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MONITORING TIMES

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With a Review of Infotech's M800

DX'ing New Guinea

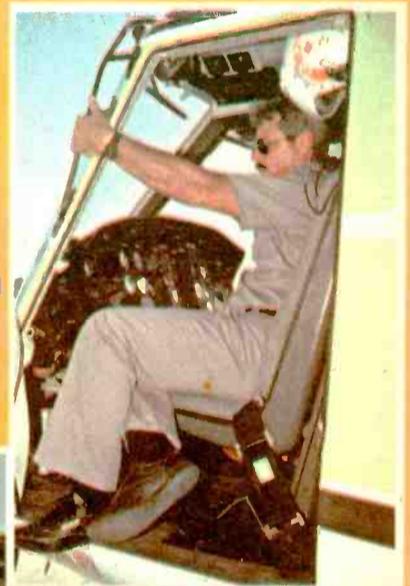
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Air Rescue One

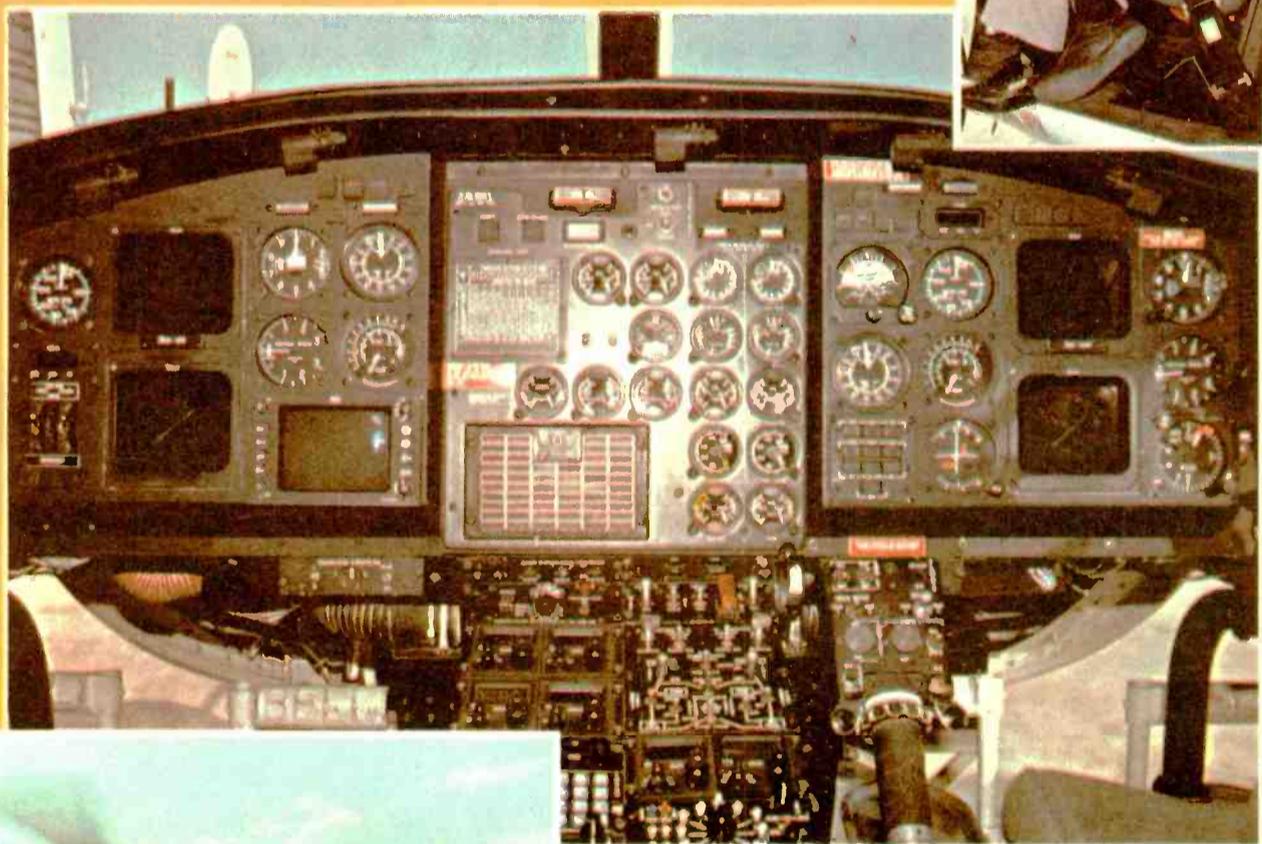
A Vital Link in South Florida's Trauma Network

by Jorge Rodriguez. See p. 6.

Climb Aboard . . .



*Set the
Instrument
Panel . . .*



*Air Rescue One
Is Airborne!*

*****3 DIGIT PRE *****
GOODMAN, DAVID J. 0187
31870 HIRAM TRAIL
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(Editorial commentary by Bob Grove)

PRIVACY ACT SIGNED INTO LAW

On Tuesday, October 21, 1986, President Reagan signed into law the Electronic Communications Privacy Act of 1986 (ECPA); it will take effect ninety days later, January 19, 1987.

The ECPA amends US Code Title 18, Chapter 119, which regulates the interception of communications, previously treated separately as "oral" and "wire", but now adding a third category, "electronic communications", which includes radio waves.

Much of the original intent was to protect the privacy of American citizens and businesses (including computer transactions) from unwarranted intrusion by indiscrete law enforcement monitoring and other unauthorized persons, thus accounting for the strong support given by the American Civil Liberties Union (ACLU).

Sadly, the ramifications of the ill-advised legislation spill over on casual hobby monitoring as well, even though the laws are totally--and admittedly--unenforceable. How will the new law affect hobby listening? Let's take a look at a few of its high(?) points as partially clarified by Senate Report SR541.

WHAT CAN WE LISTEN TO?

- Any marine or aircraft communication including radiotelephones
- Any amateur, CB or General Mobile Radio Service (GMRS) communication
- Any transmission intended for general public reception, including distress calls
- Cordless telephones (base and handset)
- Any communication from a tracking device
- Certain audio subcarriers
- Tone-only paging
- Interference-causing signals until their source is determined
- Satellite network feeds, cable programs and some satellite subcarriers
- Any governmental (including military), law enforcement, civil defense, private land mobile, or public safety (police, fire, EMS) communications readily accessible to the general public
- Any communication made by a system configured to be readily accessible to the general public

WHAT MONITORING IS PROHIBITED?

- Scrambled or encrypted transmissions including spread spectrum
- Subcarrier services (FM-SCA and satellite) not intended for the general public
- Common carrier (mobile telephones, voice paging and communications-relay satellites) except cordless telephones
- Private fixed microwave stations

WILL THEY BAN SCANNERS?

Absolutely not. The new law stipulates the ban only on devices "primarily useful for surreptitious interception"; no conventional scanner--even with cellular capability--or multiband radio falls into this category.

WHAT IF WE TUNE IN ACCIDENTALLY?

Inadvertent interception of a protected communication during the course of casual tuning of a receiver is not unlawful, but intentional listening is.

Since remote pickup units abound near 26, 153, 161, 166, 170, 450, 455, and 944-952 MHz; it would be virtually impossible to search near these frequencies without stumbling onto them. Similarly, it would be unlikely that a listener could avoid common carriers in the 35, 43, 152, 158, 454, 459, 821-850, 869-901, 928-932, and 959 MHz ranges.

INTERCEPTION--A STATE OF MIND

It does not appear that the recreational scanner monitor would be arrested for casual perusal of the bands, uncovering a protected communication, but what if he continues to listen? And for how long?

What will the courts require for "proof of intent"? Possession of a frequency list containing banned services? The court's requirement of proof of intent, coupled with the lack of guidance from Congress, may turn out to be the best friend the radio hobbyist will have under the new legislation!

GO DIRECTLY TO JAIL....

Penalties resulting from successful conviction are severe, even for a first offender --up to five years in jail and a fine of \$100,000! The minimum fine is \$500 with no prison sentence. More specifically:

- Intentional unauthorized interception: 1 year/\$100,000 (max.)
- Bad purpose ("tortious, illegal, commercial advantage, or private gain") or repeated offense: 5 years/\$100,000
- Mobile telephone or voice page: \$500
- Broadcast remote pickup: \$500-1000 (civil penalties only; someone must complain and the government must bring suit)

Additional financial restitution for civil damages may be granted by the courts to the violated party

Although oversimplified, the maximum penalty structure listed above should serve notice that the new ruling poses a significant threat if violators are prosecuted. But how real is the likelihood of detection and subsequent prosecution? This is a subject of conjecture, but we would venture to say that it is nearly nonexistent in the case of hobby monitoring.

As a case in point, Section 705 of the 1934 Communications Act already lists the penalties for unlawful disclosure of private communications, yet club bulletins, commercial publications and casual conversations disclose the contents of these communications on a regular basis. To our knowledge, there is not a single case on record of a hobby listener going to jail or paying a fine for mere recreational listening.

BUYERS BEWARE

The Senate report recommends that the Federal Communications Commission (FCC) consider mandatory labeling of cellular telephones indicating that their transmissions are readily intercepted by conventional scanners; even further it recommends that the scanners themselves be labeled with a caveat against unauthorized listening.

MANY UNANSWERED QUESTIONS

Not unexpectedly, the new law creates more questions than it answers. Is a standard AM/FM radio inside a Coke bottle, stuffed animal or antique auto model "surreptitious"? How about a home computer with a code-breaking program installed--or even the disk itself? What about a subcarrier tuner which may be used to tune in both authorized and unauthorized broadcasts?

Voice descramblers are commonly sold to decode police transmissions--are they now illegal to manufacture, sell and possess even if intended for legitimate use by authorized appointees of a law enforcement agency? Radio-teletype, facsimile and teletext readers similarly hang in limbo awaiting a test case.

Just how much listening on any unknown frequency is allowed before we are guilty of a federal crime? Can we listen in on a bug which could be considered a tracking device?

How can we possibly listen for a distress call (permitted) on an unauthorized frequency (prohibited)?

By failing to define "surreptitious", Congress has delayed federal implementation since the government has no guidance as to what receivers and accessories would be in violation; similarly, the court system has no guidance as to prosecution of individuals charged with that infraction.

ECPA is a legislative nightmare, rife with gaps, false assumptions and dubious pseudo-solutions, a highly technical issue drafted by a body of inexperienced politicians reflecting the influence of PAC pressure. It is a typical example of what can happen when a monopoly controls the representatives of the people.

Unenforceable, ill-advised and self-contradictory, this mockery of the judicial process should never have seen the light of day.

(We would like to thank our Washington correspondent Robert Horvitz for his dedication and tireless campaigning for reason in the Privacy Act issue. His personal sacrifices in time and expense will be long remembered and appreciated.)

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China, People's Republic

The latest schedule for Radio Beijing to North America in English is:

East Coast:

0000-0100 on 9550 kHz
1100-1200 on 9535 kHz
1200-1300 on 9535, 9645 kHz
1300-1400 on 9550, 9730 kHz

West Coast:

0300-0400 on 9645, 11970, 11980, 15445 kHz
0400-0500 on 9645 and 11980 kHz (George Poppin)

Dominican Republic

At Radio Clarin, all deals are apparently off. According to some sources, the anti-Castro CID has purchased practically all of the available time on the Santo Domingo shortwave station. Look for CID broadcasts on 11700 kHz beginning this month, from roughly 9:00 AM to 5:00 PM Eastern Time. Incidentally, Clarin's engineers have spiffed up the transmitter and it is reportedly operating at 50,000 watts for the first time in many years -- and it sounds it. More recently, it was putting out only about 18,000 watts

Meanwhile, Jeff White's Radio Discovery has begun using its new 1,000 watt transmitter during the day. It is producing markedly better signal strength on 15045 kHz. Listen for programs of Latin music during the daylight hours.

Ecuador

HCJB engineer Don Hastings says that four towers were raised this past summer for a new antenna that "will increase HCJB's broadcast signal fourfold" to North and South America. The antennas, when complete, will send a 500 kW signal to both continents, replacing a bi-directional antenna that split the power from the 500 kW transmitter. (HCJB)

England

In a tradition going back to the days of King George V in 1932, Queen Elizabeth II will once again give her traditional Christmas broadcast this year on the 25th. In order for her to reach the maximum number of her subjects around the world (and not a few uninterested non-British short-

wave listeners), the BBC World Service is adding some new frequencies for the one-day only even and extending some others. Try for the Queen on Christmas Day on the following schedule:

0930 UTC

West/Central Africa: 11860, 15400
Southern Africa: 9515, 15400
Australia: 9640
Caribbean: 6195

1500 UTC

North/Central America: 6195, 9515, 15260
Caribbean: 6195, 11775
South America: 15390, 17830

2245 UTC

North America: 6120, 9590

Finland

Radio Finland's new transmitter site at Pori on the west coast of Finland is expected to go into full operation in March of next year. Meanwhile, look for the three new 500 kW, one 250 kW and one 100 kW shortwave transmitters to begin testing shortly on Radio Finland's regular frequencies at the regular broadcast times. Question: will the new facility bring with it an evening transmission from this excellent international broadcaster?

France

Radio France International has announced that its Polish section was voted best station currently broadcasting in the Polish language. That award comes from the Association of Polish Journalists.

Guam

KTWR's official printed schedule shows English broadcasts on the following schedule:

0715-0720 UTC (Sundays) 15115
0720-0735 UTC (Fri & Sat) 15115
0735-0900 UTC (Mon-Thur) 15115
1300-1415 UTC (Mon-Fri) 9870
1415-1430 UTC (Sat & Sun) 9870

The 9870 frequency is an out-of-band frequency.

Italy

Italian broadcasting authorities raided Adventist World Radio in Forli, suspending the station's right to broadcast because it used out-of-band frequencies. Look for them

trying out new 6015, 6145 and 7165 kHz between 1330 and 1800 UTC. (Media Network)

Israel

A pirate radio station broadcasting rock music shattered the calm of Yom Kippur in Israel. Yom Kippur is the only day of the year that Israel's state radio is off the air. In fact, life comes to a complete standstill on that day when religious Jews fast for 25 hours. There is no public or private transport, no entertainment and no television. The pirate rocker appeared to be the latest broadside in a running battle between secular and ultra-orthodox Jews over public religious observance. (Alpert, NY)

Japan

Dave Alpert of New York heard Radio Japan over their new Radio Canada International relay on 6120 kHz at 1125 UTC with the program, DX Corner. Just before sign-off of the broadcast back in October, according to Dave, the announcer said, "If you're listening to our relay via Canada, I hope we are coming in loud and clear!" Says Dave, "They sure were!"

Libya

Listeners who heard Arabic music behind WWV on 10000 kHz were in fact hearing some rather strangely positioned broadcasts by Libya's Voice of the Greater Arab Homeland. The transmissions, which appear to have ceased, ran for a couple of months on 10000, 13000 and 14000 among others, in the upper sideband mode. Who knows where Libya will strike next?

Nepal

Nepal has reportedly reactivated their English-language external services transmission on 7165 kHz. Look for it at 1330 to 1400 UTC.

Poland

Hearing Radio Poland can be a real trick these days. One day it comes in like the AM station down the block and then the next day -- silence. And the next day and the next and the next. Says ODXA's Ivan Grishin, "It's surprising to hear the station's General Service...coming in so well." Try for that between 2305 and 2355 UTC on 7270 kHz. Weeknights the station features classical music and

on weekends there are programs of jazz. Announcements, says Ivan, are in English, French and German. (ODXA)

South Africa

From time to time, Radio RSA has mentioned on the air that they were considering switching their broadcasts to the morning. The station's monitors were even asked to check specific frequencies at that time. Now, on a recent Radio RSA program comes word that listeners have voted against having the AM transmissions. Unfortunately, the station (in typical South African fashion) refuses to consider the matter closed and says that it is still considering that option as well as those of adding more frequencies and broadcasts to the nighttime transmissions. If you'd like to express an opinion on what Radio RSA should do with its broadcasts (easy, folks, that's not what I meant), write to them at P.O. Box 4559, Johannesburg, Republic of South Africa. Address your letter to Ms. Kathy Finch.

United States

Astute shortwave listeners have probably noticed that KVOH (High Adventure Ministries in California) has finally made its appearance on the shortwave bands, testing its HCJB-bought 50 kW transmitter at various times of the day. Now comes the final, revised, operational schedule for the station.

0000-0300 UTC on 11930 kHz
0300-0600 UTC on 9852.5 kHz
0600-0800 UTC on 6005 kHz
1400-1600 UTC on 9852.5 kHz
1600-2200 UTC on 17775 kHz
2200-0000 UTC on 15120 kHz

Congratulations go to chief engineer Paul Hunter for finally getting KVOH on the air despite a seemingly endless supply of obstacles.

Back about a year or so ago, *International Radio* magazine revealed that one of the greatest journalistic organizations in the world would be going on shortwave. The time has finally come and at the end of this month (technically, January 1), WCSN, owned and operated by the Christian Science Monitor, will go on the air from Scott's Corner, Maine. The schedule for the station is as follows:

DES BROKEN!

The federal government has recently downgraded the digital encryption standard (DES) among its agencies, leading many observers to speculate that the "unbreakable" code had, indeed, been broken.

It appears that at least three or four associations which comprise the DES users group (DESUG) with branches in southern California, South Carolina, Arizona, and Florida, have been successful in cracking the code.

DESUG, naturally interested in marketing their breakthrough which allows home TVRO users to watch subscriber channels, is understandably concerned that repercussions could be forthcoming from MK/A-Com, exclusive manufacturer of the Video Cipher II.

Has the group also been successful in cracking Motorola's digital voice privacy (DVP) system as well? The question has been posed to Bill Myers, spokesman for the Black Box Communications Group, and we will report our findings to our readers as details become available.

WCSN

Time	Freq	Reception Area
0000-0100	7365	West/East Africa
0100-0200	7365	Europe
0200-0300	9745	Europe
0300-0400	9745	West/East Africa
0400-0500	9840	West/East Africa
0500-0600	9840	South Africa
0600-0700	7365	South Africa
0700-0900	7365	Europe
0900-1100	17640	West/East Africa
1100-1300	17640	South Africa
1400-1800	21470	West/East Africa
1800-2000	17755	South Africa
2000-2200	7365	Europe
2300-0000	7365	West/East Africa

The power of the new WCSN transmitter in Scott's Corner, Maine is 500 kW. Antenna gain 18 dBi which will provide an effective radiation power of 32,000 kilowatts. Should, by my calculations, be easily heard on your toaster oven.

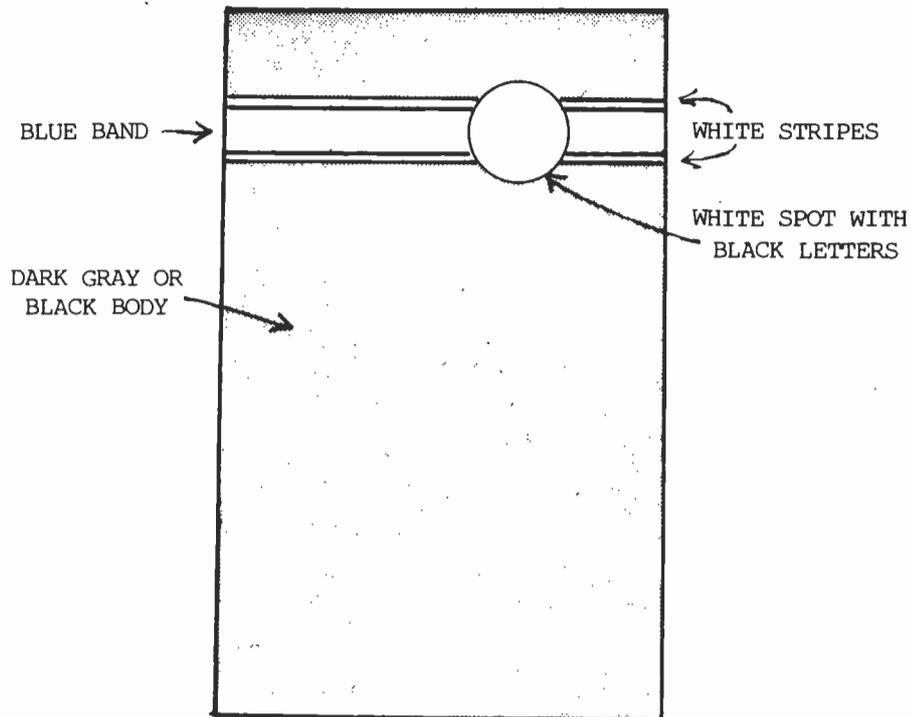
Investigation Needs Your Help

An on-going investigation has developed into a nationwide hunt for a man who has brutally attacked several women and is a suspect in a murder case as well. One clue is that he wears a radio receiver on his belt.

It is unknown at this time whether the device is a scanner or pager since it only made a static noise when briefly observed by a family member during one intrusion.

As shown in the accompanying illustration, the device is approximately 2-1/2" x 4", dark gray or black in color, has a blue band near the top bordered by two white stripes, and contains a white circle which includes some black letters.

Anyone who can identify the device is urged to call MT; the information will be treated confidentially and rushed to the investigating agency.



AT&T Supports Cellular Warning Label

In spite of the \$175 million investment that AT&T has in cellular telephone, they have just issued a formal endorsement of the Washington Legal Foundation's recommendation that all cellular telephones carry a warning label regarding interception:

"AT&T concurs in WLF's recommendation and reasoning. Like WLF, AT&T believes that cellular users have an unwarranted sensation of privacy which the label would help to dispel."

Critics are suspicious of the move, however, speculating that the giant corporation might be on the threshold of a low cost scrambling system which prospective customers would desire if they thought their privacy might be compromised. The next few months should prove interesting, indeed!

WATCH NEXT MONTH FOR:

Annual Listener's Survey
1986 MT Index of articles
Larry Miller's China Report
New Column! Reading RTTY

HUGE

70 PAGE

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AIR RESCUE ONE

A Vital Link in South Florida's Trauma Network

(Adapted from an article originally appearing in the September 1986 RCMA Newsletter)

by Jorge L. Rodriguez

"Squad 31, Engine 9, Air Rescue One," the speaker squawked interspersed with the appropriate alert tones. "Respond to a three-seventeen (vehicle accident with serious injuries) five miles west of Krome on Tamiami Trail."

Within seconds the sound of the twin turbine Bell 412 helicopter was whining at full power. The squad at Air Rescue One, Dade County's regional support helicopter to South Florida Trauma Centers, was in action.

Here where seconds can mean life or death there is no time to lose. "You have one hour to get the patient to the hospital," says Chief Smith of Metro-Dade Fire Rescue. That's the "Golden Hour" you work to stay within.

There's no time to lose and, with the usually moderate to heavy air traffic at Tamiami Airport in south Dade, that means a priority departure. The helipad is at the base of the tower and the controllers are always alert to the activity around N911AR as its crew climbs aboard and powers up.

On this particular mission the team was responding to an overturned van about one quarter of the way between Miami and Naples on state road 90. That highway--all eighty miles of it--cuts across the state through the Florida Everglades.

Once in the air everyone is busy, the adrenaline flowing. Up front, the pilot and co-pilot are occupied with

flying and navigation; meanwhile in the back, the flight medic, already wearing surgical gloves, is preparing for whatever emergency they're about to encounter.

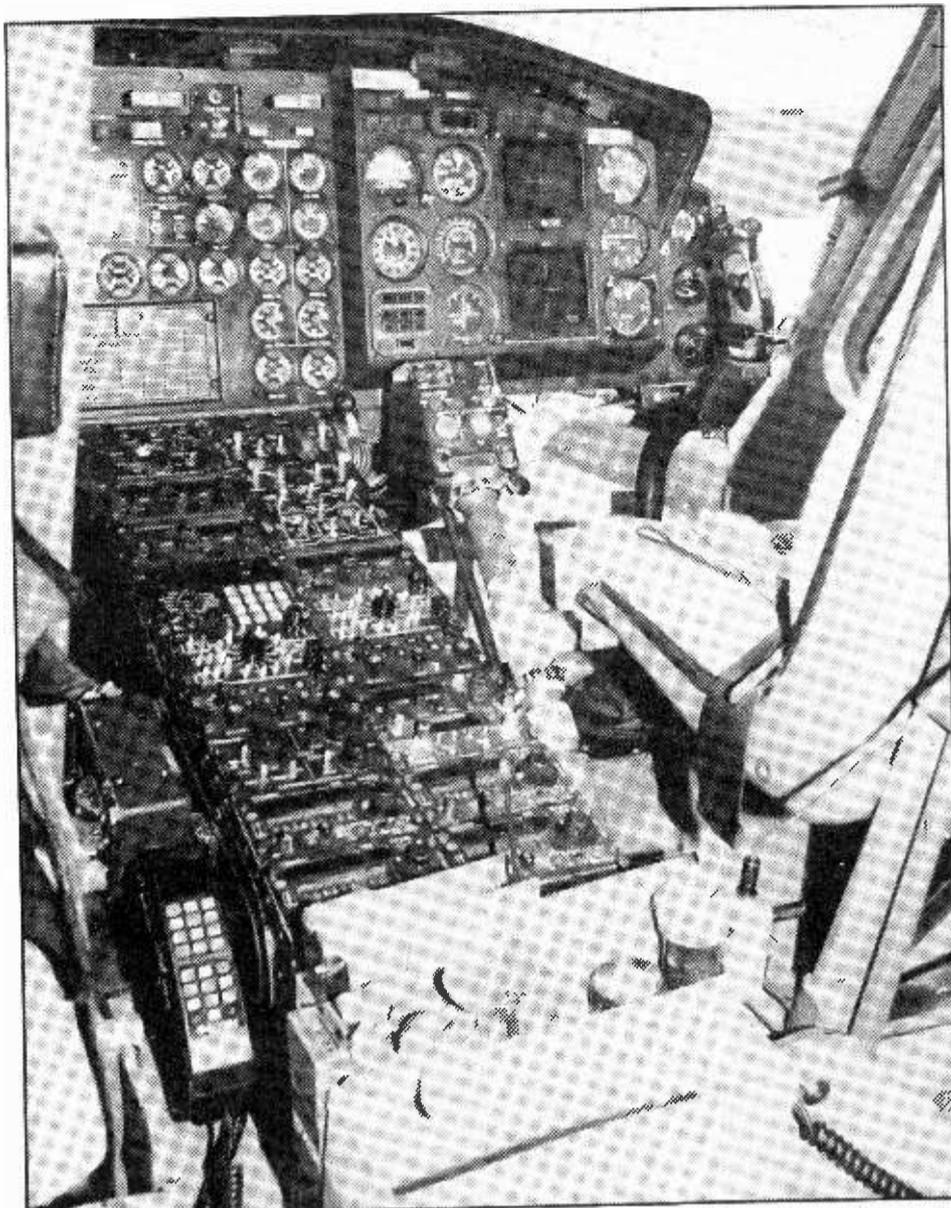
Air Rescue One is first on the scene. Quickly--by sight, by radio and sometimes even by hand signals--the crew sizes up the seriousness of the situation. This time the driver was lucky; he's not seriously injured, although it's hard to believe when you view the wreckage.

A look under the hood

Built around the Bell 412 medium life helicopter, Air Rescue One has a four-bladed rotor system and is designed to cruise at 130 knots (150 miles per hour). This translates to an average response time of under ten minutes to anywhere in the county. Powered by two Pratt and Whitney PT6T-3B engines, it is capable of flying 245 nautical miles before refueling.

The control console resembles something out of Star Wars, primarily due to the Electronic Flight Instrumentation System (EFIS) which uses color video monitors to display the primary flight instrument information. The panel is outfitted with every flight instrument which might be necessary for safe and efficient flight.

Even more impressive is the center console between pilot and copilot, a complement of radios that really sets this aircraft apart from all others in its class.



All bases covered! Above and right, radio array provides the ultimate in communications. (All photos by author)

Radios everywhere...

Resembling a military aircraft more than a county fire rescue vehicle, the helicopter is equipped with dual digital Aircraft Communication radios (COM) and dual Aircraft Navigation radios (NAV). In addition to this the aircraft's Automatic Direction Finder and Transponder are also digital.

Beyond these are two rows of radios which give Air Rescue One the ability to communicate on nearly every frequency available for voice communications in the United States!

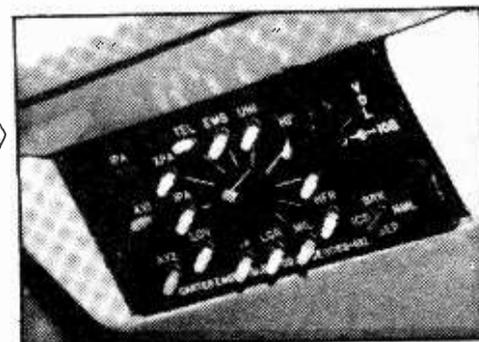
Just below the NAV radios, on the right side of the console, there is a Loran-C capable of guiding the aircraft to within 50 feet of any point in the U.S. Two custom-built Control Panels permit any of the eleven transceivers to be switched to any headset.

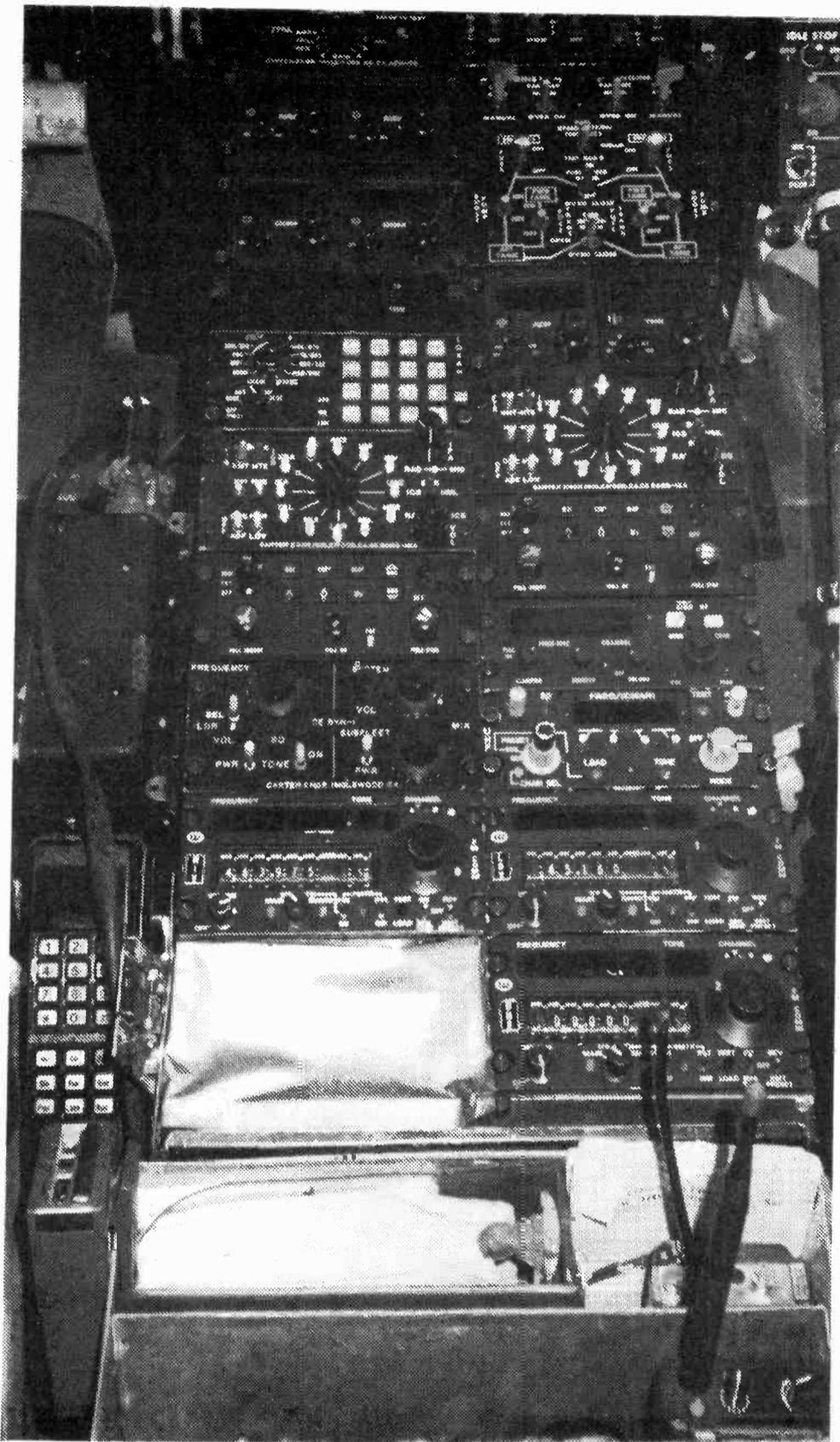
By laying out the radio positions on the rotors switch with the top (12 o'clock) position reserved for the primary radio, the pilots as well as the flight medics can switch to the aircraft COM radios or MEDCOM radios respectively without even looking. Controls for the EFIS vary

intensity of the screens or permit the copying of one screen to the other in case one of the screen generators goes out.

On the left, a second custom control panel operates two radios: a UHF radio for those fire departments above 470 MHz, and another radio for Miami's new 800 MHz system. To the right of this control head is a Collins UHF/AM Military Aircraft radio for 225-400 MHz.

Above the Collins is a King High Frequency (HF) radio. The last four units are 4000-channel Wulfsberg radios which cover (clockwise) VHF-HI (150-170 MHz); VHF-LOW (30-50 MHz); and two UHF radios for 450-470 MHz. Finally, to complete the assortment, a Cellular telephone is located just left of the console.





(Photo - Dade Co. Regional Data Processing & Communications Center)

personnel for Dade County. The 911 emergency dispatch center employs 225 personnel.

There are actually five 911 centers within the Dade County geographic area; any calls made within their city limits are automatically routed by the telephone company equipment to the correct 911 center. When answered, all 911 calls display the number of the calling party at the answering position automatically, a feature known as "Automatic Number Identification," which is often used to obtain the location of the caller when he is unable to advise where emergency help is needed.

An additional enhancement of the 911 system expected to be added in the future will also display the address of the calling party automatically (Automatic Location Identifier).

The dispatch floor is filled by 12 police radio consoles and additional dispatching consoles for dispatching Metro-Dade Fire units, Fire-Rescue (EMS) units, Air Rescue One and various units of the county government as well.

The Fire Department Medical Communications Console utilizes 30 transmitters and over one hundred and fifty receive channels to patch fire-rescue units in the field directly to hospital emergency room doctors and, if necessary, send patient EKG readings for immediate viewing by the doctors.

Computer aided dispatch System

When a call comes in, the complaint officer at the 911 answering position obtains information such as the address, name and type of problem from the calling party. This information is then sent via the computer to a display at the appropriate radio dispatch position. The computer system, a DEC 11/70, using the address of the call will

route it automatically to the correct police or fire console for dispatch.

The computer keeps track of all units and, in the case of fire and fire-rescue calls, will display to the recommended dispatch.

Some staggering statistics

During 1985 the center handled almost 1.5 million calls; the total number of radio transmissions by police and fire exceeded thirty million, handling over 526,000 police incidents (cases). The average length of time from when a 911 emergency call is answered until a unit is dispatched is less than two minutes.

The Fire Department assigned units to almost 84,000 incidents (alarms) last year, 63% of which were medically-related EMS calls. Fire Department units average just over five minutes in arriving on the scene from time of dispatch.



"Yes, it is friendly - Air Rescue One smiles!"

Key to Communications Panel Above

NAV	
COM	
Transponder & DF Control Panel	LORAN-C Control Panel
	King HF
UHF 470 MHz & 800 MHz	Collins UHF/AM
<u>Wulfsbergs:</u>	
VHF/HI	VHF-LOW
UHF (in for maintenance)	UHF

Plus handheld Miami Fire Rescue new 800 MHz, RED voice pager for use when away from helicopter, and Motorola cellular telephone

The Emergency Communications Center

Metro-Dade Fire Rescue, including Air Rescue One, are dispatched through the county's 911 Emergency Communications Center South Miami, using one of the following frequencies:

F1	North	453.525
F2	Central	453.700
F3	South	453.800
F4	Tactical	453.600
F5	(Active 12/86)	453.825

The Dade County Regional Data Processing and Communications Center was completed in the fall of 1978 at a cost of over five million dollars. Part of the building houses the data processing equipment and

DXing Papua New Guinea

A Papua Primer

by

Gayle Van Horn

During my high school years in Texas, I had the unfortunate experience of taking a sociology class.

Day after day, I would suffer through endless lectures about this and that and this and that and -- lectures so arid they would make the Gobi desert look like an oasis. After spending what seemed like an eternity listening to daily 50 minute talks about things like the mores of Asia, I began to seriously doubt my chances of passing the course.

One morning, however, the teacher began an introduction on the Pacific islands of Papua and New Guinea. "Now, we're getting somewhere!" I muttered excitedly. The islands had long held my interest for it was here the "War of the Pacific" raged during the dark days of World War II. Eventually, thanks to Papua and New Guinea, I did pass the course.

Years later, as a shortwave enthusiast, I was reintroduced to the Pacific islands via radio. That wintry morning, while listening on 4890 kHz, I once again became immersed in the Pacific. But this time the news wasn't about a war between the U.S. and Japan, it was conflicts among tribes in the province of Enga. The station was the National Broadcasting Commission (NBC) from Port Moresby in Papua New Guinea. My mind immediately drifted back to those bleak days in sociology class but this time I perked up instead of falling off to sleep.

Papua New Guinea lies some 100 miles northeast of Australia. New Guinea comprises the northern two-thirds of the main island; Papua the southern third plus the outlying islands. Much of this rugged, mountainous nation remains greatly underdeveloped.

Most Papua New Guineans still adhere to traditional village life. Here and there are examples of tribal warfare, and, according to rumor, cannibalism. Other places in more isolated terrains are quite literally just emerging from the Stone Age.

The country's capital city of Port Moresby is situated in exotic Fairfax Harbour. The city is the center of culture, the economy and the National Parliament of the country.

The most consistently heard and best known station in Papua New Guinea is the National Broadcasting Commission, broadcasting from Boroko (Port Moresby). NBC

Boroko is also the home of the National Service and the studios for the AM and FM service. Originally, the station began as the Papua New Guinea Service of the Australian Broadcasting Commission. But in 1973, two years before official independence, NBC came on the air.

The majority of National and Provincial Service broadcasts are from 0700 to 1400 UTC. Best reception for Papua New Guinea in North America is during these morning transmissions. The signal will usually fade-in somewhere between 1100 and 1300 UTC. Logging this interesting station is possible most mornings and may be heard in English, Pidgin (pronounced "pisin") and the local dialects.

National Broadcasting Commission

NBC	3925 kHz	0730-1400 UTC
NBC	4890 kHz	1930-1400 UTC
NBC	9520 kHz	2200-0800 UTC

There are 19 provincial stations of the NBC network located throughout Papua New Guinea. Some listeners consider the stations the most interesting to listen to. Others thrill to the challenge of pure DX. Most of the stations are located in the 90 and 120 meter band and although some are routinely heard, others can be a challenge even in above-average conditions.

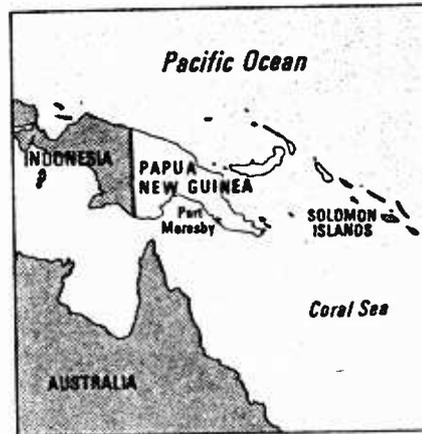
Like NBC, the Provincials broadcast a variety of programming of local and national interest. Country and Western music has become quite popular in the islands and is played constantly. Station staff have also begun to send recording teams to the villages in an effort to tape session for broadcast on the provincial outlets.

Central District

The city of Boroko is located within the Central District Province. Radio Central broadcasts from Boroko in English and local dialects. Operating in the 90 meter band on 3290, it can be heard from 0700 to 1400 UTC.

Northern Province

Thirteen years ago, Radio Northern began broadcasting from Popondetta. The city, near Port Moresby, is the site of Mt. Lamington, an active



Official Name: Independent State of Papua New Guinea

volcano. Radio Northern is heard on 3345 kHz from 0700-1400 UTC in Pidgin English and local dialects.

Sepik Province

Contained in the Sepik Province are two shortwave stations: Radio East Sepik in Wewak broadcasts on 3335 kHz from 0700-1400 UTC as does Radio West Sepik in the capital city of Vanimo. Both stations are in Pidgin English. Radio West Sepik is on 3205 kHz.

Cimbu Province

The Cimbu Province is characterized by Mt. Wilhelm. This tough catch is located in the 120 meter band on 2376 kHz. Programs are heard from 0700-1400 UTC in Pidgin English and local dialects. This one is a challenge!

Morobe Province

Situated on the north coast of Papua New Guinea is the seaport city of Lae in the Morobe Province. Radio Morobe is heard on 3220 kHz from 0700-1400 UTC and on 9575 kHz from 1900-1400 UTC. Both frequen-

cies are heard in Pidgin English and local dialects.

Madang Province

Along the northern coast, near the Bismark Sea, is the Madang Province. It was once the site of a German settlement and subsequent World War II invasion by Japan. Little of the area's previous heritage is heard on the local shortwave outlet, Radio Madang. What is heard is local.

Radio Madang broadcasts in Pidgin English on 3260 kHz from -- you guessed it -- 0700-1400 UTC.

Enga Province

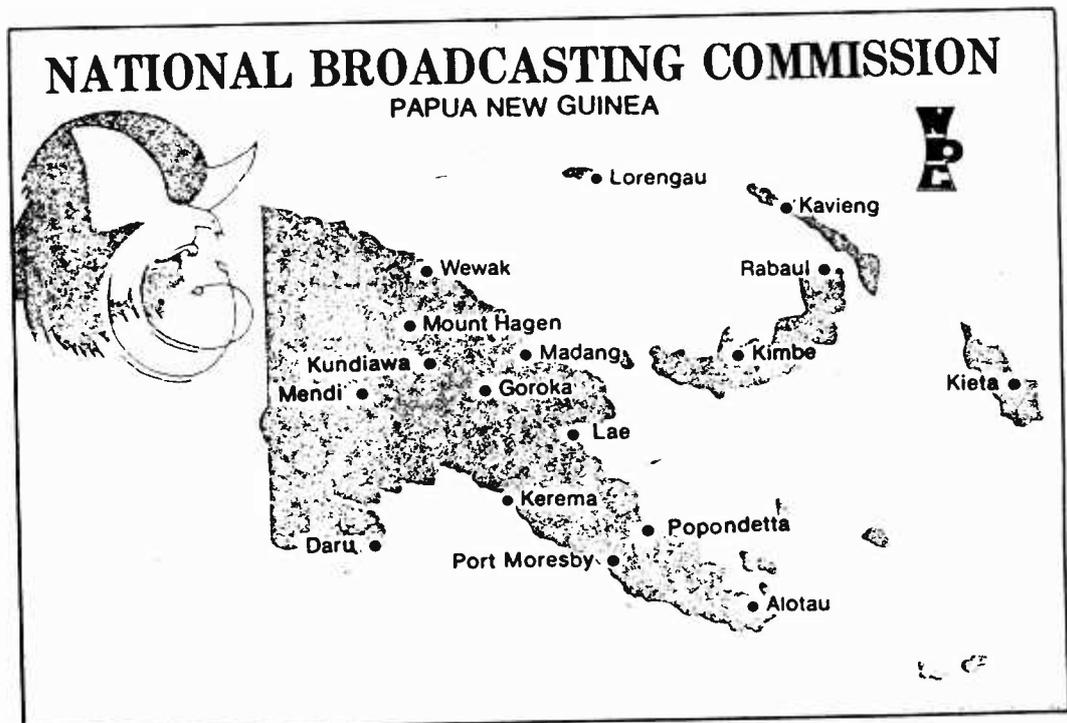
Amid the rugged land area around Wabag is the Province of Enga. Here nearly 200,000 native speak the Engan language. If conditions permit, you can get an earful of this strange and unique language along with English and Pidgin English on Radio Enga, which broadcasts on the 120 meter band. The frequency is 2410 kHz and it presents another DX challenge *extraordinaire!*

Highlands Province

A large majority of Papua New Guinea's population lives in the Highland Provinces. Many of the residents live in quaint thatched huts scattered throughout lush, tropical valleys. A number of stations emanate from this area including Radio Southern Highlands in Mendi on 3275 kHz, Radio Western Highlands in Mount Hagan on 3375 kHz and Radio Eastern highlands in Goroka on 3395 kHz. All three broadcast from 0700 to 1400 UTC.

Gulf and Western Provinces

Near the Gulf of Papua, along the southern coast, are the two large Provinces of Gulf and Western.



Radio Gulf in Kerema is heard on 3245 kHz and Radio Western from Daru is heard on 6080 kHz. In a burst of individuality, Radio Western, however, has a schedule different from its colleagues. Try for it from 2200-0700 UTC in English and local dialects -- not likely but worth a try.

Milne Bay Province

The Milne Bay Province -- a place made up of some 650 islands and atolls -- is held together by Radio Milne Bay. Radio Milne Bay has been heard in the U.S. as it broadcasts from the coastal city of Alotau. Their current schedule indicates programs in English and local dialects from 0700-1400 UTC on 3360 kHz.

Bismark Archipelago

Northeast of the main island of Papua New Guinea is the Bismark Archipelago. Four stations from this region are active on shortwave. They broadcast from the islands of New Britain, New Ireland, and the Admiralty Islands.

Of the Archipelago island group, New Britain is the largest. Rabaul, the major city, was once the capital of German New Guinea but most of it had to be rebuilt following the incessant bombing raids by the Japanese during World War II. Radio New Britain came on the air over twenty years ago, originally calling itself Radio Rabaul. It was the nation's first provincial station. Today it's one of the easiest to hear.

Radio New Britain follows the schedule, below:

2230 to 0630 UTC 5985 kHz
0700 to 1400 UTC 3385 kHz

Radio West New Britain is heard from the city of Kimbe from 0700 to 1400 UTC on 3235 kHz. Both New Britain stations broadcast in Pidgin and the local dialects.

Just north of New Britain is New Ireland, an agricultural-producing island. With good conditions, Radio New Ireland in Keviang may be heard on 3905 kHz from 0700 to 1400 UTC in Pidgin English only.

The western portion of the Archipelago consists of the Admiralty Islands. Manus is the largest of the lot and Lorengau its principal city. It was, in 1944, General Douglas MacArthur's wartime campaign center. Today, little remains from that era but quaint Pidgin English broadcasts can be heard on 3315 kHz from 0700 to 1400 UTC. Turn it on during a party. Everyone will think of sociology class. Some of your guests may even leave.

QSLING THE PAPUA NEW GUINEA STATIONS

Radio Cimbui	P.O. Box 228	Kudiawa, Cimbui Province
Radio Enga	P.O. Box 196	Wabag, Enga Province
Radio West Sepik	P.O. Box 37	Vanimu, West Sepik Province
Radio West New Britain	P.O. Box 412	Kimbe, West New Britain Prov.
Radio Gulf	P.O. Box 36	Kerema, Gulf Province
Radio Madang	P.O. Box 2138	Madang, Madang Province
Radio Southern Highlands	P.O. Box 104	Mendi, Southern Highlands Province
Radio Central	P.O. Box 1359	Boroko, Central District
Radio Western	P.O. Box 23	Daru, Western Province
Radio Manus	P.O. Box 359	Lorengau, Admiralty Islands, Manus Province
Radio North Solomans	P.O. Box 35	Kieta, North Solomans Province
Radio East Sepik	P.O. Box 65	Wewak, East Sepik Province
Radio Northern	P.O. Box 137	Popondetta, Northern Province
Radio Milne Bay	P.O. Box 111	Alotau, Milne Bay Province
Radio Western Highlands	P.O. Box 311	Mount Hagen, Western Highlands Province
Radio East New Britain	P.O. Box 393	Rabaul, East New Britain Prov.
Radio Eastern Highlands	P.O. Box 311	Garoka, Eastern Highlands Province
NBC Port Moresby	P.O. Box 1359	Boroko, Central District
Radio Morobe	P.O. Box 1262	Lae, Morobe Province
Radio New Ireland	P.O. Box 140	Kavieng, New Ireland Province

North Solomans Province

Strangely enough, although part of Papua New Guinea, Bougainville is actually the largest of the Soloman Islands chain. Another site of bitter World War II era fighting, Radio Northern Solomans (formerly Radio Bougainville) now provides the only faint whisper of history to escape from these tragic islands.

