



# MONITORING TIMES

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August, 1984



## FEMA: PLANNING FOR NUCLEAR SURVIVAL

by Bob Grove

The Federal Emergency Management Agency is responsible for implementing Presidential Directive 58, signed by President Carter in June 1980. Entitled, "Continuity of Government," it outlines plans to evacuate selected government personnel in the event of nuclear attack in order to insure continuity and survival of the U.S. Government.

With an annual budget in the hundreds of millions of dollars, FEMA is prepared to effect the Joint Emergency Evacuation Plan (JEEP) a massive helicopter transfer of 258 DOD and FEMA personnel from the Pentagon and downtown Washington DC, to Mount Weather (Berryville, VA), the Alternate National Military Command Center ("Site R," Ft. Ritchie, MD), the National Emergency Airborne Command Post (NEACP) and Andrews AFB and other classified sites as well.

Simultaneously, Joint Air Transportation Service (JATS) aircraft would transport key Executive branch

officials and vital documents to classified sites.

Running at full-tilt, holocaust-fever momentum, FEMA has requested \$254 million this year alone to begin a 7-year program designed to evacuate the general population from major cities. The Reagan administration has proposed a total \$4.2 billion budget for the program.

The primary purpose is to ensure that the National Command Authorities (NCA)--the President, Secretary of Defense and military successors--can carry out nuclear retaliation.

In the eventuality that the present command centers

would not survive the blow, the administration has proposed mobile command centers at a cost of \$1 billion.

### COMMUNICATIONS

A nationwide system of radio networks provides communications assurance; it is tested on a daily basis on its two primary modes: upper sideband and radioteletype. Some slow-speed encrypted Morse is also used as part of the authentication system.

Interlinked telephone lines connect some 400 terminals across the country, utilizing computers of the

☞ Cont'd on p.28

## - SAC - FLYING WITH THE STRATEGIC AIR COMMAND

A MONITORING TIMES EXCLUSIVE

by Art Lewis

(I would like to express my sincere gratitude and appreciation to the personnel of PAMO, HQSAC and especially to Maj. Patrick Maloney, Maj. Dave MacNamee and Lt. Michael Baker for their valuable assistance--and extreme patience--in my research for these articles.)

### PART I

#### THE MYSTIQUE

There seems to be no area of the SWL hobby filled with more misconceptions, rumors and mystique than that of the Strategic Air Command and the various land and airborne command posts. The reason for this is a mystery, because SAC is not only willing, but eager to have their story told.

In all my years in journalism I do not remember any organization that was more cooperative with the media. Even questions concerning very sensitive topics were answered as fully as possible, and not once was I given a "No comment."

Having served in Omaha in the '60s where I watched the first "Looking Glass" take off on February 3, 1961, this area of monitoring has always been one of great interest and nostalgia to me. When Bob Grove suggested I do a story on SAC, I made a promise to myself that I would trust neither my memory nor any previous literature, but would confine myself to first-hand research.

With the aid of PAMO at HQSAC, extensive briefings were arranged as well as a visit to the SAC Command Post and a tour of a "Looking Glass" aircraft.

#### SOME HISTORY

The Strategic Air Command was born on March 21, 1946 in order to continue and enhance the strategic bombing superiority developed during World War II. It began with 100,000 military personnel and 1,300 aircraft including 300 B-29s and was headquartered at Andrews AFB, Maryland.

In 1948 HQSAC was moved to Offutt AFB, Nebraska and

☞ Cont'd on p.7



The Underground Command Post showing part of the control consoles and the 16/16 foot projection screens. The command post is manned by a battle staff 24-hours a day. (SAC Photo)

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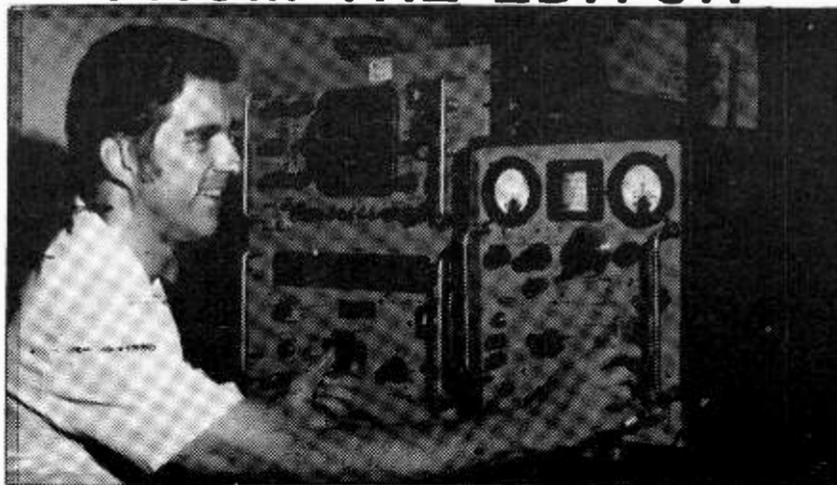
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# FROM THE EDITOR

## MONITORING TIMES

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### SCANNERS:

### Where Do We Go From Here?

With the total restructuring of the Electra Company and the accompanying cancellation of several Bearcat products (BC-250, BC-350, CompuScan 2100 as well as the unannounced BC-100XL, BC-210XLT and BC-450), it is time to reflect on the entire scanner industry with an eye on the future.

But first, let's take a look at the past, giving due recognition to the achieve-

ments of Bearcat, truly the founder of the scanner industry.

In 1968 engineer Al Lovell began producing the world's first scanning receiver, naming it "Bearcat" in tribute to his favorite antique automobile model by Stutz.

By now, the scanner industry has sold more than six million radios, penetrating 8% of U.S. households. More than half of those users monitor at least six hours per day.

Electra, parent of the Bearcat product line, must be credited with patenting "track tuning" of RF circuits; nationally distributing the first keyboard-entry scanner (1977); developing the first microcomputer controlled scanner featuring search, store and recall (1978); incorporating the first AM aircraft band function into a multiband FM scanner (1979); designing the first scanner with an

**REMEMBER!**  
**"S.A.S.E."**

We at Monitoring Times constantly receive letters from readers which begin, "Please send me everything you have on..."

As much as we would like to help, we are not a public library service. Letters received with a Self-Addressed Stamped Envelope will be answered.

And as always, my telephone line is open for pre-paid calls weekdays 1-5 pm Eastern (704-837-2216)...Bob

alpha/numeric readout display which stored service on each channel (1981); developed the first handheld programmable scanner (1981); and designed the first computer-assisted scanner with video display (1983).

All new product development has been halted by the new owner, Uniden, and we will watch with cautious anticipation their decision as to the future of the Bearcat line.

But the scanner industry will not stand still. Fox will be announcing a wide-frequency-range scanner; the J.I.L. SX-400 is now in distribution and the computer peripherals and plug-in conversion modules will be coming along in a few months; Regency projects an early fall release of the MX-7000 with the follow-up by their new MX-8000 computer-operated scanner some time next year.

Radio Shack will have no new scanners or shortwave receivers in their fall catalog.

Is it safe to make predictions regarding new products? Possibly. We should expect to see wider frequency ranges with additional modes (CW/SSB), interfacing with popular home computers, vastly increased memory storage capacity, more rapid search/scan and competitive price cutting.

At least one growing company, not presently producing receivers, will be offering wide-frequency coverage receivers with advanced features. The identity of this company will remain undisclosed until their products are ready to be announced.

In all cases, we, the listeners, will be the beneficiaries of this rapid escalation of receiver technology. There are great times ahead and, as always, MT will be the first to report these exciting new products.

## BOB GROVE

## RECEIVES AWARD

Bob Grove, editor of Monitoring Times and president of Grove Enterprises, has received a special award from AMSAT (the Amateur Satellite Corporation) for his continuing efforts to support the amateur radio space program through his writing in Monitoring Times.

Grove, a 33-year veteran of ham radio (first licensed in 1951) expressed his appreciation to AMSAT.

"It has been my privilege to report to our thousands of readers the exemplary program of AMSAT. Their contribution to amateur radio and to technology in general is a model of cooperation, commitment and dedication. We shall continue to support this fine organization and encourage similar efforts by other experimenter groups to follow their example."

# AMSAT

## Certificate of Recognition

*presented to*

BOB GROVE

*for his*

### Outstanding Contribution To The Amateur Radio Space Program



April 4, 1984  
Date

*William Kayano* N2CF  
General Manager



### Viewpoint

As an addendum to Bob Rankin's letter in the July 1984 Monitoring Times listing military communications dictionaries in Spanish, I would suggest hunting for Walter Mangold's **TERMINOLOGIA MILITAR-NAVAL-AEREA**, published by Editorial Mangold in Madrid.

This book not only contains military, naval and air force terms in Spanish and English; it has an appendix listing points of the compass, sea conditions, weather conditions, wind force and visibility.

Unfortunately, this pocket-size 191-page book is long out of print.

One should also try to find Rankin's suggested list at a used book store, most likely in the foreign language section.

Robert Margolis  
Skokie, IL

>>><<<<

Sombody goofed on page 4 of the July '84 issue of MT.

Since when have the OTH Radars used long-wire antennas?

Someone was thinkg of the NAVY Project Sanguine up in isolationist Wisconsin and Minnesota, weren't they? That is to be constructed sometime (now held up in the Fed courts by a bunch of hippies, probably agitated by a KGB cell), and used for Submarine "FOX" scheduling. It is of course VLF and damn well needs a "Long Wire" (like I need longer paper).

OTH Radars use "Billboard" antennas. We have one under construction in Maine. One site is up in - of all places - MOSCOW (OFF 201) - and the other end is up in Washington County in the blueberry barrens 'way down East between Rt. 9 and Rt. 1.

Bob Wilson, G1GVA  
Portland, ME

>>><<<<

I am writing about your editorial in the June issue of Monitoring Times titled, "Military Intelligence." What does this have to do with the Radio Hobby? It is hard to excuse the gratuitous swipe at the military, when, in the same issue you laud the dedication and skills of the people in the Air Force Weather Reconnaissance Squadrons. These are not stupid individuals and

neither are the vast majority of the members of our armed forces. The first sentence of the editorial would be more accurate if it stated that these organizations are dedicated to the prevention of nuclear war.

Was this simply intended to be a diatribe against wasteful spending? There is waste in the Defense Department. There is also waste in the Department of Agriculture, the Postal Service and your local churches and school system. You will find, however, that all of these organizations are, for the most part, staffed by people who work hard and are sincerely dedicated to doing a good job.

If you want to express your opinion about matters of public interest, write a letter to the editor of your local paper or a national magazine. The readers of Monitoring Times should be spared the propaganda of the Center for Defense Information.

Gerald Kercher  
Quaker Hill, CT

>>><<<<

I'm writing to you to comment on your recent article that appeared on page 24 of the July 1984 issue of "Monitoring Times" regarding the question - "When Will MT Become a Magazine?"

My opinion is that you should continue printing MT in the current format so as to continue to provide up to the minute information concerning the monitoring world as well as providing it to your customers in the most economical means. Raising the subscription cost \$2.00 for a newspaper stock 8-1/2" x 11" format may seem minimal at first but it eventually adds up as with all other increases.

I presently receive magazines in the slick 8-1/2" x 11" format and you are right, a lot of their news stories are old by the time the magazine arrives. Therefore, I vote for keeping the existing MT format at an economical price to your subscribers.

Barry E. Green  
Glendive, MT

>>><<<<

## LISTENING LAWS

### "Pro-Scanner" Legislation

by Bob McGovern

This column is a follow-up to an earlier one which appeared in this publication discussing the "anti-scanner" aspect of monitoring laws. Of course, there is another side of the story and this concerns the "pro-scanner" view of monitoring.

Although many states, counties, and municipalities attempt to discourage monitoring by the enactment and enforcement of restrictive monitor laws, some law enforcement agencies actually encourage the citizenry to monitor their radio activity. This practice has some undesirable effects, but many beneficial ones.

In Anaheim, California many officers will gladly give a citizen a copy of the county radio code which the department utilizes. All one has to do is ask for it. The Idaho State Police in Boise has been known in the past to provide detailed radio frequency information, radio codes and other useful information to monitor radio listeners. The only catch is that it was given out on an individual basis and it was not to be published for profit.

Another agency which has been very open with listeners is the California Highway Patrol. Much infor-

mation concerning their codes, frequencies and other data is available if you just ask for it in a polite and professional manner. Many law enforcement agencies throughout the United States operate very openly.

However, these agencies ask for your cooperation is their daily activities. Do not interfere in any way with their work. Do not go to the scene of a "disaster," fire, flood, accident or crime investigation just for the purpose of "sight-seeing." If you interfere or impede their work in any way you may be arrested and prosecuted.

Instead, help them perform their work. If you hear a wanted person or stolen vehicle broadcast and later observe the person or vehicle, report this to the authorities. If the agency asks you how you know, tell them. Over a period of time, the agency will suddenly realize the value of monitor radio listeners and their equipment. Each active monitor listener is a pair of eyes for law enforcement which needs all the help that it can possibly have.

Of course, not all "anti-scanner" laws can be eliminated. However, in states, counties and municipalities where very harsh laws exist such as New Jersey, we can approach our

Just a note to congratulate you and/or your typists for the excellent job you have done of typing my series of articles (The Radio Spectrum - A Gift to the Weatherwise) in Monitoring Times.

If your office staff can manage to get through those long article with all the troublesome subscripts (such as  $i_{R_i} h_{V V}$ , etc.) without making typing mistakes, they deserve to be commended!

Bert Huneault  
Windsor, Ontario

>>><<<<

I hope MT never becomes a Magazine!! In the shape it is mailed it is just as easily stored on the shelves of my listening post as a magazine. It is just as easy to abstract information from its present format for my computer (a 3" x 5" card index, Hi) as it is from a magazine.

As it is now published, information reaches me at least 30 days sooner than that contained in the magazines I presently subscribe to.

Why all the fuss to change a very useful monitoring tool?

Jim Boehm  
San Antonio, TX

legislators and solicit their assistance toward change.

As an example, in New Jersey it is illegal under state law to install a monitor in any motor vehicle which is capable of receiving transmissions of any fire, police or governmental radio service. The only exception is if the operator of the vehicle possess a special permit obtained by the chief of the department in the city or county where the person resides.

Violation of this law subjects the citizen to arrest and prosecution. Upon conviction of this misdemeanor, the citizen may be fined up to \$1000 and face a term of imprisonment of up to THREE years! Clearly, this is one state law that needs very much to be changed. But what should it be modified to, if we are to satisfy both the governmental agencies and the monitoring public?

The state of Oklahoma has a state law which reads, "It is unlawful for any person to operate a mobile radio capable of receiving transmissions made by any law enforcement agency for illegal purposes or while in the commission of a crime and not otherwise and any person violating the provisions shall be guilty of a

Cont'd on next page

felony and upon conviction thereof shall be punished by imprisonment in the penitentiary for not more than three years, or fined by not more than five thousand dollars or both."

The state of California has a misdemeanor section in its penal code which prohibits "Every person who goes to the scene of a disaster" (fire, explosion, airplane crash, flooding, windstorm damage, railroad accident, or traffic accident) "or stops at the scene of a disaster, for the purpose of viewing the scene or the activities of policemen, firemen, other emergency personnel or military personnel coping with the disaster in the course of their duties during the time it is necessary for emergency vehicles of such personnel to be at the scene of the disaster or to be moving to or from the scene of the disaster for the purpose of protecting lives or property, unless it is part of the duties of such person's employment to view such scene or activities, and thereby impedes such policemen, firemen, emergency personnel or military personnel in the performance of their duties in coping with the disaster."

As you can see, reasonable alternatives to the New Jersey law do exist which permit citizens to monitor whatever type of radio traffic they desire and still protect the interests of public-safety personnel who are conducting their official duties. It is time for a change. If you really are concerned with your "monitoring rights," communicate your thoughts to your legislators--they make the laws!

(Reader comments may be sent directly to the author at P.O. Box 997, Las Vegas, NV 89125)

## UNLICENSED BROADCASTERS

### PART I

Dr. John Santosuosso, a political science professor at a Florida college, is well respected as a thorough researcher in the study of unlicensed broadcasters.

His monthly column in MT is enjoyed by our readers and we appreciate his exhaustive efforts to prepare this two-part series on the present state of private and clandestine radio.

### WHAT THEY ARE

Legally there is no difference between a pirate and a clandestine broadcaster. Both operate without a license. However, those stations normally referred to as clandestine are openly political and usually have as their objective the overthrow of an existing government, or the independence of an unhappy minority. Most are operated by organized revolutionary or resistance groups. In rare instances a few clandestines have managed to obtain licenses to broadcast from neutral or sympathetic countries.

Black clandestines are stations intended to deceive. They are usually established by an unfriendly outside government rather than by domestic political opponents, although they may appear to speak for such groups. The purpose of the stations is to confuse and demoralize the enemy, and if possible to encourage defections.

The term pirate is usually applied to those stations established by radio hobbyists, who simply enjoy broadcasting. A few of the hobby pirates have been

rather politically oriented in their programming, but the vast majority prefer music and comedy.

Some pirates claim they are completely nonpolitical. Although the situation could change, at present some European countries, such as Ireland and Italy, tolerate unlicensed broadcasting within certain limitations.

### WHEN AND WHERE TO LISTEN

Because they are illegal, most pirates and clandestines must maintain an irregular schedule. Changes in frequency are also common. In the case of clandestines these may even take place during a transmission in order to avoid jamming.

Fortunately, many of the broadcasters do fall into particular patterns, which can make it somewhat easier for the monitor to hear them. Let's take a look at some typical times.

**LATIN AMERICAN** clandestines normally are best heard during evening hours in North America from about 0000 to 0600 GMT. Some of those in Central America may often be found in the early morning hours after about 1100 GMT. **FAR EASTERN** clandestines can also be logged during this same morning period.

The best time to hear **NORTH AMERICAN** pirates is on weekends, especially GMT Sunday after 0400 or 0500. During the winter months, if conditions are ideal, **EUROPEAN** pirates may occasionally be heard testing to North America after 0500 to perhaps as late as 0800 GMT.

North American pirate activity often peaks around major holidays such as

Thanksgiving, Christmas, New Years Day and Independence Day. Most stations sign on at the beginning of the hour.

While there are exceptions, pirates tend to use specific bands for their transmissions. In recent years the most popular has included those frequencies between 7350 and 7450 kilohertz. This one has also been favored by some anti-Castro clandestines.

Another band, especially popular in Europe, falls between 6200 and 6300. Some activity may also be found between 6900 and 7000, while a search between 14450 and 15100 may turn up an occasional pirate, especially on weekend afternoons.

Those in major metropolitan areas may find it profitable to monitor frequencies just above 1600 kilohertz medium wave and between 88 and 92 megahertz on the FM band. Pirates seeking an essentially local audience can sometimes be found here.

Clandestine activity is somewhat less clustered. However, frequencies between 6800 and 7100 will often yield Central American clandestines. Those between 6990 and 7100 may still contain an occasional anti-Castro broadcaster, but not in the great numbers of a few years ago.

A search of any frequencies outside the regular international broadcast bands may produce some clandestine activity. A few stations deliberately seek frequencies near those used by the governments they oppose.

### THE LANGUAGE PROBLEM

Practically all the European pirates likely to be heard in North America will broadcast some English, at least an occasional station identification. In fact, English seems to be the nearly-universal language of pirate shortwave broadcasters.

With clandestines, English is much less common. If the listener will carefully note key names of persons and places, which sound nearly the same in any language, he will discover that considerable information can still be obtained. The language barrier need not be an obstacle to enjoying clandestine transmissions.

**NEXT MONTH: The most in-depth, up-to-date list of pirates and clandestines ever published!**

## Where Did "Ham" Come From?

Few bits of technical history are as steeped in mythology and speculation as is the derivation of the word "ham" as referred to amateur radio operators.

Research into old publications a half century ago fail to shed any light onto the puzzle. Let's take a look at some popular--and not so popular--conjectures:

1)"Ham" is the English Cockney pronunciation for "am," short for "amateur."

2)Amateur Morse commu-

nicators were occasionally chided for their sloppy sending, accused of being "ham-fisted."

3)It was common for early ship operators to identify with their initials; H, A and M were three of the early "sparks" on a boat.

4)"Ham" was a dialectic pronunciation of "Home," referring to home-made equipment.

5)Ham son of Noah, was

the first in recorded history to relay a message (Gen. ch.9, vs. 20-27).

We'd like to thank reader Jim Van Dalsem for sharing these thoughts with fellow hobbyists (and linguists). Incidentally, Jim also noted some other derivations: "Chatterbox" from the open-front sounding box/dust cover combination on the old Morse telegraphy sounder; "You big lug" from the lug bolt and lug nut; and "You guys" from guy wires.

# The RadioSpectrum: A Gift to the Weatherwise

by Bert Huneault

## PART VIII

### CONCLUSION

#### Low and Medium Freq Weather Transmissions

The medium (MF) spectrum, covering a range from 300 to 3000 kHz, features SSB marine weather broadcasts in the 2 MHz radiotelephony band, and CW marine weather broadcasts in the 400-500 kHz radiotelegraphy band, as well as aviation weather broadcasts (AM mode) over air navigation radio facilities, as detailed below.

•••

#### MARINE WEATHER IN THE 2 MHZ BAND (SSB)

Perhaps not as popular with many SWLs because of atmospheric static (QRN) often experienced here, the 2 MHz marine band nevertheless offers a variety of regional marine weather broadcasts. For example, a number of Canadian Coast Guard stations in the lower St. Lawrence and Atlantic regions operate in this band in addition to HF and/or VHF bands. Some of them feature scheduled single sideband broadcasts on 2598 kHz (USB).

If you live near one of these radio stations, reception should of course be good. But even if your listening post is quite remote from these transmitters, you might be in for a pleasant surprise at night. In my location, some 1500 miles from Atlantic Canada, I pick up several Coast Guard stations from the Gulf of St. Lawrence, Newfoundland and Nova Scotia during evening hours. Some of these SSB signals are perfectly readable at times.

These marine weather broadcasts are mainly concerned with winds and sea conditions (wave heights), over a relatively small marine area, but they generally also include a weather synopsis. Table 17 lists a few of the stations, with their scheduled broadcast times. Full particulars (stations, broadcast times, marine weather regions) are contained in the Canadian Coast Guard publication "RADIO AIDS TO MARINE NAVIGATION" mentioned earlier in the May issue.

SSB MARINE WEATHER BROADCASTS ON 2598 kHz		
Time GMT	Call Sign	Station Location
0035	VCG	Riviere au Renard, Quebec
0150	VOJ	Stephenville, Nfld.
0303	VCS	Halifax, N.S.
0310	VCO	Sydney, N.S.

TABLE 17

CW MARINE WEATHER BROADCASTS IN THE 400-500 KHZ BAND			
Time GMT	Call Sign	Freq kHz	Station Location
0330	VAU	489	Yarmouth, NS
0430	CFH	438	Halifax, NS (Map Analysis)
0445	WNU	478	Slidell, LA
0530	CFH	438	Halifax, NS

TABLE 18

•••

#### MARINE WEATHER IN THE 400-500 KHZ BAND (CW)

Unless you live fairly close to one of the coastal stations broadcasting marine weather information in the 400-500 kHz maritime mobile radiotelegraphy band, you can--for all practical purposes--forget about reception of these signals during daylight hours. The D-layer of the ionosphere absorbs these wavelengths--just like it does the 2 MHz marine band signals--during the day. However, once the sun sets, the D-layer disappears and it is often surprising how far MF signals will reach out at night.

Marine weather broadcasts heard on these lower frequencies generally contain the same information as those heard on HF radio, as detailed in earlier segments of this article. From my listening post, I often pick up perfectly readable copy (especially in the winter-time) from several CW MF stations, such as those listed in Table 18.

Some of those stations first transmit a brief announcement on 500 kHz, advising listeners that a weather broadcast is about to begin on such and such a working frequency. Immediately following this notice, the station QSYs to that working frequency and proceeds with the broadcast.

These lower frequency signals, although generally weaker than HF CW, are often characterized by a very constant signal level (little QSB) and generally consist of perfect tape- or computer-controlled Morse code, giving the listener an opportunity to hone his/her copying skills as well as secure interesting weather information. QRN can be a problem, though, during the summer thunderstorm season.

If intermodulation or overloading problems caused by powerful AM broadcast stations plague reception of these MF CW signals on your receiver, try using an antenna preselector like the Grove TUN-3 Minituner.

•••

#### AVIATION WEATHER ON RADIO-BEACON FACILITIES

At some airports, aviation weather is broadcast over air navigation radio facilities such as non-directional radiobeacons (NDB). These voice broadcasts are in the AM mode. There are many aeronautical NDBs in the 300-400 kHz band, all over Canada and the USA, and if one of them in your local area features aviation weather broadcasts, it can represent yet one more source of useful meteorological information.

