100 KOJ778 (govt recds)
 [Gr L, CO] 0.5300 KAF711 (govt recds)
 [Grants, NM] 1.6100 KKF410 (govt recds)
 [Grntvlg, WY] 1.6100 KOP721 (govt recds)
 [Gudlpmtn, NM] 1.6100 KKF403 (govt recds)
 [Hydnvalley, WY] 1.6100 KOP729 (govt recds)
 [Impisndn, CA] 1.6100 KMC478 (govt recds)
 [Indiancr, WY] 1.6100 KOP710 (govt recds)
 [Johannesbrg, CA] 1.6100 KMC489 (govt recds)
 [Kanarville, UT] 1.6100 KOJ495 (govt recds)
 [Kilauea, HI] 1.6100 KWA712 (govt recds)
 [Lackawxn, PA] 1.6100 KFB784 (govt recds)
 [Lamrvalley, WY] 1.6100 KOP725 (govt recds)
 [Las Vegas, NV] 1.6100 KOJ446 (govt recds)
 [Lone Pine, CA] 1.6100 KMC472 (govt recds)
 [Longmire, WA] 1.6100 KOD767 (govt recds)
 [Luray, VA] 1.6100 KIE736 (govt recds)
 [Mabrymll, VA] 1.6100 KID773 (govt recds)
 [Mammoth Cave, KY] 1.6100 KIE765 (govt recds)
 [Mammoth, WY] 1.6100 KOP724 (govt recds)
 [Manassas, VA] 0.5300 KFB786 (govt recds)
 [Marblemnt, WA] 1.6100 KOF788 (govt recds)
 [Mdsnjct, WY] 1.6100 KOP714 (govt recds)
 [Mdwgysb, WY] 1.6100 KOP715 (govt recds)
 [Medicinepk, OK] 1.6100 KKF646 (govt recds)
 [Misquilly, WA] 1.6100 KOD769 (govt recds)
 [Moiese, MT] 1.6100 KOC631 (govt recds)
 [Mosexhibit, WY] 1.6100 KOP727 (govt recds)
 [Mtpisgah, NC] 0.5300 KIE768 (govt recds)
 [Mtwshbrn, WY] 1.6100 KOP711 (govt recds)
 [Mudvolcano, WY] 1.6100 KOP709 (govt recds)
 [Narrows, OR] 1.6100 KAC616 (govt recds)
 [NEentrnc, MT] 1.6100 KOP709 (govt recds)
 [NOentrnc, MT] 1.6100 KOP709 (govt recds)
 [Nrrsgeyser, WY] 1.6100 KOP726 (govt recds)
 [Oconalf, NC] 1.6100 KIE718 (govt recds)
 [Ocracoke, NC] 1.6100 KPC712 (govt recds)
 [Old Faithful, WY] 1.6100 KOP713 (govt recds)
 [Orick, CA] 1.6100 KPB796 (govt recds)
 [Orr, MN] 1.6100 KAC791 (govt recds)
 [Paxson, AK] 1.6100 KWA439 (govt recds)
 [Paxson, AK] 1.6100 KWA441 (govt recds)
 [Pine Is, FL] 1.6100 KIE780 (govt recds)
 [Platterv, MI] 1.6100 KIE778 (govt recds)
 [Portage, AK] 1.6100 KWA437 (govt recds)
 [Prairie Cr, CA] 1.6100 KPB795 (govt recds)
 [Promntry, UT] 0.5300 KOC774 (govt recds)
 [Provincetown, MA] 1.6100 KFB757 (govt recds)
 [Prsmngp, TX] 1.6100 KIP740 (govt recds)
 [Pt Reyes, CA] 1.6100 KPB749 (govt recds)
 [Ridcrest, CA] 1.6100 KMC471 (govt recds)
 [Rioblan, CO] 1.6100 KID760 (govt recds)
 [Rndngll, AK] 1.6100 KWA414 (govt recds)
 [Roadsdr, WY] 1.6100 KOP728 (govt recds)
 [Salem, MO] 1.6100 KAC775 (govt recds)
 [Sequoia, CA] 1.6100 call? (govt recds)
 [Shoshone, CA] 1.6100 KMC488 (govt recds)
 [Signal Peak, TX] 1.6100 KIP742 (govt recds)
 [Slana, AK] 1.6100 KWA413 (govt recds)
 [Slime Creek, AK] 1.6100 KWA438 (govt recds)
 [SoEntrance, WY] 1.6100 KOP711 (govt recds)
 [Sourdough, AZ] 1.6100 KWA436 (govt recds)
 [South Rim, AZ] 1.6100 KOP737 (govt recds)
 [Sowlfl, MA] 1.6100 KFB758 (govt recds)
 [Splitrock, WY] 1.6100 KOP421 (govt recds)
 [St Louis, MO] 0.5300 KID775 (govt recds)
 [Steinagr, UT] 1.6100 KOJ499 (govt recds)
 [Steinkr, UT] 1.6100 KOJ494 (govt recds)
 [Stembtpt, WY] 1.6100 KOP717 (govt recds)
 [Sugarlands, TN] 1.6100 KIE723 (govt recds)
 [Swharbor, ME] 0.5300 KFB759 (govt recds)
 [Tahomwds, WA] 1.6100 KOD762 (govt recds)
 [Tremont, TN] 1.6100 KIE724 (govt recds)
 [Turtland, FL] 1.6100 KIE710 (govt recds)
 [Twincrks, TN] 1.6100 KIE793 (govt recds)
 [Twrjnctn, WY] 1.6100 KOP712 (govt recds)
 [Vanburen, MO] 1.6100 KAC778 (govt recds)
 [Vidal, CA] 1.6100 KMC483 (govt recds)
 [Watchman, UT] 1.6100 KOJ761 (govt recds)
 [WEentrnc, MT] 1.6100 KOP710 (govt recds)
 [Wglacier, MT] 1.6100 KOE731 (govt recds)
 [White Sands, NM] 1.6100 KOP743 (govt recds)
 [Whitescy, NM] 1.6100 KOP741 (govt recds)
 [Wilson, FL] 1.6100 KIE711 (govt recds)
 [Wmsprnc, WY] 1.6100 KOP736 (govt recds)
 [Yucca Valley, CA] 1.6100 KMC482 (govt recds)
 [Yuha, CA] 1.6100 KMC426 (govt recds)

NASA Commander Rides in Style

When Jon McBride, Shuttle Commander, needs to fly, he uses his personal T-38 shown here during an interview by MT reader and



Shuttle Commander Jon McBride grants an interview during a recent stopover at Lafayette Regional Airport in Louisiana.

veteran listener Tom Marcotte of Duson, Louisiana.

Readers interested in tuning in on NASA flights may wish to try the official preset channels used by NASA aircraft radios; these twenty channels are shown below:

Ch	Freq	Ch	Freq
1	275.8	11	239.8
2	253.5	12	342.5
3	284.0	13	344.6
4	269.9	14	375.2
5	306.3	15	390.1
6	348.6	16	318.1
7	257.8	17	348.7
8	307.0	18	372.2
9	295.2	19	255.4
10	320.7	20	235.4

Devotees of UHF military aeronautical monitoring may recognize some of the more common channels as belonging to the U.S. Air Force; they are active nationwide and provide good targets for monitoring enthusiasts.



McBride's T-38 NASA aircraft and instrument console.



HEAR 'TIS cont'd

US: Tennessee Valley Authority, TIS, 10w [Norrisdam, TN] _____	1.6100	KIE260	(govt recds)
US: Transportation, TIS, 10w [Fairholm, WA] _____	1.6100	call?	(govt recds)
" [McLean, VA] _____	0.5300	call?	(govt recds)
" [Toutle, WA] _____	4.6100	KNFG751	(govt recds)
WA: TIS, Spokane St interchange on I-5 [Seattle, WA] _____	0.5300	KNEZ391	(govt recds)
WA: TIS, SR 520 interchange (Northrup) on I-405 [Bellevue, WA] _____	0.5300	KNEZ392	(govt recds)
Winter Park, CO: TIS, 78846 US Hwy 40 [Winter Park, CO] _____	1.6100	KNHB622	(govt recds)
Yakima WA: TIS, mobile fleet service roof 2003 E Viola [Yakima, WA] _____	1.6100	KNHE983	(govt recds)
" [McLean, VA] _____	1.6100	call?	(govt recds)
VA: TIS, 372832N 0772548W [Richmond, VA] _____	0.5300	WYR507	(govt recds)
VA: TIS, 373232N 0772657W [Richmond, VA] _____	0.5300	WYR509	(govt recds)
VA: TIS, 373319N 0772649W [Richmond, VA] _____	0.5300	WYR508	(govt recds)
VA: TIS, 373329N 0772455W [Richmond, VA] _____	0.5300	WYR510	(govt recds)
VA: TIS, Fed Intr 95 & Rt 637 near Stafford [Quantico Marine Ba] _____	1.6100	KKG654	(govt recds)
VA: TIS, Washington National Apt [Washington, DC] _____	0.5300	call?	(others)
VA: TIS, xmtr located at 609 Naval Base Rd [Norfolk, VA] _____	0.5300	WNAN682	(govt recds)
VA: TIS, xmtr located at Denbeigh Blvd I64 & Rt 173 [Newport News, VA] _____	0.5300	KNJR837	(govt recds)
VA: TIS, xmtr located at I64 Rt 258 Mercury Blvd [Hampton, VA] _____	0.5300	KNJR839	(govt recds)
VA: TIS, xmtr located at Old Oak Grove Rd at 168 Bypass [Chesapeake, VA] _____	0.5300	KNJR838	(govt recds)
VA: TIS, xmtr located at Providence Rd I64 [Virginia Beach, VA] _____	0.5300	KNJR840	(govt recds)
VA: TIS, xmtr located at Rt 44 Virginia Beach Toll Plaza [Virginia Beach, VA] _____	0.5300	KNJR841	(govt recds)
Vail: TIS, 1 East Bale Mt & Frontage Rd, Control pt: Vail Resort Assn, 241E Meadow Dr [Vail, CO] _____	0.5300	KNDC749	(govt recds)
Vail: TIS, 2 Middle Ford Park Tennis Shack, Control pt: Vail Resort Assn, 241E Meadow Dr [Vail, CO] _____	0.5300	KNDC750	(govt recds)
Vail: TIS, 3 West 2077 North Frontage Rd, Control pt: Vail Resort Assn, 241E Meadow Dr [Vail, CO] _____	0.5300	KNDC748	(govt recds)
Virginia (MN) Chamber of Commerce: CTIS, xmtr located at Mine View in the Sky, 4000 feet ESE of WHLB radio tower [Virginia, MN] _____	1.6100	WNAT488	(govt recds)
WA: TIS, 108 Highway Adm Bldg [Snoqualmi Pass, WA] _____	1.6100	WQX206	(govt recds)
WA: TIS, 15th Ave & Cherry St [Olympia, WA] _____	1.6100	KNHD261	(govt recds)
WA: TIS, Jct 1-5 & 93rd Ave SW Lathrop Rd [Tumwater, WA] _____	1.6100	KNHD261	(govt recds)
WA: TIS, Jct 1-5 S SR510 Marvin Rd [Lacey, WA] _____	1.6100	KNHD261	(govt recds)
WA: TIS, Jct SR101 & W Uncas Rd 1.3 miles S of [Uncas, WA] _____	1.6100	KNHD262	(govt recds)
WA: TIS, Jct SR510 & Evergreen College Pky [Olympia, WA] _____	1.6100	KNHD261	(govt recds)
WA: TIS, NE 450th St interchange (Eastgate) on I-90 [Bellevue, WA] _____	0.5300	KNEZ393	(govt recds)
WA: TIS, NE 45th St interchange on I-5 [Seattle, WA] _____	0.5300	KNEZ390	(govt recds)
WA: TIS, on I-90 1.5 miles W of [Ellensburg, WA] _____	1.6100	KNEF687	(govt recds)
WA: TIS, Park & Ride Parking Lot Jct SR 504 & SR 505, control pt at Sequest Park Ranger Office			

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by James R. Hay

Monitoring the U.K.

England offers a wide variety of frequencies for coastal monitoring. While there are only three stations which broadcast on high frequencies, as shown on the map, they offer ample opportunity to be heard.

To the north of Scotland, the United States Navy operates a station which can be heard using Morse code on 3724, 7504.5 and 12691 kHz. The station is located at Thurso and its call sign is GXH. Also in the north of Scotland, the British Post Office operates a CW station at Wick on 4228, 6333.5, 8469, and 12709 kHz using call sign GKR.

Before delving into the specifics of frequencies at Portishead, a word of explanation is in order. The British have a system of assigning call signs to a transmitter depending on its frequency. In this system, a number follows the first three letters of the call sign.

Number 2 is used for the 4 MHz band, 3 for 6 MHz, 4 for 8 MHz, 5 for 12 MHz, 6 for 16 MHz and 7 for 22 MHz. There are exceptions, but this is the general rule.

The numbers have been



deleted from the call signs given below. Although the call signs for the radiotelephone stations are given, normally, the station name is used.

In the radiotelephone bands, Portishead Radio can be heard on the following frequencies (kHz):

GKT	GKU	GKV
4374.3	8766.8	4436.3
4361.9	8776.1	8785.4
4386.7	17265.3	8797.8
8723.4	17277.7	13173.5
13102.2	17287.0	13192.1
13117.7	22631.5	13185.9
13105.3	22656.3	22684.2
17237.4	22637.7	22678.0
17249.8		
22612.9		

GKW	GKX
8813.3	22718.3
13198.3	
17330.4	
17345.9	
17355.2	

On CW Portishead can also be found on the following frequencies (kHz):

GKA	GKB	GKC
4286.0	4274.0	4251.5
6368.9	6379.5	6407.5
8545.9	8557.9	8516.0
12822.0	12835.4	13019.8
17098.4	17113.0	16954.4
22467.0	22448.7	22407.3

GKD	GKE	GKF
4256.0	4350.5	12815.0
6428.5	6495.0	
8569.0	8705.5	
12788.5	13072.0	
16974.6	17198.0	
22432.0	22562.0	

GKG	GKH	GKI
4267.9	4314.5	4317.5
6469.3	6470.8	6472.3
8591.5	8604.0	8606.0
12790.0	12791.5	12858.0
17072.0	17092.0	17151.2
22503.0	22525.5	22528.5

GKJ	GKK	GKM
4326.5	4336.0	4316.0
6477.5	6342.0	6397.0
8684.0	8552.0	8581.6
12871.5	13006.5	12714.0
16918.8	17167.5	17136.8
22545.0	22494.0	22527.0

GKN	GKO	GKQ
4314.9	4316.9	4356.5
6395.9	6397.9	6505.0
8580.5	8582.5	8718.0
12712.9	12714.9	13099.0
17135.7	17137.7	17231.0
22525.9	22527.9	22594.0

GKS
4344.5
6402.0
8496.0
12770.0
16882.5
22387.5

The abundance of frequencies should make it possible for anyone to hear Portishead. Marker transmissions in Morse code can also provide a place for a short wave listener to get some practice as many of them use

slow code.

Portishead Radio is a high frequency station; however, all stations are equipped with 2182 kHz and they also reply to ships who call on 2381 kHz using 1792 kHz. This is a special arrangement which was made by the British government to cut down on crowding on 2182.

Those stations which also use low frequency telegraphy also use 500 kHz which is an international distress and calling frequency.

If you are looking for British stations aside from the frequencies already mentioned, the following list will offer some help in other places to look. All frequencies are in kHz and the frequencies between 405 and 520 are CW, the rest being SSB.

GLV Anglesey Radio	447	1792
GCC Cullercoats R.	441	2719
GKE Humber Radio	484	1869
GIL Ilfracombe R.	519	2670
GUD Jersey Radio		1726
GLD Lands End Radio	438	1841
GNI Niton Radio	464	1834
GNP North Foreland	418	1848
GPK Portpatrick R.	472	1883
GND Stonehaven R.	458	1856
GKR Wick Radio	431	1827

There may be other frequencies in use and there are other stations, notably those operated by Her Majesty's Coastguard, but the above are the most likely to be heard.

Your suggestions and comments are always welcome. Please address your correspondence to: James R. Hay, 141 St. John's Blvd, Pointe Claire, P.Q., Canada, H9S 4Z2.

New NOAA Network

The National Oceanic and Atmospheric Administration is planning a \$12 million network consisting of 30 radar stations in the U.S. Midwest to profile windstorms in that fast-moving part of the country.

The grid, shown in the accompanying illustration, should be operational as early as 1989 and can be heard transmitting on 50 and 405 MHz. A prototype wind

pattern profile is already in operation in the 900 MHz band at the Environmental Research Laboratory at Boulder, Colorado.

It is expected that the new network will be able to improve weather forecasting by tracing winds to an altitude of ten miles by spacing the radar stations 120 miles apart over locations in nine states.

Proposed NOAA wind profilers



Source: NOAA

"PLANE TALK"

by Jean Baker



213 West Troy Ave
Apt C
Indianapolis, IN 46225

Indianapolis ARTCC

Part II of an interview with Mr. Harold Hale, Assistant Air Traffic Manager of the Indianapolis Air Route Traffic Control Center. He will use the initials HH, and Plane Talk is PT.

FREQUENCIES

PT: I've noticed that boundaries of ARTCCs shift from time to time, and frequencies change from one center's control to another. Why does this happen?

HH: Over the past six to seven years we've been doing a study of frequencies within the spectrum. This is where the Frequency Management people come in. Center boundaries change and frequencies shift so as not to cause conflicts.

If we find that one of our frequencies conflicts with another--such as our high altitude frequency in the vicinity of the Kansas City Center--then we'll change it so there won't be an overlap.

PT: Do you think that eventually the VHF aviation communication frequency band will have to be expanded?

HH: I think that we've almost reached this point now. This is one of the subjects that the Frequency

ERRATA: Photo caption in Part I should have read "Photo of modern FAA ARTCC," rather than "tower."

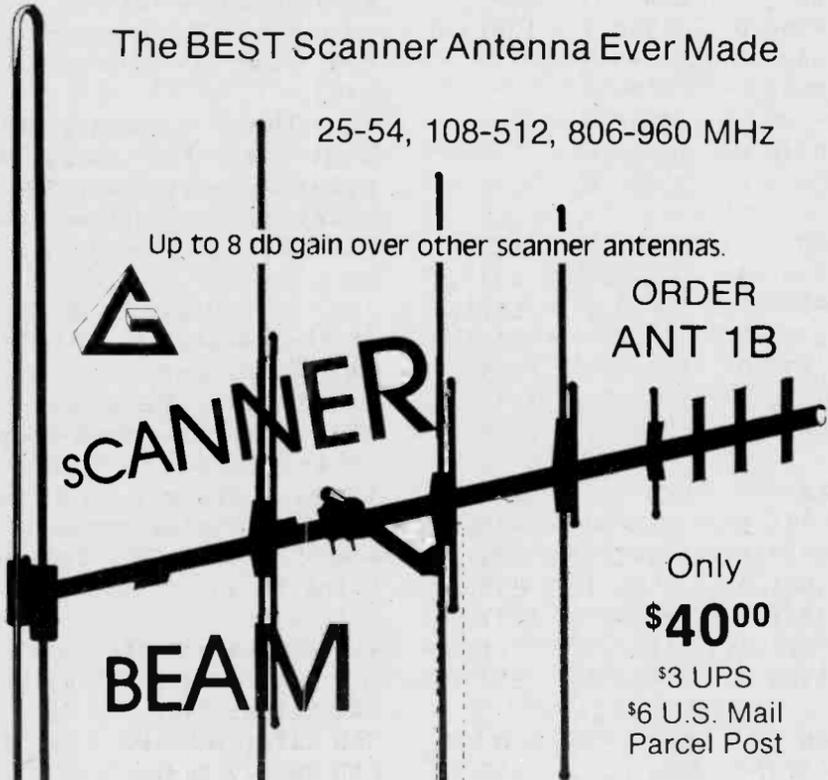
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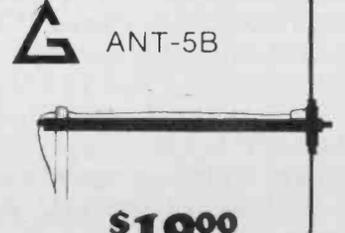
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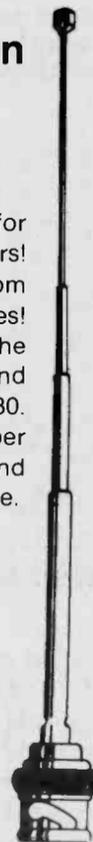
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PLANE TALK cont'd

Management people have been studying. As the country grows, and aviation grows along with it, there will be an increased, wider frequency spectrum.

EQUIPMENT MAINTENANCE

One area that we haven't mentioned yet, Jean, and a subject that I do want to mention is our technicians who maintain our equipment. No one hears much about these people, and yet they keep the equipment going and functional with the work and dedication that they put in. They're as much a part of our team as is anyone else. Not only are they needed for emergency purposes, but also for normal, routine equipment maintenance.

PT: When do they perform the routine maintenance duties on the equipment?

HH: On Sunday mornings, when there's very light traffic.

"HANDOFF" PROCEDURES

PT: What actually occurs during a "handoff"?

HH: A handoff is controllers' terminology (slang, if you will) for transfer of control. Providing both sides computers are up, the computer itself does it. You will see that when a flight comes into certain parameters of a center's boundary the aircraft will flash the sector number to Kansas City Center (for instance). When Kansas City accepts the flight it will quit flashing on the screen here and we tell the pilot to contact Kansas City Center.

Now if we are in manual mode, we just tell Kansas City Center on a land line (telephone) that this is TWA flight so-and-so; we give the flight's geographical location, altitude, time, and the Kansas City Center Controller will say, "Yes, we see him - we have contact."

The only difference is that one time the computer will do it--with the transponder of the aircraft and everything--and the other time it's manual transfer of control. We give them the location, type of aircraft, and altitude, and when it passes from their control to ours, it's done the same way.

PT: And does it work the same way when a flight is handed off from one sector to another?

HH: Absolutely. If the computer's up, it's all automatic; the aircraft will flash and when the next sector Controller accepts

VHF/UHF FREQUENCY PAIRS USED BY THE INDIANAPOLIS AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC)		
<i>These frequencies were also shown on the sector chart printed in Part I. Not all frequencies will be used at all times; occasionally, frequencies will be combined at night.</i>		
VHF	UHF	Altitude
119.550	(251.1)	Low
124.450	(370.9)	Low
124.800	(380.2)	Low
125.550	(398.9)	Low
125.650	(372.0)	Low
127.000	(285.4)	Low
127.100	(290.4)	Low
127.400	(269.6)	Low
128.300	(363.0)	Low
128.550	(269.4)	Low
128.800	(378.8)	Low
132.200	(307.1)	Low
132.325	(385.6)	High
132.475	(278.3)	High
132.525	(279.9)	High
132.600	(281.4)	Low
132.700	(269.0)	Low
132.775	(385.4)	Ultra-High
132.825	(343.6)	High
132.175	(270.3)	High
133.050	(278.5)	High
133.575	(346.3)	Ultra-High
133.775	(288.1)	Ultra-High
133.925	(387.0)	High
134.000	(290.5)	Low
134.225	(307.3)	Ultra-High
134.275	(352.0)	Ultra-High
134.700	(269.0)	Low
135.250	(290.3)	High
135.800	(351.8)	Low

control of it, the pilot is told to switch frequencies. At the time, the flight will be at the boundary of the previous sector, and it will be under the accepting sector's control.

Again, if the computer is down and it's under manual control, then we give the accepting controller all of the pertinent data.

MAINTAINING SEPARATION

PT: All of us who monitor aviation communications realize that aircraft have to maintain some kind of separation. How does this work?

HH: Our separation standard is a five-mile cylinder around the aircraft, and one thousand feet horizontally up to flight level 29.0; above 29.0 it's two thousand feet. What we call an operational error occurs when this space is violated--by even one tenth of a mile. And that's the reason that there's not as many near mid-air collisions as there could be, because we do have this buffer.

It's not like, for instance, going home tonight after work, when we have more near-misses on the expressway because there's only two feet separating my car from the next guy going 55 miles an hour.