Those DXers who think they've heard it all will think again on trying to hear this station during its 0700-1400 UTC broadcasts on 3325 kHz.

How easy is it to hear the myriad variety of Papua New Guinea stations on shortwave? Let's look at the loggings from a recent edition of the ASWLC bulletin, a small club in California.

3335 kHz 1130 UTC Radio East Sepik. English/Pidgin. Male announcer reading news items in both English and Pidgin followed by island choir music then more talk with drums, chants and singing. (Thompson, FL)

3385 kHz 1145 UTC Radio East New Britain. Pidgin. Male announcer with commentary, female with station identification and location then back to the male announcer with more talk. (Thompson, FL)

4890 kHz 1315 UTC NBC P2K4. English. Male DJ with pop music and time checks (MacKenzie, CA) (Owsley, CA) (Parker, OH)

(Thompson, FL) (Arrington, CA)

So as you see, Papua New Guinea can be heard from most parts of North America. It's not all that easy in most cases, so put the kids to bed, brew a fresh pot of coffee and plug in those headsets. We're going to the Pacific tonight!

The question burning on the lips of the listening world...

Where is my Monitoring Times?!

We at Monitoring Times are much gratified by the eager anticipation with which our subscribers await their monthly issues of our paper. This past November our cover copy was late reaching the printer and delayed the mailing by five days. We were deluged by calls!

When Should I Expect My Monitoring Times?

While we appreciate your concern, we did receive several calls before the paper was even scheduled to be mailed, so let us clarify when you can expect your paper on a "normal" month.

Our aim is to have the paper mailed to you on the next-to-the-last Friday of the preceding month, so that you may expect your paper by the first week of the issue month.

If your paper has not arrived, call us at 704-837-9200 at the beginning of the second week of the month of issue, and we will send you a replacement first class. Please save yourself the expense of calling only to be told to call again later!

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MAKING HEADLINES

by Steve Douglass

Imagine, turning on the national news and seeing a story of international significance and knowing you brought the story to the network's attention! And it's all because of this addiction we all share -- radio monitoring!

It was one of those typical evenings that a lot of us are used to by now. I thought I would try out some of those U.S. Navy tactical frequencies that I had just read about in the latest issue of *Monitoring Times*. 8972 kHz was quite busy with Navy traffic but as the evening wore on, the channel grew quieter; I soon konked out and fell asleep.

At about 2:00 am local time I was awakened by the excited voices on the radio. Something was going on. I listened intently. The radio operator of a U.S. Navy ship was tailing a stricken Soviet submarine!

I had heard that a Yankee class ballistic missile sub had caught fire in the Atlantic east of Bermuda on the network news earlier that evening, and that it was being towed by a Soviet merchant freighter back to its home port. The sub had suffered a bad fire in one of its ICBM missile tubes and had blown a hold in the sub's deck.

The Soviets reported three persons had been killed. "Was this the same sub?" I wondered. The Navy ship gave his position; I quickly jotted it down and grabbed my Atlas. Yes, the coordinates given placed the ship east of Bermuda! My heart skipped a beat, "All right...a great catch!"

I turned on the cassette recorder--I definitely wanted a recording of this! And then the plot thickened. The Navy vessel reported that the Soviet sub was sinking, a large hole that had developed on the port side made the sub list in the water. The radioman continued to report that flares had been fired and that the Soviet freighter had launched two rescue rafts to get those that had remained aboard the stricken sub.

The rescue craft had time for two trips to the sub before it sank from sight for good. The U.S. Navy ship reported that they heard explosions and breaking up noises from hydrophones as the sub went down and that there were two life rafts in the water.

I thought back to a radio milestone in history when a radio operator heard over his wireless about the

sinking of the Titanic. I think I had the same feeling as that radio operator must have had back then!

No one was at the newspaper I work for at 3:00 am, so I called the Associated Press in Dallas. When the reporter answered, I introduced myself, told her about my hobby and let her know what I had heard. She probably thought I was a little weird calling her up in the wee hours to report a sinking Russian sub in the middle of the Atlantic ocean! She said, "I don't really know how to handle this; let me call AP in New York." She said she would call me back.

A few minutes later the phone rang. It was the reporter from AP in Dallas. "Could you hold your radio up to the phone and let me hear some of this?" he asked. "I can do better than that," I said, "I will play back some of the tape I made of it for you."

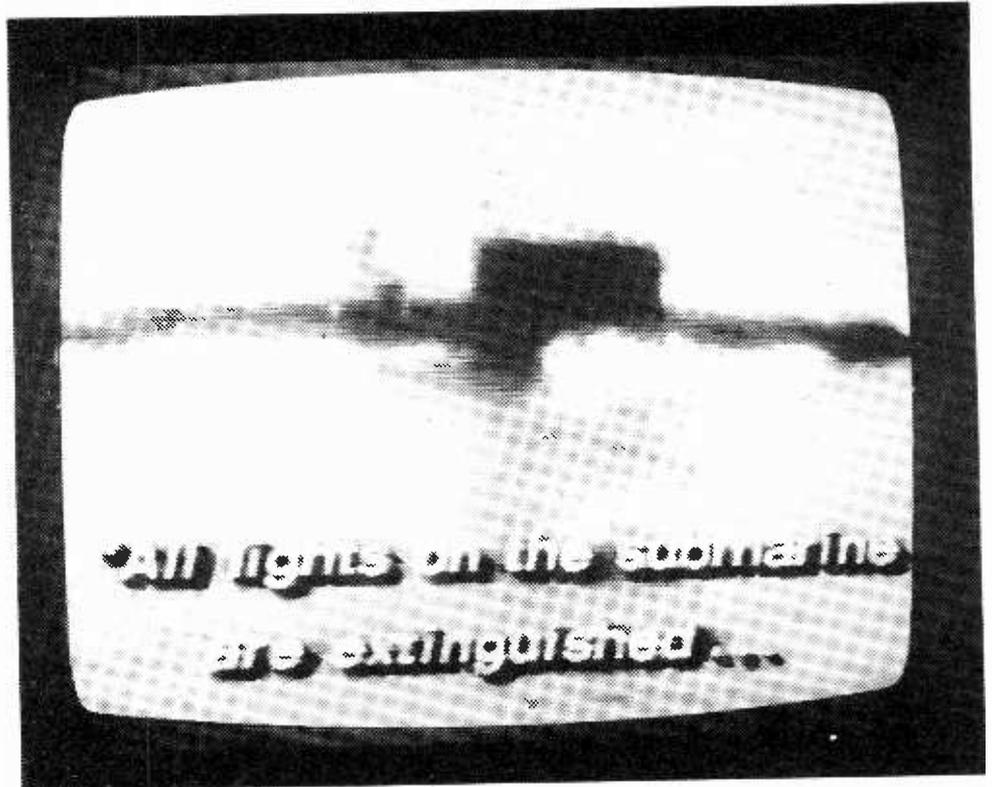
Out of the cassette player blurted the sound of the Navy radio operator excitedly reporting the sinking of the sub. The AP reporter said, "New York will be calling you!"

For the next few hours I talked on the phone with the Associated Press in New York relaying everything I heard--position reports, survivors in the water, Navy P-3 Orion aircraft, and Navy ships in the area describing the scene on a phone patch to the Pentagon.

The AP reporter said the Pentagon, who had been hedging all evening, finally admitted that the sub was having trouble staying afloat. It seemed that the White House did not want much attention called to the Soviet's plight which might strain relations further between the two super powers so close to the Summit.

At about 5:00 am AP broke the story on their wire services; The Pentagon finally verified the sinking by 5:30 am. I knew that when I went to work that day that the headline on the front page, a story of international interest, was largely brought to their attention because of my hobby. I felt like I had been involved in a little piece of history.

It was almost 6:00 am and I had just gotten into bed when the phone rang. "This is NBC news in New York; we understand from AP that you have an audio tape of the Russian sub sinking. Is this true?" "Yes," I said. "Would you be interested in selling a



NBC News telecast with captions for shortwave audio provided by the author. Photos by Steve Douglass.

copy of it to us?" the voice on the line asked. "Yea, sure!" I said excitedly. We agreed on a price and made arrangements for the tape to be flown to Dallas. By noon that day the audio of my tape had been sent to NBC News, New York, via satellite.

At 5:30 Tom Brokaw's face lit up the screen--the sinking was the lead story. A still photo of the damaged Soviet sub appeared...with the audio from my radio dubbed over the picture! Subtitles appeared at the bottom of the screen spelling out the scratchy but understandable audio from the Navy ship Powhatan. "All lights on the submarine are extinguished...We believe the subject has gone down..."

A fellow photographer at the paper

congratulated me; then the phones all began to light up. It seems the story had gotten put out among friends and relatives who called to say they saw it. I was so busy with calls that I missed the rest of the newscast! I just hope that my VCR had worked right.

The next day both AP and NBC called and thanked me. NBC said that the audio gave them an angle on the incident that the other networks didn't have. They told me that if I hear anything again that I shouldn't hesitate to call them. The money they paid me for my tape will go into a new receiver. It finally decided to get some sleep that evening to try and make up for what I had missed the previous night. But I could not resist tweaking the dials just one more time before my head hit the pillow... ↗



NBC News telecast; Navy ship Powhatan was overheard by author.

U.S. Navy Radiocommunications

(excerpted from Grove's *Shortwave Directory*)

The following frequencies are commonly used for both upper sideband and radioteletype communications by the United States Navy.

RTTY MULCAST consists of 16 channels 85Hz shift, 85Hz separation, 75 or 50 baud. NORMAL RTTY is 850 shift. Voice tactical ID's are typically letter-number-letter: ("Alpha 6. Uniform").

FREQ	USE	FREQ	USE
2130	U.S.Coastal	7507	Hurricane Warning (pri)
2150	Harbor Control	7535	Atlantic Fleet
2434	Harbor Control	7645	Disaster Net
2550	Disaster Net	7885	ASW Atlantic
2716	Harbor Control	7893	ASW Atlantic
2732	Lockheed/Nuclear Subs	8233.5	NORATS Worldwide
2745	NAVFAC Grand Turk	8757	TACSFAC
2838	Harbor Control	8778	Atlantic Fleet
3050	Air-Ground	8778	COMSTA night (pri)
3053	Ships/Tactical	8972	ASW Atlantic
3088	ASW	8976	ASW Atlantic
3095	Atlantic Fleet	8981.5	Air-Ground Pacific
3109	Air-Ground/Secondary	9002	Pacific Fleet
3130	COMSTA Pacific	9006	Atlantic Fleet
3237	PMFR Barking Sands/	9032	Pacific Aircraft
	Outrider Control	9037	Atlantic Aircraft (sec)
3261	NORATS Norfolk	9257	Tactical
3265	Atlantic Fleet	9260	Tactical
4014	Air-Ground Atlantic	9380	Atlantic/Pacific Fleets
4045	NORATS Norfolk	10730	Ops
4082	PMFR Barking Sands/	11190	Tactical
	Outrider Control	11191	ASW Atlantic
4253	Lockheed/Nuclear Subs	11195	Atlantic Fleet
4359	NAS	11198	Atlantic Fleet
4373	Virginia Capes	11234	COMSTA RTTY Coord.
4377	Pacific Fleet	11252	ASW Atlantic
4416	Pacific Fleet	11255	Atlantic Fleet
4491	PMFR Barking Sands	11261	CINCPAC
4622.5	NAS	11267	Daytime Primary
4700	ASW Pacific	11410	COMSTA
4702	ASW Atlantic	11463	Atlantic Fleet
4704	Atlantic/Pacific Flts	11570	Tactical
4707	ASW Pacific	13147	Tactical
4710.5	Air-Ground Atlantic	13169.5	Pacific Fleet
4711	Air-Ground Secondary	13181	COMSTA
4730	ASW Atlantic	13224	COMSTA
4735	PMFR Down range ships	13227	Atlantic/Pacific Fleets
5080	PMFR Range Clearance	13237	Atlantic/Pacific Fleets
5430	COMSTA	13251	ASW Pacific
5446	USMC Tactical	13629.5	Tactical
5716.5	Atlantic Fleet	15021	Pacific Fleet
5718	Atlantic/Pacific Flts	15051	Pacific Fleet
5724	Atlantic/Pacific Flts	15067	Tactical
6693	Pacific Fleet	15077	PMFR Down Range Ships
6697	Primary Night	15087	Pacific Fleet
6705	COMSTA	15520	Atlantic Fleet
6708	Atlantic/Pacific Flts	17985	Atlantic Fleet
6720	ASW & Scrambled	18009	Pacific Fleet
6723	Universal	23177	Pacific Fleet
6742	ASW Atlantic	23224	Pacific Fleet
6746	PMFR Pt Mugu NAS	23227	PMFR Down Range Ships
6799	Atlantic Fleet	23288	COMSTA

Associated Press
John O. Lumpkin
Chief of Bureau

Please relay my appreciation to your photographer, Steve Douglass, who thought to call our Dallas bureau in the early morning hours as he was monitoring military traffic on his radio.

His word that the radio was carrying a report that the Soviet sub was having trouble and perhaps sinking provided us with a tip which led to a new lead at that hour on what became a major story later on.

With us having such a report, we were able to get the Pentagon to issue a key confirmation as the story developed.

Communications Inside the Shuttle

Voice intercommunication inside the Space Shuttle is often difficult when the astronauts are suited up. For this reason NASA, in cooperation with GTE, has designed a special UHF two-way spacesuit communicator capable of 8-channel, full-duplex operation. Plug-in modules provide COMSEC (communications security).

The 8 preset channels are selected from 500 possible synthesized channels between 340 and 390 MHz, utilizing digitized speech (32 kbps CVSD--binary FSK) and operate from internal batteries or the Shuttle's 28 volt system.

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Monitoring Military Aircraft II

MID-AIR REFUELINGS

by Jack Sullivan

Mid-air refueling was developed by the Air Force during the 1940s in order to extend their operations to a truly global level, allowing aircraft to operate anytime, anywhere. It has always fascinated me as being an extremely difficult, demanding and dangerous thing to do.

Watch the B-52 refueling during the opening credits of the movie "Dr. Strangelove" or review Michael Perlman's fine feature in the October '86 *MT*, and you can't help being impressed with the drama and high-tech excitement involved!

The mechanics of mid-air refueling are important to an understanding of the communications that will be heard. The tanker, a KC-135 four-engine jet transport, will rendezvous with the receiving aircraft, usually with both initially communicating with a Ground Controlled Intercept (GCI) FAA or military radar unit.

Because of their size, most KC-135 aircraft are equipped with both VHF ("Victor") and UHF ("Uniform") radio transceivers. In order to maintain the UHF radios for military tactical purposes, many tankers will use the same VHF (118-136 MHz) air-to-ground channels as do civilian aircraft for refueling operations.

Military aircraft can be easily picked out from their radio callsigns, usually a single-word squadron identifier (such as "Dusty" for the 170th Air Refueling Group at McGuire AFB in New Jersey) followed by the 2- or 3-digit number identifying the individual aircraft or two words (such as "Dragnet Quebec").

Smaller fighter-type and other military aircraft have only UHF radios. When both tanker and receiver make contact with the GCI operator, both aircraft announce the common UHF frequency that they will use for the operation itself. UHF military transmissions will be in the AM mode, just like on the civilians' VHF aero band.

When refuelings take place in military training areas, the frequencies are preassigned to each area (Air

Refueling or "AR" tracks and "anchor" areas). These tracks/anchors and their communications frequencies are published in *AP/1B: Area Planning/Military Training Routes* as discussed in last month's article.

For each track/anchor there is a primary frequency (where most of the action will be heard) and a secondary frequency (used occasionally on an as-needed basis). Also listed are the callsigns of any military radar units and their frequencies.

Listening to the refueling frequencies listed as being used within 200-300 miles of your location can be the quickest way to pick up a lot of military aviation traffic. Transmissions are usually short, filled with unfamiliar abbreviations and jargon, and are often noisy or distorted. The more you listen, the more you'll begin to pick up.

Some refueling areas are seldom used; others are used often. It's safe to say, though, that everyone in the continental United States and Alaska should be able to pick up at least one refueling track/anchor area. A number of refueling areas are not listed in *AP/1B* such as AR-777 off the coast of Central New Jersey, primary frequency 228.0 MHz.

The rendezvous begins at the Air Refueling Initial Point (ARIP or IP for short) and is completed at the Air Refueling Control Point (ARCP or CP for short) where the tankers usually circle in a preset navigational pattern, waiting for the arrival of the receiver aircraft. The rendezvous is a precision maneuver, with the tanker turning away from the receiver just as it comes up behind the tanker.

"Tallyho"--the receiver has made visual contact with the tanker. Navigation and direction of the mission pass at this point to the navigator, who constantly monitors the receiver aircraft locations.

Using coded radar "beacons" such as the AN/APN-69, each of the receivers is identified by a specific pattern on his radar scope. The first

to refuel drops behind and below the tanker, which extends a retractable "boom." Mission control at this point passes to the boom operator or "boomer" located in the tail of the tanker.

Communicating directly with the receiving aircraft, the boomer talks it into the right position to engage the boom. The receiver first "stabilizes" his aircraft while the boom is adjusted, then maneuvers slightly to connect the tip of the boom to the refueling receptacle. "Contact" signals are exchanged as indicator lights flash on in both aircraft.

Jet fuel is transferred at the rate of thousands of pounds per second while the two airplanes cruise at 250 knots. During the contact phase the receiver aircraft is literally locked onto the tanker by a clamp at the end of the boom. As graceful as a ballet, the two aircraft can even transfer fuel while turning together!

For safety reasons, other receiver aircraft in the flight assume positions outboard of the tanker's wingtips. When fuel transfer is complete, the boomer and receiver pilot agree to "disconnect." The receiver then drops down and back, switching places off the wingtips with the next aircraft to be refueled. The end of the refueling track/anchor is called the exit point.

Refueling operations, especially those involving a number of large aircraft, can go on for a long time. Many refueling tracks are therefore very long in order to accommodate this. AR-200, for instance, begins over Central Alabama, cuts across the southwestern corner of Georgia and the Florida Panhandle and finally terminates on the southwest Florida coast south of Sarasota!

The group responsible for AR-200 is the 19th Bomb Wing out of Robbins AFB in Georgia (monitor 235.1 primary/366.3 secondary, 307.2 and 290.5 Miami Center area frequencies for the IP and exit of AR-200, respectively, to get in on the action here).

Following the advice given in last month's article you should be able to make a list of the refueling tracks/anchors operational within your receiving area. Just program them into your scanner and listen. Add 364.2 and 321.2 (common GCI control frequencies) as well as the Air Route Traffic Control Center VHF and UHF frequencies for the areas that appear close to the ARIP/Exit points on the map in *AP/1B*.

Don't be disappointed if you're not close enough to hear the ground side of some transmissions--the really interesting part is the refueling itself.

Alaskan Operations

There are at least 12 remote transmitter sites throughout Alaska for 364.2 (AICC)/269.9 communications in support of seven published refueling anchors as well as fighter training exercises and other interesting missions near the Russian border. McChord AFB in Washington has at least seven remotes on 282.6/364.2 throughout Oregon and Washington.

A lot of fun in monitoring is trying to figure out the "big picture" from the communications you log--transmitter locations, other frequencies, callsigns, and other tactical details. Can anyone identify "Huntress," "Oakgrove," "Wellington," "Incognito," and other military GCI operations? Please write and let me know.

I Ride Along

I recently was the guest of the New Jersey Air National Guard during a non-routine refueling operation. We took off from McGuire AFB in New Jersey late on a Saturday morning and headed for Syracuse, New York, to refuel two A-7 attack jets on their way home to Iowa from England. Flying the Atlantic Ocean in a small jet like the A-7 is only possible because of mid-air refuelings.

LISTENING IN ON MID-AIR REFUELINGS: frequencies to note

These 70 frequencies should cover at least 90% of all routine refuelings; they are allocated by the military to air-to-air refueling operations exclusively.

228.0	292.3	348.9
233.7	293.0	350.0
235.1	295.4	352.6
238.9	295.8	352.9
242.3	298.3	353.0
242.5	301.6	354.2
242.7	305.5	358.2
254.6	305.7	359.1
259.4	314.2	360.5
260.2	315.9	361.6
261.9	318.0	366.3
266.5	319.4	372.3
267.8	319.5	384.6
276.1	320.9	385.8
276.4	321.2	388.4
279.8	322.8	391.0
283.8	324.2	391.8
283.9	324.4	394.9
286.2	336.1	396.2
286.3	286.9	288.8
288.9	289.7	291.2
291.9	339.2	340.8
341.4	343.1	343.5
344.7		

Ground Controlled Intercept Frequencies

The majority of refuelings are initiated through military GCI stations. AICC (364.2) is common to all these stations, as are 321.2 and 243.0 ("GUARD"). Scattered throughout the country at both major and minor airbases, each of these stations has a callsign and special operating frequencies for tactical purposes. Here are a few to give you an idea of what's going on:

CALLSIGNS	LOCATIONS	FREQUENCIES	ROUTES
O'GRADY	Luke AFB, AZ	321.2-PRI 286.2-SEC	AR-603 AR-647
BIGFOOT	McChord AFB, WA (also OR)	282.6-PRI 364.2-SEC	AR-630
OCTAVO/ CHARLIE BOY	Bergstrom AFB, TX	321.2-PRI	AR-611
BROCHURE FREEMASON	Mitchell Field, WI Shaw AFB, SC (Carolinas)	311.3-PRI 286.7-PRI 321.2-SEC	AR-611 AR-601
JAYHAWK	McConnell AFB, KS	228.95-PRI 303.0-SEC	AR-653
ALLEYCAT BARRIE	MacDill AFB, FL MacDill AFB, FL	364.1 325.8	AR-716 AR-655
ROBERT ALFA	McChord AFB, WA (also OR)	271.0-CONTROL 253.4-PRI 337.4-SEC	AR-717 A&B
FORT YUKON MURPHY DOME SPARREVOHN COLD BAY TATALINA KOTZEBUE CAMPION	Elmendorf AFB, AL	364.2-PRI	AR-720 AR-721 AR-722 AR-723 AR-725 AR-726 AR-727

Our tanker, "DUSTY 63," was a few minutes early for the rendezvous and went into a racetrack holding pattern. Within a few minutes we heard the A-7s--"RETRO 53" and "54"--talking to the center controller on 295.8.

Both jets were refueled within 20 minutes; we then headed back to McGuire. This is an example of a refueling operation taking place outside of a published refueling track or anchor.

It was a great pleasure to watch the very professional National Guard at work. They accomplish almost half of the refuelings that take place. It was also interesting to learn that once the tanker leaves the ground, it is an element of the Strategic Air Command (SAC).

If you would like to see this become a regular column, please let me or Bob Grove know. I also need your help in keeping these articles interesting. Let me know if you hear anything unusual--not the local airport control tower or FAA site, but tactical operations on uncommon frequencies.

Try to be as complete and exact in your logging as possible and send details such as frequencies used, callsigns, times, type of operation, etc. Write to: Jack Sullivan WA1TEJ, P.O.Box 701, Franklin Park, NJ 08823. Include an SASE if you would like a personal response. 73!

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Radio Discovery's Jeff White

Last month, *Monitoring Times* featured the story of Radio Earth. This month, *MT* talks with Jeff White, one of the founders of Radio Earth; now part-owner of Radio Discovery in the Dominican Republic. White caused quite a stir earlier this year when he abruptly departed from the airwaves and his former employer. And for months there was speculation as to the exact cause of the fault. Today, White, after "disappearing" in the Dominican Republic to work on Radio Discovery, he talks with *MT's* Broadcast Editor Larry Miller about his relationship to the Caribbean's star broadcaster, Rudy Espinal and what really happened to destroy one of shortwave's most promising partnerships.

MT: Jeff White, where have you been hiding?

White: [Laughter] Between Santo Domingo and St. Pete Beach [Florida].

MT: What have been doing?

White: As you know, we did a series of 50 watt test broadcasts from Radio Discovery back in March, April and May of this year. Then we were off the air for a couple of months while we were preparing a 1 kW transmitter, which went on the air on the 12th of October -- Discovery Day, appropriately enough. I was down there for that, getting the new transmitter on the air, making studio improvements and I've just returned to St. Petersburg Beach to work on programming and marketing ideas.

MT: So Radio Discovery is now on the air with 1,000 watts?

White: Yes. Our present schedule is Monday through Saturday 1800 to 0000 UTC and also Sunday 1300 to 1600 UTC. Both of those are at 15045 kHz. We have done some tests in the evenings on 6245 kHz with fairly good success. So it may be that by the time this gets into print, we'll be broadcasting evenings on 6245, probably after 0200 UTC.

MT: What are doing programming-wise? Is this going to be all religion or is it going to be regional programming or what?

White: What we've found is that the one thing that listeners want is Caribbean music so that's what we're giving them. Most of the programming is a mix of, well, not just Caribbean music, but music from all of the Americas, although right now there is a heavy emphasis on Dominican music because that's what's available to us. We're expanding as quickly as we can to music from some of the English speaking music. There have been a lot of requests for reggae.

MT: Smooth sailing, mahn...

White: Yeah! So we're attempting to get some of the latest reggae music on the air. We're using 15045 kHz which is the old frequency of Radio

Grenada and Radio Free Grenada and everybody thinks that Radio Grenada is back on the air when they hear us playing reggae.

MT: I've seen some reports by people who have heard the return of Radio Grenada.

White: [Laughter] Well, it's only us. Basically, though, we have music features along with some short features which include *Discovering the Caribbean*, which is a Caribbean travelogue type feature, *Discovery DX*, which is a short DX program...

MT: Hold it. Who's doing the DX program?

White: Me.

MT: Too bad.

White [Laughter] Do you want to do it?

MT: No, thanks [laughter]. When is *Discovery DX* on?

White: Well, first let me about some of the other programs, like *Santo Domingo Journal*, which is a serialization of a book of the same name but which will be becoming the journal that I write about things that are happening in the Dominican Republic.

MT: What about the great Rudy Espinal, late of Radio Earth, late of Radio Clarin?

White: There is a strong move within the company to pressure Mr. Espinal [laughter] to out of his office and into the studio to resume *This is Santo Domingo*...

MT: He's still on Radio Earth...

White: Those programs on Radio Earth, incidentally, are years old. There are no recent programs whatsoever. I heard them the other day and was amazed. These programs have been on the air five or six times. They never get out of date, really, but my gosh, they're as old as the hills.

MT: What is the, ah, kind of "legal" status of Mr. Espinal? I mean, if you'll pardon the expression, who "owns" Espinal, Radio Earth or

Radio Discovery?

White: [Laughter] Well, I think Mr. Espinal owns himself, but... I think the plain and simple fact is that Rudy did a program called *This is Santo Domingo* for years back on Radio Clarin in the Dominican Republic. When Rudy came to work for Radio Earth, we expanded the horizons of the old *This is Santo Domingo* to reflect the culture and music of other islands in the Caribbean. And now that he's back in the Dominican Republic at Radio Discovery, the program has gone back to *This is Santo Domingo*.

MT: So Espinal has formally left Radio Earth?

White: You'll have to ask Radio Earth about that. I do know that Radio Earth objected to Rudy's starting Radio Discovery and considered it, I believe, a conflict of interest. I say that in practical terms, he is no longer doing anything for Radio Earth. He is the president of the company that owns Radio Discovery. So any of Rudy's programs that you hear on Radio Earth are ones that he, quite legitimately, did for Radio Earth, but a long time ago.

MT: Uh huh, well...

White: I might add that it's the same thing for me. I tuned in the other day and noted that they [Radio Earth] were still using IDs and commercials that I recorded months and even years ago. I'm slightly embarrassed about that but there's nothing I can do about it.

MT: Back when Radio Earth was on WRNO and you were the host, it was always--as I have often said--almost magic. But over time, the relationship between you and Radio Earth seemed to dissolve. And there's been a lot of speculation as to exactly what happened and why you left and whether it's a really bitter thing or not. What is the real story about why you left Radio Earth?

White: There's been a lot said and written about my departure from Radio Earth. In fact, I seem to be the only one who hasn't commented on it publicly [laughter]. You know, my years at Radio Earth were years of real hard work but a lot of pleasure too. I don't think it's any secret that Radio Earth has never been a financially profitable enterprise. I certainly didn't make any money on it. But I stuck with it because it was fun.

Unfortunately the fun did not last. You were correct in the last issue of *Monitoring Times* when you said that my resignation was due to lack of progress on the planned Radio Earth

WANT A BBS?

A sizable number of *MT* readers have requested our installing a bulletin board service. We could use it to increase dialogue among active hobbyists, exchange information about frequencies, list equipment for sale or swap, identify unknown users of the spectrum, update schedules, headline late-breaking news items--the possibilities seem endless.

At the present time we do have a modem on an IBM compatible with hard disk storage that could be called into service. How about it, readers? Would you like such a service? Do we have any volunteers to help design, program and initiate such an ambitious project?

The ball is now in your court!

broadcast facility and also due to financial and personal disagreements with members of the board of directors.

The directors and I simply could not agree on how to solve many of the problems we had nor on the direction we should take. I wanted to go one way; they wanted to go another. So in the end, I decided that the best thing for both parties was for me to resign so that we could each do things in our own way. It was a difficult decision, but think in the final analysis it was the only solution.

Meanwhile, Rudy asked me if I wanted to get involved in the establishment of a new station in the Dominican Republic. It was going to be called Radio Discovery and the primary purpose would be to broadcast events related to the celebration of the 500th anniversary of the discovery and evangelization of the Americas.

MT: There are two questions. What came first, the chicken or the egg? Did you already start working on Radio Discovery before you resigned from Radio Earth and did that contribute to the bad feelings, the idea that you had created a "conflict of interest"?

White: I made it quite clear to the board of directors of Radio Earth back in October of, I believe, 1985, that the income I was receiving from Radio Earth was not sufficient to even make minimum payments on my debts, which were 100% Radio Earth-related debts, therefore I would have to seek some outside income.

(Please turn to p.16)



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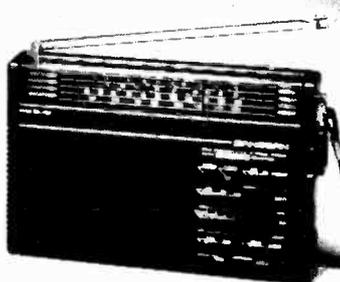
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(Jeff White, cont'd from p.14)

doesn't come through, we'll think about it [laughter].

Seriously, both Rudy and I have staked our personal reputations on this project. We're going to do our best to meet listener expectations -- and surpassing them. The listener is really the ultimate determinant of our success. And we want to maintain as much contact with them as possible.

So, along these lines, we will be sponsoring some major shortwave conventions in the next few years. The first one will be in July of 1987 and another in 1988, both here in beautiful St. Petersburg Beach, Florida. And we'll be doing others after that. In 1992, we're already making plans for a convention in Santo Domingo where the listeners can actually participate in the Discovery celebrations in the first city in the new world.

MT: I knew it was coming. But what are you going to do for a convention that isn't already being done?

White: We're going to have fun [laughter].

MT: [Laughter] If people want information on this gala, fun-filled event next summer, how do they get information?

White: They can send a self-addressed, stamped, envelope to me at Radio Discovery at P.O. Box 25454, Tampa, Florida 33622. We'll put their names on our mailing list and we'll send them some information as soon as it becomes available. This will be the best radio convention ever. I guarantee a lot of fun.

MT: Good, I can write off a trip to Florida as a business expense.

White: Right. I guess you could.

MT: Aside from the conventions, aside from Radio Discovery, what is Jeff White up to? I don't hear you on the air anymore.

MT: Because of all the work that went into setting up Radio Discovery. I've been involved in a lot of administrative work. But I miss being on the air and talking to the listeners every day. But I'm getting back to that on Radio Discovery. And I look forward to talking to everyone again.

MT: So it's "smooth sailing" for Jeff White and Radio Discovery?

White: It's ah...

MT: Choppy seas, wave heights six to ten feet. Small craft advisory?

White: I can't say that it'll be all smooth sailing ahead, but I know one thing for sure. It's a lot of fun again.

Obviously, I wasn't going to become a cashier at MacDonalds, so I became involved, indeed, in other international projects on the side.

MT: So what's the matter with working at MacDonalds?

White: I'll eat there but I'm not going to work there.

MT: You ought to try publishing a shortwave magazine. You'd be surprised what you'll do.

White: So Rudy explained the idea of Radio Discovery. The station was to be in the Dominican Republic and that's where Christopher Columbus landed in 1492 and it fascinated me. So I became a partner in the Dominican company that would own it, World Radio Network, S.A.. Rudy and myself are the main shareholders along with a few other Dominican and American investors.

MT: In retrospect, are you happy with what you did? Are you happy with the progress of Radio Discovery?

White: Well, our plans called for two phases of low-powered test broadcasts; one of 50 watts which took place earlier this year and one with 1,000 watts which is taking place this year. Probably within a year, we hope to install a 50,000 watt transmitter. But am I happy? Yes. The nice thing about Radio Discovery is that it's ours. I don't have to waste any more time on unnecessary board meetings, documents, proposals, stock splits and legal maneuvering. Radio Discovery doesn't have to put up with other stations selling us airtime and all the associated hassles: the financial gouging, editorial restrictions, incompetent operators, unresponsive management, etc. Also, we're not restricted to a short period of airtime; we can broadcast as long as we want to.

Radio Discovery is still a fledgling operation. But I think that between now and the 500th anniversary of the Discovery in 1992, it's going to grow and prosper. We intend for Radio Discovery to become the international voice of the Discovery celebrations. And then afterwards, we'll remain on the air to provide the international radio audience with what we hope will be recognized as some of the best in worldwide radio programming.

MT: But the big question is, 'do you plan to broadcast in stereo'? In fact, I heard rumors that you were going "quadraphonic". [laughter].

White: We'll let Dickson Norman [of the long-proposed NDXE Global Stereo Radio] do that first and if he

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Lots of great loggings this month; direct contributions as well as excerpts from the pages of the monthly **SPEEDX** Bulletin. Without much more talk, on to the...

LOGGINGS:

Freq	Time	Station/Lang/Notes/Time & Source
ARGENTINA:		
9690	0105	RAE: ??; Mx and nx, then mailbag. Weak (8-14 Volz-IL)
ANGOLA:		
3578	0400	R. Nacional: PP; nx headlines, ID as "transmit R. Nac de Angola"; march mx, into EZL mx w/laid back annr. 343(9-2 Quaglieri-NY)
AUSTRALIA:		
9610	1200	ABC- Perth: EE; playing US and English songs from the 1920s and 30s. 444(9-20 Hunt-NC)
6035	2000	RA: EE; nx, early for this freq. Fair(8-10 Randall-NB)
BELGIUM:		
9830	0030	BRT: ??; Nx and pgm on architecture and building in Brussels. 332(8-13 Volz-IL)
BOTSWANA:		
4820	0349	R. Botswana: Sets/EE; "Old MacDonald" barnyard ID, to choral NA, bilingual ID/skeds, QRM de HRVC. 322(8-19 Trotto-FL)
PEOPLE'S REPUBLIC OF CHINA:		
15395	2200	R. Beijing: (t); CC; weak signal under R. Australia, no definite ID, OM & YL w/nx. Poor(9-9 Randall-NB)
FINLAND:		
15400	1400	RF: EE; Discussed funeral services and comments by the late president of Finland. 433(9-7 Hunt-NC)
GREECE:		
9645	0131	V. of Greece: EE; nx. (8-17 Volz-IL)
INDIA:		
11620	1845	All India Radio: heard daily with good signal, mx and sports, sometimes // to 7412. Good(8-17 Randall-NB).
IRAQ:		
11750	0000	R. Baghdad: EE; Mx and tx of navy battle against Iran. 444(9-3 Hunt-NC)
IRELAND:		
6910	2315	RDI: EE; rock disco mx w/om DJ. 422(9-3 Hunt-NC)
ISRAEL:		
12080	2130	Kol Israel: ??; 443(8-14 Volz-IL)
ITALY:		
9575	0105	RAI: ??; Political cmty and nx. 332(8-13 Volz-IL)
JAPAN:		
15195	0220	R. Japan: (NHK-Tokyo): EE; "Japan Travel Log" with stories abt everyday living in Japan, nx of typhoons. 444(9-1 Hunt-NC)
9645	2200	R. Japan: (NHK-Tokyo): EE; nx and mx with some short talks. Good(8-21 Randall-NB)
9645	2300	R. Japan: (NHK-Tokyo): EE; Nx of earthquake in Rumania, then DX Corner, and ID w/freqs. 433(8-31 Hunt-NC) Also by Volz who reported a QSL in 15 days!
KUWAIT:		
11675	2030	R. Kuwait: EE; "Choice of the Week" mx pgm, old English and US pop songs. 555(9-10 Hunt-NC)
11675	2130	R. Kuwait: ??; pop mx and Arabic prayers (Koran??). 332(Volz-IL)
LIBERIA:		
4760	2200	ELWA: VOA nx at 2200, then local nx and into rel pgm and s/off at 2231. Good(8-12 Randall-NB)

LUXEMBOURG:

6090 2330

R. Luxembourg: EE; Rock mx advertising Malibu Suntan Lotion and "Put Your Clothes Back On" 444(9-3 Hunt-NC)

6090 0045

R. Luxembourg: ??; YL DJ w/mx and ID, TC and freqs. 332(8-13 Volz-IL)

NEW ZEALAND:

15150 0120

RNZ Wellington: EE; NZ wx rpt, then a comedy play and song by Billie Holiday. 333(9-1 Hunt-NC)

NORWAY:

15305 1300

R. Norway: Nx of Norway, and a pgm on the uses of radio in Norway. 444(9-7 Hunt-NC)

SOCIETY ISLANDS:

15170 0205

R. Tahiti: FF; OM anncr w/C&W mx, also mx from Jame Bond movies. 322(9-1 Hunt-NC)

11825 0315

R. Tahiti: Vern; Polynesian mx w/YL DJ. 433(8-30 Hunt-NC)

SOLOMON ISLANDS:

5020 0533

SIB: ??; Barely audible w/lots of QRN, popular top 40 mx mixed w/ other songs, OM DJ. Poor(9-6 Volz-IL)

SOUTH AFRICA:

6015 0210

RSA: EE; World nx and cmtly abt Bishop Tutu. Has freq been moved from 6010? 444(9-8 Hunt-NC)

SWEDEN:

9695 2314

R. Sweden Int'l: EE; "Sunday in Stockholm." QSL in 14 days! Good(8-17 Volz-IL). // to 11705.

SYRIA:

12085 2015

R. Damascus: ??; nx and pgm on the life of Mohammed. 444(8-12 Volz-IL)

TAIWAN:

11890 2210

VOFC-Taipai: EE; Pgm on life and changing times in Taiwan. 544(9-12 Hunt-NC)

UNITED ARAB EMIRATES:

17775 1335

R. Marti: SS; World nx and Dubai wx, then "Arabian History" pgm. 333(9-1 Hunt-NC)

UNITED STATES OF AMERICA:

11930 2011

R. Marti: SS; Nx and popular mx. QSL card in 8 days. Good(8-13 Volz-IL)

VATICAN:

11740 1345

VR: EE; Excerpts from speeches by Pope John Paul during his latest journeys. 333(9-7 Hunt-NC)

VIETNAM:

10040 2030

R. Hanoi: EE; Discussing Soviet Union and US nuclear capability and intent. 322(Hunt-NC)

YUGOSLAVIA:

7240 2115

R. Yugoslavia: EE; European nx and wx. 433(8-31 Hunt-NC)

HEARING CELLULAR: Another Oversight

A call received from one of our readers prompted us to an ironic fact about the new Communications Privacy Act. Even though scanner listeners are prohibited from listening to cellular telephones, they are sometimes exposed to them without tuning them in!

Images, false signals heard on off-frequency channels due to powerful local signals, are being reported on 800 MHz police frequencies, often making authorized police reception

impossible without simultaneous cellular telephone reception.

According to the new law, listeners would be compelled to stop using their scanners when this occurs even though they are not tuned to cellular telephone frequencies! This is merely one of a growing number of inconsistencies which will continue to make the new legislation an unmanageable nightmare for the courts.

Contributors: def.- Readers who make this column possible...

Billy Hunt	NRD-515 Durham, NC
Harrison Randall	DX-400 Ripples, NB, Can
Al Quaglieri	Albany, NY
Carl M. Volz	Montgomery, IL

A few closing comments: As mentioned in the last column, be sure to submit complete logging reports. That is, each log must include country, station, frequency, time, language, date, reception report, and program details. Also, it should go without saying that you must have a positive ID in order to claim a reception. That is, merely assuming you have "bagged" a rare one is not enough; listen for that positive ID. To not get a positive ID and claim a reception report is not only lowering your professional standards, but causes many others who depend on these loggings

reports for accuracy to waste their time. However, if you're not sure of a report, then by all means send it in marked tentative (t).

Log reporters were fewer this month than last, but I think we have some good loggings for everyone to try. This column is coming together very nicely but everyone should support it by sending in log reports. My address is at the top and I have a big mailbox to fill it!

That's it for this month. Remember, loggings just like these can be found in each edition of the SPEEDX Bulletin. For a sample, and information about America's most active SWL club, just write to Mr. Jack Sanderson, Business Manager, SPEEDX, 7738 East Hampton St., Tucson, Arizona 85715-4212. Be sure to tell Jack 'ol Speed sent you from the pages of Monitoring Times. Until next month... good listening. ■

VOA Feed to go Satellite

The U.S. Information Agency has awarded Communications Satellite Corporation (COMSAT) a \$33 million contract to interconnect stations of the worldwide Voice of America (VOA) network.

Employing digital technology, the new network, slated to begin operations in 1987, will mean the termination of HF feeds so familiar to SWLs and is expected to improve broadcast quality.

At least four--and possibly six--U.S. earth station and sixteen relay stations around the globe will complement the new system which will use international satellite links provided by COMSAT.

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frequency SECTION

The MT Monitoring Team

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Jim Young, CA

East Coast:

Joe Hanlon, PA
Greg Jordan, NC

Midwest:

Rich Foerster, NE

LEGEND:

- * The first four digits of an entry are the broadcast start time in UTC.
 - * The second four digits represent the end time.
 - * In the space between the end time and the station name is the broadcast schedule.
- S=Sunday, M=Monday, T=Tuesday, W=Wednesday
H=Thursday, F=Friday, A=Saturday.

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

- * The last entry on a line is the frequency. Codes here include "SSB" which indicates a Single Sideband transmission, and "v" for a frequency that varies.
- * Frequencies in bold are most likely to be heard regularly in North America.

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

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

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

Anyone whose material is used will receive a certificate of appreciation from Monitoring Times.

All frequencies in this list have been heard by one or more MT monitors during the previous month.