Some of these NDB facilities broadcast weather at specific times each hour, while others feature continuous transcribed information which generally includes a weather synopsis, terminal forecast, route forecasts, and hourly aviation weather reports. These weather reports are typically from airports within some 300 miles from your local NDB facility. Pilot Reports (PIREPs) and Notices to Airmen (NOTAMs) are also included in some of these continuous broadcasts.

From my listening post, I frequently monitor the Cleveland, OH, NDB on 344 kHz, and the Detroit, MI, NDB on 388 kHz; I find their aviation weather reports particularly useful and up-to-date, as they are updated every hour.

As an example of the aerial coverage of weather information provided by such NDBs, the hourly reports broadcast over the Detroit NDB are for the following

airports in Michigan: Detroit/City, Detroit/Metro, Detroit/Willow Run, Pontiac, Jackson, Lansing, Saginaw, Muskegon, Houghton Lake, Traverse City, Pellston, Alpena; as well as the following additional airports in the Great Lakes area: South Bend, IN; Indianapolis, IN; Toledo, OH; Cleveland, OH; Buffalo, NJ; Chicago/Midway, IL; Milwaukee, WI; and Green Bay, WI.

The fairly good resolution provided by such a closely-spaced network of airport stations gives the meteorological enthusiast an excellent opportunity for tracking weather systems, including determining the time of passage of an approaching cold front or the time of beginning or ending of precipitation, at specific stations. So, check out these MF stations...there might be something worthwhile in there for you.

#### WRAP-UP

In conclusion, it is hoped that the information presented in this eight part article will have proven of interest to many MT readers and perhaps perked up the curiosity of some who might not have been aware of the wealth of weather information available in the VHF/HF/MF radio spectrum. I wouldn't be surprised if, Benjamin Franklin notwithstanding, many MT readers turn out to be "weatherwise" after all.

We've "cracked" three different five-digit codes in this article, each one brimming with weather data: MAFOR, ANALYSIS and SHIP REPORT. As you can see, you don't have to be a cryptanalyst working for an embassy or the CIA to become literate in ciphers and codes...All you have to do is read MONITORING TIMES!

Now if Bob Grove could only come up with the five-digit code used by those spy "numbers" stations often heard in the HF bands, it would undoubtedly be the scoop of the year!!

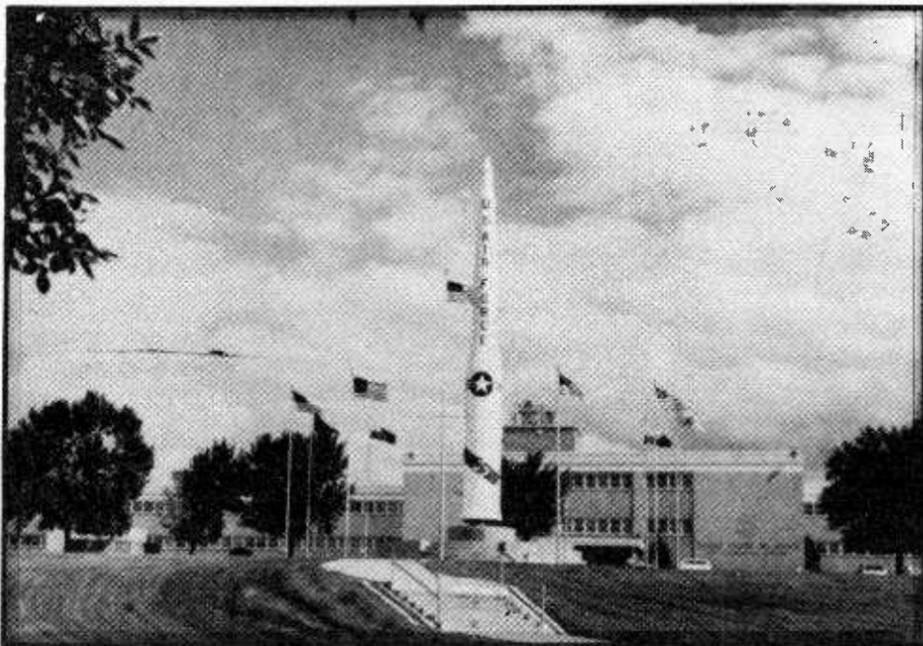
Here's wishing MT readers Happy Listening and Pleasant Weather!



Would MT readers be interested in a bound reprint of author Huneault's entire series, "GIFT TO THE WEATHERWISE"? Let us know.



SAC from p.1



Strategic Air Command Headquarters located at Offutt AFB, eight miles south of Omaha, Nebraska. A Minuteman missile is on display in front of the headquarters building. The Underground Command Post is located under the trees directly behind the missile. (SAC Photo)

in-flight refueling was born.

The '50s saw air refueling progress from the KC-97 (military version of the Boeing 377 Stratocruiser) to the KC-135 (Boeing 707); the introduction of the B-47 and the B-58 and the integration of the ICBM into the force. By the end of the decade, under the direction of General Thomas Power, one-third of SAC's bomber force was on 15-minute alert.

The '60s saw the introduction of Looking Glass, the airborne command post; and the FB111.

In the '70s, 128 KC-135 tankers were transferred to Air Force Reserve and Air National Guard units bringing these units into the SAC team. In November, 1975 the 1st Airborne Command and Control Squadron, Andrews AFB, was transferred to SAC giving SAC the new responsibility of the E-4 National Emergency Airborne Command Post.

The '80s have seen the addition of the KC-10 tanker, the modernization of the E-4 aircraft to E-4Bs, a re-engine and re-skinning program for the KC-135s and the addition of the TR-1 high altitude surveillance aircraft among other developments.

SAC is a "specified command" designated to perform a specific task and reporting directly to the Secretary of Defense through the Joint Chiefs of Staff. SAC involves approximately 120,000 military and civilian personnel.

The command has two numbered air forces: 8th AF at Barksdale AFB, LA and 15th AF at March AFB, CA. The 1st Strategic Aerospace Division at Vandenberg AFB,

CA is a major operational unit.

The 3rd Air Division at Anderson AFB, Guam is responsible for SAC operations in the Western Pacific and the 7th Air Division, Ramstein AB, West Germany is concerned with SAC activity in Europe.

SAC operates 26 air bases, is a tenant on 47 more and would be the gaining command for approximately 20 reserve and ANG units comprising approximately 15,800 members.

SAC's ICBM force numbers 1,000 Minuteman missiles with some 40 Titan IIs being phased out. There are about 300 B-52s, 60 supersonic FB111s, 615 KC-135s, 20 EC-135s, 20 KC-10 Extenders, and 4 E-4Bs. Other aircraft include the SR-71, U-2, TR-1, T-38, and RC-135.

**SAC HEADQUARTERS**

Fort Crook, located approximately 10 miles south of Omaha in what is now Bellevue, was the original home of the 22nd U.S. Infantry. Construction of the original fort was completed in 1896. During the First World War the first air unit, the 61st Balloon Company, was assigned to the post.

In 1924 Fort Crook was renamed Offutt Field in honor of Omaha's first air casualty of World War I, Lt. Jarvis J. Offutt who was killed in 1918 while flying with the RAF in France.

During WWII the base housed a Martin bomber plant and an Italian POW camp. In 1948 SAC Headquarters was moved to Offutt from Andrews AFB. Offutt also served as an Atlas D missile site from 1959-1965.

Covering an area of 1,898 acres, it has a popu-

lation of nearly 15,000 officers, airmen and civilians.

The SAC headquarters building is comprised of three stories above ground (576,000 square feet) as well as a basement and a three-story underground.

**SURVIVAL: THE UNDERGROUND COMMAND POST**

The underground complex is situated in front of the headquarters building (but 46 feet below ground level).

Containing a work-force of approximately 1,000 people, the underground complex has a total of 139,075 square feet of floor space--more than three acres. It is a specially-designed, reinforced concrete rectangular structure with a two-foot thick base and walls and two 10-inch-thick intermediate floors. The roof varies in thickness from two-feet to nearly four-feet. It is not, however, designed to withstand a close nuclear hit.

The underground, however, is designed to be self sufficient in case of nuclear war. A massive set of steel doors can be sealed and approximately 800 personnel could be fed and maintained in the underground for about two weeks.

When sealed, access to the underground is gained through an alternate entrance decontamination

unit. This feature, in conjunction with an emergency power system, rations and artesian wells could allow continuous operation without outside support for an extended period of time.

The command post itself has a 21-foot high ceiling and a floor measuring 149 feet by 39 feet. Nestled against the ceiling of the command post is the command balcony which overlooks the entire floor below. The SAC Commander in Chief (CINCSAC) and his senior staff occupy this balcony during alerts, exercises and in case of war.

It is from this command post that SAC and the National Command Authorities orders are sent to all SAC bases, aircraft and missile sites. Although CINCSAC can launch all SAC aircraft on his own authority to assure survival, only the President can order nuclear strikes.

The command post contains the most sophisticated state-of-the-art communications and computer equipment available. Within seconds, operational data on all SAC aircraft, missiles, weather and personnel can be flashed on one of four 16-by-16-foot display screens, each of which can show, in turn, four displays. This results in a total of 16 different displays simultaneously. Two

Cont'd on p.28

# MONITOR

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



by James R. Hay

While it is interesting to try to hear some of the rarer coast stations, it is even more challenging to try to listen to the ships, as they generally have lower transmitter power. Listen to the coast station frequencies; when you find a conversation in progress check the paired frequency to see if you hear the ship.

Also, if one wishes to get a feel for how things are done in the maritime service, the best way is to listen to one of the busier stations. This month we will take a look at ten of the busiest European coastals and chosen frequencies on which conversations will likely be heard.

These are not necessarily complete lists, only a selection of active frequencies. While these stations can generally be heard almost any time, they are most likely to be busiest in the evening hours of the country concerned.

Refer to the accompanying article for typical channel pairing in the ship-to-shore bands.

(All frequencies kHz)  
**PCH SCHEVENINGEN RADIO, NETHERLANDS**

CW	SSB
4250	4369.8
8622	4385.3
12799.5	4413.2
16902	8731.3
22324.5	8734.4
	8796.4
	13119.4
	13138
	13156.6
	17301.1
	17341.4
	17350.7
	22608.4
	22692.1

**SAG GOTEBOG RADIO, SWEDEN**

CW	SSB
4262	4416.3
6372.5	8718.9
8498	8725.1
12880.5	13107
17079.4	13144.2
22413	17254.6
25461	17356.9
	22602.2
	22685.9

**OST OOSTENDE RADIO, BELGIUM**

CW	SSB
4298	4388.4
6411	4431.8
8478	6509.5
12781.5	8756.1

17017.1	8762.3
22533	13119.4
25135	13138

**GKC PORTISHEAD RADIO, GREAT BRITAIN**

CW	SSB
4251.5	4372.9
6407.5	8765.4
8516	13100.8
13019.8	17236
16954.4	22611.5
22407.3	

**DAN NORDDEICH RADIO, FED. REP. OF GERMANY**

CW	SSB
4308.5	4397.7
6435.5	6506.4
8483.5	8768.5
12898.5	13172.1
17143.6	17279.4
22515	22614.6
26108	

**IAR ROME P.T. RADIO, ITALY**

CW	SSB
4320	4391.5
6409.5	6515.7
8670	8811.9
13015.5	13125.6
16895.5	17248.4
22376	22599.1

**FFL/FFS/FFT ST. LYS RADIO, FRANCE**

CW	SSB
4328	4403.9
6421.5	4413.2
8510	8793.3
8522.5	8802.6
12678	13165.9
12912.6	13187.6
17027	17288.7
17040.8	17332.1
22318.5	22605.3
22509	22689

**OXZ LYNGBY RADIO, DENMARK**

CW	SSB
4303	4410.1
6446.75	4431.8
8598	8740.6
12753.5	8771.6
12916.5	13128.7
16920	13141.1
17068.4	13169
22404	17282.5
22459	17285.6
25262	17298
	17338.3
	22642.5
	22648.7
	22704.5
	25440.5
	25444

**SVA/SVB/SVN ATHENS RADIO, GREECE**

CW	SSB
4239.4	4428.7
6344	8734.4
8704	8759.2
13029	13196.9
17194.4	17353.8
22410.8	22645.6
25401	

**LGB/LGG/LGJ/LGU/LGW/LGX ROGALAND RADIO, NORWAY**

CW	SSB
4251	6432
6467	8574
12727.5	17074.4
22425	

This station does not favor the use of particular

channels in any particular order; therefore in order to save space, only the channel numbers will be given. Reference to the accompanying article or to Bob Grove's SHORTWAVE FREQUENCY DIRECTORY will give appropriate information on channel versus frequency.

Channels	401	403	407	409	415
418	420	421	424	425	
426	603	605	606	801	
803	808	809	810	811	
813	818	821	823	825	
827	828	829	1203	1204	
1205	1210	1211	1213		
1214	1217	1218	1219		
1221	1222	1223	1225		
1226	1228	1231	1601		
1603	1604	1605	1607		
1608	1610	1613	1614		
1617	1618	1619	1620		
1621	1622	1627	1629		
1635	1641	2202	2203		
2208	2211	2213	2215		
2216	2218	2221	2228		
2230	2233	2234	2236		
2237	2239	2240			

Your correspondence is welcome, and should be addressed to: James R. Hay, 141 St. John's Blvd., Pointe Claire, P.Q., CANADA H9S 2Z2.

**SHIP TO SHORE FREQUENCY CHANNELIZATION**

In order to have some standardization in the maritime bands so that working is simplified, the I.T.U. has set up a channelization plan for both telephone and telegraph bands. This month we will discuss the channelization system so that those wishing to listen to the other frequency of a pair will be able to work it out.

**RADIOTELEPHONY**

In the HF bands the channel number will consist of three or four digits, the first being the band in megahertz, and the last two digits the channel number. An example would be channel 605 which is the fifth channel in the 6 MHz radiotelephone band (telegraph channels will be covered later). All HF radiotelephone channels in each band are separated 3.1 kHz.

Channel 401 pairs a coast station frequency of 4358.8 kHz with a ship frequency of 4064.4 kHz; the last channel is channel 426 (4436.3/4141.9 kHz).

Channel 601 (6507.8/6201.4 kHz) continues to channel 606 (6522.3/6216.9 kHz).

Channel 801 (8720.3/8196.4 kHz) continues through channel 831 (8813.3/8289.4 kHz).

The 12 MHz band begins with channel 1201 (coast

station frequency 13102.2 kHz and ship frequency 12331.4 kHz) and the last channel 1232) uses frequencies 13198.3/12427.3 kHz.

The 16 MHz band begins with channel 1601 (17234.3/16461.4 kHz); the last channel is 1641 (17358.3/16585.4 kHz).

The last band is at 22 MHz starting with channel 2201 (22597.4/22001.4 kHz). Spacing is the usual 3.1 kHz and the last channel is 2240 (22718.3/22122.3 kHz).

For those wishing to work out the unknown frequency from a known one, the coast station frequency is always higher than the ship station frequency and the spacing between frequencies of the same channel in each band is as follows:

4 MHz	294.4 kHz
6 MHz	306.4 kHz
8 MHz	523.9 kHz
12 MHz	770.8 kHz
16 MHz	772.9 kHz
22 MHz	596.0 kHz

In each band one channel is set aside for calling:

421	4420.8/4126.4
606	6523.3/6216.9
821	8782.3/8258.4
1221	13164.2/12393.4
1621	17296.3/16523.4
2221	22659.4/22063.4

**RADIOTELEGRAPHY**

The channelization plan is a bit different for telegraphy. There are no channel numbers but there are paired frequencies. Additionally, there are "group calling frequencies" which we may discuss in a later column.

As in telephony, the coast station transmitting frequency is higher than that of the ship station. Frequency spacing and channel spacing are given below:

Band	Channel Spacing	Frequency Spacing
4 MHz	0.5 kHz	179.5 kHz
6 MHz	0.5 kHz	238.0 kHz
8 MHz	0.5 kHz	361.0 kHz
12 MHz	0.5 kHz	580.0 kHz
16 MHz	0.5 kHz	537.0 kHz
22 MHz	0.5 kHz	369.0 kHz

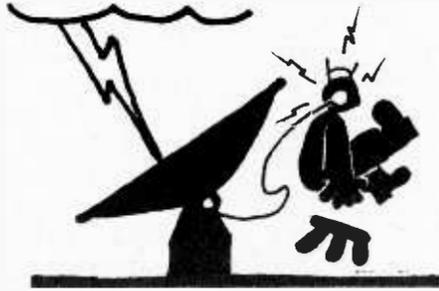
The band edge limits in kilohertz for these paired frequencies follows:

4 MHz	4350-4356.5*
	4170.5-4177**
6 MHz	6494.5-6505.5*
	6256.5-6267.5**
8 MHz	8705-8718*
	8344-8357**
12 MHz	13071.5-13099.5*
	12491.5-12519.5**
16 MHz	17197.5-17231.5*
	16660.5-16694.5**
22 MHz	22561.5-22594.5*
	22192.5-22225.5**

\* Coast Station

\*\* Ship Station

# SIGNALS FROM SPACE



by Larry Van Horn

A joint AMSAT/ARRL proposal to have a second astronaut "Ham-in-Space" early next year has been prepared proposing that Astronaut Tony England, WØORE, be permitted to operate aboard mission 51F/Spacelab 2 scheduled for launch during March 1985.

Proposed are additional operating bands (including HF!) as well as new emission types beyond the 2 meter FM voice emissions used previously by Owen Garriott, W5LFL. The 51F effort would differ markedly from the STS-9 activity in other significant ways as well. There is the possibility that some automatic RF equipment could fly which would obviate human intervention which was the constraint of the W5LFL mission.

SIGS FROM SPACE would like to thank ASR No. 78 for this very interesting information and a tip of the solar panel to the AMSAT and ARRL folks for attempting edition number 2 of "Hams-in-Space"!

UOSAT-OSCAR 11 is alive and transmitting on 145.825 MHz FM. Monitors with scanners should be able to hear the UO-11 beacon with fairly simple equipment. Listen for the Morse code/digi-talker in the afternoon identifying itself, but be careful not to confuse it with UO-9 transmitting on the same frequency.

Mike Smithwick dropped me a note to let me know the latest on the NASA contract channel TVRO information. The NASA broadcast up through STS-8 in September suffered from weak signals with 5 to 10% snow.

However, beginning with STS-9/Spacelab 1, NASA began transmitting a much stronger backup TV signal on other transponders. On STS-9 it was transponder 11 on SATCOM 1R at 139 degrees; STS-11 used transponder -1 and STS-41C used transponder 8.

The signal strength is usually the best on the bird, much stronger than even the NBC relay on transponder 1 which uses the same video. Transponder 2 is used by the New Mexico TDRSS for the shuttle real-time TV TDRSS relays to Houston.

Thanks, Mike, for this interesting bit of TVRO information. Those of you equipped with TVRO dishes and are hard-core space junkies might want to monitor the NASA contract channels during shuttle missions for uninterrupted video/audio on the mission. You can even watch the press conferences and the change of shift briefings on these channels.

## MILITARY SATELLITES BUSY

A new reporter to SIGNALS FROM SPACE, Chris Rodgers from the land of "Down under," reported some interesting information he monitored during President Reagan's trip to China.

Chris is using an AOR 2001 (the overseas version of the Regency MX-5000) and monitored signals from the FLEETSATCOM west and Indian Ocean birds.

268.350--Code names "Kokimo" /"Dark Side Moon"/"Dark Side Papa" (I show this listed as Pac East Navy ch.9)

261.750--"Clark/Clark deployed" (Pac West DOD wide band channel)

Chris noted the following channels were used in parallel when the President was enroute to China. A week before he left they were being tested extensively.

During the President's trip, military code names heard on these channels included: Air Force 1, Candlestick, Cowpuncher, Cartwheel and Calibre. Parallel transmissions were monitored on 261.750, 261.075, 261.5, 261.925, 262.025, 262.250 and 262.350 MHz.

During the trip parallel transmissions occurred on 261.4, 261.450, 261.950, 262.450, 261.950 and 262.450 MHz. Chris also noted RTTY type signals on 261.975 and secure scrambling on 261.550 MHz.

Thank you, Chris, for the great report. We hope to hear from you again soon. Most of us cannot hear these two satellites so be sure to keep us posted.

Robert Popham, head of NOAA/NESS, dropped a note for weather satellite buffs. The current geostationary

weather spacecraft summary and status is as follows:

1.GOES-East (GEOS 5)-VISSR imaging services are on 1687.1 MHz and WEFAX on 1691.0 MHz. The spacecraft is located at 75 degrees west.

2.GOES-Central (GEOS 2)-WEFAX services are on 1691.0 MHz. The spacecraft is located at 107 degrees west.

3.GOES-West (GEOS 6)-VISSR imaging services are on 1687.1 MHz and WEFAX on 1691.0 MHz. The spacecraft is at 135 degrees west.

Many thanks to Robert for the information.

And finally, after 8.5 years of service and more than a half-billion miles of travel, the nation's first 24-transponder domestic communications satellite, SATCOM 1, was retired June 4 by its owner, RCA Americom.

SATCOM 1 was responsible for sparking the growth of the cable television industry. The retirement of SATCOM 1 from service was planned and executed by RCA Americom's Space System team. It was accomplished by boosting it above geostationary orbit above the equator.

"This maneuver is required when satellites have nearly consumed their on-

board supply of station-keeping fuel," according to RCA Americom's president, Dr. James J. Tietjen. "It takes potentially uncontrollable satellites out of the usable arc."

Satellites such as SATCOM 1 are maintained in their assigned position on the orbital arc by firing small hydrazine thrusters that counteract the pull of gravity and the effect of solar winds. When this fuel is exhausted, the spacecraft can no longer be controlled. SATCOM 1 had an eight-year supply.

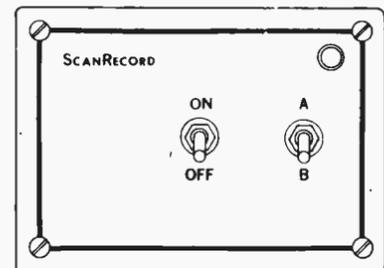
"After 8.5 years of service, 22 of the spacecraft's 24 transponders were still operating, and its attitude control, pointing and power systems were fully functional," said Dr. Tietjen.

This truly remarkable satellite gave us such programming as HBO and Showtime. Duties of this satellite have been picked up by SATCOM 3-R and 4.

Remember that SIGNALS FROM SPACE would like to hear from you. Send your contributions, questions, intercepts, etc. regarding any satellite system to: SIGNALS FROM SPACE, 1111 N. Carrier Pkwy, B-107, Grand Prairie, Texas 75050. \*

## While you were out... SOMETHING HAPPENED!

Now you can record all the scanner action that occurred while you were away for playback later. The Scan Record recorder coupler will automatically turn on your tape recorder when your scanner is receiving a message and route the audio from the scanner to the recorder.



The recorder runs only when a message is received. It does not run when the scanner is just scanning. This lets you record a lot of traffic on one tape. In addition to scanners, it will work with any receiver that has a squelch control.

The easy to use ScanRecord features user selectable drop-out delay, adjustable sensitivity, activity indicator and recorder control switch. The unit is all solid-state with no relays to stick or wear out. It operates on 9 to 15 volts DC and can be powered by a 9 volt battery or AC adapter.

All you'll need in addition to your scanner and the ScanRecord is a tape recorder with a microphone jack and a remote control jack. The ScanRecord comes complete with all connecting cables.

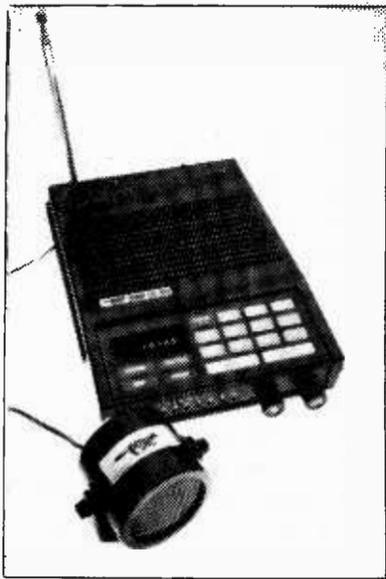
Your complete satisfaction is guaranteed. Order your ScanRecord today for only \$35.75 plus \$2 shipping and handling.

Mail and phone orders are welcome. Send check or money order or we can ship via UPS COD. We also accept VISA and MASTERCARD. Please include your card number and expiration date.

FREE CATALOG featuring scanner accessories, carrier/subcarrier detectors, voice scramblers and unusual kits sent on request.