One unique thing about

the FAA is that we have identical standards nationwide. For instance, if you fly into Los Angeles, the terminology used there is the same as is used in New York, Indianapolis or wherever. Likewise, the same standards for separation are used.

Now the terminals, because of the close proximity, use a different radar than we do. Ours sweeps about nine times per minute and theirs goes about 20 sweeps per minute. They can go down to three miles separation between similar type aircraft. However, with a heavy jet, they have to have five miles of separation behind it. This is why we'll hold airplanes on the ground, or hold them in a "fix"; but we do not lessen the separation standard.

If this five-mile buffer is broken, here is what happens: We have a piece of gear, which you may have heard about, called an AEDP. It is commonly referred to as a "snitch," "squeal-a-deal," and other names.

Needless to say, everything that a controller says and does is recorded. When the buffer is penetrated, the computer goes off with an aural alarm which warns the supervisor, then we look into it. If it's a controller screw-up--even though the penetration was only an eighth of a mile into the buffer--we pull him off the position and go through an investigative process.

But we're very proud of the fact that during the month of November--with 145,000 operations during that month--we only had one operational error (separation had gotten down to four miles)!

PT: That's a record to be very proud of!

HH: So it's a safe system and it's an efficient one. We're very proud of the work that our people do--not only in November with the large increase in traffic that we had--but all of the time.

PT: With all of this air traffic, a situation is bound to occur where the controller has two separate aircraft, each belonging to a different airline, but both having the same flight number on his frequency simultaneously. How does he - or she - handle it?

HH: The air Transport Association, which represents the airlines (basically, it's the trade group of the airlines), has been very good about handling any conflicts. They act as a central contact point. It doesn't happen very fre-

HAVEN'T SEEN YOUR FAVORITE TOPIC LATELY? LET US KNOW; WE LISTEN

quently that we get two aircraft with the same flight number--except, as you had mentioned, during extra-busy times.

When we become aware of something like that happening on a continuing basis, we work with the Air Transport Association to persuade one or the other of the airlines involved to change their flight number.

When a Controller does have two flights with identical flight numbers on a frequency he'll say "Continental 44, we also have a United 44 on this frequency, so listen very carefully." Also, when we are talking with one or the other of these flights, we always say the name of the air carrier twice, such as "Continental 40, Continental," to make sure that the correct flight responds.

PT: Mr. Hale, from time to time, I've heard controllers issue a new transponder code to a flight, replacing the one that the pilot is already using. Why is this done?

HH: The transponder code that the pilot is using may already be in use by somebody else. To give you another example, if the tower's equipment is down, then we may switch transponder codes for them. There are 4,096 subsets of codes; some are delegated to the tower--we have some and Chicago Center has some, etc. Now if we infringe on a code, the computer says, "Hey, you can't do that!" so we just change it.

PT: Is there ever any problem for the controllers to understand pilots of foreign airlines?

HH: No, not really. I worked in Chicago with them more extensively than I did here. I think that the problem might come about when we don't use proper phraseology--when we use slang, for instance. Most foreign pilots are very well educated in the English language; I personally respect them because I certainly would have a problem learning their languages!

TERMINOLOGY

PT: Will you explain to our readers just exactly what a "VOR" is?

HH: Certainly. An "OMNI RANGE" is the correct name. "V" stands for "Very High Frequency." It is a ground facility--a transmitter within a large network of similar navigational facilities--which transmits a dis-

PLANE TALK cont'd

tinctly identified radio signal in all directions. The signal is sent out in a pattern of "legs" similar to the spokes of a wheel and aircraft fly along these in a manner similar to a driver following an interstate highway. VORs are located at points where airways intersect. They are omnidirectional in operation.

PT: What is a waypoint?

HH: We define a certain geographical point in our area or another control area; with the sophisticated navigational gear today, a pilot can type into his computer the lat/longs (latitude and longitude) of a waypoint, and he will go to that particular one. You can say that he (and we) know where he's going when he gets to a particular point.

PT: We hear the word "vector" used on a continuous basis when we monitor the aviation communication bands. Would you define this term for us?

HH: We give an airplane a "steer" to a particular point; we say that we're going to "vector" him over there. These relate to headings and altitudes to be used. Would you believe that I've never had that particular question asked of me? I've never had to look it up in Webster's Dictionary exactly as to what it means by their definition, but that's what it means to us!

PT: What is "en-trail spacing"?

HH: With radar, we go to separation as a form of "flow control," metering or traffic management; because some facilities, at some given time, request that we put them 20 miles en-trail; this way, each flight would be 20 miles en-trail. It's usually imposed upon us--or we impose it upon another facility when 20 miles en-trail spacing is desired.

PT: What would happen if your primary radar went out? What do you use for backup?

HH: We have five radar systems. One of the other radars would fill in. I really can't remember the last time that we lost our radar for any extended period. If it did go down, then another one of our systems would pick it up from there. That's why our technicians perform routine maintenance regularly on our systems on Sunday morning.

PT: My last question for you, Mr. Hale, is this: During your life as an Air Traffic Controller, what is the most valuable lesson that you've learned and how

would you sum it up?

HH: That's an excellent question; I don't think that anyone's ever asked that of me. Living life in the fast lane as those of us who work in the aviation field do, we learn to take a very realistic view of life. The most valuable lesson that I've learned is that you can't take yourself too seriously. If you do, your co-workers will slap you down very quickly! That's the main point that I've learned.

PT: Mr. Hale, thank you very much. You've given us an extremely thorough look at modern Air Traffic Control operations; our readers should enjoy this very much!

- *** -

A month after this interview took place, Mr. Hale gave me permission to observe the controllers at work during a shift. I could hardly tear myself away when it was time for me to leave. This will be featured in a future column, so watch for it!

Next month, I will be interviewing the Manager of the Control Tower at Indianapolis International Airport. We will see what operations are like at this facility.

Until then, 73s and out,

Jean Baker

FCC CRACKS DOWN ON CB AMPLIFIERS

Recent studies by the FCC show that 57% of complaints of interference to TV and other home electronic equipment reported to local FCC offices involve over-powered CB stations.

Richard M. Smith, Chief of the FCC's Washington Field Operations Bureau, has announced plans for a nationwide field effort to combat the illegal sale and use of devices used to boost CB transmitter power.

As part of this coordinated program the FCC Norfolk office is stepping up its enforcement activities, according to the J.J. Freeman, Engineer in Charge. Attempts will be made to identify manufacturers and distributors of these devices in the Norfolk district which include Virginia and North Carolina. Violators will be fined and criminally prosecuted if necessary.

Anyone who has information concerning the illegal manufacture, marketing, or use of CB with linear amplifiers is encouraged to contact the FCC Norfolk office at 870 North Military Highway, Norfolk, VA 23502.

SIGNALS FROM SPACE

by
Larry Van Horn
160 Lester Drive

Orange Park, FL 32073



MT readers watching the Super Bowl on Sunday, January 26 probably glanced over the announcement that the Super Bowl was being relayed to the passengers aboard the Queen Elizabeth 2. I have had several letters that indicate some were paying attention and wanted to know how this was accomplished.

COMSAT was responsible for the broadcast to the QEII via the MARECS-A satellite parked at 26° W. Since the live transmission took place during the ship's dining hours, the QEII chose to videotape the game on-board the luxury liner for a special viewing by the passengers later in the evening.

The historic live telecast of the Super Bowl to the QEII followed by only ten days the first "full motion" video transmission to a ship at sea, and is one in a series of experimental maritime television transmissions that is being

coordinated by COMSAT's Maritime Services.

Irving Goldstein, Chairman and Chief Executive Officer of COMSAT, noted, "We're delighted that--through satellite communications--the QEII's passengers were able to view one of the most popular sporting events of the year. We've now completed over a week of trial transmissions, and their quality has far exceeded our expectations. Based on these initial test results, we feel that the regular telecast of television to ships at sea is certainly feasible."

The large amount of transponder capacity required for video transmissions has until this time made it uneconomical to relay television programming via maritime satellites. These trial transmissions utilize compressed video techniques which significantly reduce the satellite transponder capacity re-



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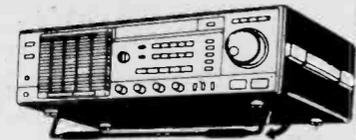
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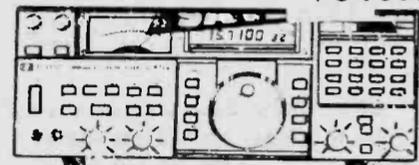
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quired for video transmissions.

At the time of the Super Bowl game, the QEII was about 100 miles off the coast of Peru. The Super Sunday transmission to the luxury liner was routed via domestic satellite link from the New Orleans Superdome to Shipboard Satellite Services Network studios in North Vale, New Jersey, and again via domestic satellite to a COMSAT coast earth station in Southbury, Connecticut.

From there it was up-linked in C-band (6.42025-6.4250 GHz) to INMARISAT's MARECS-A satellite and then downlinked in the L-band (1.53775-1.5425 GHz). The signal was captured aboard the QEII by an approximately 7-foot Sea-Tel antenna.

This information should interest Maritime band listeners as new receivers can cover the marine satellite band. The R-7000 from ICOM is capable of covering the L-band range downlink from MARECS. If you ask if ships are moving to satellite, the answer is definitely yes.

John Biro, recently dropped me a note to add some insight to the quick return of the Salyut 7 cosmonauts last year. John has added some new information in addition to that already presented in the February MT. Here is some of that info.

"I started to receive scrambled voice comms from the Salyut 7, but I received them before 13 November. It sounded like SSB; in fact at first I thought they had changed over to SSB and I tried to tune it in, but soon found that it was scrambled FM. The scrambling is most likely some form of voice inversion. Not all transmissions were scrambled -- they seem to start scrambled and then change to 'clear'. I could hear what sounded like clear voice in the background even when I was receiving the Salyut 7 scrambled.

"In the February 1986 issue of *Soviet Life* on pages 20 and 21 there is an article about the Salyut 7 Orbital Station. The story contains information on how the T-13 cosmonauts got the Salyut 7 back into operation.

"During the unmanned mode session of the Salyut 7 it was revealed that a defunct radio system for picking up earth commands was completely inoperative. Then things got worse, so they decided to put a crew aboard the station to

SALYUT TIME LINE

10/02/84	Salyut 7 mothballed and put into unmanned operation.
06/06/85	Soyuz T-13 piloted by Vladimir Dzhnibekov and Victor Savinykh was orbited.
06/08/85	Soyuz T-13 approached the Salyut 7 and docked.
06/10/85	The first battery was charged.
06/13/85	The positioning control system, rendezvous facilities and the propulsion motors were tested.
06/14/85	Ship's water supply predicted to run out and the emergency supplies of water would only last a week.
06/16/85	There was running water; the crisis had ended.
06/23/85	Progress 24 linked up with Salyut 7 at the aft docking port with supplies, fuel and equipment needed to restore Salyut.
07/15/85	Progress 24 cut loose, decays in earth's atmosphere.
07/19/85	Cosmos 1669 docks with Salyut 7. Scientific module.
09/17/85	Soyuz T-14 docks with Salyut 7.
09/26/85	Soyuz T-13 returns to earth. Leaves three cosmonauts aboard. Two of them are military.
09/29/85	Cosmos 1686 "unmanned cargo capsule" docks with Salyut 7.
11/13/85	Voice transmissions on 142.417 MHz scrambled.
11/21/85	Soyuz T-14 mission cut short; cosmonauts return to earth.

restore its normal operation. The solar panels were found to be at an angle of 70 to 90 degrees to each other; they should have been parallel.

"When the T-13 crew docked with Salyut 7 they first had to sample for toxins and station temperature. The air was found safe but the temperature was below freezing. They were worried that working in the Space Station would increase the concentration of carbon dioxide, so they concocted a makeshift ventilation system and started making jumper cables to charge the batteries directly from the solar cells.

"The next major problem was getting the temperature up above freezing. Besides being cold, they had a limited amount of water on the Soyuz T-13, about enough for eight days before using the emergency supplies. The crew estimated it might take them from several days to a month to get the station livable. However, in short order, the heat came on and the batteries were charged and the water supply, which was frozen, became potable.

"The problem for the Salyut 7 power failure was found to be a gauge that had stuck in the fully charged position. As a result, the batteries were automatically disconnected and then gradually discharged.

"Based on the time line in the *Soviet Life* article and information presented in MT, the accompanying information is presented as a synopsis of the T-13 mission."

I'd like to thank John for the new insight and time line. It will be interesting to see if the Salyut 7

remains an active Soviet space station now that the new generation of space station is in orbit.

If you are a hardcore TVRO DX'er, your shack will be incomplete without the "1985 World Satellite Almanac" by Mark Long. This little gem slipped up to me by the back door and I must say I am glad it did.

Fashioned after the now famous "World Radio TV Handbook," the 1985 WSA is a complete bible on TVRO reception techniques and

satellites. There is a lot of information between the covers of this book that will help the avid viewer find just about any kind of signal on the transponders from any TVRO only satellite in the world. The book is broken down in ITU regions, then by satellite orbital position to facilitate easy tuning across your portion of the Clarke belt.

The book is a little steep--\$39.95 each--but is well worth the cost. You can order it from: World Satellite Almanac, Subscription Dept., P.O. Box 70697, Dept. R, Pasadena, CA 91107. Be sure to tell them you saw it in MT's Signals From Space.

Speaking of good books, the second edition of *Communications Satellites* should be out shortly after this column is in print. I hope that the new information presented in the book is of value to you all. There are new frequencies, photos and even a new section on satellite hints and tips. As usual the book can be ordered from Grove Enterprises.

Well, that about wraps it up for this month. Next month I hope to be reviewing the latest version of the AMSAT VR86 for the Commodore 64 and Commodore 128 in the C64 mode satellite tracking program. The program is available from AMSAT Software Exchange and sells for \$30.00. Until next month, best of 73 and satellite DX.

* * * Listening to the Stars * * *

by Bruce M. Boston, N9ETX

Observing the stars and planets can be an enjoyable pastime but extremes in temperature, wind and cloud cover, as well as the length of darkness, can place a limit on the amount of observing you can do. That is unless you're into the very interesting study of radio astronomy.

This type of astronomy can easily be done at home and, in most cases, with equipment already at hand. But before we get into how it's done we should briefly go over the history of the science.

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Back in the early 1930's Karl Jansky, an employee of Bell Labs, was assigned the task of tracking down the source of noise that was interfering with transatlantic radiotelephone transmissions. In time, Jansky accounted for most of the static he heard but one source remained, a source which moved across the sky

in relation to the time of day. It was later determined that this "noise" emanated from a region toward the center of our galaxy.

Jansky's discovery, for the most part, was not researched until the conclusion of World War II. By that time celestial radio emissions, a bit closer to home, were found; speci-



Jupiter as seen through a collage of its moons. (NASA: photographed by Voyager I)

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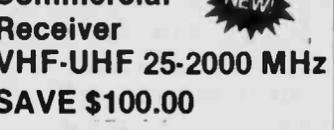
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LISTENING TO STARS cont'd

fically, the Sun and the planet Jupiter. The Sun has an 11 year cycle of activity which is currently near its lowest point but should peak again in the early 1990's. Jupiter, on the other hand, is almost constantly emitting signals over a wide variety of frequencies. The ones we're most interested in are around 21 MHz.

If you have a SW radio or a ham transceiver which can tune this part of the spectrum, there's a simple way it can be used with only a small amount of work. The only items you need, in addition to the receiver, are a voltmeter and a directional antenna. This combination will allow you to observe Jupiter in a way few of your astronomy friends have ever considered doing.

TUNING IN

Before assembly of your new radio telescope begins you need to know what you'll be listening for--noise! It's similar to the static we're all familiar with, but this time we have a way of telling it from the other types of noise we encounter.

As Jupiter moves into the antenna's path the noise level around 21 MHz increases to a peak, then decreases as Jupiter moves out of the beamwidth. How the variations are detected is where the voltmeter comes in.

You could use other devices such as a strip recorder or an oscilloscope, but a voltmeter is the best choice to begin with because it's inexpensive and simple to use. The easiest way to use the meter is to connect its leads to the speaker terminals or to the external speaker jack and then watch the audio output voltage. There are some other steps necessary to use the meter effectively, but let's work on the antenna portion of the radio telescope first.

Dipoles, longwires or verticals won't do because they're not directive enough. What is needed is an antenna with higher gain such as a simple two or three element beam. You could even use a loop of wire cut for about 21 MHz placed in front of a screen wire reflector. Whichever design you decide to go with, it should be built in such a way that it can be moved to the left and right as well as elevated.

In astronomy the movements are known as right ascension and declination, respectively. Many antenna designs can be found in the

ARRL Handbook or Antenna Book. Remember, the antenna doesn't have to be anything fancy, but the more directional you make it (higher antenna gain), the better you'll receive the planet.

The antenna's aiming and tracking is very easy. Simply go outside at noon and point the beam directly at the Sun which will be above the south point on your horizon. If you're on Daylight Savings Time, you'll need to adjust your antenna at 1:00 p.m. instead.

The reason for pointing at the Sun is the fact that Jupiter is in a plane with the rest of the solar system so, as the Earth rotates, Jupiter passes right in front of where your antenna is aimed. The tracking part of the radio telescope is, in this way, taken care of by the Earth's rotation.

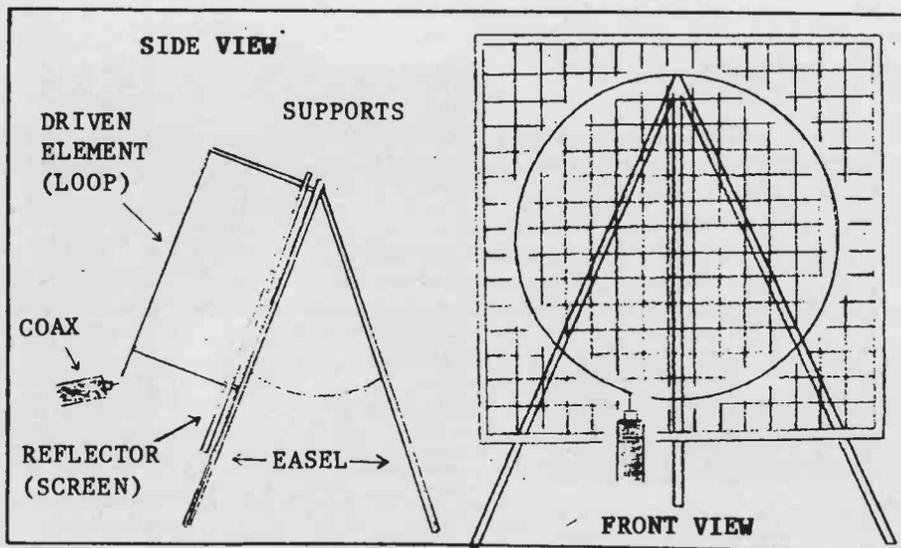
Now it's time to hook up the voltmeter as described earlier. After you've done that, set the voltmeter to a low AC scale and vary the volume control to swing the meter's needle around. The idea is to adjust the meter so that the entire scale is used. This will allow you to easily see changes in the signal intensity.

If your receiver has an automatic gain control switch, turn it off. This will make your outfit more sensitive to small signal variations.

When you're sure Jupiter has set, adjust your voltmeter for a small deflection to indicate the constant background noise level. Later, as Jupiter rises and moves across the beamwidth of your radio telescope, the voltage will gradually rise, peak and then fall. Record the voltage readings at 15 to 30 minute intervals then later graph the data and you'll have a good grasp of what happens.

The amount of time you'll have to "monitor" Jupiter will depend on your antenna's beamwidth. The Earth revolves at 15 degrees per hour so, if your antenna has a beamwidth of 45 degrees, Jupiter will pass by it in three hours.

When to start your observing will depend on Jupiter's rise and set times. This information can be found in magazines like Astronomy and Sky and Telescope. A sky guide for 1986 is available from Sky Publishing Corp. (49 Bay State Road, Cambridge, MA 02238-1290). This guide lists the rise and set times for the Sun, Moon and all of the



A simple antenna design for your radio telescope is to mount a sheet of screen or chicken wire on a frame, which in turn is mounted on an easel. Next cut a piece of wire 66 inches long (1/8 wavelength on 21 MHz) and form it into a loop. Mount the loop 12 inches in front of the screen reflector and connect the coax (center conductor) to the loop. NOTE: Sketches not drawn to scale.

planets and is available for \$1.00 (order #S2000).

Based on the times given, you'll need to estimate the time when Jupiter is above the due-south point on your horizon. This information, combined with the amount of time Jupiter is in front of your beam, will indicate the amount of observing time you have.

Of course, it never hurts to give yourself at least an extra half hour on each side of the "window" just to make sure you don't miss anything. Remember, be sure to add one hour to your estimates when you're on Daylight Savings Times.

Once you have your own radio telescope in operation, you're sure to have lots of fun with it and, if you monitor often enough, you'll eventually catch one of Jupiter's gigantic radio-

storms. And as the Sun becomes more active over the next few years, you can use your radio telescope in a similar way to detect solar storms.

There is a group of people who study radio astronomy at various levels. If you would like more information about this organization and the field of radio astronomy send an SASE to the Society of Amateur Radio Astronomers, P.O. Box 6020, Wheeling, WV 26003 (See below).

I have been an enthusiastic follower of the space program for as long as I can remember. I would like to dedicate this article to the seven member crew of the space shuttle Challenger who heroically gave their lives in our quest for the stars on January 28, 1986, during mission 51-L.

Getting Started in

Amateur Radio Astronomy

Extracted from RADIO ASTRONOMY, the Journal of the Society of Amateur Radio Astronomers, P.O. Box 6020, Wheeling, WV 26003.

by Bob Sickels

Basically, amateur efforts in this discipline



To listen to the stars it's not necessary to be the owner of monstrous parabolic dish; SARA members do it on a regular basis. Read on to see where you might fit in.

fall into two general categories:

1. Indirect method studies of solar phenomena, meteor infall, Jupiter noise storms, etc. This work is usually done at the low radio frequencies with relatively narrow band receivers.

2. Imaging radio astronomy. This work makes up the bulk of serious amateur radio astronomy projects. It is by its nature, best practiced at the VHF, UHF, and EHF radio spectra with receiving equipment of relatively broad band design.

Radio astronomy has been described as the examination of ripples riding on waves above an entire sea of noise. It is estimated that the total amount of energy

RADIO ASTRONOMY cont'd

which has fallen upon every radio telescope in the world would not equal the energy in a single snowflake!

The assault on the problem is multi-directional and is conducted in the following wise:

1. One begins with as large an antenna aperture as can be acquired to capture as much energy from the object as is possible. This usually involves a quiet radio location, but does not necessarily require huge antennas. The problem can be solved with phased antenna arrays.

2. The receiver is designed to be low noise, high gain, and of wide band width.

3. The receiver is designed such that the internal noise is cancelled out permitting one to amplify the bejabbers out of what remains--which is, of course, the desired signal.

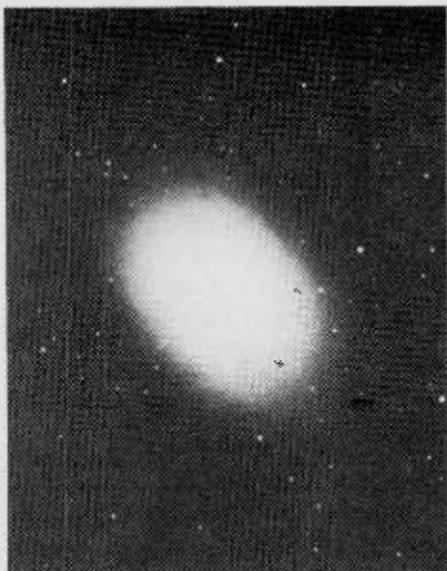
In practice, cancellation of receiver noise is accomplished by two methods:

a) In so-called total power receivers, the receiver output which contains the residual receiver noise and the desired signal is converted to a fluctuating d.c. potential. A counter-d.c. potential is then introduced to cancel the known receiver noise and the residual is amplified to a high level for presentation to a computer or strip recorder.

This practice works well for short term observations; long term observations can introduce problems with receiver gain drift which tends to erase the zero point of reference. In this situation a stable calibration signal is introduced at the start and at the end of the observation.

b) There is also a method commonly used whereby the receiver noise is automatically cancelled out. This is accomplished by circuitry which causes the receiver to alternately "look at" the signal-plus-noise condition, and then at its own noise only. These two values are automatically subtracted by the receiver, with the result that the desired signal emerges.