0000 UTC	[7:00 PM EST/4:00 PM PST]
0000-0015	Voice of People of Kampuchea 9693, 11938
0000-0025	Radio Tirana, Albania..... 7065, 9760
0000-0030	BBC, England..... 5975, 6005
	6120, 6175
	7325, 9410
	9515, 9590
	9915, 12095
0000-0030	KGEI, California..... 15280
0000-0030	Radio Berlin International.. 6080
0000-0030	Radio Canada International.. 5960, 9755
0000-0030	M Radio Norway International.. 9590, 9610
0000-0045	Kol Israel..... 5885, 7465
	9435, 9815
0000-0050	Radio Pyongyang, North Korea 15140, 15160
0000-0100	Armed Forces Radio and TV.. 6030, 11790
	15355, 17765
	9910, 11715
0000-0100	All India Radio..... 9910, 11715
0000-0100	CBC Northern Quebec Svce... 6195, 9625
0000-0100	CFCX, Montreal, Canada..... 6005
0000-0100	CFRX, Toronto, Canada..... 6070
0000-0100	CFVP, Calgary, Canada..... 6030
0000-0100	CHNX, Halifax, Canada..... 6130
0000-0100	TEN Christian Science Monitor... 7365
0000-0100	CKFX, Vancouver, Canada.... 6080
0000-0100	KCBI, Texas..... 11910
0000-0100	TES KSDA, Guam (AWR)..... 15115
0000-0100	KVOH, California..... 15250
0000-0100	TES KYOI, Saipan..... 15405
0000-0100	Radio Australia..... 15160, 15240
	15320, 15395
	17795
0000-0100	Radio Baghdad..... 11750
0000-0100	Radio Beijing, China..... 15445
0000-0100v	Radio Dublin International.. 6910
0000-0100	Radio Havana Cuba..... 6090, 9740
0000-0100	Radio Korea (South)..... 15575
0000-0100	Radio Moscow, U.S.S.R..... 5940, 6170
	7115, 7185
	7195, 7215
	7310, 13665
	15425, 15580
0000-0100	Radio Sofia Bulgaria..... 9700, 11720
0000-0100	Radio Thailand..... 9650, 9665
	11905
0000-0100	Radio Veritas, Philippines.. 9740
0000-0100	Radio New Zealand Int'l... 11780, 15150
0000-0100	RTL Luxembourg..... 6090
0000-0100	Spanish Foreign Radio, Spain 6125, 9630
0000-0100	Voice of America..... 5985, 6125
	6130, 9455
	9650, 9775
	9815, 11580
	11680, 11740
	15205
	11770
0000-0100	WHRI, Indiana..... 7355
0000-0100	WRNO Worldwide..... 15365, 15440
0000-0100	WYFR, Florida..... 15460
0015-0100	AWR, Costa Rica..... 5975, 6005
0030-0100	BBC, England..... 6075, 6120
	6175, 7325
	9515, 9590
	9915, 11750
	9915, 11750
	9915, 11750
	9915, 11750
0030-0055	BRT, Belgium..... 9670, 11810
0030-0100	HCJB, Ecuador..... 15155

0100 UTC	[8:00 PM EST/5:00 PM PST]
0100-0115	All India Radio..... 6035, 7215
	9595
	6030, 9605
0100-0115	Vatican Radio..... 11845
	6010, 9575
0100-0120	RAI, Italy..... 5885, 7465
0100-0125	Kol Israel..... 9435
	9670, 11910
	15155
0100-0130	HCJB, Ecuador..... 6080, 9730
0100-0130	Radio Berlin International.. 7140, 9675
0100-0130	Radio Japan General Service. 15235, 17810
	7112v
0100-0130	Radio Vientiane, Laos..... 15150
0100-0145	Radio New Zealand Int'l... 9555, 15440
0100-0145	WYFR, Florida..... 6040, 6085
0100-0150	Deutsche Welle, West Germany 6145, 9545
	9565, 11785
	15425
0100-0200	ABC, Perth, Australia..... 6030, 11790
0100-0200	Armed Forces Radio and TV... 15355
	5975, 6005
0100-0200	BBC, England..... 6120, 6175
	7325, 9515
	9590, 9915
	6195, 9625
0100-0200	CBC Northern Quebec Svce... 11920
0100-0200	CFCX, Montreal, Canada..... 6005
0100-0200	CFRX, Toronto, Canada..... 6070
0100-0200	CFVP, Calgary, Canada..... 6030
0100-0200	CHNX, Halifax, Canada..... 6130
0100-0200	Christian Science Monitor... 7365
0100-0200	CKFX, Vancouver, Canada.... 6080
0100-0200	FEBC, Manila, Philippines.. 15315, 21475
0100-0200	KCBI, Texas..... 11910
0100-0200	KSDA, Guam (AWR)..... 15115
0100-0200	TEN KVOH, California..... 11930
0100-0200	KYOI, Saipan..... 15405
0100-0200	Radio Australia..... 15320, 15395
	17715, 17750
	17795
0100-0200	Radio Baghdad, Iraq..... 11750
0100-0200	Radio Belize..... 3285
0100-0200	Radio Canada International.. 5960, 9755
	11845, 11940
0100-0200	(M) Radio Cultural, Guatemala... 5955
0100-0200	TES R. Discovery, Dominican Rep. 6245v
0100-0200	Radio Dublin International.. 6910
0100-0200	Radio Havana Cuba..... 6090, 9740
0100-0200	Radio Moscow..... 5920, 5940
	6170, 7115
	7185, 7195
	7215, 7310
	7440
0100-0200	Radio Moscow World Service.. 7130, 7315
	11720, 11845
0100-0200	Radio Prague, Czechoslovakia 5930, 7345
	9540, 9740
	11980
0100-0200	Radio Thailand..... 9665, 11905
0100-0200v	RAE, Argentina..... 9690, 11710
0100-0200	SBC Radio 1, Singapore..... 11940
0100-0200	Spanish Foreign Radio, Spain 6125, 9630
0100-0200	Sri Lanka Broadcasting Corp. 6005, 9720

0100-0200	Voice of America..... 5995, 6130
	9455, 9650
	9775, 9815
	11580, 11680
	11740, 15205
	9680, 11790
0100-0200	Voice of Indonesia..... 6015v
0100-0200v T-A	Voice of Nicaragua..... 15145
0100-0200	WINB, Pennsylvania..... 9680
0100-0200	WHRI, Indiana..... 7355
0100-0200	WRNO Worldwide..... 7430, 9395
0130-0140	Voice of Greece..... 9420
	9870, 15155
0130-0200	HCJB, Ecuador..... 6155
0130-0200	Radio Austria International. 6025, 6110
0130-0200 (W,A)	Radio Budapest Hungary..... 9520, 9835
	7120, 9760
0130-0200	Radio Tirana Albania..... 6480, 7275
0145-0200	Radio Korea.....
0200 UTC	[9:00 PM EST/6:00 PM PST]
0200-0215	Vatican Radio..... 6145, 7125
	9650
	5885, 7465
0200-0225	Kol Israel..... 9435
	5975, 6005
0200-0230	BBC, England..... 6120, 6175
	7325, 9410
	9515, 9590
	9915
	7185
0200-0230	Burma Broadcasting Corp.... 6155
0200-0230	Radio Austria International. 6025, 6110
0200-0230 (T-A)	Radio Budapest, Hungary..... 9520, 9835
	5960, 9755
0200-0230 (M-F)	Radio Canada International.. 7275, 11810
0200-0230	Radio Korea World..... 6135, 9725
0200-0230	Swiss Radio International... 9885, 11925
	12035
0200-0230 T-A	Voice of Nicaragua..... 6015
0200-0230	WINB, Pennsylvania..... 15145
0200-0250	Deutsche Welle, W. Germany.. 6035, 7285
	9650, 9690
	11945
0200-0256	Radio RSA, South Africa..... 5980, 6015
	9615
0200-0300	ABC Perth, Australia..... 15425
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	9625
0200-0300 (S)	CBC Northern Quebec Service. 6195, 9745
0200-0300 T-S	Christian Science Monitor... 9745
0200-0300	GBC, Guyana..... 5950
0200-0300	HCJB, Ecuador..... 6230, 9870
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0200-0300	TES KYOI, Saipan..... 15405
0200-0300	TES Radio Australia..... 15240, 15395
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0200-0300	Radio Belize..... 3285
0200-0300	Radio Bras, Brazil..... 11745
0200-0300	Radio Bucharest, Romania... 5990, 6080
	9510, 9570
	11810, 11940
	9475, 9675
0200-0300	Radio Cairo, Egypt..... 5960, 9755
0200-0300 (T-A)	Radio Canada International.. 6245v
0200-0300 TES	R. Discovery, Dominican Rep. 6910
0200-0300 (T-S)	Radio Dublin International.. 6090, 6100
0200-0300	Radio Havana Cuba..... 6140, 9740
	15420, 15195
0200-0300	Radio Japan..... 17825
	11810
0200-0300	Radio Korea, South..... 5820, 5840
0200-0300	Radio Moscow..... 6070, 6170
	7115, 7185
	7195, 7215
	7310, 7440
0200-0300	Radio Nacional do Brasil... 11745
0200-0300	Radio New Zealand Int'l... 15150
0200-0300	Radio Polonia, Poland..... 6095, 6135
	7145, 7270
	9525, 11815
	15120

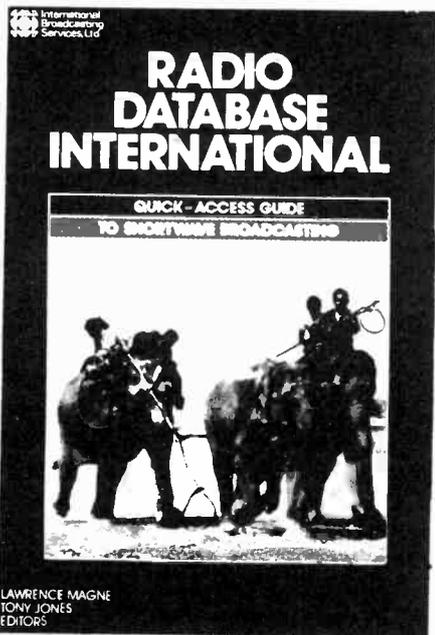


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frequency SECTION

0200-0300	Radio Thailand.....	9665, 11905	0300-0400 (M)	World Music Radio.....	6910		0400-0500	CKFX, Vancouver, Canada.....	6080
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		11720, 15205	0300-0400	Radio Prague, Czechoslovakia	5830, 7345				6100, 6140
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0200-0300	WINB, Pennsylvania.....	15145	0300-0400	Radio Thailand.....	9580, 11905				7165, 7775
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0200-0300	WRNO Worldwide.....	7355	0300-0400		15425				7310, 9635
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0215-0300	Radio Berlin International..	6080, 9730	0300-0400	Voice of America.....	5995, 6035		0400-0500		15180
0230-0300	BBC, England.....	5875, 6005			6130, 9455		0400-0500	Radio Sofia Bulgaria.....	7115
		6120, 6175			9575, 9650		0400-0500	Radio Uganda.....	4976, 5026
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		9915	0300-0400		11580, 11680		0400-0500	VLW 15, Lyndhurst, Australia	15230
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0230-0300	Radio Netherland.....	6020, 6165	0300-0400	WHRI, Indiana.....	4820				6035, 6040
		9590, 9895	0300-0400	WRNO Worldwide.....	7355				7170, 7280
0230-0245	Radio Pakistan.....	7315, 11740	0305-0400 (A)	Radio Austria International.	6185				9575, 9670
		15115			5945, 6055				11835, 15205
0230-0300	Radio Sweden International..	9695, 17840	0310-0330	Vatican Radio.....	6155		0400-0500	Voice of Turkey.....	9560
		SSB	0315-0330	Radio France International..	6150		0400-0500	WHRI, Indiana.....	7400
0230-0300	Radio Tirana Albania.....	7065, 7120			6005, 6055		0400-0500v (M)	World Music Radio.....	6910
		9760			6175, 7135		0400-0500	WRNO Worldwide.....	6185
0230-0300	SLBC, Sri Lanka.....	9720	0330-0400 (M)	CBC Northern Quebec Service.	9535, 9600		0415-0430	Radio France International..	6055, 6175
0230-0300 (S,M)	WINB, Pennsylvania.....	15145	0330-0400	BBC, England.....	9790, 9800				7135, 9535
0240-0250	All India Radio.....	6110, 9545	0330-0400		6195, 9625				9550, 9790
		9610	0330-0400	Radio Austria International.	5975, 6120				9800
0245-0300	Radio Berlin International..	6125, 6165	0330-0400	Radio Havana Cuba.....	6175, 9410		0425-0450	RAI, Italy.....	5980
			0330-0400	Radio Sweden International.	6155		0430-0455	Radio Tirana Albania.....	7300, 9480
0300 UTC [10:00 PM EST/7:00 PM PST]			0330-0400	Radio Tanzania.....	6090, 6100		0430-0500	BBC, England.....	7160, 9510
0300-0310	CBC Northern Quebec Service.	6195, 9625	0330-0400	UAE Radio, Dubai.....	6140, 9740			Deutsche Welle, W. Germany..	7150, 7225
0300-0315	Radio Budapest, Hungary....	6025, 6110	0330-0400	All India Radio.....	11705		0430-0500	Radio Austria International.	9565, 9765
		9520, 9835	0330-0400		5985				5945, 6155
0300-0325	Radio Netherland.....	6020, 6165	0335-0340	Radio Tanzania.....	6200, 7065		0430-0500	Radio Berlin International..	9560, 9620
		9590, 9895		Radio Tirana Albania.....	9640		0430-0500	Radio Netherlands.....	9895, 11720
0300-0330	BBC, England.....	5975, 6005	0340-0400	UAE Radio, Dubai.....	3905, 4860		0445-0500	Radio France International..	6055, 6175
		6120, 6155	0345-0400	All India Radio.....	7105, 9545				7135, 9535
		6175, 7160			9610, 11830				9550, 9790
		7185, 7325			11895, 11940				9800
		9515, 9915	0345-0400	Voice of Greece.....	7430, 9420				
0300-0330	Radio Berlin International..	6125, 6165	0345-0400	Radio France International..	6055, 6175				
0300-0330	Radio Cairo, Egypt.....	9475, 9675			7135, 9535				
0300-0330	Radio Canada International..	5960, 9755	0345-0400		9550, 9800				
0300-0330	Radio Japan General Service	17810, 17835	0350-0359	Radio New Zealand Int'l....	97901				
		17845		Radio Yerevan, Armenia SSR	9620, 9645				
0300-0330	Radio Kiev, Ukrainian SSR...	6035, 7165			11705				
		7175, 7250	0400 UTC [11:00 AM EST/8:00 PM PST]		11790, 13605				
		11790, 1605			15180				
0300-0330 (T-A)	Radio Portugal.....	9565	0400-0410	Voice of Kenya.....	6090		0500-0515	Radio Belize.....	3285
0300-0330 (S,M)	WINB, Pennsylvania.....	15145	0400-0415	Radio Budapest.....	6025, 6110		0500-0510	Radio Lesotho.....	4800
0300-0350	Deutsche Welle, West Germany	6010, 9545	0400-0415	Radio Cultural, Guatemala...	9520, 9835		0500-0515	Deutsche Welle.....	5960, 6065
		9565, 9840	0400-0425	Radio Netherlands.....	3300				6120, 6130
0300-0350	Radio Berlin International..	9560	0400-0425	Radio RSA, South Africa.....	7175, 9895				7150, 7225
0300-0350	Voice of Turkey.....	9560	0400-0425		3230, 4990				9565, 9700
0300-0400	Armed Forces Radio and TV...	6030, 11730	0400-0430	BBC, England.....	7270, 9585		0500-0515	Koi Israel.....	7410, 9009
		11790, 12060			5975, 7160		0500-0525		9435, 9860
		17765, 21570	0400-0430	Radio Bucharest, Romania....	6175, 7160		0500-0530		11610, 11960
0300-0400	CFCX, Montreal, Canada.....	6005	0400-0430		12095, 15420		0500-0530	Vatican Radio.....	11725, 15190
0300-0400	CFRX, Toronto, Canada.....	6070			5990, 9510		0500-0530 (M)	Radio Netherland.....	9895, 11720
0300-0400	CFVP, Calgary, Canada.....	6030			9570, 11810		0500-0530 (S,M)	Capital Radio, S. Africa....	3930
0300-0400	CHNX, Halifax, Canada.....	6130			11940		0500-0530	KNLS, Alaska.....	9670
0300-0400	Christian Science Monitor...	9745	0400-0430 T-A	Radio Canada Intl.....	5960, 9755		0500-0530	Radio Canada Int'l.....	11840
0300-0400	CKFX, Vancouver, Canada.....	6080			11920		0500-0530	Radio Norway International.	15180, 15165
0300-0400	HCJB, Ecuador.....	6230, 9670	0400-0430 M	Radio Norway International..	9590		0500-0545	Trans World Radio, Bonaire..	9535
0300-0400	KCBI, Texas.....	11910	0400-0430	Swiss Radio International...	6135, 9725			Radio Havana Cuba.....	5970, 6080
0300-0400	KSDA, Guam (AWR).....	17840			9885, 12035				6100, 9740
0300-0400	KVOH, California.....	9852.5	0400-0430 (S,M)	TWR Bonaire.....	9535		0500-0550	Deutsche Welle.....	5960, 6120
0300-0400	KYOH, Saipan.....	15190		Trans World Radio, Bonaire..	4835, 7295		0500-0600	ABC, Melbourne, Australia..	15330
0300-0400	La Voz Evangelica, Honduras.	4820	0400-0500	ABC, Perth, Australia.....	15425		0500-0600	ABC, Perth, Australia.....	15425
0300-0400	Radio Australia.....	15160, 15240	0400-0500	Armed Forces Radio and TV...	6030, 12060		0500-0600	Armed Forces Radio and TV...	6030, 11790
		15320, 15395			11730, 11790				15330, 17785
		17715, 17750			17765				5875, 6005
		17795, 11750	0400-0500	BBC, London, England.....	6005, 7105				6175, 7105
0300-0400	Radio Beijing, China.....	15180, 15280	0400-0500	Capital Radio, South Africa.	3827, 3830		0500-0600	BBC, London.....	7160, 9410
		15445			7149				9510, 9600
0300-0400	Radio Belize.....	3285	0400-0500	CBC Northern Quebec Service.	6195		0500-0600		9825, 12095
0300-0400	Radio Cultural, Guatemala...	5955	0400-0500	CFCX, Montreal, Canada.....	6005		0500-0600	CBC Northern Quebec Service.	9625
0300-0400 (T-S)	Radio Dublin International..	6910	0400-0500	CFRX, Toronto, Canada.....	6070		0500-0600	CFCX, Montreal, Canada.....	6005
0300-0400 (T-S)	Radio Earth.....	7355	0400-0500	CFVP, Calgary, Canada.....	6030		0500-0600	CFRX, Toronto, Canada.....	6070
0300-0400	Radio Havana Cuba.....	6080, 6100	0400-0500	CHNX, Halifax, Canada.....	6130		0500-0600	CFVP, Calgary, Canada.....	6030
		6140, 9740	0400-0500	Christian Science Monitor...	9745		0500-0600	CHNX, Halifax, Canada.....	6130
							0500-0600	Christian Science Monitor...	9745
							0500-0600	CKFX, Vancouver, Canada.....	6080
							0500-0600	HCJB, Quito, Ecuador.....	6230, 9670
									11910

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0500-0600	Kol Israel.....	11610	0615-0655 (A,S)	BRT, Belgium.....	9680, 21810	0730-0800	Radio Netherlands.....	9630, 9715
0500-0600	TEN KVOH, California.....	9852.5	0615-0630 (M-F)	Radio Canada International..	6140, 7155	0730-0800	Radio Prague.....	11855, 17840
0500-0600	KYOI, Saipan.....	15190			9740, 9760			21705
0500-0600	Radio Australia.....	15160, 15240			11775			
		15320, 15395	0615-0630 (M-A)	Vatican Radio.....	15190, 17730			
		17715, 17750	0625-0700	TWR, Monaco.....	7105			
		17795, 17795	0630-0655	Radio Netherland.....	9895, 11930	0800-0805	GBC, Accra, Ghana.....	3366
0500-0600	Radio Beijing, China.....	9565	0630-0700	Radio Polonia.....	6135, 7270	0800-0825 (M-F)	BRT, Belgium.....	9880, 17585
0500-0600	Radio Canada International..	6140			9675	0800-0825	Radio Netherlands.....	9630, 9715
0500-0600v	Radio Dublin International..	6910	0630-0700	Radio RSA, South Africa....	5980, 7270	0800-0825	Voice of Malaysia.....	6175, 9750
0500-0600	Radio Japan General Service.	9675, 15235			9585, 11900			15295
		17810	0630-0700	Radio Sofia, Bulgaria.....	9700, 11720	0800-0830	Radio Bangladesh.....	11645, 12030
		7275			15140	0800-0830	HCJB, Quito, Ecuador.....	6130, 6205
0500-0600	Radio Korea World News Svc..	5905	0630-0700	Radio Tirana.....	7080, 9500	0800-0830		9745, 9660
0500-0600	Radio Uganda.....	4976, 5026	0630-0700	Swiss Radio International..	3985, 6165	0800-0830	Voice of Nigeria.....	7255, 15185
0500-0600	S				9535, 9870	0800-0845 (S)	FEBA, Seychelles.....	15120, 17795
0500-0600	Radio Zambia.....	11880	0645-0700 (M-F)	HCJB, Quito, Ecuador.....	12030, 15430	0800-0900	AFAN, Antarctica.....	6012
0500-0600	SBC Radio 1, Singapore.....	11940	0645-0700	Radio Bucharest, Romania...	6205	0800-0900	AFRTS Far East Network....	11750
0500-0600	Soloman Islands Bcating Co	5020			11940, 15250	0800-0900	BBC, London.....	9410, 9510
0500-0600	Spanish Foreign Radio.....	9630			15335, 17790	0800-0900 (S)	BBS, Bhutan.....	6035
0500-0600	VLW 15, Lyndhurst,Australia	15230			17805, 21665	0800-0900	CFCX, Montreal, Canada.....	6005
0500-0600	VLW 15, Waneroo, Australia.	15425				0800-0900	CFRX, Toronto, Canada.....	6070
0500-0600	Voice of America.....	5995, 6035				0800-0900	CFVP, Calgary, Canada.....	6030
		7170, 7200	0700 UTC	[2:00 AM EST/11:00 PM PST]		0800-0900	CHNX, Halifax, Canada.....	6130
		9575, 9670				0800-0900	CKFX, Vancouver, Canada....	6080
		11925, 15205	0700-0712	Radio Bucharest, Romania...	11940, 15250	0800-0900	FEBC, Manila.....	6030, 11890
0500-0600	Voice of Nicaragua.....	6015			15335, 17790			21475
0500-0600	WHRI, Indiana.....	7400			17805, 21665	0800-0900	FEN, Tokyo.....	3910, 6155
0500-0600v (M)	World Music Radio.....	6910	0700-0725	Radio Tirana Albania.....	9500, 11985	0800-0900 (S,A)	GBC, Accra, Ghana.....	3366
0500-0600	WRNO Worldwide.....	6185	0700-0730	Burma Broadcasting Corp....	9730	0800-0900	HCJB, Quito, Ecuador.....	6130, 9745
0530-0600	Radio Cameroon.....	4850	0700-0730	BBC, London.....	5950, 5975	0800-0900	King of Hope, Lebanon.....	6280
0530-0600	Radio Netherland.....	6165, 9715			6050, 7150	0800-0900	KNLS, Anchor Point, Alaska.	11860
					7210, 9510	0800-0900	KTWR, Guam.....	11735
					15360	0800-0900	KYOI, Saipan.....	15190
					9535	0800-0900	Radio Australia.....	5995, 6080
					11880v			9580, 9655
					6070			9710, 15395
					11780, 15150			11720, 17715
					6065, 7355			17750
					7400, 9455	0800-0900	Radio Earth (via Milan)....	7295
					11930, 13750	0800-0900	Radio Korea World News Svc..	7275
					15340	0800-0900	Radio Kuwait.....	9750
					9660	0800-0900 (S)	Radio Prague.....	6055, 9505
					9680			11990
					15400	0800-0900	Radio Pyongyang, N. Korea..	13680, 11830
					6035			15160, 15180
					6005	0800-0900	RTE Portugal.....	9670
					6070	0800-0900	SBC Radio 1, Singapore.....	5010, 11940
					6030	0800-0900	TWR Monte Carlo.....	7105
					6130	0800-0900	Voice of Indonesia.....	11790, 15150
					6080	0800-0900	WHRI, Indiana.....	7355
					11830	0800-0900 (S)	WRNO Worldwide.....	6185
					11850, 15350	0830-0900	Radio Austria Int'l.....	6000, 6155
					3366			11915, 15410
					6205, 9745	0830-0900	Radio Beijing.....	9700, 11755
					9845			15440
					6280	0830-0900	Radio Prague,Czechoslovakia	11855, 17840
					6005			21705
					9555	0830-0840	All India Radio.....	5960, 5970
					15190			5990, 6010
					4890			6020, 6050
					5995, 9655			6100, 7110
					7295			7125
					9525	0830-0855 (M-A)	Radio Netherlands.....	9630
					9675, 9735	0830-0900	HCJB, Quito, Ecuador.....	6130, 9745
					11855, 15235			11925
					17810, 17855	0830-0900	Radio Netherlands.....	17575, 21485
					9560	0830-0900	Swiss Radio International..	9560, 11745
					7290, 17590			11905, 15570
					17880	0840-0900	Radio Australia.....	6045, 6060
					9655, 11905			9580, 15395
					5010, 11940	0847-0852 (A)	R. Pacific Ocean, Vladivost.	9500, 9620
					5020			9635, 9785
					4920			9810, 11710
					3990, 5995			11815, 11910
					6035, 6080			12010, 15260
					6125, 7280			15295, 17785
					9550, 9670			17815, 17850
					5985			
					6175, 9750	0900 UTC	[4:00 AM EST/1:00 AM PST]	
					15295	0900-0905	Africa Number One, Gabon....	7200, 15200
					17800	0900-0915	BBC, London.....	9410, 9510
					9620			9750, 11750
					6910			11880
					6185	0900-0915 (S)	Radio Austria International.	6000, 6155
					11725, 15190			11915
					15120, 17795	0900-0925	Radio Netherlands.....	17575, 21485
					7105	0900-0930	Radio Australia.....	5995, 6080
					5990, 6010			9580, 9655
					6020, 6050			9710, 11720
					7110, 7250	0900-0930	Radio Korea.....	7275
					9610, 11730	0900-0950	Radio Pyongyang N. Korea...	9765, 11830
					11850, 11935			13650
					9410, 9510	0900-1000	ABC, Brisbane, Australia....	9620, 9680
					12095, 15070	0900-1000 (S)	Advertis World Radio.....	9670
					11735, 15115	0900-1000	AFRTS.....	6030, 6125
					6120, 11755			9530, 9580
					15265			9700
0600-0700	Radio Ghana.....	4915	0700-0730 (A,S)	TWR, Bonaire.....	9535			
0600-0610	Voice of Kenya.....	4806, 6090	0700-0730v	Radio Zambia.....	11880v			
0600-0620	Vatican Radio.....	6185, 9645	0700-0735	TWR Swaziland.....	6070			
0600-0625	Radio Netherland.....	6165, 9715	0700-0745	Radio New Zealand Int'l....	11780, 15150			
0600-0630	AWR, Italy.....	6185	0700-0745	WYFR, Florida.....	6065, 7355			
0600-0630	Deutsche Welle.....	7290, 9625			7400, 9455			
		9700	0700-0750	Radio Pyongyang.....	11930, 13750			
0600-0700	Armed Forces Radio and TV...	6030, 15330			15340			
		17765	0700-0800	ABC Brisbane.....	9660			
0600-0700	BBC, London.....	5965, 5975	0700-0800	ABC Lyndwurst.....	9680			
		6175, 7150	0700-0800	Armed Forces Radio and TV..	15400			
		7185, 7120	0700-0800 (S)	BBS, Bhutan.....	6035			
		9510, 9600	0700-0800	CFCX, Montreal, Canada.....	6005			
		9825, 9915	0700-0800	CFRX, Toronto, Canada.....	6070			
0600-0700 (S)	BBS, Bhutan.....	6035	0700-0800	CFVP, Calgary, Canada.....	6030			
0600-0700	CFCX, Montreal, Canada.....	6005	0700-0800	CHNX, Halifax, Canada.....	6130			
0600-0700	CFRX, Toronto, Canada.....	6070	0700-0800	CKFX, Vancouver, Canada....	6080			
0600-0700	CFVP, Calgary, Canada.....	6030	0700-0800 (A,S)	ELWA, Liberia.....	11830			
0600-0700	CKFX, Vancouver, Canada.....	6080	0700-0800	FEBC, Manila.....	11850, 15350			
0600-0700	CHNX, Halifax, Canada.....	6130	0700-0800	GBC, Accra, Ghana.....	3366			
0600-0700	TEN Christian Science Monitor...	7365	0700-0800	HCJB.....	6205, 9745			
0600-0700	GBC, Accra, Ghana.....	3366			9845			
0600-0700	HCJB, Quito, Ecuador.....	6230, 9870	0700-0800	King of Hope, Lebanon.....	6280			
		11910	0700-0800	TEN KVOH, California.....	6005			
0600-0700	King of Hope, Lebanon.....	6280	0700-0800	KNLS, Anchor Point, Alaska..	9555			
0600-0700	TEN KVOH, California.....	6005	0700-0800	KYOI, Saipan.....	15190			
0600-0700	KYOI, Saipan.....	15190	0700-0800	NBC, Papua New Guinea.....	4890			
0600-0700	Radio Australia.....	15160, 15240	0700-0800	Radio Australia.....	5995, 9655			
		17715, 17750	0700-0800 (S)	Radio Earth (via Milano)....	7295			
		17795	0700-0800	Radio Havana Cuba.....	9525			
0600-0700	Radio Cook Islands.....	11760	0700-0800	Radio Japan General Service.	9675, 9735			
0600-0700	Radio Havana Cuba.....	9525			11855, 15235			
0600-0700	Radio Korea, South.....	9570, 7275	0700-0800	Radio Kuwait.....	17810, 17855			
0600-0700	Radio Moscow.....	5905, 7175	0700-0800	Radio Moscow.....	9560			
		7310, 7270			7290, 17590			
		7300, 9490	0700-0800	Radio Thailand.....	17880			
		9635, 9580	0700-0800	SBC Radio 1, Singapore.....	9655, 11905			
		9755, 11770	0700-0800	Soloman Islands Bcating Svc	5010, 11940			
		11950, 12030	0700-0800	VLM4 Brisbane, Australia....				

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1300-1337 (A-S)	TWR, Bonaire.....	11815	1400-1500	All India Radio.....	11810, 15335	1500-1600	Radio Australia.....	5995, 6030
1300-1350	Radio Pyongyang, N. Korea...	9345, 11665	1400-1500	BBC, London.....	7105, 9740	1500-1600	Radio Canada International.	6060, 6060
1330-1355 (S)	Radio Finland.....	11945, 15400			9750, 12095	1500-1600	Radio Japan General Service.	6035, 7205
1300-1400	4VEH, Haiti.....	4930			15070, 17705	1500-1600	Radio Moscow.....	8580
1300-1400	ABC Waneroo, Australia.....	6140, 9610			17790, 17885	1500-1600	RTM, Sarawak, Malaysia.....	11955, 15440
1300-1400	AFRTS.....	6125, 9700	1400-1500	CBC Northern Quebec Service.	9625, 11720	1500-1600	SBC Radio 1, Singapore.....	17820
		11805, 5330	1400-1500	CFCX, Montreal, Canada.....	6005	1500-1600	Sri Lanka Broadcasting Corp.	5990, 11815
1300-1400	B.S. Kingdom Saudi Arabia..	11855v	1400-1500	CFRX, Toronto, Canada.....	6070	1500-1600	Voice of America.....	15310, 21700
1300-1400	CBC Northern Quebec Service	9625, 11720	1400-1500	CFVP, Calgary, Canada.....	6030	1500-1600	Voice of Nigeria.....	11705, 11840
1300-1400	CFCX, Montreal, Canada.....	6005	1400-1500	CHNX, Halifax, Canada.....	6130	1500-1600	15425	9535 LSB
1300-1400	CFRX, Toronto, Canada.....	6070	1400-1500	CKFX, Vancouver, Canada.....	6080	1500-1600	Voice of Indonesia.....	6110, 15205
1300-1400	CFVP, Calgary, Canada.....	6030	1400-1500	FEBC, Manila.....	9685, 11815	1500-1600	V. Revolutionary Ethiopia..	7255, 11770
1300-1400	CHNX, Halifax, Canada.....	6130	1400-1500	HCJB, Quito, Ecuador.....	11745, 15115	1500-1600	WHRI, Indiana.....	11790, 15150
1300-1400	CKFX, Vancouver, Canada.....	6080	1400-1500		17890	1500-1600	WRNO Worldwide.....	11965
1300-1400	CKZU, Vancouver, Canada.....	6160	1400-1500	Kuching, Sarawak, Malaysia	4950	1513-1600 (F-S)	FEB, Seychelles.....	11820
1300-1400	FEBC, Manila.....	11850	1400-1500	KVOH, California.....	11940	1515-1600	Radio Berlin Int'l.....	15204
1300-1400	FEN, Tokyo.....	6155	1400-1500 (S)	Radio Beijing.....	11600, 15165	1530-1600	Radio Bangladesh.....	7195
1300-1400	GBC, Accra, Ghana.....	7295	1400-1500	Radio Canada International.	11955, 17820	1530-1600 (M-A)	Radio Budapest Hungary.....	9835, 11910
1300-1400	HCJB, Quito, Ecuador.....	11745, 15115	1400-1500	Radio Korea, South.....	9570, 9750	1530-1600	R. Prague, Czechoslovakia..	15160, 15220
		17890	1400-1500	Radio Moscow.....	15575	1530-1600	Radio Yugoslavia.....	17710, 21665
1300-1400	KTWR, Guam.....	9870	1400-1500		6020, 6050	1530-1600	Swiss Radio International..	11730, 11990
1300-1400	NBC, Port Moresby, Papua New Guinea.....	4890			7160, 7265	1530-1600	17570, 17830	15305, 15430
1300-1400	Radio Australia.....	5995, 6060			9580, 11840	1530-1600	Voice of Asia, Taiwan.....	17570, 17830
		9580			12025, 13615	1530-1600	WYFR, USA.....	5980, 7445
1300-1400	Radio Beijing.....	4460, 5320			13665, 13680	1540-1550	Voice of Greece.....	11875, 15170
		5860, 5880			13790, 15225	1545-1600	Vatican Radio.....	11645, 15630
		9550, 9730			15320, 15375			17565
1300-1400	Radio Moscow.....	11660, 11755			15475, 15540			11810, 15120
		11840, 13615	1400-1500	Radio Pyongyang, N.Korea....	9555, 9750	1600 UTC	[11:00 AM EST/8:00 AM PST]	
		13665, 13680	1400-1500	Radio RSA, South Africa....	21590	1600-1605	SBC Radio 1, Singapore....	11940
		13790, 15210	1400-1500	Radio Veritas, Philippines	6160	1600-1615	Radio Pakistan.....	9645, 11675
		15225, 15375	1400-1500	SBC Radio 1, Singapore.....	5010, 5052			11735, 11925
		15475, 15530	1400-1500	Sri Lanka Broadcasting Corp.	11940			15515, 15595
		15540, 15595	1400-1500		6075, 9720			17660
		17655, 17665	1400-1500	WHRI, Indianapolis.....	15425	1600-1630	Radio Berlin Int'l.....	15255
		17820	1400-1500	WYFR, USA.....	11790	1600-1630 (S)	Radio Norway International..	9730, 11860
1300-1400	Radio RSA, South Africa....	15220, 21535	1400-1500	Voice of America.....	9680, 11830	1600-1630 (M-F)	Radio Poland.....	6135, 9540
		21590	1400-1500	Voice of Nigeria.....	11875	1600-1630	Radio Portugal.....	15105, 15330
1300-1400 TES	Radio Veritas, Philippines...	6160	1400-1500	KTWR, Guam.....	6110, 7230	1600-1630	Radio Sweden Int'l.....	11705
1300-1400	SBC Radio 1, Singapore.....	5010, 5052	1400-1500	GBC, Accra, Ghana.....	9760, 11715	1600-1630	Voice of Vietnam.....	10040, 15010
		11940	1400-1500	Radio Berlin Int'l.....	7255, 15120	1600-1645	TWR, Swaziland.....	3200
1300-1400	Sri Lanka Broadcasting Corp.	6075, 9720	1400-1500	Radio Australia.....	9820	1600-1700	AFRTS.....	9700, 11805
		15425	1400-1500		7295			15330, 15430
1300-1400	Voice of America.....	15425	1415-1430	Radio Budapest Hungary.....	11795, 15445	1600-1700	BBC, London.....	9410, 9515
		6110, 7230	1415-1500 (S,A)	Radio Korea World News Svc..	17700			11705, 12095
1300-1400	Voice of Nigeria.....	9660, 9760	1415-1500	Radio Netherland.....	5995, 6045	1600-1700 (A)	CBC Northern Quebec Service.	9625, 11720
		7255, 15120	1415-1500		6060, 6035	1600-1700	CFCX, Montreal, Canada.....	6005
1300-1400	WHRI, Indiana.....	11790	1430-1500	Radio Ulan Bator, Mongolia..	6080, 7205	1600-1700	CHNX, Halifax, Canada.....	6130
1300-1400 (S)	WRNO Worldwide.....	9715	1430-1500 (M-A)	Radio Yugoslavia.....	9580	1600-1700	CFRX, Toronto, Canada.....	6070
1300-1400	WYFR, USA.....	5985, 9680	1430-1500	WRNO, Worldwide.....	9835, 11910	1600-1700	CFVP, Calgary, Canada.....	6070
		11830	1430-1500	Radio Vatican.....	15160, 15220	1600-1700	CKFX, Vancouver, Canada.....	6030
1330-1400	All India Radio.....	11810, 15335	1445-1500	Radio Ulan Bator, Mongolia..	13770, 15560	1600-1700	KVOH, California.....	6080
1330-1400	Laotian National Radio.....	7123v	1445-1500		17575	1600-1700	KYOI, Saipan.....	17775
1330-1400	BBC, London.....	9750, 9760	1500 UTC	[10:00 AM EST/7:00 AM PST]	9620, 15240	1600-1700	Radio Australia.....	9665
		12095, 15070	1500-1505	Africa #1, Gabon.....	11965	1600-1700		6035, 6060
		17885, 21710	1500-1520	Radio Ulan Bator Mongolia...	15090	1600-1700	Radio Beijing.....	6080, 9550
1330-1400	BBS, Bhutan.....	6035	1500-1525	Radio Finland.....	9575	1600-1700	Radio Canada International.	11955, 15440
1330-1400	Radio Berlin Int'l.....	21465	1500-1530	HCJB, Quito, Ecuador.....	11740, 11745	1600-1700	Radio France International..	17820
1330-1400	Radio Korea World News Svc.	15575	1500-1530	Radio Austria International.	15115, 17890	1600-1700	Radio Jordan.....	6175, 9660
1330-1400	Radio Tashkent.....	7325, 9715	1500-1530	Radio Bucharest.....	6000, 6155	1600-1700	Radio Korea.....	11705, 17620
		15460	1500-1530	Radio Netherland.....	12015, 15420	1600-1700	Radio Malawi.....	9560
1300-1400	Swiss Radio International..	9670, 11905	1500-1530	Radio Netherland.....	11940, 15250	1600-1700	Radio Moscow.....	5975, 9870
		11955, 12030	1500-1530		15335	1600-1700	Radio Prague, Czech.....	3380, 5995
		15570, 15585	1500-1530	Radio Austria International.	5955, 11735	1600-1700	Radio Riyadh, Saudi Arabia..	11840, 13790
		11940, 17775	1500-1530	Radio Bucharest.....	13770, 15560	1600-1700	Radio Tanzania.....	15375
		17865, 21605	1500-1530	Radio Netherland.....	17575	1600-1700	Radio Zambia.....	11990, 13715
1330-1400	Voice of Vietnam.....	10040, 15010v	1500-1530		9575	1600-1700	UAE Radio.....	15110, 17705
1330-1400	Radio Austria International	11935	1500-1530	Radio Veritas, Philippines..	9565, 15120	1600-1700	Radio Riyadh, Saudi Arabia..	9720v
1330-1400	WYFR, Florida.....	15055	1500-1530	TWR, Guam.....	9870	1600-1700	Radio Tanzania.....	6105
1330-1355 (M-F)	BRT, Belgium.....	15580, 15590	1500-1530	Voice of Nigeria.....	7255, 11770	1600-1700	Radio Zambia.....	9505
1337-1400 (A)	TWR, Bonaire.....	11815	1500-1530	Deutsche Welle.....	15135, 17825	1600-1700	UAE Radio.....	9640, 11955
1345-1400	Vatican Radio.....	7250, 9645	1500-1530	Radio RSA, South Africa....	21590	1600-1700	Voice of America.....	15320, 1435
		11740	1500-1530	AFRTS.....	9700, 11805	1600-1700	6110, 9575	9780, 11920
			1500-1530		15330, 15430	1600-1700	15410, 15445	15580, 15600
1400 UTC	[9:00 AM EST/6:00 AM PST]		1500-1530	BBC, London.....	9515, 11775	1600-1700	17785, 17800	17870
1400-1415	GBC, Accra, Ghana.....	7295	1500-1530		15070, 15280	1600-1700	Voice of Asia.....	5980, 7445
1400-1415	Radio Berlin International.	21465	1500-1530	CBC Northern Quebec Service.	17740, 17885	1600-1700	Voice of Nigeria.....	7255, 11770
1400-1415	U.A.E. Radio, Dubai.....	11940, 17775	1500-1530	CFCX, Montreal, Canada.....	21710	1600-1700	WHRI, Indiana.....	15105
		17865, 21605	1500-1530	CFRX, Toronto, Canada.....	9625, 11720	1600-1700	WRNO Worldwide.....	15420
1400-1430	Radio Australia.....	5995, 6035	1500-1530	CFVP, Calgary, Canada.....	6005	1600-1700	WYFR, Florida.....	11580, 11830
		6045, 6060	1500-1530	CHNX, Halifax, Canada.....	6070			11875, 15586
		6080, 9580	1500-1530	CKFX, Vancouver, Canada.....	6030			17640, 17845
		9710	1500-1530	FEBC, Manila.....	6080			21525
1400-1430	Radio Finland.....	11945, 15400	1500-1530	HCJB, Quito, Ecuador.....	6130	1610-1620 (M-F)	Radio Botswana.....	4820, 7255
1400-1430	Radio Japan General Service.	5990, 7140	1500-1530		9670	1610-1645	Radio Belem.....	3205
		9675, 9685	1500-1530		11940	1630-1655 (M-F)	BRT Belgium.....	11885, 15515
		11815	1500-1530					
1400-1430 (S)	Radio Norway International.\	15245, 15300	1500-1600					
		15310	1500-1600					
1400-1430	Radio Polonia.....	8095, 7285	1500-1600					
1400-1430	Radio Sweden International.	11785, 15345	1500-1600					
1400-1430	Radio Tirana.....	9500, 11985	1500-1600					
1400-1430	WRNO, Worldwide.....	9715	1500-1600					
1400-1500	AFRTS.....	9700, 11805	1500-1600					
		15330, 15430	1500-1600					

frequency SECTION

1630-1700	KNLS, Alaska.....	7355
1630-1700	ELWA, Liberia.....	11830
1630-1700	Radio Nacional Angola.....	7245, 9535
		11955
1630-1700	Radio Netherland.....	6020, 15570
1630-1700	Radio Polonia.....	7125, 9525
1630-1700	Voice of Africa, Egypt....	15255
1645-1700	Radio Pakistan.....	6230, 9455
		9465

1700 UTC [12:00 PM EST/9:00 AM PST]

1700-1710	Voice of Lebanon.....	6548
1700-1720	Radio Netherland.....	9515, 15570
1700-1730	BBC, England.....	9515, 11775
		11955, 12095
		15070, 15260
		15400, 17880

1700-1730	Radio Australia.....	6035, 6060
		7205

1700-1730	Radio Japan.....	5990, 11815
1700-1730	Radio Norway International..	9655, 15230
		15305

1700-1730	Radio Portugal.....	15250
1700-1730	Swiss Radio International...	3985, 6165
		9535

1700-1800	4VEH, Haiti.....	4930
1700-1800	AFRTS.....	9700, 11805
		15330, 15345
		15430

1700-1800	CBC, N. Quebec, Canada....	9625, 11720
1700-1800	CFCX, Montreal, Canada.....	6005
1700-1800	CFRX, Toronto, Canada.....	6070
1700-1800	CFVP, Calgary, Canada.....	6030
1700-1800	CHNX, Halifax, Canada.....	6130
1700-1800	CKFX, Vancouver, Canada....	6080
1700-1800	CKZU, Vancouver, Canada....	6160
1700-1800	(S) KCBI, Texas.....	11735
1700-1800	KNLS, Alaska.....	7355
1700-1800	TEN KVOH, California.....	17775
1700-1800	KYOI, Saipan.....	9665
1700-1800	Radio Beijing.....	9570, 11600
1700-1800	Radio Korea, South.....	5975, 15575
1700-1800	Radio Moscow.....	9490, 9825
		11745, 11840
		15375

1700-1800	(MWF) Radio Nacional, Eq. Guinea	9535
1700-1800	Radio Nacional Angola.....	7245, 9535
		11955
1700-1800	Radio Pyonyang, N. Korea....	7105, 7205
		7305, 9325
		9860, 9977

1700-1800	Radio Riyadh, Saudi Arabia..	9720v
1700-1800	Radio Tanzania.....	6105
1700-1800	Radio Zambia.....	9505
1700-1800	Voice of Africa, Egypt....	15255
1700-1800	Voice of America.....	11760, 15410
		15575, 15580
		15600, 17785
		17800, 17870

1700-1800	Voice of Nigeria.....	11770
1700-1800	WHRI, Indiana.....	15105
1700-1800	WINB, Pennsylvania.....	15285
1700-1800	TEST WMLK, Pennsylvania.....	15110
1700-1800	WRNO Worldwide.....	15420
1700-1800	WYFR, Florida.....	11580, 11830
		11875
		15070

1730-1745	BBC.....	6035, 9580
1730-1800	Radio Australia.....	7145, 9640
1730-1800	Radio Bucharest, Romania....	9690, 11830
		6135, 9540

1730-1800	Radio Polonia.....	6135, 9540
1730-1800	Radio Surinam.....	17755
1730-1800	Spanish Foreign Radio.....	6020, 7275
		9765

1745-1800	BBC, London.....	9410, 11745
		12085, 15070
		15260, 15400
1730-1800	Radio Sofia, Bulgaria.....	11735, 11840
		15310

1745-1800	Radio Berlin Int'l.....	9730
1745-1800	SLBC, Sri Lanka.....	11800

1800 UTC [1:00 PM EST/10:00 AM PST]

1800-1810	Voice of Kenya.....	6135
1800-1815	Kol Israel.....	13747
1800-1815	Radio Cameroon.....	4750, 4795
		4850, 5010
		9745

1800-1830	AWR, Italy.....	6205
1800-1830	Radio Berlin Int'l.....	9730
1800-1830	Radio Canada International..	15260, 17820
1800-1830	Radio Japan.....	7250, 9875
1800-1830	Radio Mozambique.....	3340, 9620
1800-1830	Swiss Radio Int'l.....	9535

1800-1830	TWR, Monte Carlo.....	11965
1800-1900	Voice of Africa, Egypt....	15255
1800-1830	Voice of Vietnam.....	12020
1800-1900	Deutsche Welle.....	7285, 9700
		9735, 11785

1800-1850	Radio Nacional do Brasil..	15265
1800-1900	4VEH, Haiti.....	4930
1800-1900	AFRTS.....	15330, 15345
		15430, 17765

1800-1900	All India Radio.....	11940, 15280
1800-1900	BBC, London.....	3955, 7325
		9410, 12095
		15070, 15400
		9625, 11720

1800-1900	CBC, N. Quebec Service.....	6005
1800-1900	CFCX, Montreal, Canada.....	6070
1800-1900	CFRX, Toronto, Canada.....	6030
1800-1900	CFVP, Calgary, Canada.....	6080
1800-1900	CKFX, Vancouver, Canada....	6160
1800-1900	CKZU, Vancouver.....	11735
1800-1900	KCBI, Dallas.....	7355
1800-1900	KNLS, Alaska.....	17775
1800-1900	TEN KVOH, California.....	9665
1800-1900	KYOI, Saipan.....	5995, 6045
1800-1900	Radio Australia.....	6060, 6035
		6080, 7215

1800-1900	(A,S) Radio Canada International..	15260, 17820
1800-1900	TEST R. Discovery, Dominican Rep	15045
1800-1800v	Radio Jamahiriya, Libya....	15450v
1800-1900	Radio Korea.....	5975, 15575
1800-1900	Radio Kuwait.....	11675
1800-1900	(MWF) Radio Nacional, Eq. Guinea...	9553
1800-1900	Radio New Zealand Int'l....	11780, 15150
1800-1900	Radio Moscow.....	9625, 11840
		15375

1800-1900	Radio Riyadh, Saudi Arabia..	9720v
1800-1900	Radio Tanzania.....	6105
1800-1900	Radio Zambia.....	9505
1800-1900	RAE, Argentina.....	15435
1800-1900	TWR, Swaziland.....	9550
1800-1900	Voice of America.....	11760, 11920
		11580, 15445
		15580, 15410
		15600, 17785
		17870, 17800
		11770, 15120

1800-1900	Voice of Nigeria.....	11770, 15120
		17800
		15105
		15400
		15420
		9535, 11580
		11830, 11875
		11860, 12015
		17755

1805-1830	(A,S) Radio Austria Int'l.....	6240, 7505
1814-1817	Radio Suriname Int'l.....	6080, 6115
1815-1900	Radio Bangladesh.....	5910, 9905
1815-1900	Radio Berlin International..	6120, 9655
1830-1855	(M-A) BRT Brussels, Belgium.....	11755
1830-1855	Radio Finland.....	5995, 6135
		7125, 7285

1830-1900	Radio Polonia.....	9525, 9675
		11840

1830-1900	Radio Sofia, Bulgaria.....	6070, 9700
		11720

1830-1900	Radio Sweden Int'l.....	11845
1830-1900	Radio Tirana.....	7065, 9480
1830-1900	Swiss Radio International..	9885, 11955
1830-1900	Radio Netherlands.....	6020, 9540
		17605, 21685
		11840, 15375

1830-1900	Spanish Foreign Radio.....	11940
1830-1900	Radio Abidjan, Ivory Coast.	11785
1830-1900	Radio Havana Cuba.....	11780
1830-1900	Radio New Zealand.....	11780, 15150
1840-1900	Voice of Greece.....	11645, 12105
		15630
		7412, 11620

1845-1900	All India Radio.....	7412, 11620
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1900 UTC [2:00 PM EST/11:00 AM PST]

1900-1915	Radio Bangladesh.....	9855, 11555
1900-1925	Radio Netherland.....	6020, 9540
		17605, 21685

1900-1925	Radio Prague, Czechoslovakia	5930, 7345
1900-1930	(M-F) Radio Canada International..	5985, 7285
		15260, 15325
		17820, 17875
		21685

1900-1930	Radio Japan.....	9505
1900-1930	Radio Kiev, Ukrainian SSR...	7230, 8010
		6090, 6185
		9580, 11850
		15225

1900-1930	(S) Radio Norway Int'l.....	9580, 11850
		15225
1900-1930	Spanish Foreign Radio.....	15375
1900-1930	Voice of Vietnam.....	10040, 15010v
1900-2000	4VEH, Haiti.....	4930

1900-2000	AFRTS.....	15330, 15345
		15430, 17765
		21620

1900-2000	All India Radio.....	7150, 9665
		11620, 11845
		15265

1900-2000	BBC, London.....	3955, 7320
		9410, 15070
		15400

1900-2000	B.S. Kingdom Saudi Arabia..	9720
1900-2000	CBC Northern Quebec Serv....	9625, 11720
1900-2000	CFCX, Montreal, Canada.....	6005
1900-2000	CFRX, Toronto, Canada.....	6070
1900-2000	CFVP, Calgary, Canada.....	6030
1900-2000	CKFX, Vancouver, Canada....	6080
1900-2000	CKZU, Vancouver, Canada....	6160
1900-2000	HCJB, Ecuador.....	15270, 17790
1900-2000	KCBI, Texas.....	11735
1900-2000	KNLS, Alaska.....	7355
1900-2000	KVOH, California.....	17775
1900-2000	Radio Australia.....	5995, 6045
		6060, 6035
		6080, 7215
		9580

1900-2000	Radio Beijing.....	9860, 11500
1900-2000	(A,S) Radio Canada International..	7130, 9555
		11945, 15325
		17875

1900-2000	TEST R. Discovery, Dominican Rep	15045
1900-2000	Radio Havana Cuba.....	11795
1900-2000	Radio Kuwait.....	11675
1900-2000	Radio Moscow.....	9825, 9875
		11840, 11860
		13665, 15375

1900-2000	(MWF) Radio Nacional, Eq. Guinea...	9553
1900-2000	Radio New Zealand Int'l....	11780, 15150
1900-2000	Voice of America.....	9700, 15410
		15445, 15580
		11760, 17785
		17800, 17870

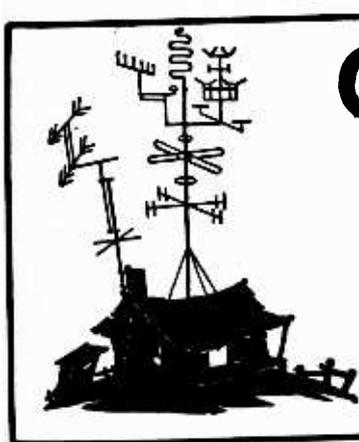
1900-2000	Voice of Nigeria.....	7255, 11770
1900-2000	V. Revolution.....	9595
1900-2000	WHRI, Indiana.....	15105
1900-2000	WINB, Pennsylvania.....	15400
1900-2000	WRNO Worldwide.....	15420
1900-2000	WYFR.....	11830, 11875
		11580, 15170
		15566, 21615

1900-2000	Radio Botswana.....	3355, 4820
1920-1930	M-A Voice of Greece.....	7430, 9395
		9420

1930-2000	Radio Beijing, China.....	9440, 11515
		11905

1930-2000	Radio Bucharest, Romania....	7145, 9690
		9750, 11940
		6120, 11755

1930-2000	Radio Finland.....	7145, 9690
1930-2000	Radio Sofia, Bulgaria.....	9700
1930-2000	Radio Tirana Albania.....	7075, 9500
1930-2000	V	



GETTING STARTED

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

"ANTENNAS NOT ALLOWED"

Many radio hobbyists are finding themselves in a position of not being able to erect an outside antenna. The reasons vary from community ordinances to unsympathetic landlords or parents. Fortunately, today's sensitive receivers don't need 1000 foot longwires to do a good job on the SW bands. Let's take a look at what can be done.