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## BEHIND THE DIALS



**FOX BMP 10/60 PROGRAMMABLE SCANNER**

While not a new release by any means, the Fox BMP-10/60 has kept such a low profile we felt that our readers would like to know more about the small programmable scanner.

Measuring only 6-1/2" x 1-3/4" x 8-1/2" the Fox unit weighs less than two pounds making it ideal for compact mobile installations.

An optional mobile mounting bracket provides for quick removal, yet sturdy mounting in a mobile installation (\$9.95).

For portable operations, an optional "Porta-Pac" is available which accommodates either NiCad or ten standard C cells (\$29.95). The AC power adaptor which is supplied with the scanner may be used to charge the batteries.

For particularly-noisy mobile installations a handy plug-in mini speaker on a tilt base is also available, allowing the sound source to be located closer to the user (\$14.95).

The little BMP 10/60 allows ten channel coverage of 32-50, 144-174 and 420-512 MHz FM with 0.5 microvolt sensitivity on VHF and 1.0 microvolt sensitivity on UHF.

A handy telescoping antenna is built in to the unit for convenient desk-top listening; it may be compressed or swiveled out of sight when used with an external antenna which can be plugged into the rear panel.

Sixty pre-programmed channels are factory set to receive the most commonly-used weather, police, fire and mobile telephone frequencies.

A six-digit LED display reads out frequency and channel number; it also alerts users to "error" com-

mands inappropriately keyed in.

The memory is kept alive by a standard 9-volt battery (supplied).

Search capability ("seek") is also provided, allowing ten-channel-per-second increments, the same as the scan rate.

### OUR TEST

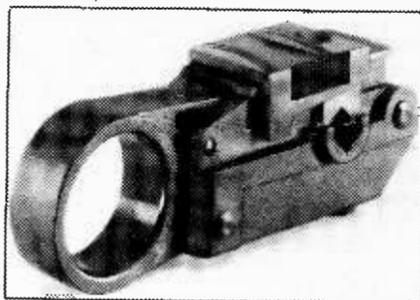
Looking for a logical low-cost programmable to complement the high-end scanners so profuse on the marketplace, we were eager to test the little Fox.

While programming is complicated by the use of non-standard panel legends and commands ("Pause" for delay; "Skip" for lockout; "Action" for priority; "Seek" for search; "Auto" for scan; "Control" for program), the actual procedure was no more cumbersome than a Regency or Radio Shack scanner once the callouts became familiar.

Spot checking two frequencies in low and high band we confirmed excellent sensitivity; tightly squelched, the Fox responded to signals well below 0.2 microvolts.

Audio is quite good, the top-mounted speaker provides adequate volume for most installations and the audio contouring of the circuitry assures crisp voice passband.

Our conclusion is that the Fox BMP-10/60 is an excellent value for under \$200. ●



### VACO COAX STRIPPER

It is safe to observe that anyone who has picked up a pair of wire cutters to prepare coaxial cable for installation of a connector has thought, "There has to be a better way!"

Naturally, companies who utilize production quantities of coax benefit from full automation, or at least motorized strippers costing hundreds to even thousands of dollars.

But what about the small shop or home experimenter? True, there are several contrivances to help and some actually work. Now, VACO offers a clever, versatile hand tool to assist the casual user.

Designed to strip outer insulation, inner braid and inner dielectric materials from RG-8/U, RG-6/U, RG-9/U, RG-174/U and other sizes as well, the VACO 70374 stripper is a cinch to use. Merely open the jaws, insert the cable and spin the unit around via the finger hole.

A handy detent slide adjustment allows custom cutting, including 2 or 3-level strips.

While not absolutely infallible, we found the VACO stripper to be certainly as useful as, if not more so than, any other hand-operated cable strippers we had ever tried.

(#70374, \$45.90 from VACO Products Co., 1510 Skokie Blvd., Northbrook, IL 60062) ●



### AZIMUTH DUAL TIME CLOCK

Compact, handsome, easy to read. These are important characteristics in a monitoring post and they are characteristic of the new Azimuth world-time dual-zone clock.

With large, contrasty LCD characters (5/8") the all-metal black-finished clock looks good and works well.

Each clock module has its own long-life cell, readily available for replacement when eventually necessary. Pushbuttons on the edge of the two clocks provide immediate and simple reset as well as choice of date, time and seconds.

The left-hand clock keeps 12 hours AM/PM time and may be set to flash time and date. The right-hand clock provides 24 hour radio time, used universally by military, government and other communications agencies. It may also be queried for the date and may be set right to the second for high accuracy.

### HOW WELL DOES IT WORK?

With our Azimuth clock in use in our monitoring post for about a month now, we found the 24-hour clock to be accurate within about two seconds...not bad! The local time was about 30 seconds slow, so we decided to see how the quartz frequency was controlled.

Sliding the clock from its extruded aluminum housing, we gently removed the mechanism. A fixed 30 pF disc capacitor was soldered to the crystal; if it were replaced by a 3-30 or 3-40

pF trimmer, virtually perfect timekeeping should prove possible.

Alternatively, a fixed capacitor of lower value could be selected to raise the clock frequency and speed up the timepiece.

### CONCLUSION

Were we impressed? You bet! We feel that this little clock represents an excellent value for the listener to keep time. Handsome and functional, the Azimuth clock's battery power renders it invulnerable to power failure.

\$26.90 including postage and handling from AZIMUTH COMMUNICATIONS CORPORATION, Dept. MT, 11030 Santa Monica Blvd, Suite 200, Los Angeles, CA 90025 ●



### HEIL AUDIO SYSTEM

Many of us have wondered if the internal speaker in our receivers could be improved upon. In the vast majority of cases (perhaps all cases) the answer is, "yes!"

A case in point is the new Heil SS-2 "Magic Box" sound system, a custom-designed audio add-on for scanners and shortwave receivers.

Housed in a high-impact silver beige cabinet are two five-watt amplifiers, a 3.5" woofer (with a half-pound magnet!), a 1.5" tweeter and a 12 dB-per-octave passive crossover network.

Only one of the two amplifiers is connected to the speaker system; the other may be used to drive an additional speaker (it actually awaits the arrival of a Heil dual-diversity parametric equalizer now under development).

Measuring a compact 4" x 5" x 4" and weighing a scant two pounds, the SS-2 is powered by a 12-volt, 400 milliamper DC supply (optional; PA-2 AC adaptor, \$10.95).

### BUT DOES IT WORK?

Skeptical that any substantial improvement could be made by simply connecting an external speaker system

Cont'd on p.29

# NASA DISCOVERY Support Utilizes HF Backup

During the aborted launch attempts for the new Discovery space shuttle, listeners reported quite a few HF single sideband and data frequencies in use.

At press time these frequencies (kHz) had been noted:

- 2622
- 5350
- 5718
- 5810
- 6693
- 7461
- 10178
- 11407
- 20192

Don't forget to check the ham bands for rebroadcasts of the astronauts' voices: 3860, 7185, 14295 and 21390 will be relaying the transmissions from club station W3NAN at the Manned Space Flight Center, Houston.

### ...And a new satellite for monitors:

Slated for orbital insertion with the success of mission 41-D is the new Department of Defense LEASAT-1 (SYNCOM), built by Hughes. Weighing nearly 8 tons, the huge satellite has twelve on-board UHF repeaters featuring both earth-pointed helical (2) and omnidirectional antennas.

LEASAT is scheduled for a synchronous orbit over the equator, assisted by two hypergolic (self-igniting) liquid fuel engines which are fueled by monomethyl hydrazine and nitrogen tetroxide.

Hughes will operate the satellite under U.S. Navy auspices who, in turn, will share the service with Marine Corps, Army and Air Force. Eventually five LEASATs will occupy positions over the Atlantic, Pacific and Indian Oceans as well as south of the United States to support mobile air, surface, subsurface and fixed military earth stations.

## ANOTHER U.S. SHORTWAVE BROADCASTER?

Another short-wave broadcast station in the U.S. operated by a Christian broadcaster could be on the air by the end of September, according to a report in the May issue of Religious Broadcasting, the official journal of the National Religious Broadcasters. The

Have you ever wondered what "PP," "MC," "IM," "PO" and other two-letter designators mean next to frequencies in official listings? These service codes identify the type of user authorized on that particular frequency allocation.

The following comprehensive list provides an exhaustive listing of these service codes and will be of special help to owners of the new Grove FCC microfiche master file.

This service code list is now included with all Grove FCC microfiche orders. A copy is available at no charge by sending a self-addressed stamped envelope with your request to Grove Enterprises, Box 98, Brass-town, NC 28902.

### AVIATION

- AA Aviation Auxiliary
- AC Civil Air Patrol
- AD Aviation Developmental
- AF Aeronautical and Fixed
- AG Aircraft
- AR Aviat. Radionav. Land
- AX Aero. Mobile Satellite

### BROADCAST

- BA Auxiliary Broadcast
- BF FM Broadcast
- BI Int'l Broadcast
- BS Standard Broadcast
- BT TV Broadcast

### COMMON CARRIER

- CA Indiv. Mobile Radio
- CC Int'l Fixed Pub. Cntrl
- CD Domest. Pub. Land Mobil
- CE Dig. Electronic Msgs
- CF Point to Point Microwave
- CG Domestic Public Air-Gnd
- CI International Fixed Pub
- CL Cellular Telecommunications
- CM Multi Pt. Distribution
- CO Offshore Radiotelephone
- CP Int'l Fixed Pub. Press
- CR Rural Radio
- CS Int'l Fixed Satellite
- CT Local TV Transmission
- CX Domestic Fixed Sat.

50,000 watt station will be operated by the Criswell Center for Biblical Studies of Dallas, Texas, which has operated KCBI-FM, Dallas, since 1976.

NRB reports a construction permit for the new station was issued by the FCC on January 29. The station will beam programming to two continents which were not specifically identified.

Large portions of the continental United States will be able to receive the signal when the new station goes on the air.

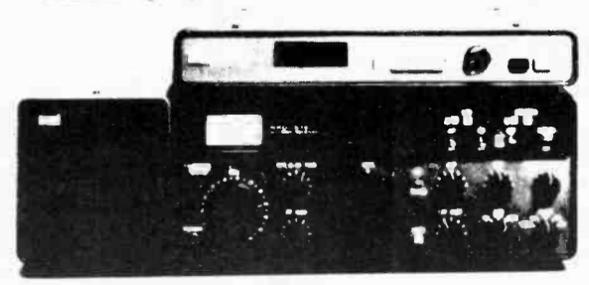
At this writing no call sign or frequency assignments have been issued.

# FCC SERVICE CODES

DS	DISASTER Disaster	YB	TRUNKED SYSTEMS Business
HA	AMATEUR Amateur	YC	Motor Carrier
HR	RACES	YO	Other Services
HS	Amateur Satellite	YT	Taxicab
IB	INDUSTRIAL Business	YX	Mixed Services
IF	Forest Products	MA	MARITIME Marine Auxiliary
IM	Motion Picture	MC	Coastal
IP	Petroleum	MK	Alaska
IR	Industrial Radio- location	MR	Marine
IS	Special Industrial	MS	Ship Guard
IT	Telephone Maintenance	MX	Maritime Mobile Sat.
IW	Power	RA	RADIO ASTRONOMY Radio Astronomy
IX	Manufacturing	SF	STANDARD FREQUENCY Standard Frequency
IY	Relay Press	SM	Indust., Scient., Med.
LA	LAND TRANSPORTATION Automobile Emergency	TR	CABLE TELEVISION Cable Television Relay
LI	Interurban Passenger	XC	EXPERIMENTAL Experimental Contract
LJ	Interurban Property	XD	Experimental Develop.
LR	Railroad	XE	Experimental Export
LU	Urban Passenger	XR	Experimental Research
LV	Urban Property	ZA	PERSONAL RADIO General Mobile
LX	Taxicab	ZC	Radio Control
PF	PUBLIC SAFETY Fire	ZD	Citizens Band
PG	State Guard	A	Type of Authorization Codes
PH	Highway Maintenance	L-License	L-License
PL	Local Government	1-Construction Permit	1-Construction Permit
PO	Forestry Conservation	2-Special Temporary Per	2-Special Temporary Per
PP	Police	3-Operating CP	3-Operating CP
PS	Special Emergency	4-Development License	4-Development License
GB	SPECIALIZED MOBILE RADIO CONVENTIONAL SYSTEMS Business	5-Developmental CP	5-Developmental CP
GC	Motor Carrier	6-Developmental STA	6-Developmental STA
GO	Other Services	P-Pending	P-Pending
GP	Police and Fire	A-Allotment	A-Allotment
GT	Taxicab	S-Z-Construction Permits	S-Z-Construction Permits
GX	Mixed Services		

## NRD-515

**JRC** *Japan Radio Co., Ltd.*



The JRC NRD-515 offers more features and performance than any other receiver in its class. Exceptional selectivity and stability make this an excellent radio for RTTY and FAX reception. Designed for the serious DXer who demands the best!



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**\$224.00**

NCM-515 Keypad Controller  
**\$149.00**

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**\$ 39.95**

Call or write:  
**Universal Amateur Radio**  
 Fred Osterman - SWL Dept.  
 1280 Aida Drive  
 Reynoldsburg, Ohio 43068  
 Phone: 614 866-4267



# RTTY/FAX

## GETTING STARTED IN RTTY

by Fred Osterman, Manager  
Universal Shortwave Radio  
1280 Aida Drive  
Reynoldsburg, OH 43068  
(614-866-4267)

### PART I: What can you hear?

Shortwave listening is a fascinating and exciting hobby. Even with a modest receiver, music, news and sports events can be heard from every corner of the globe. Radio amateurs (HAMS), ships at sea, international aircraft and military stations are scattered throughout the shortwave spectrum as well. (For more information on general shortwave listening ask for our free pamphlet "Interested in Shortwave Listening.")

Shortwave is filled with many exotic voices, but the excitement doesn't end here! There are many interesting stations that transmit "text." These stations send their transmission in non-voice modes.

### MORSE CODE (CW)

One common non-voice mode is called "Morse code" (also called "CW"). When radio began, Morse code was the first and only way to communicate. Despite the introduction of many new, more sophisticated modes, CW remains popular for several reasons. First, Morse code propagates (travels) better under adverse (noisy) conditions, than any other mode. While voice signals may be covered by noise, CW signals can often "punch through." CW requires no special equipment: it is technically the simplest mode. Morse continues in wide use by radio amateurs and maritime users.

The maritime stations and ships at sea can provide very interesting listening. A few of the many coastal stations that you will hear using Morse code include:

- VHP4 Canberra, Australia
- TIM Limon, Costa Rica
- LZW42 Varna, Bulgaria
- JOU Nagasaki, Japan
- KLC Galveston, USA-TX
- UMV Murmansk, USSR
- D4A6 Sao Vicente, Cape Verde Isls.
- VPS60 Cape D'Aguilar, Hong Kong
- LFB2 Rogaland, Norway
- UKA Vladivostok, USSR
- SUH3 Alexandria, Egypt

Many countries continue to utilize CW for military traffic:

- FUX French Navy  
St. Denis, Reunion Is
- EBA Spanish Navy  
Madrid, Spain
- GYU Royal Navy  
Gibraltar
- ZXJ4 S. African Navy  
Silvermine, S.AF.
- 4XZ Israeli Navy  
Haifa, Israel
- CTU2 Portuguese Navy  
Monsanto, Portugal
- FUV French Navy  
Djibouti, Jibuti
- NAM US Navy  
Norfolk, USA-VA
- WAR US Army  
Washington, USA-DC

Until recently, there was only one way to copy Morse code... "by ear"! Thanks to the advent of microprocessors this is no longer true. As we will soon see, there are several ways to copy Morse code without knowing a dash from a dot!

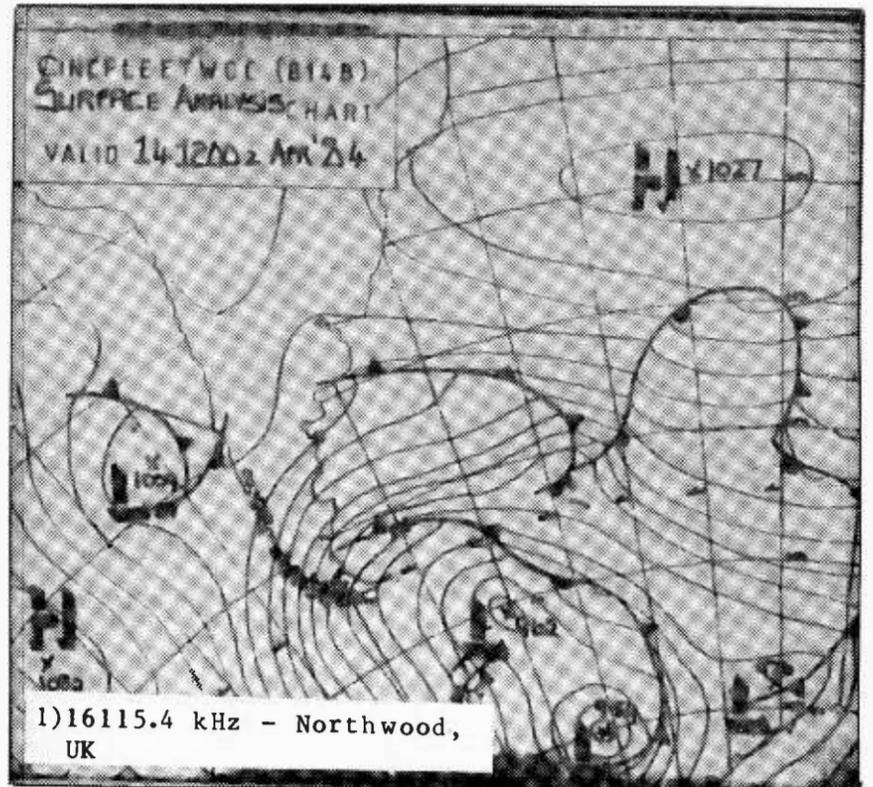
### RADIOTELETYPE (RTTY)

Another mode by which text is transmitted is called radioteletype (RTTY). It differs from Morse code in several ways. Traffic (text) can be sent faster than with Morse code. Radioteletype must be copied by a machine... no one can copy RTTY "by ear."

Most RTTY transmissions heard on shortwave use a RTTY format called "Baudot." The Baudot format represents each character with a series of 5 bits. Each bit is either a MARK (1) or a SPACE (0). The letter A is represented as: 11000 or MMSSS. Your radio will receive the mark tone, and the space tone. The distance between these two frequencies is called the "shift." Common shifts on shortwave include 170, 425 and 850 Hz.

Another transmission protocol is called ASCII. In this format each character is sent as a series of 7 bits. ASCII can be found on shortwave, but only rarely. One transmission mode that is growing very rapidly is TOR (ARQTOR, FECTOR, AMTOR). We can suggest equipment for listeners wishing to copy these formats. It should be said that there remains a large percentage of signals (50+%) that cannot be copied by conventional equipment. These would include multiplex, computer encrypted, and computer scrambled transmissions.

Now let's talk about the thousands of stations that can be read!

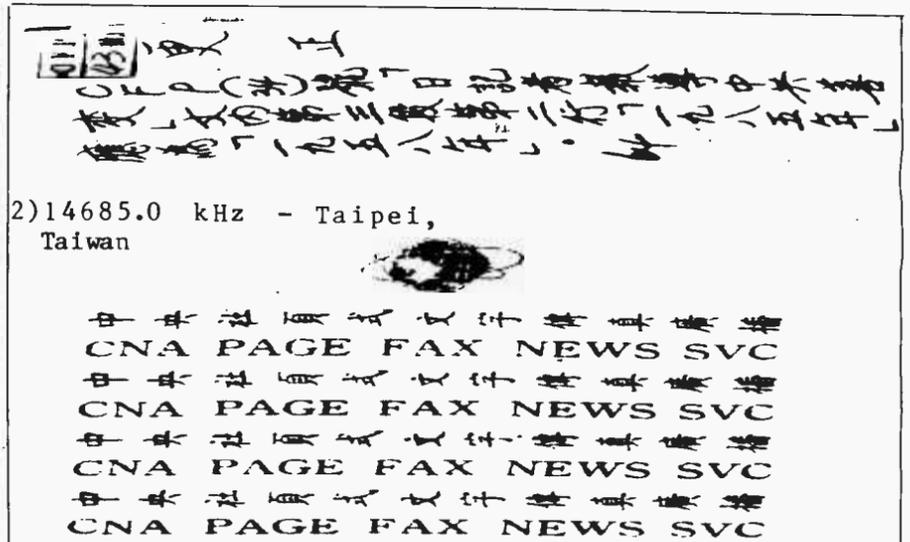


## JUST THE FAX

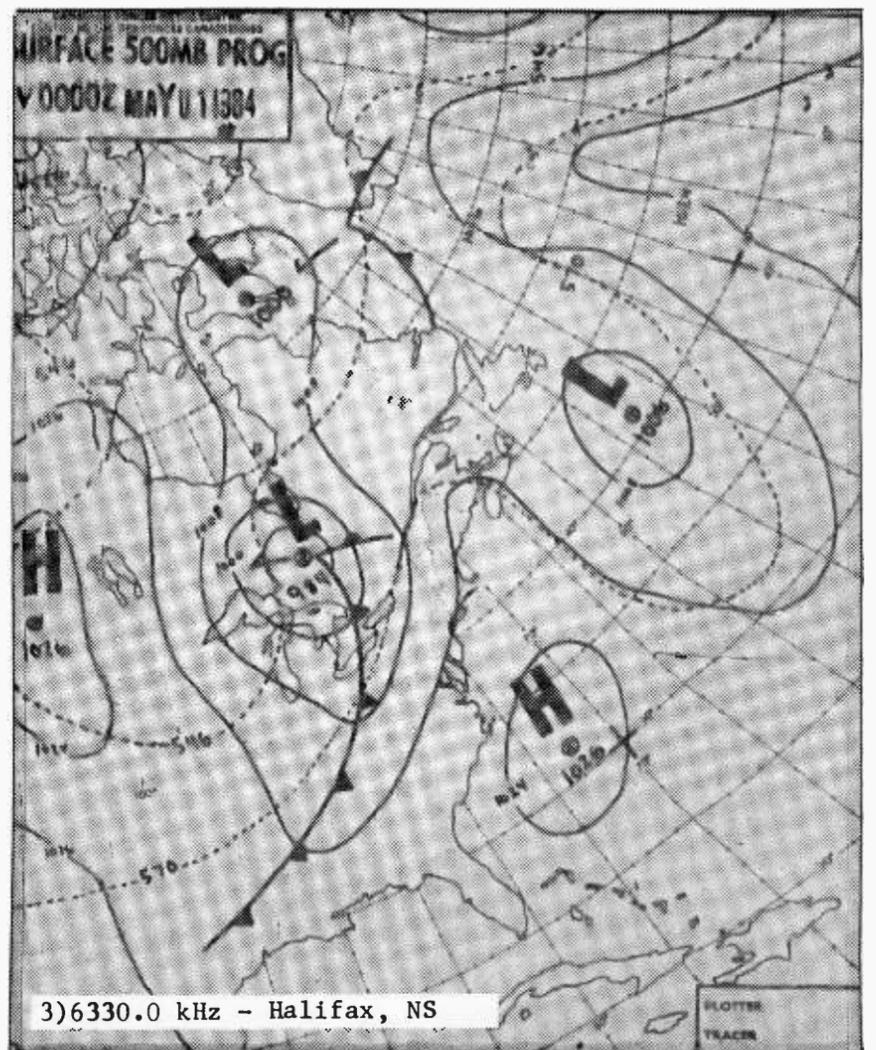
This fine collection of weather and news photofacsimile was monitored off the air by Bill Grant of Worces-

ter, MA. Thanks, Bill, for sharing these fine catches with fellow MT readers!

(More to follow next month.)



2) 14685.0 kHz - Taipei, Taiwan



☞ Cont'd on p.29

★ COLLINS RADIO NETWORKS ★

For decades, Collins Radio (now a division of Rockwell) has supported development of communications systems for all branches of military, government and industry.

From a sophisticated electronic complex at Cedar Rapids, Iowa, additional transmitter sites are remotely keyed up at Richardson, Texas and Newport Beach, California.

Most of these transmissions are single sideband (upper sideband dominating). They are used for equipment tests in the aeronautical and maritime mobile services.

KHR and KHT are in the maritime coastal radio service; KBU6, KLK2 and KM2XMN are in the aeronautical and fixed service; KA2XAH, KK2XHQ and KM2XHY are experimental research authorizations.