In practice this is accomplished by circuitry involving a square wave generator operating at a frequency of from about 40 up to 800 hertz. The use of this so-called Dicke switching improves the stability of the receiver from one to two orders of magnitude over the total power method.



Andromeda Nebula--center of our galaxy and one source of radio noise. (NASA)

For the benefit of those who are attempting to define a project, we wind up this article with a list of the available radio spectra, the type receiving equipment employed, and the areas of useful work which may be accomplished in each band.

(The tabled information below is taken from Radio Astronomy Handbook, 1986, by R.M. Sickle)

Which radio band? Which receiver? Which observing program?

The whole radio spectrum, it seems, is filled up with some kind of broadcast. Add to that the arcing of motor brushes of our appliances, ignition radiation from cars and even the neighbor's lawn mower, and the situation seems impossible.

Nevertheless, there are clear radio bands, and some of these are actually allocated for radio astronomy use by the Federal Communications Commission. Additionally, not all of the broadcast bands are active at specific times of day. There are also 6 MHz patches in the radio spectrum which are reserved for VHF and UHF broadcast which are not presently used in your area.

BANDS ALLOCATED FOR RADIO ASTRONOMY USE (MHz):

25.55 -25.67	22210 -22500
37.5 -38.25	23600 -24000
73.00 -74.60	31300 -31800
406.1 -410.0	51400 -54250
608 -614	58200 -59000
1400 -1427	64000 -65000
1660 -1670	86000 -92000
2655 -2700	105000-116000
4990 -5000	164000-169000
10680 -10700	182000-185000
15350 -15400	217000-231000

20-100 kHz:

These are useful in an indirect method of recording solar flares. The plan utilizes receivers of very inexpensive design and which are usually homebuilt.

Antennas for these systems consist of longwires, loops and the lately-designed whips with broadband amplifiers for those who have limited space for antenna systems. The cost of the basic receiver is from \$30 to \$60.

The work also involves a strip recorder which may be bought quite cheaply if found at a surplus sale, but may cost as much as \$350 to \$700 if purchased brand new. The cost of strip paper is about \$5-\$6 per month if the recorder is allowed to run continually--half that if the recordings are made only in the daytime hours.

18-22 MHz:

Direct reception of the noises from Jupiter are obtainable at these frequencies on a sporadic basis. They are not always present and require some patience, therefore, on the part of the listener. When they are present, they are extremely powerful rushes of noise sounding like the sea and, once heard, may be instantly identified by comparison with any other noise.

Receivers used are of the communications. AM variety, best obtained from ham radio flea market sales--somewhat more expensive if bought new. Antennas used

are the same as for any other use of the 18 to 22 MHz band. Jupiter work may be carried on about 8 months of the year when it is not too close to the sun.

A directional type of antenna may be helpful but not totally necessary to this effort. The observations also involve watching for any effect Jupiter's inner moon, Io, has on these events. This may involve the use of an optical telescope as well.

10-26, 28-80 MHz:

Observations for short-wave enhancement of noise or broadcast fadeouts due to solar bursts may be conducted in these two bands. Note that the 27 MHz citizens band is deleted due to the traffic. This work involves the use of communications receivers (AM and without limiters and automatic gain control.

Appropriate antenna systems for the band are used and there is also the usual cost for recording equipment. The radio effects of solar storms during 11 year peaks of the sun's activity are very dramatic, and once learned, are easily identified.

Also interesting work if conducted as a team

GOOD NEWS




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effort with an optical observer who has a telescope equipped with a red H alpha filter. Here the visual and radio effects of a solar storm may be recorded (It'll likely be seen before it is heard).

75 MHz:

This is a good band for the detection of meteors. Tons of meteoric material hit the earth daily. Any granule, marble size or larger, burns up in a spectacular way if seen at night, undetected except by radio effect in the day.

This scheme involves a suitable AM receiver and antenna array (preferably Yagis pointed up and to all compass points). In this plan an aircraft beacon which is only marginally received is tuned in. The meteor, when it arrives, leaves a trail of ions and the sudden booming in of the station denotes the event.

If you use a directional antenna array and are fortunate enough to get a location bearing on a big meteorite which made it all the way down to the earth's surface, you have a priceless find. Meteorites of this size are worth several thousand dollars to museums and also to rock dealers.

88-108 MHz:

This is the commercial FM band. If an FM set is altered to AM reception and used without AGC or limiters, crude imaging is possible of strong radio noise objects. The portion of the band used must, of course, be clear. Antennas used--helices, Yagis, with typical sky resolution around 30 to 40 arc degrees. This also is a good system for monitoring solar bursts, too, when they are present.

88-890 MHz:

The very high frequencies and the ultra high frequencies are good areas for solar bursts with suitable AM receivers, with the bursts being most easily detected at the lower frequencies. As the observational frequency becomes higher, better and better sky resolution is possible for observation and imaging of discrete radio sources. Use of the VHF and UHF-TV spectrum, where it is unoccupied by broadcast, provides a clear channel and permits the use of some equipment developed for the mass TV market with consequent low cost.

Antennas used include helices, Yagis at the lower

"If the Moon Influences Lunatics, What Does the Sun Do?"

A recent study of 25 well-documented cases of intense paranormal ("telepathic") experiences concerning death or illness has been cross-referred to global geomagnetic activity ("aa activity"). All 25 experiences apparently occurred on low geomagnetic activity days.

The report, based upon documentation from 1878 to 1967, was published by Michael A. Persinger: "Geophysical Variables and Behavior:XXX. Intense Paranormal Experiences Occur During Days of Quiet, Global, Geomagnetic Activity" (Perceptual and Motor Skills, 61:320, 1985).

As reported in a related piece of research, "Periods of international peace were found to occur in nearly regular cycles of 11 years, corresponding closely to sunspot peaks"; the probability of this occurring by chance is less than 0.008.

Geomagnetic storms occur with greater frequency and intensity during the peak of the 11 year sunspot cycle and also appear to correspond to increased frequency of accidents, illness, psychiatric admissions, and crimes.

This research was published by Buryl Payne: "Cycles of Peace, Sunspots, and Geomagnetic Activity" (Cycles, 35:101, 1984).

Finally, an article from the San Francisco Chronicle (Steve Rubenstein, "Detours on the Trail of Mysterious Hum," September 25, 1985) speculates on the source of a strange humming sensation that is driving Californians in the Pacific Heights and Marina District of San Francisco Bay crazy.

Suggestions as to the source of the humming noise have ranged from a diesel generator to a hospital CAT-

frequencies and parabolic dishes at frequencies above about 450 MHz. Use of the dish enables the observer to predict the circular resolution of the observing beam pattern.

1-4 GHz:

Though not formerly explored by amateur radio astronomers because of equipment cost, these bands are opening up due to mass produced ham equipment engineering and the concentration of low noise design for TV receive-only satellite service (TVRO). This band includes the 21 cm hydrogen line and the 18 cm OH line.

scan machine to underground power lines. Still no answer.

We would like to thank William R. Corliss of the Sourcebook Project (P.O. Box 107, Glen Arm, MD 21057) for this interesting report. Readers interested in learning more about the fringes of science are invited to drop Mr. Corliss a line along with an SASE for his latest catalog of titillating publications.

If you have read this far, then there is yet another publication which will be of interest: Stonehenge Viewpoint. Very scientific, it explores a variety of aspects of geology, archeology, astronomy and related fields. While some of the theories involve mathematics, the general flavor of the publication is quite readable and very informative.

Send for a sample by writing to Stonehenge Viewpoint, 2821 De La Vina Street, Santa Barbara, CA 93105, and tell them you read about their publication in Monitoring Times.

BEHIND THE DIALS

SANGEAN ATS-803

While a casual observer might be tempted to call the Sangean a Uniden CR-2021 clone, it definitely is not; the Sangean is a cosmetic copy, but its performance and quality fall short. In spite of its shortcomings, however, the ATS-803 offers good listening potential.

Before we examine closely the performance of the receiver, let's take a quick look at its features:

- * 150-29999 kHz AM/SSB/CW and 87.9-108 MHz FM frequency coverage;
- * Automatic and manual scanning with 9 memory channels;
- * Tuning dial and keyboard frequency entry;

Combination Screw(ball)



...an MT April First Exclusive

by D. K. deNeuf

There are a sizable number of people, believe it or not, who are not sure whether a wood screw should be turned clockwise or counterclockwise when inserting it in wood or whatever. It was discovered some years ago that the ancient Egyptians were well aware of this human failure, and one of the leading engineers, believed to have designed the Pyramids, found the solution: Fashion the screw with a combination of both right and left hand threads. It can then be inserted in either direction.

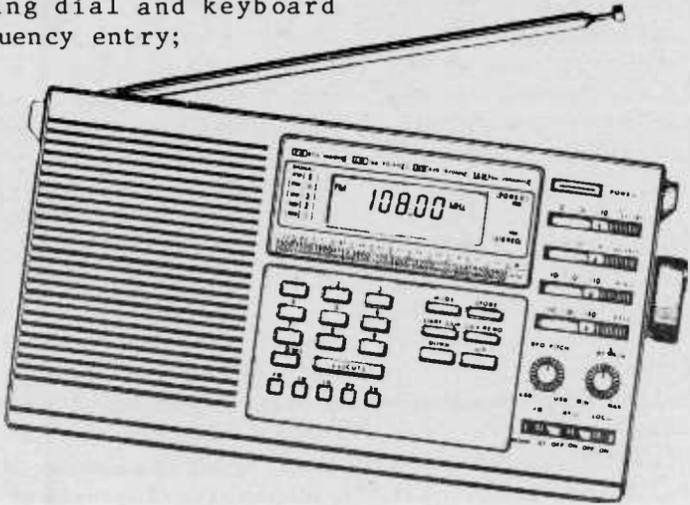
He didn't leave any diagrams for the benefit of posterity on how this was accomplished, but it has long been suspected that the method involved a cast and mould technique.

By pure luck we were fortunate enough to have recently found in an obscure antique shop one of the old casting moulds used to cast such a screw. We made an experimental pouring of lead and shown above is what the resultant screw looked like. Pretty clever, eh?

- * FM stereo reception through headphones (included);
- * Battery or AC operation;
- * Built-in antennas with external connection provision;
- * Adjustable sleep timer;
- * Large, contrasty LCD readout with pushbutton backlight;
- * Separate bass and treble controls;
- * RF gain control.

A MIXED BAG

There are a number of good characteristics to complement the features. The adjustable BFO is very



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IC-R71A



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ICOM introduces the IC-R71A 100KHz to 30MHz superior-grade general coverage HF receiver with innovative features including keyboard-frequency entry and wireless remote control (optional).

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Superior Receiver Performance. Passband tuning, wide dynamic range (100dB), a deep IF notch filter, adjustable AGC (Automatic Gain Control) and a noise blanker provide easy-to-adjust clear reception even in the presence of strong interference or high noise levels. A preamplifier allows improved reception of weak signals.

32 Tunable Memories. Thirty-two tunable memories, more than any other general coverage receiver on the market, offer instant recall of your favorite frequencies. Each memory stores frequency, VFO and operating mode, and is

backed by an internal lithium memory battery.

Options. FM, RC-11 wireless remote controller, synthesized voice frequency readout, IC-CK70 DC adapter for 12 volt operation, MB-12 mobile mounting bracket, two CW filters, FL32-500Hz and FL63-250Hz, and high-grade 455KHz crystal filter, FL44A.



First in Communications

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BEHIND THE DIALS cont'd

stable for single sideband and Morse code reception; the receiver is very easy to use and the owner's manual is well written. The tuning dial automatically adjusts its step increments by your tuning speed--if you turn it fast, it skips wider gaps than if you turn it slowly.

We found, however, that the frequency synthesizer is very noisy while it is being tuned; prominent whines and thumps are heard continually during the dialing process. Slide controls are used extensively in lieu of rotary controls which are inherently longer lasting. Selectivity on short wave is rather broad.

The radio has a discount counter look with its lightweight plastic panel and controls. The LCD automatically reverts to time display shortly after a frequency has been tuned in, requiring a recall button to be pressed every time you want to know what frequency

The busy LCD calls out a variety of status signals, time and frequency.



you are monitoring. The LCD illumination light is a pushbutton switch which has to be held for night viewing.

The FM sensitivity seemed to be low and prominent audio distortion was evident on all but the strongest FM stations. The stereo headset, while of good audio quality, has only a two foot cord, necessitating the listener's head be placed close to the receiver during use.

IN SPITE OF THAT...

The ATS-803, after all, is not intended for competitive short wave listening; It is a multiband, multifeatured, under-\$200 portable radio. In this perspective it does the job it was intended to do.

The ATS-803 and other Sangean portables are available from Electronic Equipment Bank, 516 Mill Street N.E. Dept MT, Vienna, VA 22180



SONY ICF 2010 (2001D)

by Ron Pokatiloff

The Sony is a little smaller than the Uniden CR 2021 (Radio Shack DX-400) and weighs 3 lbs, 12 ozs. The lighted display is easy to read except on an angle.

Band select keys: Air, FM, AM.

AM mode keys: Wide filter, narrow, AM sync, USB, LSB CW.

Manual tuning dial for frequency and time set: smooth, with finger hole; AM fast rate--1 kHz, slow--.1 kHz; FM--.05 MHz, Air--.025 MHz.

(It needs a slower tuning rate. The dial can be locked. SSB is difficult to tune because there is no fine tune between the 100 Hz resolutions. They should have kept the up/down buttons as on the 2001.)

AF gain: Slide switch hard to move

Direct tuning keys to enter frequencies. The keys are outstanding; no leading buttons or zeros are needed. Although the frequencies read to 100 Hz, you can only enter frequencies to 1 kHz.

32 dual function memory keys: The first two channels are for the upper and lower limits of frequency scan. If you press the shift key, the memory buttons also provide frequency scan, a 9, 10 kHz MW

step, 12/24 hour clock, MW band.

S1 stops frequency scan on signal, and S2 stops scan for about two seconds, then continues.

Timer program keys: 0, 15, 30, 60 minutes; signal strength/battery meter: 10 LEDs. Sync light indicators.

Other features: External antenna: AM and FM/AIR; record and earphone jacks (stereo phones can be used); AM ATT: DX/local; 4.5 volts DC/AC adapter; DOC-127A battery cord for 12 volts auto (optional).

Tone control; RF gain (slide; hard to move). There is circuit noise when you lower gain to minimum; info plate slides out from side; you can enter memory data for easy recall.

Batteries: Three D cells (30-40 hour life); two AA's for computer/clock (1 year).

BANDS

The 116 to 136 MHz aircraft band is covered by this unit; a squelch would have been a nice feature here. AM is continuous from 150 to 29.999 kHz. Listen to music on the FM band--76 to 108 MHz. The Sony also has long and medium wave. Specific SW bands are available at the touch of a few buttons.

BASIC SPECS

Selectivity: On a strong station with the wide filter I had to tune about 7 kHz away to almost silence the station; on the narrow bandwidth, about 5 kHz did the trick. The filters are probably 6 and 4 kHz, very good for a portable.

Stability: Rock solid; no noticeable drift.

Sensitivity: Excellent.

Overload: Not apparent. I compared reception of RAE Argentina on 9690 with the Sony and Uniden. The Sony was better.

Sound quality: Good, but should be better.

MODES

FM: good

AM: AIR, LW, SW; SSB (USB/LSB-CW) The lack of fine tuning between 100 Hz intervals compromises the otherwise good SSB capability.

AM sync mode: You can use both the wide and narrow filters, turning the main dial to switch sidebands. It is possible to get reasonable audio response with the wide filter. The sync mode phase-locks the BFO to the carrier for low distortion. In normal AM, the fading carrier causes distortion. Does this circuit work? YES; however the difference is not very apparent as reported by others. There is circuit

noise; I hear a noticeable hum with some hiss.

ECSSB: Excellent except for the lack of fine tune. Usually only one sideband will be in tune--or almost in tune. This exalted carrier selectable sideband mode is a good alternative to the somewhat noisy AM sync mode, especially on voice (Only the narrow filter can be used on SSB).

OTHER FEATURES

Memory: 32 channels/VFOs that store frequencies to 100 Hz, mode, bandwidth.

Memory scan: outstanding; each channel is sampled for 5 seconds. There is a skip device. The scan steps are: LW, 3 kHz; MW, 9, 10 kHz; SW, 5 kHz; inadequate for SSB utility DXers.

The scan stops for 2 seconds; you need a good signal strength to stop scan. There is a beep at the top of the scan. Ch 1 and 2 store the scan limits.

Timer: Four stations can be assigned any 4 channels for the previously stated time periods. I tested the system and it works as advertised. However, how much good is this when there is no means to control a tape recorder?

SUMMARY

The Sony 2010 is outstanding for International Broadcast. For SSB--ham and ute--there is one good point, but many bad ones. The good point is the excellent memory scan; the bad points are: no fine tuning between 100 Hz, main dial tuning speed too fast, and 5 kHz freq scan too broad. It would have been wise to include up and down buttons and step rates as on the 2001 and Uniden.

Overall, the Sony ICF 2010 is well worth its price. The sync feature and the somewhat compromised ECSSB alone make the Sony the best portable going. The radio is even better than many home sets. For international broadcast--highly recommended; for ute--good as a second set for memory scan.

Cushman CE-15 Spectrum Monitor

Last month we took a close look at a state-of-the-art spectrum analyzer; this month we will examine the applications and performance of a spectrum monitor. The difference between the two is that the

BEHIND THE DIALS cont'd

analyzer is designed to provide a wide variety of analytical functions on the received signal (and many models also have additional test-bench equipment built in as well), while the spectrum monitor is intended to visually and audibly detect radio signals without the additional analysis functions.

BASICALLY

Of the two, the spectrum monitor is certainly easier to use. The CE-15 has been around for about a decade now and is a favorite in the surveillance industry. The user has a choice of display bandwidths and can also listen to AM or narrowband FM signals. Squelch is automatic.

The CE-15 has a frequency coverage from 1-1000 MHz; a digital LED readout displays the closest megahertz. Two knobs permit rapid coarse tuning and fine adjustment of frequency.

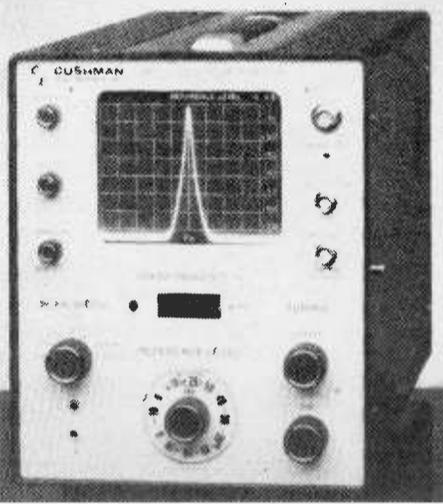
Selectable scan widths display signals above and below the tuned frequency as "pips"--rises in the baseline trace. Strong signals are tall; weak are short. A

calibrated level control allows relative measurements of signal strengths.

The CE-15 may be adjusted to show any 100 MHz-wide chunk of spectrum simultaneously; smaller increments of 10 MHz, 1 MHz and 100 kHz may also be selected. A resolution of a single signal only a few kilohertz wide is possible to examine the modulation envelope.

Because the logarithmic display has a 70 dB range, weak signals are readily distinguished among the strong. Although the unit does drift and the coarse tuning control has backlash, an AFC (automatic frequency control) circuit provides some stability of received signals.

Sensitivity of the CE-



one time. Receiving modes are AM, FM, CW/SSB, and pulse. Up to seven IF filter bandwidths may be ordered from 5 to 5000 kHz.

A 256 channel memory allows separate bandwidth, mode, dwell time, frequency, and antenna polarization information. The search/acquisition mode accommodates five programmable search ranges.

IEEE 488 bus control is an available option; the 8601 is equipped with an NSC-800 (Z-80 compatible) microprocessor, controllable at an RS232C port.

Images are no problem with the 8601, at least 90 dB down, as is IF rejection.

The receiver is provided in a 19" rack mount format, 7" high and 24" deep. A heavyweight at 40 pounds, it is powered by either 115 or 230 VAC, 50-60 Hz, 75 watts.

15 is -115 dBm (0.5 microvolts); IF image rejection is greater than 70 dB. The use of a YIG (yttrium aluminum garnet) high-Q tunable oscillator insures superior spurious signal rejection.

IS IT A GOOD "RADIO"?

The Cushman CE-15 is a test instrument. It is first and foremost a visual representation of occupants of the radio spectrum; secondarily, those signals may be detected if in the AM or narrowband FM mode. Scanner and short wave listeners who are used to receivers designed for that purpose would, quite frankly, be disappointed attempting to use the CE-15 as a radio.

The mute (squelch) circuitry is not terribly sensitive, meaning that the weakest signals would not be heard even though they would appear on screen; tuning in a single signal is tricky, requiring a lot of patience.

REGENCY MX8000 UPDATE

A few months ago, MT broke the story about Regency's MX8000, the American version of the Japanese AOR Company's AR2002, now in wide distribution in the Orient and Europe.

The MX8000 will be an upgraded version of the MX7000 with tuning knob, LED signal strength indicator, and RS232 computer interface port.

A spokesman for AOR said that he expects the MX8000 to be shipped to the United States by May, 1986.

In the meantime, the MX5000 has been discontinued, replaced by an electronically-identical MX5500 which has no mobile mount but is selling for a higher price, possibly in response to the failing dollar value against the Japanese yen.

The Japanese spokesman ventured that it was possible the MX5500 might also be discontinued in the near future after the MX8000 becomes a viable product.

In the meantime, the MX7000 continues to be the choice among scanner listeners looking for an inexpensive, wide frequency coverage receiver.

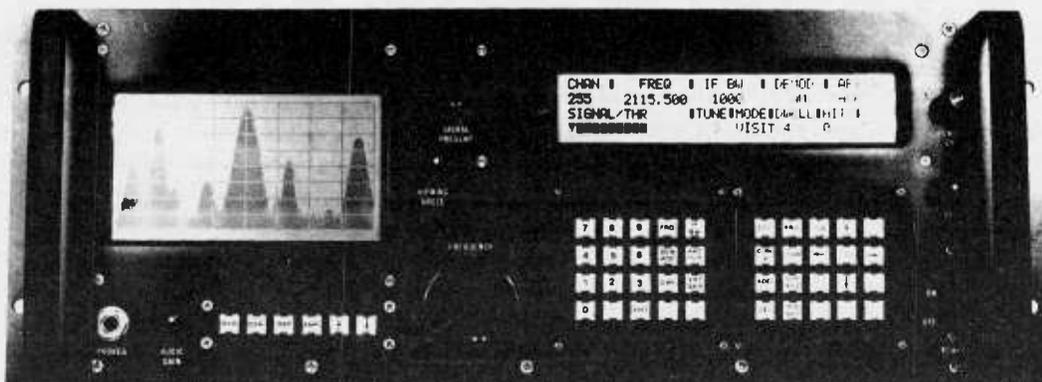
NEW ARRIVALS

A VHF/UHF "Dream Receiver"

It is probably quite safe to say that all of us, at one time or another, daydream about the ideal receiver--if price were no object. VHF/UHF monitors would love to get their hands on the new model 8601 from INTERAD, Ltd (Gaithersburg, MD). And if price is no object, be prepared to dole out \$16,000-\$28,000 depending upon options.

The basic mainframe receiver is capable of total 20-520 MHz coverage, expandable to 2120 MHz with an accessory converter. Frequencies may be entered by keyboard or dialed up with 1 kHz resolution, displayed along with other status line callouts on an LCD display.

Built in is a spectrum display unit with up to 3 MHz dispersion visible at



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Converts out-of-band signals to vhf or uhf scanner bands. Cables provided. Simply plug into scanner.



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CLUB CORNER

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

By now you've had a month or so to cogitate over my suggestions for utilization of the 1605-1705 kHz spectrum, and I'm sure that some of you have come up with better ideas. I'd appreciate your sharing them with me and even the readers of MT...write to the address above.