Those restrictions

The general public looks upon antennas as dangerous devices that cause damage when they fall, attract lightning and look terrible up there in the air. Very often a SWL, CBER or amateur in the neighborhood has aroused their ire by erecting what the community considers an eyesore.

What do most laws say?...

...that anything that looks like an antenna cannot be erected. No one really cares if you listen to the BBC on your radio as long as you don't endanger your neighbor or destroy the beauty of the area.

So, What can you do?

Erect an antenna that does not look like an antenna. Here are a few ideas that I like.

Several years ago an avid SWL moved into a development that forbade all types of outdoor antennas including TV. All services were underground. Everyone moving into the area had to agree in writing not to erect an outside antenna.

Our SWL friend noted that nearly every house in the neighborhood was decorated with light at Christmas-time and many of the houses had wires on them all year long. He simply installed a loop of green wire around his roof. Feeding it with 300 ohm TV lead-in through an antenna tuner he had an effective all band antenna, and never a complaint!

You can also use fine magnet wire (26 or 28 gauge) to form an invisible loop. Loop antennas work very well and on the band they are designed for provide some directivity (see fig. 1). Circle, oval, triangle or rectangle, it will work fine. The open end (front

and back) will favor the direction of the stations.

Can't put up a loop? A long wire or dipole can be strung along the roof of the house and fed at one end through an antenna tuner (figs. 2&3). Rain gutters can be pressed into service as a disguised antenna. If your rain gutter is painted, scrape the paint from a spot about the size of a dime and connect a thin wire at this point, a self-tapping screw or alligator clip can be used to make the connection. Run the wire to your receiver through an antenna tuner.

Keeping out of jail

Assume the worst case; any wire outside and a posse calls at your door to haul you off to the pokey!

Still not too difficult--if you live in a frame house! An antenna erected inside a frame house will work just as well as the same antenna outside at the same height.

The same loop, long wire or dipole can be used indoors. Drape the wire over, around and under obstructions where necessary.

The situation changes somewhat if you live in a steel building with its inherent shielding. You will need to experiment to find the best location.

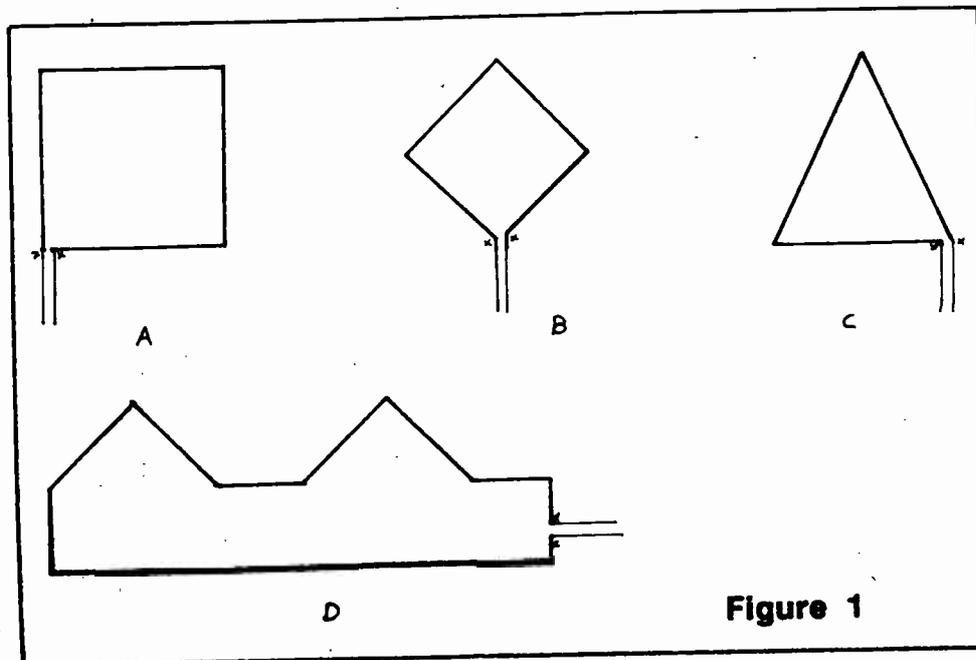


Figure 1

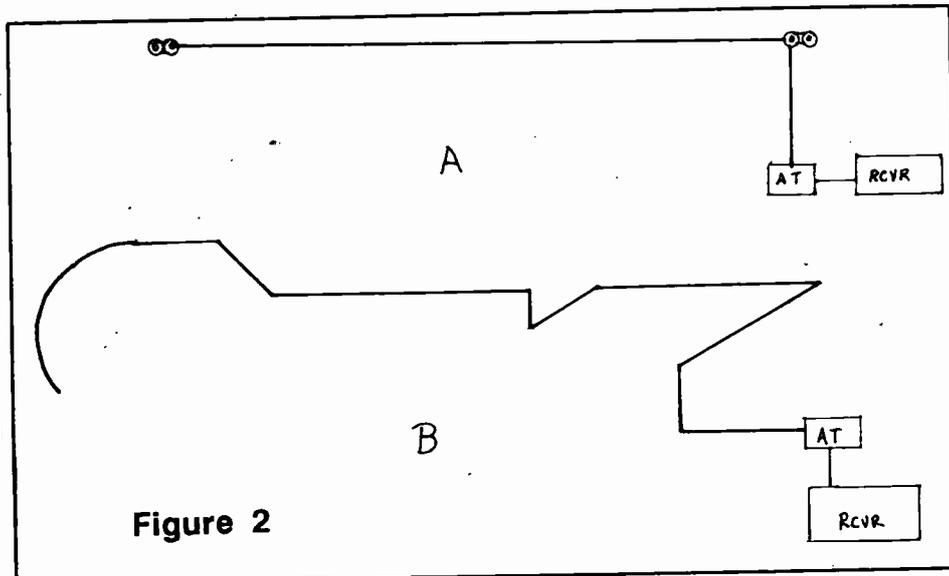


Figure 2

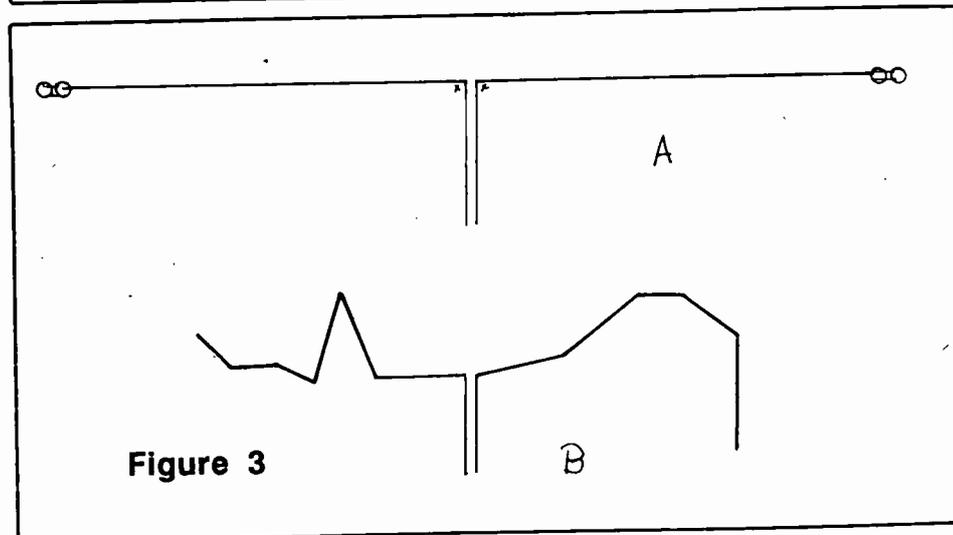


Figure 3

Active antennas

An active antenna is a short wire or whip that is connected to a high gain amplifier; normally, these antennas cost from \$50.00 to \$125.00 and do a good job for the SWL. If all other options are closed to you this is one way out of the antenna dilemma.

One drawback to the active antenna is noise. The high gain amplifier often amplifies indoor electrical noise along with the signals you want to hear. If noise is bothersome try moving the antenna to another location.

If you must use a makeshift antenna, use an antenna tuner; it will deliver more signal to the receiver, especially on low frequencies. A tuner (or pre-selector) can also eliminate spurious signals caused by strong stations mixing with frequencies inside your receiver to produce signals outside the range you are tuning.

UPDATE ON BUILDING YOUR OWN BEAM (Sept. 1986 Getting Started)

Quite a few of you have built the four-element Yagi beam I described in my September column. Most folks have no trouble with the antenna if it is used within its intended range of 140 to 150 MHz; however, problems arise when the antenna is used on frequencies far removed from this range. Consult the dimensions in Table A if you wish to use the antenna on another range of frequencies.

If signals seem strongest from some other direction than straight ahead, use a piece of PVC pipe between the rotator and the antenna. Metal masts can cause the signal to skew in an unpredictable direction sometimes.

Your interest in this project was very pleasing to me and I will try to present more nuts and bolts articles for you.

Bugging Big Brother is Big Business

Both the U.S. and Soviet governments make a popular sport out of electronic surveillance. A report from Washington reveals that recently as well as in 1978 the Soviets were allowed free access to shipments of electronic typewriters to be used in the U.S. Embassy in Moscow.

Subsequent inspections showed that the typewriters, used extensively for composing super-secret documents and memos, had translators installed permitting eavesdropping agents to read every word.

The news item recalls similar instances such as the discovery in the 1950's of the microwave cavity microphone embedded in the beak of the eagle in the Great Seal of the United States in that embassy, and a Soviet antenna discovered in the late 1970's in the chancery.

In an effort to prevent unfair eavesdropping at the Iceland

summit, electronic countersurveillance measures were operating full bore in Keflavik to prevent a recurrence of a 1984 incident in which Soviet Aeroflot aircraft were banned from landing in Norway because they were loaded with intelligence gathering gear.

(Thanks to H. Miller of Seattle, WA)

Autek, Inc., Closes

Autek, Incorporated, long respected as the manufacturer of the QF1A active audio filter, has apparently gone out of business, according to the ANARC marketplace newsletter.

By slicing a narrow swath out of the audio spectrum the QF1A could be adjusted to remove heterodyne tone interference from any receiver. Similar products are now available from several manufacturers.

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A.C. Adapter Included

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- 25% size of famous SONY ICF 2001, SONY's best seller
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CONTEST TIME

During the winter months the amateur radio frequencies crackle with contests. Some contests the SWL can enter and win awards (usually a certificate for top SWL score). Dates, times and rule can be found in most of the ham magazines.

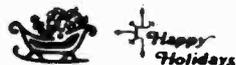
CQ magazine takes special care to note which of the contests are open to the SWL and is the best magazine for the SWL contester to follow for contest info.

There are radiotelephone, Morse, RTTY (radioteletype), and SSTV (slow scan television) contests. Frequencies from MF to microwaves are used. This is a good time for the SWL to increase his country total (hearing 100 countries and more is not uncommon during a weekend!) and gain experience and knowledge about a new mode or band. (How about a contest for moon bounce communication? It's there.) Have fun and learn something new--try contesting.

Want to win a prize?

Send a letter, postcard or SWL card to me. One piece of mail will be picked at random this month and that person will win a prize (yes, it's worth the price of a card!). While you're at it you might let me know what you want to see in "Getting Started." Contest runs from December 1 through 30, 1986.

Happy Holidays one and all.



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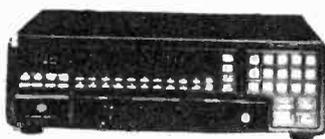
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- We checked them all. This is the best.

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HAZARDS OF THE HOBBY

Broadcast band DXers are, essentially, collectors who have a hard time convincing neighbors, relative, and friends that their collection is of radio stations. Distant radio stations. You know, across the country. No, not ham or shortwave, AM... broadcast band... Here, let me show you my collection of veries. Yes, veries -- verification letters. Here's KFI; I heard them last winter. I heard a station in Arizona the same night, but I couldn't get them to... Hey. Now hold it! What do you mean I belong in an institution?!

Most DXers will at least keep track of the number of stations they've heard from one location, but the purists among us demand some sort of "proof" that these stations were actually heard. The time honored method is to write the station a nice letter, describe some of the key program details heard and request a return letter. Unfortunately, there is no guarantee that you'll get a reply. Most marginal broadcast operations simply don't have the manpower or the inclination to offer much help to DXers. After all, why should they be concerned about a listener 1,000 miles away who can't affect the ARB ratings? Other station's will verify anything that crosses their desk, all in the name of clearing out the paperwork.

Old timers with thousands of veries may take my next suggestion as rank heresy, but there's more than one way to collect a radio station. The DXer who uses a more modern method of verifying a station, that of tape recording enough of a station's broadcast to convince any skeptic that one more DX target has been achieved, has complete control over his collection. There's no waiting weeks, months, even years for confirmation of reception. Furthermore, the DXer has captured a unique bit of history which, probably, no one else has. I've collected tapes for years and frankly, wish I had tapes of stations I listened to twenty or thirty years ago to enjoy now. At one time, I even dubbed all of my DX onto cassettes and placed them in a bank vault so that I would never lose them to fire, theft, or magnetic aberration.

SPLIT FREQUENCIES

Atmospheric and propagation conditions are ideal from now through the end of winter for you to hear some split frequency stations from Central and South America, even on an ordinary car radio. A split is a station that broadcasts on a frequency between domestic stations. If you should hear a whistling sound as you tune between domestic stations, you may be hearing a heterodyne as the "split" interferes with the domestic station on frequencies on either side of it.

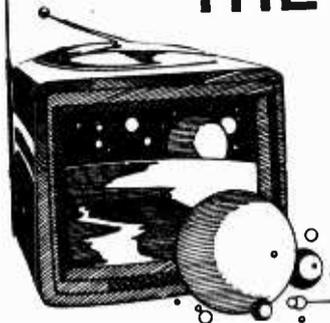
Be careful that you're not just hearing TVI, or harmonics caused by a nearby TV set; you'll soon be able to detect the slight difference in sound with practice. YSS-655 in San Salvador, El Salvador, will produce a steady 500-cycle tone, for example, but a station on 713 kHz (such as a wandering Cuban) will produce both 300 and 700-cycle tones on either side as you tune across it.

Another way of detecting a carrier on a split frequency is to turn on your BFO or upper/lower sideband detector if you have a communications receiver. I find it a good practice to do this at the beginning of a DX session and to log all apparent occupied split frequencies. I can then systematically check them while DXing, and if one station follows Murphy's Law and fades out just before prime ID time at the top of the hour, I can flip to another DX frequency and try to capture an ID from that station instead.

The loudest hets are the strongest, of course. Use your narrow-band filter is necessary; you might even be able to hear the signal better if you listen on upper or lower sideband. I sometimes use this trick on my HQ-180, and even though the sound quality was degraded, I still was able to DX weak splits against strong signals from 50 kW'ers.

That's about it from here. Let me close with my sincerest wish that the spirit of the holiday helps you transcend your problems, and that 1987 be your best year ever. 73. ■

THE OUTER LIMITS



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

Scott McClellan
P.O. Box 982
Battle Creek, MI 49016

HONDURAS

Things continue to be interesting in that Central American nation. Last month we reported on the activities of Radio Miskut and Sani Radio. Now it appears that clandestine Radio Monimbo is about to be reactivated after a period of silence. Recently, the station has been monitored on its old frequency of 6230 kHz (6229.8 to be precise) with test transmissions consisting solely of music. There is no commentary or other IDs. This form of testing has been utilized by Monimbo in the past. Look for test broadcasts around 0000 or 0100 UTC. They are usually fairly extensive, and signal strength may be reasonably good, so this one should not be too difficult. In fact, by the time you read this, regular programming will probably already be in effect. Reports sent along with a prepared verification card and return postage to Nicaraguan Development Council, 1000 Thomas Jefferson Street, Suite 607, Washington D.C. 20007 are sometimes verified.

Does all the Honduran radio activity signify that Washington is preparing for new confrontations with the Sandinistas? Over the next several months the monitoring of both clandestines and licensed broadcasters in Central America will prove interesting indeed.

SURINAME

An interesting and easily heard clandestine is Radio Fri Sranan (Radio Free Suriname). It once had its own transmitter but in more recent times it has used the facilities of La Voz del CID. Look for it on 9940 kHz Monday, Wednesday and Fridays. Sign on time varies, but you should hear it by 2235 or 2240 kHz. Normally Dutch and Sranan Tongo are the languages used.

In the past the station has been an excellent verifier, often sending along literature, postcards, and other items along with a verification letter. Reports in English are accepted and may be sent to the Council for the Liberation of Suriname, P.O. Box 5517, 3008 AM Rotterdam, The Netherlands. Some reporters have been put on the mailing list to

receive the Council's monthly publication, "CLS Bulletin."

THE McCLELLAN REPORT

Although not a pirate station, Joe Wosik gets a gold star for his report of The Voice of the Great Peace March. It was heard several times between 0030 and 0920 UTC as the event wound its way across the United States. The sign off for the station was usually around 0500 UTC, says Joe, and he found it on 1630 kHz. The station also uses a four letter call sign beginning with "WI," but Joe couldn't copy it clearly.

The station features talks about peace with various songs in between. The announcer said that they were a licensed mobile radio station and they would be on the air from Los Angeles to New York City. Unfortunately, by the time you read this, your chances of logging this once-in-a-lifetime station will be past.

Joe also logged WHOT on 1627 kHz between 0545 and 0630 UTC. The two announcers --with "really hyper voices" -- took phone calls. Joe called them up and was told that he is their farthest listener so far. The station is apparently located near New York City as they have an FM outlet for that area. Joe adds, "Too bad they don't have a shortwave outlet. They are entertaining."

Also heard was Canadian Club Radio on 7440 kHz between 0120 and 0448 UTC, playing the theme from "Masterpiece Theatre." The host, "Captain Willy," said they were on a "bunch of frequencies" but Joe could only hear them on 7440. The address for QSLs is P.O. Box 245, Moorhead, MN 56560.

KDJF, or something sounding similar to that, was heard on 6240 kHz at 0355 UTC with a very weak signal. The deejay said that they were a new station and they would soon have a mail drop for reception reports. "Dr. Dipole" claimed they were on the west coast.

'Tis the season not only to be jolly but also to scan the bands for pirates. The Christmas and New Year's seasons are usually very active with

pirate activity, and the alert DXer can find lots of entertainment on the bootleg bands. If you find any such activity on your radio, please share it with us! See you next month. And now, back to John.

THE STATION THAT DOESN'T WORK!

In an excellent article that we must condense due to space limitations, Pennsylvania's John Demmitt comments on legislation introduced in the House of Representatives to provide \$20 million for a 100 kW medium wave station to broadcast to Nicaragua. The proposed station would appear to be something of a Nicaraguan version of Radio Marti.

Among other things, Demmitt argues that current Voice of America sites in Costa Rica and Belize cannot serve the main target area. Conditions in Honduras make it a poor choice to provide a good nighttime skywave pattern. Central America already has congestion in the medium wave frequencies, and the power to be utilized is in excess of what the ITU will permit after sunset. As a less costly alternative, Demmitt suggests a series of synchronized medium wave transmitters in Honduras and Costa Rica bordering Nicaragua. These might be supplemented by a transmitter on a ship off the coast of Nicaragua.

OTHER NEWS

Eason Jordan, Deputy Foreign Editor of Cable News Network, questions my claim in last month's column that Eden Pastora speaks excellent English. He points out that every time CNN interviewed Pastora it had to work with a translator. Could it be that those speeches we heard several years ago on La Voz de Sandino were translations of Pastora's comments read by an English-speaking announcer? This writer would welcome any additional information anyone can supply in regard to this subject.

John Demmitt, commenting on the Captain Midnight situation, notes that as a result of the Captain's activities, the F.C.C. is considering a proposal to require all transmitters in the United States to have an automatic ID tag. This would be transmitters on a subcarrier.

Meanwhile, Dan Cochran of the Captain Midnight Grassroots Coalition reports that the group recently turned \$500 over to John MacDougall to help him with his \$5,000 fine. The affiliated group S.T.O.R.M. is currently lobbying United States senators in an attempt to protect the rights of satellite dish owners.

That's it for this month. Keep our mailboxes filled, folks!

Navy Vessels Disappear at Will

EMCON--emission control--is what the U.S. Navy officially calls it. But to the enemy, it is an effective deterrent to detection. Apparently the "Stealth" aircraft technology is also seaworthy.

While details of the system are highly classified, Navy spokesmen say that a masking technique makes one ship look like another. A combination of EMCON and masking has proved very effective in electronic evasion.

During EMCON, the ship virtually shuts down its electronics, thus avoiding detection of its normally high level of radio frequency emissions.

A demonstration to the press last April impressed network reporters who watched the carriers Coral Sea and America disappear from the screens off the coast of Sicily, re-emerging less than 24 hours later in the southern Mediterranean to launch an attack on Libya.

It's Not Too Late

for Santa to deliver your gift subscription of **Monitoring Times** to your favorite SWL'ers this Christmas.

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7. Spike protection added, no need to spend \$30.00 for a wall plug-in spike protector. It's installed right inside where it is most effective **COST \$25.00**
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- You can even watch television programs by plugging in a video monitor into the optional video output. **\$25.00**
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- Plus there's much more, including a 24-hour clock, multiplexed output, LCD readout, signal strength graph, and an AC power adapter.



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Far Flung FEBC



Say the words "religious shortwave broadcasting" and HCJB in Ecuador springs to mind immediately. It's the oldest such station and it's generally assumed to be the largest.

But there are a number of other very large religious organizations making use of the shortwave frequencies in order to reach a worldwide audience and, in contrast to HCJB, these other groups have placed their transmitters in more than one location so that they can better achieve global coverage. HCJB is so well positioned from a geographical standpoint that they are able to reach much of the world with their high power transmitters in Pifo.

One of those "lesser giants" in the religious shortwave broadcasting field is the Far East Broadcasting Company (FEBC), which has studios and offices in 13 different countries! It offers its listeners some 9,000 hours of broadcasts each month -- in 100 different languages and dialects over some 30 different transmitters.

SMALL BEGINNINGS...

FEBC began operation in 1945 with the "grand" total of \$1,000 in funds. This paltry amount of money -- small by even 1945 standards for someone starting a business -- was scraped together by three men: Robert Bowman (still FEBC president), John Broger and William Roberts. But it was another three years before the first station came on the air from the Philippines, and then it was a medium wave transmitter in Manila. It was another year (1949) before the first FEBC shortwave station went on the air. "The Call of the Orient" began with a domestic (Philippine) service using two 10 kilowatt transmitters. An international service was added later that year and, in 1956, FEBC acquired two shortwave transmitters which had been used by the Voice of America as relay stations.

Today, in the Philippines alone, FEBC operates medium wave, FM and shortwave stations (variously) in Manilla, Cebu, Davao, Zamboanga, Lagaspi, Marbel, Bacolod, and Iba.

BUT, MY, HOW YOU'VE GROWN!

FEBC shortwave runs transmitters of 50 and 100 kW, beaming broadcasts to China, Australia, New Zealand,

Papua New Guinea, Thailand, Laos, Cambodia, Malaysia, Indonesia, Singapore, Vietnam, Burma, India, Pakistan, Sri Lanka, and Saudi Arabia in a total of 21 languages.

Listeners might try to hear English from FEBC-Philippines on 11850 kHz starting at 1300 UTC. Reception reports (with 3 IRCs) go to Box 1, Valensuela, Metro Manila, The Philippines.

In 1960, the organization acquired its first shortwave station outside of the Philippines. And it was all ready to go. KGEI in Redwood City, near San Francisco, was originally owned and operated by the General Electric Company which put the station on the air as a promotional vehicle during the 1939 World's Fair on Treasure Island, San Francisco, using the call W6XBE. After the Expo ended, the station was moved to its present site and became the "Voice of Freedom". The role didn't last for long. Once World War II began, the government's office of War Information took over the facility, making it a government voice for wartime broadcasts overseas. After the war, GE resumed operation and used the station largely to promote its products, largely to an audience in Latin America.

The Friendship Station (Voice of Friendship or, La Voz de la Armistad, in Spanish) runs transmitters of 50 and 250 kilowatts, focusing primarily on Latin America and the USSR with its programs in Spanish, Russian, German, and English. The station is presently heard well in Russian on 7365 kHz from 0200 to 0630 UTC or in Spanish on 9615 from 0400 UTC. Reception reports go to KGEI, Friendship Station, Redwood City, CA 94065.

The early 1970s brought the Far East Broadcasting Association on the air from the Seychelle Islands in the Indian Ocean. FEBA is based in Great Britain and is described as "an independent member of FEBC." Broadcasts are beamed over 100 kilowatt transmitters to South Africa, the African Horn and Nepal, in 21 languages. Like other FEBC regional operations, it has several studios and offices scattered around its prime area of concern; in this instance, India, Pakistan, Sri Lanka, Kenya and Lebanon.

Try FEBA with English beamed to South Africa at 1515 UTC on 9590 kHz. Reports go to Box 234, Mahem the Seychelles, Indian Ocean.

The baby of the FEBC family is KFBS which went on the air about two years ago from Saipan in the Marianas Islands. Four 100 kilowatt transmitters are in use from a location at Marpi and beam programs in nine languages to China, India, Malaysia, Vietnam, the USSR, and Poland.

LISTENING IN

To hear KFBS, try for English at 1230 on 9510 kHz or at 1300 on 9520 kHz. Reception reports may be sent to KFBS, Box 209, Saipan, CM 96950.

Note that we have provided only one or two suggestions for tuning each station. Full schedules are long and complex so for complete times and frequencies, readers should check *Radio Database International* or the *WRTH* or write to the individual

stations for current program and frequency information. Aside from KGEI, the other FEBC stations are a good distance away and programming is not beamed to an audience here, making them not always the easiest stations to pick up -- certainly not "loud and clear" reception. But all of them have been heard many, many times in the United States so logging FEBA-Seychelles, FEBC-PHILIPPINES, or KFBS-Saipan is a long ways from being an impossible task.

FEBC programming, like that of most other modern religious broadcasters, is a careful mix of the pure religious programming (including a number of "Back to the Bible" type programs) and more secular features ranging from programs for the DXer to educational/instructional programs.

Readers interested in knowing more about FEBC, its stations and its work, might ask to be put on the mailing list for the bi-monthly FEBC magazine, "The Broadcaster." ■

MT

HELPFUL HINTS

We welcome short, useful listening hints, tips on equipment use, hard-to-find sources, etc.; Let others profit by your hard-won experience!

CAVEAT: HARMFUL HINTS

In our November issue we gave several suggestions regarding solving the problem of connecting an antenna to the N connector on the ICOM R7000. Several readers expressed indignation over our even mentioning deforming the center pin of the N connector, even though the procedure began, "If you are willing to abuse the N connector" and ended, "This brute force procedure is not recommended".

Greg Lefebvre, K5LTW, of Madison Electronics correctly points out that suitable adaptors are available from electronic supply outlets for under \$7. As also mentioned in the article, Grove has an F to N adaptor for \$2 and a simple procedure is described for converting a BNC adaptor to a make-do N adaptor.

We appreciate reader reaction and will be more careful in the future about describing procedures which may harm equipment.

A CURE FOR R70 TUNING NOISE

David Woo, Chicago, Illinois

My Icom R-70 receiver was plagued with "clicks" while tuning the 5 and 6 MHz bands. I discovered that the coax cable I was using to feed my Infotech M-600 demodulator from the R-70's "REC" jack was radiating RF from the inside of the receiver! When I disconnected that cable, there was a general decrease in background noise in all frequency ranges.

At first, I thought the problem was poorly shielded cable which I replaced with RG-174A/U after placing a ferrite bead on the output "hot" side of the "REC" jack. This accomplished nothing.

Next, I looked at the schematic; it showed an RF bypass ground at the "REC" jack capacitor C8, a .0047 mfd. I added an additional .1 mfd across this. That did the trick!

COMMENTS ON THE SONY ICF2010

by M. Dorian Gregory

I bought my 2010 partly from experience with the 2001 and partly from the reviews which were available earlier this year. Excepting one problem which required servicing, and a few quirks of behavior which aren't described by the manual, I find this is an excellent radio.

Of course there are idiosyncrasies of operation. For example the keyboard frequency entry is only enabled down to 1 kHz with the 100 Hz finer tuning done by dial tuning. This is fine for broadcast stations but if you are a utility DXer then this mixed mode tuning is a touch awkward.

The small studs on the side of the case aren't easy to move. The tone switch has become distinctly wobbly. I find the switched attenuator is redundant; any signal strength reduction is handled well by the RF gain control.

But in the end, the only features I could suggest adding are dual VFO's (as the ICOM R71), squelch control (especially with the scanning features), a switchable preamp/antenna tuner, and perhaps a computer interface.

This radio shares one feature in common with other communications devices; the numeric keypad is ordered top-to-bottom--the reverse order from computers and calculators. It may be more efficient, but it is an unending source of confusion in switching between keyboards. Time will tell if one layout or the other might prevail.

The result is that one often garbles a frequency entered from the keypad. The manual only tells you to wait for the erroneous entry to clear by itself, but a quick alternative is to press the band-switch button to restore the previously displayed frequency. Thus, press AIR, FM, or AM depending which range you're using.

If you're certain your 2010 is in perfect working order, the SYNC function allows you to measure the frequency of AM or ISB signals to within 100 Hz with confidence. You must know beforehand whether SYNC switches between upper and lower sidebands directly on frequency or 100 Hz higher. For example, when my 2010 is tuned to CBU on 690 kHz and I switch on SYNC, the LOWER sideband indicator lights; tuning to 690.1 kHz moves to UPPER sideband. So when you find the point where your SYNC function shifts sidebands, you've found the frequency to within 100 Hz.

It was a problem with the frequency accuracy that lead me to have the radio serviced. In tuning known frequencies the receiver was consistently 400 Hz too low on the frequency display.

One final item. Recently I've begun to try tuning SSB signals using

the SYNC function. It sometimes works. Apparently the signal has to be strong enough and have little interference, otherwise the SYNC circuitry can't lock on. When this method works the results are excellent.

In conclusion, the Sony ICF 2010 has to be one of the best receivers

on the market. For the price it gives excellent value. To those who aren't satisfied with the performance of their 2010's, I encourage you to have them thoroughly checked out by qualified service people. This is one of the most complex receivers Sony has marketed. As I was told by the head service technician at SONY, "We don't usually get shortwave radios in here with problems. I'll have to send away for the servicing information."

Got a friend who scans?

Why not make his day (or hers) and introduce him to *Monitoring Times* in a gift subscription?! There's no *Times* like the present!

Regency "Scanner Answer" Giveaway



Here's your chance to win a complete monitoring package from Regency Electronics and Lunar Antennas. 18 scanners in all will be awarded, including a grand prize of the set-up you see above: the Regency HX1500 handheld, the Z60 base station scanner, the R806 mobile unit, and a Lunar GDX-4 Broadband monitoring/reference antenna.

55 Channels to go!

When you're on the go, and you need to stay tuned into the action, take along the Regency HX1500. It's got 55 channels, 4 independent scan banks, a top mounted auxiliary scan control, liquid crystal display, rugged die-cast aluminum chassis, covers ten public service bands including aircraft, and, it's keyboard programmable.

Compact Mobile

With today's smaller cars and limited installation space in mind, Regency has developed a new compact mobile scanner, the R806. It's the world's first microprocessor controlled crystal scanner. In addition, the R806 features 8 channels, programmable priority, dual scan speed, and bright LED channel indicators.

Base Station Plus!

Besides covering all the standard public service bands, the Regency Z60 scanner receives FM broadcast, aircraft transmissions, and has a built-in digital quartz clock with an alarm. Other Z60 features include 60

channels, keyboard programming, priority control, digital display and permanent memory.

Lunar Antenna

Also included in the grand prize is a broadband monitoring/reference antenna from Lunar Electronics. The GDX-4 covers 25 to 1300 MHz, and includes a 6 foot tower.



ELECTRONICS INC.
7707 Records Street
Indianapolis, IN 46226

Grand Prize (1 awarded)

- 1—Regency Z60 Base station scanner
- 1—Regency HX1500 Handheld scanner
- 1—Regency R806 Mobile scanner
- 1—Lunar GDX-4 Antenna

First Prize (5 awarded)

- 1—Regency Z60 Base station scanner
- 1—Regency R806 Mobile scanner

Second Prize (5 awarded)

- 1—Regency HX1500 scanner

Contest rules: Just answer the questions on the coupon, (all answers are in the ad copy) fill in your name and address and send the coupon to Regency Electronics, Inc., 7707 Records Street, Indianapolis, IN 46226. Winners will be selected from all correct entries. One entry per person. No purchase necessary. Void where prohibited by law. Contest ends June 30, 1987.

1. The Regency Z60 is
 - a digital alarm clock
 - an FM radio
 - a scanner
 - all of the above
2. The Regency R806 is the world's first _____ controlled crystal scanner.
3. The Regency HX1500 features
 - 55 channels
 - Bank scanning
 - Liquid crystal display
 - all of the above
4. The Lunar GDX-4 antenna covers _____ to _____ MHz.

Name: _____

Address: _____

City: _____ State: _____ Zipcode: _____

I currently own _____ scanners.

Brands owned: _____



Send in a photo (like this one of Mike Nikolich and his Regency monitoring station) and receive a free gift from Regency. Be sure to include your name, address and phone number.

MT UTILITY

Don Schimmel
516 Kingsley Road SW
Vienna, VA 22180



HURRICANE HUNTING

Many *MT* readers specialize in listening to the transmissions of the National

Oceanic and Atmospheric Administration (NOAA). An article which appeared in the *Washington Post* (September 10, 1986) describes a branch of NOAA called the NOAA Commissioned Corps which includes the famous Hurricane Hunters.

As the country's seventh-smallest-uniformed service its members are all college graduates, and one quarter have master's or doctoral degrees. Established in 1807 by President Thomas Jefferson and consisting of a fleet of 28 seagoing vessels and 15 aircraft, it is the only U.S. uniformed service that Fidel Castro permits to fly over Cuba.*

Air to Ground Hurricane Reconnaissance

(Extracted from the *Shortwave Directory* by Bob Grove)

Frequencies USB	
3407	10015
5562	13354 (Pri)
6673	17901
8876	21937

Call sign	Location
KJY74	Miami, FL

**(Watch for an extensive background article on NOAA ships and assignments to appear in MT in the next couple of months...Bob)*

BACKGROUND BOOKS

I ordered two more publications from the GPO and am well pleased with them. The first one was *Nicaragua, a Country Study* which bears catalog number 008-020-00932-6 and costs \$12.00. This is a hard cover book which was prepared by Foreign Area Studies, American University, Washington, DC.

Topics included are the historical setting, the society and its environment, the economy, government and politics, and national security. If you like to keep up to date on the happenings in Latin America, this is another book you will enjoy reading.

The second title was *The Soviet/Cuban Connection in Central America and the Caribbean* with catalog number 008-000-00419-6, costing \$2.25. In addition to an informative text, the booklet contains revealing photos like the example printed here.

Both of these items are available from the Superintendent of Documents, Washington, DC 20402.

INTERESTING INTERCEPTS

Bill Frantz of Georgia wrote in saying he could not identify a frequency we heard used by Navy a/c 49676; it was enroute to Norfolk NAS and in contact with Andrews AFB on 9007.2 LSB. The flight was apparently important and somehow connected with VIP's.*

Ron Bruckman, Maryland, asks several questions. The first concerned frequencies used by NASA at Wallops Is., Virginia, and Goddard Space Flight Center, Green Belt, Maryland. The book, *Communications Satellites* by Larry Van Horn, shows Wallops assigned 14452, 20089 and 22745 kHz.

GSFC has a radio amateur club located there which rebroadcasts Space Shuttle communications during their missions. Frequencies reported are 3860, 7185 and 14295 kHz. In the past such rebroadcasts were also heard on 14230, 14263 and 21360 kHz. These frequencies were listed in *U.S. Military Radio Communications* by Michiel Schaay.

Next, Ron wanted to get some information on frequencies/schedules for CW weather broadcasts relating to the Maryland-Virginia coastal areas. *Worldwide Weather Broadcasts* by Bert Huneault indicates station NAM, Norfolk, Virginia, had a 1700 sked on 8090 and 12135 kHz and at 2200 on 8090, 12135 and 16180 kHz. Map analysis broadcasts were carried on the same frequencies and skeds plus on 8090 kHz at 1000. All times UTC. →

**(Virtually all in-flight diplomatic transmissions heard on HF in LSB mode are part of the USAF "Mystic Star" network...Bob)*

SCANNER FINDS ELT

by Bob Grove

Recently, I was called by our local sheriff's office who, in turn, had been notified by the closest Civil Air Patrol (CAP) squadron that an emergency locator transmitter (ELT) signal had been detected by satellite in the Brasstown area. Although about 99% of these beacons are false alarms, there was still the possibility of a downed aircraft.

A quick sweep of the horizon on 121.5 MHz with our Scanner Beam detected no characteristic down-swept tone, the signature of an ELT. A commercial airliner flying nearby verified its presence, however, and the SARSAT (search and rescue satellite) continued to register a "hit".

A search party quickly organized at the sheriff's office, joined shortly by the members of the CAP who were equipped with two radio direction finders (RDFs). The cadets took several readings and headed out. Subsequent readings were inconsistent and the CAP search party was shortly 20 miles distant.

At that point I turned on my Bearcat 100XL scanner, tuned in 121.5 MHz and attached it to a Grove ANT-10 mobile whip. A weak down-swept tone was detected!

We began driving around the area, listening for increases in signal strength and radioing our findings to the CAP team. Our preliminary findings indicated that we were much closer to the signal than the cadets. The CAP radio officer transmitted to her team, "They are using a scanner which is inappropriate"! That was a challenge which couldn't be ignored!

Soon we drove to the center of town where the signal was extremely strong, especially near the post office. Stopping the vehicle we resumed the search on foot. As we approached the post office, we could remove the scanner's whip antenna and still hear the signal! Obviously, the package was inside.

In one final attempt to assist the CAP, we called them on the radio to tell them we had located it. No, they replied; they knew it was down in the river about a mile away!

Reluctantly, they finally joined us after they couldn't find the ELT. It was 3:00 AM when the postmaster arrived to open the post office. A quick sweep of the mail disclosed the "radio-active" package which, after the owner was located, was opened and the ELT deactivated.

EPILOGUE

There is no substitute for experience; a good RDF is an extremely useful tool when in the right hands, but radio direction finding is more an art than a science. In hilly terrain, reflections can be very misleading; fixes (bearings) must be taken from

mountaintops and open areas.

The adjoining article will assist the home experimenter in building a direction-finding loop antenna which will provide amazing accuracy, but only after the operator has had considerable practice in its use.

Radio Direction Finding (RDF) Loops

A series of experiments was performed, yielding the following observations:

1. An unbalanced (one side grounded to the coax) gave uniform unidirectional response.
2. The loops must be oriented vertically, feedpoint down; no other position provides consistent bearings.
3. A null (minimum) is generally sharper than a peak (maximum).
4. A circular wire provides the most consistent bearings, followed by a square, triangle and oval; stretched or distorted shapes are proportionately poorer.
5. A half-wave circumference (38" at high band) seems signal-efficient; tests from 1 to 500 MHz showed unidirectional response.
6. Operating inside a building resulted in false bearings and multiple responses from reflected signals.
7. Taking bearings near a hillside results in false bearings due to reflections.
8. The loop must be physically and electrically isolated from the scanner, the ground and the operator by a length of coaxial cable.
9. Bearings taken within two hours of sunrise and sunset are unreliable.
10. As many readings from as many different locations should be taken as possible, averaging out the bearings.
11. Widely divergent bearings should be discarded.
12. A fluttering or fading signal indicates propagation instability and results in unreliable readings.
13. Multiple lobes indicate signal reflections; change locations.
14. A wire loop has very low impedance and decreasing efficiency with decreasing frequency.

RTTY REPORTS

Station CXR, Montevideo Armada Radio, Uruguay, was sending RY's and "quick brown fox" transmissions on 13815 kHz, RTTY 75-850, at 2338Z on 18 September. CXR was calling PWZ Rio De Janerio Naval Radio, Brazil, and indicated he was also sending RY's and Fox tape on 20150 kHz.

A Swedish diplomatic link was observed in RTTY 75-425 on 14365 kHz 19 September at 1521Z. Preceded by the phrase "Telegram via UD Radio" and addressed to AMBASSWDEN MANAGUA, Swedish plaintext and 5-letter groups were passed. Upon completion of the traffic both stations came up in SSB voice, conversed briefly and then shut down.

An East German link to the Far East was copied on 29 September at 1310Z using RTTY 50-425 on 13923.1 kHz. A message in English to Beijing gave congratulations on a Chinese national holiday; another message to a commercial firm in Shanghai had text in the German language.

Berlin then indicated traffic was upcoming for Pyongyang and transmitted a number of messages, some in English and some in Hungarian. Since all messages appeared to have originated in Budapest, Berlin was probably the relay point.

JAMMERS AND NUMBERS

An unidentified SWBC music program was clobbered by a very strong jamming signal of the pulsating tone type. This was heard on 9513 kHz on 3 September at 1544Z.

At 1505Z on 21 September a repeated CW message consisting of five 6-figure groups was picked up on 13460.8 kHz. By 1715Z the message had been changed to five new groups, likewise repeated over and over. At 1742Z and 1803Z the same groups were still being transmitted. Considerable fading was noted on later intercepts.

An apparent military CW message on 3237 kHz, 22 September at 0007Z, sent a very simple heading as follows: "QRA DE J1Q NR 01 -R-220001Z GR 40 BT," then went into five-letter groups with the first group BNWVA repeated as the last group. Immediately after the CW carrier went down a high speed MUX signal came up for about one minute, then it, too, went down.

Shortly after 2100Z on September 1, 2 and 3, a raspy CW station was heard on 6541 kHz. LLY called YTO repeatedly and also called SLV on 1 September. On 2 September LLY sent a very short message which had the following heading: NR 5 GR 7 BT DRX BT. The seven four-figure groups utilized the cut number system: A U 3 4 5 6 7 D N T for the digits 1-10. Another

message sent by LLY used the designator MYQ in the heading.

On 3 September SLV called YTO and TJO followed by CLK; LLY was called by HUB. Broken English was noted in the chatter between operators exactly as observed on 11342, 11326 and 11322 kHz in the 2100Z time frame. Calls noted on these frequencies were YBA, BWW, WSX, GOC.

On 2 September I heard operator chatter at 2112Z (a sample follows): BGN CLG KCJ BUT ZAN CTD Y ME ALSO STL KP KCJ AR K. On 3 September at 1533Z BHO was called by TBW on 11311 kHz. Most of these transmitter have a very distinctive raspy sound. I have commented on this strange activity in several previous columns.

I am sure some of you have heard or used the expressions "his fist sounds like a banging barn door" or "he sends like he is pounding on a log," etc. Well, I have another definition of a lousy fist for you that applies to a CW station operating in the 6235-6250 kHz region on a daily basis, usually commencing a few minutes after 1200Z. This guy is so bad he sometimes sounds as if his wrist is in a cast and he has raw, painful blisters on his fingers!

He apparently calls two stations; one is FST and the other is as yet undetermined because sometimes he sends it as GTB, other times as MAB, and yet other times as XTB! One time he started calling FTB, sent the error sign and corrected the call to FST. On 11 September he sent two messages, one consisting of five-figure groups and the other of five-letter groups. I have not ever heard the other ends of this activity.

The station was also heard in August and was reported in the column last month. Spanish language chatter was again noted and the link was active throughout the day and at least up to 2200Z at which time I stopped checking the frequency.

In checking the 14 MHz band I noted quite a few Spanish language operators spread out in the 14.4 MHz region. One group at 14434.4 kHz on 24 September at 2007Z seemed to be operating with "Antonio" as Control and out-stations utilizing number call signs like diez-y-siete, veinte-y-cuatro, and diez-y-ochó. This type of activity has been going on for several years.**

Trigraphic groups (phonetized) were seen on 10154.6 kHz on USB on 17 September at 2301Z. Two OM/SS were handling the traffic but local QRM made it impossible to copy the entire transmission so I did not gain any clues to the origination of the traffic.

I wonder how many of you have run across the MCW station on 6104

*(There is good reason to suspect that this is a Latin American terrorist group...ed)

kHz which sends "DE VK30 V's K" for hours? I have not been able to identify the station which transmits from about 1350Z to after 1600Z.

This next net is possibly military. USB callups were heard on 6900.6 kHz on 26 September at 1232Z and consisted of call signs "Canary Feed" and "Duck Pond." The latter could hear Canary Feed but Canary Feed could not hear Duck Pond and as a result they both kept calling back and forth for a considerable period of time.

Five-letter CW groups were intercepted on 3463.8 kHz on 12 September at 0001Z. Stations ABA and DAR were heard with cipher

traffic. The Spanish language "eneyh" (Morse code "MW") was noted among the characters in the cipher text.

A MINI-DXPEDITION

During the early part of September I had the opportunity to do some monitoring from Nags Head, North Carolina. In the evenings I heard many low frequency beacons that I am unable to hear from my northern Virginia location. Upon returning home I noticed conditions had improved somewhat for low frequency reception; I was picking up Canadian low frequency beacons that I had not heard in the past.

SEPTEMBER 1986 LOGGINGS

Table with 3 columns: KHZ, DTOI, and MODE/IDENTIFICATION/COMMENTS. It lists various radio logs including station calls, frequencies, and locations such as MCW/DIW Dixon, NC 2000W and RTTY 75-850/Enciphered transmission.