FREQ KHZ/CALLSIGN

2398	KA2XAH KM2XHY KK2XHQ
2851	KBU6 KLK2 KM2XMN
2868	KBU6 KLK2
2994	KBU6 KLK2
3004	KBU6 KLK2 KM2XMN
3443	KBU6 KLK2 KM2XMN
3474	KBU6 KLK2

4125	KHT KHR
4143.5	KHT KHR
4675	KBU6 KLK2
4682	KBU6 KLK2
4797	KA2XAH KM2XHY KK2XHQ
5451	KBU6 KLK2 KM2XMN
5469	KBU6 KLK2 KM2XMN
5559	KBU6
5571	KBU6 KLK2 KM2XMN
5596	KBU6 KLK2
6153	KA2XAH KM2XHY KK2XHQ
6172.5	KA2XAH KM2XHY KK2XHQ
6221.5	KHT KHR
6550	KBU6 KLK2 KM2XMN
6669	KLK2
6550	KBU6 KLK2 KM2XMN
8294	KHT KHR
8822	KBU6 KLK2 KM2XMN
8917	KBU6 KLK2
9657	KA2XAH KM2XHY KK2XHQ
10009	KBU6 KLK2
10045	KBU6 KLK2 KM2XMN
11287	KBU6 KLK2
11288	KBU6 KLK2 KM2XMN
11306	KBU6 KLK2 KM2XMN
11375	KBU6 KLK2
11763	KA2XAH KM2XHY KK2XHQ
12432	KHT KHR
13312	KBU6 KLK2 KM2XMN
15343	KA2XAH KM2XHY
15407.5	KA2XAH KM2XHY KK2XHQ
16587	KHT KHR
16593	KHT KHR
17964	KBU6 KLK2 KM2XMN
17965	KBU6 KLK2
21727	KA2XAH KM2XHY KK2XHQ
21931	KBU6 KLK2 KM2XMN
22127	KHT KHR

22133 KHT KHR  
 23100 KA2XAH  
 27740 KA2XAH KM2XHY KK2XHQ  
 29930 KAWXAH KM2XHY KK2XHO  
 KHT at Cedar Rapids (Collins/Rockwell headquarters) pinpoints their commercial maritime clients (Exxon, Maritime Oversea Corporation of New York, others) with three giant log periodic beam antennas.

The frequencies used are shared by other similar limited coast stations which are allowed to communicate only with contracted companies and the majority of two-way communications will be ship to shore phone patches.

KHR at Newport Beach, California shares the same frequencies and is remotely keyed from Cedar Rapids. It has one log periodic antenna. Both antenna installations are capable of 6-60 MHz continuous coverage but are used only up to 22 MHz on the maritime bands.

A source close to the operation provided MT with details on the best times and frequencies to monitor ship to shore communications; the list is shown here (all frequencies in kilohertz, upper sideband):

4125	Primary night, winter
4143.6	Secondary("Bravo")
6221.6	Primary night, winter
6218.6	Bravo
8291.1	Primary early AM, late eve.
8294.2	Bravo
12429.2	Bravo
12432.3	Primary day&night
16587.1	Primary daytime
16593.3	Bravo
22124.0	Primary daytime
22127.1	Bravo
22133.3	Alternate, unused

Collins also supports flight test operations of radionavigational equipment on frequencies authorized for that purpose. Listen for 71CR (turboprop), 80CR and 82CR (jets) on the following frequencies: 6550 8822 10045 11288 11306 13312 17964 21931 kHz.

All of these frequencies are "pool," that is they are shared with other services. On one occasion the Department of Energy (KP6) came up on 13312 and asked Collins what they were doing there! The shortwave spectrum is a busy place.

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- AM or FM on any channel
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- A large LCD display shows frequency, channel, priority function, lockout of unused channels, delay of resumed scanning or searching, search increments, reception mode and time of day (24 hour clock). A chime confirms keyboard entries.

CALL TOLL-FREE  
 1-800-438-8155



# CLUB CORNER

**Paul Swearingen**  
**7310 Ensign Ave**  
**Sun Valley, CA 91352**

Welcome again to MT's CLUB CORNER. This edition could be called the Odds and Ends edition, as we have a number of items to pass along. But first...let me remind club presidents/CEO's that if you have been disappointed when reading this column to find that your organization's events are not chronicled, it's because YOU haven't been sending them to the above address.

I received one phone call from New York promising information which never arrived...and a rather confusing printed communique (from Minneapolis) which may

or may not have been intended for this column. I couldn't tell. So ... keep the information flow going; this column is for YOU and your potential audience and club members.

At deadline time in June, no further action has been taken in choosing a new editor/publisher for the International DX'ers' Club of San Diego bulletin, but Ward Brookwell is continuing to offer publications from the club for sale. Contact him at 110 Ashland Avenue -

Medford, OR 97504, including an SASE in your letter.

\* \* \* \* \*

Some monitoring organizations are not strictly "clubs," but they are non-profit in nature. S.P.A.M. (The Society for Promotion of Amplitude Modulation) promotes DX'ing among amateur radio operators, and the associate S.P.A.M. Auxiliary offers recognition to SWL/DX'ers who are not hams. For S.P.A.M. information, send an SASE to F.A. Dunlap - 14113 Stoneshire - Houston, TX 77060; for S.P.A.M. Auxiliary information, forward an SASE to Jody Coles - P.O.Box 2404 - Spring, TX 77383.

Have you ever wondered

what other DX'ers might be living nearby, or what smaller clubs might cater to DX'ers in your area but couldn't seem to find any information? Many of us started DX'ing by ourselves and eventually stumbled into clubs by accident or by reading about them in publications like MT or the defunct Radio-TV Experimenter.

Fred Osterman of Universal Shortwave Radio - 1280 Aida Drive - Reynoldsburg, OH 43068 will attempt to link up DX'ers with large and small clubs and other DX'ers through his future publication of a DX'ers' Directory, which will list both individuals and clubs. For more information, send him an SASE; if you are active in a small or regional DX club, he'd be very happy to list information about your organization.

\* \* \* \* \*

Speaking of directories, DX'ers will find ANARC's Club List very useful in guiding one to joining the appropriate clubs. The Association of North American Radio Clubs was founded twenty years ago as a uniting organization for non-profit DX clubs in North America and serves as an umbrella organization. Member clubs have met ANARC's high standards; probationary clubs have met the same standards but, as newer clubs, are awaiting full membership status.

To protect DX'ers, any club which turns flaky is dropped from membership after an ANARC investigation. ANARC publishes a newsletter which highlights club activities and includes equipment reviews and some news about for-profit establishments and products.

For more information or for a copy of the club list, send an SASE (plus 25¢ for the club list) to ANARC Publisher - 1500 Bunbury Drive - N. Whittier, CA 90601. A sample copy of the bulletin costs an additional 60¢, but I suggest that you shoot the works and subscribe for a year for \$7.50. It's well worth it.

\* \* \* \* \*

In club activities ... DC DX'ers will munch down August 4 at the Washington Area DX Association Cookout and picnic from 2 to 6 pm. Call Arlene Luskin at (301)593-4411 for directions ... The Chicago chapter of The RCMA will meet Saturday, August 4, at 1:00 at Mancini's Restaurant, 5555 St. Charles Rd., Berkeley, IL. For more info, send an SASE

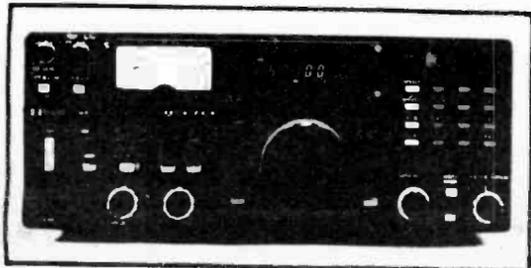
## SWL HEADQUARTERS

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- Memory back-up
- Wide dynamic range
- Voice synthesizer (optional)
- See ICOM's ad in this issue for more details.

EEB Options Installed -

- Mechanical filter (Replaces SSB ceramic filter) \$95.00
- FL44A 8 pole crystal filter replaces SSB ceramic filter \$159. Installed \$179
- FM (Detection) 10 meter band \$39.50. Installed \$49.50
- 12V DC Kit \$9.95. Installed \$15.00

#### \* KENWOOD R-2000



- 100 KHz to 30 MHz
- All mode AM-CW-SSB-FM
- 10 memories (memorizes mode)
- Memory backup
- Memory scan
- Programmable band scan
- 24-hour clock-timer
- VC-10 VHF converter 118-174 MHz \$139

R-2000 \$599.95 SALE \$499  
 R-1000 \$499.95 SALE \$429  
 R-600 \$399.95 SALE \$329  
 ADD \$6.50 UPS

#### \* PANASONIC RF-B600



- 1.6 to 30 MHz, FM/LW/MW/SW
- Micro computer multi-tuning system
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RF-9 \$99.95 SALE \$89.00  
 RF-B50 159.95 SALE \$129.00  
 RF-085 CLOSE OUT \$49.95  
 RF-B300 \$249.95 SALE \$209  
 RF-3100 \$379 SALE \$279  
 ADD \$4.00 UPS

#### \* G.E. WORLD MONITOR



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- 120V/220V or battery

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#### \* 1984 WORLD RADIO TV HANDBOOK



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- The shortwave listeners' Bible
- A reference guide for the beginner and serious DX'er
- 145 pages devoted entirely to listings of SW, MW, LW, and TV stations around the world
- Listings of English SW broadcasts
- An annual review of shortwave receivers
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#### \* YAESU FRG-7700



- 150 KHz-30MHz
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- Digital frequency and clock

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- MU-7700 12 channel memory \$135
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- FF-5 VLF low pass filter \$20
- DC-7700 12 VDC kit \$8
- FRV-7700 VHF converter \$135
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SPECIAL PACKAGE DEAL  
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#### \* SONY ICF-2002



- Ten memory channels
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- SSB/CW

ICR-4800 \$99.95 SALE \$89.95  
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 ICF-7600A \$169.95 SALE \$139  
 AN-1 \$79.95 (AC Adapt \$9.95)  
 ADD \$4.00 UPS



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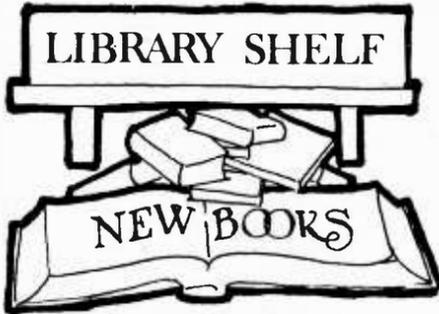


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Cont'd on p.15



LOUISIANA FREQUENCY EXCHANGE (Monthly newsletter by annual subscription; \$7 Baton Rouge area, \$6 Louisiana state, \$5 other states: P.O.Box 45913, Dept. MT, Baton Rouge, LA 70895)

Editor N.P. ("Trey") Oliver, III has taken on quite a challenge with this informative periodical. Each issue contains specific frequency and systems information, along with some historical insights, of a particular radio service in the Louisiana (and surrounding states) area.

Recent issues focused on the New Orleans World's Fair, police and fire departments, aircraft and similar listening targets. As such, format is similar to the Bearcat "SCAN" Magazine, although not a glossy --it is in offset print running roughly 8-12 pages.

A more accurate comparison would be the All Ohio Scanner Club publication; both have been around for a couple of years now and are growing both in membership and maturity.

Membership privileges include equipment and antenna installation assistance (Baton Rouge area), en route frequency lists for vacationing mobilers, free classified ads and other club perks.

Send \$1 for a sample copy of the LFE and judge for yourself.

CLUB CORNER from p.14

to Edward Robert Sirovy - 311 South Williams St. - Westmont, IL 60559 ... The International Radio Club of America reaches a milestone August 17-19 with their 20th annual convention in Toledo. Gary Siegel has details; write him at 2728 106th St. - Toledo, OH 43611 ... The National Radio Club kicks off its second fifty years with its annual convention August 31 to September 2 in Colorado Springs. I'll be at this one. Send requests for information to Wayne Heinen - 1642-C South Idalia Circle - Aurora, CO 80017, with your SASE.

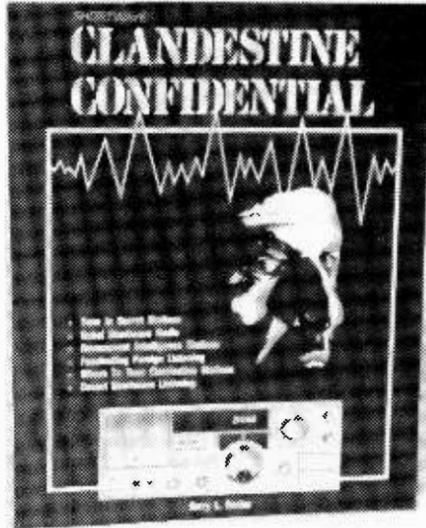
\*\*\*\*\*

That's it for now. Mail your club items to reach me by the 10th of the month two months before publication; for example, for the October issue items should reach me by August 10. Thanks!

CLANDESTINE CONFIDENTIAL by Gerry L. Dexter (8-1/2" x 11", 84 pages, softbound; \$8.95 plus \$1.75 postage from Universal Electronics, Dept.MT, 4555 Groves Rd., Suite 3, Columbus, OH 43232).

Most readers will immediately recognize the name of author Dexter, whose monthly column in Popular Communications updates that publication's readers on the world of unlicensed broadcasting.

CONFIDENTIAL is the first book-length treatment of unlicensed politically-inspired broadcasters. Well-endowed with photos, sketches and QSL samples, CONFIDENTIAL is divided into six chapters which treat history, profiles, QSL'ing and schedules of 30 countries sporting these renegades of the air.



COMPUTER PROGRAMS FOR AMATEUR RADIO by Wayne Overbeck and James A. Steffen (6-1/2" x 9-1/2", 328 pages, softbound; #0657-8 from Hayden Book Co., Dept.MT, Hasbrouck Heights, NJ).

Yes, another computer book--but a good one. Programs include logging, antenna design, satellite tracking, beam heading, database management and sunrise/sunset.

Machines for which the programs are available are the Apple, TRS-80 and Commodore 64; conversion guides for the IBM-PC are included.

No fewer than 60 programs divided among the 3 computers make COMPUTER PROGRAMS a handy reference for the radio hobbyist.

COMMODORE 64 PROGRAMMER'S REFERENCE GUIDE (6" x 9", 490 pages, softbound; \$19.95. Available from Commodore Business Machines, Inc., Computer Systems Division, Devon Park Drive, Wayne, PA 19087 or Howard W. Sams and Co., Inc., 4300 W. 62nd St., Indianapolis, IN 46268).

Inquisitive Commodore 64 users will revel in the contents of this massive missal which could have been

subtitled, "Everything You Ever Wanted to Know about the C-64."

Bound with easy-to-flip plastic spiral, this user's guide has it all: BASIC programming rules, vocabulary, graphics and sprites, sound and music programming, machine language, input/output diagrams, expansion and port designators, chip specifications and schematic diagram.

A must for the crunchers and addicts alike!

THE URBAN DXER edited by Gregory Baker (Monthly newsletter from the New York DX Association, 4103 Ft. Hamilton Pkway, Brooklyn, NY 11209-1207; \$5 annual membership).

It may seem to many readers that just about every major city now has a monitoring club. It is not surprising that New York City has spawned its share of listening enthusiasts and the New York DX association seems to have a lot going for it if their recent newsletter is any indication.

No fewer than a dozen informative articles adorned the pages of our sample, including such topics as ship to shore frequencies, INTERPOL RTTY net, VOLMET aero weather frequencies,

active Coast Guard channels and even a "sneak preview" of the ESKA RX99PL receiver.

But URBAN is not just utilities-oriented; articles on monitoring international--and even local--broadcasters are also included.

Interested listeners may wish to send \$1 to sample one of their newsletters.



TUNE IN TO

AUDIO EXPERT

Wondering about audio and communications? Microphone equalization? Ear response? Compressors and limiters? Tune in on the North American Teleconference Radio Net.

Four times each year a special repeater interlinking nationwide lets hams and scanner listeners tune in on experts who share their fields of expertise for the edification of interested participants.

The June issue of MT (p.7) listed the participating repeaters across the country in preparation for the session on antennas. September 14 at 7:30 PM CDT (0300 UTC next day) Bob Heil, 1984 "Amateur of the year" will present the special audio seminar on the air.

GOVERNMENT RADIO SYSTEMS Northern California

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# BROADCASTING...

## HANK BENNETT ON SHORTWAVE

(The following article is from an Associated Press story written by Mel Reisner)

### "GHOST" RADIO OPERATED ON RESERVATION

Given the affinity that Indians feel for the world spirits, it was probably appropriate that a "ghost" radio station operated for a year in this St. Regis Reservation community.

Operating without a federal license - or red tape - 26-year-old Ray Cook had things his own way.

He and his all-volunteer staff changed formats and air times at will, playing anything from "the blues to Beethoven," over a transmitter off the Empire State Building by way of South America and Tennessee. But they were serious about the venture, viewing it as the potential forerunner of a major tribal-owned broadcasting complex overlooking the St. Lawrence River.

"We had a potential audience of 55,000," he said. "I wanted to get an FCC (Federal Communications Commission) license to cover our butts, but a couple of the chiefs just told me, 'No, just go through the council.'"

The Mohawk broadcaster said federal reaction to the signal didn't interest him as much as complaints from stations in nearby Massena that he was cutting into the market.

"I wrote a letter to the Editor (of the local weekly) the following week and put in there that it was basically an educational station," he said.

Cook eventually went away to college, but the equipment remains on the reservation for another entrepreneur. With \$50,000, he said, he could start his own television station, utilizing video equipment acquired on government grants.

"All we'd need is the disc, transponders and an amplifier to send the signal over cable," he said.

He named his tiny 20-watt operation "Akwasasne Freedom Radio," giving it the Mohawk name for the St. Regis area. But others called it WREZ, humorously christening it with letters - "REZ" - which sounded like the Indian short name for "reservation."

Indians in other parts of the nation have opera-

tions like that envisioned by Cook - a 100,000-watt station run by the Lac Courte Oreilles tribe of Wisconsin is one of the largest - and Canada has more than 50 tribal stations.

(I've never seen a listing for the 100,000-watt station. It is probably an FM outlet. Does anyone have further information? HB)

Cook said the Canadian government is generous in funding such operations requiring in turn that 10 percent of the air time be devoted to government-related programming.

By contrast, Cook's studio was in the back of his house.

He said he and friends rebuilt most of the equipment, including a transmitter which once crowned the Empire State Building. They amassed about 250 record albums by asking for donations from private collections.

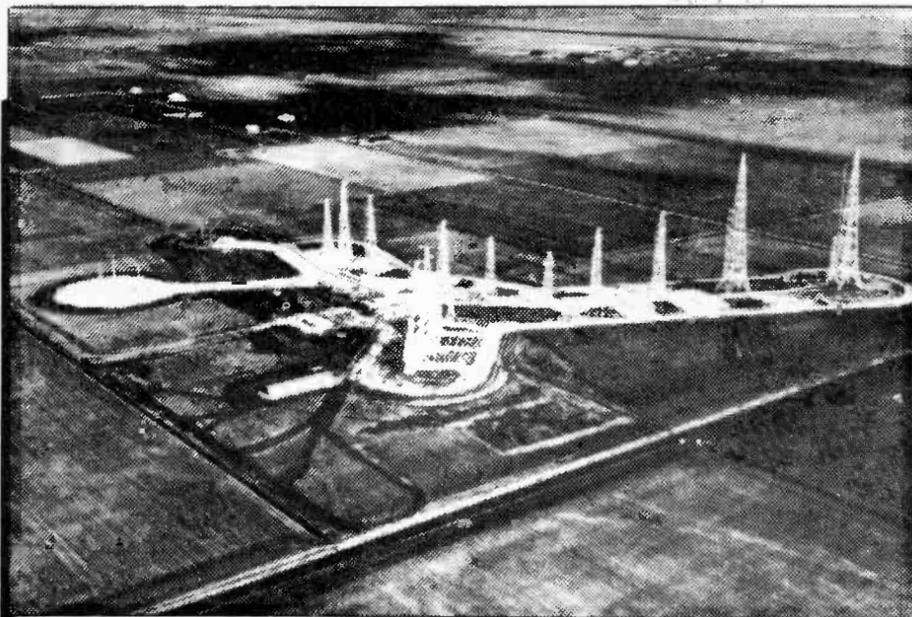
Cook acquired the transmitter - and the training to run a station - at The Farm, a 1,700-acre cooperative in Tennessee which sponsors self-help projects for indigenous peoples.

In its heyday from June, 1982, until last summer, WREZ offered music, talk in both English and Mohawk, and a breezy, insouciant place for young Indians to study the communications media and to lay plans for the future.

"I generally went in about 6 p.m., and we were supposed to work until 10, but some of us were known to stay on until 2 or 3 a.m.," said Dan Thompson, who wrote for the Akwasasne Notes newspaper while playing disc jockey. "I usually did the show with the blues and jazz, and I'd get into it sometimes and forget to go home. It wasn't unusual to start playing the blues and end up with Beethoven."

Received too late for inclusion in an earlier column was the shocking news of the tragic death of Perry Ferrell, owner and operator of Gilfer Associates of Park Ridge, New Jersey. Perry and his wife had been returning home for a visit with friends when their automobile was struck head-on by another motorist who is believed to have fallen asleep at the wheel. Perry was killed outright and his

Cont'd on p.30



### RADIO NETHERLANDS INSTALLS NEW TRANSMITTER

Radio Netherlands, respected worldwide for its objective programming, has inaugurated a new transmitter sit at Flevo. The entire complex, reclaimed from the sea, is 6 meters below sea level and promises to provide an excellent ground!

Four 500-kilowatt transmitters and a 1-kilowatt reserve are completely automated, assuring frequency changes within seconds.

For the present, traditional transmitter sites at Lopik, Bonaire and Madagascar are doing the majority of the work with the new

Flevo site gradually being phased in.

### NEW PUBLICATIONS FROM R. NETHERLANDS

Two popular annually-published booklets are now available free of charge from R. Netherlands: "Receiver Shipping List" and "The Booklist." As the titles imply, these are guides to receivers and publications.

For your copies, write: Jonathan Marks, Producer Radio Media Network, English Section, Radio Nederland Wereldomroep, P.O.Box 222, 1200 J G Hilversum, Holland.

### SPECIAL TO MONITORING TIMES

## "Sounds from the South Pacific"

### PART I

by Gayle Van Horn

To think of the South Pacific is to imagine visions of waving palms, sandy beaches, colorful Polynesians and South Sea island music.

Many of us cannot afford to travel to the islands, but as SWL's, we can "arm-chair" travel to this region of the world via our shortwave receivers.

Our first stop is a group of islands strung across the equator.

### KIRIBATI

The islands of Kiribati are among 28 inhabited coral-atoll lagoons.

Kiribati (pronounced Kiribas) is a former British colony, previously known as Gilbert and Ellis Islands until its independence in 1976.

The island's only shortwave service is Radio Kiribati. This station of 10 kW is heard on 16433 kHz SSB between 0530 and 1000 GMT. Listen for their station ID in English: "This is Radio Kiribati," and in Kiribatese: "Alo Banaan Kiribati."

Their new transmitter on 9825 kHz has been heard

in English and Kiribatese from 0620 to 1000 GMT.

For a QSL send your reception reports along with two IRCs to: RADIO KIRIBATI, P.O.Box 70, Bairiki, Tarawa Atoll, Kiribati.

### SOLOMON ISLANDS

Until the bloody battle at Guadalcanal, the Solomon Islands were hardly known to the western world.

The Solomon Islands Broadcasting Corporation (SIBC) broadcasts in native Pidgin and English languages.

Listen for the distinctive interval signal of drums and bamboo pipes. The station ID's as "Radio Hapi Isles" or "SIBC."

The local flare of programming includes news and entertainment of the island, local merchant commercials, rock and island music.

Using 10 kW on 5020 and 9545 kHz, broadcasts can be heard by 0730 to 1130 GMT.

For collectors, SIBC issues an attractive white logo QSL card. Send three IRC's and 30 minutes of program details to SOLOMON ISLANDS BROADCASTING CORP, P.O.Box 654, Honiara, Solomon Islands.

Cont'd on p.29

# BROADCASTING.

## ENGLISH LANGUAGE BROADCASTS

by Tom Williamson

The summer months are now upon us--with the consequent increase in static!

### BBC via CANADA

For those who may want to listen to the BBC World Service in the mornings at 1300 there is now a half hour relay over the Canadian station at Sackville, which may make listening easier in your area.

The program of news reports/analysis entitled, "Twenty-four Hours" is one of the best of its kind, now extended up to 7 days a week with broadcasts daily at 0509 and 0709.

### NEWS ANALYSIS..."As We See Them"

It's sometimes instructional to us to listen to Western broadcasts aimed at other Third World areas and see how our own editors and correspondents interpret affairs in these lands.

Not only do we get insight into their minds, but also it is possible to get a more detailed knowledge of news events in

foreign countries which might not be available on our domestic networks.