* For what it's worth, I've taken over the editorship of a DX column for a BCB DX club and will be reporting on the changes in status of foreign broadcast band stations. Although I receive many fine bulletins which I glean to be able to offer reports in my DX columns, I'm still not receiving or am totally unaware of others.

The point is that your bulletin sent to me is checked for information to be used in not just one but several columns and then is sent on to other DX'ers. I'd appreciate receiving samples of DX bulletins from new and established clubs, and I promise to pass them on.

* The MICHIGAN AREA RADIO ENTHUSIASTS have established a unique program in which a member elects to sponsor a columnist, publication or SW station. My thanks to Don Fleming of Taylor, MI, (who edits MARE's "Non-Broadcast Loggings" column) for sponsoring me. As MARE's business manager explains, "On a tight budget like other small clubs, we can't afford to send out copies of our

newsletters to broadcasters, radio publications, etc."

Other clubs who hope to expand their membership might consider this idea. For more information, write to Don at 24500 Union, Dearborn, MI 48124 (and enclose \$3.00 for six issues while you're at it). Enclose an SASE, please. MARE covers practically the entire radio spectrum, by the way.

* I've just received my copy of the "IRCA ALMANAC," fourth edition. Although aimed at broadcast band DX'ers with its lists of frequency checks, radio networks and programs, and articles about AM broadcasting, it also contains sunrise-sunset maps, sunset times for major U.S. cities and other information, making it a useful publication for any DX'er.

It's \$9.00 to non-members, a buck less to members, and a check (made out to IRCA) and sent to Dennis Kibbe, 1017 W. Manhattan Drive, Tempe, AZ 85282 will get you a copy.

* The TENNESSEE DX CLUB sent me a copy of its attractive "Journal." It would seem that Jeff Clark is spearheading the organization of this club and hopes to hold elections for officers as soon as enough DX'ers join the club.

The club emphasis seems to be on SW, amateur and scanner DX, but MW DX is included. For more information, send a buck or two to Tennessee DX Club, P.O. Box 74, Burns, TN 37029-0074.

* The GREAT CIRCLE SHORT-WAVE SOCIETY is also considering nominations for their offices of president, vice-president and treasurer, with applications to be received no later than June 1, 1986. An SASE to GCSS, Box 874, Kankakee, IL 60901 will get you more details. Their bulletin, the "WPE Call Letter," is growing, with new columns added to the January issue.

I think I've previously made it clear that I consider GCSS an anachronistic breath of fresh air among clubs and its quarterly bulletin unique, as their emphasis is on the use of vacuum tube equipment. Annual membership is \$6.50.

* Another publication which supports the use and preservation of tube gear is the "HOLLOW STATE NEWSLETTER." Skip Arey started it several years ago, and now Chris Hansen edits it. An SASE to Chris at P.O. Box 1226, New York, NY 10159

will get you more information. Thanks to FRENEX and Skip for this tip.

* I've mentioned ODDX (Old Dominion DX'ers) before, but this local SWL club serving southwestern Virginia and northeastern North Carolina deserves a second mention. For a sample of their monthly bulletin and info, send an SASE to ODDX Club Headquarters, 625 Charlecote Drive, Virginia Beach, VA 23464.

The bulletin also includes some MW and Ute listings, and the members meet on a regular basis.

* Somehow I've missed seeing a copy of WORLD DX CLUB's bulletin, "Contact," but I'll pass on the Ontario DX Club's recommendation for it. The club's emphasis is on MW and SW, and many top DX'ers and radio stations enjoy a membership.

For a sample, send three IRC's to Arthur Ward, 17 Motspur Drive, Northampton, England NN2 6LY or, if you'd like to join immediately, send \$14 (Airmail) or \$9 (Surface mail) to Richard D'Angelo, 2216 Burkey Drive, Wyomissing, PA 19610. My \$9 went into the mail the same day this column went out!

A FEW GATHERINGS...

SCADS and ASWLC will meet at Golden West College in Huntington Beach, CA, May 10, 10am-4pm. An SASE to Don R. Schmidt, 3809 Rose Avenue, Long Beach, CA 90807-4334 will get you the details.

ASWLC's regular meetings will be April 5, May 3, May 31, July 5, and August 2 at 16182 Ballad in Orange County, CA, starting at 10 a.m. Stewart MacKenzie hosts this fun event.

The SEMARA HAMFEST SWAP AND SHOP will be held at Grosse Pointe North H.S., on Vernier between Mack and Lakeshore April 6, 8am-3pm, attracting Michigan DX'ers.

RCMA sponsors monthly tours in the LA Area, and the March 29 tour was to be held at LAX in the control tower at 12:30 p.m. The tour was timed to follow the monthly swap meet at TRW, at Aviation and Marine in Redondo Beach, from 7-11am. I've picked up a few choice items at this meet and highly recommend it as a fun activity on the last Saturday of each month.

RCMA's April 25 tour will take place at 8 p.m. in the LAPD Dispatch center, City Hall East, 4th floor basement, 200 N. Main Street, Los Angeles. Their May tour is on the 24th at 11:30 a.m. at the United States Forest Service, 2524

HAP Closes Its Doors

The Handicapped Aid Program, a popular source of recordings, publications and equipment for handicapped radio hobbyists, has officially ceased to exist, according to John M. Kapinos, final director of HAP-USA.

Last September, John sent out more than 200 letters requesting volunteer assistance to keep the service going; only a couple of recipients responded.

John has arranged to transfer all assets of HAP-USA to the Handi-Ham Courage Center, a volunteer organization to help handicapped amateur radio operators.

In the meantime, Phillip Dampier of the DX Radio Network continues to make Monitoring Times available to the visually impaired. For more information on his services write to the DX Radio Network, 3176 Elmwood Avenue, Rochester, NY 14618-2535.

Mulberry, Riverside, CA.

ANARCON '86, in Montreal July 18-20, will be hosted by Ian McFarland and RCI. For information, write Ian at RCI, Box 6000, Montreal, Quebec, H3C 3A8, Canada.

I LIKE...

Phil Reefer's "Bandspread" column in his Capitol DX'ers Newsletter. The December column, for example, contains 32 specific logging tips, such as "Radio Kuwait is heard on 9840 at 1630, along with Abu Dhabi, UAE, on 9595," making it easy for the novice to follow right along and pick up these semi-difficult stations.

Their 40-page bulletin is a bargain at \$10.00 per year. Contact Phil at 2021 Wright St. #19, Sacramento, CA 95825.

I might mention that I've received notices about events much too late to make my deadline of the tenth of each month. If you possibly can plan ahead to send me a note or bulletin at least two months ahead of the event, I'll get it in the column for you. As you read this, we'll be moving up to the April 10 deadline for June (and later) events.

That about covers it for this issue. Remember to send your thoughts concerning the utilization of 1605-1705 MHz to my address or to MT's "Viewpoint" column. Make your ideas known! 73

SOLAR STORM DISRUPTS RADIO

A series of powerful solar flares the first week in February 1986 resulted in the worst disruption of communications in ten years. The aurora borealis (northern lights) was visible farther south than usual, and orbiting earth satellites were knocked out of their tracks, requiring orbital realignment.

The effects of such a geomagnetic storm causes fluctuations in the earth's normal magnetic field which results in navigational equipment error as well as confusion of the delicate biological instincts of homing pigeons.

Solar storms may disrupt radio communications for a period of several hours to one or two days, as evidenced by a lack of signals to be heard throughout the short wave bands.



SCANNER FREQUENCY DIRECTORY: UPSTATE SOUTH CAROLINA, 1986 edition, by Larry E. Williams (67 pages, 5" x 8", paperbound; \$6.95 from Radio Research, 10 Elf Lane, Dept. MT, Greenville, SC 29611)

Now in its third edition, Williams' directory is an informative nugget of scanner frequencies for South Carolina and some neighboring locales as well (Washington, DC; Florida; western NC). And if you are taking a road trip, a list of key highway patrol frequencies for major states and arteries is included.

Listings are cross-referenced by frequency, licensee and service. Several pages of programming and operational tips and techniques are included.

The directory is most useful if you are in the Greenville, SC, area, but even if you are not, there are listings and discussions of value to all scanner owners. And the price is right.

AMATEUR RADIO CALL DIRECTORY (printed and microfiche) from Buckmaster Publishing (Name index--586 pages, 8-1/2" x 11", paperbound, \$25 plus \$3 shipping; geographical index--656 pages, 8-1/2" x 11", paperbound, \$25 plus \$3 shipping. Fiche: Amateur radio call directory, amateur radio name index, amateur radio geographical index; \$5 each plus \$3 shipping. Available from Buckmaster Publishing, Whitehall Dept. MT, Mineral, VA 23117)

Hams and SWLs alike who desire more information concerning the locations of amateur radio operators heard on the air can rejoice in the comprehensive printed or microfiche lists available from Buckmaster. Fiche listings are easily read on the Grove microfiche reader (RDR-4) or on a companion unit available from Buckmaster.

A choice of three fiche sets include the call sign directory (call, class of

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license, name, and mailing address; 13 cards); geographic index (state, city, address, call sign; 7 cards); and name index (name, call sign, class of license, state; 7 cards).

The hard copy books include the geographical index and name index as separate books; the information in the books is the same as on the matching fiche. Printing, although small in order to hold such a vast database, is of excellent quality--crisp and black.

ONTARIO SCANNER BOOK by Bart Veerman (111 pages, 8-1/2" x 11", paper/spiral bound; \$14.95 Canadian, \$12.95 U.S., plus \$2 shipping. Haruteq, P.O. Box 9268 Dept. MT, Stoney Creek, Ontario, Canada, L8G 3X9)

Ontario scanner owners will find a real windfall in this excellent VHF/UHF frequency directory. Cross referenced by frequency and city, the Haruteq scanner book includes listings of government, business, public safety, hams, transportation, and aircraft. Over 5000 Ontario listings in all.

Guide to Non-English Language Broadcasting

A REVIEW
by Peter DeHart

An essential step in the process of identifying foreign broadcast stations on the short wave bands lies in the ability to recognize foreign languages. The effectiveness of listeners' reports in club bulletins and logging information heard through numerous short wave programs can be greatly enhanced by the listener's ability to associate a program in a recognizable foreign language with a specific time and frequency.

Aside from infrequent encounters with speakers of unfamiliar languages, most of us find our exposure to diverse tongues quite rare; thus, the recognition of Urdu or Hindi or the distinguishing between Cambodian and Vietnamese is nearly impossible unless we spend some time in the presence of that language.

The recently published **GUIDE TO NON-ENGLISH LANGUAGE BROADCASTING** may be a great aid in solving the short wave listener's language recognition problem. Listing more than 1400 American radio and television stations which broadcast at least partially in

BROADCASTING...

Reflections on Radio

by Hank Bennett

The English Overseas Service of FEBC Radio International, Manila, is presenting "The Sound Alternative" for more than 12 hours a day. In addition to broadcasting for your pleasure, they are also urgently requesting comments, questions and suggestions. In beams that are primarily aimed for South Central Asia, East Asia, Southeast Asia, and Australia, the station is often well heard in many parts of the United States.

No specific frequencies were given in their latest brochure but they do operate on any of the following frequencies: in the 19 meter band on 15310, 15315, 15320, 15350, and 15445 kHz; in the 25 meter band on 11815,

non-English languages for ethnic groups within their respective broadcast areas, the guide places the continental United States listener in potential touch with broadcasters and languages whose counterparts occupy a somewhat "exotic" and challenging portion of the short wave spectrum.

If you live in the Detroit area, Arabic, Hungarian, Macedonian, and Spanish are as near as your FM dial. Listeners in Denver can familiarize themselves with Greek and Japanese, while Persian, Finnish and Polish await Boston listeners. Listings for stations broadcasting in Hindustani, Hmong and Inuit are frequent, too. Equally interesting is the possibility for short wave listeners to link culturally with broadcasters of "foreign" programming through an easily made continental U.S. phone call.

The GUIDE is available for loan and inspection in most libraries or from the following address:

National Clearinghouse for
Bilingual Education
1555 Wilson Boulevard
Suite 600
Rosslyn, VA 22209
800-336-4560

Ask for the Guide to Non-English Language Broadcasting by Joshua A. Fishman, Esther Lowery, William C. Milan and Michael H. Gertner.

11840, 11850, and 11890 kHz; and in the 31 meter band on 9515, 9670, and 9730 kHz. They suggest listening carefully to their broadcasts for any frequency change announcements.

In order to offer the best programming for "The Sound Alternative," they are requesting listeners to answer the following questions:

- 1-Name and full address.
- 2-Your age group--under 18, 18-25, 26-35, 36-45, 46-55, 56-65, or over.
- 3-Your sex and marital status.
- 4-Your occupation.
- 5-At what time of day do you usually listen to FEBC?
- 6-How often do you listen? Daily, several times weekly, or --?
- 7-How long have you been listening to FEBC?
- 8-How did you first hear about FEBC?
- 9-What sort of programs do you enjoy most?
- 10-What sort of programs do you most dislike?
- 11-Is there another type of program that you like that is not now carried on FEBC?
- 12-How many other family members listen to FEBC?
- 13-What other radio stations do you listen to?
- 14-What do you find to be the best frequency for reception of FEBC?
- 15-What is your basic language?
- 16-If your language is basically not English, how long have you been studying English?
- 17-Your religion?
- 18-Other hobbies or interests, other than short wave listening?

You may write to the station directly at FEBC Radio International, Manila, Philippines, or at Box 209, Saipan, North Marianas 96950.

Be advised that the second address listed is a United States ZIP code office and no additional postage for foreign service would be required.

The schedule brochure shows service to Malaysia and Singapore on 19 meters at 2300-2355; to Southeast Asia on 25 meters at 0000-0045; to India on 25 meters at 0100-0300; to Papua New Guinea on 25 meters and to Malaysia on 19 meters at 0700-0815; continuing to Papua New Guinea and China to 1000 but closing the Malaysian Service at 0930;

and to India, Burma and Southeast Asia on 25 meters at 1300-1355 and to the same areas on 25 and 31 meters at 1400-1600. All times are Universal Time.

The latest issue of the monthly club bulletin of the American Shortwave Listeners Club has a note in it from amateur station W5YI which he obtained from QST Magazine. Seems that the long-time old faithful 6L6 tube is having a birthday this year--its fiftieth, in fact!

QST mentioned this tube first in their May 1936 issue. RCA Radiotron had just developed the 6L6 for power output applications in audio amplifiers. The June 1936 issue of QST showed the 6L6 as a crystal oscillator. For years your editor used a transmitter with a 6L6 as a crystal oscillator and we found it to be one of the easiest tubes with which to work. In all my years as W2PNA, I have never had to replace a 6L6 for failure reasons.

I'm sure that many of my readers in this publication, as well as others for whom I once wrote, will recall my stand on pirate stations. And I have often been called unflattering adjectives for taking that stand. But would you believe "W2PNA"--that's me--as a pirate? Tune in to this column next month and we'll tell you all about it.

As promised, here are some more answers to the quizzers that we gave you in the November and December issues.

109--Those two stars of the old WLS Barn Dance were Lulu Belle and Scotty. Someone told me it was Highland Scotty but this name doesn't ring a bell.

110--Fireside chats were presented by President Franklin D. Roosevelt; the name of his dog was Fala.

111--When WFI and WLT merged their stations but not their stores, the call sign became WFIL, which it is to this day.

112--"This is the Nation's Largest Independent Radio Station, WJJD, Chicago, with 20,000 watts of power."

113--Lucille Annette Simonelli - she was LuAnn Sims of the Arthur Godfrey Show. Where is she now?

114--Phil Harris' female counterpart was Alice Faye.

115--"The Make Believe Ballroom" was for years conducted by Martin Block. This was on WNEW, New York. Towards the end of his career he changed to another station, either WJZ or WOR, both in New York.

116--"The Make Believe Ballroom," also carried at times on the Armed Forces Network, had two themes, both named "Make Believe Ballroom." The original was by Charlie Barnett; the latter and far more widely known, was by Glenn Miller.

117--Gertrude and Heathcliff were the fictional birds made famous by that master comedian Red Skelton.

118--The Beatles were introduced to the American public by that newspaperman turned television master-of-ceremonies, Ed Sullivan.

119--"How Dry I Am" was made into a full-blown 8-1/2 minute production by Arthur Fielder and the Boston Pops. We found it on Volume 2 of "Pops Party," a Reader's Digest 8-track cartridge.

120--The orchestra with the Bobcats was Bob Crosby.

121--Two radio stations that have the exact same letters in their call sign as in the name of their town: WACO in Waco, Texas, and WARE in Ware, Massachusetts. Are there others?

122--The two colors once used by NBC were for the Red and Blue Networks.

123--Elmo Tanner was a whistler on the Ted Weems Orchestra and his best known recording was "Heartaches."

124--WOO, before being assigned to the marine radiotelephone station in Ocean Gate, New Jersey, was with the Wanamaker Store in Philadelphia.

125--Eveningtime news commentator Carter. His first name? Boake.

126--"Yehudi" was made famous by none other than Jeffrey Colona.

127--Colonel...and Bud. The missing name was Stoopnagle.

128--Billy Greenbush was a helicopter pilot in M*A*S*H.

129--Benjamin Kubelsky from Waukegan, Illinois, was better known as Jack Benny.

130--Norman Brokenshire was another of the evening-time news commentators.

131--Phil Cook--we're still working on this one.

132--This is one to which we have gotten no further information. Don Winslow

SWL WORLD WATCH



by Ken Wood

Conditions on the shortwave bands continue to pattern themselves after an elevator: lots of ups and downs! And it often seems the elevator spends most of its time hovering around the ground floor! Still, the DX is there if you persevere.

If you like to hunt the Latins you should be checking the off-breed frequencies on 6 megahertz and below on a regular basis. More often than not these out-of-banders will appear one night and then not be heard for several nights running.

49 meters continues to be a madhouse (too many crowded into that elevator!) and it will tax both your receiver's capabilities and your own tuning talents in order to pull a halfway usable signal out of the ether more often than not.

It's all part of the fun and games associated with the approaching sunspot low and you needn't bother to look for any great improvements in the situation anytime soon. We're stuck with having to make the best of things for the time being.

was, I believe, with the Coast Guard. The sponsor was another breakfast cereal in, I believe, the wheat line.

133--Anne Tenna once wrote for a radio magazine. The magazine was Radio Index, better known as RADEX. A bit more on this in our next column.

134--Those clubs we mentioned --URDXC was the Universal Radio DX Club (Hayward, California); IRM was International Radio Monitors (possibly from somewhere in Utah); GNSWLC was the Grand National SWL Club (Detroit, Michigan); R9LL was the R-9 Listeners League (I don't remember where this one was located). And there were others.

We still have some more answers that we'll give you in the near future. Be sure to tune in here next month for the exciting (?) story of Hank Bennett - on the air with no license!

All comments may be sent to Box 3333, Cherry Hill, NJ 08034.

Other than the sign-on of WHRI reported last time, there hasn't been any really outstanding shortwave broadcast news in the past four weeks, although we're waiting for a number of promised new stations to make appearances. None of the stations currently being heard seems worthy of any special attention so let's just get right to the log. All times are in UTC.

AFRICA

ANGOLA - Radio Nacional, Luanda, is still wandering around on 60 meters, noted most recently on 4.963, but often on 4.953 around 0400. If you hear an ID for "Radio Madrugada," that's simply the name of the all-night service.

BURKINA FASO - Ouagadougou heard on 4.815 from 2340 to sign-off at 0003, all in French. Again from 0530.

CAMEROON - Radio Douala, 4.795 heard at 0540 with news in English, into French at 0600. Often very well heard recently.

DJIBOUTI - Radio Djibouti noted in French at 0315 one evening on 4.780, with the Venezuelan La Voz de Carabobo off the air.

EQUATORIAL GUINEA - Radio Nacional Malabo, 6.250 in Spanish to sign-off just after 2200.

KENYA - The Voice of Kenya heard with English at 1915 on 9.725. Listed to run to 2000 sign-off. Had news and vocals in English.

LIBYA - Radio Jamahiriya, in Arabic at 0305 on 6.155, continued to 0330 sign-off.

MALI - Radiodiffusion National du Mali heard on 4.785 from 0600 sign-on in French, also noted on 4.834--two channels operative now.

MOZAMBIQUE - Radio Mozambique on 4.733 at 0305 in Portuguese with an apparent newscast. Poor to fair but audible most nights lately.

MOROCCO - RTVM in Arabic at 2220 on 9.865. Often heard at a very good level.

SAO TOME - Radio Nacional, 4.806 noted in Portuguese with various musical selections, chimes, IDs from 0625 tune-in.

SOUTH AFRICA - Capital Radio, Transkei, with an English disc jockey and rock music on 3.390 around 0325.

SOUTHWEST AFRICA - Southwest African Broadcasting Corporation, 3.295 heard with elevator music at 0215. One English ID noted.

SUDAN - Omdurman noted tentatively at 0412 in Arabic on 5.039 with appa-

SWL WORLD WATCH cont'd

rent Koran recitations, but very weak.

SWAZILAND - Trans World Radio from 0357 sign-on on 5.055 and into religious program. Look out for TIFC, Costa Rica, which also carries religion same time and frequency.

TANZANIA - Radio Tanzania, poor at 0305 in language on rarely noted 4.785 with a variety of QRM sources.

ASIA AND MIDDLE EAST

BANGLADESH - Radio Bangladesh in English around 1340 on 9.775. Signed off or faded out at 1344, but mention of Radio Bangladesh heard.

NORTH KOREA - Radio Pyongyang heard in English at 0025 on 13.650. Not strong and only partially copyable.

OMAN - Radio Oman in Arabic with good signal at 1630 on 9.655.

PAKISTAN - Radio Pakistan heard in unknown language with interval signal to 1650; brief ID in English but otherwise in vernacular.

SAUDI ARABIA - Broadcasting Service of the Kingdom of Saudi Arabia now using out of band frequency of 6.940 around 1500, which is dual to 9.655, in Arabic.

SYRIA - Radio Damascus heard in English to sign-off just after 2200 on 7.455.

UNITED ARAB EMIRATES - UAE Radio Dubai noted at 1600 in English on 11.955. Also heard parallel on 15.300 and 15.320.

UZBEKISTAN - Radio Tashkent with its English program at 1200 on 5.985 and better 9.600.

EUROPE

ITALY - Adventist World Radio, Forli, on 6.205 in English with religious program to 2100, then into German language programming. Was good on this occasion, but later sunset times may have lessened chances on this frequency in the afternoons.

LUXEMBOURG - Radio Luxembourg, 6.090 with usual fare at 2350.

PORTUGAL - Tentative Radio Rensascenca heard on 9.600 at 0020 in Portuguese. Mention of "Catolica."

NORTH AMERICA

DOMINICAN REPUBLIC - Radio Santiago heard at 0250 with a live sports program and commercial inserts on 9.778.

GREENLAND - Gronlands Radio noted tentatively at 2330 in presumed Greenlandic. Apparently using a stronger transmitter now,

but still not enough to overcome the ham QRM completely.

HAITI - Radio Citadelle noted briefly around 2057 in French with ID on 6.155. This and 4VEH are the only active Haitian shortwave stations.

MEXICO - Radio Huayacocotla on 2.390 noted irregularly (depending on conditions) around 0045 to sign-off at 0110 or a little before. All in Spanish with deep fades.

NICARAGUA - Radio Zinica, Bluefields, on 6.121 in Spanish with Latin music at 1205. Slogan "voz amiga.."

SOUTH AMERICA

ARGENTINA - A new service called La Voz de Sur America tested for a time of 6.090 around 0030 but hasn't been noted in a couple of weeks now. Likely via Radio Belgrano transmitter.

BOLIVIA - Radio Fides, La Paz, on 4.845 at 0145 to 0200 sign-off with ID and chimes. All Spanish.

BRAZIL - Radio Nacional Port Velho good lately in the evenings. All Portuguese on 4.945.

COLOMBIA - Radio Bucaramanga, 4.845 has been reactivated here. Heard in Spanish around 0250.

ECUADOR - Radio Centinela del Sur on 4.890 at 0015 in Spanish but broadcasts seem to be irregular.

FALKLAND ISLANDS - FIBS on 3.958 in English with a wide variety of music noted around 0620. Mention of "Falklands Calling." Usual severe ham QRM.