Listener's Log

Omaha Police Dept.

contributed by David Epp

Ch. 1	460.100	Traffic
Ch. 2	460.150	North
Ch. 3	460.225	South
Ch. 4	460.275	Information
Ch. 5	460.350	Command
Ch. 6	460.425	Detectives
Ch. 7	460.500	Citywide

10-CODES

- 1 Unable to copy
- 2 Signal good
- 3 Stop transmitting
- 4 Message received
- 5 Relay
- 6 Busy stand by
- 7 Out of service
- 8 In service
- 9 Repeat
- 10 On minor detail, subject to call
- 11 Talking too fast
- 12 Visitor or officials present
- 13 Weather and road conditions
- 14 Convoy or escort
- 15 Have prisoner in custody
- 16 Pick up prisoner at
- 17 Pick up papers at
- 18 Urgent - rush present detail
- 19 Return to your station
- 20 Location
- 21 Call this station by phone
- 22 Disregard last information
- 23 Having interference
- 24 Trouble at station help needed
- 25 Do you have contact with
- 26 Holding subject, rush reply
- 27 Any answer our number
- 28 Full registration information
- 29 Check records for wanted/previous convictions
- 30 Does not conform to rules/regulations
- 31 Is lie detector available
- 33 Emergency traffic at
- 34 Disturbance at (location)
- 35 Have hit. Confidential information to follow.
- 36 Correct time
- 37 Operator of officer on duty
- 38 Assignment officer Nr
J 1 working in plain clothes
J 2 Returning to uniform
- 39 Full registration no violation
- 40 Drug violation
- 41 Beginning tour of duty
- 42 Officer Nr. at home
- 43 Return to this station
- 44 Accident property damage
- 45 Accident with injury
- 48 Speeder
- 49 Cover traffic at/contact
- 50 Use caution
- 51 School bus inspection at
- 52 Out of unit vehicle check at
- 53 Phone / contact (name)
- 54 Meet (name) at #
- 55 Dispatch ambulance
- 56 Property damage
- 57 Any record radio file
- 58 Operators license info
- 59 Attention all units
- 60 Suspension check
- 61 Sick leave
- 62 Motorist assist at
- 63 Out of unit serving warrant at
- 64 Message delivery
- 65 Probable death
J 1 Accident
J 2 Suicide
J 3 Felonious possibility

- 66 Equipment in unit/keys available
- 67 Clear of message
- 68 Repeatdispatch
- 69 Message received
- 70 Message for you
- 71 Burlar alarm active at
- 72 Place road block at
- 73 Pedestrian drunk
- 74 Watch for
- 75 Stolen motor vehicle
- 76 Ending tour of duty
- 77 No contact with
- 78 For your information
- 79 Use emergency frequency
- 80 OFC Nr. request conference call to Ofc. Nr.
- 81 Standby on 30 min alert until further notice
- 82 Reserve room and bath for
- 83 Have officer Nr. call/contact
- 84 Advise call Nr. to city office
Nr. will not drive until (date & time)
- 85 Message for delivery by mobile unit
- 86 Bomb threat at
- 87 Pay checks out
- 88 Advise present phone
- 89 Request assistance or Ofc. request phone patch to Ofc.
- 90 Tower lights burning improperly
J 1 Out all levels
J 2 Out all top levels
J 3 Out middle levels
J 4 Out bottom levels
- 91 Pick up prisoner/subject
- 92 Improperly parked vehicle or subject known to have poor character (use caution)
- 93 Frequency check
- 94 Give test without voice
- 95 Give test with voice
- 96 Mental subject
- 97 Arrived at scene
- 98 Finished with last assignment
- 99 Unable to receive

SIGNAL CODE

- 1 No record
- 2 Has record
- 3 Wants on file
- 4 Suspended drivers license
- 5 Stolen auto
- 6 Felony warrant

- AA Mental patient
X Dangerous person

CODES

- 1 Made report
- 2 Made arrest
- 3 Issued ticket
- 4 Gone on arrival
- 5 Unable to locate
- 6 Civil matter
- 7 Assignment completed
- 8 Turned over to someone else
- 80 Lunch
- 96 Gas break
- 10-10 On portable

BELLEVUE FIRE AND RESCUE CODES

- 1 No apparent injury
- 2 Minor injury
- 3 Serious injury
- 4 Dead
- 99 CPR in progress

Maritime and Aeronautical Loggings

This month Garie Halstead of St. Albans, West Virginia, shares his maritime and aeronautical loggings as a guide to other enthusiasts of those services. Some real excitement is included as you will see!

Date/Time	Freq	Mode	Traffic
08/25/1907Z	12610.0	CW	Soviet tanker "Rafael" (C/S UOYO) working shore station PJC in the Netherland Antilles
09/02/1423Z	12588.0	CW	Panama "Zuijin" (C/S HPHI) working WCC in Chatam, Mass.
09/13/2142Z	12586.0	CW	"Hans Leonhardt" from Panama, (H/S/HPNO) to WCC
09/15/1318Z	12621.0	CW	Spanish "Alraigo" (C/S EHKF) working CBV in Chile
09/15/1329Z	12590.0	CW	Vatutino from the U.S.S.R. (C/S UNSQ) working GKB in Great Britain
09/16/1207Z	13050.0	CW	Soviet UDK2 (Murmsask) working Soviet vessel "UIZE"
09/17/1611Z	12589.0	CW	Bahamian "M/V Colombian Reefer" (C6BT2) NMR in San Juan
09/23/1336Z	12583.5	CW	Sunny Island (C/S 3ERM4) working FFL in France
09/24/2340Z	8492.0	CW	PPR (Rio de Janeiro) Panamanian vessel (3EUV4)
09/28/1606Z	12616.0	CW	Liberian "Lucid Star" (6ZBM) working VAI in Vancouver
09/28/1649Z	12566.0	CW	Greek Antiochia (SVXD) working GKC in Great Britain
09/29/1200Z	8497.0	CW	VIP in Perth (Western Australia) sending "SOS." Catamaran "Dragonfly" reported breaking up in the Indian Ocean. Requesting immediate assistance. Man overboard from Ming Chuan No. 2/BYAK (gave position). Shipping in transmitting area requested to keep sharp lookout.
09/28/0353Z	2887.0	SSB	Russian Airliner "Aeroflot 347" working New York
09/24/0518Z	3016.0	SSB	Alitalia 611 working Shanwick (Ireland)
09/24/0547Z	3016.0	SSB	Aeroflot 334 working Gnader (NFLD)
10/02/0347Z	3016.0	SSB	Aero Mexico 450 working Santa Maria (Azores) with emergency -- "fire on board!"
09/28/0716Z	5547.0	SSB	Qantas 18 working Honolulu
09/21/0741Z	5550.0	SSB	Czechoslovakian aircraft (Oscar Kilo 576) calling Boyeros (Havana airport)
09/17/0438Z	5598.0	SSB	KLM 773 working San Juan
09/28/0455Z	5598.0	SSB	West Indian 900 (BWIA) working San Juan.
09/02/0534Z	5598.0	SSB	Nigerian 850 working New York for info on Hurricane Earl
09/17/0448Z	5616.0	SSB	Aeroflot 334 working New York
10/03/0526Z	5616.0	SSB	Cubana 476 working New York
09/26/0338Z	8842.0	CW	Soviet aircraft 86497 to RFNV (Moscow)
09/24/2116Z	8842.0	CW	Soviet aircraft 86478 working COL (Havana)
09/24/2149Z	8842.0	CW	ROWEC (86485) working COL
09/28/2348Z	8842.0	CW	ROWCS (86517) working COL

More Utilities Logging

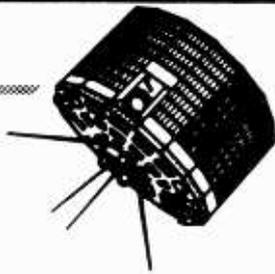
Peter Goubeaud of Sewanee, Tennessee, shares some excellent upper and lower sideband catches this month. All are clear voice messages and provide an excellent frequency list for beginning utilities monitors to snag their quarry.

Date/Time	Freq	Traffic
08/20/0130	8984	CG 1714 working COMSTA Miami
08/20/0135	6753	Trenton military
08/20/0200	4369	WLC Reogers City, MI
08/20/0205	4470.5	USMC MARS net
08/20/0230	5598	San Juan & Santa Maria working int'l flights
08/27/1250	8828	S. Pacific VOLMET
08/27/1340	6218.6	Tugs working base
08/28/1155	6506.4	USCG Honolulu
08/28/1210	6218.6	WGK St. Louis working tug
08/28/1600	6506.4	NMW Portsmouth
09/02/1620	13100.8	KMI Pt. Reyes
09/04/1900	15015	MAC 80226 working Dover Command Post
09/04/1907	15015	"Detone Bravo" working Scott AFB
09/04/1915	13211	"Detone Brave" radio check
09/07/2212	13264	Shannon, Ireland, VOLMET
09/09/1417	11182	"Dragnet Uniform" working Scott AFB
09/09/1740	11182	AIREVAC 336 working Scott Command Post
09/09/1815	11182	"Detone Papa" to McDill AFB
09/09/1950	11182.2	"Century 56" working Raymond 24 (Tinker)
09/10/1505	11182	"Detone Mike" working "Best Deal"
09/10/1518	18018	Ascot 4195 working Architect (RAF)
09/10/1530	18018	"Architect" calling "Celebrity" (RAF)
09/16/1320	9007	A/C49-676 to Andrews
09/18/1410	9010	Halifax Mil.
09/19/1435	9027	"Lifeboy" Sky King broadcast
09/19/1500	8846	New York working international flights
09/19/1500	6577	New York working international flights
09/19/0035	8825	New York working international flights
09/21/2210	8894	NW Africa international flights
09/21/2210	8921	London, England
09/21/0015	6738	RAF
09/21/0020	6604	Gander Radio, Nfld., VOLMET

MT

FAX FACTS

G. P. Mengell
2685 Ellenbrook Drive
Rancho Cordova, CA 95670



Well, readers, here we are in a new month. The season is shifting and the weather gets to be a little more interesting. In short, a good time to turn on the receiver, activate the FAX systems, and see what the weather has in store for us!

High frequency facsimile gets hopping this time of year as the air/sea interface changes gear. The shortwave spectrum is alive, day and night, 365 days a year, with weather charts to aid mariners and aviators.

The information gathering is done globally under World Meteorological Organization treaties and in the U.S. and possessions by the National Weather Service and NOAA (National Oceanic and Atmospheric Administration). After processing, the maps are distributed to transmission points via land line and satellite, then transmitted via FAX over HF.

Satellite photos of the earth and weather maps of the Pacific are sent at 120 scans per minute by the following stations (freq. kHz):

NPM	02112.00	19396.00
	08494.00	14826.00
KVM70	0982.5	23331.5
	16135.0	

On the eastern Pacific basic rim, Scripps Institute in La Jolla, California, operates WWD on 8644.1 kHz with infrared earth images and surface analysis charts. NMC in Point Reyes, California, the transmitting organ for NOAA's office in Redwood City, operates irregularly throughout the day; they do, however, include a schedule with every 'cast (also 120 scan, freq. kHz):

NMC	4344.1	12,730.1
	8680.1	17,149.3

The Canadian armed forces at Esquimalt, British Columbia, broadcasts high quality map FAX 'casts (120 scan) intermittently throughout the day and night on 4268.0, 6946.0 and 12125.0 kHz.

ASIA

Venturing a little farther from our shores, we find that the Japanese have legions of FAX stations, some transmitting WX in great detail, others press articles in oriental characters. Some stations vary between 60, 90 and 120 scans per minute to accommodate changing standards and local practices in communications.

Japanese weather FAX stations

have been heard here on 14610, 14690, 13597, and 18220 kHz.

The Soviet Union also broadcasts very detailed weather maps of both their own and their neighbors' territories. It gets a little interesting when you see California all mapped out with the wind direction, cloud cover and barometric readings. Where do they get it? View them for yourself, using 60, 90 and 120 scans, on 19275.0 and 14737.0 kHz.

10220 is unique, giving maps of Afghanistan, India, the Indian Ocean, and China. On nearly the same frequency is a Cuban radioteletype station passing much traffic. Moscow has been copied on 7750 and 10980 kHz.

The U.S. East Coast

It is convenient to start out with U.S. Navy fleet FAX, well known to mariners on the Atlantic seaboard. NAM at Norfolk, Virginia, sends 120 scans per minute on:

NAM	3357.0	16510.0
	8080.0	20015.0
	10865.0	

This is the Atlantic version of NPM on the Pacific and its format is identical.

The Canadian Armed Forces alternate 75 baud RTTY and 120 scan FAX on:

	04271	0989
	06330	13510

Closer to home, the N.W.S. puts out broadcasts on 6852 and 9157 kHz, and NIK (Boston) provides ice flow charts on a seasonal basis on 8502.0 and 12750 kHz, all at 120 scans.

Great Britain has several stations listed, but reception in California has been limited. They include (in kHz):

GFA	4610	GFA	12741
GFE	4782	GFE	14437
GFA	8400	GFA	14582
GFE	9203	GFA	16938
GFA	11086		

This concludes this session of HF weather, but we will, no doubt, discuss far more. Please drop a line and let me know what you would like to see in this column; mail at this address has been pretty heavy. I'll answer ASAP, barring trips, business commitments, etc.

73, G.P. Mengell ■

Watching the Best of Shortwave

Breaking into Radiofax; a Listener's Primer

by Bill Grant

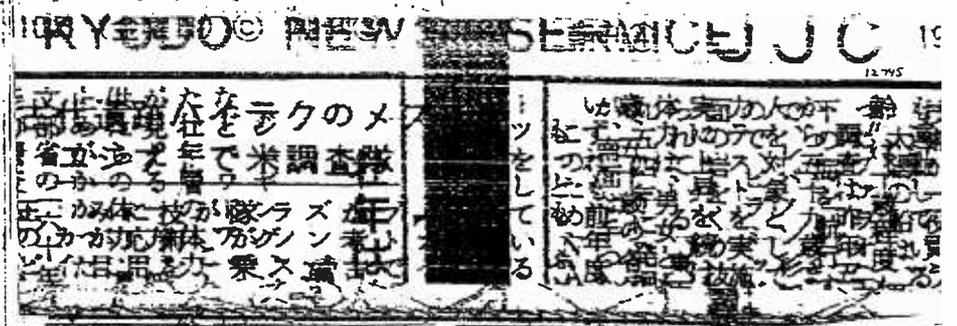
While most of us have listened to shortwave, few of us have had the opportunity to watch the shortwave spectrum. Printed text may be viewed on a radioteletype output on a video monitor or printer. However, it is also possible to receive maps, charts and pictures.

Many stations around the world transmit "radiofax" signals which can be easily decoded with low cost, solid-state equipment, our shortwave receiver and a printer.

Worldwide Pictures

Over 450 stations in nearly 60 countries transmit radiofax over the long and short waves; more than 85 percent of these are from land-based stations sending weather charts designed primarily for domestic consumption. These charts provide a valuable resource to the weather enthusiast or the "budding" meteorologist.

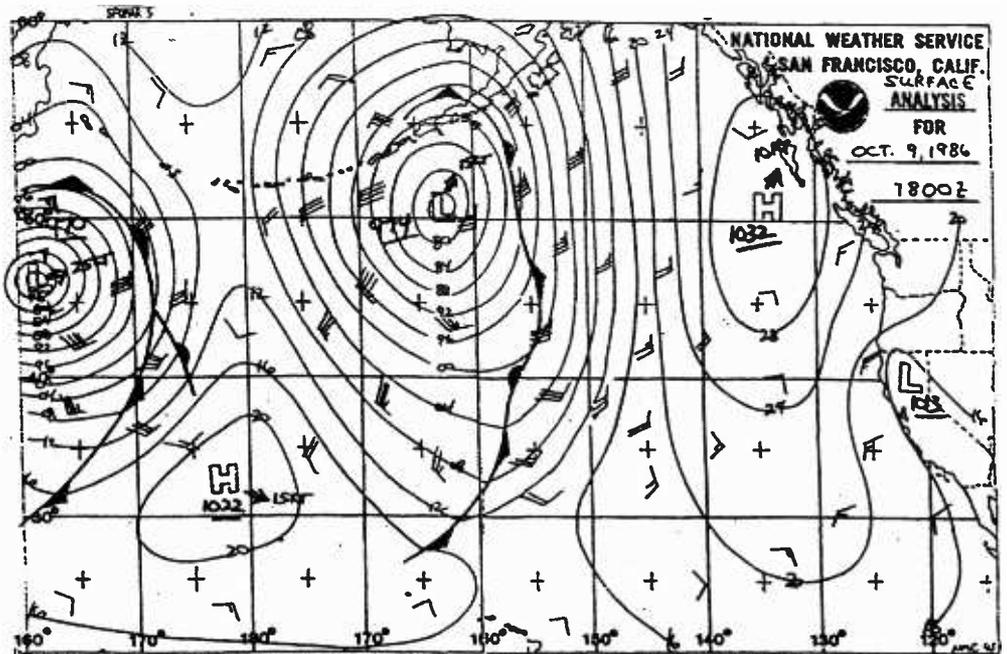
The remaining 15 percent of



Kyodo News Service transmission on 12745 kHz



They aren't really that stout! "Index of cooperation" determines the aspect ratio and varies with the service. Streaks are caused by interference.



NMC northern Pacific weather transmission on 4344.1 kHz, Oct. 9, 1800Z

these transmissions are primarily news photos--the same photos you might see in your daily newspaper from news services such as AP and Reuter. The transmissions originate from Argentina, Italy, North Korea, the United States, and several other countries.

Then there are the stations that transmit newspaper text by radiofax: Norway, Japan, Taiwan, and the Soviet Union; however, you'd better sharpen up on your foreign languages first!

If you want to do some real radiofax DX'ing, try receiving transmissions from ships at sea or from aircraft in flight -- transmissions by the Canadians, Americans and Russians.

Canadian icebreakers operating in Arctic waters send their observations to Ice Central in Ottawa via radiofax charts. This past summer there were six Canadian icebreakers sending charts to Ottawa from points as far north as Lancaster Sound and Resolute Bay.

The charts were transmitted on 14770 kHz USB between 1650 and 1850 GMT daily during the Arctic shipping season. Each icebreaker had an assigned time period in which to send its 15-20 minute chart.

Complementing the icebreakers are airborne aircraft operating out of Canadian bases in the far north such as Frobisher, Resolute and Inuvik. During the past summer an aircraft with the

identifier CFR was observed sending charts to Ottawa of ice conditions along the coast of Alaska while flying off-shore between Point Barrow and Prudhoe Bay.

The transmissions were usually sent hourly on days the aircraft were aloft and were heard on 15642 kHz USB during daylight hours in the target zone.

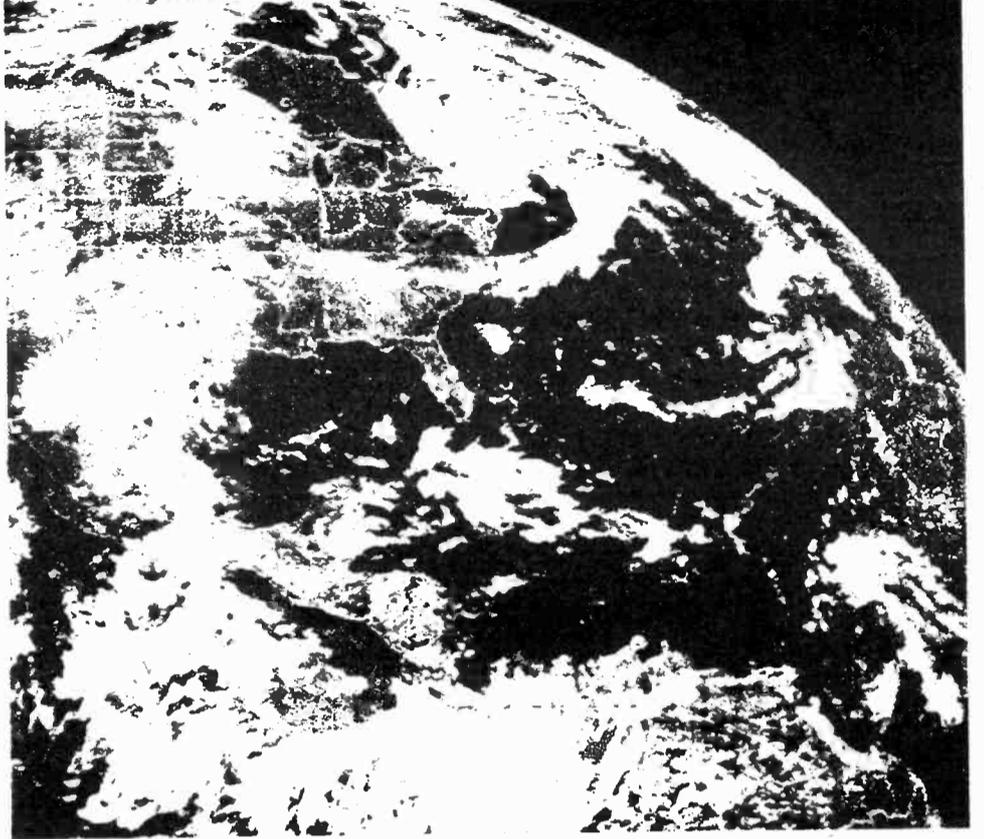
The United States and the Soviet Union also use ships to transmit weather charts to their navy and merchant fleets. The U.S. Navy ship H.E.Holt (NUI) operates in the Pacific and transmits weather charts 24 hours a day on several frequencies including 9496.6 kHz USB.

The Soviet communications vessels V. Bugaev (ERES) and G. Ushakov (ERET) alternate as weather ships at ocean station C7C located at approximately 52.7°N 35.5°W. These ships transmit weather charts several times each day on various frequencies in the maritime bands.

At 1905 GMT, a surface weather chart of the North Atlantic (the area between Cuba and the Norwegian coast), prepared by onboard meteorologists, is transmitted on 12469.5 and 6230.6 kHz USB to Soviet ships in the North Atlantic.

As you can see, there is more to be "seen" on shortwave than first meets the ear! Give radiofax a try...you will be pleasantly surprised.

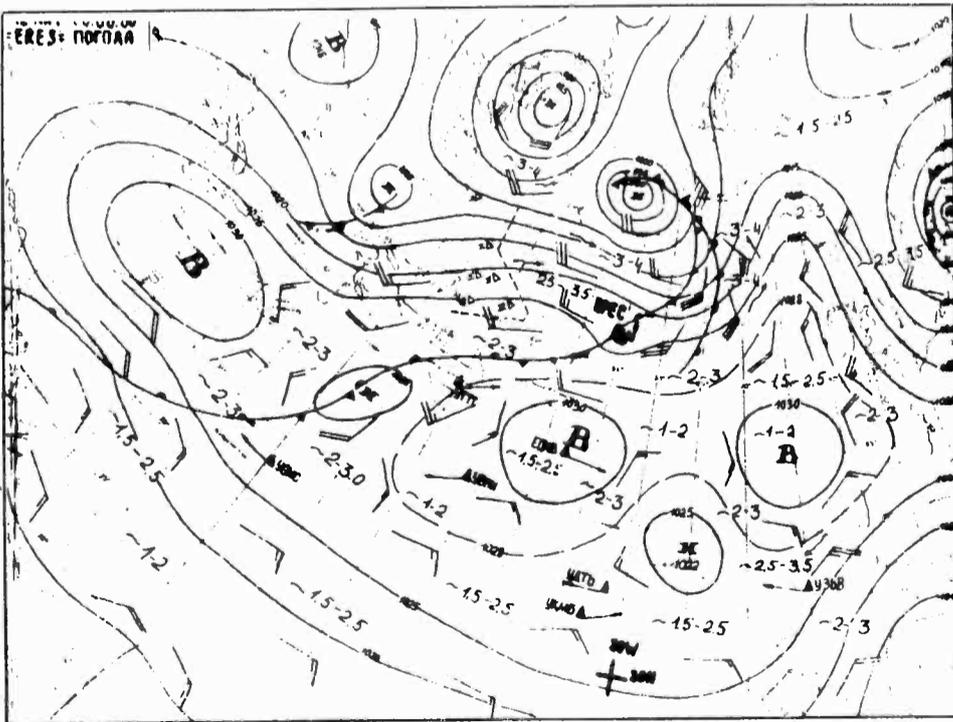
1731 24AU86 18A-4 00912 25311 XC25N79U-1



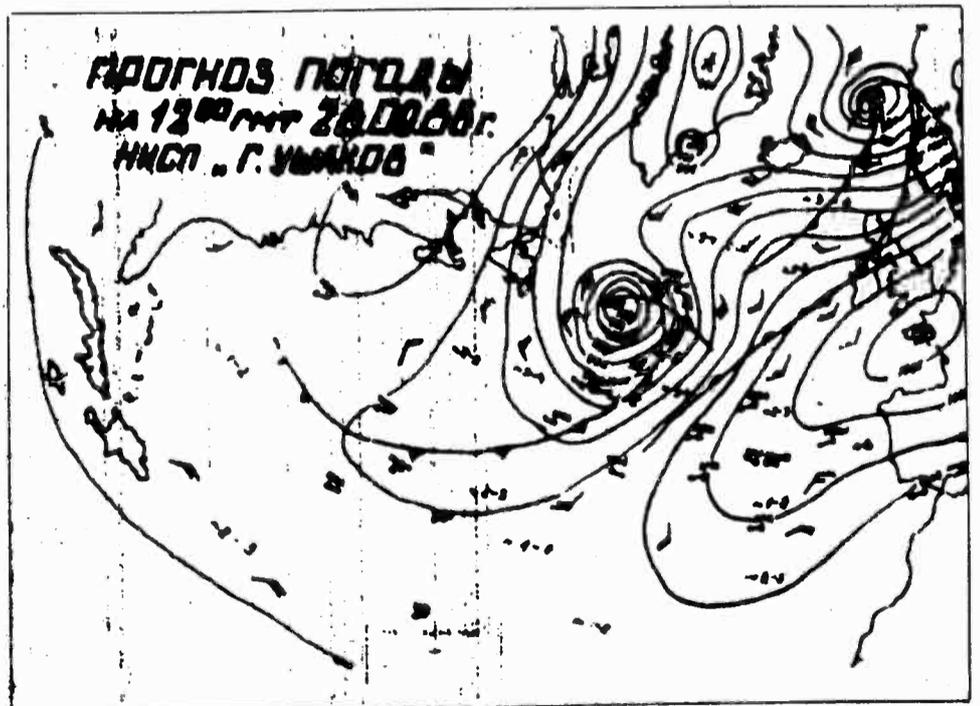
U.S. Navy weatherfax from Norfolk, VA, on 8080 kHz



Soviet newspaper headlines sent on Oct. 12, 1986, at 1300 and 1700 UTC on 12827 kHz (USB and 60 RPM).



Viktor Bugaev transmission (ID's as ERES, or "EPEC" on the map). Weather prognosis for Northern Atlantic in August. Frequencies of transmission 12469.5/8322 kHz at 1905 GMT.



Russian weather map

SCANNER SALES BOOMING

While some hobbyists express concern that the newly-passed Privacy Act could curtail their listening habits, far more buffs are turning on their radios.

A recent estimate in Denver, Colorado, suggests that scanners are being sold by area stores there at a record-breaking 100 a day or more, doubling over the last two years.

Sergeant John Wyckoff of the Denver Police Department was quoted as saying that monitoring of police calls by criminals is unusual. Even so, when high security is a risk, police officers don't discuss business over the air waves.

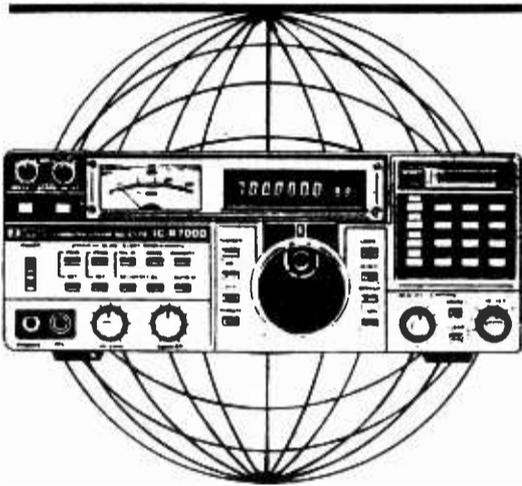
(Thanks to Dr. Mark Weigand, Lakewood, CO)

Pilots Chat as Easy as 1-2-3-4-5

Airline pilots, and even some private, military and federal pilots, have adopted 123.45 MHz as an air-to-air chit-chat channel, much to the dismay of the FAA.

While the channel does fit into the spectrum planning for the aircraft services, use of the channel for private correspondence is not authorized.

Some pilots reportedly talk to private ground stations, keeping touch with families and friends over long distance flights, a practice specifically forbidden by international regulations.



Worldwide Scanning with Norm Schrein

Fox Marketing, Inc.
4518 Taylorsville Rd.
Dayton, Ohio 45424

SCANNING IN TORONTO

Toronto, Ontario, is a metropolitan area the size of Boston and has plenty of active frequencies to listen to.

The metropolitan police are a bit difficult to listen to on their main channels because of a steady tone used to update the system which causes the scanner to lock up on the channel and not scan further. Natives have come up with a device that eliminates the tone and permits their scanner to scan the frequencies; however, this approach is not practical to the visitor to the area.

Instead, one can listen to the "MITRE" frequencies. These are channels designed as a mobile relay between the officer's hand held unit, his vehicle and the dispatcher. The frequencies can be easily heard and do not have the constant tone.

The Toronto metropolitan area is well represented in other service groups as well, plenty of local government (public works) operations, marine, mobile telephone (including a very active cellular telephone system), as well as all sorts of business activities.

Even the federal government is well represented; we include a sample of the Toronto federal government frequencies that one can tune into in the area.

FURTHER REFERENCES

There are two good reference books for use in Toronto and Ontario. The first is a directory for all of Ontario which also covers listings for the Metro Toronto area. This is the *Hurateq Scanner Book* (P.O. Box 9268, Stoney Creek, Ontario, Canada L8G 3X9). The other directory concentrates on local frequencies for the Toronto-Hamilton area. This is the *Fox Scanner Radio Listings--Toronto-Hamilton* (stock number RL 030-1) available through Fox Marketing (4518 Taylorsville Road, Dayton, OH 45424).

AMBULANCE AND RESCUE			
Base	Mobile	Chan	Division
156.195	149.410	F8	Mobile Rptr
151.820	155.174	F2	North East
152.375	155.640	F1	North West
143.340	148.525		ALS #3
149.605	149.170		ALS #2
148.165	153.905	F4	South East
150.530	154.860	F3	South West
148.360	151.520	F7	Supervisors
149.410	-	F5	Tactical



PLANE TALK

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

ARINC: The Voice on the Ground

Judging from the letters I've received from readers of "Plane Talk," ARINC (Aeronautical Radio Incorporated) is a service that seems to elicit more questions than any other subject in aviation communications.

For those of you who are not familiar with this air-ground-air service, ARINC provides voice communications on the domestic VHF-AM networks, primarily for the exchange of company operational messages to and from flights of aircraft operators (i.e., airlines, corporate aircraft) who utilize ARINC's services.

On their HF (international SSB voice), ARINC provides communication linkage/relay between aircraft and Air Traffic Control over oceanic areas, and operational control between flights and their companies. HF Communications Centers are

located in San Francisco, Honolulu, New York, and San Juan.

The following interview took place with Raymond Lash, Air/Ground Operations Manager, at the Communications Center in San Francisco. It will cover (and answer!) the questions that are asked most frequently about ARINC.

MT: Mr. Lash, how many communications operations do you handle per month?

RL: Within the last year, it's climbed from around 50,000 and 60,000 per month. This averages out to 30,000 contacts on the domestic VHF, and the same number on the international HF. Multiply 60,000 per month times 12, and you come up with 720,000 contacts per year!

Both directories are available in local stores (other than Radio Shack) that deal with scanners -- and there are plenty of them in the Toronto-Hamilton area!

METROPOLITAN TORONTO POLICE

Base	Mobile	Band/Ch	Division
142.875	138.675	A Band	11, 12
142.305	138.105	B Band	13
142.965	138.855	C Band	14
142.905	138.705	D Band	21, 22, 23
142.035	138.945	E Band	31
142.065	138.975	F Band	32, 33
142.725	138.315	G Band	41
142.155	138.045	H Band	42, 43
412.2125	417.2125		ISS*
412.2875	417.2875		ISS*
412.3625	417.3625		ISS*
412.8875	417.8875		ISS*
142.335	138.135	J Band	51, 53
142.995	138.885	K Band	52
142.965	138.855	L Band	54, 55
142.125	138.015	M Band	Spare
155.490	-		Harbour Commission
151.295	148.990		Metro Network
148.490	155.850		2nd District Mitre
148.850	154.995		1st District Mitre
149.740	-		Ch. 6
155.400	159.300		5th District Mitre
155.550	159.180		4th District Mitre
156.240	158.895		3rd District Mitre
155.235	-	F3	MSS*
155.430	155.025	F4	MSS*
155.520	-	F1	MSS*
156.000	-	F2	MSS*
			* Investigative

TORONTO FIRE DEPARTMENT

Base	Mobile	Chan	Division
412.6625	417.6625	F3	Mobile Rptr
412.7124	417.7125	F5	Mobile Rptr
461.8875	466.8875		Pearson Int'l Airport
461.7875	466.7875		Pearson Int'l Airport
414.7625	-		Dispatch 1
411.9875	416.9875	F1	Operations
416.3125	-		Dispatch 2
411.7875	416.7875	F2	Tactical
411.8625	416.8625	F4	Tactical
412.8125	154.070		Fire Marshal Rptr
412.3125	-		Supervisors

GOVERNMENT LISTINGS

Base	Mobile	Agency
32.700	-	Canadian Forces Base (Downsview)
34.800	-	"
149.140	-	"
149.350	-	"
149.800	-	"
150.250	-	" (Military Police)
164.520	-	"
413.2875	418.2875	RCMP (Pearson Int'l Airt)
413.0625	418.0625	RCMP (Pearson Int'l)
140.190	-	RCMP
140.400	-	RCMP
149.080	-	Dept of Communications (DOC)
173.220	-	Dept of the Environment
410.0375	415.0375	Canada Post Office
410.1125	416.1125	Canada Post Office
410.1375	415.1375	Canada Post Office
460.200	465.200	Dept of Transportation
460.2125	465.2125	Dept of Transportation

MT: And these figures are for this Communications Center by itself?

RL: That's correct. Honolulu probably runs right around the same figures. The total for the whole system ran about 157,000 in March of this year.

MT: That's an impressive figure! How many operators and other personnel work here at the Comm Center?

RL: I've got 40 operating personnel at the present time: 32 operators, four supervisors, and four lead operators. The lead operators answer the phones, take messages to relay to aircraft; also they get the wx (weather) for the operators, and perform many other duties depending on what's necessary.

On the midshift, the lead operator receives all of the calls from airlines wanting us to contact their flights. Also, anyone who doesn't have a teletype service requires us to telephone them (such as corporate users) and then the lead operator takes the calls and relays the message.

MT: How many operators work a shift?

RL: On both the day and evening watches we have four people on the domestic networks (*see insert for a domestic frequency chart*); there's always at least two operators working the international radio side. During the day, between 10 am and 6 pm, we have three operators working the frequencies (on international), and one person who coordinates with ATC (Air Traffic Control).

This ATC coordinator works from 9 in the morning until 10 at night. By this I mean a separate ATC person assigned to that position. Basically, this person covers the phone line between ATC and our facility here to copy clearances and similar duties.

After 6 pm we close down one of the international positions and the communications are handled by two people. On the domestic (VHF) nets, we go down to three operators at about 5 pm; comes the midshift, the total personnel is made up of two operators on the international side, two on the domestic nets, a lead operator, and a supervisor.

MT: When are your peak traffic periods?

RL: On the domestic side, during the day shift from 7 am until about 5 pm; we're typically taking anywhere from 65 to 75 contacts per hour domestically. Internationally, the busiest time is between 10 am and 4 pm. This seems to average out to 50 contacts per hour.

In regard to seasonal traffic: We see a change (*busier*) when the weather's bad because more people (*pilots*) want to talk to their dispatchers, go to alternates (*airports*), etc. It really gets hectic when the weather goes down, especially when you have ACARS (ARINC Communications Addressing and Reporting System), digital data link which permits routing of routine messages to and from suitably equipped aircraft which the voice operators don't get involved in. Pilots receive all of these bad weather messages then, all of a sudden, everyone in the world wants to talk and we're just not staffed for it!

If they know ahead of time, sometimes the dispatchers will call us and say, "Hey, it looks like the weather's going to be pretty bad tonight; you might want to put an extra operator on." But they can't always let us know in advance; by the time we do get someone to come in and help out, the problem's usually over with.

MT: I've noticed a lot of heavier communications traffic around the holidays.



San Francisco ARINC

RL: Quite a few airlines put on extra flights during (winter) holiday periods; Even in the summer, you get these sudden thunderstorms and squall lines popping up.

Keep in mind, Jean, also, that traffic across the Pacific is expanding at an enormous rate. Malaysian Airlines just started service this month. United Airlines expects to double their trans-Pacific service within the next five years!

MT: A lot of readers are interested in the training and background of the ARINC operators. You had mentioned to me earlier that quite a few of them receive their communications training in the military. Do many of them also have airline radio communications background?

RL: Yes, and those from the airlines, in most cases, have been trained in the military service. Also, we have had several operators that had been radio operators on airplanes.

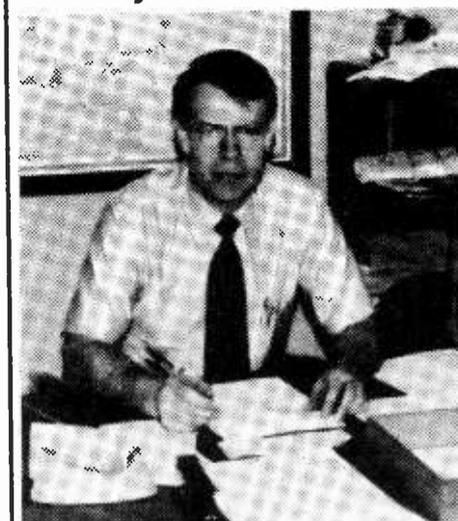
MT: How long does it take to train a communications operator and just what does the training consist of?

RL: It takes about six weeks to break them in. We start them out on the domestic circuit and get them familiar with copying the traffic there, and then we'll take them to the international side. By that time they've got a little bit of experience under their belt, and they know what to do there.

Basically, what they have to learn - if they come from a non-airline background - is all of the three-letter codes for the cities around the United States and from around the world; nowadays, also the airline codes! This is because you can't type everything out in long-hand. Also, they have to learn how to read weather and basic good radio technique.

It's basically on-the-job training. On the first day that an operator's here, I give them procedure books and have them familiarize themselves with them. They continue to familiarize with these and at the same time, sit down with an experienced operator and hear what's

Raymond A. Lash



Raymond A. Lash, Air/Ground Operations Manager for the San Francisco ARINC Communications Center, went from military communications to Eastern Airlines as an Air/Ground Communications Operator, continuing there for seven years. When ARINC took over the communications for Eastern (1965) he went to work for them. He started out with ARINC's station in New Orleans (now closed down), and stayed there until 1970. At that time, a Communications Center was opened in Annapolis, Maryland, and he was transferred to what was then called the Washington Communications Center at that location. In October of 1975, Mr. Lash came out to the San Francisco installation, and in 1980 became Manager of Air/Ground Operations.

going on as well. When they get on the circuit, I'll monitor them and critique them on a regular basis as they continue through their probationary period.

Other Comm Centers have different methods of training. For instance, Honolulu, which is all international, gives two weeks of classroom training before they even let an operator trainee get near a radio. This is because there is so much to learn out there in the Pacific--all of the different control areas, coordinates, checkpoints, and so forth.

Before they let them get on the radio, the trainee must pass a series of tests. Once they pass those tests, they are allowed to sit down with an experienced operator and start their training.

MT: The type of equipment that you utilize is of interest to quite a few readers - as well as to myself. What do you use for your VHF transceivers, for instance?

RL: Wulfsberg 100's are what we use for our domestic (VHF) transceivers.

MT: And for your HF equipment?



ARINC SFO (San Francisco Communications Center)
(All photos by Dale Spurgeon)

(Plane Talk, cont'd)

RL: AeroCom-1330 transmitters (5 kW); and the receivers are AeroCom-1310. The backup transmitters are 1300's.

MT: How about your antenna farm; will you tell us something about it?

RL: Our antenna farm is located up on Skyline Drive along with the transmitters here in San Mateo County. We have the receiving antennas, which are sloping-V's; one oriented at 318° one at 249.5°, and one at 210°. The one at 210° is the biggest and best. It's a 950 foot sloping-V, pointed right at Tahiti.

The transmitter antennas are the northwest and the southwest ones on 80-foot towers. The LDOC (Long Distance Operational Control) transmitter antenna is just an omni. We hope to upgrade that in the future and are having a new antenna designed back in Annapolis. It will replace this omni which doesn't have too much range.

MT: Speaking of range, let me ask a hypothetical question: If necessity dictated it, just how far out could a flight be for a San Francisco ARINC operator to still be able to work it? I mean, suppose that Honolulu ARINC was having communication problems and SF had to help out?

RL: If we had to, we could work them all the way out to Honolulu; probably three to four thousand miles.

MT: I realize that this would depend on atmospheric conditions, propagation, and so forth.

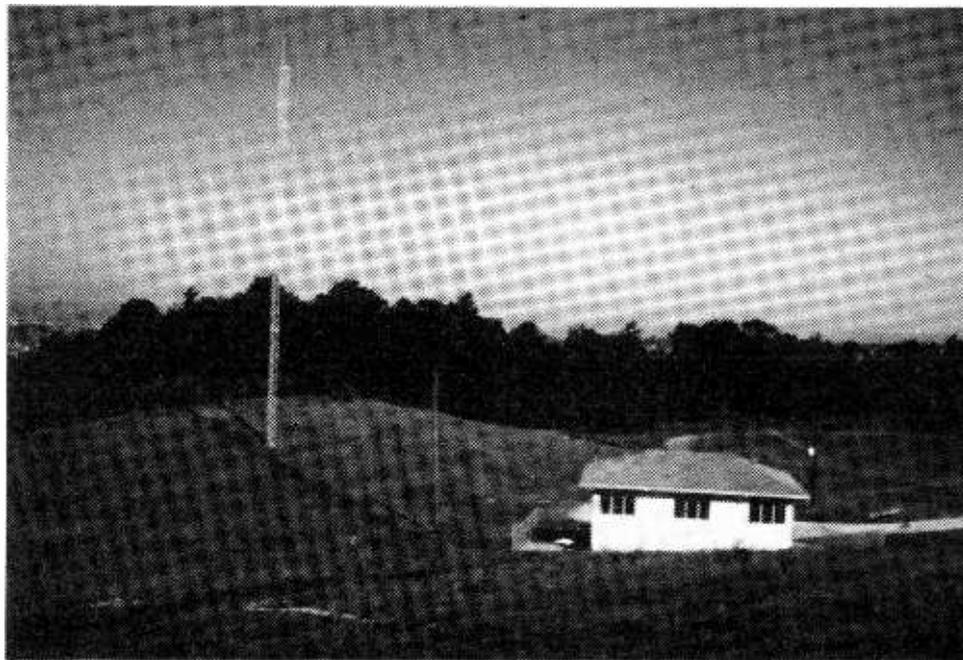
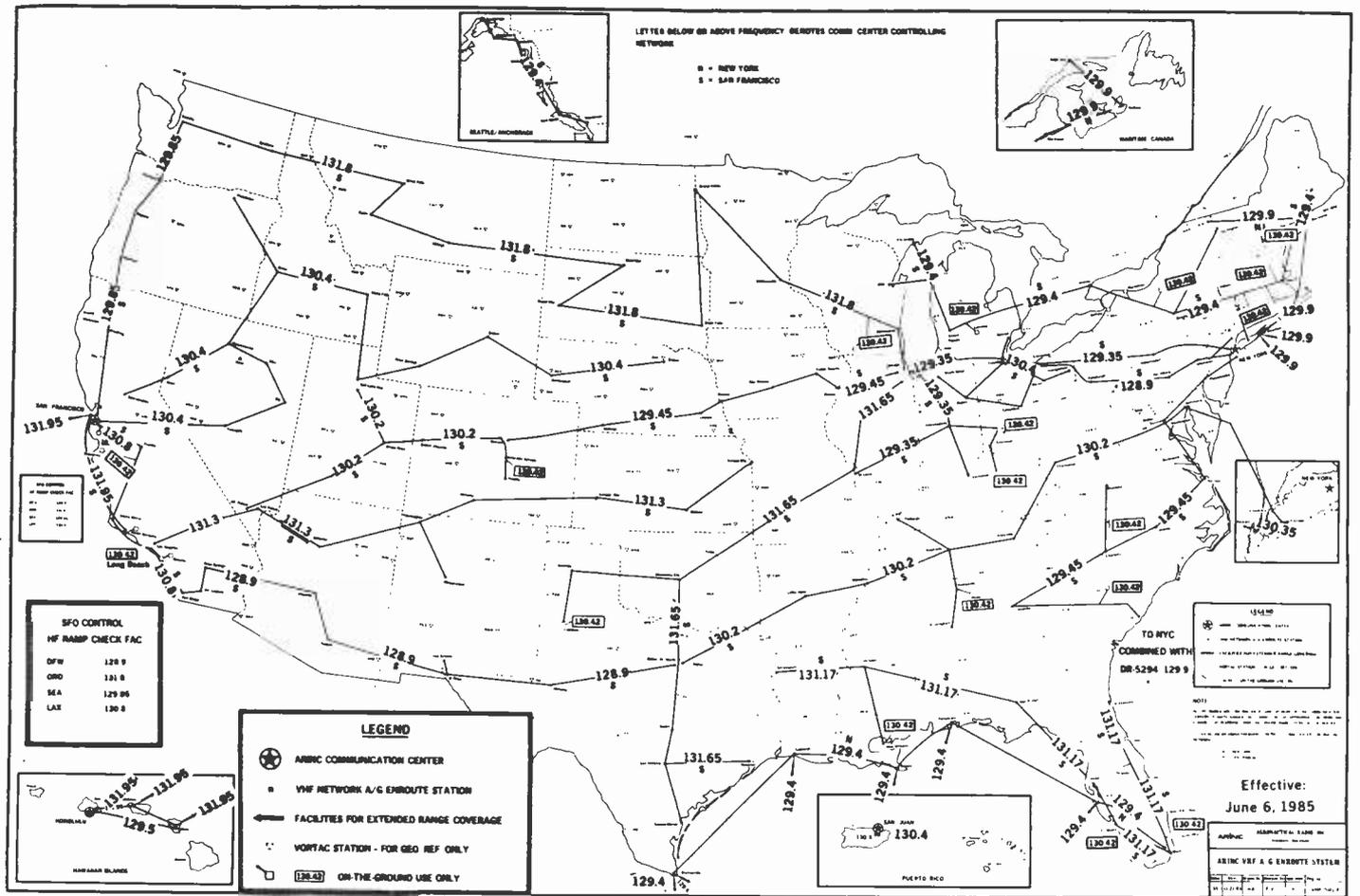
RL: Of course, and we have had periods when we could hear Honolulu on our VHF! This happens every five or six years where we have conditions that are just right and they come booming in here. Matter of fact, it happened not too long ago; two-way VHF communications between here and Hawaii!

MT: Mr. Lash, I want to thank you for letting me interview you, and also for answering our readers' questions. I thoroughly enjoyed touring the facility, too. It really makes what I hear on my receivers come alive.

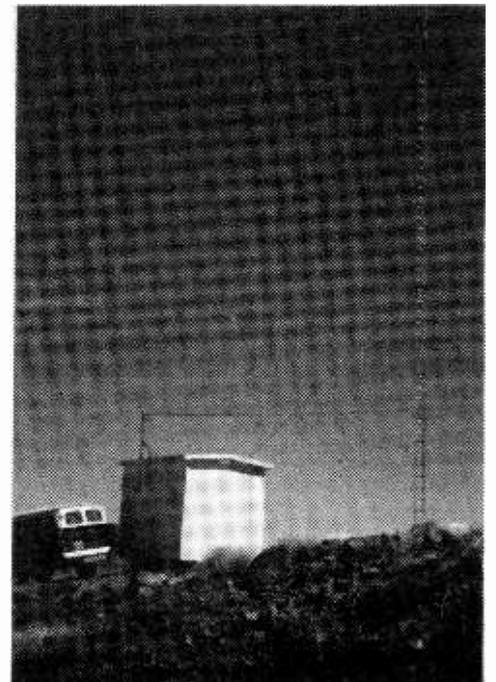
RL: You're very welcome. I hope that your readers like the pictures as well!

NEXT ISSUE: We'll look at navigational aids in aviation communication. **COMING UP:** VOLMETs around the world, ARTCCS across the country (actual sector/frequency charts), and other goodies!

73s and out.



San Francisco transmitter site (Globe site)



VHF antenna, Elko, Nevada; 130.4 MHz

San Francisco ARINC HF (International Frequencies) CENTRAL EAST PACIFIC FAMILY OF FREQUENCIES:

2869	6673	13261
3413	8843	13354
5547	10057	17904
5574	11282	

Most of these frequencies are shared with Honolulu ARINC. For VHF (domestic networks) frequencies, please see chart.

GWEN Still Very Much Alive

Although meeting considerable opposition from environmentalists, the U.S. Air Force's Project GWEN (Ground Wave Emergency Network) still moves toward the installation of some 200 unmanned radio sites around the country designed to provide communications in case of nuclear attack.

site of America's bloodiest Civil War battlefield, a gray steel tower has been erected. In case of nuclear conflict, the Gettysburg tower will send messages to missile silos, bomber and submarine bases.

(Thanks to Bernie Wimmers, Vienna, Virginia; Mel Pratt, Baltimore, Maryland; and Dave Hansen, Portland, Oregon)

In the quiet farmland of rural Pennsylvania, nearly adjacent to the

SIGNALS FROM SPACE

Larry Van Horn
160 Lester Drive
Orange Park, FL 32073



Ferretting It Out, Soviet Style

The Soviet government has long had a reputation for giving special attention to the gathering of ELINT (electronic intelligence) data, also referred to as "ferretting," SIGINT (signal intelligence), COMINT (communication intelligence), and/or RADINT (radar intelligence).