While many of the broadcasts are in foreign languages, several sources of this type are available in English.

Let us take a look at three major Western services: the BBC, VOA and RADIO FRANCE INTERNATIONAL. All broadcast special programs for Africa in English. They contain a depth of news reporting and commentary not easily found elsewhere.

### VOICE OF AMERICA

Transmissions to Africa include the following analytical programs: "African Panorama" at 1710 with correspondents' reports and background information; "Nightline Africa" at 1600, 2000, (Sundays) and 1610/2010 (Monday through Saturday) - includes news features on African issues.

"Voices of Africa" at 1910 Saturdays and 1710 Sundays features views of Africans in different countries. Transmissions to

the Caribbean and the Americas feature such special programs as "Caribbean Report," correspondents' reports and opinions; "Spotlight," a detailed examination of issues in the Caribbean; and "Report to the Americas" with news reports and interviews. (For times and frequencies of these broadcasts please see the June column.)

### RADIO FRANCE INTERNATIONAL

The Paris studios of RFI have, for many years, given us a top level program on African affairs entitled "Paris Calling Africa," quite a favorite among SWLs around the world! It consists of news and commentaries about Africa given by excellent English speaking announcers and features the French reaction to affairs such as events in the Chad Republic.

There are also some fascinating examples of African national music, much of the popular folk and rhythm style ("hi-life" dance music). How strange that this program should be France's ONLY contribution to short-wave broadcasting in English! It is on the air from 1600-1700 over multiple frequencies in the 16/19

meter bands (15315 & 17620 often good).

### BBC WORLD SERVICE

From London there are special transmissions to Africa from 0330-0400, 0509-0545, 0630-0700, 0730-0800, 1500-1530, 1615-1645, 1709-1745 weekdays, with 2115-2200 additionally on Sundays.

Programs include "African News," "This Week," "Time of my Life," "Network Africa," "Focus on Africa," "Postmark Africa," "African Perspective" and "Blueprint Africa."

Such a large range of programming for one continent reflects the historical British background of the old Empire days. It also speaks to the BBC's thoroughness in news reporting and commentating, and their intelligent use of a wide network of experienced correspondents. There are also programs in African vernacular languages.

By contrast Asia does not fare too well. A daily segment at 0215-0230 provides an edition of "Radio Newsreel" and Sundays only there is "South Asia Survey" at 0145-0200; alternatively "The World Today" at this same time on Tuesday through Friday. In contrast, there are many more Asian language broadcasts as compared to African languages.

For Latin America, long treated as the "orphan" of BBC overseas broadcasting, there are NO special programs in English except the

Cont'd on p.30

## LISTENING TO THE WORLD

by Roger N Peterson



Bored with the booming programs of the superbroadcasters like the BBC, Deutsche Welle or Radio Netherlands? Get off the beaten track and try a couple of neat, little European stations that deserve more attention than they usually get.

### AUSTRIA

I first tried Austrian Radio when I heard about their Sunday morning DX program, about one year ago. Since then, I've become a regular listener to these broadcasts from Vienna. Austria, a country that is geographically smaller than the State of Maine and has only 7,00,000 people, seems to produce real big league programs for its listeners around the world.

The DX program that I mentioned is still going strong; you can hear it every Sunday morning at 1230 GMT. It is primarily a feature-type program with recordings of seldom-heard stations, "rare" catches, etc.

Glenn Hauser, the well-known American SW expert, is a frequent contributor to this program; it's not repeated so you have to catch it on Sunday morning.

The regular daily program, "Report From Austria" begins for the U.S. at 0130 GMT. It is repeated for West Coast listeners at 0300 GMT. The next morning at 1230 GMT the program is repeated once again.

Sundays, after the news, they offer a "Profile of Austria" which focuses on some location or aspect of life in their country. "Sports Review" is the feature for Monday, giving you ski results in the winter but European football during the rest of the year.

"Austria and the UN" is the Tuesday feature followed by "The Austrian Economy" on Wednesday. For those of you who enjoy light music, I can recommend Thursday's "Pop Corner," featuring rock jazz with a distinct Austrian flavor!

Fridays are given to cultural interests: musical, literary, artistic, etc. And on Saturdays, "The Tourist Scene" takes you on trips to

resorts, both winter and summer, and introduces you to Austrian food and wine.

### BELGIUM

"Brussels Calling," as they call their broadcasts to the U.S., is usually excellent. This little country--about the size of Maryland but with a population of ten million--does a fine job of programming and puts out a good signal.

Their main broadcast to the U.S. is at 0030 GMT but you may also be able to pick up their broadcasts in English in the mornings at 1400 GMT and in the late afternoon at 2100 GMT. For those of you still awake you can hear Brussels also at 0715 GMT.

The Belgians follow a similar pattern to Austria in their program approach - starting off with the news and then shifting to the feature of the day. Mondays, a Sports Report is followed by a feature on Belgian cooking.

Tuesdays feature letters from listeners; Wednesdays they have a stamp program and their own DX show - "Radio World." Thursdays are directed toward touring Belgium and Fridays focus on industry and technology.

Saturday is cultural and Sundays feature light

music and another version of "Radio World," the DX program.

You can get your own free programs from both stations by writing to the following addresses:

AUSTRIAN RADIO; Short-Wave Service, A-1136 Vienna, Austria

BELGISCHE RADIO EN TELEVISIE (BRT) P.O.26, B-1000, Brussels, Belgium

### HOW TO HEAR AUSTRIA & BELGIUM

#### AUSTRIA

0130 GMT on 9.770 MHz  
0330 GMT on 9.770 MHz  
1230 GMT on 15.320 MHz

#### BELGIUM

0030 GMT on 9.925 MHz  
1400 GMT on 17.610 MHz  
2100 GMT on 11.695 MHz  
5.895 MHz  
0715 GMT on 9.880 MHz

# PIRATE RADIO



by  
**John Santosuosso**

**NICARAGUA:** From Holland Michiel Schaay reports that on May 14 the English language program of LA VOZ DE NICARAGUA was blocked by jamming from 0430 GMT until 0503, a few minutes after the end of the program. Another Dutch listener, Rudolf Vos, also heard jamming on May 17 around 0440, although it was not as strong as that noticed on the 14th.

On the same frequency as La Voz de Nicaragua (6017.5) the Dutch have encountered a CW station which identifies itself with a 4-letter code that is changed daily. On one day Michiel heard it identifying as DE DOQB.

So far no similar interference with La Voz de Nicaragua seems to have been noticed by listeners in North America. However, monitors may want to listen to the English language transmissions at 0100 and 0400 to determine who may be on 6017.5 in addition to Managua. The 0100 broadcast does suffer heavy QRM from Vatican Radio on 6015.

**RADIO MAMBI:** Since the closure of LA VOZ DE ALPHA 66 in 1983 by the FCC, RADIO MAMBI has been the only anti-Castro broadcaster heard on a fairly regular basis, with of course the exception of the extensive network operated by Comandante Huber Matos' CUBA INDEPENDIENTE Y DEMOCRATICA organization.

RADIO MAMBI is the station of the Junta Patriotica Cubana, an umbrella group of over 200 anti-Castro organizations. Despite having problems of its own with the FCC, it has managed to continue its broadcasts. You might hear it occasionally around 0100 GMT on the frequency of 7075 or 7080.

The station will verify reception reports, provided you send them a prepared QSL card to sign. Reports in English are acceptable and

can be sent to Junta Patriotica Cubana, Box 350-492, Riverside Station, Miami, FL 33135. Occasionally reports are printed in the organization's newsletter, "Presencia."

The Junta also broadcasts Sundays on several medium wave stations. Those in the Chicago area might try for them on WEDC, 1240 kilohertz, at 4:30 p.m. CDT. In the Miami area they can be heard on WOCN, 1450, at 11:00 p.m. EDT. They are heard Sundays in the Orlando, Florida, area via WMJK Kissimmee on 1220 kilohertz.

**RETURN OF COMANDANTE DAVID?** A most unusual logging was reported by Ohio's George Zeller in the June ACE. On May 12 he logged a clandestine identifying itself as RADIO LIBERTAD CUBANA on 6905.5 from 0116 to 0138. The format George reports sounds much like that used by the most famous of the Cuban clandestine broadcasters, the legendary Comandante David.

The Comandante's broadcasts may have been responsible for considerable sabotage in Cuba and most of the events that led up to the Mariel boatlift. He was supposedly at one time the most popular radio personality in Cuba. His station did call itself Radio Libertad Cubana.

The Comandante has been silent for quite some time, but there have always been rumors that he might return. If indeed he has, there may well be an increase in Cuban clandestine broadcasting over the next few months.

**RADIO MARTI:** The rumors which first claimed that RADIO MARTI would begin transmissions to Cuba in April, and then May, failed to materialize. The current rumor says operations will not begin until sometime this fall.

**ISRAEL:** On May 25 th CBS Evening News reported that the Reagan administration is negotiating with the government of Israel for the rights to build a radio station which would transmit news about Afghanistan to the people of the USSR.

**PIRATE PROGRAMMING PERSPECTIVE BY JOHN T. ARTHUR:** There are several types of unlicensed broadcasters active today, loosely classified as: political clandestine, alternative, and the infamous "kids playing radio." Clandestines are covered extensively by several clubs and Gerry Dex-

ter's CCN, so we will concentrate on the remaining two types.

One of the newest and best alternative broadcasters is THE VOICE OF LARYNGITIS. Their recent broadcasts in the 19 and 41 meterbands have been prototypes of what free radio is all about.

The Huxley Family Players (Ghengis, Cowboy Stan, Reverend Billy Bob, and little Michael) interweave several lines of humor in their half-hour programs, never driving any one line into the ground.

The St. Patrick's Day broadcast featured a running gag on "spy numbers for the CIA" as well as "The Case of the Radio Pusher," a full-blown radio drama, which obviously took several hours to prepare.

VOL has a series of five QSL cards and verifies correct reports if three 20-cent stamps are included. Report via Box 982, Battle Creek, MI 49016.

(John T. Arthur's "column within a column" will be a regular feature. Next month he will look at a long-time favorite, KQSB International.)

**TANGERINE RADIO:** Tangerine Radio has sent us their latest schedule. They use frequencies between 7415 and 7435 as well as 14485 and 21495. Their power is 50 watts AM or 100 PEP on USB.

Most likely transmission times are Saturdays at 0100 and 1130, Sundays at 2000, Mondays at 0300, and Tuesdays at 2300. All times and dates are GMT. Also look for them at 0330 on the night of the full moon!

**"JUPITER":** The Minority Association informs us that they have been delayed in resuming their broadcasts in which they hope to spread the philosophy of Arnold Toynbee about colonizing Jupiter. However, they hope to have their Viking II transmitter mobile and operating by fall. In the meantime we understand they may have a program relayed by another station before the end of the summer.

**LOGGINGS:** Daniel Grogl of Indiana sends us some excellent free radio loggings. He heard KQRR on 15050, May 6, from 1852 to 1917. The station featured Irish music. The same day from 2128 to 2144 he heard SECRET MOUNTAIN LABORATORY broadcasting on 7431. May 9 brought an unidentified station on 6233 from 0413 to 0432. This station never identified and played only Beatles music.

Dan had a first-time logging of WIMP on 7420, May 10, from 0253 to 0306. WIMP certainly is a modest operation referring to itself as "the most boring station" and "Nurd Radio," according to Dan. The 10th also brought KQRP on 7415 from 0306 to 0340, and the classic RADIO CLANDESTINE from 0318 to 0352 on 7354.

Perhaps the most unusual station Dan logged was on 7315, May 10, from 0200 to 0225. He thinks it may have been a ham upset with the world. The broadcaster complained about foreign aid, the price of food, interest rates, the price of cars, and trade with the Communists. On shortwave you just never know what you might come across. Now what are you hearing?

**GREAT BRITAIN:** Terry Krueger writing in the May 23 issue of DX South Florida reports that a new law has taken effect in Britain which makes illegal broadcasting a criminal rather than a civil offense. Fines have been raised to 1000 pounds, and the Home Office has been given authority to search and seize transmitters in houses even if the transmitter is not on the air.

Unfortunately the new law has already brought about the end of Scotland's RADIO FREEDOM INTERNATIONAL, which decided to make its final broadcast March 31. Last fall this station's signal made it wall the way to North America.

In addition to Terry's report, we might add that technically it is illegal to even listen to a pirate broadcast in Britain, although of course the government cannot enforce this. Legislation has also been proposed to make it illegal to advertise on the offshore commercial pirates, such as RADIO CAROLINE.

**RADIOTELEX:** Italy's Dario Monferini sends along information on an excellent European free radio publication, RADIOTELEX. Published in Bremen, West Germany, it is entirely in English and contains extensive news about European pirates as well as a considerable number of loggings.

Appearing twice a month, it is 10 pounds per year in Britain, but North Americans should write to RADIOTELEX, P.O.Box 700 825, D 2820 Bremen 75, West Germany, for information on subscription rates. You can get a sample copy for one IRC.

"Los  
Numeros"

32444 69213 88816 52196 63811 94216

Havana Moon



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There's strong opinion (and not altogether unwarranted) among some "numbers" monitors that there's some sort of "cover-up" of worldwide magnitude as regards these mystery transmissions.

Over the past few months I have personally taken a very close look at two letters from the FCC that are identical. Only the dates on these letters differ. I--for one--hardly think that this exact wording is by chance.

And what about the ITU? These "keepers of frequencies" appear to keep all "numbers" related correspondence on file.

In one instance a requestor's letter of over one year earlier was referenced. Curious, isn't it? Of course the ITU has no mandate to answer specific questions from sources outside the ITU.

**ACTIVE AND HOT**

Florida sources from the Ft. Lauderdale area continue to report daylight hour "numbers" intercepts on 3090 and 4030 kHz. These same sources strongly hint at a transmission site in this area!

Monitors in Key West or areas north of Ft. Lauderdale are invited to let this column know what--if anything--you're hearing on these two "hot" frequencies. Let's see if we can isolate a 5-digit site.

**DELIBERATE TELEMETRIC ENCRYPTION**

"...the Soviet Union has over the past decade encrypted increasingly high levels of telemetry from tests of strategic weapons systems covered by Salt II. Current test programs for the SS-X24 and 25 ICBM programs and the SS-X-20 and 23 SLBM programs contain especially high levels of telemetry encryption."

"The U.S. Administration charges that Soviet encryption before 1981 was a violation of legal obligation. Activities after 1981,

when Secretary Haig declared SALT II "dead," are considered violations of political commitments. The Administration objects both to the nature and extent of encryption on new missiles..."

This somewhat lengthy report as extracted from The Congressional Record of Wednesday, February 1, 1984, also makes mention of that "mystery" Cuban military communications center. This is the same facility that I often mentioned in the now defunct Newark News bulletin. More recent comments have appeared in this column.

If you desire a copy of this report, contact your Congressional Representative.

**A MYTH BITES THE DUST?**

It's very possible that "the end of disinformation" terminator that's often reported on some English "numbers" transmissions is actually "end of this information."

This long standing myth just recently resurfaced in William Poundstone's (William Morrow) Big Secrets. A rather lengthy discussion about "numbers," "beacons" and other things that go "bump-in-the-dark" cover several pages of this--generally--well written and researched book.

It's a shame that Mr. Poundstone knows not of MT!

**COMMUNICATIONS**

A big THANK YOU to Reed Darsey of good 'ol Mobile for checking in. Very nice information. Other readers of this column might read KGB Today, The Hidden Hand, by John Barron, 1983. (Reader's Digest Association) Reed and I suggest that you check out a copy of this book ASAP.

Darn nice research, Reed. How about keeping me posted as far as your "numbers" intercepts are concerned. Would be very interested in knowing what you are hearing on 3 MHz about 1500 and 1600 hours.

A real "savvy" note from a "crypto-pro" of Fayetteville, New York, contained some real helpful comments. I will be in touch shortly.

**THANK YOU**

Thanks for the one vote, High-Collar Carlos. I would have had two votes if Mom had mailed her vote to the right publication. You're my kind of person, High-Collar. Rockford should be proud. Your next Tecate is on me, O.K.?

**TRADECRAFT**

I often see mention of a mysterious substance that allows the CIA and other snoops to read the contents of sealed mail without going so far as to use an old fashioned steam-iron. "Check-out-stand" tabloids always fail to give us the name of this wonder substance.

It's nothing more than liquid freon!

**MYSTERY TRANSMISSION**

Five musical notes for several minutes followed by groups in unknown language. Best time is 0530Z on 4030 kHz. Static crashes and low signal level have--so far--prevented a positive language ID. Any ideas?



**those mysterious beacons**

Heard throughout the shortwave spectrum, these weak signals eternally emit single Morse characters which repeat every few seconds.

Much speculation has been written regarding their identification--propagation sounders, channel markers, fishing buoys--but no one has ever definitively identified their location or purpose.

An excellent history accompanied by an exhaustive frequency list and well-based speculation is presented in the new SPEEDX Utility Guide, (for more information send an SASE to Don Johnson, P.O. Box E, Elsinore, CA 92330).

The story begins with the appearance of the "K" beacon on 9043 kHz some 20 years ago. From that time on more and more SLHFBs (single letter high frequency beacons) have been reported worldwide.

As with the numbers stations, official radio direction finding efforts are lacking (at least to the general public), but occasional breakthroughs in tentative identification occurred at infrequent intervals.

One of these discoveries pointed toward Khabarovsk, USSR, a Russian naval shipyard near the Sea of Japan, site of the Korean Airlines incident!

Could these beacons play a role in the Russian

**UNUSUAL INCIDENT**

Reception incidents such as the "musical note" type are most welcome. Keep your reports brief and please be specific. I would like to feature two or three under the above heading each month. Reports should be of an unusual nature and "numbers" related. Your name will be used unless otherwise requested.

**TECHNICAL DIFFICULTIES**

Photos of that U.S. Government frequency list are not--at this time--of high enough quality for newsprint reproduction. I hope to have this problem solved by the next issue. Your patience is appreciated.

Time now for a Tecate and...

Adios,  
Havana Moon y Amigas

(The opinions expressed in this column are those of Havana Moon and do not necessarily represent the views of Monitoring Times.)

readiness effort, providing go-code status reports much like the familiar "Sky King" broadcasts which populate the U.S. Air Force frequencies?

Credence to the Russian origin theory is supported by the fact that some characters are Cyrillic like the K reported on several frequencies (see table below). Speculation is that beacon K is in eastern USSR and U is in western USSR.

Presented herewith is a partial listing of beacons recently reported to MT. Additional listings and/or corrections from other monitors would be greatly appreciated.

K	- 4005.5	7905.5	8158.8
	9043.5	11155.5	12150.5
	14477.5	14967.5	
U	- 4448.5	6245.5	7569.5
	8136.5	8670.5	9057.5
	10216.5	12185.5	
S	- 5305.5	6801.5	8645.5
	10643.5	13635.5	17015.5
	20991.5		
C	- 5306	6802	8646 10644
	13636	17016	20992
P	- 5306.5	6802.5	8646.5
	10644.5	13636.5	17016.5
	20992.5		
D	- 5307	6803	8647 10645
	13637	17017	20993
G	- 5307.5	6803.5	8647.5
	10645.5	13637.5	17017.5
	20993.5		
O	- 5308	6804	8648 10646
	13638	17018	20994
Z	- 5308.5	6804.5	86468.5
	10646.5	13638.5	17018.5
	20994.5		
IO	- 5309	6805	8649 10647
	13639	17019	20995



# Listener's Log

## Atlantic Coastal Scanning

by Kevin Johnson  
P.O. Box 7464  
Hampton, VA 23666

(ED.NOTE: The following list is part of an installment

series; MT readers wishing a computer printout of the entire series may send \$5 with your request to the author at the address above.)

LOCATION	AGENCY	DESCRIPTION	FREQUENCY
<b>MASSACHUSETTS</b>			
BOSTON	FD		483.2125
BOSTON	FD		453.6500
BOSTON	FD		483.1875
BOSTON	FD	DISPATCH	483.1625
<b>MARYLAND</b>			
BALTIMORE	FD	F1 DISPATCH	154.3100
BALTIMORE CO	FD	F1	46.4600
BALTIMORE	FD	F2	154.3700
BALTIMORE CO	FD	F2	46.2800
BALTIMORE	FD	F3	154.4450
BALTIMORE CO	FD	F3	46.5200
BALTIMORE	FD	F4 EMS	154.1450
BALTIMORE CO	FD	F4	46.5600
BALTIMORE	FD	FIREGROUND	154.3850
BALTIMORE CO	PD	A	39.4200
BALTIMORE CO	PD	B	39.4400
BALTIMORE CO	PD	C	39.5600
BALTIMORE	PD	CITYWIDE	453.3000
BALTIMORE	PD	COMMAND	453.9750
BALTIMORE CO	PD	D	39.6200
BALTIMORE	PD	DETECTIVE	453.3500
BALTIMORE CO	PD	E	39.7200
BALTIMORE	PD	EAST	453.2750
BALTIMORE CO	PD	F	39.8400
BALTIMORE	PD	F1 S/WEST	453.0500
BALTIMORE	PD	F2 CITYWIDE	453.2000
BALTIMORE	PD	F4 CENTRAL	453.4250
BALTIMORE CO	PD	G	39.9600
BALTIMORE CO	PD	H	39.7800
BALTIMORE	PD	JAIL	453.5000
BALTIMORE	PD	N/EAST	453.5250
BALTIMORE	PD	N/WEST	453.9250
BALTIMORE	PD	NORTH	453.8250
BALTIMORE CO	PD	PORTABLES	158.9700
BALTIMORE	PD	RADIO REPAIR	460.5250
BALTIMORE	PD	S/EAST	453.7750
BALTIMORE	PD	SECURITY	453.7250
BALTIMORE	PD	SOUTH	453.6750
BALTIMORE	PD	TACTICAL	453.6500
BALTIMORE	PD	TRAFFIC	453.8500
BALTIMORE	PD	WEST	453.6250
BALTIMORE	STATE PD		460.0500
BALTIMORE	TRANSIT PD		494.4875
BALTIMORE	TRANSIT PD		494.5875
BALTIMORE	TRANSIT PD		494.2875
BALTIMORE	TRANSIT PD		494.3875
BALTIMORE	TRANSIT PD	TUNNEL	453.1000
BOLING AFB	FD		173.5875
BOLING AFB	PD		163.4875
EMMITSBURG	FD		46.4200
EMMITSBURG	PD		39.1000
EMMITSBURG	PD		39.0200
MARYLAND	STATE PD	BARRACKS	155.4750
MARYLAND	STATE PD	BARRACKS	155.1900
MARYLAND	STATE PD	F1 STATEWIDE	39.1000
MARYLAND	STATE PD	F10	39.0400
MARYLAND	STATE PD	F11(US 13)	39.0600
MARYLAND	STATE PD	F12	39.4000
MARYLAND	STATE PD	F2 STATEWIDE	39.2600
MARYLAND	STATE PD	F3	39.3000
MARYLAND	STATE PD	F4	39.3400
MARYLAND	STATE PD	F5	39.1400
MARYLAND	STATE PD	F6	39.3200
<b>LOCATION</b>			
<b>AGENCY</b>			
<b>DESCRIPTION</b>			
<b>FREQUENCY</b>			
MARYLAND	STATE PD	F7	39.3800
MARYLAND	STATE PD	F8(US 13)	39.2400
MARYLAND	STATE PD	F9	39.5200
MARYLAND	STATE PD	IN CAR RPTR	155.7300
MONTGOMERY	FD	F1	153.9500
MONTGOMERY	FD	F2	154.1600
MONTGOMERY	PD	BETHESDA	494.8625
MONTGOMERY	PD	GERMANTOWN	495.8375
MONTGOMERY	PD	ROCKVILLE	494.7125
MONTGOMERY	PD	SILVER SPRNG	494.9125
MONTGOMERY	PD	WHEATON	495.3125
POCOMOKE	FD		46.3800
POCOMOKE	LG		45.4400
POCOMOKE	PD		39.1000
PRINCE GEORG	FD	F2	494.8375
PRINCE GEORG	FD	F4	495.0625
PRINCE GEORG	FD	PAGING	46.1200
PRINCE GEORG	PD	DETECTIVE	494.7375
PRINCE GEORG	PD	F1	494.6875
PRINCE GEORG	PD	F2	494.5625
PRINCE GEORG	PD	F3	494.9375
PRINCE GEORG	PD	F4	495.1375
PRINCE GEORG	PD	F5	494.5375
PRINCE GEORG	PD	F6	495.0875
PRINCE GEORG	PD	F7 DETECTIVE	494.8875
PRNCSS ANNE	PD		39.2000
SALISBURY	FD		33.9800
SALISBURY	PD		39.8200
WASH DC	STATE PD		453.5500
WICOMICO CO	PD		39.6400
WICOMICO CO	PD		39.1000
WORCESTER CO	PD		39.1000
ST LOUIS	FD		154.1300
<b>NORTH CAROLINA</b>			
AHOSKIE	AMATEUR		145.1300
AHOSKIE	AMATEUR		146.9100
CHARLOTTE	FD	F1	460.5250
CHARLOTTE	FD	F2	460.6250
CHARLOTTE	FD	F3	460.5500
CHARLOTTE	FD	F4	460.6000
CHARLOTTE	FD	F5 DISPATCH	460.5750
CHARLOTTE	PD		453.7000
CHARLOTTE	PD		453.3000
CHARLOTTE	PD		453.9000
CHARLOTTE	PD		453.5000
CHARLOTTE	PD		453.8000
CHARLOTTE	PD	MUTUAL AID	155.1900
DARE CO	PD		460.3750
DARE CO	PD	BASE RPTR	460.2500
ELIZABETH CT	COAST GUARD		171.2375
HATTERAS	NTL PARK SVC		164.7250
HATTERAS	NTL PARK SVC		169.6500
MANTEO	AMATEUR		146.9400
N CAROLINA	PD	MUTUAL AID	155.1900
N CAROLINA	STATE PD	BASE/BASE	154.6800
N CAROLINA	STATE PD	F1 MOBILE	42.8000
N CAROLINA	STATE PD	F1 BASE	42.5200
N CAROLINA	STATE PD	F1 CAR-CAR	42.5200
N CAROLINA	STATE PD	F2 MOBILE	42.7800
N CAROLINA	STATE PD	F2 CAR-CAR	42.6200
N CAROLINA	STATE PD	F2 BASE	42.6200
N CAROLINA	STATE PD	F3? BASE	42.6000
N CAROLINA	STATE PD	F3? MOBILE	42.6600
N CAROLINA	STATE PD	F4? BASE	42.6400
N CAROLINA	STATE PD	F4? MOBILE	42.7600
N CAROLINA	STATE PD	F5? BASE	42.5600
N CAROLINA	STATE PD	F5? MOBILE	42.7000
N CAROLINA	STATE PD	NCSBI	42.7200
N CAROLINA	STATE PD		460.4750
N CAROLINA	STATE PD		465.1750
N CAROLINA	STATE PD		460.2500
N CAROLINA	STATE PD		460.1750
N CAROLINA	STATE PD		465.2500
N CAROLINA	FD	COUNTY	154.3550
N CAROLINA	FD	F1	154.0250
N CAROLINA	FD	F2	154.3100
N CAROLINA	FD	F3	154.4150
N CAROLINA	FD	MOBILES	153.7700
N CAROLINA	FD	MUTUAL AID	154.2650
N CAROLINA	PD		453.3500
N CAROLINA	PD		155.0100
N CAROLINA	PD		155.1900
<b>NEW JERSEY</b>			
ATLANTIC CTY	CASINO CTRL		465.1750
ATLANTIC CTY	CASINO CTRL		460.2500
ATLANTIC CTY	CASINO CTRL		460.1750
ATLANTIC CTY	CASINO CTRL		465.2500
ATLANTIC CTY	FD		154.3550
ATLANTIC CTY	FD	F1	154.0250
ATLANTIC CTY	FD	F2	154.3100
ATLANTIC CTY	FD	F3	154.4150
ATLANTIC CTY	FD	MOBILES	153.7700
ATLANTIC CTY	FD	MUTUAL AID	154.2650
ATLANTIC CTY	PD		453.3500
ATLANTIC CTY	PD		155.0100
ATLANTIC CTY	PD		155.1900