FRENCH GUIANA - RFO Cayenne on 3.385 heard at 0100 with an apparent newscast in French.

GALAPAGOS ISLANDS - La Voz de Galapagos at 0210 in Spanish on 4.810. Signed off at 0215.

PARAGUAY - Radio Nacional on 9.715 at 0132 in Spanish. News and music.

PERU - Several new ones reported on the air from here. Radio Programas in Lima on 5.979 with an all news/talk format seems 24 hours a day. Radio Estrella Polar on 6.760 variable from San Miguel de Pallaques is showing occasionally around 0030. And 6.348 is apparently Radio Utcubamba, Bagua Grande, heard around 0000. Reception is highly irregular, however.

SURINAM - Radio Surinam International, via Radiobras in Brazil at 1810 on 17.755.

VENEZUELA - Radio Mundial Bolivar at 0130 in Spanish. Music and IDs on 4.770.

JEEVES SAYS -

By the time you read this Ken and I will be

spending more time patrolling the higher bands since the advent of spring should find these frequencies holding up a bit later in the day and this will, hopefully, alleviate some of the pressure on the lower portion of the SWBC bands.

Contrary to the way pure DX'ers look at things, 1986 may prove to be one of the years in which summer provides better listening opportunities than did the preceding winter months. We shall see.

WHRI in Nobelsville, Indiana, which began test broadcasts in early December and regular programming

around Christmas is unique for a U.S. shortwave station in at least one respect: they announced an one-the-air date, and they met it! Unusual to say the least. So who'd have thought that we'd still be waiting for QSLs more than a month later?

I hope that I'll have time to do a little listening over the next month. Any day now I'm expecting Ken to hand me the list of spring cleaning assignments. The list seems to grow in length every year.

But, one way or another, we'll be back next month. 'Til then, 73 from Ken and me.

Coming up on SW Broadcast

by Ken Wood

The past five years or so have seen a remarkable growth in shortwave listening interest in the United States, thanks largely to the importation of all those nice high tech radios with digital frequency readout, memory channels and all the rest built into attractive, easily portable packages.

Growth on the shortwave broadcasting bands has kept up a steady pace dating back to even before the receiver revolution. If anything, the pace is increasing. Nary a month tears off the calendar without some station or some organization somewhere releasing news of plans for a new shortwave radio station or an expansion of one already on the air. And that doesn't include all the many new voices which appear with no formal announcement, particularly in Latin America and Africa. Business would seem to be booming for the broadcast equipment manufacturers.

The next months and years show every evidence of a continuing growth. More stations, more transmitters. More targets for the SWBC DX'er and more things to listen to for the program listener. Here's an overview of some of the things we can expect to be popping out of our receiver speakers this year and next.

EUROPE

In Europe, Yugoslavia is still building a brand new complex for Radio Yugoslavia, due to start operating from Bijeljina in 1987. Radio Finland International plans another shortwave transmitter at their Pori site. The BBC is reportedly building a new plant at Bearley Park in Warwickshire.

World Music Radio, a Dutch-based programming

service until now relayed on short wave over Radio Dublin International, hopes to have their own transmitter on the air soon from Italy. The pirate station Radio Caroline says it will be putting a transmitter on short wave.

AFRICA

New stations will spring up in Africa. The Ivory Coast is apparently very close to placing a 500 kilowatt station on the air at Bingerville. South African homelands Venda and Bophuthatswana still have plans to add short wave to their local services.

A new national shortwave service in Liberia is being planned, funded in rather unusual fashion, by tithing, on orders from Liberian leader Dr. Samuel Kanyon Doe. Zaire has had additional shortwave outlets planned for several of its cities for some years and they are not yet on.

Zimbabwe wants to combat what it sees as radio propaganda from South Africa, with a stronger external service. Well-known South African DX'er Richard Ginbey is said to be planning a Radio-Earth-like service which eventually hopes to have its own transmitters.

ASIA

In Asia, the near and middle east, Deutsche Welle is still hoping that its new Sri Lanka relay station can be saved from guerrilla problems in the area. If the relay can be put into full service look for a third English feed to North America (at 0300 UTC).

India has plans for a variety of new shortwave sites: Kingsway, Garakhpur, Malad, Doddaballapur, and Shillong have all been mentioned. Japan is rebuild-

ing its main shortwave facility at Yamata and still puzzling over whether or where to put relay stations (Panama is one site that's been mentioned frequently but at last word no agreement had been signed).

The Maldives still make occasional noises about putting their station back on short wave. Thailand will be adding a 250 kilowatt station. Tiny Bhutan's Radio NYAB has already upped power to 5 kilowatts and promises 50 kilowatts next year.

Pakistan reportedly has plans for shortwave regionals at Abbottabad, Zhab, Lorali, and Sibi. Hong Kong will be back on regularly thanks to the BBC relay station going up there. A 300 kilowatt BBC relay is due to go on from the Seychelles sometime late next year.

Bayrak Radio in the Turkish zone of Cyprus plans a power increase up to 300 kilowatts. Qatar is building a new high power complex at Al-khadai and Jordan one near the Amman airport. Oman will have a couple of 100 kilowatt transmitters at Thumrair.

✓ PACIFIC

In the Pacific, Australia already has its Northern Territory domestic relay system in partial operation with a new station at Alice Springs operating on 3.320 and 4.835. Others due shortly are Tennant Creek on 3.315 and 4.910 and Katherine using 3.370 and 5.025.

Papua New Guinea plans a 50 kilowatt station at Lae. Adventist World Radio will be on with four high power transmitters at Guam and the Federated States of Micronesia are said to be planning a shortwave service using 25 kilowatts.

✓ CENTRAL AMERICA, ETC.

Central America and the Caribbean will soon see Radio Lira International on the air from Costa Rica using 11.870 and 15.210 initially. Radio Earth will have its own transmitter at Curacao in the Netherlands Antilles.

There's also a report that a U.S. group, the World Peace University, will be putting a shortwave station on from Ciudad Colon in Costa Rica late this spring.

Plans for an expansion of United Nations radio which would have used high power transmitters in Chile, Ethiopia and Thailand may have been set back with the recent news that the UN could not afford higher

rental rates for the VOA transmitters they were using and had to suspend services.

✓ U.S.

The United States has been and continues to be a hotbed of activity. The VOA, in the midst of an enormous expansion program, will add relays in Puerto Rico and Israel, and add short wave to the Thailand relay. The VOA's Sri Lanka relay is also being refurbished. A VOA African relay initially planned for Botswana may now be in Liberia instead.

In the private sector, NDXE in Opelika, Alabama, still plans a mid-summer sign-on. KVOH is supposed to begin broadcasts from Rancho Simi, California, at any

time. KRSP in Salt Lake City is under construction. Radio USA in California plans a 100 kilowatt station as does the Reverend Hugh Van Eaton in Homewood, Louisiana.

Sesquehanna Broadcasting of Miami wants to get on the air with 50 kilowatts. Herald Broadcasting Inc., part of the Christian Science Monitor, plans to begin in 1987 with high power stations at two U.S. sites.

There are at least five other applications for shortwave stations now pending at the FCC! Those listed above are just the ones we know about! There should be a lot of action coming soon to your nearest shortwave radio. Stay tuned! ●

best in the summer months (May - August). I understand there has been some cutback in broadcasting time recently, but no details available here.

Operated by the Cook Islands Broadcasting and Newspaper Corporation, the station transmits in the Maori and English languages; programming includes English news often on the hour, children's programs with plays and stories, pop music, and local announcements. Frequent time checks have been noted, and the station identifies as "RADIO COOK ISLANDS CALLING."

The improved reception on 11760 kHz is due to a higher transmitter power than previously; now, I think, it is 10 kW.

ENGLISH LANGUAGE BROADCASTS

by Tom Williamson

This month we take a look at broadcasts in English from OCEANIA (The Pacific region, excluding Asia.)

Now, this is a difficult area for consistent signal reception due to distance and low power stations. Do not expect to tune in most of these stations on a daily basis. Nevertheless, we can expect many good days from several of these countries when propagation is good, provided we know where and when to look for them. Of course there is one daily signal:

AUSTRALIA!

RADIO AUSTRALIA is familiar to all of you, no doubt, with its around-the-clock service beamed to many parts of the globe from high power stations at Shepparton, Carnarvon, Lyndhurst, and Darwin. We have featured the schedules regularly in our "Big Six" of the world's broadcasters.

Currently, it seems that RA is shaking up some program times, so we will await more details when things are clear; however, as regards best times for reception in North America, perhaps this brief outline is useful:

0200-0400: 17795 kHz
0800-1400: 9580 kHz
2100-0100: 17795 kHz

Of these, I don't doubt that the good old standby of 9580 continues to be the most reliable channel, month in, month out! However, many other services to the Pacific and Asia may be well heard and, for your editor, the 6 MHz channels are often good. Between 1100-1300 some of the following may be audible in your region:

5995, 6060, 6080 kHz.

But, of course, that is not all that is available from Australia; the regional stations often provide hours of good reception from their lower-powered transmitters at Perth, Brisbane and Lyndhurst. These domestic service stations use between 10-50 kW power on short wave.

The best of these for me is the Perth station (actually at Wanneroo), frequently heard on 9610 (VLW9) from 1100-1400, and occasionally on 15425 in the 2300-0900 time slot. They often relay BCB channels so you may hear the medium wave call-sign used, such as "6WN" and so on. Interesting for local news and comparison with Radio Australia.

Brisbane is heard quite often over 4920 kHz (VLM4) at our dawn in the East, usually announcing as "A.B.C.", and with frequent programs of mixed music including opera and classical music; political talks are heard also, and this seems to have a sort of "cultural" program bias, but perhaps that's my chance listening!

The most difficult for me is the Lyndhurst station, but sometimes it may be audible on 6150 or 9680 around 0800-1300.

COOK ISLANDS

In former days, reception of Rarotonga would have been considered a really exotic "DX" catch by most North American listeners! Although it's still a more difficult station to hear, in recent years the 25 meter channel has been frequently received in the nighttime and early morning around 0400-0800 UTC, and at its

GUAM

One of the world-spanning network of "Super-Power" radio stations for Christ, TRANS WORLD RADIO operates from Agana with a 100 kW transmitter, call-sign KTWR. They broadcast in 12 languages to the Far East and Soviet Union, and also included are English segments of programming. This is, of course, a religious evangelical station similar to those at Monte Carlo, Bonaire, Swaziland, and other places familiar to you on the radio dial.

Unlike other channels, they use the call letters in station identification. Quite well heard around North America when propagation is good, the 31 meter band seems to be the best bet. The English segment at 1330 may be logged on 9870 kHz which seems to be the most often heard channel at present but this probably depends upon your location.

KIRIBATI

If you hear this one let me know! They have been heard from time to time in local and English language on a 16 MHz sideband (!) channel (variously reported near 16433), and this transmission is stated to be a relay of their BCB outlet for listeners on Christmas Island. So perhaps we should really include this as a "utility" station. But it's RARE!

NEW ZEALAND

The Broadcasting Corporation of New Zealand has been in some financial trouble lately, at least in respect to its shortwave broadcasting. Despite threats of imminent closure, RADIO NEW ZEALAND (International) continues to air programs. The transmitters are somewhat old and of low

ENGLISH LANGUAGE cont'd

power (7-1/2 kW), so one needs good propagation for reliable reception.

Notwithstanding this, reception is quite frequent, with HF channels giving better signals, providing the bands are open! Around 1100-1200 they may be heard on 6100, 9600, 9650, 11780 kHz, but some of these channels may have changed.

The other frequency well heard from time to time is 15150 kHz, 0500-0600. Programs are of mixed nature, with relays from domestic network and, of course, the ancient sport of cricket (The only game one can play for days without a result!!).

NORTHERN MARIANAS

Saipan has come into prominence lately with a "one-two" punch! First we had a new commercial station KYOI which is quite widely heard with its nonstop pop music programming and station announcement "SUPER ROCK KERYOY" (Well, that's what it sounds like, since they sound the call letters, rather than spelling them.) KYOI is best heard on 11900 kHz around 1100-1300UTC.

The newer station is a religious broadcaster, KFBS, also located at Saipan and an outlet of the Far East Broadcasting Co. They have been heard in the 31 meter band occasionally, but no clear pattern of reception is apparent to me. Programs are multilingual and the transmitter, like KYOI, is rated at 100 kW.

PAPUA NEW GUINEA

The NATIONAL BROADCASTING COMMISSION of PNG operates both national and local provincial services. This region is the DXers paradise! There are about 19 local stations with exotic locations like Admiralty Island! Of these low power outlets (between 2-10 kW), the Bougainville station on 3385 kHz is certainly the best heard, and if propagation is good in the 1100-1300 time period you should be able to hear them with a mixed English/Pidgin program.

I understand there is a steady shift of stations from the 120 meter band to 90 meters, so they should all finally be operating between 3200-3400 kHz.

It is the NATIONAL SERVICE station at Port Moresby which has made listeners familiar with this part of the world. Originally VLT4 under the Australian Broadcasting Commission, now listed as P2K4 since independence (I've not heard the

call letters used), they put in quite a consistent signal on 4890 kHz between 1100-1400 sign-off (with National Anthem).

Programs are varied, include classical music--which may go on past the hour!--and news in English on the hour at times. Time pips are heard, and they ID as "N.B.C." and sometimes "Radio Port Moresby" (Coady-DX0). Also heard around 0700-0800 is the 9520 channel; both of these are listed at 10 kW.

SOLOMON ISLANDS

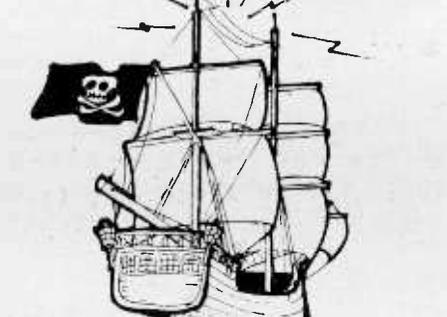
Last stop on our Pacific tour! The "Happy Isles," as they are sometimes called, are currently the most consistent of these Oceanic radio targets. SIBS is heard on 60/90 meters rather like PNG, over 6020/9545 kHz around 0630-0730 on the 31 meter channel. The 60 meter station is even more frequently heard

at different times between 0200-1130. Programs in English/Pidgin of varied nature with much pop music, record requests, local news; identifies as "This is the S.I.B.C." Alternate ID as "Radio Happy Isles" has been noted by some.

SELECTED SCHEDULES: OCEANIA

Table with columns for location and frequency/time slots. Locations include AUSTRALIA (Perth, Brisbane), COOK IS., GUAM KTRW, NEW ZEALAND, N.MARIANAS (KYOI), PAPUA NEW GUINEA, and SOLOMON ISLANDS.

PIRATE RADIO



by John Santosuosso P.O. Box 1116 Highland City, FL 33846

THE PIRATES: The past few months it seems as if we have been talking mostly about the clandestine stations. For a change, this month we will begin with a bit of news from the "pirate front."

Out in California, Norman Alexander logged RADIO HYPER WAVE December 30 GMT on 7435 kHz. The gang at Hyer Wave announced an address of P.O. Box 3034, Fullerton, CA 92634. If memory serves me correctly, this is one of the few logs I have seen of this station. So, Norman, I suspect you have come across a relatively new one. Congratulations!

And you should have known I could not resist some clandestine news when the opportunity presented itself. Our readers at RADIO CAIMAN may be pleased to know that Norman heard them January 13 at 0130 GMT. Apparently Radio Caiman can be heard over a rather large area.

From his "pirate ship on the high seas," our good friend R.F. Burns of the legendary RADIO CLANDESTINE phoned to say that he "was amused to read that Radio Clandestine is in Canada." Well, R.F., wherever you and the rest of the Radio Clandestine crew are in port these days, we hope you will continue to keep us entertained with some of the most creative programming to ever come from any station. For those of you not familiar with Radio Clandestine, the pirate ship has managed to sail for some eleven years, and that is quite a record!

In the "we're happy to eat crow department," we note on several past occasions we have indicated our displeasure with pirate WMTV's mail policy. While announcing an address, the station never responded to reception reports or any other correspondence.

That has apparently changed; several DXers have received QSLs in recent weeks. If you happen to log WMTV some weekend in the 41 meter band, or you want to send a follow-up report, the address is Box 1945, Delray Beach, FL 33444. We cannot guarantee the station will reply, but there is a possibility.

Not too long ago we received the winter edition of "The Wave," published by TANGERINE RADIO. The station calls this little quarterly "a radical journal of news, ideas, and methods." It is exactly that and tends to stress operator "Raunchy Rick's" openly anarchist philosophy.

You may not agree with this controversial publica-

tion and its articles on such matters as the abolition of work, but you will find it interesting. A one year subscription is \$2.00 cash to Box 5074, Hilo, HI 96720.

In Florida, Dave Crawford monitored a strange signal on the unusual frequency of 1742 January 9 from 0056 to 0105 sign-off. It most likely was a pirate, as he heard the announcement, "This has been a test," just before the station left the air. Before that he heard Pat Benatar music, but the signal sounded as if it were part FM and part USB. Whoever it was, it sounds as if they need to clean up their audio!

That's it on the North American pirate scene for this month. As always, your logs and other information are most welcome.

WAQI RADIO MAMBI: From Pennsylvania John Demmitt has noticed something quite interesting about Radio Mambi on 710 kHz and Castro's Radio Rebelde jammer. Demmitt says the two are playing some sort of "cat and mouse game." Radio Mambi will shift slightly above or below 710, only to have Rebelde engage in "follow the leader." The jammer attempts to stay right on top of Radio Mambi.

This entire situation may be getting more complex. In the latest edition of the "World Radio TV Handbook," Ron Schatz claims that four of the powerful Rebelde network transmitters have now shifted to 710 kHz. Here in central Florida in recent weeks, Radio Rebelde has been dominating the frequency even during daylight, although its signal also seems to have diminished in strength.

Finally, I might note that a few days ago I was rather surprised to receive a QSL for a 13-month old report I had sent to Radio Rebelde on one of their shortwave transmissions on 5025 kHz. While the station does not respond to reports very often, especially from Americans, someone just might want to try to QSL one of the 710 broadcasts. You could wind up with a genuine rarity.

If you care to try for a QSL, the address is Apartado 3277, Habana 6, Cuba. Keep in mind, however, that even if you do get a reply it may not specify what frequency you heard. Unfortunately, at present at least, reports to Radio Mambi are not being answered.

PIRATE RADIO cont'd

■ **THE COLOMBIAN CORRECTION:** From New York, Vito Echevarria, who is a clandestine expert, was kind enough to write to let us know of an error. In a past column we mentioned the Colombian clandestine Radio Marquetalia and attributed it to the group M-19. Vito points out it was, in fact, the work of the FARC-- Fuerzas Armadas Revolucionarias de Colombia, a rival group. It, along with M-19, the EPL, and some smaller groups are still attempting to overthrow the Colombian government, but at present the station is inactive. If anyone hears it or has information about it, Vito and I would appreciate hearing from you.

■ **"CLANDESTINE CONFIDENTIAL":** If you have really been bitten by the "clandestine bug," naturally, we hope you will continue to read this column very month! However, we would also highly recommend the newsletter "Clandestine Confidential," published six times a year by Gerry L. Dexter, RR4 Box 110, Lake Geneva, WI 53147. It is a superb publication and very little about clandestines will ever escape Dexter's attention. Subscriptions are \$10.00 per year.

■ **OTHER CLANDESTINE NEWS:** An interesting letter arrived from Martin Tatuch. On December 22 he logged Radio Caiman while in Mexico City. This was a morning transmission on 9960 from 1530 to 1600 GMT. He reports a clear, consistent signal. He also heard La Voz del CID January 4 on 9940 from 1640 to 1715 with a very strong signal. This shows you can hear clandestine South of the Border (many are obviously intended for that area!), and we wish we got more reports from there.

It is always good to hear from Marty Croze up in Minnesota. Marty frequently logs Radio Caiman, but he has also been hearing some strange tones on 9960 around 1630 and 1740 GMT. Anybody else hearing strange things on this frequency?

Dave Alpert of New York sends word that in early January the Sandinista government of Nicaragua closed, at least temporarily, Managua's Radio Catolica (720 kHz) for failure to broadcast most of a year-end message to the nation by President Daniel Ortega. The station had been shut down several times previously.

Although several

"Los Numeros"

32444 69213 88816 52196 63811 94216

Havana Moon



(Editor's Note: Although Havana Moon's column has been discontinued on a regular basis, occasional guest articles will appear from time to time as new information becomes available.)

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MAILBAG, INTERCEPTS AND COMMENTS

Kevin Klein of Wisconsin checks in with a very nice card. Here's just a portion of what Kevin has to say:

"While reading your article on English numbers in the December issue of MT, I discovered an omission. On the night of November 19,

priests serve in the Sandinista government, relations between it and the Roman Catholic Church have been strained for some time and have gradually deteriorated.

A Lebanese Communist attack on semiclandestine Voice of Hope last October received considerable attention. What was not as widely reported was that at almost the same time another terrorist incident destroyed a Lebanese communications facility--the fundamentalist Christian Broadcasting Network lost its TV station to a guerrilla attack. Meanwhile, the Voice of Hope is hoping to establish broadcasting facilities on a ship off the coast of Singapore.

Liberian religious broadcaster ELWA has such a large audience inside the country that last fall when rebels unsuccessfully tried to overthrow the government, they seized the station to broadcast to the people. The government also used it to announce that the coup had failed.

That's it for this time. Next month we will have an extensive report on the pirate situation in Ireland, thanks to our friend Tony Donlon. We will also have the previously promised remainder of Dario Monferini's list of unlicensed Italian shortwave stations.

1985, I monitored my first English language 5-digit spy station on 5090 kHz. The signal was very strong at my QTH.

"For three consecutive nights, I noticed this transmission at 2300 hours GMT. The word 'repeat' was used often. As I said, I've never logged a spy station in this frequency area, much less English. I've continued to recheck this frequency, but it appears to have since left. I never did log the S/ON or S/OFF times."

Thanks very much for the informative card, Kevin. How about monitoring 3090 kHz at 1200 and 1300 hours GMT. And while you're at it, give a listen on 5080 kHz at 1230 and 1330 hours GMT. What you hear--or don't hear--on these frequencies in Wisconsin could be very helpful.

"Bill, from down Texas way, says that the column is always of interest as I often deal with the seamy side of SWLing as well as other subjects of interest.

It's like this, Bill: One person's sleaze is another person's... Thanks for taking the time to write to the column, Bill. I will strictly adhere to the request in the last paragraph of your letter.

Mike McCloskey of California writes to say that he was saddened to read that I was leaving MT. Mike is of the opinion that "specialty" columns such as "Los Numeros" are needed.

Thanks for the kind words, Mike. I wish you well during your recuperation. I will say that there are other logs in the fire, Mike. Get the picture?

ANOTHER REVELATION

The name and address of the writer of the following letter will be withheld. Here's a major portion of what this learned and distinguished person has to say:

"On December 17, 1985, I intercepted a numbers transmission which was erroneously put out in the 49-meter broadcasting band. At 1000 UTC on 6135 kHz a female (or perhaps computer-synthesized) voice continuously announced the numbers zero, two, one, in the Polish language: 'zero dwa jedna' (the latter pronounced as 'jedena').

"At around 1004 the engineer in charge apparently noticed the switching error, but made it worse by erroneously putting on a female voice in German 'fuenf' (pronounced as 'fuennef', meaning five). Then, for about one minute, switching clicks were audible, then the circuit was shut off.

"There are--or were--two stations using 6135 kHz as a major outlet; these are Radio Polonia (1130-0800 UTC) and Radio Free Europe/Radio Liberty (1600-0230 UTC) and it would be fair to assume that the numbers transmission originated at either one of these transmitter parks.

"The voice heard could be computer-synthesized, or beamed at computerized voice-recognition systems at the receiving point, which would explain the non-standard pronunciation of 'fuennef' and 'jedena' (instead of 'fuenf' and 'jedna'). Having to choose between Radio Polonia and RFE/RL as the possible source of this transmission, I would pick the latter, as RFE/RL used to have (emphasis mine-HM) an official CIA-connection."

Thanks very much for this informative letter. I'm most confident that "numbers" switching errors such as you describe have happened more than once with other international broadcasters.