By definition, all spacecraft which receive and report on electromagnetic radiation are performing the same basic task. You could include in this category such satellites as solar studies, astronomy, weather reporting, earth resources work, or communications.

It is still useful, however, to sort out categories of difference in origin and the use of such signals. These fall into two major sub-groups: (a) those directed toward space deliberately to be picked up and relayed by satellites, and hence supporting the function of communication satellites, and (b) those not intended to be picked up by the receiving satellites, such as private messages or inadvertent leakages of signals, and hence supporting the function of ELINT, RADINT, COMINT and related categories.

Military interests extend to all natural phenomena for two reasons: to understand the difference between natural signals and those which are man-made; and because many natural emissions, such as reflected light or radiated heat, translate into pictures and data defining ground, air and space activity.

Emissions which are generated by electronic devices such as radio stations, radar equipment, microwave towers, and other spacecraft provide a general category of signals whose frequencies, power levels, locations, directions and times of emission may answer questions of military interest. Although the mere detection of the emissions presents technical challenges, decoding those emissions is an even bigger challenge.

Soviet interest in ELINT is evident in such activities as the maritime trawlers with their forests of antennas which follow NATO and US naval maneuvers. These trawlers attend missile launchings and

recovery areas or cruise off the coasts of the United States.

Since Soviet trawlers, naval vessels, embassies, and air and space defense systems all engage in signal gathering, it can be assumed that the Soviets also gather by spacecraft signals which are then relayed, either real time or after taped-storage, to analytical centers in the Soviet Union.

Up until recently, no known signals were ever received from Soviet ELINT satellites. But a new generation of Soviet heavy ELINT satellites has now been heard from. These satellites first made their appearance in 1981 launched from the F-2 rocket. They soon replaced the older heavy ELINTs launched by the A-1 rocket.

These new heavy ELINT satellites are launched into 665 km by 630 km orbits inclined at 82.5°. According to one report these satellites "operated in a record/playback mode and can locate pulsed emitters to a best accuracy of about 10 kilometers," providing an electronic order-of-battle (EOB) capability.

These satellites transmit a CW beacon on two frequencies (thus far): 51.140 and 51.160 MHz. The reason for two frequencies is to eliminate interference from two nearby satellites of the same class. These beacons have also been heard on the third and fourth harmonic frequencies of 153.420/153.480 MHz and 204.560/204.640 MHz respectively.

Listeners, especially in Europe, are asked to keep an eye out on these frequencies and report any intercepts you might receive to "Signals from Space."

Odds and Ends

• In the October column, I mentioned the publication *Worldview*: according to its editor, Raul J. Alvarez, the name has been changed due to a trademark conflict with another publication. Weather satellite buffs can write for more information to: The Journal of the Environmental Satellite Users' Group, Raul J. Alvarez, Editor/Pub-

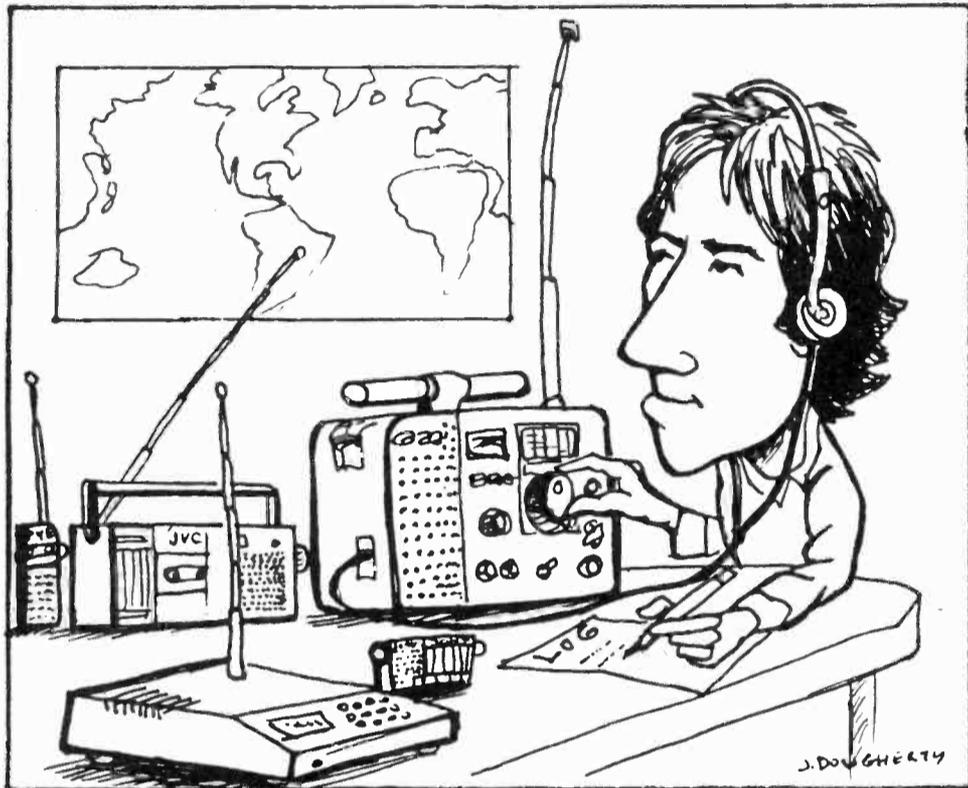
Figure 1
Satellite Frequencies and Designators

Intl Designtr	Name	Frequency(s)/ All freqs in MHz	Type of satellite
62-AA1	Tiros 5	136.230	Weather satellite
64-83D	Transit 0-2	136.650	Navigation satellite
66-77B	EGRS-15	136.440	DOD scientific satellite
66-77C	ERS-15	136.800	DOD scientific satellite
66-110A	ATS-1	137.350	NASA comm test satellite
67-40D	OV5-3	136.260	DOD scientific satellite
67-48A	Transit 0-9	149.988/399.968	Navigation satellite
69-09A	ISIS 1	136.410	Scientific satellite
69-37B	EGRS-13	136.800	DOD geodetic satellite
69-46B	OV5-6	136.380	DOD scientific satellite
69-82B	Timation 2	137.380	Quartz clock test
69-82E	S69-4	137.410	unknown
70-25A	Nimbus 4	136.500	Weather satellite
71.24A	ISIS-2	136.410	Scientific satellite
71-80A	Shinsei	136.694/400.450	Japanese scientific sat.
71-93A	Prospero	137.560	UK scientific satellite
71-110C	DOD	137.080	SSU precursor
73-81A	Transit 0-20	149.988/399.968	Navigation satellite
75-33A	Ariabat	137.440	India scientific sat.
75-49B	SRET 2	137.530	French research satellite
77-48A	GOES 2	136.380/1691.0	Geo weather satellite
78-62A	GOES 3	136.380/1687.1/1691.0	Weather satellite
78-100A	RS-1	29.402	USSR ham satellite
79-47A	Ariel 6	137.560	UK scientific satellite
79-51A	Bhaskara 1	137.230	India earth resources
79-57A	NOAA 6	136.770/137.500	Orbiting weather sat.
80-51A	Meteor 1-30	137.130	USSR weather satellite
81-44A	Nova 1	149.988/399.968	US navigation satellite
81-49A	GOES 5	1691.0/1687.1	Geo weather satellite
81-57A	Meteosat	137.080/1691.0/1694.5	Weather satellite
81-59A	NOAA 7	137.620	Orbiting weather sat.
81-65A	Meteor 1-31	137.130	USSR weather satellite
81-100B	UOSAT 1	145.825/435.025	UK ham satellite
81-115A	Bhaskara 2	137.230	India earth resources
81-120C	RS 5	29.454/29.331	USSR ham satellite
81-120E	RS 7	29.500/29.341	USSR ham satellite
81-122A	MARECS A	137.170/1.5 GHz	ESA maritime satellite
82-03A	Kosmos 1333	149.940/399.842	USSR Mil NAVSAT
82-25A	Meteor 2-8	137.850	USSR weather satellite
82-33A	Salyut 7	142.4175/19.954	(John, this is a Kosmos add-on module freq) Manned space station
82-116A	Meteor 2-9	137.300	USSR weather satellite
83-22A	NOAA 8	137.500	Orbiting weather sat.
83-33A	Rohini 3	137.400	India scientific sat.
83-58B	OSCAR 10	145.810/436.020	US ham satellite
83-63A	Hilat	149.988	DOD scientific satellite
83-99A	Kosmos 1500	137.400	Oceanographic/earth resources satellite
83-108A	Kosmos 1506	150.000/400.000	USSR civilian NAVSAT
83-109A	Meteor 2-10	137.400	USSR weather satellite
84-21B	UOSAT 2	145.825/435.025	UK ham satellite
84-46A	Kosmos 1553	150.000/400.000	USSR civilian NAVSAT
84-62A	Kosmos 1574	150.000/400.000	USSR civilian NAVSAT
84-72A	Meteor 2-11	137.850	USSR weather satellite
84-105A	Kosmos 1602	137.400	Oceanographic/earth resources satellite
84-110A	Nova 3	149.988/399.968	US navigation sat.
84-123A	NOAA 9	137.620/137.770	Orbiting weather sat.
85-13A	Meteor 2-12	137.400	USSR weather satellite
85-21A	GEOSAT	150.012/400.032	US geodetic satellite
85-41A	Kosmos 1655	150.000/400.000	USSR civilian NAVSAT
95-93A	GPS 11	1575.42	US NAVSTAR NAVSAT
85-100A	Meteor 3-1	137.400/137.850	USSR weather satellite
85-119A	Meteor 2-13	137.300	USSR weather satellite
86-39A	Meteor 2-14	137.300	USSR weather satellite
86-66B	Oscar 30	149.988/399.968	US navigation satellite
85-66A	Oscar 24	149.988/399.968	US navigation satellite

MT

MONITORING POST

Proud of your monitoring post or ham shack? Then this is your column--Send your photo and a brief description to Monitoring Post c/o Bob Grove or Larry Miller and see yourself in print!



Dougherty of Ridley Park, Pennsylvania, would like to share this self portrait with fellow monitors. John has been listening to shortwave now for four years and his monitoring post includes a Panasonic RF2200, JVC RC-522, Sony ICF4910, Realistic PRO2009 scanner, and a Pye Audio TR-0170 air band radio.

(Signals from Space, cont'd)

lisher, 2512 Arch Street, Tampa, Florida, 33607. I'd like to thank Raul for this information.

● *MT* SFS's intrepid satellite reporter, John Biro, has sent along the list of satellite frequencies shown in figure 1. Always, John, it is good to hear from you.

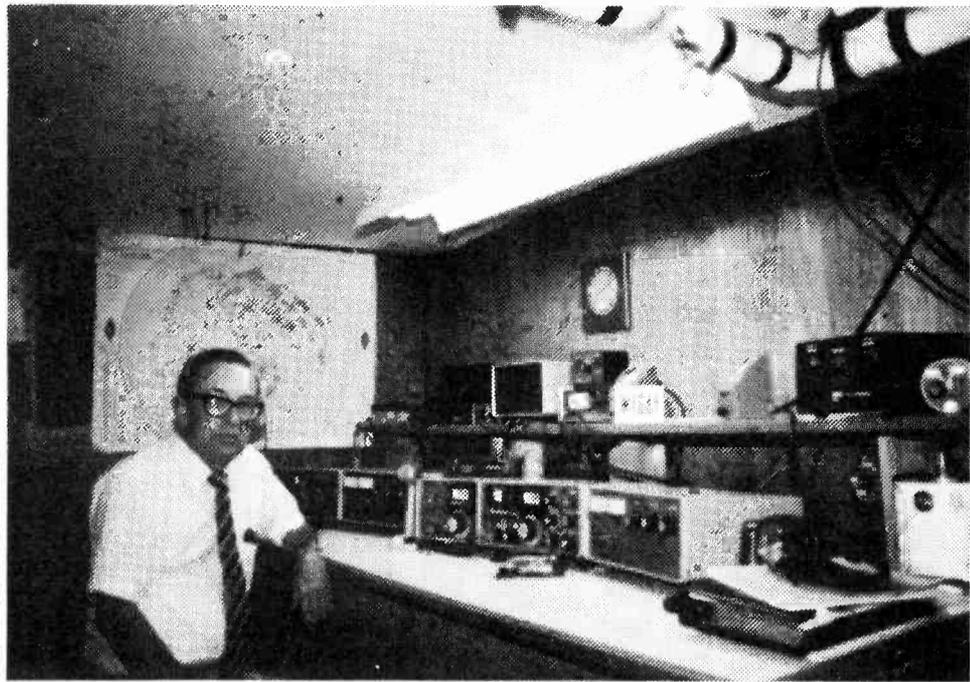
I am sure that other *MT* readers have their favorite list of satellite frequencies or military aircraft frequencies. If you would like to share your favorite list with us, send it to the column masthead address. If you desire a personal reply, please enclose an SASE.

● Finally, an interesting intercept from a reader who will remain anonymous. A net was in progress on

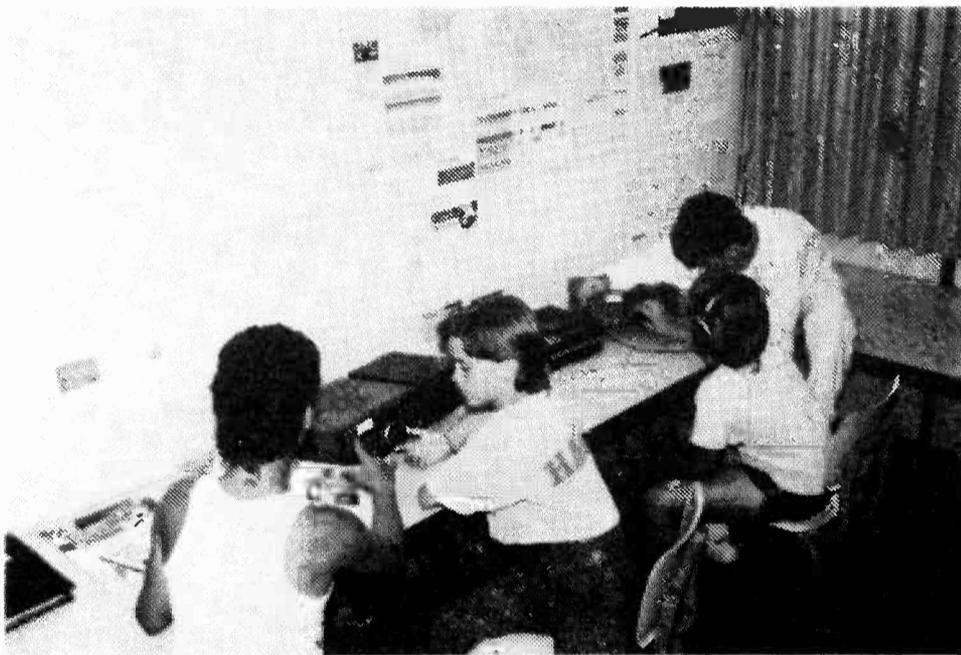
Fleetsatcom/Leasat 261.750 MHz with stations using phonetic call signs. Brandywine broke in and told one of the stations if he did not receive an auto-von call in five minutes, he would jam the channel. One of the stations indicated to another that he was unable to contact Brandywine. Immediately, Brandywine jammed the channel with a dead carrier. The jamming ceased after three hours and the net was gone.

This was not as strange as the latest rumor from a noted south Florida TV DX'er. He thinks that Bob Grove is an agent of the CIA. OK, Bob, we know that you are the CIA's answer to Captain Midnight! Quit jamming 251.750 MHz!

To all *MT* readers from Loyd, Gayle and me, may you all have a happy holiday season and prosperous new year in 1987. 'Til next month, 73's.



Duncan Kreamer of Vineyard Haven, Massachusetts, operates amateur CW under the call sign WIGAY. His streamlined station reflects some fifty years of licensed hamming.



With an ICOM R71A and an ICOM R7000 Craig Dible's classroom at Horace Mann Middle School in Beverly Hills, California, is no bore! For more information on his innovative curriculum see the Nov. issue of *MT*, p. 15, or write Craig at 8701 Charleville Blvd., Beverly Hills, CA 90211.

Hill Street and Night Heat

The award-winning police show, *Hill Street Blues*, looks like it must have been shot in New York City--if you live in New York, that is. Chicago and Los Angeles residents also identify with the locales.

In fact, the opening credits were filmed in Chicago, complete with Chicago cruisers and shoulder patches, but the fictitious Hill Street Precinct is generic; nowhere on the program will a specific municipality

be named, according to the show's star, Daniel J. Travanti, during a recent interview. Story line scenes are shot in California.

In similar fashion, the hard-hitting *Night Heat* features opening footage filmed in New York, but the story is actually shot in Toronto, Canada. Producers feared that if it were known that Canadian locations were used they would lose American viewers.

ON THE HAM BANDS

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

The Foundations of Early Radio

Part II

In last month's historical segment, we discussed the period from the Radio Act of 1912 to the arrival of the War in 1917. We will continue with that story next month, but this month I want to discuss the development and utilization of the equipment during the period from 1900 to 1917 and the background that led up to the existence of that equipment.

As we progress through time in this series of articles on the history of amateur radio, I want you to get a good feel for the equipment which existed in each time period and how that equipment was used. Since there was almost no equipment in existence (except in the hands of several dozen experimenters) until 1899 to 1900, we will start at that point. But first some background.

2600 years ago, certain "electrical" properties were observed to exist. The word "electricity" came along about 2200 years later (some ideas take awhile to catch on!). Some serious pattering around began about 400 years ago and a few interesting things were learned, but it wasn't until about 140 years ago that an Englishman, Michael Faraday, described the "laws" of induction (and lots of other stuff, too, since he was a genius!), thereby giving those who followed something they could get their teeth into.

James Maxwell, a Scotch mathematician, bit hard and proposed theories that said all this "electricity" stuff was actually waves, like light, and moved through the "ether" which filled up all the space between the heavenly bodies. Had he said this a hundred or so years sooner, he no doubt would have been burned at the stake. He was ahead of his time, but not fatally so.

From Wire to Wireless

Heinrich Hertz, a German student and later a physicist, read Maxwell's book, said, "Why not?!" and proceeded to spend a lot of his copious free time messing about with coils of wire and sparks...and darned if he didn't manage to demonstrate exactly what Maxwell said would happen if someone messed about in

that way!

At about that same time, a lot of other people, both scientifically trained and amateurs, including Dr. Loomis (remember the word "aerial"?), started playing around with "induction," and a few of them had some real success (does the name Alexander Graham ring your Bell?). But let's get back to "radiation."

The ideas these people we have mentioned had (and the ideas of many others, too) were really great, but it took one man to come along and make them practical. He didn't invent "wireless," but he read all the ideas which has been published before, put them all together, and said, "Hey, if I take one from column A and two from column B, and connect them together, I can make a practical working wireless system!" or words to that effect, and that is what he invented!

He and Hertz thought a lot alike, but Guglielmo Marconi was smart enough to patent everything he thought of. His timing was good, too; around the turn of the century there was a lot of interest in electricity, wire communications and the like, and his efforts made good press, too!

What was amazing about all of this was that most of what he and the others used in those days was nothing much more than a whole lot of bits of wire in various configurations connected to each other by...you guessed it...more wire!

We're talking really simple here and yet it all worked! Of course we're just talking about telegraphy, but it was super simple.

Now I know what you're thinking. When Fleming and deForest did their thing with the valve (tube), things changed, right? Wrong! Those first tubes took years to catch on, were very hard to get hold of, and cost a lot of bucks. Specifications were different for each tube! They were really just interesting experimental devices until Armstrong invented regeneration, even though some were used as detectors.

The First Boom Box

Early "radios" were a bunch of parts laid out on a table, workbench or one or more boards (hence the term, "breadboard") and were not a cohesive "boxed" unit. The idea of putting the whole thing into one box or cabinet--or even on one board--didn't occur until about 1915.

Until then, what little commercial amateur equipment was available often was simply one part of the circuit on a "neat" looking board or in a small box. It took several of these boards or boxes to make up a receiver or transmitter.

The first "sets" usually consisted of a transmitter made up of a condenser, an induction coil and a spark gap. A receiver was made up of a coherer/decoherer (a detector which originally consisted of a tube filled with filings or later an electrolytic or crystal detector), a "slide" tuner (a coil with a sliding contact, but most early stations were untuned so the slide tuner was a rarity in the early years prior to 1908 to 1910), and a single earphone or a pair of headphones.

Add one aerial (usually a "flat top" which consisted of two or more

wires, often four, parallel to each other with a spreader attached at each end to hold them apart, placed as high as possible), a good ground, and either AC power (if you had it!) or some Leyden Jars and/or dry cell batteries, and you were in business.

You had no amplification, no sensitivity, no selectivity...just brute force, and DX was a few blocks to a few miles with under 1 kW (if you had 3 to 5 kW, maybe several hundred miles...if the wind was blowing in the right direction!), but it was hamming!

During this period, most hamming consisted of QSOs with nearby friends, testing new ideas and equipment and, later in that period, traffic handling.

There were various refinements here and there, especially the slide tuner, the three slide tuner, electrolytic and silicon crystal detectors, but this was the status of amateur equipment in the 1900 to 1915 time frame. However, in 1915, the millenium had arrived and its name was... regeneration!

The First Breakthrough

Edwin Armstrong was definitely a



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receiver man; since 1915 (right up to today), almost all receivers built by amateurs or commercially manufactured for all purposes (broadcasting, commercial/business, government, etc.) have used his circuit design ideas.

His regenerative and superheterodyne circuits and his invention of frequency modulation--FM--rank with Hertz and Marconi in their dramatic effect on all communications electronics.

All this from a young college student, an amateur (later a professor of electronics), messing around in his attic work room.

Prior to the regenerative circuit, the receiver simply detected the energy of the transmitter as received at the antenna *without* any amplification. The distance at which a signal was heard was a factor of the power of the transmitter and the quality of the detector.

With regeneration, the signal was fed through an audion (triode tube which had been greatly improved by 1915) and part of the signal was fed back from the plate to the grid and reamplified again and again.

By controlling the coupling between the grid and plate (to prevent oscillation), and by tuning the grid and plate, this circuit immensely increased the sensitivity and selectivity of the receiver over all previous methods. The previous typical DX of 5 to 100 miles quickly jumped to 50 to 1000 miles and more!

During the year prior to the war, at least two commercial regenerative tuners were on the market, and within less than two years from its invention, the majority of hams had built or bought a regenerative tuner at their stations. They would continue to be "the tuner" for the next 20 years or so for amateurs, commercial and government users.

There were improvements to be sure (such as capacitor instead of inductor tuning), but those improvements would come later; for then, the real promise of wireless communications had arrived and the hams were ready to take advantage of it...just as soon as they finished with the war to end all wars!

Next month we will look at World War I, Radio War I (not the same war) and the explosive growth of broadcasting.

Reflections on a New Column

There are two ways to start a new column in a magazine or

WHAT'S NEW?

Equipment Shelf

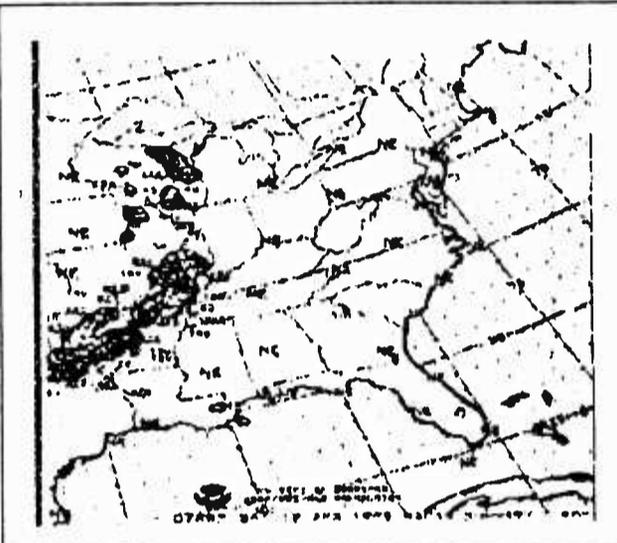


FAX ON THE HOME COMPUTER

Gary Sargent is an expert in simplifying weather facsimile display on the home computer. Last year he published an outstanding "One Chip Facsimile" article for the Atari in 73 Magazine (October, 1985); this year it's for the Commodore 64 (October, 1986).

Called "Visifax" by the author, the program allows eight input commands: RESET, SYNC, SKIP, MODE, CLEAR BUFFER, SCROLL, LPM (lines per minute), and QUIT--all with a single chip (EXAR 2211 tone detector circuit to be provided by the user) plugged into the game port.

Both versions are available from the author (specify Atari 400/800/130XE or Commodore 64) at \$10 each including diskette, circuit



A radar summary chart received from NAM on 3.357 MHz.

diagram and documentation. For an additional \$5 Gary will supply the source code on the diskette as well as hard copy form.

Order from Gary Sargent, 4227 Willow Run Drive, Dept. MT, Dayton, Ohio 45430.

newspaper. The first method is to write it like it has always been there, wading right in to the middle of things. The second method is to ease into it, taking a few months to build up to what you want and develop a following. As you might have guessed, I chose the second method.

It seemed to me that since I wanted to have a column with three elements, it was the best way to do it. Those three elements are a basic story or article on some subject or subjects of interest, a chatty section with letters from readers containing questions or comments or bright (or nasty) remarks, jibes, etc., and small bites of the latest news in the ham world.

So far, we're getting there, but we have a way to go yet. Obviously, the basic story(ies) is usually written well in advance of the deadline and planned in advance. The cards and letters are just now starting to arrive (it does take awhile to get the dialog going) and we make the final pick of new items within a few days of the deadline in order to have the latest stuff.

Your input will be another factor. A column often has a life of

factor. A column often has a life of its own and while one tries to write to the widest audience, he will also tend to cater to the want of his readers who express opinions.

During 1987, we will continue our walk together through ham history, though in smaller bites, so you will gain a better perspective on your favorite hobby.

Current subjects such as amateur radio clubs, operating techniques, operating modes, repeaters, amateur radio nets, specialized equipment, etc. will be covered.

These subjects will provide information for hams to use in their hamming and information for SWL's to use in their monitoring. We will continue to provide news of the current happenings in amateur radio, especially those of interest to both hams and SWLs to keep you on top of what's what. And we will start the dialog going as the flow of letters grows.

My seasons greetings to you all. Have the happiest of holidays and let's look forward to a great 1987 together. And keep those cards and letters coming!

REGENCY TO ADD NEW PRODUCTS

Regency Electronics of Indianapolis, Indiana, gave their stockholders a boost recently when they announced the imminent introduction of three new product lines.

According to an industry source, Regency plans to reenter the CB radio and radar detector market after the first of the year, possibly revealing a line of Korean-manufactured electronics (Maxon?) at the winter Consumer Electronics Show (CES) in Las Vegas.

At the same time, it appears that an entirely new line of scanners will be manufactured by the company at their Satellite Beach, Florida, land mobile division facility and yes, they will include the 800 MHz band!

Preprogrammed Scanning

One forerunner, "The Informant," is a radical departure from conventional scanners. Identical in size to the R806, the new INF-1 has approximately 400 preprogrammed police frequencies as well as all seven U.S. and Canadian weather channels and is designed for 12-volt mobile installation.

Scanning at a rapid 40 channels per second, the INF-1 allows the user to select state and city while on the road; "The Informant" will automatically select those state, county and city frequencies assigned to the locale. No external programming is possible.

We suspect that the INF-1 will be followed by a new line of Regency scanners which will include other agencies as well.

PR-02004 DELAYED

Radio Shack's eagerly-anticipated PRO-2004 wide-frequency-coverage scanner will be delayed at least two months according to a company spokesman. Tandy management is wrestling with the problem of the newly-passed Privacy Act (see editorial commentary elsewhere this issue).

A decision will be reached shortly whether to exclude the two cellular telephone bands from the 800-1300 MHz range, maintaining the rest of that spectrum. The concern was raised because Tandy also markets a cellular telephone.

LIBRARY SHELF



Two New Fox Directories...

FORT WAYNE/LIMA SCANNER RADIO LISTINGS: In keeping with the standard format of previous Fox editions, this latest local directory is categorized by licensee, agency or service, call sign, and frequency. As implied by the title, the book concentrates on the northeast Indiana/northwest Ohio complex.

Nationwide listings are also provided for federal agencies like DEA and Secret Service as well as common frequencies for marine, aircraft and railroads. Localized listings are provided for applicable federal departments and bureaus including Forestry, Interior and FBI.

GREAT LAKES REGIONAL DIRECTORY: Last year Fox issued a giant compendium for the southeastern US; this year it's the Great Lakes. At 412 pages the regional directory carries information on Illinois, Indiana, Kentucky, Michigan, Ohio, and Wisconsin.

Subdivided by state, then by service and alphabetized by city, data includes frequencies (input and output), call signs and licensees. As with the local directories, this regional book carries listings of aircraft, broadcasters, federal agencies, railroads, and marine frequencies as well.

All directories are available from Fox dealers nationwide or by contacting Fox Marketing, 4518 Taylorsville Road, Dayton, Ohio 45424-2497.

FMEDIA by Bruce Elving, Ph.D.: A new FM radio newsletter promises to be of great interest to FM DXERS. Authored by noted *FM Atlas* publisher Bruce Elving, *FMEDIA* covers stereo, high fidelity broadcasting, traveling with an FM radio, market reports, programming, and news notes.

For a sample newsletter send one dollar to FM Atlas Publishing, Box 24, Adolph, MN 55701-0024.

GOOD REFERENCE BOOKS

A recent listing by Harold Selers in the *ANARC* newsletter is of special interest to our readers. The following list of books and periodical publications are briefly described as to content for your reference. Sources are given as well.

Prices are given as a guide and may vary somewhat. They do not include shipping from the dealer.

WHERE TO FIND SHORTWAVE RECEIVER REVIEWS

A DXER'S TECHNICAL GUIDE, 2nd edition 1982, is a 120-page collection of articles by various authors. For the mediumwave DXer, although useful to others. Contains reviews of receivers, antennas and accessories, as well as modifications. Authored by Nick Hall-Patch. US\$65.00 postpaid in North America, US\$9.50 elsewhere. IRCA, P.O. Box 21074, Seattle, WA 98111.

ANARC NEWSLETTER is the monthly publication of the Association of North American Radio Clubs, the umbrella organization for listening clubs in North America. Harold Sellers writes a column reporting on new equipment for SWLs/DXers and usually includes a receiver review as well. A subscription costs US\$7.50 in North America, US\$10.00 elsewhere. ANARC Newsletter, P.O. Box 462, Northfield, MN 55057, USA.

ENJOYING RADIO, compiled by David Newkirk, is currently a section a *DX LISTENING DIGEST*, by Glenn Hauser. Enjoying Radio is basically a forum for the exchange of ideas on equipment as well as a question and answer column. Opinions on receivers are common and more extensive reviews of receivers are occasionally included. A subscription to *DX LISTENING DIGEST* is available for US\$17 in North America, \$19 elsewhere (extra for airmail). DXLD and RIB may both be subscribed to for \$33 in North America.

Address: Glenn Hauser, P.O. Box 490756, Fort Lauderdale, FL 33349.

HOLLOW STATE NEWSLETTER is devoted to tube-type equipment. Originally started by a Collins R-390 users group, it has expanded to include all tube receivers. The newsletter includes tips and information on maintenance, parts location, repairs and operation of tube receivers. Reviews are occasionally included. A subscription costs US\$4 for four issues per year. Write to Chris Hansen, P.O. Box 1226, New York, NY 10159, USA.

INTERNATIONAL RADIO is an amateur radio enterprise which has published separate newsletter for users of Kenwood, Icom and Yaesu equipment. Although predominantly amateur in content, there are occasional reviews and comments on SWL equipment. Enquiries may be made to International Radio, Inc., 747 S.W. South Macedo Blvd., Port St. Lucie, FL 33452.

MONITORING TIMES, a monthly magazine published by Grove Enterprises, a mailorder company offering many products to SWLs/DXers. Recently merged with *INTERNATIONAL RADIO* by Miller Publishing. Contains many articles on listening to all portions of the spectrum and also equipment reviews by writers such as Larry Magne and Bob Grove. A subscription is US\$15 in North America and US\$22.00 elsewhere. Grove Enterprises, P.O. Box 98, Brasstown, NC 28902.

RADIO COMMUNICATION RECEIVERS is a 280-page book written by Cornell Drentea and published by TAB Books (#1393) in 1982. The book explains receiver



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- **MFJ 1020A INDOOR ACTIVE ANTENNA** like new with AC adaptor, manual, original carton. Cost \$140, sell \$79.
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Bearcat BC300 scanners, Drake 4245 shortwave receiver, JRC NRD505 shortwave receiver, Uniden CR2021 shortwave receiver, Regency MX7000 scanner, Bearcat 100 scanner, Icom R71, NRD515 and Drake R7 or R7A shortwave receivers, Sony CRF330K shortwave receiver, Bearcat BC350 scanners, Bearcat BC250 scanners, Infotech M600 RTTY readers.

Call 1-704-837-9200 for a used equipment trade agreement if you are interested in swapping!

(Library Shelf, cont'd)

theory and it is well-illustrated. Although not containing receiver reviews, it can provide the technical background to allow you to evaluate a receiver to some degree yourself. It is sold for US\$13.95-\$14.50 by several SWL mailorder firms.

RADIO DATABASE INTERNATIONAL, a guide to shortwave broadcast schedules, included several receiver reviews in the 1986 International Broadcasting Edition. RDI is edited by Larry Magne, who also produces the reviews for both RDI and the **WORLD RADIO TV HANDBOOK**. The articles are extensive and easy to read. For 1987 the RDI will be published as a single book covering International and Tropical bands. Published by International Broadcasting Services, Ltd., Box 300, Penn's Park, PA 18943. The price will be approximately US\$13. Mr. Magne has recently offered "White Papers" on specific topics, including one reviewing the J.R.C. NRD-525 receiver; price US\$4.

RADIO EQUIPMENT FORUM is a monthly section of **REVIEW OF INTERNATIONAL BROADCASTING**, edited by Glenn Hauser. R.E.F. is compiled by Loren Cox, Jr., and consists of reviews and comments on equipment, radio nostalgia and an exchange of ideas and opinions. Subscribers contribute to the column. R.I.B. is available for US\$18 in North America and US\$20 elsewhere (extra for airmail) from Glenn Hauser, P.O. Box 490756, Fort Lauderdale, FL 33349.

RADIO EQUIPMENT REVIEW is a bi-monthly newsletter of receiver and accessory reviews, user comments and equipment information. Subscribers contribute material. Printed on 8-1/2"x11" sheets. Begun in March/April 1985 by Ronald Pokatiloff, 2661 Sheridan Rd., Zion, IL 60099. Price is US\$2 per issue in North America and \$3 elsewhere, payable to Mr. Pokatiloff. All 1985 issues may be bought as a book for US\$8.50 North America, US\$11.50 elsewhere.

RADIO NETHERLANDS RECEIVER SHOPPING LIST - Jonathan Marks compiles this booklet and updates it on a regular basis. It is a useful listing of what receivers are available, their prices in various countries, features and availability. Brief comments are made on each receiver. The booklet contains other useful information, such as company addresses and sources for vintage radio equipment. Free from Media Network, Radio Netherlands, P.O. Box 222, 1200 JG Hilversum, The Netherlands.

RADIO RECEIVERS - CHANCE OR CHOICE is an English translation of an original work in German by Rainer Lichte. In its over 300 pages fifty of the most popular radios of the past, as well as today's receivers are tested and evaluated. Published in 1985 by Gilfer Shortwave, P.O. Box 239, Park Ridge, NJ 07656. Price: US\$18.50. Gilfer has recently offered a separate review of the J.R.C. NRD-525 by Mr. Lichte for US\$3.

ANTENNA REFERENCES FOR THE SHORTWAVE LISTENER AND DXER

WORLD RADIO TV HANDBOOK, 1986 40th edition, current issue. 1987 copy to be available in January/February 1987. Larry Magne authors a section containing extensive reviews of receivers, as well as some listening accessories. This feature has been included since 1980. The WRTH may be purchased from SWL/DX mailorder firms, SWL/ham retail outlets and many bookstores. Price is US\$19/Cdn\$29 or less.

ANTENNA COMPENDIUM by American Radio Relay League. Volume 1 is 178 pages, paperback. Price: US\$10-\$11. A fine collection of articles on designing and

building antennas. Primarily of interest to radio amateurs, but some designs are applicable to shortwave listening.

ANTENNAS FOR RECEIVING, by Wilfred E. Caron. 123 pages in a 8-1/2" x 11" size. Published by Grove Enterprises in 1985. Price: US\$12.95 to \$14.95. One of the few books presently available that specifically deals with receiving antennas, VLF through UHF. Contains many good projects for beginner and advanced antenna experimenters. Also lots of theory. Best for the experienced listener, as it may overwhelm the beginner with theory.

ARRL ANTENNA BOOK, by the American Radio Relay League. 14th edition contains 328 pages, paperback. Price: US\$8.00-\$8.50. The best book to serve as a technical reference on antennas. For those with a technical background or considerable antenna experience, this book will provide many tips and answers to questions. Beginners should not buy this book, but rather build up to it as they gain experience.

HF ANTENNAS FOR ALL LOCATIONS, by L.A. Moxon. 264 pages, hardcover. Published by Radio Society of Great Britain in 1982. Price: US\$12.00. Britain's equivalent to the ARRL ANTENNA BOOK, although not quite as extensive. Many good tips, heavy on theory. For the radioamateur and SWL with technical know-how and those who like to experiment. Not recommended for a beginner.

HOME-BREW HF/VHF ANTENNA HANDBOOK, by William Hood. 210 page paperback. Published 1977 by TAB Books. Book #963. A well-illustrated book that covers antenna basics, theory, construction, types, etc. The theory is elementary. A good book for all antenna experimenters, beginner to veteran. May be out of print.

HOW TO BUILD HIDDEN, LIMITED-SPACE ANTENNAS THAT WORK, by Robert Traister. 308 page paperback. Published by TAB Books. Not yet reviewed by us. Radio Netherlands says the designs are best for communications receivers, rather than portables.

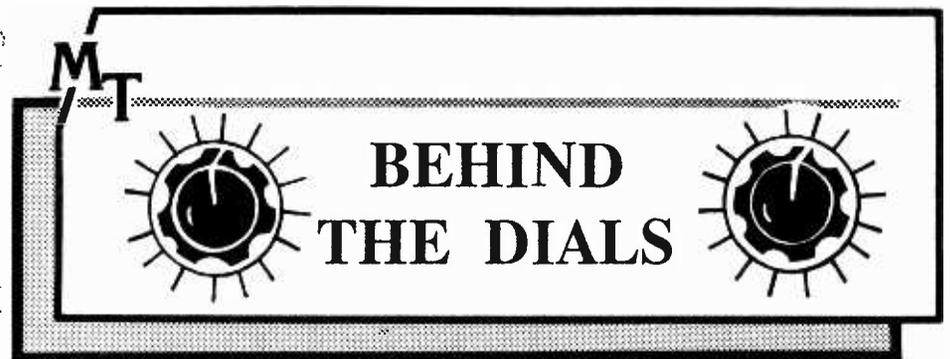
SEVENTY-THREE DIPOLE AND LONG-WIRE ANTENNAS, by Edward M. Noll. 160 page paperback. Published by Editors and Engineers in 1970, 5th printing 1976. See above comments. The designs in this book are generally more applicable for frequencies at higher shortwave frequencies and beyond. No longer in print.

SIMPLE, LOW-COST WIRE ANTENNAS, by William Orr. 192 page paperback. Published by Radio Publications, Inc. in 1972. Now out of print. This book has some good points, especially when it comes to construction tips, but there are better books available today. It is written primarily for radio amateurs.

THE ANTENNA CONSTRUCTION HANDBOOK FOR HAM, CB AND SWL, by Rufus P. Turner. 237 page paperback. Published by TAB Books in 1978. Book \$1054. Other books listed here may be a better choice, but if CB and/or ham radio is also an interest, then this book is a good source of basic theory and antennas to build. May be no longer in print.

THE ARRL 1986 HANDBOOK FOR THE RADIO AMATEUR, by the American Radio Relay League. 1184 page, 40 chapter paperback, includes section on antennas. Price: US\$18-\$19. Although not entirely on the subject of antennas, it does contain a great deal of antenna theory and construction information. A valuable reference for the shortwave listener, but should not be the first book bought by a beginner SWL seeking antenna information.

THE SHORTWAVE LISTENER'S ANTENNA HANDBOOK, by Robert Traister. 191



PALOMAR NOISE BRIDGE by Bob Grove

One of the most indispensable pieces of test equipment for the antenna experimenter is the noise bridge. Connected between the receiver and antenna, a quick rotation of one or two dials permits accurate measurement of antenna resistance, capacitive reactance and inductive reactance at any frequency within its design range.

The RX100 noise bridge from Palomar Electronics is a classic example of a design which has deserved to last for many years. Some ten years ago--possibly more--I acquired a previous Palomar model and it served the purpose well. I was eager to test the new model.

To verify the accuracy of the unit I connected a pure resistance to the antenna port; the other end was attached to my NRD525 general coverage receiver. From 1.6-30 MHz the unit provided plenty of signal and excellent accuracy.

I next switched receivers to an ICOM R7000 to make VHF measurements (the Palomar bridge is specified no higher than 100 MHz). Sure enough, the signal was still prominent right through low band (30-50 MHz), but by the time I reached 100 MHz any meaningful readings were gone.

ANTENNA MEASUREMENTS

Now that I had verified the accuracy of the Palomar bridge I was ready to make some antenna measurements on my favorite 134-foot HF (shortwave) dipole. Starting at 1.6 MHz and taking readings at one

page paperback or hardcover. Published by TAB Books in 1982. Book \$1487. Price: US\$9.95 soft/\$15.95 hard. One of the best books now commonly available, this book should be one of the first bought on the subject of antennas. As with most TAB books, it covers theory only basically, but contains many practical and useful tips and it is well-illustrated.

TWENTY-FIVE SIMPLE SHORTWAVE BROADCAST BAND AERIALS, by Edward M. Noll. 63 page paperback. Published by Bernard Babani. Book #BP132. Price: 1.75 pounds. An inexpensive and easy to read book for shortwave listeners. There is little theory that can confuse the non-technically minded, but the twenty-five antenna projects presented range from the simple to the more complex. Good book for all SWLs.

TWENTY-FIVE SIMPLE TROPICAL AND MW BAND AERIALS, by Edward M. Noll. 56 page paperback. Published by Bernard



megahertz intervals (more frequent in the ham bands where I transmit) I made an interesting discovery--I have some antenna pruning to do!

Resistive readings ran from 10 ohms to 155 ohms with some reactances as high as 70 ohms or more; clearly, some adjustments were called for to make the antenna more transmit-worthy. Fortunately, receiver applications are far more forgiving and the antenna works well in that mode even with its widely variant impedance characteristics.

OTHER APPLICATIONS

An antenna noise bridge is not limited to antenna impedance measurements; it can be used in conjunction with a receiver to determine resonant frequencies of LC (inductance/capacitance) circuits and determine turns ratio and working status of balun transformers as well.

Another application is determining appropriate lengths of coaxial cable to make resonant stubs when you know the velocity factor of the cable.

(Please turn to p.48)

Babani. Book #BP145. Price: 1.75 pounds. The same comments can be made about this book, as about the one above. The added items in this include mediumwave antennas, Beverage antennas and others.

PUBLISHERS

The above books may be found listed in many catalogs of SWL suppliers. However, should you wish to contact the publishers, some addresses are provided here.

American Radio Relay League, 225 Main St., Newington, CT 06111.

Bernard Babani, The Grampians, Shepherds Bush Road, London W6 7NF, England.

Radio Society of Great Britain, 35 Doughty Street, London WC1N 2AE, England.

TAB Books, Blue Ridge Summit, PA 17214. Telephone (717)794-2191.

Tune in the Caribbean Emergency Network

The Caribbean Ocean region is ever vulnerable to tropical storms; hurricanes may bring devastating winds and ravaging waters. Thousands of lives may be lost. Radio communications provide a vital link for evacuation and disaster relief.

At the present time 20 participating states comprise the emergency network which ranges from Belize in the west to Barbados in the east, and from Guyana in the south to the Bahama Islands in the north. All communications are single sideband voice.

The net control station (NCS) identifies as DISPREP ANTIGUA and is located in the office of the Pan-Caribbean Disaster Preparedness and Prevention Project (PCDPPP) at St. John's Antigua.

Net practice sessions are held Tuesdays and Fridays at 1330 UTC on 7850 kHz USB (channel 2) for the eastern Caribbean group, and at 1400 UTC on 7453.5 kHz LSB (channel 5) for the western Caribbean group. Both of these frequencies are also used Caribbean-wide for routine traffic.

Other frequencies (kHz) used Caribbean-wide include:

- 2182 USB (Marine emergency only)
- 2527 USB (Marine emergency only)
- 6977.5 USB (National Weather Service net; ch.6)
- 7453.5 LSB (Routine traffic)
- 10100 LSB (Emergency only)
- 13965 USB (PCDPPP/Red Cross communications)
- 14303 USB (Amateur; emergency only)

Occasional relays are needed when propagation is poor; in these cases, Federal Emergency Management Agency (FEMA) station WGY932 in Puerto Rico provides assistance.

EASTERN CARIBBEAN

Utilizing the calling frequency 7850 kHz USB (channel 2), a common language (English) and, with the exception of Guyana, the same time zone, the following states monitor mutually: Guyana; Trinidad and Tobago; Grenada, St. Vincent, Barbados, St. Lucia, Dominica, Montserrat, Nevis, Anguilla, St. Kitts, Antigua, and Tortolla.

Additional frequencies (kHz) available for this group include:

- 13998.5 USB (Red Cross communications)
- 7220 USB (Emergency only)
- 7453.5 LSB (Routine traffic)
- 3815 USB (Emergency only)
- 3616 USB (Emergency; amateur; inter-island police)

WESTERN CARIBBEAN

Crossing time zones and languages (English, French and Spanish), members include Belize,

Dominican Republic, Jamaica, Haiti, Turks and Caicos Islands, and the Bahama Islands. This group monitors 7453.5 kHz LSB. Amateurs may use 7150 kHz LSB for emergencies only.

CALL SIGNS AND LOCATIONS

- DISPREP Pan-Caribbean Disaster Preparedness and Prevention Project
- HHP57 Haiti Emergency Operations Center
- J6P St. Lucia Police HQ
- J6L St. Lucia National Coordinator's Office
- J39AI Grenada
- J39YK Grenada

- WGY901 St. Thomas Civil Defense (FEMA)
- WGY932 Puerto Rico Civil Defense (FEMA)
- ZJL89 Tortola
- ZOA Antigua Police HQ and EOC
- ZOB St. Kitts Police HQ and EOC
- ZOD Dominica National Coordinator's Office
- ZOG Grenada
- ZOK St. Vincent Police HQ
- ZOM Montserrat Police HQ
- ZON Nevis
- ZOU Anguilla
- 6YODP Jamaica

- 6YX Jamaica Coast Guard
- 8PF Barbados Coast Guard
- 9YA Trinidad Coast Guard
- 9Y4ST University of the West Indies seismic unit

NETHERLANDS ANTILLES

An emergency and weather network has been established for the Netherlands Antilles as well; listen for their practice drills daily during storm season at 1030 and 2230 UTC on 3815 kHz LSB.

We would like to thank Tony Munro of Gloucester, Maryland, for sharing this interesting information with fellow listeners.

NEW! Lower Price Scanners

Communications Electronics,™ the world's largest distributor of radio scanners, introduces new lower prices to celebrate our 15th anniversary.

Regency® MX7000-EA

List price \$699.95/CE price \$399.95/SPECIAL 10-Band, 20 Channel • Crystalless • AC/DC Frequency range: 25-550 MHz, continuous coverage and 800 MHz to 1.3 GHz, continuous coverage. The Regency MX7000 scanner lets you monitor Military, Space Satellites, Government, Railroad, Justice Department, State Department, Fish & Game, Immigration, Marine, Police and Fire Departments, Broadcast Studio Transmitter Links, Aeronautical AM band, Aero Navigation, Paramedics, Amateur Radio, plus thousands of other radio frequencies most scanners can't pick up. The Regency MX7000 is the perfect scanner to receive the exciting 1.3 GHz, amateur radio band.

Regency® Z60-EA

List price \$299.95/CE price \$179.95/SPECIAL 8-Band, 40 Channel • No-crystal scanner Bands: 30-50, 88-108, 118-136, 144-174, 440-512 MHz. The Regency Z60 covers all the public service bands plus aircraft and FM music for a total of eight bands. The Z60 also features an alarm clock and priority control as well as AC/DC operation. Order today.