Cont'd on p.31

# TUNE IN CANADA



by  
**Norman H. Schrein**

FOX MARKETING, INC.  
4518 Taylorsville Road  
Dayton, OH 45424

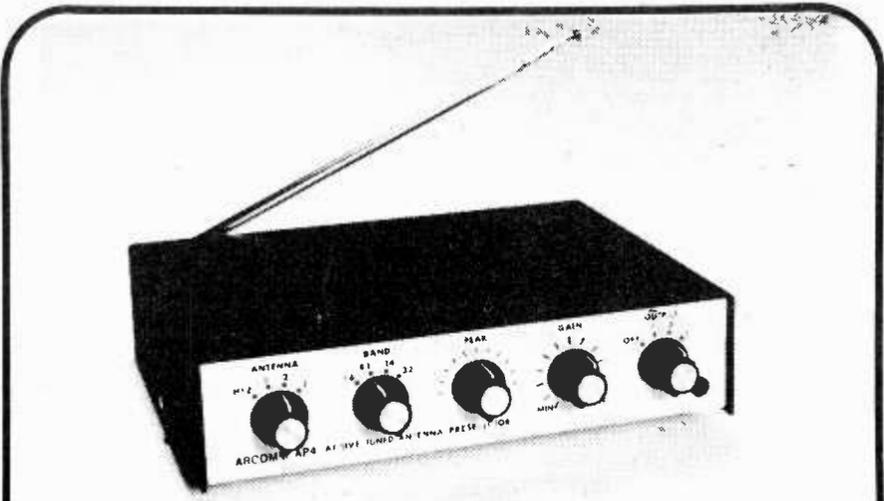
(ED.NOTE: In future months, "Tune in Canada" will be appearing on a bi-monthly basis; keep watching for this informative column by Norm Schrein.)

This month's column will concentrate on frequencies in the Vancouver, British Columbia area. I have had many requests over the past months, so this is a feeble attempt to hopefully answer many of the requests.

- 149.320 BC Hydro&Power Auth CJN 714
- 150.185 same
- 149.470 P (Paired freq)
- 157.650 same
- 165.210 same
- 166.290 P
- 165.930 same
- 464.950 Canadian Forest Products/CJN 995
- 165.510 Westcoast Transmission/CJO 833
- 462.050 Air Canada/CJO 838
- 467.0625 P
- 158.490 BC Hydro&Power Auth CJQ 63
- 463.6875 same
- 468.6875 P
- 153.140 Crosstown Carriers CJQ 604
- 163.080 Canadian Marconi CJQ 637
- 151.655 Macmillian Bloedel CJR 966
- 156.275 Seaspan Int'l CJS 231
- 156.925 BC Packers/CJU 43
- 158.865 Vancouver Emergency Progrmme/CJW 239
- 158.910 same
- 450.700 Moffat Communications/CJY 473
- 455.2125 Pattison Broadcasting/CJY 626
- 450.200 P
- 455.4125 Canadian Broadcasting Corp/CJY924
- 152.870 same/CJZ 420
- 458.0875 Western Approaches CJZ 423
- 142.065 BC Hydro&Power Auth CKV 37
- 138.075 P
- 135.050 Air Canada/CVJ
- 160.845 Canadian Pacific CZV 236
- 161.475 same
- 161.535 same
- 121.500 Dept of Transport. VAI
- 127.300 same
- 156.725 same
- 156.800 same
- 161.650 same
- 161.825 same
- 157.225 P
- 161.900 same
- 157.300 P

- 156.550 Pacific Pilotage Auth/VBP 21
- 156.600 same
- 156.725 same
- 156.800 same
- 156.850 same
- 156.875 same
- 139.290 RCMP/XJA 43
- 140.430 same
- 140.670 same
- 139.680 P
- 142.035 same
- 138.045 P
- 153.800 same
- 154.905 same
- 154.950 same
- 155.130 same
- 155.175 same
- 155.325 same
- 155.595 same
- 155.670 same
- 461.550 same
- 461.7375 same
- 155.595 P
- 413.0625 same/XJD 622
- 413.2875 same
- 139.080 same/XJE 317
- 139.350 same
- 140.430 same
- 155.670 same
- 139.470 same/XJE 911
- 139.740 same
- 139.920 same

That's all for this time, keep the requests coming, and I will do my best to keep providing the data. Until next time --- Good Monitoring.



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## FINDING THE SPIES: WORLD WAR II STYLE

by HAWKER/OSS

During World War II in Europe the radio bands were completely jammed; most of the time it sounded almost like contest night in the 40 meter amateur CW band!

There was no central plan; everyone was looking for the best frequencies to operate on. The U.S. Army, Navy, Air Corps, Marines, Signal Corps, the French, English, Germans--everyone was trying to find space.

One of our best frequencies was almost always occupied by a high speed German CW net; when we had to send a message to our HQ in Paris, all we had to do was touch the key and they would stop sending until we finished. They must have had fun trying to decipher our messages if they even bothered to try.

Most enemy operatives stuck out like a sore thumb; their equipment was always small and usually not tuned properly; their sending was usually sloppy; they were always in a hurry to finish the contact so that they would not be detected. Since it was always almost impossible to find the base operation frequency, they were

almost always on a different frequency.

The agent would send his calling signal three or four times, then identify once or twice. His base was ready to copy immediately, then transmit back to the agent.

Since the agent would usually keep a schedule at the same time every day it was easy to get quite a file of messages for possible deciphering by our special unit in England, but we proceeded with the DFing immediately.

We would triangulate from two or three positions to find the general area of the station. When the agent started transmitting again we sometimes used the AR-88 (see inset below) to triangulate once more, but most of the time could copy him on the field strength meters and would move in fast.

Besides capturing German agents in this manner we also located several British and other Allied radio stations. They were usually quite surprised to see us, especially in the manner in which we were approaching them!

### OSS/ETO MOBILE DIRECTION FINDING INSTALLATION

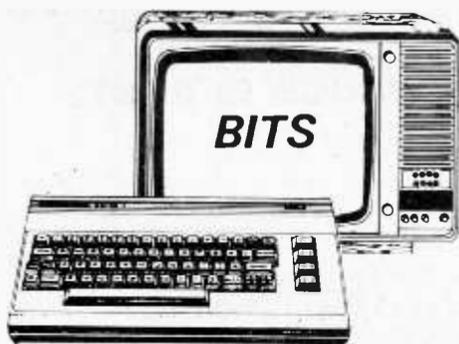
VEHICLE: Standard US Army OD Ambulance painted with White Crosses

#### EQUIPMENT:

- (1) AR-88 Receiver (540 kHz-35 MHz)
- (1) Special DF receiver (broadly-tuned RF Amplifier and detector)
- (2) Amplified field strength meters(broad-band 100 kHz-100 MHz)
- (1) Motor-generator (120 V. 60 Hz)
- (1) Voltage converter (12 VDC/120 VAC)
- (6) Hand grenades in canisters
- (2) .45 cal. sub-machines guns
- (1) Concealed outside antenna
- (1) DF loop antenna

The DF loop antenna was controlled from inside and had a 360 degree calibrated marker; it could be switched to either receiver. A long table or desk was used to hold the equipment and had room to lay out the detailed maps for triangulation of the signal.

(See the July issue of MT for more experiences from Hawker and the OSS.)



**by Mike Edelson**  
P. O. BOX 203  
ROSELLE PARK, NJ 07204

**BASIC's Basics**

This month we'll finish up INPUT and OUTPUT by examining the DATA/READ statements.

While the INPUT statement allows for the input of variable data, the DATA statement allows for the input of data that is constant. The syntax for the DATA statement is:

**Line number DATA** (a list of constants)

thus  
**1000 DATA 1,2,3,4,5**  
would be legal as would  
**1010 DATA Bob, Mike, Ann, Bill.**

A DATA statement is actually an FIFO queue (FIFO stands for First In, First Out); another name is a STACK. To use some later data you must first use all the data before it. Thus, referring to the above example, to use "Ann" you must first use "Bob" and "Mike."

A DATA statement can use REAL, INTEGER or STRING constants. It is possible to use a series of DATA statements to form tables (arrays) or constant data lists.

They can be placed anywhere in a program without affecting program execution or operation. One point that I CAN NOT stress enough is that all DATA statements are linked as if they are one continuous DATA statement. Therefore if you have three separate DATA statements, they will be treated as if they are one.

To access the data in the DATA statement we use a READ statement. The READ statement syntax is:

**Line number READ** (parameter list of variable names).

Therefore, the following are valid:

**100 READ AZ**  
**2700 DATA 1,2,3,4**  
**2800 READ NAMES**  
**5610 DATA BILL, JOHN, JIM**

or

**1010 READ LOCZ, NAM\$, SSNO\$**

**1500 DATA 110, "Jim M. Doe", 100-10-1111, 617, "Will B. Doe", 217-10-9634**

Remember the DATA statements can appear anywhere in the program. What happens is that a READ statement will assign data from a DATA statement. But data types and variable names must match. If they don't match an error will occur. Also another possible error situation is if you hit a READ and there is no data to read.

It should be noted here that CBASIC will assign data that fits variables if the data and variables don't match. In other words a real variable can take real or integer numeric data but if it encounters string data and there is a real or integer variable the compiler will assign a 0 (zero) to the variable.

A string variable can read any data item. A real data item is read accurately so long as the value after truncating at the decimal point is between -32768 and +32767.

An integer variable acquires a zero value if it tries to read a string data item. It is important to be sure of what your data is as it goes into the system under a DATA/READ block.

To demonstrate inaccurate variable type/data type assignments consider the following:

**510 DATA1, "John Q. Public", "123-12-7777", 500.10**

**720 READ N, NAME, SSNOZ, SALARY\$**

When the READ puts this data in, the variable N equals 1.0, the variables NAME and SSNOZ equal 0 and SALARY\$ equals "500.10" because N is a real variable (the data must be real in configuration). NAME and SSNOZ are taken by the system to be integers, not strings as they should be. SALARY\$ is a string variable and is thus treated as such.

Always remember that there must be at least as many remaining items in the DATA statement parameter list (list of variable names) as there are variables in a READ statement. Therefore, if a READ statement contains fewer parameters (variable names) than there are data items, the next READ statement will use the DATA statement pointer to continue where the previous READ statement left off.

Cont'd on p.30

**Impedance Matching Made Simple on TRS-80C**

MT Reader Neil Iverson responded to our request last month urging fellow readers to share home computer programs relating to radio and electronics.

Based upon the formulas presented in QST magazine, August 1983, the following program will work on i6K extended BASIC and will solve component values for virtually any frequency used in Pi, L and Pi-L network design. Thanks, Neil!

```

1 PEM IVERSON'S BIG DEAL MATCHING NETWORK THINGY
5 CLS
10 PI=3.14159
15 PPINT "MATCHING NETWORK DESIGN"
20 PRINT @106, "SELECT TYPE"
25 PRINT @168, "(1) PI NETWORK"
30 PRINT @200, "(2) L NETWORK"
35 PRINT @232, "(3) PI-L NETWORK"
40 AN$=INKEY$
45 IF AN$="" THEN 40
50 ON VAL (ANS) GOTO 120,610,900
60 GOTO 5
110 REM REFER QST AUGUST 1983
120 CLS
130 PRINT "PI NETWORK DESIGN"
140 INPUT "R1="; RA
150 INPUT "R2="; RB
160 INPUT "Q0="; Q0
170 IF ABS((Q0*Q0+1)-(RA/RB))<.01 THEN GOTO 480
180 IF ABS((Q0*Q0+1)-(RB/RA))<.01 THEN GOTO 480
190 IF RA<>RB THEN GOTO 260
200 REM SPECIAL CASE WHERE R1=R2
210 IF RA=RB THEN XA=(2*RA)/Q0
220 XB=(2*RB)/Q0
230 QA=Q0/2
240 XL=(RA*Q0)/(QA*QA+1)
250 GOTO 330
260 IF (RA/RB)>(Q0*Q0+1) THEN GOTO 500
270 IF (RB/RA)>(Q0*Q0+1) THEN GOTO 500
280 QA=((RA*Q0)-SQR((RA*RB*Q0*Q0)-((RA-RB)*(RA-RB))))/(RA-RB)
290 QB=Q0-QA
300 XA=RA/QA
310 XB=RB/QB
320 XL=(RA*Q0)/((QA*QA)+1)
330 PRINT "XC1="; XA
340 PRINT "XL="; XL
350 PRINT "XC2="; XB
360 INPUT "RUN TO PRINTER Y/N?"; B$
370 IF B$="Y" THEN GOTO 520
380 INPUT "MHZ="; F
400 CA=(1/(XA*2*PI*F))*1E6
410 PRINT "C1 (PF) ="; CA
420 L=XL/(2*PI*F)
430 PPINT "L (UH) ="; L
440 CB=(1/(XB*2*PI*F))*1E6
450 PRINT "C2 (PF) ="; CB
460 IF B$="Y" THEN GOTO 590
470 GOTO 380
480 PRINT "L NETWORK"
490 GOTO 615
500 PRINT "NO SOLUTION"
510 GOTO 15
520 PRINT #-2, " PI NETWORK VALUES":PRINT #-2
530 PRINT #-2, "R1", "R2", "Q0"
540 PRINT #-2, RA, RB, Q0:PRINT #-2
550 PRINT #-2, "X1", "XL", "X2"
560 PRINT #-2, XA, XL, XB:PRINT #-2
570 PRINT #-2, "C1 (PF)", "L (UH)", "C2 (PF)", "MHZ"
580 GOTO 380
590 PRINT #-2, CA, L, CB, F
600 GOTO 380
610 CLS
615 PRINT "L NETWORK DESIGN"
620 INPUT "R1="; RC
625 INPUT "R2="; RD
627 IF RC<RD THEN GOTO 700
630 QC=SQR((RC/RD)-1)
632 XD=SQR((RC*RD)-(RD*RD))
635 XE=RC*SQR(RD/(RC-RD))
640 PRINT "Q1="; QC
641 PRINT "XL="; XD
642 PPINT "XC="; XE
643 INPUT "RUN TO PRINTER Y/N?"; B$
645 IF B$="Y" THEN GOTO 715
650 INPUT "MHZ="; F
660 CC=(1/(XE*2*PI*F))*1E6
665 PRINT "C (PF) ="; CC
670 LA=XE/(2*PI*F)
675 PRINT "L (UH) ="; LA
680 IF B$="Y" THEN GOTO 740
685 GOTO 650
700 PRINT "R1 MUST BE GREATER THAN R2"
710 GOTO 615
715 PRINT #-2, " L NETWORK VALUES":PRINT #-2
720 PRINT #-2, "R1", "R2", "Q"
725 PRINT #-2, RC, RD, QC:PRINT #-2
726 PRINT #-2, "XC", "XL"
727 PRINT #-2, XE, XD:PRINT #-2
730 PRINT #-2, "C (PF)", "L (UH)", "MHZ":PRINT #-2
735 GOTO 650
740 PRINT #-2, CC, LA, F
    
```

Cont'd on p.32

**COMPUTER PROGRAMS**

The Association of North American Radio Clubs has made available their list of non-copyrighted computer programs directed toward the radio hobby.

Station logs, DX times, daylight/darkness calculator, antenna design, call signs, country search, satellite finder and many more for Apple, Timex/Sinclair, Commodore.

For your free list send a business-size SASE to: ANARC COMPUTER INFORMATION COMMITTEE, 6700 153rd Lane NW, Anoka, MN 55303.

# GETTING STARTED

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

## AGC: What Does It Mean?

by John Dorsey

This writing deals with Automatic Gain Control and Dynamic Range. Let's see if we can explain something technical without sounding like we swallowed an electronics dictionary!

I have an old military radio (AN-SRR 13) that has an on-off switch in the AGC circuit. I'm amazed at how much even a strong signal will vary in strength when I switch off the AGC action. Naturally, we can't manually vary the RF Gain every time the signal strength changes. Within limits, the AGC circuits do it for us. When related to shortwave receivers, AGC and AVC, Automatic Volume Control, are essentially the same thing.

The way these circuits work is to extract some signal voltage from the detector and use it to control the receiver's amplification. The amplification runs wide open at minimum AGC voltage, then cuts down as this voltage rises due to an increase in signal strength. When an extremely strong signal is present we've got problems, the worst of which is very distorted audio.

If you visualize the block diagram of a receiver, you'll see that AGC action occurs "after-the-fact," meaning that a low-level stage could be overloaded before the high-level voltage builds up enough to remedy the problem, a condition known as overshoot.

The brain of AGC is a capacitor which is charged by the voltage derived from incoming signal. The resistors around this capacitor determine how fast this action starts and stops. If we run enough RF Gain to insure noise-free reception, we can eliminate a lot of fading, the more voltage stored in the AGC capacitor, the longer it will take to discharge so amplification can begin again.

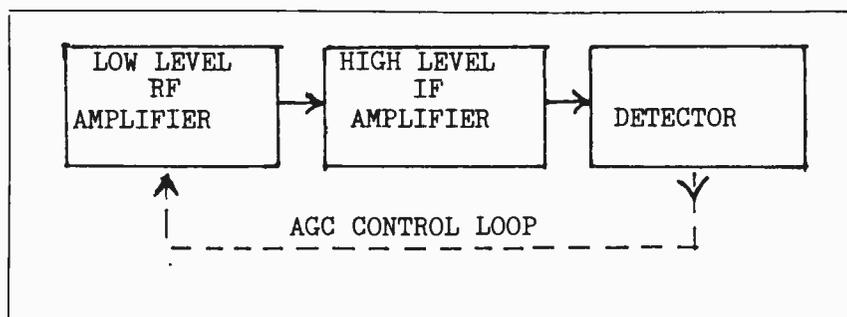
### DYNAMIC RANGE

Take a close look at an S-meter. It's displaying two different measurements of signal strength: S-units and decibels (dB). Let's convert it to all S-units. 40dB = S100, 60dB = S1000 and 80dB = S10,000.

On a clear day, a weak signal is workable at two-tenths of a microvolt. The other extreme is when VOA in Greenville, NC lights off one of their 500 kW rigs and dumps at least half of that on my antenna! Let's guess two millivolts. We've just shown an 80dB variation in signal strength. I don't care how good a manufacturer is at designing circuits, he can't overcome the fact that electronic law simply won't allow that much range in AGC circuits. An AGC capacitor that would hold that much voltage would take too long a time to ever get off the circuit. That's why even the top sets have an RF Gain control, and are still subject to overloading.

Add to the extreme variation of signal strength the problem of designing circuitry to track the speed of that change. Most signals will vary peak to null in a few seconds and AGC action is timed accordingly. What happens when the signal dances in and out like airplane flutter bouncing a TV picture? We watch our meter jump back and forth and listen to our set "pump."

Some day a manufacturer is going to come out with micro-processor-controlled AGC which will change time constants to stabilize rapidly-fluctuating signals as well as switch out sensitive low-level stages when a very strong signal is present. But until this set hits the market, we'll just have to stand by with a coathanger for our alternate antenna!



## 50 OR 75 OHM CABLE: WHICH IS BEST?

Years ago it was determined that antenna systems were more efficient when fed through coaxial cable with similar electrical characteristics.

As an antenna radiates its signal into space, it encounters a certain "resistance," more commonly termed "impedance." Coaxial cable is available in matching impedances of 50 and 75 ohms, corresponding to ground plane and dipole antennas.

For high power transmitters, correct matching between the transmitter and transmission line is important to avoid power losses which may become destructive voltages and heat.

For receiving purposes, impedance matching is far less important. While a nominal 50 ohm impedance is declared for shortwave and scanning receivers, no receiver made actually maintains a 50 ohm impedance over its entire tuning range. A scanner's impedance may run from 30-90 ohms or so!

Similarly, no antenna is capable of representing a perfect 50 ohm impedance

over its entire range as called upon by wide-frequency-coverage receivers. Specifying 50 ohm cable solely on a basis of matching frequency-agile receivers is meaningless.

All important, however, is "signal attenuation," the absorptive affect that coaxial cable has for radio signals traveling from one end to the other.

Weak signals may be totally lost by the time they traverse the length of the line from the antenna to the receiver. And the higher the frequency, the greater the attenuation.

The truth of the matter is that 75 ohm cable typically has lower attenuation than 50 ohm cable; that is why Grove Enterprises sells RG-6/U rather than RG-8/U. Not only does it work better, but it is smaller, easier to handle and considerably less expensive. And it has 100% shielding, making it immune to intrusion by electrical interference.

Next time someone tells you that 75 ohm coax won't work as well as 50 ohm coax on his receiver, inform him of the facts!