I'm also confident that a computerized voice-recognition system is in use at the receiving end of phonetic-alphabet station transmissions.

WARNING! Numbers Transmissions May Be Hazardous to your Health

On some few occasions, certain individuals have stated that SOME 5-digit Spanish transmissions are originated by Cuban Intelligence (DGI). I seriously caution South Florida "numbers" monitors that DGI scum are armed and should be considered dangerous. I'll say no more, lest I begin to sound as if I'm coming from one of the check-out stand tabloids.

One writer states that the DGI has an established net that includes several U.S. installations as well as facilities on Cuba. This writer continues by saying that there has been one 5-digit Spanish station run by DGI in South Florida for nearly 15-years!

It has also been said that a small portion of these transmissions are sponsored by anti-Castro

LOS NUMEROS cont'd

terrorists.

Similar statements of the above type have come from several unrelated sources. Could Omega 7 be involved?

HOT FREQUENCIES

From Florida come reports of 3010, 3040, 3090, 3690, 4035 and 5080 kHz being very active on weekends. Reliable sources indicate that it's almost a sure bet that late Sunday morning (after 1400 GMT) transmissions on 3690 kHz originate from a site between Miami and West Palm Beach. Had any complaints, ARRL?

U.S. GOVERNMENT SITE WANTED

Several Florida monitors have forwarded copies of FCC newspaper advertisements. Seems that the FCC finds its Ft. Lauderdale home somewhat shabby and desires to relocate in the vicinity of Vero Beach, Florida.

The advertisement states that the Commission will conduct an investigation of possible sites for a monitoring station near Vero Beach, Florida. A rural site of 140 to 180 acres will be required. Property must be located north of Palm City and south of Gifford and must be no more than 20 miles from the coast. Further, the site should be on level terrain with no lakes or other large bodies of water within one mile of the center of the plot.

I wonder if this new site will be home to state-of-the-art equipment?

READING LIST

The mail has yielded an interesting mailing from Agean Park Press of Laguna Hills, California. Here's a small sampling of the goodies available from this unique publisher/distributor:

CRYPTOGRAMS IN SPANISH, Plus Spanish-letter frequency data

MILITARY CRYPTANALYTICS, Part I, Volumes 1 and 2 by William F. Friedman and Lambros D. Callimahos

MANUAL OF CRYPTOGRAPHY by Luigi Sacco

THE ORIGIN AND DEVELOPMENT OF THE ARMY SECURITY AGENCY 1917-1947

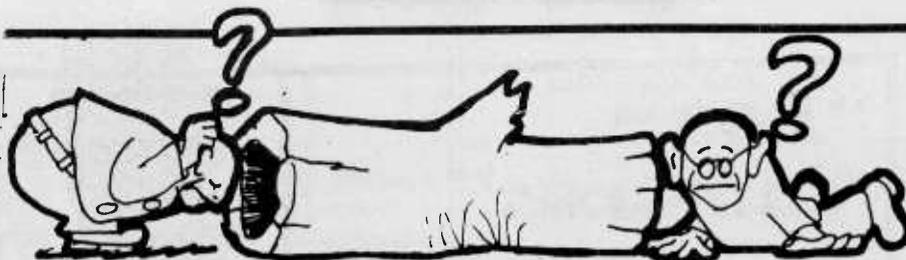
COURSE IN CRYPTANALYSIS, Volumes 1 and 2, British War Office

For a complete list of publications:

AGEAN PARK PRESS
P.O. Box 2837

Laguna Hills, CA 92654

Be sure to include an SASE with your request.



Listener's log

FLORIDA SCANNER FREQUENCIES

Contributed by Douglas Jackson, Auburndale

Talkie-Auburndale 159.135 County Radio

BUSINESS

- 43.14 Coca Cola-Auburndale
- 43.12 Adam Citrus Co-Auburndale
- 44.22 Commercial Carrier-Auburndale
- 151.805 B&J Sanitary Disposal-Winter Haven
- 151.745 AAA Sanitary Disposal-Winter Haven
- 151.685 Best Sanitary Disposal-Winter Haven
- 463.300 Motorola-Lakeland
- 153.395 Minute Maid Walkie

FLORIDA HIGHWAY PATROL

- 154.66 Area Dispatch
- 154.680 "
- 154.695 "
- 154.920 Emergency Aircraft/Car to car base
- 465.1625 Vehicular Repeaters

HILLSBOROUGH COUNTY

- 155.650 Sheriff
- 155.300 "
- 154.950 "
- 155.010 Detectives
- 153.920 Disaster Control

72 MHZ POLICE LINKS IN CALIFORNIA

Contributed by Rene Borde, Sunnyvale, CA

C.H.P. DIVISION	DISPATCH OFFICE	STATION AREA OFFICE	STA NO.	CHAN	BASE	MOBILE	DOWN-LINK*
Coastal Monterey	Hollister/Gilroy	23 Green	42.54	42.24	74.14		
Coastal Monterey	Santa Cruz	26 Green	42.54	42.24	74.14		
Valley Chico	Oroville	35 Brown	42.50	42.82	75.78		
Valley Chico	Williams	39 Brown	42.50	42.82	75.78		
Valley Chico	Yuba/Sutter	43 Brown	42.50	42.82	75.78		
Valley Sacramento	N. Sacramento	46 Gold	42.12	42.20	72.46		

*Downlink frequencies repeat mobiles to dispatch office receivers.

A NEAT CATALOG

Drop a dollar bill in an envelope and mail to:
PALADIN PRESS
P.O. Box 1307
Boulder, CO 80306

For the dollar you'll receive a 40-page catalog chock full of all sorts of hard to find publications. Be warned that if your reading tastes lean toward Vanity Fair or Popular Science that you should save your dollar.

POLICY STATEMENT

NO COMPENSATION is received for mention of any product or publication in this column. Information of this nature is presented solely for the benefit of readers of this column.

I would ask, however, that when writing to any mentioned address in this column that you mention Havana Moon and Monitoring Times.

HELP WANTED

Although "Los Numeros" now appears on a somewhat irregular basis, I continue to solicit your intercepts and comments. I'm most interested in what you are hearing on 4047 ±2 kHz on Saturdays and Sundays at 0400 and 0430 hours GMT.

Even if you don't hear anything I would find this information very valuable. It would be great to have a response from as many states as possible.

When responding I would appreciate it if you would include the 3-digit identifier, the group count and the first 5-digits of the crypt. You need not sign your name. It is important, however, that you include your QTH, antenna system and type of receiver. Kindly use the SINPO code when reporting.

Results will be published in a later edition of MT. Hey! All it takes is a stamp and a few minutes of your time. Let's hear from you.

Until next time...

The nearly-famous Eric Conners says he wonders what makes me think there will be a next time.

Goodnight, Tammy Faye.

Time now for a Tecate and...

Adios,

Havana Moon y Amigas
The views expressed in this column are those of Havana Moon and do not necessarily represent the views of the MT management, staff or readers.

PINELLAS CO AGENCIES

- 154.755 Sheriff
- 155.640 "
- 154.710 "
- 154.815 Detectives
- 154.400 Clearwater Beach Lifeguards

CITY OF ST. PETERSBURG

- 155.865 South of Central
- 155.910 North of Central
- 155.700 Detectives
- 154.845 Special Details

SEMINOLE CO AGENCIES

- 154.800 Sheriff
- 154.950 "
- 155.1300 "
- 154.770 Altamonte Springs PD
- 155.260 "
- 158.865 "
- 155.010 Apopka PD
- 453.800 Casselberry PD
- 154.770 Longwood PD
- 460.500 Sanford PD

VOLUSIA COUNTY

- 154.860 Sheriff
- 154.725 "
- 155.070 Daytona Beach
- 154.785 "
- 155.790 Daytona Beach Shores
- 155.940 "
- 154.740 Deland PD
- 155.580 Edgewater PD

TUNE IN



WITH Ed Noll

BCB DX'ers: Increase Your Loggings

Medium wave broadcast band DX'ers can put more interesting and useful information into their scans and DX logging by subdividing the MW spectrum into four approximately equal 260 kHz segments. Concentrate on one band section at a time and learn more about propagation characteristics, performance features and station distribution in a more orderly manner. Working one section at a time over an extended period can be a revealing experience and disclose just how different each segment can be.

You may wish to cover the four band segments by assigning one segment to each week. Repeat the same each month of the year and you will gain a knowledgeable understanding of MW broadcast operations and listening.

Band scans could also be arranged to better match the various propagation changes that occur over a 24-hour period or during



ED NOLL cont'd

your own typical listening period. For example, the times that best accommodate the daily schedules of the majority of MW DX'ers are early morning, sunset plus/minus 1-1/2 hours, early evening, and late evening.

The four suggested segments are 535-800, 810-1070, 1080-1340 and 1350-1610 kHz. Certainly you are very aware of the significant difference in characteristics and station distribution between the lowest and highest frequency segments. In fact, if you embark on this operation the easiest place to start is at the low end.

In general there are fewer station assignments per channel than further up the band. Tuning is easier. There are 17 clear channels including three Canadian and two Mexican. On most of the USA clear channels there is only one 50,000 watt assignment which represents the clear channel station.

There are also several lower-powered stations assigned to the same frequencies. A number of these assignments are daytime only stations. Other clear channels are occupied by two or more 50,000 watt stations spaced across the country and, when appropriate, with directional antenna systems.

Just copying all the clear-channel assignments can be a chore, especially on those channels where there are multiple 50,000 watt assignments or even a lower-powered licensee that happens to be near you in the path toward the clear channel station you wish to receive.

For example, KFI in Los Angeles is a difficult clear channel station to copy from the East Coast. It is by no means impossible but things must be just right because WFNC in Fayetteville, North Carolina, WHLO in Akron, Ohio, and a Cuban are on the same frequency.

Some island stations can be picked up readily on this segment of the MW band. Listen for several Mexican stations and a number of Canadian CBC and privately owned stations. Those I was able to pick up during the short listening period are listed in the band scan of Table 1.

The band scan was made during random listening times over a period of about one week. A much longer preparation time is recommended, permitting your data to adjust to the propagation changes that take place over a year. Why hurry through it when you can enjoy it leisurely? Listen to some of

ONE WEEK BAND SCAN 535-800 KHz			
kHz	6:30-10a.m.	4:30-6:30p.m.	7-11p.m.
535			Grenada
540	WLIX	WLIX	CSJB
550	WGR, WSVA	WKRC	WGR, Cuba
560	WFIL	WFIL	WFIL
570	WMCA	WMCA	WMCA
580	WHP	WHP	WHP
590	WARM	WARM	WEEI, Cuba
600	WICC, WFRM	WICC	WCAO, Cuba
610	WIP	WIP	WIP
620	WSKQ	WSKQ	WSKQ
630	WMAL	WMAL	WMAL
640	WHLO, WFNC	WHLO, WFNC	WHLO, WFNC, Cuba
650	WSM	WSM	WSM
660	WNBC	WNBC	WNBC
670	WMAQ	WMAQ	WMAQ
680	WCBM, WRKO	WCBM	WRKO
690	WYIS, CBC	WYIS, CBC, WVOK	CBC
700	WLW	WLW	WLW
710	WOR	WOR	WOR
720	WGN	WGN	WGN
730	WKIX	CKAC	CKAC, XEX
740	WVCH, KRMG	WRMG, CBC	CBC
750	WBMD	WSB	WSB
760	WJR	WJR	WJR
770	WABC	WABC	WABC
780	WBBM	WBBM	WBBM
790	WAEB	WAEB	WAEB
800	WTMR, CKLW	CKLW	CKLW, Bonaire Twr

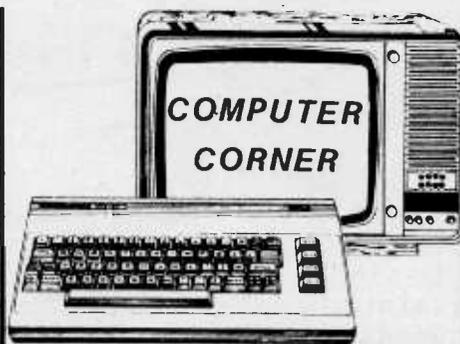
the programs.

Allow space for adding new information and changing old. Design the log to meet your needs and interests. Mine is just a simple sample to introduce the idea. You can add more information if you desire about programming and technical data.

The three listening periods that best accommodate my own daily activities are early mornings from 7-10 a.m., sunset periods from 4:30-6:30 p.m. and evenings from 7:30-11 p.m. These times probably match those available to the majority of SWL's.

The scan was prepared from irregular listening intervals over a week's time, but always within the three time slots. I was able to ID at least one station for each 10 kHz assignment from 540-800 kHz in each time position. The results demonstrate what concentration on a limited frequency span can do for you.

I must add that this achievement is much more difficult and perhaps impossible in many continental locations. In Alaska and Hawaii it would be very challenging because of the many foreign stations that can be received there with



by
C.W. Ellis
P.O. Box 202
Ulster, PA 18850

Computing International

This month we take a look at computers and communications across the sea. There is a whole lot of interest in foreign countries in the use of computers. We owe a loud and hearty "thank you" to Jonathan Marks of Radio Nederland. Jonathan is head of the English Section and producer of "Media Network." The name is BASICODE and it originated as an experiment to broadcast computer programs via medium wave radio transmission. Testing confirmed that programs could be received in Denmark, Belgium, Britain, and other countries as well.

While the idea worked, one of the major obstacles to overcome was the use of different computers which interpret BASIC commands. Thus was born the idea of BASICODE.

Simple in concept, it took a lot of work to set up. Radio Nederland played a large part in the experiments to transmit programs to computer hobbyists and good results were obtained over distances as great as 2000 kilometers.

While there is still work underway to present a uniform method of implementation in each interested country, it just might become an international standard for computer users with a communications interest. Let's take a look at the concept.

CREATING A COMMON GROUND

The originators of BASICODE looked at the various implementations of BASIC on a number of machines and weeded out the commands that were common to all computers. In other words, these commands produced the same actions or results on all computers. The remaining "different" commands were those that produced different results

TABLE I BASICODE LINE NUMBERING	
LINES	USE
0 - 999	Standard machine
1000 -19999	Main program
20000-24999	Subroutines needed by program but not allowed in BASICODE.
25000-29999	Data statements
30000-32767	REM (remark) statements

TABLE II BASICODE GOSUB STATEMENTS	
GOSUB 100	- Screen clear subroutine; leaves cursor at 0,0; the upper right hand corner.
GOSUB 110	- Cursor positioning, using reserved variables HO and VE.
GOSUB 120	- This subroutine reads current cursor position into the HO and VE variables.
GOSUB 200	- Subroutine to check for key depression, stores as IN\$ variable.
GOSUB 210	- Same as 200 except waits for a key depression.
GOSUB 250	- Sounds "beep."
GOSUB 260	- Generates random number, variable RV.
GOSUB 270	- Checks free memory and stores result in the variable FR.
GOSUB 300	- Number manipulation subroutine, based on the reserved variables CT, CN, and SR. Result is in SR\$.
GOSUB 350	- Prints SR\$ on printer, leaves line open.
GOSUB 360	- Closes 350 and opens new line.

appropriate receiver and antenna systems. In my particular installation I use two switchable long-wires.

Two notable pickups for me were WFNC on its opening first day on its new frequency of 640 kHz, and the reception of KRMG Tulsa, Oklahoma, on 740 kHz early one evening and again just after sunrise the next morn-

ing. In all I must have added ten call signs to my list.

You may wish to keep an additional table listing call letters, location, and any additional programming and technical data that are of interest to you.

NEXT MONTH: Hints on tuning in those elusive "graveyard" stations!

COMPUTER CORNER cont'd

on different machines.

For example, I started out with a Commodore VIC-20, and the command to print a line was:

```
PRINT "This text will appear
on the printer"
```

But that same command in a basic program for an IBM PC will result in the line appearing on the display! To make the IBM PC print, the command is LPRINT "This text...". Anyway, you get the idea.

This problem is not confined to print statements, but is true for disk operations, graphics, screen display, etc. The solution was to set up a skeleton program, reserve a few variable names and write the main body of the program using only the common well-behaved commands.

All machine-dependent functions are obtained through the use of subroutines and the data is passed to the subroutine each time the function is called. The basic line numbering is allocated as indicated in Table I.

GOSUB statements in the first section of the program are used to access the specific machine functions. The 0-999 section is further defined in Table II.

I included these subroutine definitions because these are the line numbers to be used no matter what computer brand is in use. This enables you to take any BASICODE program, feed it to your computer and obtain the same results as someone with a different make of machine. More importantly, it enables you to write basic programs that will run on any machine.

All the end user has to do is to provide the subroutines specific to his machine. Once these subroutines are written, they are used with any BASICODE program just by adding them to the front of the BASICODE program. If you are writing a program to allow a computer to control a receiver, for example, and you want the program to print a line of text, all you have to do is set the variable SR\$ to the text and issue a GOSUB 350.

The end user has added his specific basic code at line 350 to print the variable SR\$ using the commands his machine needs. No complex conversions, no hours spent retyping a portion of your code in as he/she modifies it, and no testing to see if the modifications really work.

LISTENER'S IBM-PC DATABASE

by Jim Dantin

Those of you with IBM PC compatible computers have at your disposal an extremely simple method for maintaining a database of radio frequencies. The MS-DOS operating system has a number of standard utilities that take care of sorting, editing and printing. Without any fancy database programs or wordprocessors, you can automate your record keeping and produce easily readable printouts.

The first step in creating your database is to decide what information you want to keep and how you want it to appear in the printouts. After much head scratching and many false starts, I chose the following:

PROGRAMS

All in all, the authors of BASICODE have developed a unique solution to a problem almost every computer enthusiast has seen more than once. There are translation programs available for some computers already which furnish the subroutines listed above.

Programs are available for:

- *APPLE II, APPLE IIe, and APPLE compatibles.
- *BBC Microcomputers, operating system 1.0 and above
- *Colour Genie
- *Commodore 3000, 4000, 8000, 64, and VIC-20
- *CP/M based computers
- *EXIDY Sorcerer, New Brain
- *Phillips P2000
- *TRS-80 mode I and III, Videogenie, and compatibles
- *DAI, OSI Challenger, SWTPC-6800, PET 2001

Soon to be added, and probably available as of this writing, are the MSX machines and the IBM PC.

Sample program listings included in the information sent me include programs to calculate sunrise/sunset times based on longitude and latitude, and one to calculate MUF and LUF (maximum and lowest usable frequencies) between two geographic locations.

Further information on programs, translation programs, etc. can be obtained from:

Hobbyscoop
P.O. Box 1200
Hilversum

The Netherlands

Since the BASICODE project is non-profit, they ask that you include two international reply coupons, available at any US Post Office.

nnn.nnn+aaaaaaaaaaaaaaaaaaaa

where:

nnn.nnn is the frequency in MHz
+ is a tag for verified receptions
aa..aa is any information about the frequency

As an example:

453.6000+KY state police -
Henderson

or

450.0000 - 451.000 TV &
radio press

The first example shows an individual frequency listing for the Kentucky State Police, verified by me. The second shows a way to create a band allocation list. The dash (-) allows it to be sorted nicely, as you will see later.

To create the master list, you can use MS-DOS's editor EDLIN. While not the most friendly editor in the world, it is free and does the job! Any other editor or wordprocessor can be used as long as it produces plain ASCII text files. WORDSTAR works well if you use the "N" non-document mode.

As you create the master file, all you have to watch for is the alignment of the data. Be careful to add leading spaces for frequencies under 100 MHz so the decimal points all line up. I'm going to have to make a slight change if I get an ICOM 7000 to handle frequencies over 1000 MHz!

After the list is typed in, you may use two different sorts: frequency order and alphabetical order. The MS-DOS utility SORT can handle these quite nicely.

Let's call our master frequency list SCANNER.LST. We will also produce two other lists: SCANNER.123 for frequency order, and SCANNER.ABC for alphabetical order.

The following commands do the work:

```
SORT
<SCANNER.LST >SCANNER.123
```

```
SORT
<SCANNER.123 >SCANNER.ABC
/+10
```

(Say what??? It's not as bad as it looks!)

The first command says to SORT from SCANNER.LST and write the output to SCANNER.123. The second command SORTs from the new SCANNER.123 and creates SCANNER.ABC but only looks at characters from the 10th position! Pretty slick!

Remember the dash (-) in the band description entries? Well, that dash sorts before any of the alphabet so you will wind up with a band plan list ahead of the alphabetical list of individual frequencies!

What about the "+" marker on the verified frequencies? By starting the alphabetic sort in the 10th column, the plus is ignored. But another MS-DOS utility lets us extract the verified

Figure 1

FREQUENCY LIST PRINT PROGRAM

```
1 ^Prints scanner list in compressed format
20 WIDTH "LPT1:",255
29 ^the following line sets printer into tiny type
30 LPRINT CHR$(27)+"*4"+CHR$(27)+"E06"+CHR$(27)+"L04"
40 OPEN "SCANNER.123" FOR INPUT AS #1 : GOSUB 100
50 OPEN "SCANNER.ABC" FOR INPUT AS #1 : GOSUB 100
60 OPEN "SWAVE.123" FOR INPUT AS #1 : GOSUB 100
70 OPEN "SWAVE.ABC" FOR INPUT AS #1 : GOSUB 100
90 GOTO 1000
100 FOR J=1 TO 4
110 FOR I=1 TO 130
115 IF EOF(1) THEN 200
120 LINE INPUT #1,A$
129 ^the following line creates the column offsets
130 LPRINT TAB((J-1)*41);A$
140 NEXT I
149 ^the following line backs up the paper to line 1
150 LPRINT CHR$(27)+"POO"
190 NEXT J
200 LPRINT CHR$(12)
210 CLOSE 1
220 RETURN
999 ^the following line rests the printer to normal
1000 LPRINT CHR$(27)+CHR$(26)+CHR$(73)
32767 END
```

Figure 2
SCANNER.BAT

```
SORT <SCANNER.LST >SCANNER.123
SORT <SCANNER.123 >SCANNER.ABC /+10
SORT <SWAVE.LST >SWAVE.123
SORT <SWAVE.123 >SWAVE.ABC /+10
BASICA SCANNER.BAS
```