Regency® Z45-EA

List price \$259.95/CE price \$159.95/SPECIAL 7-Band, 45 Channel • No-crystal scanner Bands: 30-50, 118-136, 144-174, 440-512 MHz. The Regency Z45 is very similar to the Z60 model listed above however it does not have the commercial FM broadcast band. The Z45, now at a special price from Communications Electronics.

Regency® RH250B-EA

List price \$674.30/CE price \$329.95/SPECIAL 10 Channel • 25 Watt Transceiver • Priority The Regency RH250B is a ten-channel VHF land mobile transceiver designed to cover any frequency between 150 to 162 MHz. Since this radio is synthesized, no expensive crystals are needed to store up to ten frequencies without battery backup. All radios come with CTCSS tone and scanning capabilities. A monitor and night/day switch is also standard. This transceiver even has a priority function. The RH250 makes an ideal radio for any police or fire department volunteer because of its low cost and high performance. A 60 Watt VHF 150-162 MHz, version called the RH600B is available for \$454.95. A UHF 15 watt version of this radio called the RU150B is also available and covers 450-482 MHz, but the cost is \$449.95.

NEW! Bearcat® 50XL-EA

List price \$199.95/CE price \$114.95/SPECIAL 10-Band, 10 Channel • Handheld scanner Bands: 29.7-54, 136-174, 408-512 MHz. The Uniden Bearcat 50XL is an economical, hand-held scanner with 10 channels covering ten frequency bands. It features a keyboard lock switch to prevent accidental entry and more. Also order part # BP50 which is a rechargeable battery pack for \$14.95, a plug-in wall charger, part # AD100 for \$14.95, a carrying case part # VC001 for \$14.95 and also order optional cigarette lighter cable part # PS001 for \$14.95.



NEW! Scanner Frequency Listings

The new Fox scanner frequency directories will help you find all the action your scanner can listen to. These new listings include police, fire, ambulances & rescue squads, local government, private police agencies, hospitals, emergency medical channels, news media, forestry radio service, railroads, weather stations, radio common carriers, AT&T mobile telephone, utility companies, general mobile radio service, marine radio service, taxi cab companies, tow truck companies, trucking companies, business repeaters, business radio (simplex) federal government, funeral directors, veterinarians, buses, aircraft, space satellites, amateur radio, broadcasters and more. Fox frequency listings feature call letter cross reference as well as alphabetical listing by licensee name, police codes and signals. All Fox directories are \$14.95 each plus \$3.00 shipping. State of Alaska-RL021-1; State of Arizona-RL025-1; Baltimore, MD/Washington, DC-RL024-1; Buffalo, NY/Erie, PA-RL009-2; Chicago, IL-RL014-1; Cincinnati/Dayton, OH-RL006-2; Cleveland, OH-RL017-1; Columbus, OH-RL003-2; Dallas/Ft. Worth, TX-RL013-1; Denver/Colorado Springs, CO-RL027-1; Detroit, MI/Windsor, ON-RL008-3; Fort Wayne, IN/Lima, OH-RL001-1; Hawaii/Guam-RL015-1; Houston, TX-RL023-1; Indianapolis, IN-RL022-1; Kansas City, MO/KS-RL011-2; Long Island, NY-RL026-1; Los Angeles, CA-RL016-1; Louisville/Lexington, KY-RL007-1; Milwaukee, WI/Waukegan, IL-RL021-1; Minneapolis/St. Paul, MN-RL010-2; Nevada/E. Central CA-RL028-1; Oklahoma City/Lawton, OK-RL005-2; Orlando/Daytona Beach, FL-RL012-1; Pittsburgh, PA/Wheeling, WV-RL029-1; Rochester/Syracuse, NY-RL020-1; San Diego, CA-RL018-1; Tampa/St. Petersburg, FL-RL004-2; Toledo, OH-RL002-3. New editions are being added monthly. For an area not shown above call Fox at 800-543-7892. In Ohio call 800-621-2513.

NEW! Regency® HX1200-EA

List price \$369.95/CE price \$214.95/SPECIAL 8-Band, 45 Channel • No Crystal scanner Search • Lockout • Priority • Scan Delay Sidelit liquid crystal display • EARMEMORY New Direct Channel Access Feature Bands: 30-50, 118-136, 144-174, 408-512 MHz. The new handheld Regency HX1200 scanner is fully keyboard programmable for the ultimate in versatility. You can scan up to 45 channels at the same time including the AM aircraft band. The LCD display is even sidelit for night use. Order MA-256-EA rapid charge drop-in battery charger for \$84.95 plus \$3.00 shipping/handling. Includes wall charger, carrying case, belt clip, flexible antenna and nicad battery.

NEW! Bearcat® 100XL-EA

List price \$349.95/CE price \$203.95/SPECIAL 9-Band, 18 Channel • Priority • Scan Delay Search • Limit • Hold • Lockout • AC/DC Frequency range: 30-50, 118-174, 408-512 MHz. The world's first no-crystal handheld scanner now has a LCD channel display with backlight for low light use and aircraft band coverage at the same low price. Size is 1 1/2" x 7 1/2" x 2 1/2". The Bearcat 100XL has wide frequency coverage that includes all public service bands (Low, High, UHF and "T" bands), the AM aircraft band, the 2-meter and 70 cm. amateur bands, plus military and federal government frequencies. Wow... what a scanner! Included in our low CE price is a sturdy carrying case, earphone, battery charger/AC adapter, six AA nicad batteries and flexible antenna. Order your scanner now.

Bearcat® 210XW-EA

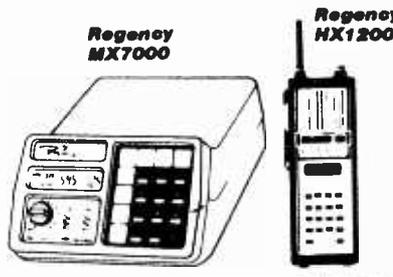
List price \$339.95/CE price \$209.95/SPECIAL 8-Band, 20 Channel • No-crystal scanner Automatic Weather • Search/Scan • AC/DC Frequency range: 30-50, 136-174, 408-512 MHz. The new Bearcat 210XW is an advanced third generation scanner with great performance at a low CE price.

NEW! Bearcat® 145XL-EA

List price \$179.95/CE price \$102.95/SPECIAL 10-Band, 16 Channel • AC/DC • Instant Weather Frequency range: 29-54, 136-174, 420-512 MHz. The Bearcat 145XL makes a great first scanner. Its low cost and high performance lets you hear all the action with the touch of a key. Order your scanner from CE today.

TEST ANY SCANNER

Test any scanner purchased from Communications Electronics™ for 31 days before you decide to keep it. If for any reason you are not completely satisfied, return it in original condition with all parts in 31 days, for a prompt refund (less shipping/handling charges and rebate credits).



NEW! Bearcat® 800XL-EA

List price \$499.95/CE price \$317.95 12-Band, 40 Channel • No-crystal scanner Priority control • Search/Scan • AC/DC Bands: 29-54, 118-174, 408-512, 808-912 MHz. The Uniden 800XL receives 40 channels in two banks. Scans 15 channels per second. Size 9 1/4" x 4 1/2" x 1 1/2".

OTHER RADIOS AND ACCESSORIES

- Panasonic RF-2600-EA Shortwave receiver... \$179.95
- RD05-EA Uniden Remote mount Radar Detector... \$128.95
- RD55-EA Uniden Visor mount Radar Detector... \$98.95
- RD9-EA Uniden "Passport" size Radar Detector... \$239.95
- BC-WA-EA Bearcat Weather Alert... \$49.95
- DX1000-EA Bearcat shortwave receiver SALE... \$349.95
- PC22-EA Uniden remote mount CB transceiver... \$124.95
- PC55-EA Uniden mobile mount CB transceiver... \$59.95
- R1080-EA Regency 10 channel Scanner SALE... \$92.95
- MX3000-EA Regency 30 channel scanner... \$198.95
- XL156-EA Regency 10 channel scanner SALE... \$129.95
- UC102-EA Regency VHF 2 ch. 1 Watt transceiver... \$124.95
- RH250B-EA Regency 10 ch. 25 Watt VHF trans... \$329.95
- RH600B-EA Regency 10 ch. 60 Watt VHF trans... \$454.95
- RU150B-EA Regency 10 channel UHF transceiver... \$449.95
- P1405-EA Regency 5 amp regulated power supply... \$69.95
- P1412-EA Regency 12 amp reg. power supply... \$164.95
- MA256-EA Drop-in charger for HX1000 & HX1200... \$84.95
- MA257-EA Cigarette lighter cord for HX1200... \$19.95
- MA917-EA Ni-Cad battery pack for HX1200... \$34.95
- SMMX7000-EA Svc. man. for MX7000 & MX5000... \$19.95
- SMMX3000-EA Service man. for Regency MX3000... \$19.95
- B-4-EA 1.2 V AAA Ni-Cad batteries (set of four)... \$9.95
- FB-E-EA Frequency Directory for Eastern U.S.A... \$12.95
- FB-W-EA Frequency Directory for Western U.S.A... \$12.95
- ASD-EA Air Scan Directory... \$14.95
- SRF-EA Survival Radio Frequency Directory... \$14.95
- TSG-EA "Top Secret" Registry of U.S. Govt. Freq... \$14.95
- TIC-EA Techniques for Intercepting Comm... \$14.95
- RRF-EA Railroad frequency directory... \$10.95
- CIE-EA Covert Intercept. Elect. Eavesdropping... \$14.95
- A60-EA Magnet mount mobile scanner antenna... \$35.00
- A70-EA Base station scanner antenna... \$35.00
- USAMM-EA Mag mount VHF/UHF ant. w/ 12' cable... \$39.95
- USAK-EA 1/4" hole mount VHF/UHF ant. w/ 17' cable... \$35.00
- USATLM-EA Trunk lip mount VHF/UHF antenna... \$35.00

Add \$3.00 shipping for all accessories ordered at the same time. Add \$12.00 shipping per shortwave receiver. Add \$7.00 shipping per scanner and \$3.00 per antenna.

BUY WITH CONFIDENCE

To get the fastest delivery from CE of any scanner, send or phone your order directly to our Scanner Distribution Center. Michigan residents please add 4% sales tax or supply your tax I.D. number. Written purchase orders are accepted from approved government agencies and most well rated firms at a 10% surcharge for net 10 billing. All sales are subject to availability, acceptance and verification. All sales on accessories are final. Prices, terms and specifications are subject to change without notice. All prices are in U.S. dollars. Out of stock items will be placed on backorder automatically unless CE is instructed differently. A \$5.00 additional handling fee will be charged for all orders with a merchandise total under \$50.00. Shipments are F.O.B. Ann Arbor, Michigan. No COD's. Most products that we sell have a manufacturer's warranty. Free copies of warranties on these products are available prior to purchase by writing to CE. Non-certified checks require bank clearance. Not responsible for typographical errors.

Mail orders to: Communications Electronics,™ Box 1045, Ann Arbor, Michigan 48106 U.S.A. Add \$7.00 per scanner for U.P.S. ground shipping and handling in the continental U.S.A. For Canada, Puerto Rico, Hawaii, Alaska, or APO/FPO delivery, shipping charges are three times continental U.S. rates. If you have a Visa Master Card or Discover Card, you may call and place a credit card order. Order toll-free in the U.S. Dial 800-USA-SCAN. In Canada, order toll-free by calling 800-221-3475. WUI Telex anytime, dial 671-0155. If you are outside the U.S. or in Michigan dial 313-973-8888. Order today. Scanner Distribution Center™ and CE logos are trademarks of Communications Electronics Inc. † Bearcat is a registered trademark of Uniden Corporation. ‡ Regency is a registered trademark of Regency Electronics Inc. AD #051586-EA/2 Copyright © 1988 Communications Electronics Inc.

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Consumer Products Division P.O. Box 1045 □ Ann Arbor, Michigan 48106-1045 U.S.A. Call 800-USA-SCAN or outside U.S.A. 313-973-8888

(Behind the Dials, cont'd from p.46)

The antenna noise bridge is a flexible and useful tool for the RF experimenter, and the Palomar RX-100 at \$59.95 (add \$4 for shipping and handling) is a fine example.

The point I'm leading up to is that often we want to monitor a frequency that is outside the tuning range of

our general-coverage receivers. What do we do then? Sometimes we go out and buy an extra receiver with the desired frequency coverage, but that's a fairly expensive solution!

In the case of the 17.2 Khz, you might be hard pressed to find a receiver which would tune the frequency you want to receive; most receivers today tune no lower than 100 Khz, and many don't go that low.

INFOTECH M-800 FACSIMILE DEMODULATOR

by Gregory Mengell

The new Infotech M-800 FAX converter obsoletes such behemoths as the Litton UHX2B and Alden 9244, creating a savings in space, power consumption, acquisition price, and the purchase of special paper which can run into the hundreds of dollars.

The M-800 is capable of receiving FAX at four speeds--60, 90, 120, and 240 LPM--and is switchable to three indexes of cooperation (I.O.C.--picture length). It is capable of receiving analog press photos with extreme clarity via HF and satellite links and performs remarkably on weather charts from around the world, printing them out on standard computer paper.

Also included in its inventory of accomplishments is the ability to receive VHF-FM/AM APT signals, GOES satellites, and even TIROS pictures (providing level is set correctly).

Choosing a Printer

I would recommend the M-800 be used in conjunction with the Epson LQ 800 printer which offers the most versatility; there are limitations on speed and resolution when used with printers such as the Epson FX85.

The M-800 sells for \$499.95 and the printer price will depend upon your choice of model. The initial investment of around \$1000 may sound somewhat prohibitive, but when you compare performance to anything else on the market (\$2500-\$6000) it's cheap.

A Bonus for M-600/6000 Owners

An added feature for those of you who own Infotech M-600 or M-6000 RTTY devices is that the M-800 has provisions to share the printer with both devices.

The reception on the GOES weather satellite is extremely good once certain level adjustments are met. TIROS reception will depend upon your requirements for amount of cloud cover versus land detail; much of this is an audio-level-dependent function, so results may vary. Assuming that you know your subject area, things should work well after some adjusting.

SAVING RIBBON

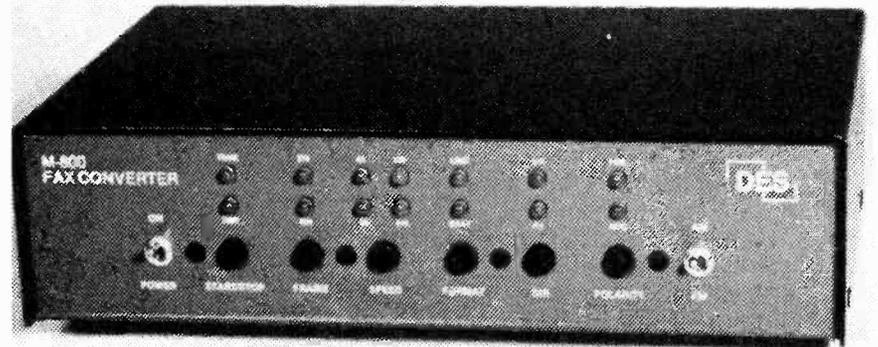
Typewriter ribbon can be exhausted at a rapid rate. The best solution for this problem is to purchase a re-inker from Universal Electronics in Reynoldsburg, Ohio, for around sixty dollars. It gives you the double advantage of re-using the typewriter ribbon several times over and rendering even better resolution than with the original ribbon.

A single ribbon should last 60-70 frames. Do not run the LQ 800 with too dry a ribbon as it may damage the print head.

Any Room for Improvement?

All they need to do to improve it is put in a video port with 256 x 256 resolution to have an exceptionally desirable product (but, then again, it is already that!).

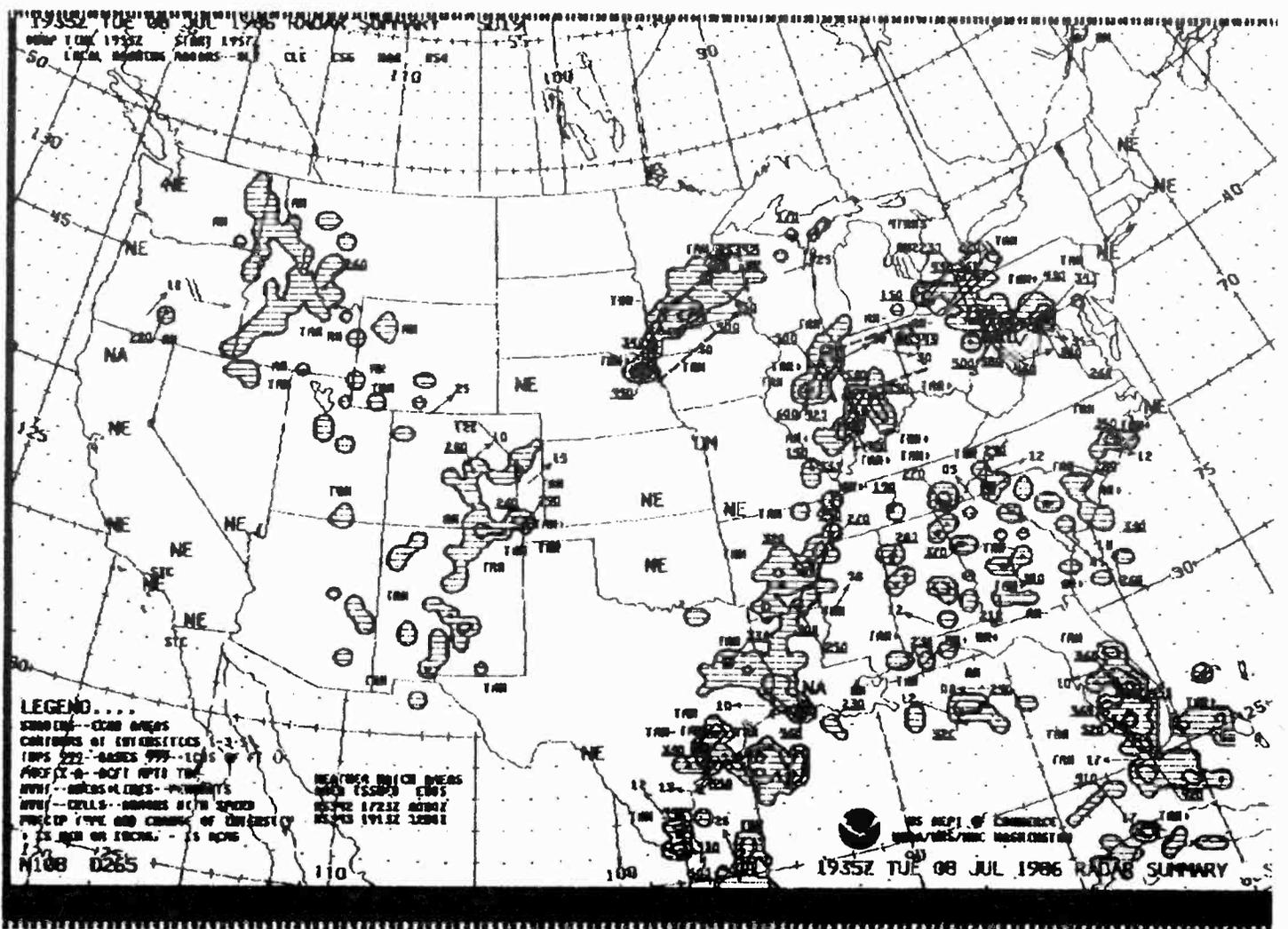
D.E.S. (Infotech) is an extremely reputable firm. I have had years of



Be the latest with the news and weather with the latest in FAX reception -- the new InfoTech M-800 facsimile demodulator! Weather chart below is actual size.

satisfied service from them and I do not believe one could go wrong dealing with them. Very simply put, if something goes wrong they fix it. A service standard that is increasingly rare in this day.

(M-800 Demodulator, \$499 from Universal Shortwave, 1280 Aida Drive, Dept. MT, Reynoldsburg, Ohio 43068 (800)431-3939.



ANTENNA TOPICS

W. Clem Small, KR6A

Is Your Receiver's Frequency Coverage Too Limited?

TRY A CONVERTER

Last week I attended the 25th annual conference of the Antique Wireless Association in Canandaigua, New York (see November MT coverage). One of the most interesting events for me was an attempt to receive DX CW transmissions from an antique Alexanderson radio frequency alternator located at station SAW, Varber, Sweden. The signals were transmitted especially to and for the convention.

Yes, the transmitter was an alternator, not a spark-gap type, not arc type, nor did it have a single vacuum tube, transistor, or integrated circuit. The grand old machine, in some ways very similar to the electrical alternator in your automobile, put out a signal on 17.2 KHz. That's VLF, down around the audio range if it were a sound wave rather than a radio wave!

The old-timers who had prepared for the convention had strung a very long wire up as a VLF antenna, and we were all looking forward to hearing that "signal out of yesterday" come zipping into our receiving station. However, early in the a.m., before we arrived that day, someone stole our long antenna! There was no signal heard from Sweden that day, but, another year we will no doubt succeed.

A Simple Device

Not to worry; there's a simple and workable solution to the problem. Devices are available, both commercially and home-brew, that will "convert" the signal which you want to receive to the frequency range that your receiver already tunes. These devices are, reasonably enough, called "converters."

Figure 1 gives the block diagram of the circuit of a simple and workable converter. Most of the converters which you might buy or build are, in their basic functioning, essentially the same as this circuit.

Rolling Your Own

If I had stayed home rather than attending the convention, I would still have tried to monitor SAQ. But I don't have a VLF receiver, so I cannot tune to 17.2 kHz. I could have put a VLF converter on my receiver

and received that frequency quite nicely. I got so interested in that prospect that I dug out a diagram (see fig. 2).¹ If you'd like to try "rolling your own" converter, check references such as numbers 2, 3, and 4 below for further information.

Commercially Built Converters

Had I chosen to monitor the 17.2 KHz signal at home but didn't want to build a converter, at least two companies (Palomar Engineers and L.F.Engineering) have commercial units available for that frequency range.

There is a wide variety of converters available today, covering many different frequency ranges. For instance, it is possible to buy converters to convert VLF, LF, MF, HF, and VHF signals to the range of your shortwave or ham-band-only receiver. This opens a vast spectrum of listening to the monitoring enthusiast at a reasonable cost.

Going the other direction, some suppliers such as Grove Enterprises have at times offered converters which up-converted the HF (shortwave) bands so that they could be monitored on VHF or UHF scanners! MFJ Enterprises currently offers a VHF to UHF converter which allows owners of two-meter (144-148 MHz) handhelds to monitor police, fire and other utilities between 154 and 164 MHz (see fig. 3).

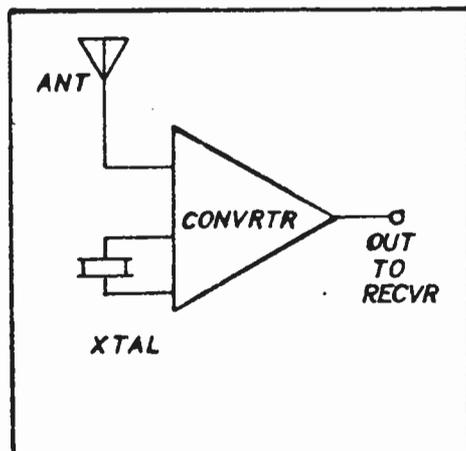


FIG. 1. BLOCK DIAGRAM OF A SIMPLE CONVERTER

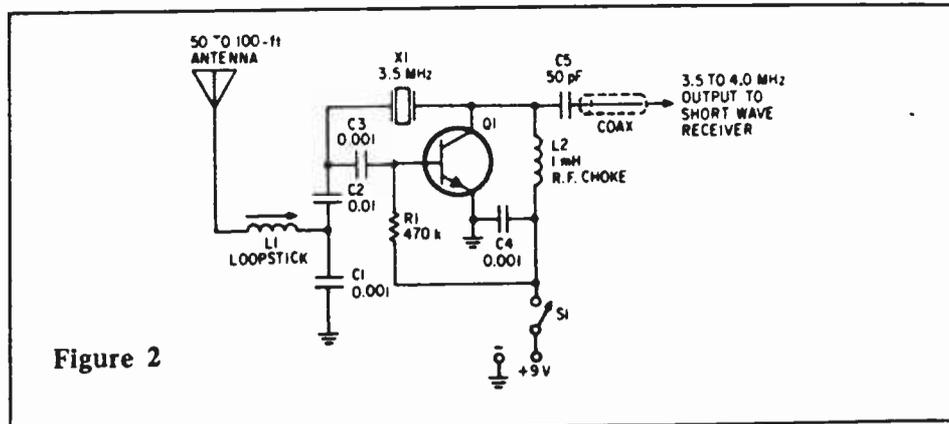


Figure 2

So, how do you go about finding where to purchase the converter which you need for converting that special frequency range you desire to one which you can already cover? A good starting point is to check the advertisements in the various journals which cater to radio buffs.

Another good method is to write to the various supply houses which advertise in those communication journals, and get their catalog. If you can't find what you want in the catalogs, try writing the supply houses with a specific description of your needs, asking them where you can get what you seek.

In Summary:

When do you choose to utilize a converter rather than buy a complete extra receiver for new frequencies you wish to monitor? The main deciding factor for most of us is probably cost. A good converter together with your high-grade general coverage receiver will outperform a mediocre new receiver which you might purchase for the new bands. Remember that a converter allows you to utilize all of your present receiver's features such as good selectivity, rejection tuning, various modes of detection--whatever your present rig has.

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Tune in "secret" FM broadcasts. Kit covers the new 92 KHz subcarrier as well as the standard 67 KHz. Dual tunable filters in addition to adjustable automatic muting. Use with most any FM radio. Operates on 6 to 17 VDC @ 15 mA. 1½" x 3" x 1" high.

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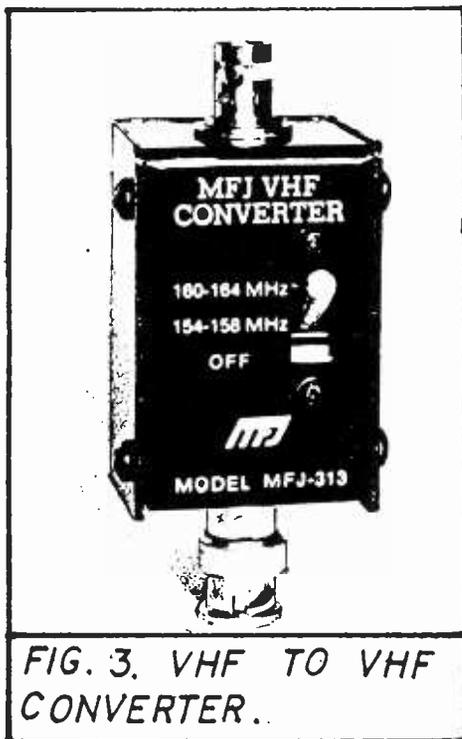


FIG. 3. VHF TO VHF CONVERTER.

(Antenna Topics, cont'd)

Another factor to consider for many of us is size. Our operating area is often already full of gear, and another complete receiver might just be too much for our table to hold! But the converter's size is usually much smaller than a receiver, and can often be tucked away out of sight. The Kenwood R-2000 and R-5000 HF receivers have an optional VHF converter that is completely contained within the receiver.

Don't forget to use an appropriate antenna for each converter you use; the antenna in use with your receiver is probably not a good choice for the frequencies covered by the converter.

And, in Closing:

So, if lack of certain frequencies in your receiver's tuning range is all that prevents enjoying the listening on bands that interest you, give a thought to converters. For a moderate outlay of construction time and/or cash, you can increase your monitoring coverage considerably.

RADIO RIDDLES

Last Month's Radio Riddle: Last month I told you that one type of vertical transmitting antenna is called an "antifade antenna," and you were asked: "What is this antenna, and how does it reduce fading?"

To answer this we'll have to think about ground waves, and also skywaves reflected from the ionosphere. See references 5 and 6 in your past issues of *Monitoring Times* if you want a refresher on these modes of propagation. Last month's column showed the vertical radiation patterning of radio waves around various vertical antennas.

All of those antennas have

some skywave radiation; only a completely flat pattern would have no skywave radiation. The .625λ vertical antenna showed the flattest pattern, but it had a minor lobe of radiation pointing skyward.

Signal Cancellation: Skywave radiation from a vertical antenna can produce fading after sundown; that's when the skywave is likely to be reflected back to earth from the ionosphere. The fading occurs because the skywave, bouncing back down to the distant listener's receiving antenna, will have an out-of-phase relationship with the groundwave; thus, the two waves cancel each other to some degree and the signal available to your receiver is weaker.

At other times the waves are in-phase and then the signal becomes stronger. As the ionosphere shifts, the skywave path changes and the phase relationship of the skywave to the groundwave varies. This leads to the rapidly changing fading which we often hear after dark on the high-frequency end of the AM broadcast band.

A vertical antenna with its electrical length cut to give a strong ground wave component and a minimum skywave component, will give good coverage with minimum nighttime fading. This is the antifade antenna design. One authority on antennas gives .528λ as the optimum length for antifade antennas at stations where fading, rather than low transmitter power, is the primary reception problem.⁷ As a result of the antifade properties of this design, the .528λ has become something of a standard in the broadcasting industry.

This Month's Radio Riddle: In the October "Antenna Talk" column, I referred to the superheterodyne receiver, and figure one of that month's column gave a block diagram of a "superhet." The converter shown in that figure is basic and essential to the operation of the superhet receiver design. Some superhets have more than one converter and are said to be "double-conversion," or "triple-conversion." This gives rise to names like "double-superheterodyne," and "triple-superheterodyne."

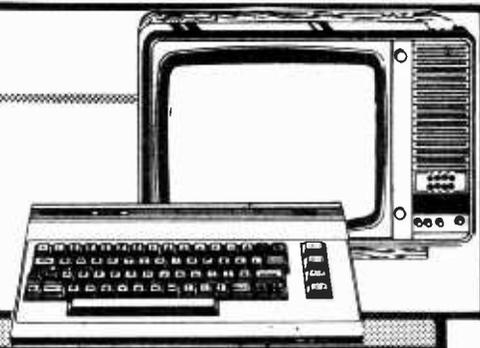
It is probably true that more than 99% of the receivers operating today are some version of the Armstrong superheterodyne design. This month's riddle asks: "Just what is so 'super' about the superheterodyne receiver?" **Hint:** "Super" in the name does not refer to the excellent performance of this highly respected circuit! ■

REFERENCES

1. Grove, Bob, *The Listener's Handbook*. (1986) Grove Enterprises, Brasstown, NC: pp. 84-85.

Computer Corner

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



COMPUTERS FOR COMMUNICATIONS

Part II

Using an Oscilloscope

One of the most difficult troubleshooting and debug tasks is to make a device on the microprocessor bus function under program control; however, when we remember that any device on the bus has a unique address, we can theorize that if the micro puts the correct address on the address bus, then the I/O device in question should recognize that address and respond.

But what if it doesn't? Either the device isn't decoding the address correctly, or it isn't responding with the correct action.

Scoping such an action is difficult. Merely putting a probe on any address line will show many pulses as the various addresses change during program execution. How do you know which pulse is actually the one present when the address of interest is present?

Is the program really going out to that address? One way to get in sync is to build the address match card shown schematically in figure 2. The address match card does just what its name implies - it outputs a pulse to the scope every time the address bus is at the address we are interested in.

Once the scope is sync'd on the address, the read or write pulse for

that address can be displayed and, bit by bit, the data on the data bus can be checked.

The card to be described in the following text is made for the IBM and bus-compatible series of computers, but the theory is the same for any computer.

The address match card is built on an IBM prototype card, available from any authorized IBM dealer, and also manufactured by some of the breadboard card manufacturers. Many of the mail order electronics dealers also stock them.

One source is J.D.R. Microdevices, 110 Knowles Drive, Los Gatos, CA 95030. There are models available for the IBM, S-100 and Apple computers ranging in price from \$15 to \$30 depending on type of machine, voltage bus or not, etc.

Also needed is a socket of the type used on the motherboard, and epoxied to the top of the prototype board in such a fashion that the card you are debugging plugs into it rather than the motherboard. Probably the best source of this socket is your friendly computer dealer, who may be persuaded to salvage one or two from a defunct motherboard.

Wirewrap wire is used to connect the new socket in parallel with the card tabs (see figure 3). Socket all eight chips and wirewrap the board according to figure 2. Note that the 7485 chips U1 through U5 are not all shown. U1 is typical of all five chips, and a four position dip switch is wired to each 7485 as shown.

Refer to the chart in figure 1 to wire the inputs to U1-U5. R1-R4 are 1 K-ohm, eight-watt, 10% carbon resistors, and there are 20 required. These values are not critical--anything from 470-2200 ohms will work. The same values are used for R5-R8.

Mount the eight sockets, 24 resistors and five four-position dip switches on the card. Mount the switches as shown in figure 3, with S1 wired to U1, S2 to U2, etc. →

2. American Radio Relay League, *The Radio Amateur's Handbook* (any edition). Newington, CT.
3. American Radio Relay League, *The Radio Amateur's VHF Manual* (any edition). Newington, CT.
4. Radio Society of Great Britain, *The Radio Communication Handbook* (any edition). London.
5. Small, W.Clem, "Antenna Talk: Propagation," *Monitoring Times*. (May, 1986) Vol. 5, No. 5, pp. 35-36.
6. Huneault, Bert, "Signal Propagation and the Ionosphere," *Monitoring Times*. Part I, (July, 1986) Vol.5, No. 7, p. 26, and Part 2 (August, 1986) Vol.5, No. 8, pp. 30-32.
7. Kuecken, John A., *Antennas and Transmission Lines*. (1969) Howard W. Sams, Indianapolis: p. 247.

IC #	IC PIN	TAB #	IC #	IC PIN	TAB #
1	15	A 12	4	15	A 24
1	13	A 13	4	13	A 25
1	12	A 14	4	12	A 26
1	10	A 15	4	10	A 27
2	15	A 16	5	15	A 28
2	13	A 17	5	13	A 29
2	12	A 18	5	12	A 30
2	10	A 19	5	10	A 31
3	15	A 20			
3	13	A 21			
3	12	A 22			
3	10	A 23			

Figure 1

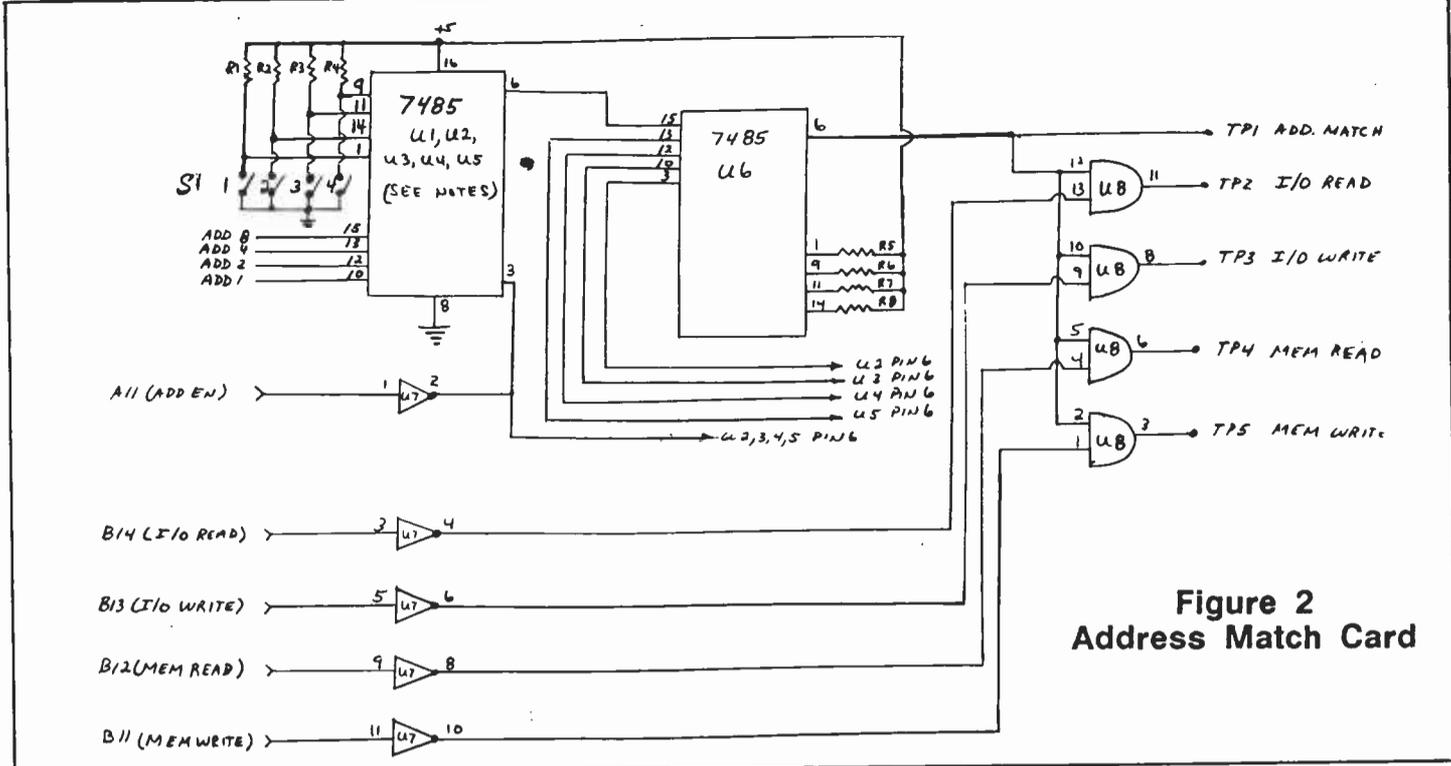


Figure 2
Address Match Card

Parts List and Wiring

U1 through U6 are TTL chips, type 7485. U7 is a 7404, and U8 is a 7408. The LS series of chips can be used also. Also needed are several 1 microfarad electrolytic capacitors, 6 volt rated or greater, and a pin-type header strip for the 'scope to hook to.

Mount the capacitors next to the 7485 chips, and space the caps out among the chips evenly. Wire the + (positive) end of each cap to the nearest 7485 pin 20, and the - (negative) side to the same chip pin 10.

If your card is equipped with voltage and ground rails, install the caps across the rails, + side to + 5 volts, - side to ground.

After the components are mounted, begin wiring by hooking all 7485 chips pin 20 to the 5 volt bus on the card. If your card does not have the power and ground bus rails, wire them to the B29 and B03 tab pins, which are +5 volts. In addition, wire pin 14 of the 7404 and 7408 to the +5 volt tab.

Split the chips up on the +5 tab pins; remember, anytime you put a wire into one of the tab pin holes, a

second wire will have to run from each tab pin hole to the top motherboard connector. All tab pins are connected in parallel with the top connector.

When all the socket wiring is complete, wire all the resistors and switch pins together and to the appropriate 7485. Don't forget to wire the four resistors on U6, and make sure that one end of every resistor is wired to the + 5 volt source. If any resistors are not wired to the +5 volt supply, the card may work, but it will be unreliable.

Next, wire all 7485 chips pin 10 to the corresponding ground bus or tab pins B01 and B31. The 7404 and 7408 pin 7 are also wired to ground.

Next, wire all the chip interconnections from figure 2. (Using a marking pen to trace each wire as it is installed makes the job easier.) Now, wire the header strip to U8. Finally, add the wire from the tab pins to the 7485s as shown in Figure 1.

Checkout Time

Double check all wiring and pay particular attention to solder shorts and pins with no wires. The 7404 should have pins 12 and 13 open only. All other pins should have wires on them.

Plug the card into your IBM/compatible in any vacant slot, and power on normally. There should be no effect on the computer at this time (leave the cover off). Turn ON all the switches in switch bank 1 and 2. Turn OFF switches 3 and 4 in switch bank 3. The individual switches are labeled 1 through 4 left to right. Switch banks 4 and 5 should be all ON.

The row of switches should look like this (X=on and O=off):

XXXX XXXX XXOO XXXX XXXX
This sets the address to be matched to 00300, the prototype card range of addresses, and is chosen because there is little chance of any other hardware being at that address.

Now, load Basic and enter and run this little program:

```
10 out 768,0
20 for k = 1 to 100:next
30 goto 10
```

If all is working, there should be a + pulse on TP1, and it should be stable and repetitive. Now, change line 20 or the program to make the loop

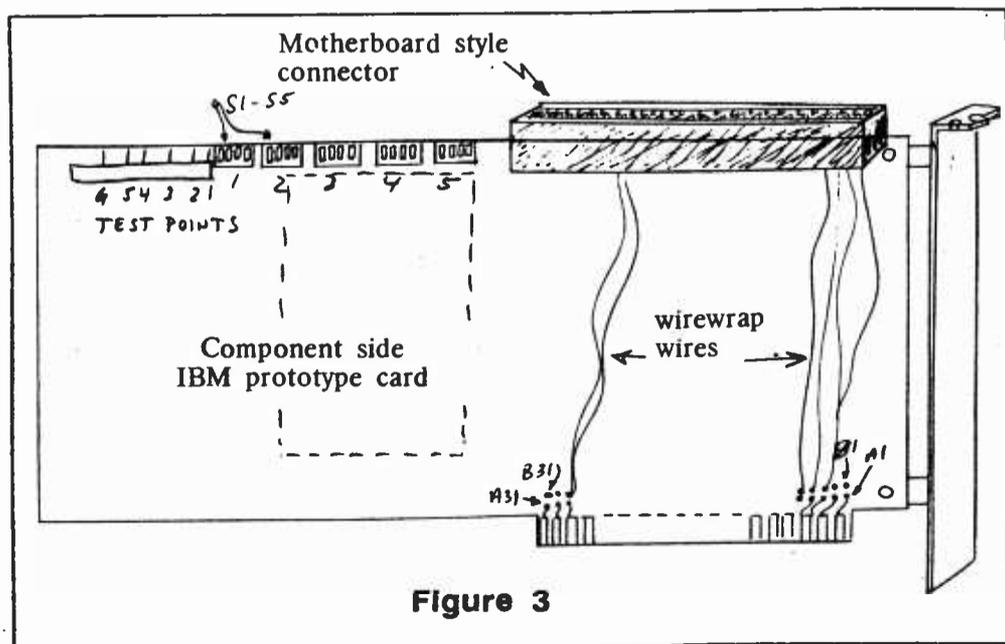


Figure 3

-SEEKER-

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- DEALER INQUIRIES INVITED -

(Computer Corner, cont'd)

value 200 instead of 100, and the time between pulses should double. TP 3 should have a similar pulse present, while TP2, 4 and 5 should have no pulses.

Changing line 10 to out 769,0 should result in no pulses on any TP. Changing switch 4 on switch bank 5 to OFF should restore the pulses on TP1 and TP3. Change line 10 to read 10 A=inp(769). TP1 and TP2 should now have the pulses.

If all works as described, set the card aside until next month when I will cover some of the theory and practical uses. In the meantime, try figuring out the switches and how they correlate to bus addresses. Or take a look at the little test program - why did the command out 768,0 have anything to do with the address 300?

Should you have any questions on the construction thus far, drop me a line; I'll do my best to help.

Compuserve Mystery

An interesting letter turned up in my mailbox about the first of October. Postmarked Denver, Colorado, it had no return address, and contained only a single sheet of paper. The paper contained only the following:

"THERE IS NOW A SHORTWAVE SECTION ON COMPU-SERVE IN THE HAM FORUM. AT ANY PROMPT TYPE GO HOM 11. SHORTWAVE VIA COMPUSERVE HOM11."

Pretty self-explanatory, except who sent it? A short time later the mystery cleared itself up. Bob Grove forwarded a letter to me from Rob Harrington, which read:

"Shortwave listeners who have computers can now communicate with other shortwave listeners. Rob Harrington is on Compuserve, Rob's number is 70216,222. Rob can also be contacted via FIDO Net Mail. Net 104, Node 611 is where to send messages to Rob Harrington. Also on Compuserve is a shortwave section in the ham forum. Go HOM 11 at any prompt."

Another update on bulletin boards: The ANARC SHORTWAVE BBS has moved, and has a new phone number: 401 E. Walnut, Greenfield, IL 62044; (217) 368-3124.

The protocol is still 300/300,8, N,1 and no password is needed. Voice phone number is (217)368-3119 just in case you're in a talkative mood!

For those of you lucky enough to own an ICOM IC-R71A and a Commodore C-64, AF Systems has put together a package to allow the C-64 to control the ICOM. Some of the features of "SEEKER", as the system

is called, are database/search, receiver status display, UTC time display, date, signal level, etc.

The package consists of a hardware interface, data base editor and "SEEKER" control program. System requirements are C-64 with disk drive, and an IC-R71A receiver with the EX-309 interface unit. (AF SYSTEMS, P.O. Box 9145, Waukegan, Illinois 60079)

More on Murray TTY

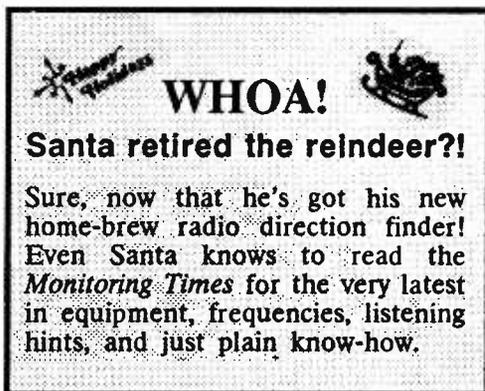
Another letter in the mailbag this month was from Larry J. Clark of Alexandria, Virginia. Larry asks some interesting questions concerning RTTY programs and wanting to know if it would run on a CP/M computer. CP/M is an older operating system, originally developed by DEC (I think) and has been around in several flavors. The latest I've run across is CP/M86, and I think supports 16 bit machines.

CP/M got its name from Control Program for Minicomputers, or Control Program for Microcomputers, depending on whom you ask. It was a standard operating system before IBM (Microsoft) came along with DOS and upset the standards applecart.

Anyway, Larry reminds me that I didn't tell all the story about Murray TTY. It is written in BASIC and could be ported to a CP/M machine. I shouldn't think it would be a big job. The only big task might be patching up the file handling part of the code.

So, Larry, I'll ship you a copy and you can have at it! I'll load each file and save it with the ASCII parameter, and then print it for you in case you can't read the IBM diskette. But, it is a lot of code, so the best bet would be to find someone with an IBM PC that you could hook to via an RS-232 port and dump the ASCII files to the CP/M machine.

Hooking two incompatible machines together via RS-232 is a common trick to swap ASCII files, and that sounds like material for a future column!



" ASK BOB "

Bob Grove, WA4PYQ, answers questions of general interest

Reader Asks about Antennas and Cables

We try to answer questions from our readers as time permits in the "Ask Bob" column, but occasionally a comprehensive letter comes along that reflects the questions of many readers.

Such a letter from Ed Skasko of Scarborough, Ontario, is extracted from here, along with brief answers.

Q. Is height as important for active antennas like the Sony AN-1 and Datong AD370 as it is for passive antennas like the Grove Skywire?

A. Absolutely. Just because the antenna is physically smaller and has a built-in preamplifier doesn't mean that the additional height won't help it.

Any antenna should be placed as high as practicable, away from electrical wiring or large metallic surfaces like house siding.

Q. Why is RG-174/U coax rarely mentioned for radio use? It is very thin, lightweight and has excellent shielding; it also has nominal 50 ohm impedance, universally used for radio work.

A. The key criticism is its small diameter which makes it very lossy at high frequencies and in long lengths. Because it is less used, it carries a higher price, often more than superior RG-58/U, RG-59/U and RG-6/U. Thus, its use is confined to short runs where small diameter is crucial.

Q. For receiving applications, can you tell any difference between 50 and 75 ohm cable, assuming other characteristics are equal?

A. No. In receiving installations where antennas are used over wide ranges, their impedances often change drastically. Insisting on one impedance over the other is futile. Choose the cable with the lowest loss characteristics.

Q. Why don't you recommend RG-59/U TV-type coax with foil shielding for scanner use?

A. RG-59/U is a very good choice for scanner applications. We recommend RG-6/U because it has slightly less loss and is often less expensive. Specifically, we retail (through Grove Enterprises) a variant called RG-59/6/U which has the better loss characteristics of the 6 and the smaller, more conventional diameter of the 59. It is also among the least expensive cable we have found.

Q. If you feed the end of a long wire antenna (high impedance) with coax (low impedance), does a tuner at the receiver correct the mismatch?