## Logging 170 Meters

by Craig Healy, Editor "Top End Yearbook" (66 Cove St., Pawtucket, RI 02861)

### 1600-1800 kHz LOGGINGS

- 1615 Ohura, NEW ZEALAND, OR beacon
- 1629 Australia, MI161 or Z161 mixing w/2RPH
- 1637 KA80100 vry fast code
- 1685 Mercaderes, Colombia
- 1689 Mt. Hagen, Papua, NEW GUINEA
- 1707 2WJ and dash for 30 secs every 4 min
- 1740 KA5223 fast code
- 1782 30 pip/min

LOGGING CREDITS: Art Peterson (CA), and Craig Healy (RI)

### TEN TARGET STATIONS ON 175 METERS

- 1610 ANGUILLA  
The Caribbean Beacon is heard all over North America. Should be the easiest 175 meter station to hear.
- 1613 GUATEMALA  
Rabinal RAB beacon is heard everywhere.
- 1685 COLOMBIA  
Mercaderes MER beacon is also widely heard

- 1675 ECUADOR  
Esmeraldes ESM beacon. Harder than MER but not too tough.
- 1615 NEW ZEALAND  
Ohura OR beacon. Only a West Coast target. Can be heard east of the Rockies, but don't bet the rent on it.
- 1709.5 Decca HiFix station. Sounds like the Morse code letter "J", with the first dit at a slightly lower frequency. Fairly easy.
- 1746 Another Decca station like above. Not as strong, though
- 1747 Another Decca. As good as 1709.5 usually. Someday we'll find out where these things are.
- 1668 BELIZE  
2nd harmonic of 834 kHz. This is heard up into Canada.
- 1635/  
1637 This last target isn't a station, but rather a group of them. These are heard all over the country with various calls/times. There is something for everybody here.

# HELPFUL HINTS

## Radio Abbreviations

### CURING THE RFI PROBLEM IN THE REGENCY MX-5000

by Dave Buda, WA2RYC/WDX2DLB

As anyone who has used the new Regency MX-5000 knows, there's a good amount of interference radiating from it's internal workings.

This "internal" interference was proved out when an external antenna was used. The problem disappeared as soon as an outside antenna (external) was connected to the unit.

Being a Ham in the true sense of the word, I had to take my new toy apart as soon as possible. In the process of nosing around inside I decided to make a simple modification that proved to be a great help in eliminating 95% of the radiation problem.

I contacted a company named "Miller-Stephenson" (Danbury, Connecticut 06810) and obtained a couple of cans of the RFI-Conductive Coating Spray. The MS-485 spray has an attenuation of 78dB at 1 MHz and 44dB at 1000MHz with a surface resistivity of 2.9 ohms per square inch.

The manufacturer recommends you apply several light coats to obtain a 1.5 to 2 mil coating.

I removed the top and bottom covers and the front panel as well. After carefully masking the outside of these covers I proceeded to spray the inside of the covers and panels with about 4 thin coats as recommended.

The spray dries quickly so the whole modification shouldn't take more than about a half hour.

When I replaced the covers, I simply added star lock washers between the metal chassis and the outer covers. This allowed for good contact to ground for the now shielded plastic case.

The modification was a success. As soon as I turned the unit on again, the RFI problem had disappeared. Birdies were almost non-existent and I was on my way to scanning again.

As a final note, I would like to point out that over the years I've had just about every scanner on the market. I feel qualified to say that the Regency MX-5000 is every bit as sensitive and selective as the Bearcats.

(Thanks, Dave, for sharing this excellent hint with fellow MT readers...Ed)

In the early days of radio the use of abbreviations was mandatory in order to save time sending messages in Morse code. Over the years many of these abbreviations have been retained, even for voice communications ("CQ," "DX," etc.) and more have been added.

This month MT presents a comprehensive list of abbreviations likely to be encountered by listeners, especially while monitoring amateur radio services on all modes.

We are grateful to CQ magazine for sharing this information as it appeared in the June, 1984 "Novice" column by Bill Welsh, W6DDB.

A	atto (prefix), ampere (basic unit of electrical current)
AA	all after (retransmission request)
AB	all before (retransmission request)
ABT	about
AC	alternating current
ACC	Affiliated Club Coordinator (ARRL)
ACSB	Amplitude Companded Single Sideband
AD	analog-to-digital
ADR	address (mailing)
AF	audio frequency
AFC	automatic frequency control
AFSK	audio frequency shift keying
AGC	automatic gain control
AGN	again
AH	ampere hour
AIRS	ARRL Interference Reporting System
ALC	automatic level control
AM	amplitude modulation (voice)
AMSAT	Amateur Satellite Corp.
AMTOR	Amateur Teleprinting Over Radio
ANI	any
ANT	antenna
ARA	Amateur Radio Association
ARC	Amateur Radio Club
ARES	Amateur Radio Emergency Service (ARRL)
ARO	automatic repeat request
ARRL	American Radio Relay League
ARS	Amateur Radio Society/Station
ASCI	American Standard Code for Information Interchange
ASSC	Amateur Satellite Service Council
ATV	amateur television
AVC	automatic volume control
AWG	American wire gauge
AZ/EL	azimuth-elevation
B	bel
BALUN	balanced-to-unbalanced (r.f. transformer)
BC	broadcast
BCD	binary-coded decimal
BCI	broadcast interference
BCNU	be seeing you
BD	baud (bits per second in single-channel binary data transmission)
BER	bit error rate
BFO	beat frequency oscillator
BIT	binary digit
BIT/S	bits per second
BK	back
BM	Bulletin Manager (ARRL)
BN	been, all between (retransmission request)
BPF	band-pass filter
BPL	Brass Pounders League (ARRL)
BT	battery
BUG	semi-automatic telegraph key
BURO	international QSL forwarding bureau
BW	bandwidth
B4	before
C	centi (prefix), Celsius (temperature), yes (code), capacitor, coulomb (quantity of electric charge)
CAC	Contest Advisory Committee (ARRL)
CANS	headphones
CATV	Cable TV Interference
CB	Citizens' Band (Citizens' Radio Service)
CBMS	computer-based message system
CCTV	closed-circuit TV
CCW	coherent CW, counterclockwise
CD	Civil Defense, Communications Department (ARRL)

CFM	confirm
CK	check
CL	call, closing station
CLD	called
CLG	calling
CLR	clear
CM	centimeter
CMOS	complementary-symmetry metal-oxide semiconductor
CNFMD	confirmed
COAX	coaxial cable
COR	carrier-operated relay
CP	code proficiency (award)
CPU	central processing unit
CQ	general call to all stations (work sign)
CRT	cathode-ray tube
CS	callsign
CT	center tap
CTCSS	continuous tone-coded squelch system
CUL	see you later
CVTR	converter
CW	clockwise, continuous wave (A0, F0 - not code)
D	deci (prefix), diode
DA	deka (prefix)
D/A	digital-to-analog
DAC	digital-to-analog converter
DAT	that
DB	decibel (0.1 bel)
DBI	decibels above/below isotropic antenna
DBM	decibels above/below one milliwatt, double balanced mixer
DBV	decibels above/below one volt
DBW	decibels above/below one watt
DC	direct current
D-C	direct conversion
DE	the, from (work sign)
DEC	District Emergency Coordinator (ARRL)
DEG	degree(s)
DEM	them
DERE	there
DET	detector
DF	direction finder/finding
DIP	dual in-line package
DIS	this
DLVD	delivered
DLVR	deliver
DOSE	those
DP	dipole (antenna)
DPDT	double-pole, double-throw (switch)
DPSK	differential phase-shift keying
DPST	double-pole, single-throw (switch)
DR	there, gear
DS	direct sequence (spread spectrum)
DSB	double sideband (voice)
DTMF	dual-tone, multifrequency
DVM	digital voltmeter
DX	distant station (usually foreign)
DXAC	DX Advisory Committee (ARRL)
DXCC	DX Century Club (award)
E	voltage
EC	Emergency Coordinator (ARRL)
ECAC	Emergency Communications Advisory Committee (ARRL)
ECL	emitter-coupled logic
EHF	extremely-high frequency (30-300 GHz)
EIRP	effective isotropic radiated power
ELF	extremely-low frequency (audio)
EMC	electromagnetic capability
EME	Earth-Moon-Earth (moonbounce communication)
EMF	electromotive force
EMI	electromagnetic interference
EMP	electromagnetic pulse
EPROM	erasable programmable read-only memory
ES	and
F	frequency, femto (prefix), Fahrenheit, fuse, or farad
FAX	facsimile (A4, F4)
FB	fine business (excellent)
FD	Field Day (contest), folded dipole
FER	for
FET	field-effect transistor
FL	filter
FM	frequency modulation (voice)
FREQ	frequency
FSK	frequency-shift keying
FT	foot (12 inches)
G	giga (prefix), gram (unit of mass)
GA	good afternoon, go ahead (transmit)
GAAS	gallium arsenide
GALLON	full power (usually 1500 watts, PEP output)
GBA	give better address (traffic handling)
GDO	grid/gate dip oscillator
GE	good evening
GG	going
GHZ	gigahertz
GM	good morning
GN	good night
GND	ground
GP	ground plane (antenna)
QUD	good
H	hecto (prefix), henry (unit of inductance)
HANDLE	name

HARMONIC	child (if not frequency)
HERTZ	cycle per second, half-wave antenna
HF	high frequency (3-30 MHz)
HFO	high frequency oscillator
HI	laughter (code)
HPF	highest probable frequency, high-pass filter
HR	here, hear
HV	have
HW	how
HW?	how do you copy my signal?
HX	hydrographic report
HZ	hertz (frequency)
I	current, indicator lamp
IARU	International Amateur Radio Union
IC	integrated circuit
ID	identification, inside diameter
IF	intermediate frequency
IMD	intermodulation distortion
IN	inch/inches (unit of length)
IN/S	inches per second (velocity)
I/O	input/output
IRC	International Reply Coupon
ITF	Interference Task Force (ARRL)
ITU	International Telecommunications Union
IW	Intruder watch
J	joule (energy or work unit), jack, operator for complex notation
JFET	junction field-effect transistor
K	kilo (prefix), Boltzmann's constant, answer (work sign), kelvin (temperature)
KBD	1000 bauds
KBIT	1024 bits
KBIT/S	1000 bits per second
KBYTE	1024 bytes
KG	kilogram
KHZ	kilohertz
KM	kilometer
KNW	know
KV	kilovolt
KW	kilowatt (1000 watts, d.c.)
L	inductance, lambert, liter (liquid volume)
LB	pound
LC	inductance - capacitance
LCD	liquid crystal display
LED	light-emitting diode
LF	low frequency (30-300 kHz)
LHC	left-hand circular (polarization)
LID	loop operator
LO	local oscillator
LP	long path (opposite antenna heading), log periodic (antenna)
LS	loudspeaker
LSB	lower sideband (voice)
LSI	large-scale integration
LW	long wire (antenna)
M	mega (prefix), meter, milli (prefix)
MA	milliampere
MAH	milliamperehour
MARCONI	one-quarter wave antenna
MDS	Multipoint Distribution Service, minimum discernable signal
MF	medium frequency (300-3000 kHz)
MH	millihenry
MHO	(use Siemens)
MHz	megahertz
MI	mile
MIC	microphone
MIKE	microphone
MI/H	miles per hour
MI/S	miles per second
MIN	minute (time)
MIX	mixer
MM	millimeter
MNI	many
MOD	modulator
MODEM	modulator/demodulator
MOS	metal-oxide semiconductor
MOSFET	metal-oxide-semiconductor field-effect transistor
MS	millisecond
M/S	meters per second
MSG	message
MSI	medium-scale integration
MUF	maximum usable frequency
MV	millivolt
MW	milliwatt
N	nano (prefix), no (wrong)
NBFM	narrow band frequency modulation (voice)
NBVM	narrow band voice modulation (voice)
NC	normally closed, no connection
NCS	Net Control Station
ND	nothing doing, no dice
NF	nanofarad
NF	noise figure
NG	no good
NH	nanohenry
NICD	nickel cadmium (battery)
NIL	nothing, I have nothing for you
NM	Net Manager
NMOS	N-channel metal-oxide silicon
NO	normally open
NPN	negative-positive-negative (transistor)



Cont'd on p.31

# TECHNICAL TOPICS *by Bob Grove*

**Q** Is the Grove MiniTuner (TUN-3) a useful accessory for use with the ICOM R-71A? (Kaufman, TX)

**A** Probably not. The Mini-Tuner is intended to reduce interference from inter-modulation and images; since the ICR-70 has virtually none of either, an external preselector probably won't help. The same applies to the JRC NRD-515.

On the other hand, shortwave receivers from Kenwood, Yaesu, Sony, Panasonic, Uniden, Bearcat, Radio Shack and other mass merchandisers of consumer-grade radios are invariably improved with the versatile little antenna preselector.

**Q** Can the ICOM R-71A be used for exalted-carrier SSB reception on AM international broadcast stations without RIT? (Ron Pokatiloff, Zion, IL)

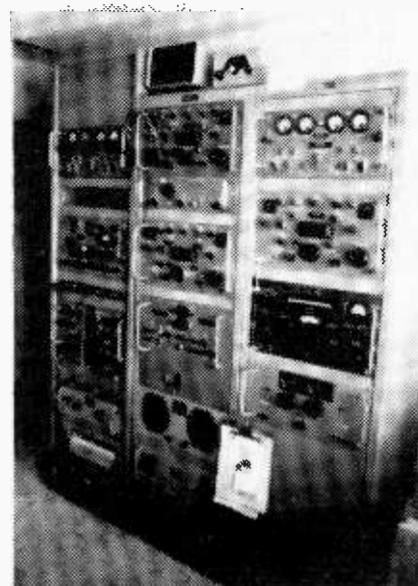
**A** Absolutely. I tried it. Since resolution of 10 Hz is possible, it would take a trained ear to hear beat distortion, even on music. And for the purist, a trimming adjustment is included for exact zeroing-in.

On the stock wide AM filter, audio quality is pleasant in the SSB mode.

# PROFILES

Bill Neill of San Antonio is understandably proud of his professional monitoring position which features military-grade receivers: Three R-390A's, one 51J4, one R-389 and one R-220.

The flexible receiver array interfaces with a variety of radioteletype machines for hard copy.



## Having Trouble Catching Military UHF Air to Ground?

Many new owners of MX-5000 scanners and Grove CRV-1B Scanverters are perplexed at not being able to hear much in the 225-400 MHz AM military aeronautical band.

Certainly compared to the busy 118-136 MHz civilian aircraft band, the UHF range sounds vacant. There are a number of good reasons for this.

There are far more civilian flights in the air than there are military, and those civilians are compressed into only 18 MHz worth of spectrum space compared with the 175 MHz at military UHF--nearly ten times the space for only a fraction of the users!

Military transmissions tend to be quick and formal: "Navy one-nine lima to Atlanta Center." Civilian flights are a little more chatty: "Chicago O'Hare, this is United flight 315 looking for winds aloft in the vicinity of Lake Superior north approach. Can you give us a hand?"

Obviously, the chances of interception greatly increase with long transmissions and shorter spectrum space to search.

Additionally, all military transmissions are associated with training and routine missions; as a result, there are often two-week-on and two-week-off stints (except for SAC), and daylight is likely to net more activity than night time.

It is best to know where to look than to hunt and peck. Some frequencies are in nationwide use. Let's take a look at a sampling.

**Q** Why doesn't my Power Ant bring in signals stronger from 60 miles away? Why isn't South Carolina included in Listener's Log? Why isn't the Grove Government Master File microfiche available in printed form? (Marcus Ard, Georgetown, SC)

**A** Antenna preamplifiers perform differently with different scanners; generally speaking, 30-50 MHz is virtually unimproved due to the low noise preamplifier transistors already in use in the scanner. 150-174 MHz will enjoy a small amount of improvement due to the better transistors found in the external preamplifier, while UHF (450-512 MHz) should receive a profound boost in signal strengths.

Listener's Log depends entirely upon contributions from readers; if the list doesn't come in, it can't get printed.

The Grove Government Master File was purchased in that form from the federal government just days before the entire list was classified; as such, it can no longer be obtained in any form. To reprint it would cost thousands of dollars; remember, it contains some 20,000 pages which would make a stack approximately 6-1/2 feet high!

- 460.125 Ch 4/Car-car
- 460.200 Ch 5/Dist 4, 5
- 460.225 Ch 6/Dist 6
- 460.300 Ch 7/Tactical
- 460.325 Ch 8/Felony Action Squad
- 460.400 Ch 9/Internal Affairs
- 460.500 Ch 12/Phonepatch

### ADDITIONAL LISTINGS

- 153.875 U of New Orleans (security)
- 154.785 NOPD Harbor Patrol
- 155.795 " " "
- 463.425 Superdome Police
- 453.525 Delgado Jr. Coll. (security)
- 453.675 NOPD Bridge Authority Police
- 453.400 " " "
- 453.775 Superdome Police
- 463.200 Tulane Univ. (security)
- 154.540 Orleans Parish Schools
- 462.025 RCA repeater
- 463.800 Rhodes Funeral Home
- 463.275 Southland Mall
- 155.145 St Bernard Parish Port & Harbor
- 452.975 Times Picayune
- 453.000 " "
- 173.375 " "
- 464.675 Transglobe Container Service
- 464.775 Uptown Square
- 461.450 (LWE)Construction Crews

- 460.350 (LWE)Management
- 460.450 (licensee-State of LA) Law Enforcement/Security
- 460.410 (LWE)related/exact use unknown
- 464.1875 (LWE)" " "
- 463.775 New Orleans East Towing
- 154.085 N.O.Health Dept.
- 464.775 N.O.Marine
- 464.925 " " "(Mechanics)
- 461.975 N.O.Steamboat (Dispatcher/Secur)

- 236.6 Air Force control towers
- 241.0 National Guard Training
- 243.0 Emergency/calling
- 255.4 Flight Service Stations
- 257.8 Military to FAA twrs
- 272.7 Flight Service Stations
- 311.0 Strategic Air Command pri.
- 321.0 Strategic Air Command sec.
- 348.6 Military to FAA towers
- 381.8 Coast Guard pri.
- 275.8 Ground control
- 342.5 METRO (weather)
- 340.2 Navy towers
- 372.2 Air Force dispatch
- 289.4 Clearance delivery
- 297.0 Military Airlift command
- 364.2 NORAD pri.
- 264.9 NORAD sec.
- 305.4 Radio direction finding
- 225.4 Ground control

Naturally, a good antenna and coax cable are also essential for properly receiving these weaker UHF signals. Use the Grove OMNI, Scanner Beam, a discone or 10" ground plane.

For coax, use only low-loss cable like Grove CBL series or other top-of-the-line RG-6/U, RG-8/U or RG-11/U, especially for runs exceeding 50 feet.



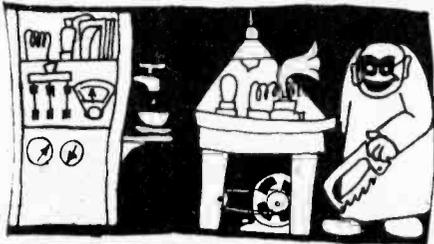
## GOING TO THE WORLD'S FAIR? TUNE IN!

Already in full swing, the 1984 World's Fair will be dominating New Orleans until November 11. If you and your family are planning a trip to see this gala event, take along a scanner and tune in on the excitement!

We would like to thank Noah Price Oliver, III, editor of the Louisiana Frequency Exchange (see review in this month's Library Shelf) for the listings included in this column.

- NEW ORLEANS POLICE DEPARTMENT**
- 460.025 Ch 1/Dist 1,8
  - 460.050 Ch 2/Dist 2
  - 460.100 Ch 3/Dist 3, 7

# EXPERIMENTER'S



## WORKSHOP

Assemble This

### BNC/MOTOROLA ADAPTER

by René Borde

Newer type scanners such as the Regency MX-5000 require a BNC plug for an outdoor antenna instead of a Motorola-type plug. This adaptor will enable you to retain your Motorola-type plug to be used with other scanners. Of course, two commercial adapters such as a VG-225/U male BNC to SO-239 and a PL-259 to Motorola may be combined, but with a subsequent increase in insertion loss.

#### PARTS REQUIRED

Adapter, RCA-type Phono-Jack to Male BNC (Radio Shack 278-254)

Jack, Motorola-type (Radio Shack 274-712, OR Jack w/cable, Motorola-type, Radio Shack 274-713)

The Phono-Jack will accommodate the center contact of a Motorola-type lug, but requires a ground shell.

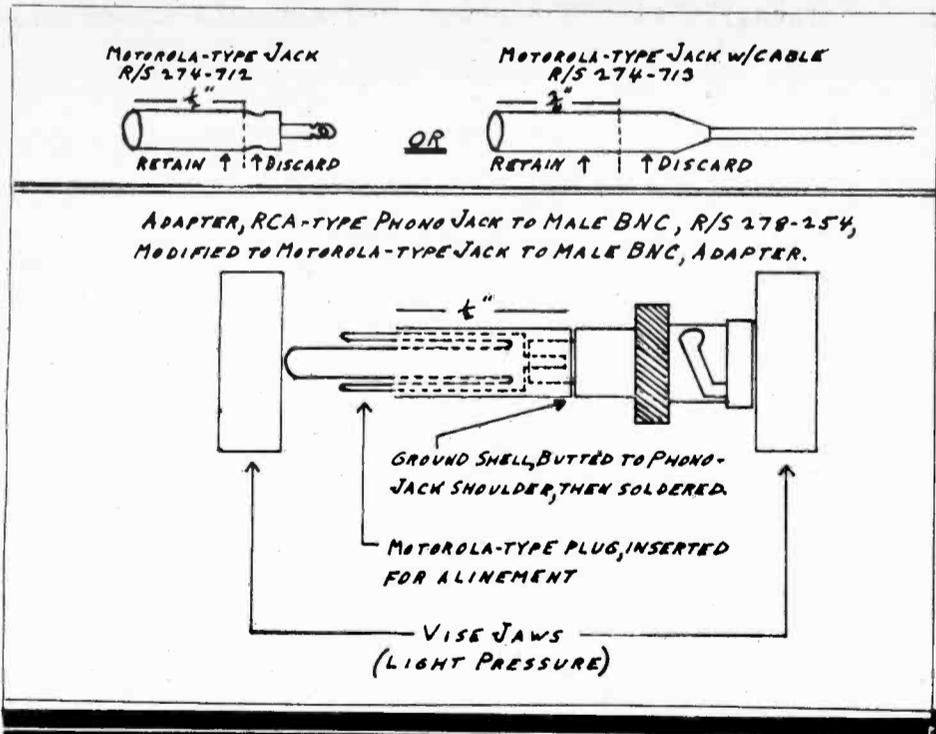
#### PROCEDURE

Press or tap out the mounting flange from the Motorola-type Jack (R/S 274-712). Carefully hack-saw a 1/2" portion of the ground shell off. File and smooth the rough edges, then butt the shell against the shoulder of the Phono-Jack (see drawings). Insert a Motorola-type plug to line both units up.

Place the assembly in a vise and apply vary slight holding pressure.

With a soldering iron, run a bead of solder around the butted ends by carefully rotating the adapter. Do not apply more heat than required. If a longer (3/4" ground shell is desired, use Jack w/cable (R/S 274-713) and hack-saw it 3/4" from the open end. Push out the inner shell and follow the instructions above. Any excess solder may be removed by careful filing or with a grinding wheel.

(Thanks, Rene, for sharing this excellent project with fellow MT readers...Bob)



### ADD COR TO YOUR SCANNER

by Jean Pronovost  
P.O. Box 454  
St-Jean, Quebec  
CANADA J3B 6Z8

Although written for the Realistic PRO-2001 scanner, this modification can be applied to other models in principle. You will need the service manual for your receiver to help you find where to hook-up your modifications.

A carrier operated relay (COR) will provide a make or break switch when-

ever a signal is present on your receiver. Our project comprises two transistors, a few resistors, a capacitor and a diode, a relay and an LED to show when the relay is activated.

While a COR can be made all solid state, in which case it becomes a COS (carrier operated switch), I prefer to use a relay because it will handle AC or DC loads with ratings limited only by the relay's contacts.

One useful application of a COR is to activate a tape recorder; other applications I will leave to your imagination!

Tape recorders are widely used in the military and political circles, and once you start recording your own tapes you will understand why. If you have your slave recorder monitor all the action on a specific channel, you are bound to learn all the aspects of an operation going on (like the "10" code and other unknown buzz-words).

This is particularly effective with seldom-used channels where you would have to sit in front of your receiver for days without ever knowing if you are listening to police detectives, security guards or some thieves.

And when the action unfolds at a frantic pace, you are sure not to miss a word since you will be able to play back any puzzling transmission.

You may wish to build a tape library of major events: Olympic Games, riots, fires or storms. However, bear in mind that the Communications Act forbids you from making those tapes public.

#### SEARCH THE UNKNOWN

Instead of monitoring a single channel, it is also possible to search a deserted segment of a band to make sure you are not missing anything. After a week or so of continuous monitoring, you should have a fair knowledge of what's going on there. If activity was recorded, then you will have to find out by other means on which frequency it took place.

#### THE CIRCUIT

Figure "A" shows the schematic of the COR and gives a description of the parts used. The COR is triggered by a positive voltage as it appears at the output

of the squelch circuit.

For the PRO-2001 Realistic scanner, the input of the COR is connected to the collector of transistor Q23 and the supply voltage (9.4 VDC) is taken from the emitter of transistor Q34 (refer to your service manual for the location of these transistors).