30.0000 - 30.5100 Federal government	149.9000 - 150.0000 Satellite/radionav.	461.0000 - 462.4500 Business
30.5100 - 30.6400 Special industry	150.0000 - 150.8000 Federal government	462.4700 - 462.5300 Forest,pet,tel,bus.
30.6600 - 31.9800 Business, industry	150.8000 - 150.9700 Auto emergency	462.5500 - 462.7500 GMS
32.0000 - 33.0000 Federal government	150.9900 - 151.1300 Hwy. maintenance	462.9200 - 463.1750 EMS units rptr. in
33.0000 - 33.1200 Hwy.maint.,sp.emer.	151.1400 - 151.4800 Forestry	463.2000 - 465.0000 Business
33.1800 - 33.3800 Petroleum	151.4900 - 151.6000 Special industry	468.0000 - 468.1750 EMS units rptr. in
33.4200 - 33.9800 Fire	151.6100 - 151.9900 Mobile	465.0000 - 470.0000 Mobile & h.t. units
34.0000 - 35.0000 Federal government	152.0000 - 152.2400 Mobile telephone B	470.0000 - 512.0000 UHF T band
35.0000 - 35.2000 Business	152.2700 - 152.4500 Taxi bases	453.0500 - 453.9500 Police,fire,loc.gov
35.2200 - 35.6800 Mobil.tele.B,sp.ind.	152.5100 - 152.8100 Mobile telephone B	453.3000+KY state police - mobile
35.7000 - 35.9800 Business, sp.ind.	152.8700 - 153.0200 Film crews, sp.ind.	453.4500 KY state police
36.0000 - 37.0000 Federal government	153.0300 - 153.4000 Forestry, petroleum	453.5000 KY state police
37.0200 - 37.4200 Police, local govt.	153.4100 - 153.7300 Power utilities,pet	453.5250 FEMA rptr. output
37.4400 - 37.8800 Power utilities	153.8000 - 154.4600 Fire, local govt.	453.5500+KY state police - Madisonville
37.8800 - 37.9800 Hwy.maint.,sp.emer.	154.5000 - 154.6300 Business	453.6000+KY state police - Henderson
38.0000 - 39.0000 Federal government	154.6500 - 155.4000 EMS units	453.6500+Davies Co. KY roads maint.
39.0000 - 39.9800 Police, local govt.	155.4200 - 156.0300 Police,EMS,loc.govt	453.8000 KY state police
40.0000 - 42.0000 Federal government	156.0400 - 156.2400 Highway maintenance	453.8500 KY state police
42.0000 - 42.9400 State police	156.2500 - 157.1000 Maritime channels	453.9000 KY state police - TAC
42.9600 - 43.1800 Business, sp.ind.	157.1100 - 157.4250 Taxi mobile	453.9500 KY state police - TAC
43.2200 - 43.6800 Mobile telephones M	157.4300 - 158.0700 Mobile telephones M	454.0200 - 454.5400 Mobile telephones B
43.7000 - 44.6000 Busses, trucks	157.7700 - 158.0700 Mobile telephones M	454.6750 - 454.9750 Ground-to-air phone
44.6200 - 45.0600 State p., forestry	158.1300 - 158.2700 Power utilities	455.0000 - 455.9999 TV & radio press
45.0800 - 45.6600 Police, local govt.	158.2800 - 158.4400 Forestry,petr.,bus.	455.0500 NBC-NEWS
45.6800 - 45.8600 Police, hwy. maint.	158.4900 - 158.6700 Mobile telephones M	455.0875 ABC-NEWS
45.8800 - 46.0400 Fire, police, sp.emer	158.7300 - 158.9700 Police, local govt M	455.1500 ABC-NEWS
46.0800 - 46.5000 Fire	158.9800 - 159.2100 Hwy. maint.,police	455.1500 ABC-NEWS
46.5200 - 46.5800 Local government	159.2200 - 159.4300 Forestry	455.2875 ABC-NEWS
46.6100 - 46.9700 Portable telephones	159.4900 - 160.2000 Trucks	455.3500 NBC-NEWS
46.6000 - 47.0000 Federal government	160.2150 - 161.5650 Railroads	455.3875 ABC-NEWS
47.0200 - 47.4000 State hwy. maint.	161.6400 - 161.7600 TV & radio press	455.4125 ABC-NEWS radio
47.4200 - 47.6800 Sp.emer., sp.ind.	161.8000 - 162.0000 Ship-to-shore tel.B	455.5875 ABC-NEWS
47.7000 - 48.5400 Power utilities	162.0000 - 173.2000 Federal government	455.6125 ABC-NEWS
48.5600 - 49.5800 Forest, petroleum	173.2250 - 173.3750 Newspapers & film	455.7500 NBC-NEWS
49.6700 - 49.9900 Portable telephones	173.4000 - 174.0000 Federal government	455.8000 CBS-NEWS
49.6600 - 50.0000 Federal government	175.0000 - 215.0000 television ch. 7-13	455.8500 NBC-NEWS
50.0000 - 54.0000 HAM	220.0000 - 225.0000 HAM	457.0000 - 460.0000 Mobile to bases
55.0000 - 87.0000 television ch. 2-6	225.0000 - 400.0000 aviation AM	459.6750 - 459.9750 Air-to-ground phone
88.0000 - 108.0000 FM radio	406.0000 - 420.0000 Federal government	460.0000 - 460.5500 Police bases
118.0000 - 121.4000 Air traffic control	420.0000 - 450.0000 HAM	460.5700 - 460.6300 Fire bases
121.6000 - 121.9250 Flight service st.	450.0000 - 451.0000 TV & radio press	460.6500 - 460.8800 Airline operations
122.7500 - 123.5875 Federal government	451.0000 - 451.1500 Power utilities	461.0000 - 462.4500 Business
123.1250 - 123.6900 Flight test	451.1700 - 451.7500 Power ut.,tel.main.	462.2000+WEHT-TV 25 Evansville IN
123.6750 - 123.8250 Air traffic control	451.7200 - 452.3000 Sp. ind.,taxi bases	462.2000+N.S.A.
128.8500 - 132.0000 Commercial airlines	452.3250 - 452.4750 Railroads	462.2500+N.S.A. h.t. repeater output
132.0250 - 135.9750 Air traffic control	452.3000 - 452.5000 Taxi, truck, railroad	462.4700 - 462.5300 Forest,pet,tel,bus.
135.8500 - 136.0000 Federal government	452.5200 - 452.6000 Auto clubs base	462.5500 - 462.7500 GMS
136.0000 - 138.0000 Satellite downlink	452.6000 - 452.7750 Trucks	462.9200 - 463.1750 EMS units rptr. out
138.0000 - 144.0000 Federal government	452.7750 - 452.9500 Railroads	463.2000 - 465.0000 Business
144.0000 - 148.0000 HAM	452.9750 - 453.0000 Newspaper press	463.2250+WTW-TV 7 Evansville IN
148.0000 - 149.9000 Federal government	453.0500 - 463.9500 Police,fire,loc.gov	463.2500+N.S.A. Exec. system output
	454.0200 - 454.5400 Mobile telephones B	463.7750 Red Adair firefighters
	454.6750 - 454.9750 Ground-to-air phone	465.0000 - 470.0000 Mobile & h.t. units
	455.0000 - 455.9999 TV & radio press	468.0000 - 468.1750 EMS units rptr. in
	459.6750 - 459.9750 Air-to-ground, phone	470.0000 - 512.0000 UHF T band
	467.0000 - 460.0000 Mobile to bases	471.0000 - 889.0000 television ch.14-83
	460.0000 - 460.5500 Police bases	902.0000 - 928.0000 HAM
	460.5700 - 460.6300 Fire bases	
	460.6500 - 460.8800 Airline operations	
	461.0000 - 461.0000 Alarm companies	

to the VLF band; however, from 160 to 200 kHz AM phone from overseas broadcasters can be heard when conditions are good. The best time to tune for these broadcasters is during the winter months after sunset.

The period from about a half hour before sunset to a half hour after sunset and again from about a half hour before sunrise to a half hour after sunrise are excellent times to snag some really long distance DX. This is the time when stations halfway around the earth from your location can be heard.

This sunrise/sunset period is often called "Grayline DXing." The grayline refers to the terminator, that twilight area of the earth that is between night and day. Signals seem to travel along this line quite easily at times. Grayline DXing is not restricted to this band of frequencies, but plays an important role in DXing up to about 10 MHz.

In the U.S. a license-free experimenters' band is located from 160 to 190 kHz and anyone is allowed to put a station on the air as long as power does not exceed one watt and the antenna plus feed line is not more than 50 feet in length.

While normal range on this band is 20 to 50 miles, some stations work to ranges of 100 or more miles on a regular basis. Under good conditions contacts out to several hundred miles are made (present record is over 600 miles).

Many of these low frequency experimenters (they are called LOWFERS) have worked ten or more states. Most communication is carried on by Morse code although SSB and DSB radio-telephone are also used.

Several dozen LOWFERS have established beacon stations; some of these stations operate 24 hours a day seven days a week; others are on only at night or weekends. The beacons send slow speed Morse code with the station's call letters and address and request signal reports.

Tuning the beacons is a good hobby, and you can contribute valuable information about this band by sending these experimenters accurate reports of their signals. Some of the stations send very detailed station descriptions and good-looking QSL cards for your report--remember to send a SASE when requesting your QSL, though.

If you would like to know more about this experimenters' band send several

IBM-PC DATABASE cont'd

entries to create yet another list!

```
FIND "+"
<SCANNER.ABC >SCANNER.VER
```

This will extract any entry with a "+" and write it out to a file called SCANNER.VER (VER for VERified!). This same FIND utility could be used to extract all of the listings for "KY". Some creative thought on standardized names for your entries will let you pull out specialized lists.

The only remaining job is to print out the results. You could use TYPE or PRINT to get plain printouts or, depending on your printer, get fancy.

I have access to a printer that can produce an extremely compressed print of 20 characters per inch and a line spacing of 12 per inch. With this, I can produce a 4-column printout that can hold up to 520 entries on a single 8-1/2" x 11" sheet.

Since the printer is capable of reverse line feeds, I wrote the BASIC program shown in Figure 1 to print out the SCANNER files and my SWAVE (shortwave) listings.

As a final step, I offer the batchfile SCANNER.BAT printed in Figure 2. This batch file does all the work. After entering your data (or making updates to your master .LST files), typing the word SCANNER will sort the lists and run the BASIC program that prints them out.

I hope this has given you the incentive to utilize the power of your computer-- Let's see some more frequency lists submitted to MT for publication!

Figure 3 A sample of Jim Dantin's frequency sort.

GETTING STARTED



by

IKE KERSCHNER N3IK
Rd 1 Box 181A
Kunkletown, PA 18058

This month we continue our discussion of the radio spectrum with a look at the very low frequencies (VLF), low frequency (LF) and medium frequency (MF) bands. We will conclude the series next month with very high frequency (VHF) and ultra high frequency (UHF).

VERY LOW FREQUENCIES: 3-30kHz

By international agreement, the assignable spectrum begins at 9 kHz. In the VLF region you will hear Navy and maritime traffic and radio location beacons. Morse code and radio teletype are the only modes employed on VLF. Stations operating on this band use very high power transmitters and huge antenna arrays.

The range of VLF signals is fairly constant over water, and the high power transmitters can provide reliable communication with ships under most conditions.

Range will vary with time of day and season, winter nights being the best time to hear the weaker DX stations. During the summer, static is a problem; but the closer powerhouse stations will still be heard.

LOW FREQUENCY: 30-300 kHz

From 30 to about 150 kHz activity will be similar



NAA's antenna system covers several acres (U.S. Navy)

GETTING STARTED cont'd

large SASE's to Hal Murken, 19 Hobby Lane, Oakland, NJ 07436 and tell him you would like to receive his LOWFER Newsletter.

If you live in the extreme western part of the U.S. contact Michael Mideke, Box 123, San Simeon, CA 93452; send him the same large SASE's and ask for his newsletter. These fellows print the newsletters out of their own pocket, so a small donation will really help out.

An amateur radio net for LOWFERS meets Sunday night at 9 p.m. EST on a frequency of 1977.5 kHz on SSB and AM phone. Listen to the net for up-to-date info on what is happening on the LOWFER band.

There is also a LOWFERS club, the Longwave Club of America, which publishes a monthly newsletter called the Lowdown. It contains information on equipment, new beacons, member loggings, and classified ads. Membership in the club is ten dollars per year. For more information write THE LONGWAVE CLUB OF AMERICA, 45 Wildflower Road, Levittown, PA 19057.

200 to 400 kHz

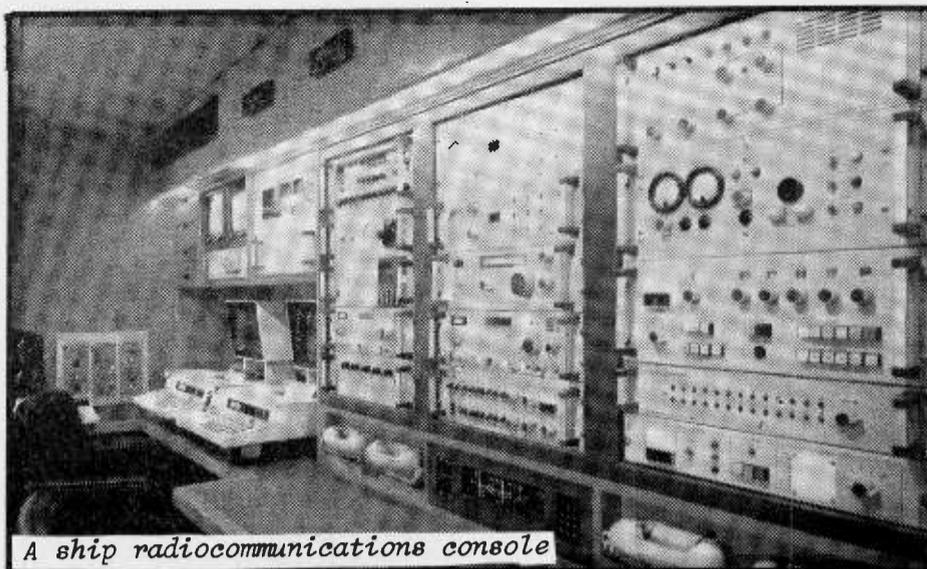
Aeronautical beacons sending their call letters 24 hours a day, seven days a week in slow Morse code on MCW (Morse code being sent as tone-modulated AM), weather reports on AM radiotelephone, and radio location beacons are the occupants of this portion of the LF band.

MEDIUM FREQUENCY: 300-3000kHz

Between 400 and 540 kHz expect to hear Morse code conversations concerning cargos, arrival times, course changes, and general ships' business. This part of the band is devoted to maritime traffic. At night the band is alive with ship traffic in Morse code. This is a good place to practice receiving CW.

The AM broadcast band in the U.S. extends from 540 to 1600 kHz on a shared basis. During the daylight hours this is not much of a problem because range is usually limited to 100 miles or less; after dark, though, stations thousands of miles away are heard and crowding becomes serious. Many stations decrease their power and change the direction of their antenna pattern or go off the air to avoid interfering with each other.

The poor BCB DX'er has a real problem, though, as he tries to pick one station



A ship radiocommunications console

out of the jumble of signals he can hear on his communications receiver. Often the avid BCB'er will stay up late listening to a station till it signs off the air so he can hear a low power station several states away on the same frequency, and he may do this several nights or weeks before he hears that elusive station and gets a solid ID for it. But that is the pay-off--total elation and that feeling like you are walking on air!

BCB DX'ing is one of the most difficult of the radio monitoring hobbies, but it is also very rewarding! The dyed-in-the-wool DX'er wants to hear the low power weak signals--a real challenge which requires some special techniques.

Most loyal BCB'ers use some kind of directional antenna; usually a loop or ferrite antenna that they can rotate to peak a signal or null out an interfering station. Loops are easy to build and very effective for this kind of work.

If you would like to build your own loop antenna I suggest you get copies of the April and May 1985 issues of Popular Communications and see Mark Manucy's "Broadcast Topics" column. You can also purchase a set of plans for three different loops from Mark for \$5.50 postpaid (Mark Manucy, 4146 Roland Ave., Baltimore, MD 21211).

Other excellent sources of information on loops include the Low and Medium Frequency Scrap Book by Ken Cornell (\$10; from the author at 225 Baltimore Ave., Point Pleasant Beach, NJ 08742); and Antennas for Receiving by Wilfred Caron (\$12.95 + \$1.50 shipping from Grove Enterprises, P.O. Box 98, Brasstown, NC 28902).

Another tactic used by BCB DX'ers is to use either the USB or LSB mode on their receiver to hear the desired AM signal, but too often the squeals and squalls of the carriers on the frequency

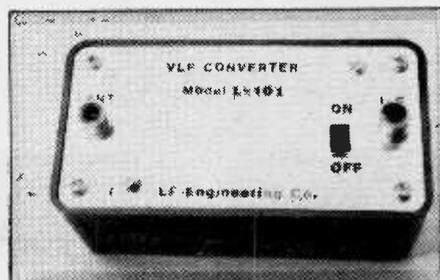
will defeat the effort. Often the only way to hear the DX is to stay up till the wee hours in hopes that you can catch them when the other stations have signed off.

EQUIPMENT FOR THE LOW FREQUENCIES

While most older general coverage receivers cover the range of 540 kHz to 30 MHz, some of the newer units go as low as 100 kHz. If you want to explore VLF and LF a converter may be connected between the antenna and your receiver which changes the VLF and LF signals to a band of frequencies that your receiver can cover, usually 3.5 to 4.0 MHz.

Converters are fairly inexpensive: most cost in the \$50 range. If you are handy with a soldering iron and can read schematic diagrams you can build a converter. There are plans for a very-easy-to-build converter in The Listener's Handbook by Bob Grove, available from Grove Enterprises. Also try Ken Cornell's Radio Scrapbook mentioned above.

Ready-built converters are available from LF ENGINEERING CO, 17 Jeffrey Road, East Haven, CT 06512; PALOMAR ENGINEERS, 1924 West Mission Road, Escondido, CA 92025; and a converter kit is available from the HEATH COMPANY, Benton Harbor, MI 49022.

NEXT MONTH: 30 MHz and above

AN ANTENNA TALK

W. Clem Small KR6A

Which Antenna Is Best?**PART II: CONCLUSION**

Last month, in exploring the question "Which antenna is best?" we came to the understanding that there certainly is not one antenna which we could call the "best" antenna for all applications. We even went so far as to say that there is not necessarily just one "best" antenna for each specific application which we may have in communications work. As a matter of fact, there may be several very good antennas for some applications, and no one of them clearly the "best."

This month's column will take those concepts and define them in a bit more depth. They they will be employed in discussions of actual antenna utilization. When you finish this second and last article of the series, you will be able to intelligently choose among the various antenna configurations in general use today to fill your own communications antenna needs.

ANTENNA GAIN

"Gain" is an often-misunderstood term; obviously, a certain amount of power is supplied to an antenna from a transmitter and that amount will not increase just because the antenna has a "high gain." What "gain" refers to is that the power supplied to the antenna can be directed specifically to a certain direction or directions. The power gained in that certain direction is lost to other directions, thus there is "loss" in the non-favored directions. (1) Under weak signal conditions, an antenna which has high gain will give us advantages over one with less gain. We'll keep this in mind for picking our "best" antenna.

DIRECTIVITY

From the above discussion you can see that in most cases an antenna which is directive has gain and an antenna which has gain is, by definition, directive. Directivity is obtained when an antenna, as indicated by its horizontal radiation pattern (see fig. 1A, 1B,

ANTENNA TALK cont'd

1C, 1D), transmits more of its energy in certain directions than in others.

Nicely enough, when an antenna has a directional radiation pattern, it also has the same directional pattern for reception. This commonality of patterning between radiation and reception is called antenna "reciprocity." In picking that elusive "best" antenna we will need to consider whether we wish to emphasize reception or transmission in one or more directions. If, on the other hand, we want all-round coverage in our communications, a non-directional antenna will be our choice.

ANGLE OF VERTICAL RADIATION

The radiation patterns discussed in the above paragraph are representative of the signal strength from an antenna as considered in a horizontal plane (toward the horizon). This pattern is usually measured at ground level in all directions from the antenna. When we say that an antenna is directional, we usually mean that this horizontal radiation pattern is not circular as in 1A or 1B, but has lobes that favor some directions more than others, as in 1C or especially 1D.

We can also consider how the antenna concentrates its transmitted power in the vertical plane (fig. 1E, 1F, 1G, 1H). Thus, the idea of directivity can also be applied to the way an antenna distributes its power vertically. In considering this "vertical directivity," however, we usually use the terms "angle of radiation," or "vertical angle of radiation," rather than vertical directivity.

Figure one shows the vertical distribution of power by a quarter-wave Marconi antenna (1E), and by a half-wave vertical antenna (1F). Note that more of the quarter-wave antenna's energy is radiated vertically (skyward), and that less is radiated horizontally (along the ground) than is true for the half-wave vertical antenna. Thus, if we want good ground-wave coverage, we would pick a half-wave vertical antenna over a quarter-wave vertical antenna.

If we want to emphasize higher-angle radiation (as for short skip work), we may want the quarter-wave antenna. So, we have the consideration of angle of vertical radiation as one more factor to utilize when picking that "best" antenna for our station.

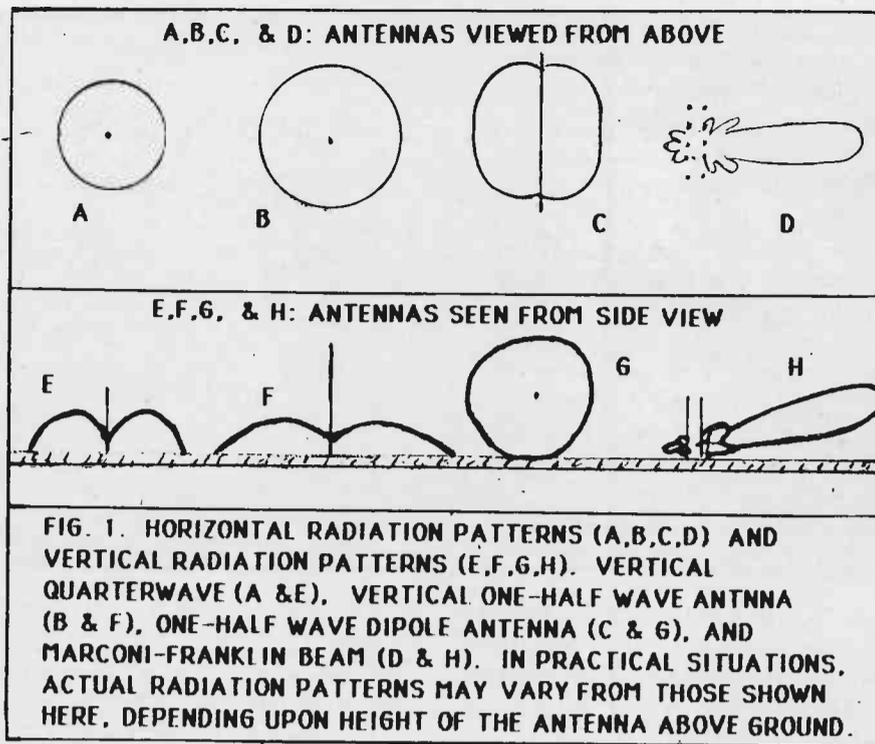


FIG. 1. HORIZONTAL RADIATION PATTERNS (A,B,C,D) AND VERTICAL RADIATION PATTERNS (E,F,G,H). VERTICAL QUARTERWAVE (A & E), VERTICAL ONE-HALF WAVE ANTENNA (B & F), ONE-HALF WAVE DIPOLE ANTENNA (C & G), AND MARCONI-FRANKLIN BEAM (D & H). IN PRACTICAL SITUATIONS, ACTUAL RADIATION PATTERNS MAY VARY FROM THOSE SHOWN HERE, DEPENDING UPON HEIGHT OF THE ANTENNA ABOVE GROUND.

SIGNAL POLARIZATION

Polarization of radio waves is determined by the orientation of the electric field of those waves. This generally means that an antenna which is vertical in orientation will transmit vertically polarized waves, and an antenna which is horizontally oriented will produce horizontally polarized waves.

Sometimes it is not obvious from looking at an antenna whether its waves will be vertically, or horizontally polarized. For instance, an "L" shaped antenna may produce either type of polarization, depending on the relative lengths of the two segments of the "L" and the frequencies on which it is used. There are two other kinds of polarization: circular and elliptical.

We don't have to worry about figuring out which kind of polarization an antenna will produce because the texts which give us our design data will usually tell us which kind of polarization the antenna produces.

Receiving antennas respond best to waves which are polarized the same way that the antenna itself would polarize waves if it were transmitting them. Thus, a vertical Marconi-type antenna transmits vertically polarized waves, and it receives waves best when they are polarized vertically. For most small antennas, you may set the polarization angle at vertical or horizontal by mounting the antenna at the appropriate angle as you install it.

ANTENNA BANDWIDTH

Many common antennas are actually resonant (tuned) circuits in addition to being radiators (or receptors). This means that they respond best when they

are used at their design frequency or at certain harmonics of the design frequency. When used at frequencies different from those intended, the antenna often performs less efficiently. Examples of such resonant antennas are the quarter-wave grounded vertical antenna and the various configurations of the half-wave, including the common center-fed dipole antenna.

The degree to which it is possible to operate an antenna efficiently at frequencies other than its design frequency is a function of its "bandwidth." The bandwidth of an antenna can often be usefully extended by using thicker conductors or by utilizing multiple conductors in its construction.

Some antennas, such as the rhombic or the non-resonant vee antenna, function somewhat after the fashion of a transmission line and do not have the narrow bandwidth which we find for resonant antennas. If we want our antenna to function well over a broad band of frequencies, we will need to consider the bandwidth of the antenna design which we choose.

If we want a really broad frequency coverage, we will want to consider some antennas with a very broad bandwidth: the rhombic, non-resonant vee, and the logarithmic designs are examples. An antenna tuner may also be used to vary the frequency response of an antenna system and thus increase its useful frequency coverage.

PHYSICAL SIZE

If you own a ranch or live in a national forest, physical size of your antennas may not be a consideration. Most of us, however, have various physical limitations which we must accept

in terms of the size or height of antennas which we can erect. Antennas often differ dramatically from one another in the space which they require for installation.