A. No. An "antenna tuner" (transmatch) only equalizes the impedance match between the radio and the transmission line.

Q. I read that a long wire antenna, close to the ground and shorted to ground at the far end, makes a good receiving antenna. Why doesn't it ground the signals? Why is it most effective at the lower frequencies and not VHF or UHF?

A. Such an antenna is called a Beverage. It responds to ground wave signals which are absent at VHF and UHF. The arriving signal appears as a voltage across the antenna wire referenced to ground, almost as though you had a battery (an AC battery?) attached between the antenna and ground. It is due to the wavelength present at those low frequencies that the signal does not "ground out."

For more information we refer our readers to Antennas for Receiving by Wilfred N. Caron, available for \$12.95 plus \$1.50 shipping from Grove Enterprises.

Q. What frequencies do the AAA auto wreckers use? (Vincent Rister, Lakeland, FL)

A. While frequencies may vary from location to location, they are from a common pool: 150.905, 150.920, 150.935, 150.950, 150.965, 452.500, 452.525, 452.550, 452.575, 452.600, 955.600, and 959.200 MHz.

Q. When does a preamp cause a loss in gain rather than an increase when hooked to a scanner? (Gary Hickerson, Ft. Smith, AR)

A. Preamplifiers will amplify weak signals--within a range ("dynamic range"); above that, they become saturated and actually decrease signal strengths ("dynamic compression" or "desensitization").

The effects of strong signal overload may be produced by the preamp, by the scanner, or both,

often resulting in intermodulation ("intermod"), the appearance of phantom repeated signals throughout the range of the scanner on frequencies where they should not be heard.

If you live in a metropolitan area or near a strong broadcast transmitter, a preamplifier connected to an outside antenna is usually asking for trouble. You may partially resolve the problem with a notch filter, but that will suppress strong signals near only one frequency setting.

Q. I wish to purchase an ICOM R7000 receiver but would like a panoramic display to go with it. Are there any available on the government surplus market? (Jeffrey Lawrence, Bellerose, NY).

A. The IF output of the R7000 is 10.7 MHz; most commercial spectrum display units (SDUs) are made for 21.4 or 30 MHz and would take some modifications to put them on 10.7 MHz.

Grove Enterprises is actively developing a panoramic display for this type of receiver, but it is not yet ready for the market.

In the meantime you may wish to contact EEB, an MT advertiser in Vienna, Virginia, who offers modified surplus units.

Q. My Regency MX7000 seems to be off frequency; it sounds better when I program it 5 kHz low. Is this possible? (Robert M. McKee, Stoughton, WI)

A. Absolutely. The crystal oscillator probably needs to be "tweaked" back on frequency. This procedure must be done by a qualified technician and, if the scanner is still in warranty, it would be best to send it to Regency's customer service department.

Q. Is there any way I can hook an S-meter to a Bearcat 250 scanner? (Marcus Ard, Georgetown, SC).

A. Yes, but you must be technically competent to do so or risk harming the integrated circuit to which it must be attached--and repair parts are no longer available for the 250.

The schematic below shows a simple S-meter circuit. It is connected to the AGC bus on the IF chip. Any sensitive (50 microamp to 1 milliamp) meter movement may be used and DC voltage is anything convenient, 5 to 12 volts.

The meter is adjusted for zero deflection with no signal present. Be extremely careful when first adjusting the calibration resistance; the voltage setting should be equal to the voltage coming out of the IF chip, otherwise the meter or chip could be damaged.

(FDM cont'd from p.54)

cannot be copied but the news service is standard 67 wpm RTTY.

Sometimes you will copy the "quick brown fox" test message; all of the channels in that FDM group may be sending "foxes." Other times there will be no RTTY, just the "mark" tone for each channel in the group.

Figure 3 lists FDM RTTY loggings I have made over the last few years. Try 6.993 MHz in the evenings; the signal strength is very strong in the midwest. Change the receive frequency to 6.9926 and you will receive weather in the same FDM group using a different baud rate. I have not yet found a reliable method of determining which channel is being received.

FDM can be copied from the satellites; the technique requires a satellite dish, an LNA receiver and a shortwave receiver. The same tuning techniques are used with satellite FDM reception.

If you already are an FDM listener, drop me a line; I would like to hear from you. My address is 203 York Place, New Lenox, IL 60451.

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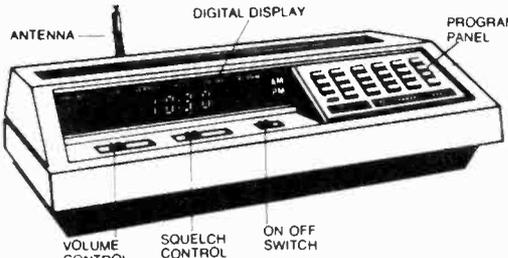
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50 Channels — Mobile/Base

Features include simple raised button keyboard programming of the following frequency ranges: 32-50 MHz, 118-136 MHz, 144-174 MHz, 421-512 MHz. Vacuum fluorescent display, dim control, priority, count transmissions, non-volatile memory retains memory without power back-up, automatic search, scan speed control, automatic search, scan delay, lockout, service search, automatic squelch, crystal-less, digital clock, external speaker & tape jack, auxiliary equipment control, plus much more. Built inside the rugged metal cabinet. Includes AC & DC cords, telescopic antenna, mobile mounting kit, and one year factory warranty on the Bearcat 300 for only \$239.99 and \$7.00 shipping. (Optional extended warranty: 3 years \$35, or 2 years \$25.)



Regency Z30

30 Channel Automatic Programmable Scanner

ANTENNA, DIGITAL DISPLAY, PROGRAM PANEL, VOLUME CONTROL, SQUELCH CONTROL, ON OFF SWITCH

The Regency Z30 is a compact, programmable 30 channel, multi band, FM monitor receiver for use at home or on the road. It is double conversion, super heterodyne used to receive the narrow band FM communications in the amateur, public safety and business bands: 30-50, 144-174, and 440-512 MHz. Size 10 3/4" W x 2 7/8" H x 8 3/8" D.

Sophisticated microprocess-controlled circuitry eliminates the need for crystals, instead, the frequency for each channel is programmed through the numbered keyboard similar to the one used on a telephone. A "beep" acknowledges contact each time a key is touched. The Z30 scans approximately 15 channels per second.

Any combination of two to thirty channels can be scanned automatically, or the unit can be set on manual for continuous monitoring of any one channel. In addition, the search function locates unknown frequencies within a band.

Other features include scan delay, priority and a bright/dim switch to control the brightness of the 9-digit Vacuum-Fluorescent display. The Z30 can be operated on either 120 VAC or 12 VDC. Includes one year warranty from Regency Electronics (optional 3 yr extended warranty only \$35, gives you a total of 4 yrs complete warranty or 2 yr extended warranty only \$25, gives you a total of 3 yrs complete warranty.)

Scanner World Special

\$129.99

(plus \$5.50 shipping each)

Optional Accessories:
Cigarette Lighter Plug RGMPC \$4.95
Z Mobile Bracket — Special ... \$5.99

REGENCY HX1200

Digital programmable 45 channel hand-held Scanner. Frequency coverage 30-50MHz, 118-136MHz, 144-174MHz, 406-420MHz, 440-512MHz. Covers public service bands plus Aircraft. Has priority, search, lockout, scan plus much more. Package includes HX1200, AC charger/adaptor, Ni-Cad battery, carry case, rubber antenna and 90 day factory warranty.

Complete package only **\$216.99** (6.50 shipping)
(3 year extended warranty only \$35.00, 2 year \$25.00)

BEARCAT 50XL Programmable Hand-Held	124.99	(5.00)
AD100U AC Adapter/Charger for 50 XL	12.95	(.00)
BP50 Ni-Cad Battery Pack for 50XL	12.95	(.00)
BEARCAT 180 AC Digital Scanner	159.99	(5.00)
BEARCAT 140 AC Programmable Scanner	94.99	(5.00)
BEARCAT 145XL AC Programmable Scanner	104.99	(5.00)
BEARCAT 175XL AC Digital Scanner	159.99	(5.00)
BEARCAT 100XL Digital Hand-Held	199.99	(6.50)
BEARCAT 210XW AC/DC Digital Scanner	199.99	(6.50)
BEARCAT 2020 AC/DC Digital Scanner	229.99	(5.50)
BEARCAT 280 AC/DC Digital Scanner	219.99	(6.00)
BEARCAT 300 AC/DC Digital Scanner	239.99	(7.00)
BEARCAT 800 XLT AC/DC Digital Scanner	319.99	(6.00)
BEARCAT DX-1000 Shortwave Receiver	284.99	(12.00)
REGENCY HX-1200 Digital Hand-held 45 Channel	216.99	(6.50)
REGENCY MA-257 Cigarette cord for HX1000/1200	16.99	(.00)
REGENCY MA-917 Ni-Cad Battery for HX1000/1200	24.99	(.00)
REGENCY HX-CASE Hvy Leath. case for HX1000/1200	34.99	(.00)
REGENCY MA-256 Drop in charger for HX1000/1200	69.99	(3.50)
REGENCY R-1000 Programmable 10 chan. AC Scanner	94.99	(5.00)
REGENCY HX-2000 Digital Hand-Held	159.99	(7.00)
REGENCY MX-3000 AC/DC Digital Scanner	198.99	(6.50)
REGENCY MX-4000 AC/DC Digital Scanner	179.99	(7.00)
REGENCY MX-5000 AC/DC Digital Scanner	329.99	(6.50)
REGENCY MX-7000 AC/DC Digital Scanner	399.99	(7.00)
REGENCY Z-30 AC/DC Digital Scanner	129.99	(5.50)
REGENCY Z-45 AC/DC Digital Scanner	159.99	(5.00)
REGENCY Z-60 AC/DC Digital Scanner	178.99	(5.50)
Mobile Mounting Bracket for Z Scanners	5.99	(.00)
REGENCY D-810 AC Digital Scanner	178.99	(5.50)
REGENCY ACT-R-1 AC/DC Cryst. Single Channel	75.99	(4.00)
REGENCY RH-256 High Band Transceiver	399.99	(7.75)
REGENCY UC 102 Hi-VHF Hand Transceiver	119.99	(5.50)
REGENCY RU1508 UHF Transceiver	439.99	(7.75)
Book "Top Secret Registry of Gov't Frequency"	12.95	(.00)
Book "Covert Intelligence, Electronic Eavesdropping"	8.95	(.00)
Book "Betty Bearcat Frequency Directory"	14.95	(.00)
Book "Rail Scan Directory"	7.95	(.00)
Book "Air Scan Directory"	12.95	(.00)
RCD MRP-1 Single Channel Hand-Held	38.99	(3.00)
JIL SX-200 AC/DC Digital Scanner	189.99	(6.75)
FANON M8HLU DC Crystal Scanner	99.99	(5.00)
FANON PSK-1 AC Adapted for M8HLU	12.99	(.00)
FANON SIm-6 HLU Crystal Hand-held Scanner	96.99	(5.00)
FOX BMP-1060 AC/DC Digital Scanner	129.99	(5.50)
FOX Mounting Bracket for BMP-1060	9.99	(.00)
WHISTLER Spectrum Radar Detector	199.99	(5.00)
WHISTLER Remote Spectrum Radar Detector	199.99	(5.00)
ANT-1 Magnet Mount Mobile Scanner Antenna	22.99	(3.00)
ANT-6 Base Scanner Antenna w/50' cable	29.99	(3.00)

Regency HX2000

Digital Programmable 20 Channel Hand-Held Scanner with raised button keyboard for easy programming of the following frequency ranges: 118-136 MHz, 138-174 MHz, 406-512 MHz, 800-950 MHz (NOTE: This is the only hand-held portable scanner which will receive the 800-950 MHz range plus high band, air, and UHF). Features include priority, scan delay, memory backup, dual scan speed, channel lockout, jacks for external antenna and earphone, 90 day factory warranty, keyboard lockswitch, sidelit liquid crystal display for night use, program AM or FM mode, search or scan, size is 3" x 7" x 1 1/2". Complete HX-2000 package includes Ni-Cad rechargeable batteries, wall charger adapter, protective carry case, and rubber antenna. All for the low price of only \$159.99 plus \$7.00 shipping each. (Optional extended warranty: 3 years \$35, or 2 years \$25.)

\$159.99 (Plus \$7.00 Shipping each)



Regency MX4000

Digital programmable 20 channel scanner operates as a Base or Mobile unit or can be used as a portable with rechargeable Ni-Cad batteries included. MX4000 covers the following frequency ranges: 30-50 MHz, 118-174 MHz, 406-512 MHz, 800-950 MHz. Features compact size of 5 1/2" x 2 1/4" x 7 3/8", memory backup, scan delay, priority, dual scan speed, channel lockout, jacks for earphone and external antenna, keyboard lockswitch, one year factory warranty. Sidelit liquid crystal display for night use, program AM or FM mode, search or scan, reset button. Complete MX 4000 package includes telescopic antenna, mobile mounting bracket, mobile power cord, rechargeable Ni-Cad batteries, wall charger adapter. All for the low price of \$179.99 plus \$7.00 shipping each. (Optional extended warranty: 3 years \$35; 2 years \$25.) Optional cigarette lighter Plug #4000MPC \$4.99.

\$179.99 (Plus \$7.00 Shipping each)

Bearcat 100 XL

\$199.99 (6.50 shipping) Handheld digital programmable, no crystal portable scanner. 16 channels, search feature, plus more! Frequency range: 30-50, 118-174, 406-512 MHz. Included in the package is a flexible rubber antenna, earphone, battery charger/AC adapter, 6 AA Ni-Cad rechargeable batteries and a heavy duty carry case. All for the low price of:

\$199.99 (6.50 shipping)
(3 year extended warranty only \$35.00, 2 year \$25.00)

REGENCY RH-256 B PROGRAMMABLE TRANSCEIVER

RH-256B Transceiver, 16 channel 12 VDC 2-way Radio fully programmable in transmit and receive mode. Includes built-in CTCSS tones for encode/decode, time-out timer, scan delay, 25 watts transmit power, priority, plus more. Frequency spread as shipped 152-158 MHz. Package includes mobile mike, bracket, mobile antenna, and all cables and instructions for installation. **Special package deal only: \$399.99** (7.75 shipping)
(2 year extended warranty \$48.00 — 3 year \$68.00)

ORDERING INFORMATION

Call (518) 436-9606 to place orders by phone or mail orders to Scanner World, 10 New Scotland Av., Albany, NY 12208. Orders will be shipped same day received by United Parcel Service. Scanner World accepts VISA, MasterCard (COD shipments by United Parcel will be for cash or certified checks only). Mail orders with personal or business checks will be held 4 weeks for bank clearance. Orders with cashiers checks or money orders shipped same day received. Prices, specifications and terms subject to change without prior notice. If items are out of stock we will backorder and notify you of delivery date. All shipments are F.O.B. Scanner World warehouse in Albany, NY. We are not responsible for typographical errors. All merchandise carries full manufacturers warranty. Bid Proposals and Purchase orders accepted from Government agencies. Free full line catalogue available upon request. No minimum order. New York State Residents add 7% sales tax.

SHIPPING CHARGES

(*) Add (\$) per scanner, and \$3.00* for all accessories ordered at same time. C.O.D. shipments will be charged an additional \$3.00 per package. Full insurance is included in shipping charges. All orders are shipped by United Parcel Service. Shipping charges are for continental USA only. Outside of continental USA, ask for shipping charge per scanner.

Scanner World, USA
10 New Scotland Ave., Albany, NY 12208
(518) 436-9606
Most orders Shipped Same Day Received!

Monitoring FDM "Buzzsaws"

Part II

by Jack Albert WA9FVP

In the last issue of *MT* I explained how FDM is transmitted and how it may be received using a receiver and one "RTTY decoder box."

The Receiver

Receiving FDM-RTTY is not complicated if you have a stable receiver like the Icom R70/71, the new Kenwood R5000 or the NRD 515/525, and a RTTY decoder with RTTY software for your computer. You will also need the optional ICOM 2.4 kHz (FL44A) or the Kenwood 270 Hz (YK88CN) narrow filter and a good audio filter.

The stock filters in the "NRD's" are adequate for some FDM reception. Filtering is very important and if a good quality crystal filter is not available for your receiver, you may have trouble copying FDM. The receiver should be fully synthesized for greatest stability. The RTTY decoder must have two filters with a 170 Hz shift rate or better. Some RTTY "boxes" use a PLL decoder or a single filter design which is not adequate for FDM reception.

The Importance of Selectivity

The I.F. stage in a receiver ultimately defines the selectivity. By placing a narrow CW filter at the first IF in a

receiver, fewer signals will pass through the successive stages.

Better filters are available for some receivers as an option, but you can also buy filters from other sources like International Radio, Inc., or Fox Tango Corp. I use a pair of matched 2.1 kHz filters from International Radio in my ICOM R71 and they improved the performance of the passband tuning.

As shown in figure 1, the channel spacing is 240 Hz, the RTTY is centered in the channel space and the shift is 120 Hz. The total bandwidth of the three-channel FDM signal is 720 Hz. If you tried to receive the three channel FDM group on a standard shortwave receiver, you would hear nothing but noise.

The bandwidth of your receiver is probably 6 kHz in AM mode and 2.4 kHz for single sideband mode; both modes are too wide for FDM. What you need is a narrow window that would select one mark and space from one FDM channel. That receive window is provided by the narrow IF filter or the PBT control. The IF filter cannot do the job alone; that is why an audio notch filter is needed. The audio notch filter "trims off the fat"--it removes the remaining hash.

A Simple Setup

Figure 2 shows a block diagram of a simple FDM-RTTY station.

I use a "homebrew" audio filter with my rig; you can use a commercially made filter but I won't guarantee it will work. Before purchasing it make sure you can get it on a trial basis. The IF notch filter on the R70 or 71 is too wide for FDM work.

Tuning FDM

You will notice that, while receiving in the narrow RTTY mode, when you tune across the FDM group the audio pitch of any channel can be changed; that is because the BFO in the receiver beats with the received signal, allowing you to match the pitch of any FDM channel to the "RTTY FSK" tones which are 2125 Hz and 2295 Hz. To copy FDM shift of 120 Hz the "RTTY Decoder" can be switched to the 170 Hz shift rate.

The Technique

- 1) Set your receiver to AM enabling you to tune rapidly to spot the "buzzsaw";
- 2) When you sport a "buzzsaw" switch to narrow RTTY mode (Some receivers offset the IF when you are in RTTY mode and you can adjust the PBT for a narrow bandpass. If your receiver does not have PBT or a RTTY mode switch, but it does have a narrow IF shift control, adjust the IF shift while in narrow CW mode until you hear high pitched tones that are in the range of 2125 to 2295 Hz. There will be some hash mixed in with the RTTY tones);

- 3) Tune the audio filter until the hash is reduced and you can hear pure RTTY tones (the notch filter will reject the 2005 Hz--ch. 201--"space" tone as shown in figure 2);
- 4) Slowly adjust the tuning dial until the "RTTY box" indicates a properly tuned mark/space tone (A RTTY tuning scope simplifies this step. You can see the hash in the cross pattern and by tuning the PBT or IF shift, the receive frequency and the audio filter, you can get a perfect "+" pattern. This is the most-difficult step; if you cannot get a good indication on the tuning meter or scope, you will copy nothing but garble);
- 5) Go back to step 2 and touch up the controls. If you cannot reduce the hash, the noise you hear may be a jammer.

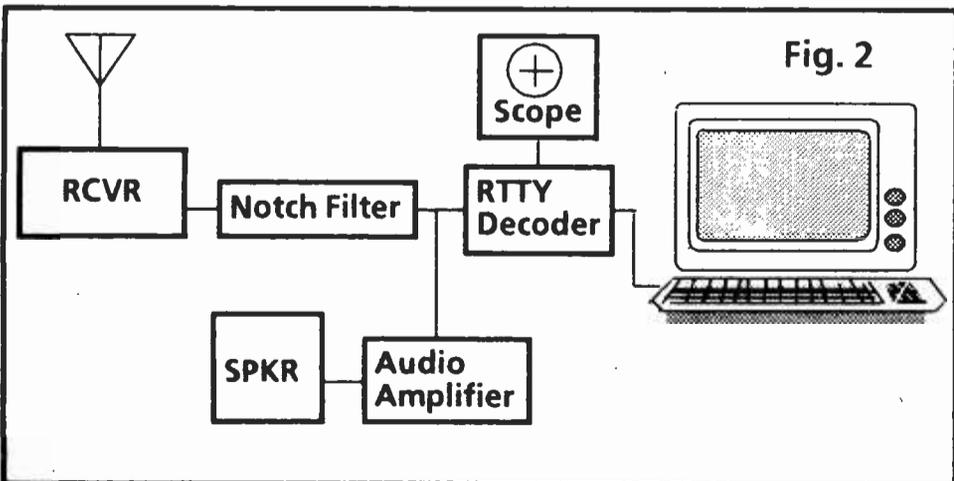
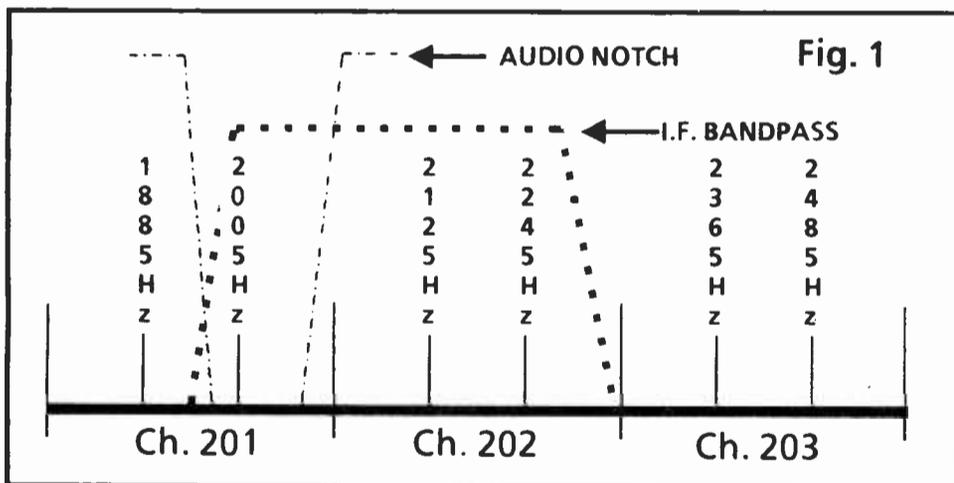
When you get more familiar with this technique, you will notice as you tune slowly in 10 Hz steps, you will hear RTTY channels "pop" in and out as you tune across the FDM group.

Try different speeds and reversed RTTY if copy is garbled. Remember, many channels of RTTY are present in one RDM group and you are searching for unencrypted normal 67 or 100 wpm RTTY.

What Can Be Heard?

Many services share a single FDM group; you can receive government encrypted channels mixed with wire news services carried by the Armed Forces Radio and Television Service (AFRTS). The encrypted RTTY

(Please turn back to p.53)



FDM RTTY LOG			Fig. 3
FREQ (MHz)	SHIFT (Hz)	SPEED (WPM)	REMARKS
5.0731	170	45	UPI
6.432	100	68	UPI non-standard speed
6.9926	75	100	Weather
6.993	170	67	AP (AFRTN)
7.5869	170	67	6VU41/6VU73 179 CQ RY
7.923	170	67	UPI
8.0323	170	100	"Foxes"
9.2141	170	67	AP
9.317	75	67	RY's DE LGAT
9.961	75	55(Baud)	AP News
10.2588	65	100	AP News
10.281	170	67	"Foxes"
10.3172	30	80	Narrow Shift Odd Speed
10.6095	30	54	UPI AFRTN
10.8577	170	67	RYRY All Chnls.
11.0486	170	67	UPI News
11.0970	170	67	"Foxes"
11.4833	170	100	RYRY
11.4249	170	67	DE SHD TESTING RYRY
11.5395	170	67	UPI
12.1490	170	67	"Foxes" DE MKD TESTING
12.5259	170	67	UPI
135665	158	50	DE MKD "Foxes" All chnls.
14.4071	165	50	DE MKD "Foxes" All chnls.
14.6032	170	67	DE MKD "Foxes" All chnls.
16.1502	175	50[Baud]	DE MKD "Foxes" All chnls.

EXPERIMENTER'S WORKSHOP

A Quick-and-Dirty Under-\$15 Preamp

by Mark Simari

Do you need extra gain where it counts? Place this amp at the input of any radio or antenna mast and POW!--a gain of 10 to 20 dB across ten octaves!

You control the gain by use of a series base current variable resistor. The layout is very simple using double-sided copper-clad board, a couple of connectors (your choice) and a small metal box.

CONSTRUCTION

To begin, you must cut out the 1/4 by 1/8 inch Z patterns using a sharp knife.

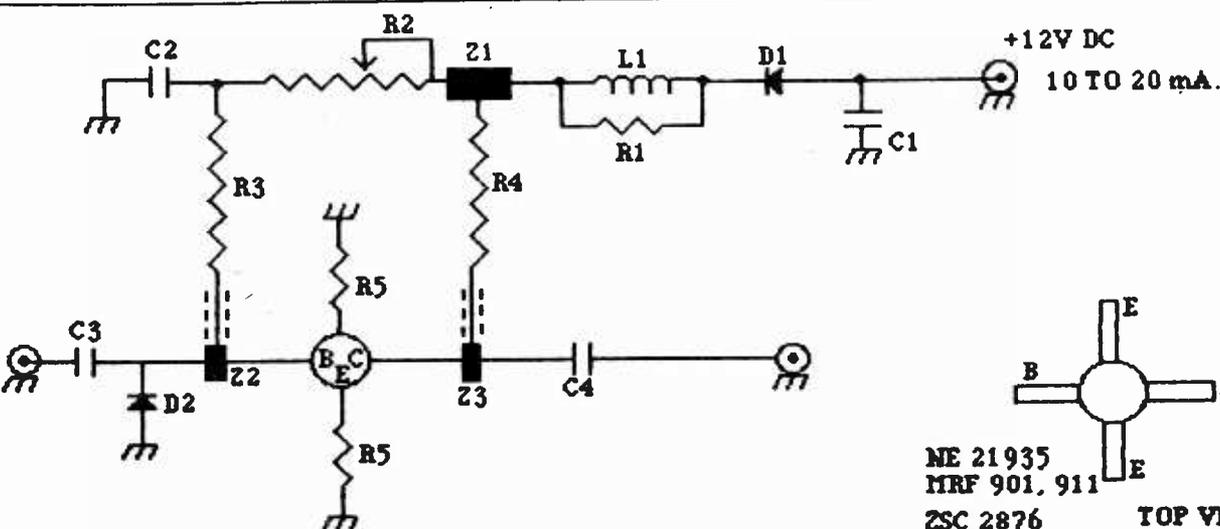
Alternatively, you could stick 1/4" x 1/8" copper foil, tape or brass shim stock on the non-clad side of single-sided board with instant-setting glue.

Place Z2 and Z3 in configuration with the transistor base and collector lead. Place Z1 so that R4 will fit with the shortest leads possible. The emitter leads must be grounded to the metal foil.

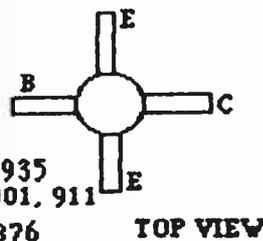
Wire R2 as a rheostat with R3 in series. D1 is an "idiot diode" for idiots like me who power up backwards! D2 is a hot carrier diode which adds about one picofarad to the base of Q1 and will also limit any strong signal from causing a massive Q1 burnout. Keep leads as short as possible! (Optional) ferrite beads on the resistors are indicated by dotted lines. If more gain is desired change R5 to 5 ohms each and you will have a gain of 18.5 dB at the low end and about ten dB's at the high end.

PARTS

- C₁-C₄ .1 μF ceramic disc (RS no: 272-1069)
- D₁ 1N914 or 1N4148 (RS no. 276-1122)
- D₂ HP5082 or IN5712 or EC6519 (RS no. 276-1124)
- R₁ 1KΩ 1/4W (metal film preferred)
- R₂ 100KΩ 1/4W .5W att pot (RS no. 272-1722)
- R₃ 10KΩ 1/4W (metal film preferred)
- R₄ 47Ω 1/4W (metal film preferred)
- R₅ 10Ω (2) 1/4W (metal film preferred)
- L₁ 10 μH choke (RS no. 273-101)
- or 10 turns #20 wire, .25" I.D.
- Q₁ MRF 901 (RS no. 276-2044)
- or NE 21935D from California Eastern Labs, 3 New England Exec. Park, Burlington, MA 01803: \$4.75
- Z₁-Z₃ .25" long x 1/8" wide copper foil or copper or brass shim stock
- Bud Box (RS no. 270-235)
- BNC connector recommended (RS no. 278-105)



DOTTED LINE INDICATES FERRITE BEAD (OPTIONAL)



NE 21935
MRF 901, 911
ZSC 2876

TOP VIEW

Tape Recorder Activator

David Fuller of Bogalusa, Louisiana, sent us a nifty--and very simple--tape recorder activator which senses the presence of audio coming out the speaker jack of any receiver, thus closing a relay (K1 in the diagram). If those closed contacts are connected to an audio patch cord going into the remote jack of a cassette recorder, the tape will start.

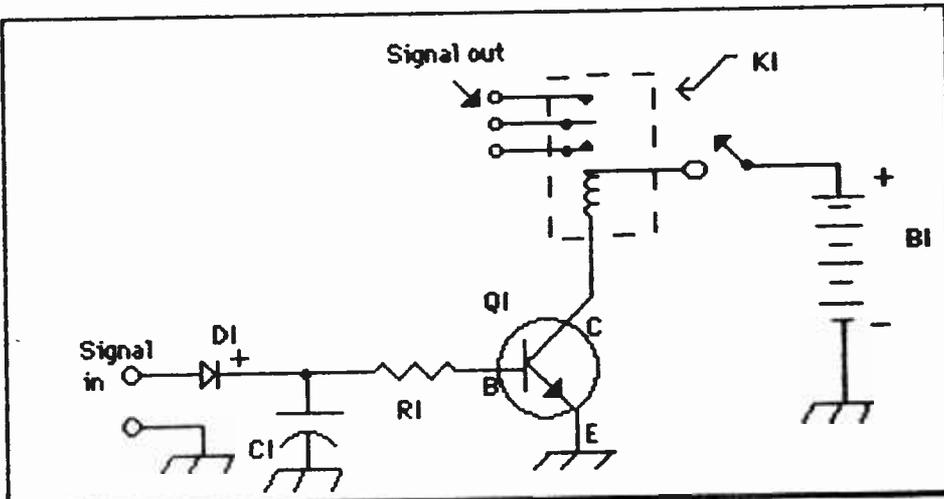
capacitor (C1) used in conjunction with a 100,000 ohm resistor (R1) should provide a delay of roughly two to three seconds before the closed relay drops out again, stopping the recorder. D1 also isolates the charge of C1/R1, preventing it from draining back into the receiver's audio circuit.

PARTS

B1 is a convenient battery from 6 to 15 volts; D1 is a small signal diode like the 1N914 or 1N4148; K1 is a reed relay or sensitive relay with a coil voltage compatible with the battery used; Q1 is a convenient small signal transistor like a 2N3904 or 2N2222; C1 and R1 are chosen for their time constant and may be from 2.2-150 microfarads and 4700-470,000 ohms respectively.

THEORY

D1 rectifies the incoming audio signal to supply a positive voltage to timing network R1/C1. The number of seconds the relay will remain closed after the signal drops out is roughly equal to the resistance in ohms times the capacitance in microfarads divided by one million. For example, a 25 microfarad



Why an Attenuator?!

by Mark Simari

Have you, like me, gone out and paid a small fortune for a scanner only to find that when it is connected to an outside antenna your scanner can be "too sensitive"? You did pay all that cash for sensitivity, right? But put an attenuator in the antenna line and reduce the signal strength by a factor of two, four, six, or 8 dB and find out how much better the scanner behaves!

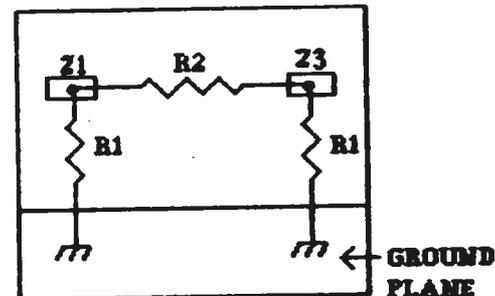
Yes, reduce the signal strength a little and listen to the difference!

Sensitivity means the receiver's ability to receive weak signals. Too much attenuation will turn off the signal while too much signal will cause overloading and desensitizing of the scanner's front end.

The attenuator described below can help in some situations. I live in a jam-packed northeast area and 2 to 4 dB's of attenuation works wonders. Construct it on a small piece of double-sided copper-clad board with two connectors of your choice; use metal film resistors (1/8 watt if possible), and mount it in a small metal box.

PARTS VALUES

- Z1 .3" x .125" microstripline
- Z3 .15" x .125" microstripline
- 1 dB = R₁ 870Ω R₂ 5.8Ω
- 2 dB = R₁ 436Ω R₂ 11.6Ω
- 4 dB = R₁ 221Ω R₂ 23.8Ω
- 6 dB = R₁ 150.5Ω R₂ 37.3Ω
- 8 dB = R₁ 116Ω R₂ 52.8Ω



Mailbag

Utilities

Bob Grove, Utilities Editor, P.O. Box 98, Brasstown, NC 28902

KEEP MT FOR SWL's

I have enjoyed *MT* since I began subscribing some time ago. It was a good paper before the new format and appears to be getting better since the consolidation of *MT* and *International Radio*.

I would suggest one word of caution, though, regarding the trend to bring SWL'ing and amateur radio closer together as I see it developing in *MT*. I subscribed to *CQ* and *73* also (and also *POPCOM* magazine). The amateurs have their magazines and publications, so let us have ours. They don't care much for us SWL's in their publications either, and neither does their mother-organization, the ARRL. No, I don't dislike amateurs; just that trying to mix hams with SWL'ers is like trying to mix apples and oranges. These are two different hobbies, and we should leave it at that. If some hams are SWL'ers, that is fine; if an SWL'er becomes a ham, then that is OK, too; both can coexist, and each has his or her respective hobby press to support that aspect of the hobby.

Regarding the suggestion of a contest (pg.27, Oct. 86 *MT*), I support that. I would also like to see more SWL (or really, UTE) contests, with possibly award certificates given out as prizes. Matter of fact, why not start an awards program for the SWL/Ute community?

M/Sgt David Freed, KCA6LE
U.S. Army, Frankfurt, Ger

THOUGHTS ON A LOOP ANTENNA

(Referring to Chris William's *RDF antenna article in the Oct. 1986 issue*)

Antenna theory assumes a free-space element which may be simulated by placing an antenna several wavelengths away from the earth's surface and operating it in a zero-degree plane.

If the plane of the antenna meets the plane of the earth's surface, you can no longer assume free-space conditions.

Consider the null patterns on a loop-stick (figure-8), then slant it 45 degrees. Now, with one end pointing to the ground, a second "sensing" element is not needed to get a heart-shaped ("cardioid") pattern.

Bob Russ
Walworth, WI

...AND A REPLY

Mr. Russ' comments are very

interesting. On receipt of his letter, I did some extensive reading and then performed a number of experiments. The results suggest there may be merit in his proposed technique for eliminating the sensing element from HF loopstick antennas.

I've found that when tilted, the loopstick nulls do seem to lose their symmetry. Indeed, as he speculated, on of them all but disappears; but, unfortunately, the other null simultaneously broadens. I suspect this is a result of local reflections of the incoming sky wave finding their way into sidelobes of the receive pattern at angles and relative polarizations non-existent before the tilt.

I would like to express my appreciation to Mr. Russ for his letter. It was thought-provoking and it is entirely possible that further study and experimentation will prove him right and yield a tilt angle that does, in fact, render the sensing element superfluous.

Chris Williams

GOVT REGULATING THE AIRWAVES - AGAIN!

Well, our government is trying to shove it to us again! First, it was the "Privacy Act of 1986"...now, they're trying to outlaw RADAR DETECTORS nationwide!!

The pro-radar detection group, R.A.D.A.R., along with Cincinnati Microwave Co., and several other manufacturers of well-known, popular detectors, is currently engaged in an unpublicized "war" with the government to protect the rights of American drivers to keep and use the over-six-million radar detectors currently owned by the public.

Everyone who owns a radar detector is not a crazed maniac who drives 90 MPH in his/her "hopped-up" sports car; nor are they a group of "ban-the-speed-limit" enthusiasts. Perhaps most of these devices are used occasionally to circumvent the national speed laws, but just as many are in use to prevent excessive speed.

But the real scary part of this scheme is, once again, the word r-e-g-u-l-a-t-i-o-n. Why don't they want you to know where radar is in use? After all, you are the target, and the one being "micro-waved."

The fact remains that, no matter how one feels about the pros and cons of radar (and radar detectors), the government is again trying to regulate what you can



FORUM

The On-Going ANARCON Debate

Point

Editorial, Oct DX Ontario

When the September 1986 issue of the new *Monitoring Times* arrived I was anxious to read Larry Miller's photo-story of the 1986 ANARC Convention, which I, and many other ODXA members, had attended in July. Unfortunately, what I read was a disappointment to me and, I think, represented a journalistic disaster for *MT*.

It was nice that there were sixteen photos of the Convention and the preceding broadcasters conference, also hosted by RCI, but they were degraded by some less than humorous or even wise captions. Broadcasters were characterized as being less than intelligent. Others at the Convention captured by Miller's camera likewise received belittling comments.

In the text of his report, Miller dwells upon the more eccentric of The convention's attendees. What good reason can there be for ridiculing people who are different than most of us, but have just as much right to be at an ANARC Convention as any of us?

It is quite obvious that Larry does not find ANARC Conventions totally to his liking. He accuses them of having "uninspiring seminars" and being in hotels with "bad" food. I think each person has to make his own decisions about the seminars, but concerning the food, if Larry is including the banquet meal in his

blanket statement, then he is sadly wrong. The Holiday Inn provided an absolutely delicious, abundant and well-served dinner at an excellent cost. Nowhere in Toronto will you find such a meal, with a bottle of wine per four people, for \$25. My memory seems to tell me that Larry did not even attend the banquet, but entered the room later.

Miller also claims that the "hierarchy" of shortwave: broadcasters, club personnel, well-known DXers" and a small handful of ordinary folk attend these Conventions. Any of the recent ANARCON organizers could tell him that there is a large number of ordinary folk who attend, outnumbering the "hierarchy." But what is wrong with the so-called "hierarchy" attending? Don't we all want to meet these people there? We'd complain if they didn't show up!

I'm glad that Larry Miller does concede that the ANARC conventions are improving and do have pluses, but I'm sure he didn't make friends by calling the 1985 gathering a "disastrous run." Reading his review of that Convention in the August 1985 *Shortwave Guide* he doesn't use that word and in fact is very complimentary of the Convention!

Finally, will all those DXers who spend \$1000 (U.S.?) to attend ANARCON's please stand up? I doubt that many spend anything near to that figure, which Miller claims is the price you have to pay to attend the Convention.

receive through the airwaves. This appears to be an up-and-coming fad with our legislators to continually attempt to regulate any type of radio transmissions that the public can monitor.

So, write to your representatives!! Let them again know that people involved in the hobby or radio monitoring and related activities are a force to be reckoned with, and not just a bunch of disgruntled people looking for a reason to complain.

Larry Wiland
292 S. Turner Road
Youngstown, OH 44515
(so the Feds' know where to arrest me...)

THE NITE BEFORE CHRISTMAS

"Twas the nite before Christmas and all through the Shack, the rig was turned off and the mike cord lay slack. The antenna rotor had made its last turn, the tubes in the linear had long ceased to burn. I sat there relaxing and took off my specs,

preparing to daydream of armchair DX, when suddenly outside I heard a loud sound.

I pushed back my chair and leaped to my feet, I dashed out the door and into the street. The moon shone down brightly and lighted the nite; for sure, propagation for low bands was just rite. I peered toward the roof where I heard all the racket, and there stood some gink in a red fur-trimmed jacket.

I stood there perplexed, in a manner quite giddy; Just who was this stranger, di di dah dah di di. He looked very much like an FCC guy who'd come to check up on some bad TVI. I shouted quite loudly - "OM, QRZed? Hey you by the chimney all dressed up in red." I suddenly knew when I heard sleigh bells jingle, the guy on the rooftop was jolly Kris Kringle.

He had a big sack that was full of ham gear, which made a big load for the prancing reindeer. Transmitters, receivers for cabinets and racks, some meters and scopes and a lot of

Mailbag

Broadcasting

Larry Miller, MT Broadcast Editor, P.O. Box 691, Thorndale, PA 19372

ANARC Conventions are not perfect, but they are a lot better than Larry Miller's attempt at journalism in *MT*.

Harold Sellers

→ ←

Counterpoint

Miller's Response, Nov DX Ontario

I read with great interest your editorial on the September 1986 *Monitoring Times* review and photo spread of the July 1986 ANARC convention.

Unfortunately, you appear to have missed the point in my review of this and other past ANARC conventions. That point is that they continue to foster the concept of shortwave radio listening as a highly technical and difficult-to-understand activity filled with unnecessary jargon. The seminars are, in my opinion, uninspiring, almost always technically oriented and offer little in the way of interest to the newcomer or the casual listener. Shortwave, on the other hand, offers one of the easiest ways for the average person to learn about his world. Contrary to the party line, it doesn't require a lot of money or a degree in electrical engineering and it's as simple as turning on the TV. Period.

I maintain that as currently formatted, the ANARC conventions are not conventions for "listeners" -- the people who make up the vast majority of those who tune to international radio -- but rather events for professionals, hobbyists and the hard-core. As a result, this most visible event in our industry -- which has the opportunity to increase listenership -- instead drives people away. Why else does short-

wave, with its (as recent surveys show) millions of regular listeners (in North America alone) have as its main event a convention that draws only around 300 people when amateur radio, which has far fewer numbers, can generate a turn-out at the Dayton Hamvention numbering more than twenty thousand? In my book, that's a pretty strong indication that we're doing something very wrong.

As for the convention hotel, I did indeed find its staff rude, its equipment (need I mention the elevators?) poorly maintained and the food bad. I did not enter the room at the end of the banquet. I chose not to attend at all.

With all sincerity I must say that my job as an entertainment-journalist is not to write "happy-face" reviews for everything to do with shortwave listening. My job is to report it as I see it. That's what I did. And that's no more of a disaster than having a convention in a hotel that can't get its attendees from one floor to another without a half-hour wait.

Reviews such as the one I did in *MT* are not in any way meant to denigrate the many hours of hard work that go into the making of such an event. On the contrary, the technically-splendid events staged by ODXA are prime example of the commitment many of us make to shortwave. For that you deserve our hearty and sincere applause.

But I do feel that it's time we were all a bit more honest with ourselves about the direction of shortwave and our roles in it. Unless we do so, we'll continue to live in this narrow-interest, high-frequency fantasy world. I, for one, plan to continue reporting it as I see it.

Larry Miller

Welcome to a slightly abbreviated edition of "Mailbag" for December. I'll be back from my trip shortly with a report on China and Chinese radio so don't forget to check your mailbox for the January issue of *Monitoring Times*. Without further ado, let's dig in.

Technicalities

Gordon Bell of Melrose, New York read the mention we had in the November, *Monitoring Times* about unusual antennas for apartment dwellers. Gordon's suggestion is a simple one, too, although I haven't tried it yet. He suggests "folding the tail end of an antenna lead in aluminum foil and set a telephone handset on it." The result, says Gordon, is that the radio is "capacitively coupled to Ma Bell's antenna."

Speaking of mildly technical topics, Bill Smith (not his real name), who is a prisoner in Virginia, writes to say that his state, like Pennsylvania and a few others, do not allow inmates to have shortwave radio. But Bill says that he and some others have learned how to "easily" modify small AM transistor radios to pick up shortwave. Clever and ingenious, sir. How about drawing up a short article telling us non-technical types how to do it in easy, step-by-step terms?

Had the opportunity to visit the truly incredible radio room of Mark Swarbrick the other day. I had always been curious about the array of antennas on the roof of a house nearby, several of which are Grove jobbers. But when I saw his radio room, yipes! It looked like the control panel of Air Force One. I understand Bob Grove is always interested in a photo of your set-up, so if you've got one, pass it along to him.

We didn't get much feedback concerning John Tuschere's suggestion that we include transmitter sites in our frequency section. Any thoughts on this, folks?

I found an interesting accessory for my Sony 2010 that you might be interested in. If you have a '2010, you know that it has a timer that will turn the unit on and off automatically at times you have preset in the memory. Frustratingly, the radio will not, in turn, activate an attached tape recorder. So if you want to tape something while you're out of the house, it's strictly no go. Now comes a unit by one Saul Berger. It's called

the CC-2020 cassette controller and it costs somewhere in the neighborhood of \$40.00. If you'd like more information, write to Saul at 6720 North 11th Street, Philadelphia, PA 19126. Tell him *Monitoring Times* sent ya.

Regarding Radio Earth

"Congratulations on a fine article on Radio Earth" says Martin Dellman. "I've been a listener for lo these many years, have, in a way, shared both their suffering and triumphs via my radio. It was great to get to meet them through your article. Your warm, friendly style of writing complimented the Poulos' just right." Thank you, Martin. They're good folk. And that comes through no matter who writes the article. What I didn't mention in the article is how helpful and supportive the whole Radio Earth team (including, then, Jeff White) was when I first got started in the shortwave business. We both got started at the same time and we shared a lot together.

That's it until next month. Good listening!

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Monitoring Times will print at no charge (as space permits) announcements and questions of a non-commercial service nature.

Contact needed in western N.C. for person using Washington radio reports. Write: L.E. Williams, 10 Elf Lane, Greenville, SC 29611.

Wanted: Information on Iowa/Missouri National Guard aircraft frequencies, especially air-to-air 220-400 MHz and regular military air-to-air and any McDonald-Douglas frequencies. Have SAC and air refueling channels to trade. Zel Eaton, 904 East Wall St., Kirksville, MO 63501.

Reader is requesting help in locating a computer program for Commodore 64 or 128 which would organize frequency list. Interested in option which would add or delete "sensitive" frequencies. Will pay postage or replace disc with program already copied. Contact: Ron Michael Hughes, 4357 Barr Avenue, Memphis, TN 38111-7832; (901)725-0341.

I would like to contact any other monitoring hobbyists in or outside of Phoenix interested in VLF, LF, MW, SW, VHF lowband, VHF Public Services, UHF, TVDX, utility listening, time signals, Part 15, international BC, CB! Phone (602)266-9734 Leave message or write Robert C. Homuth, 5215 N. 11th Ave., Phoenix, AZ 85013. Listen for "World Monitor" ch. 5,14, or 35 CB!

Monitoring Times wishes you all
a Happy Holiday and the best in
listening for 1987!

Judy
Bob
Sue
Mini
Rachel
Angie

coax. He said not a word 'cause he'd finished his work, he picked up his sack and then turned with a jerk. He leaped up to his sleigh and he shouted with glee, and I knew in a moment he'd be QRT. I heard him exclaim as he flew o'er the trees,

"HAPPY CHRISTMAS TO ALL,
AND TO ALL SEVEN THREES!"

Written by Chuck WB7NUW
& Bobbie WB7NUU Vaughan,
slightly modified and submitted by
Frank Bolen WA2KWC, Highlands,
NJ.

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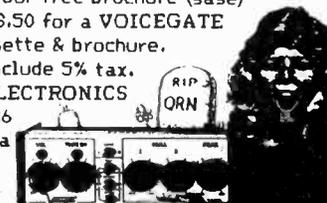
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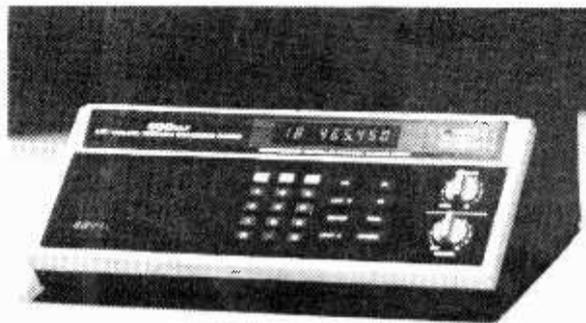
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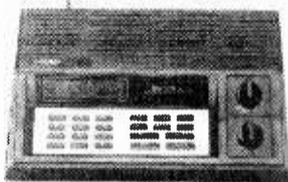
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