If you are an apartment dweller with a landlord who doesn't wish to let you install antenna wires on the building or grounds, you may have to utilize some of the indoor designs available. These will, of necessity, be physically small designs. Loop antennas or active antennas with their short whips are frequent receiving antenna choices for apartment dwellers.

Even if we can put our antenna outside the size of our lot may be too short for a half-wave dipole, leading us to utilize expedients such as trap-loaded antenna or bending the legs of our antennas to fit the real-estate. The "best" antenna under such conditions may not be the optimum you would choose without the space limitation, but you will probably still be able to come up with a good workable system.

You may note that our discussion thus far has omitted mention of antenna impedance and the concept of whether the antenna is balanced or unbalanced. Problems arising due to these factors are usually handled through the use of a balun transformer or antenna tuner and need not necessarily determine the choice of antenna. On the other hand, they are important, and will be treated in this column at a later date.

THE BEST ANTENNA?

Now we're ready to get down to business. Let's consider some practical situations and how we would pick an antenna for some specific applications.

VHF-UHF SCANNER ANTENNAS

First, let's consider an application common to many Monitoring Times readers: using a VHF-UHF scanner to monitor the action in your area.

Most of the signals on these bands are vertically polarized, so our choice of antenna should have vertical polarization. The ground-plane antenna is a very common vertically polarized antenna which takes up little physical space and also provides the needed non-directional pattern so that you won't miss signals from any direction. Although the gain of a ground-plane antenna is relatively low, it is sufficient for most

ANTENNA TALK cont'd

applications in monitoring activity in the area surrounding your home.

If you want general coverage over a broader area than the low gain of the ground-plane will allow, there are various higher-gain, non-directional vertical antennas available such as the Grove OMNI, AEA isopole and Butternut SC-3000.

On the other hand, if you live out of town and the action is mostly in town, then a better choice might be a beam antenna. A beam will let you reduce interference from non-desired directions, while its gain will let you copy signals which may be a bit weak due to your living some distance away from the area whose activity you are monitoring. We can mount VHF-UHF beams vertically or horizontally, so polarization will be no problem.

VHF/UHF ground planes and beams are usually small enough that there is no concern with space; some may even be used indoors. Beams used indoors may well suffer considerable loss of directivity however, due to the interference of various conductors such as house wiring, sheet metal, or even metal objects in the room. If there is much metal in the building where you have your station, you may suffer signal loss with any indoor antenna.

Bandwidth

If all of the stations which we are monitoring are relatively close together in frequency we can probably forget about bandwidth considerations. However, if we want to scan across a wide band or switch from VHF to UHF, then we need to get an antenna which can respond to signals so widely separated.

GENERAL SHORTWAVE LISTENING

Consider another situation common to many readers of this column: general shortwave listening between 3 and 30 MHz. This is relatively easy if you have enough space to put up 50 to 100 feet of wire 20 or more feet in the air (the higher the better, usually). A wire antenna of this type is usually a good performer in such an application. Using an antenna tuner will often help optimize its performance across the bands.

Since the polarization of shortwave signals is affected as the signals are propagated through the ionosphere, signals which you will receive may have a variety of polarization orientations. Therefore,

either vertical or horizontal polarization is generally equally acceptable for use on the shortwave bands.

If you are looking for a simple antenna which will work DX, a half-wave vertical is a good choice since the longest ionospheric skip signals come in at the low radiation angles to which this antenna responds very well (fig. 1F). If you get more particular in your HF monitoring, you may even want to get a beam antenna or a cubical quad. These add the gain and directivity sometimes necessary to pull those weak ones out of the static and interference plus they have the additional advantage that they can be rotated to the direction desired.

If you have the real-estate, the rhombic or the non-resonant vee are broad-band antennas which give good gain and directivity. They cannot be rotated to different directions as the Yagi-Uda and quad can, however. Once again, picking the best antenna is a matter of deciding on the requirements which you have to demand from the antenna.

HF HAM BANDS

How about the amateur radio operator who wants to get his first station on the air with a minimum of expense? Just as in the example above, an antenna tuner and a wire as long and high as possible is one solution. Where there is room for a half-wave on a low frequency (say 40 or 80 meters), the Zepp antenna with its open-wire end-feed is a good multi-band choice. This antenna requires a tuner.

Multi-band dipoles are another good choice here, either the trap variety or the multi-element design. All of these antennas have moderate gain and are adequate to provide respectable communication over both long and short distances on the short wave bands.

While their horizontal polarization is acceptable on the short wave bands, their physical size may be a problem for some operators. A half-wavelength antenna is 67 feet on 40 meters and 135 feet on 80 meters. If you don't have enough open-space to permit erecting a half-wave antenna, consider using loading coils to shorten the antenna or bend the ends as suggested earlier.

MONITORING THE LOW FREQUENCY BAND

On these frequencies the most common antenna seems to be the venerable wire, and the longer the

TABLE ONE

ANTENNA.....	GAIN.....	DIRECT'NL.....	POLARIZN.....	BANDWIDTH.....	RELATIVE SIZE*
1/4 WAVE VERTICAL	LOW	NO	VERT.	MODERATE	MODERATE
GROUND-PLANE	LOW	NO	VERT.	MODERATE	MODERATE
1/2 WAVE DIPOLE	MOD.	VERY LITTLE	HORIZ.	MODERATE	LARGE
INVERTED VEE	LOW	NO	?	MODERATE	LARGE
LONG-WIRE	VARIABLES W/FREQ.	VARIABLES W/FREQ.	HORIZ.	MOD..VY WIDE W/ ANT. TUNER	LARGE TO VY. LGE.
NON-RES. VEE	HIGH	YES	HORIZ.	WIDE	VERY LARGE
RHOMBIC	HIGH	YES	HORIZ.	WIDE	VERY LARGE
LOOP	LOW, HIGH W/AMP.	YES	DEPENDS ON POSITN	MOD. BUT USUALLY TUNEABLE	SMALL TO VY SMALL
YAGI-UDA	HIGH	YES	DEPENDS ON POSITION	NARROW	MODERATE
CUBICAL QUAD	HIGH	YES	DEPENDS ON POSITION	NARROW	MODERATE
LOG-PERIODIC	MOD. TO HIGH	YES	DEPENDS ON POSITION	VERY WIDE	MODERATE
ACTIVE	HIGH	NO	?	VERY WIDE	VERY SMALL

MOD.-MODERATE, VY-VERY, W/-WITH, POS.-POSITION, AMP.-AMPLIFIER
 *SIZE OF ALL OF THE ABOVE ANTENNAS, EXCEPT THE ACTIVE ANTENNA, VARIES DIRECTLY WITH WAVELENGTH (I.E., 1/2 WAVELENGTH AT 150 MHZ. IS 1 METER, WHEREAS AT 150 KHZ. 1/2 WAVELENGTH IS 1 KILOMETER !).

better. These antennas are not too directional to be good all-round monitoring antennas, but they do pick up electrical noise. Noise is often quite a problem on the lower frequencies, and this makes loop antennas popular on that band. Their popularity is due to the fact that the loop's sharp directivity often allows a noise source to be nulled-out.

If you can't put up a long wire, some of the active antennas available cover the low frequencies effectively. The choice of antennas on the low frequency band is somewhat limited due to the fact that resonant antennas would require thousands of feet (or even several miles) of space to erect at these long wavelengths.

IN SUMMARY

When you have need for an antenna, decide what you want that antenna to do and check over the various types of antennas available to see which ones can fill the bill. Table one lists some of the more common antennas for your consideration. References two through five are all good sources of information on antennas commonly used in communications.

RADIO RIDDLES

Last month's Radio Riddle:

Q.What is the difference between an antenna and an aerial?

A.The name "antenna" was originally derived from a reference to the antennae of insects. The insects sense incoming sensory information with their antennae, thus the receiving aerial was called an "anten-

na," because it senses incoming radio waves. The term "aerial," which literally means "high in the air," was first used to describe Marconi's vertical antennas as they were put up higher and higher in the air. Sometimes these monsters were elevated as much as 800 feet.

Most antennas of today are not very "aerial," certainly very few are as high as 800 feet. So now "aerial" is considered to be an archaic term (except in England) and is no longer used much. "Antenna" is the accepted term.

This Month's Radio Riddle:

What popular beam antenna of today was developed in response to a need for an antenna which could, without arcing and destroying itself, be used to transmit high power short-wave signals from the moist tropical atmosphere of a certain South American missionary broadcast station?

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HELPFUL HINTS

Shortwave Converters for Cars

A number of inquiries have been received here at Grove Enterprises regarding the availability of short wave converters which can be added to a car radio for mobile reception of international broadcasters.

Reader M. McDaniel reminds us that one of our MT advertisers, Radio West (3417 Purer Rd., Escondido, CA 92027) stocks the Grundig KV-1000 automotive converter for \$140 plus \$2.50 shipping and handling.

Two additional short wave converters for automotive applications are manufactured by MFJ; both retail for less than \$100 and are available from several MT advertisers including Universal Shortwave (1280 Aida Drive, Reynoldsburg, OH 43068).

Faster Scan/Search on Regency's MX7000

Although excellent electronically, the popular Regency MX7000 (and MX5000/5500 as well) suffers from a tediously slow scan and search rate of about 3-1/2 increments per second compared with competitors' speeds typically in the 15 channel-per-second range.

One sharp-eyed experi-

HX1200 Frequency Range

The widest frequency coverage in a hand held scanner now on the market is found on Regency's popular HX1200, the fastest selling scanner at Grove Enterprises. As with previous Regency scanners, there seems to be a conflict in reporting the actual frequency range this scanner is capable of.

When Regency designs a scanner, they build in a fixed limit that the microprocessor will accept; depending upon the alignment procedure, only a portion of that range potential is actually capable of reception.

This is the reason that, right off the shelf, some Regency programmables

menter has discovered that the speed is controlled by a 1 megohm resistor which he changed to a much lower value (approximately 27,000 ohms) to lower the time constant and increase the speed.

He suggests, however, that the newer, much faster speed is too rapid for weak stations and closely-spaced channels to stop the scanning sequence and that a slightly greater resistance than 27,000 ohms be tried.

Since we don't know which resistor was changed, we suggest that only experienced experimenters tamper with the circuitry. Please let us know what you find out!

may extend out of their published bounds by varying amounts on different scanners.

The HX1200 has a maximum set of frequency limits as follows: 20.0-59.995, 118.0-175.995, 406.0-420.0 and 440.0-519.995 MHz. While all individuals of the HX1200 series are capable of the full upper ranges, the bottom frequency normally accepted during the programming attempt will be between 25 and 30 MHz with approximately 28 MHz being most common.

The circuit senses its own alignment, shutting down and displaying "frequency error" if an attempt is made to enter a frequency outside of the alignment range.

MODIFICATIONS to Receivers and Scanners

Here at Grove Enterprises we are frequently asked for various modifications for receivers such as S-meters on scanners, sharper filters on short wave radios and so on.

Would you like Grove to offer a modification service? If so, please let us know what you would like. And those of you who have modifications you would like to share with us for popular short wave and scanning receivers, please send details to us so that we can develop procedures to share with listening enthusiasts. Thanks!

EXPERIMENTER'S



WORKSHOP

The malady of the modern age...

COMPUTER INTERFERENCE AND HOW TO CURE IT

by Chris Williams

The growth in popularity of the personal computer has exploded in recent years; every neighborhood seems to have several of them. This is fine for users' groups and retail software dealers, and even for computer repairmen, but it can be a major headache for short wave listeners!

The problem is that the level of radiation which computer manufacturers are permitted by the FCC is high enough to propagate a considerable distance. That radio-frequency energy appears throughout a large portion of the electromagnetic spectrum, and an SWL with even a modest listening post will hear it up to several hundred feet away.

Fortunately, there are things one can do to improve matters. What I'd like to discuss in this article are some techniques I've found effective in attenuating personal computer radiation to a tolerable level. They are all simple techniques to implement, but sometimes only one is required. You'll have to experiment in your own shack to find which of

them you need.

WHY DO COMPUTERS RADIATE?

Personal computers operate digitally. This means that within the machine, all operations take place by quickly switching a voltage back and forth from five volts (called TTL level) to zero volts. This is interpreted by the machine as the manipulation of 1's and 0's.

These individual 1's and 0's are called bits. Eight of these bits form entities called bytes--which are then used by the computer in many different ways.

The rate at which bit voltages change is controlled directly by the computer's operation (the software commanding the changes) and indirectly by the computer's clock. The clock is typically a crystal oscillator that has an oscillation frequency of several megahertz. These oscillations produce a sine wave which is then converted to a TTL square wave. This square wave is then buffered and fed to the clock input of the microprocessor.

The RF radiation difficulty comes from the nature of square waves. Fourier theory states that square waves are combinations of many sinusoidal frequencies, and it is these that are the source of the problem. Unfortunately, most of them radiate from the computer. Some are too weak to cover more than a few inches, but some can propagate hundreds of feet.

The oscillator's fundamental square wave is only one of many square waves within the machine. Every bit that changes value in response to software operation also creates a pulse,

TECHNICAL TOPICS by Bob Grove

Q When I enter certain frequencies on my scanner, say 152.632, it reads 152.630, not what I entered. Can I fool it into receiving my frequency? (Michael Hawke, Uniondale, NY)

A Frequency - synthesized (no-crystal, keyboard) scanners may be designed to enter and receive any frequency you care to assign. But the more precise the frequency, the more expensive the circuitry.

Scanner manufacturers have found that by rounding off the entry to the nearest 5 kilohertz, they can save parts and money at no sacrifice in reception, since the "width" of the received FM signal is at least 15 kilohertz anyway. No, you can't fool mother nature or the frequency synthesizer!

Q Will the Grove ANT-5B OMNI work as well indoors as if mounted outdoors? (Gordon Hubbard, Tucson, AZ)

A Building materials like wood are essentially transparent to radio waves; as material becomes more dense (cement, brick, stone) it also becomes more resistant to penetration by radio waves.

Metal siding, electrical wiring and conduit, air conditioning ducts, and other sizable metal masses can be serious reflectors and absorbers of signals.

Finally, if you are on the first floor, the antenna will be close to the ground and a more desirable height for greater distance cannot be met. These are the reasons that a general rule of thumb for any antenna is to mount it high and in the clear.

Nevertheless, if deed restrictions prevent an outside or rooftop location, any antenna can be used indoors with reduced performance. The degree depends upon your particular obstacles.

EX.WORKSHOP cont'd

which is, in effect, a portion of a square wave and creates its own radiation.

All of this adds up to numerous whistles and squeals on your receiver as you tune across a band. Worse still, you needn't even tune. As the computer performs different functions, the frequencies it generates will change and these will sweep in and out of your receiver's passband at whatever frequency it might be tuned to.

If your antenna is close enough to the computer (i.e., within a few feet), even the weakest of the radiation will be audible. These many signals will be so closely adjacent in frequency that they will sound like noise of "hash" as either you or they sweep through the band.

REMOVAL NOT A TRIVIAL TASK

Interference from personal computers is difficult to eliminate. If it were caused by an exceptionally strong signal at some frequency other than that to which your receiver was tuned (overloading) we would simply construct a notch filter tuned to the strong signal's frequency and attenuate it down to a level your receiver's front end could deal with.

Personal computer interference isn't like this. Rather than being off frequency and strong, it is on frequency and weak. There is no overloading taking place. It comes through the receiver front end because it is right at the frequency of interest.

So how does one stop these signals? Well, one doesn't. As long as the computer is turned on, the frequencies will be produced. The goal in reducing or removing the interference is to attenuate it, and to do this, one must understand how it propagates.

RF from personal computers can get into your receiver through two paths--direct radiation into the antenna or by coupling through the AC power line cord or audio interface cables. Let's deal with the line cord first.

There are several standard techniques for sup-

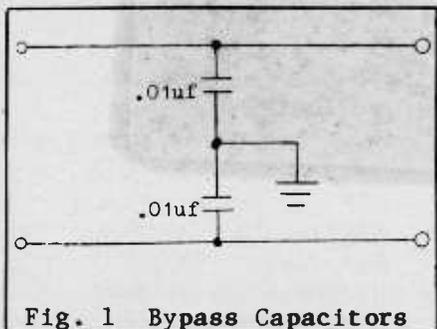


Fig. 1 Bypass Capacitors

pressing RF on the AC line. One of the simplest and best is shown in fig. 1.

Here we see the use of bypass capacitors to effectively short any RF to ground. Bypass capacitors function by virtue of their value, which is chosen to yield a small reactance at the frequency of concern. This is shown below:

$$X_c = \frac{1}{2 * \pi * F * C}$$

So for 0.01 uF at 2 MHz and 30 MHz we have

$$X_c = \frac{1}{2 * \pi * F * C} = \frac{1}{2 * \pi * 2\text{MHz} * .01\mu\text{F}} = 8 \text{ ohms}$$

and

$$X_c = \frac{1}{2 * \pi * F * C} = \frac{1}{2 * \pi * 30\text{MHz} * .01\mu\text{F}} = 0.5 \text{ ohms}$$

At 60 Hz, the line's power frequency, (which we certainly do not want to short) the reactance is:

$$X_c = \frac{1}{2 * \pi * F * C} = \frac{1}{2 * \pi * 60\text{Hz} * .01\mu\text{F}} = 254,000 \text{ ohms}$$

So you see the capacitors present a short circuit for RF and essentially an open circuit for 60Hz. Make sure the DC voltage rating of the capacitors is at least 600 volts, preferably 1000. This margin will provide protection from transient spikes on the AC line.

There are potential difficulties with bypass capacitors. Sometimes you can get away with placing them right at the wall plug your receiver is using, but sometimes not. If you use bypass capacitors at the plug, the length of cord from the wall to your receiver can pick up RF and put you right back where you started from.

The best place for line bypass capacitors is inside the receiver itself. This approach has its own drawbacks. No one wants to open his radio and risk damaging something, especially if it is still under warranty.

The standard compromise solution that has evolved is to place the capacitors right at the receiver, which shortens the length of unbypassed cord to almost nothing.

A more powerful method of filtering RF from the AC line is shown in fig. 2.

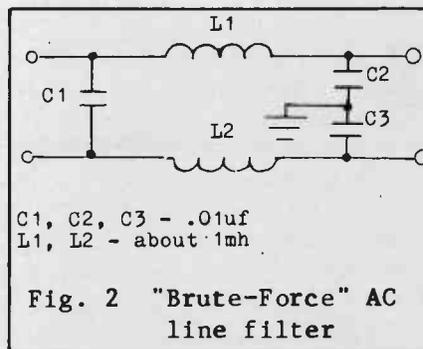


Fig. 2 "Brute-Force" AC line filter

This is the "brute-force" AC line filter from the ARRL Radio Amateur's Handbook (available from Grove Enterprises). This circuit adds more low reactances in parallel and some high reactances in series, all of which are designed to allow the 60 Hz power through and stop RF.

THE ANTENNA

A much more difficult problem is posed by interfering RF coming in through the antenna. This is where RF is supposed to enter the receiver, so you can't filter it. Indeed, there is really only one action you can take to alleviate the problem of computer radiation entering here. You must attenuate the radiated signal.

You can do this best simply with distance. As I've already mentioned, PC interference isn't strong; if you simply separate your antenna from the offending computer you will see an amazing improvement. I moved my computer desk from one side of my shack, which was only a few feet from my outside antenna, to the other side--and saw all interference disappear. Sometimes it doesn't take much.

Incidentally, that improvement was very important for me. I use my Apple to decode CW and RTTY and so I can't simply turn it off if it interferes with my monitoring. I mention this to give heart to anyone suffering the same problems with their computer in the same room as their listening post. Some AC filtering and good separation between computer and antenna works wonders.

\$19 not cheap enough?!

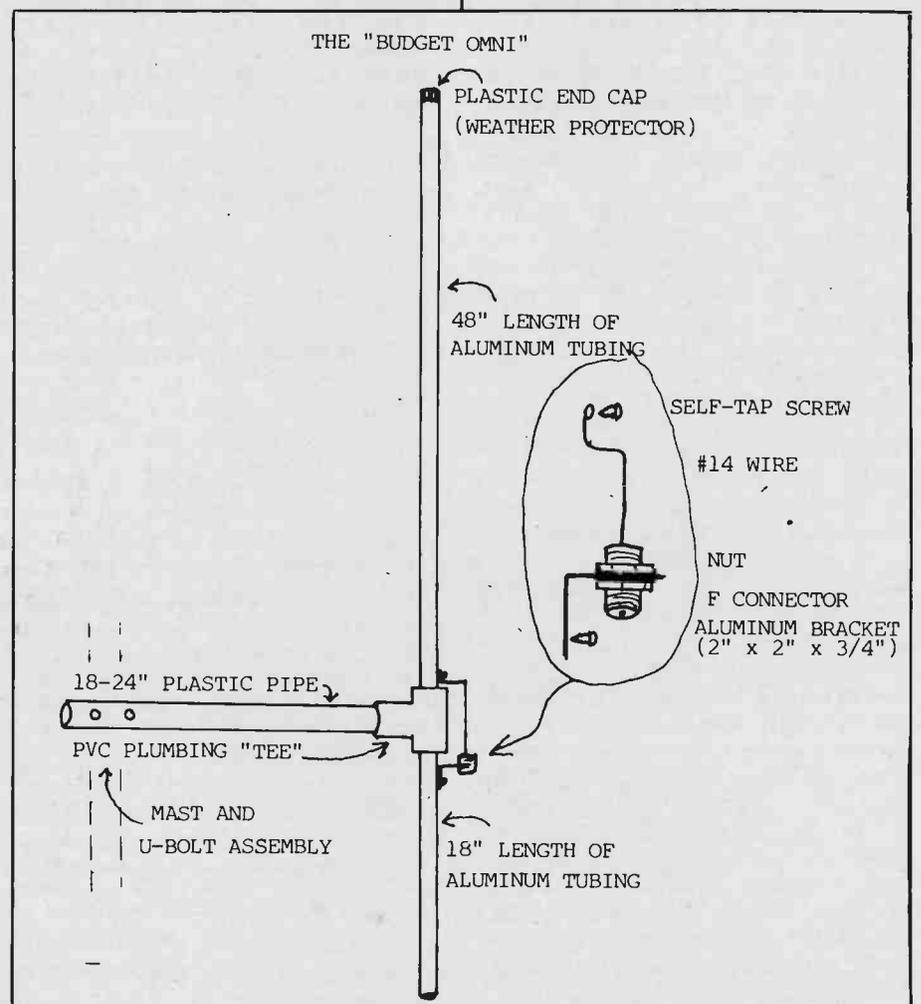
BUILD THE BUDGET OMNI

MT columnist Don Schimmel suggests the following economy project for those stalwart VHF/UHF monitoring enthusiasts who feel that \$19 is still too much to pay for an all-band scanner antenna!

Don decided to home-brew his version of the popular Grove OMNI antenna with readily-available hardware parts (see sketch). The upper and lower aluminum pipe section must not touch inside the tee, but are connected to an F connector as shown in the drawing detail.

The F connector is mounted through a hole in the right-angle bracket which has an additional hole for a screw to mount into the lower (shorter) antenna element.

It is recommended that brass or aluminum screws be used to avoid Galvanic corrosion between dissimilar metals, resulting in a poor connection over time.



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Scanner REGENCY MX7000 \$295; RTTY, ASCII, CW dedicated system MICROLOG-ACT ONE with MONITOR green screen just plug into short wave receiver and copy \$195.00. Ken Araujo, P.O. Box 2696 Marathon Shores, FL 33052, evenings (305)872-9106.

WANTED to buy shortwave radio that will pick up all the upper bands and Air Force, space shuttle, and so on. AND WANTED to buy an antenna that will pick up all shortwave bands from top to bottom even satellites. Send price of both to Gene Perryman, Box 1104 RR 2, Kendrick, ID 83537.

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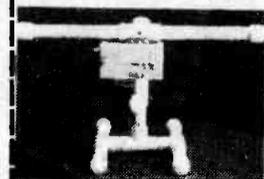
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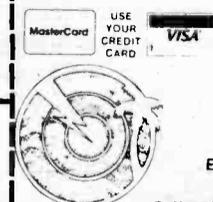
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