For other receivers, first look at the block diagram of your receiver in your service manual and find which components (transistors or IC's) are associated with the squelch circuit; then, using the schematic and parts layout, examine where those components are located.

Using a V.O.M. as a DC voltmeter (0-10 VDC scale), poke around these components and, while opening and closing the squelch, find the squelch output where you have a reading of a few volts with the squelch open, and zero volt or near ground with the squelch closed.

The COR circuit layout is not critical, but make sure only that the board and relay will fit inside your receiver. The LED indicator should be placed on the front panel at a position where it will be easily installed and won't obstruct any other components behind the panel. For the PRO-2001 Realistic scanner, the LED is located to the right of the "Realistic" logo.

A stereo jack on the rear panel of your receiver is used to connect the relay contacts to the outside world. If space is restricted, you can use a miniature jack.

Make sure you use a low current relay with a coil resistance of 500 ohms or more. With the squelch open or with a signal at the input, the LED should be on and the relay energized; with the squelch closed, the LED and relay should be off.

Any type of tape recorder will do as long as some kind of "remote" jack

Cont'd on p.30

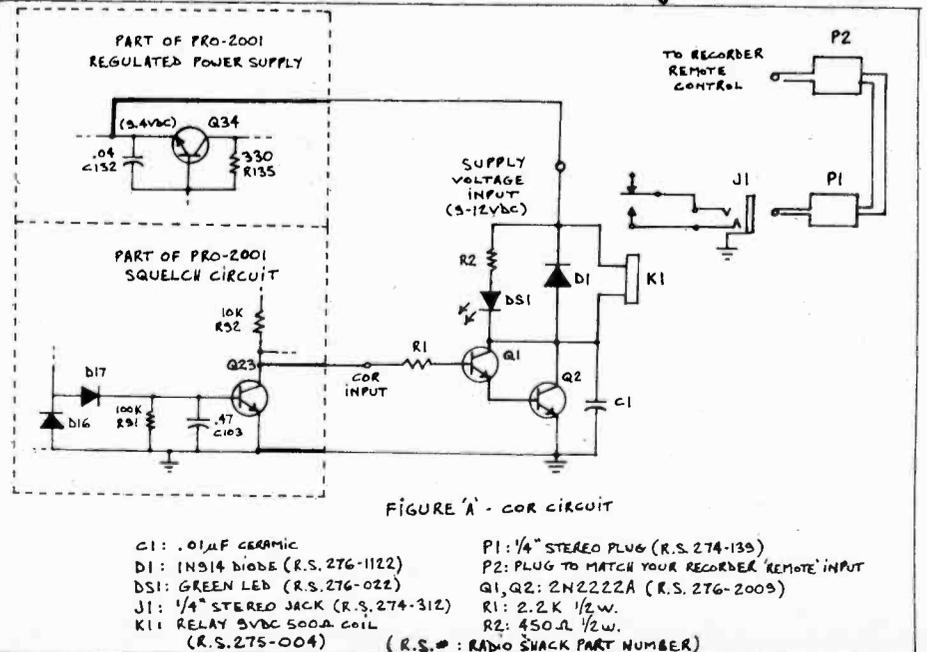


FIGURE A - COR CIRCUIT

- C1: .01µF CERAMIC
  - D1: 1N514 DIODE (R.S. 276-1122)
  - D17: GREEN LED (R.S. 276-022)
  - J1: 1/4" STEREO JACK (R.S. 274-312)
  - K1: RELAY 5VDC 500Ω COIL (R.S. 275-004)
  - P1: 1/4" STEREO PLUG (R.S. 274-135)
  - P2: PLUG TO MATCH YOUR RECORDER 'REMOTE' INPUT
  - Q1, Q2: 2N2222A (R.S. 276-2009)
  - R1: 2.2K 1/2W.
  - R2: 450Ω 1/2W.
- (R.S. # : RADIO SHACK PART NUMBER)

SAC from p.7

more 16-by-16-foot screens flank these four screens to project viewgraphs.

The primary system for storing and supplying the data is the SAC Automated Command Control System (SACCS). Data is constantly being fed into the system from SAC Forces around the world. As the data is needed, it is recalled from the computer by using the data request control panel located on the command post floor. The information is available as hard copy and/or projected on the screens.

The SACCS projection system displays both tabular and graphic material in seven colors and two sizes. In addition, color photographic material can be developed by sophisticated equipment in only 20-seconds and projected on the screens.

COMMUNICATIONS

As with every other aspect of SAC, **redundancy** is the key word in SAC communications. Every system has a backup, and every backup system has a backup.

On the desk in front of the center position of the Command Balcony (CINCSAC's position) sits an awesome array of seven telephones.

A gold phone is the Joint Chiefs of Staff Alerting Network (JCSAN); A black telephone is a scrambled voice telephone; A red phone is the Primary Alerting System (PAS) and lifting this telephone alerts all SAC bomber and missile sites; A gray telephone is used to contact individual bases or sites through the PAS for normal communications; A blue telephone connects SAC to NORAD; A pink telephone is the local telephone network; and a white telephone is the internal Offutt base telephone system.

**JCSAN:** The primary voice communication system through which CINCSAC would receive the authority to expend nuclear weapons would come over this **non-secure** system to save the few seconds needed to encrypt and decrypt voices on the scrambled phone.

CINCSAC is within reach of this system constantly via telephones, mobile telephone and a portable radio he carries at all times. This system connects CINCSAC with the National Military Command Centers through which launch orders would originate from the President through the JCS.\*

**PAS:** The heart of SAC command control communications is the Primary Alert System. This non-secure

voice communications system links the SAC command post with command posts at the numbered air forces and unit command posts at all SAC aircraft and missile units in the world.

Again redundancy is the key word. Communications over the PAS are carried by two widely separated routes simultaneously. A direct line goes from HQSAC to the wing command posts and at missile units on to alternate command posts and missile launch control centers.

An alternate route goes to the numbered air force command posts, then to command posts for aircraft units, the alternate missile command posts, launch control centers and wing command posts. Although the system uses commercial telephone lines, there has never been a communication failure over these lines.

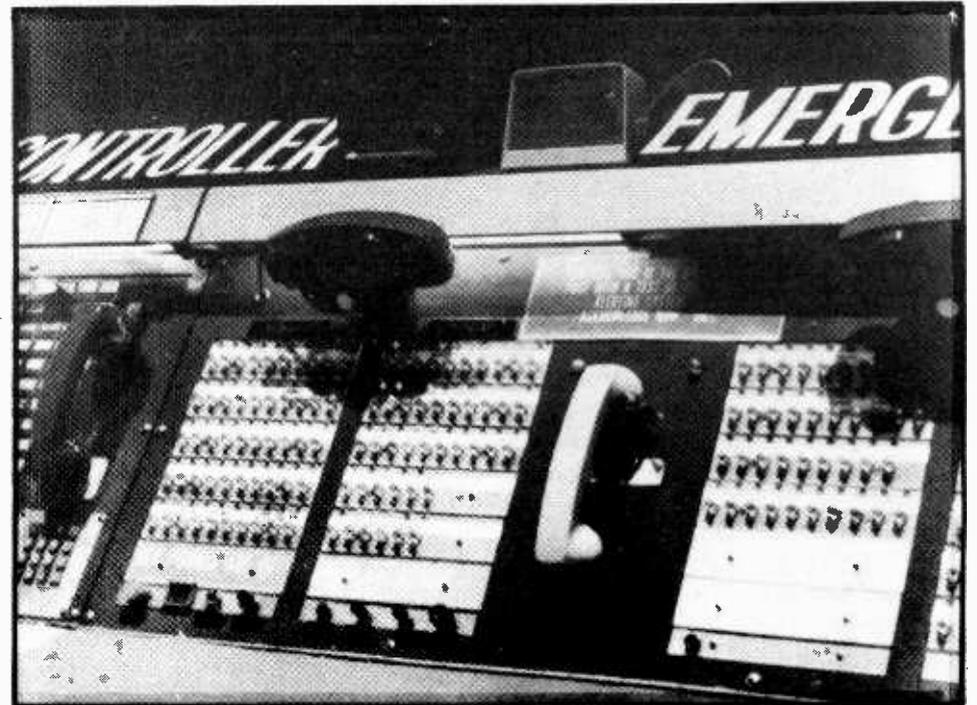
Located at the Senior Controller position in the Command Post, the PAS consists of a red phone in a cradle and a gray phone on a hook. The gray handset is used for routine communications to any of the units on the PAS network.

The red telephone is "hot" as soon as it is removed from the cradle. As it is removed a red rotating beacon flashes throughout the entire command post. Almost simultaneously buttons begin lighting up on the console, indicating that each unit has lifted their handset to receive communications. Only a few seconds are allowed for every unit to be on-line.

As soon as every button is lighted the message is passed. The routine test message, passed periodically throughout the day is: "Skybird, This is the SAC Command Post with a test of the Primary Alert System. Acknowledge now. Out." ("SKYBIRD" is the callsign for any SAC command post, "SKYKING" is the callsign for any airborne command post). As each unit in the network acknowledges, its light goes out on the console until the entire console is dark again.

This is the means by which the Emergency Action Message (EAM) or the so-called "go codes" would be dispatched to the SAC units. Although it is non-secure, the codes would be meaningless to anyone intercepting them.

**SOCS:** The SAC Operations Conference System is the backup system to the PAS. It is also used on a day-to-day basis to facilitate coordination of operation and maintenance functions.



The Primary Alert System console, located at the Senior Controller's position in the Underground Command Post. Lifting the red telephone at top of panel instantly alerts every SAC command post and missile launch control center. (Photo by Art Lewis)

The system differs from PAS in two ways: It is an operator-assisted system and it is connected not only to SAC units but also to vendors, aircraft manufacturers and logistic command depots for conference purposes.

SCOPE SIGNAL THREE:

This is the HF single sideband system used for positive control of SAC's airborne force by dispatching emergency action messages (EAM). It also provides routine communications with SAC aircraft.

The system, undergoing massive restructuring, will utilize three main command posts: Offutt, McClellan and Andrews which will act as gateways to other sites. Under Scope Signal III, transmitters at 12 sites can be keyed from Offutt, allowing world-wide communications with SAC units without the need of relays. The system interfaces with AUTOVON/AUTODIN.

Each station is equipped with four-channel independent sideband radios consisting of Collins HF-8054/54A receivers which tune from .25 to 30MHz; Collins HF-8014/14A exciters transmitting from 1.6-30MHz; and Collins HF-8022 10-kilowatt linear power amplifiers (weighing nearly one tone each!).

An around-the-clock schedule of frequency checks at five minute intervals is maintained with each of the twelve world-wide stations transmitting practice EAMs on the following present schedule:

H+:03-YOKOTA, Japan  
:08-CROUGHTON, England  
:13-McCLELLAN, California  
:23-ANDERSON, Guam  
:28-THULE, Greenland

:33-HICKAM, Hawaii  
:38-LAJES, Azores  
:43-ELMENDORF, Alaska  
:48-LORING, Maine  
:53-CLARK, Phillipines  
:58-MacDILL, Florida

**GREEN PINE:** This system is made up of UHF radio stations located in an arc from Adak, Aleutian Islands to Keflavik, Iceland. It allows direct contact between the SAC command post and aircraft crews in the northern area, even when propagation problems affect HF radio.

Cont'd on p.27

\*Alexander Haig's infamous "I am in charge here" remark may not have been as far off-base as some people thought at the time. There are two different lines of succession. Constitutionally, the progression is Vice President, Speaker of the House, President Pro-Tem of the Senate and Cabinet members in order of seniority.

However, the authority to launch nuclear weapons takes a different succession entirely: Vice President, Secretary of Defense, Chairman of the JCS and the Emergency Action Officer aboard Looking Glass (a general office) as the lowest ranking officer with the nuclear codes.

Assuming that in the confusion General Haig thought he was still Secretary of Defense instead of Secretary of State, he would have been in charge of authorizing nuclear expenditures until the Vice President returned to Washington and had access to the "football" (The attache case which accompanies the President everywhere containing launch options and codes).

**SAC from p.27**

**SLFCS:** The Survivable Low Frequency Communications System in the LF/VLF range is available for use in the event of complete HF black-out (for instance in the face of nuclear disruption).

The system is composed of two high power ground transmitter-receiver sites at Hawes, California (37.2 kHz) and Silver Creek, Nebraska (48.5 kHz); transmit-receive capabilities aboard Looking Glass, the auxiliary Airborne Command Posts and the National Emergency Airborne Command Post and more than 200 receive-only sites at SAC Headquarters, numbered Air Force command posts, selected wing command posts, all missile launch control centers and all "Green Pine" sites.

**ERCS:** The Emergency Rocket Communication System is a backup system in which a number of ICBMs at sites throughout the system contain recording equipment which, after launch, would play back a pre-recorded EAM simultaneously over two UHF frequencies.

**FEMA from p.1**

Emergency Information Coordination Center at FEMA headquarters. Additionally, voice grade lines link 2400 warning points nationwide.

FEMA was created in 1979 from five federal agencies and implements its radio warnings through the Emergency Broadcast System (EBS), a logical outgrowth of the old CONELRAD (Control of Electromagnetic Radiation) system of the 1960's which utilized 640 and 1240 kHz in the standard AM radio band.

Activation of the EBS by the President is accomplished when he directs the White House Communications Duty Officer to contact either the North American Aerospace Defense Command (NORAD) or FEMA to release the Emergency Action Notification to control points of the radio and TV networks, communications common carriers, as well as AP and UPI through a dedicated teletype network.

Pre-selected code words provide authentication procedures at the time of the message.

Running 10 KW of transmitter power, the HF transmitters provide reliable communications across the country among regional centers.

The new command center at Olney, Maryland is an ideal example of planning.

**GIANT STAR:** This is SAC's portion of the UHF AFSATCOM system. The space segment is composed of AFSATCOM repeaters incorporated into the Navy's FLTSATCOM system.

AFSATCOM has worldwide coverage with the exception of the South Pole area. The system is aboard all SAC bombers, reconnaissance aircraft, airborne and ground command posts, missile launch control centers, special weapons sites and other locations. The system handles multiple circuits at 100 words per minutes with built-in anti-jam and security capabilities.

Other communications include tropospheric scatter radio, SHF satellite, hardened cable and microwave. Communications paths are geographically scattered to ensure survivable positive control of SAC forces worldwide. In addition, SAC is a major user of the DCS (Defense Communications System) including AUTOVON, AUTODIN and AUTOSEVOCOM.

**NEXT MONTH:** A sky full of command posts and their frequencies

Capable of housing and feeding 450 people for 30 days, it has its own water supply and uninterruptable power. Electronic equipment is shock mounted to survive earthquake or even nuclear attack on nearby Washington, DC.

Four-ton concrete doors open to reveal a facility entirely enclosed within 1/4" steel plate to isolate the delicate equipment from electromagnetic pulse (EMP) associated with a nuclear explosion.

Four communication antennas are buried beneath the ground, but may be raised for two-way operation.



**FEMA Nerve Center:** The underground command post at Olney, MD

**Federal Emergency Management Agency (FEMA)**

**CIVIL DEFENSE NATIONAL RADIO SYSTEM (CDNARS)**

This list is extracted from Bob Grove's new SHORT-WAVE DIRECTORY (BOK-14), available from Grove Enterprises for \$12.95 (book rate)

Formerly the Defense Civil Preparedness Agency (DCPA), FEMA'S prime responsibility is to assure continuity in government during an enemy attack, as well as to respond to natural disasters as declared by the President. Civilian employees man the facilities.

VIP protection installations, such as those deep in Mount Weather, Berryville, VA (Blue Ridge Mountains, Rt 601 between Paris and Bluemont, VA), are part of this nationwide complex.

A sophisticated USB/RTTY (100WPM/85Hz; encrypted 67 WPM) network has been established to support this vital program. Slow-speed encrypted CW is also transmitted. ATS-3 satellite is also used. Communications security (COMSEC) is observed when discussing critical materials for stockpiling in case of aggression.

Foxtrot 06	2320	*28	10493 (day)
07	2360	29	10588
08	2377	80	11721
09	2445	31	11801
10	2658	32	11957
11	3341	33	12009
12	3379	**34	12216
13	3388	35	14450
14	4780	36	14776
*15	5211 (night)	37	14837
16	5402	38	14886
17	5821	39	14899
18	5961	40	14908
19	6049	41	16201
20	6106	42	16430
21	6108	43	17519
22	6151	***44	17649
23	6176	45	18744
24	6809	46	19757
**25	7348	47	19969
26	9462	48	20027
27	101941	49	12129
		50	20063

- \* calling/emergency
- \*\* point-to-point alternate
- \*\*\* WGY908 encrypted CW
- \*\*\*\* emergency secondary, region 9 & 10

**REGIONS**

WGY900  
Ops Support Warning Division, FEMA HQ, Wash DC

**REGION 1**

WGY901 MAYNARD, MASS  
WGY921 Concord, NH  
WGY931 Montpelier, VT  
WGY941 Augusta, ME  
WGY951 Hartford, CT  
WGY961 Framingham, MA  
WGY971 Providence, RI

**REGION 2**

WGY902 NEW YORK CITY, NY

WGY932 St Thomas, VI  
WGY942 Albany, NY  
WGY982 North Trenton, NJ  
WGY992 San Juan, Puerto Rico

**REGION 3**

WGY903 OLNEY, MD  
(Net Control Station)  
WGY923 Harrisburg, PA  
WGY933 Pikesville, MD  
WGY943 Charlestown, WV  
WGY953 Delaware City, Delaware  
WGY963 Richmond, VA  
WGY983 Washington, D.C.  
WGY933 Charlottesville, VA

**REGION 4**

WGY904 THOMASVILLE, GA  
(3rd alternate NCS)  
WGY914 Canal Zone, (Balboa Hts)  
WGY924 Nashville, TN  
WGY934 Columbia, SC  
WGY944 Atlanta, GA  
WGY954 Montgomery, AL  
WGY964 Jackson, MS  
WGY974 Tallahassee, FL  
WGY984 Raleigh, NC  
WGY994 Frankfurt, KY

**REGION 5**

WGY905 BATTLE CREEK, MI  
(4th alternate NSC)  
WGY925 Madison, WI  
WGY935 St Paul, MN  
WGY945 Columbus, OH

Cont'd on p.29

**FEMA from p.28**

WGY955 Springfield, IL  
 WGY965 Indianapolis, IN  
 WGY975 Lansing, MI

**REGION 6**

WGY906 DENTON, TEXAS  
 (2nd alternate NCS)  
 WGY926 Oklahoma City, OK  
 WGY936 Santa Fe, NM  
 WGY946 Baton Rouge, LA  
 WGY956 Austin, TX  
 WGY966 Conway, AR

**REGION 7**

WGY907 KANSAS CITY, MISSOURI  
 WGY947 Des Moines, IA  
 WGY957 Lincoln, NB  
 WGY977 Jefferson City, MO  
 WGY997 Topeka, KS

**REGION 8**

WGY908 DENVER, COLORADO  
 (1st alternate NCS)  
 WGY928 Pierre, SD  
 WGY938 Cheyenne, WY  
 WGY948 Bismark, ND  
 WGY958 Helena, MT  
 WGY968 Golden, CO  
 WGY998 Salt Lake City, UT

**REGION 9**

WGY909 SAN FRANCISCO, CA  
 WGY929 Carson City, NV  
 WGY939 Sacramento, CA  
 WGY949 Phoenix, AZ  
 WGY959 Honolulu, HI

**REGION 10**

WGY910 BOTHELL, WASHINGTON  
 WGY920 Boise, ID  
 WGY930 Olympia, WA  
 WGY940 Salem, OR  
 WGY960 Soldotna, AK  
 WGY970 Juneau, AK  
 WGY980 Alcantra, AK  
 WGY990 Moses Lake, WA

WGY911 Telecommunications  
 Management; FEMA HQ,  
 Wash DC

WGY912 VIP Relocation Site,  
 Mt Weather, VA (Test  
 Tues 1330 UTC; slow  
 encrypted CW sent  
 3388.8)

WGY915 National Communica-  
 tions System, Arling-  
 ton, VA

**VIP SUPPORT FACILITIES**

Ft Myer, VA	WAR21
Ft Belvoir	WAR22
Hagerstown, MD	WAR30
Mt Weather, VA	WAR42
Mercersburg, PA	WAR45
Ft Richie, MD	WAR46
Boonsboro, MD	WAR47

**BEHIND THE DIALS**

from p.10

to our new ICOM R-71A, we plugged the unit into the headphone jack (some plug wiring will have to be done by the user).

After selecting a marginal single sideband signal, the unit was alternately connected and disconnected. No doubt about it;

there was a measurable improvement in voice articulation with the Heil speaker system.

The experiment was repeated on several AM broadcast signals; again, noticeable improvement was noted on both voice and music.

Some additional sound countouring may be done by adding a 0.01 microfarad capacitor in series with the audio to reduce bass (omit for full music range).

The unit works.  
 (Heil SS-2, \$54.95 plus \$4 U.S. shipping, \$5 Canada. Heil, Ltd, #2 Heil Drive, Marissa, IL 62257)

**COMING NEXT MONTH:** Reviews of the Microlog AIR-1 and AEA MAP 64/2 RTTY/AMTOR interface packages; also the new SCAN-LOC by MicroComm for the TS-430S transceiver.

**RTTY/FAX:**

**GETTING STARTED from p.12**

**PRESS STATIONS**

Most commercial and governmental press agencies transmit "press" on RTTY... very often in English. There is no faster way to get news...it's like having a wire service in your home! A small sampling of press stations transmitting English news include:

	Agency
3MA35	China News Taipei, Taiwan
VNA30	Vietnamese News Hanoi, Vietnam
BZR66	Xinhua News Beijing, China
SUA289	Middle East News Cairo, Egypt
GLK42	Associated Press London, England
JAN24	Kyodo News Tokyo, Japan
YIX70	Iraqi News Baghdad, Iraq
HML60	Korean Central Nws Pyongyang, N Korea
RCB53	Tass News Moscow, USSR
FTK94	France Press Paris, France
GPE30	Reuters News London, England
9KT383	Kuwait News Kuwait Cty, Kuwait

**WEATHER STATIONS**

Shortwave is filled with RTTY weather stations. Copying meteorological transmissions takes some practice and preparation. While some weather stations transmit "plain text" weather, the majority transmit weather data in a special "synoptic" code. We sell a special book called AIR AND METEO GUIDE for \$15.95 (+shipping) to help you decode these transmissions. Not everyone agrees that RTTY weather transmis-

sions are interesting, but no one can deny they afford loggings from some of the rarest countries in the world. Weather stations I have monitored include:

FJY4	Martin de Vivies St Paul & Amsterdam Isls
RUZU	Molodezhnaya Antarctica
TZH	Bamako, Mali
LOK	Orcadas del Sur S Orkney Isls
TNL77	Brazzaville, Congo
3BT4	Plaisance Mauritius
UGE2	Bellingshausen S Shetland Isls

**AERONAUTICAL STATIONS**

Like weather stations, RTTY aero stations transmit throughout the shortwave spectrum. They can often be found sending an "RY" or "FOX" test. The format of an RY & FOX test are as follows:

RYRYRYRYRYRYRYRY DE STK STK

THE QUICK BROWN FOX JUMPS OVER THE LAZY DOGS BACK 0123456789 DE D48 D48 D48

Aero RTTY stations can also be a rich source of DX. Listen for:

ETD3	Addis Ababa Air Ethiopia
5YD22	Nairobi Air, Kenya
ODT	Beirut Air, Lebanon
D4B	Sal Air, Cape Verde Island
9JZ9	Lusaka Air, Zambia
JYN	Amman Air, Jordan
CAI7E	Pascus Air, Easter Island
YKA8	Damascus Air, Syria
ARA	Karachi Air Pakistan
STK	Khartoum Air, Sudan
PZP	Zanderij Air Surinam

**MILITARY STATIONS**

Many military stations use uncoded RTTY to pass non-sensitive traffic. Traffic relating to weather, mundane clerical matters, and war maneuvers can be monitored. A sampling of the military stations you can hear include:

GYU	Gibraltar Naval R.
NBA	US Navy Balboa
MKD	Royal Air Force Akrotiri
MKG	Royal Air Force London
ZRH	South African Navy Capetown
OBC	Peruvian Navy Callao

**OTHER SERVICES**

Other services using RTTY on shortwave include diplomatic and commercial concerns. Embassy traffic can be monitored, as well as United Nations outposts all

over the world. On the commercial front; it is not uncommon to read reports coming off an oil rig near Indonesia, or financial traffic being sent from a rubber plantation in Africa. Radio amateurs (HAMS) from around the world can be heard communicating via radioteletype.

**NEXT MONTH: Equipment for RTTY Reception**

**BROADCASTING: SOUNDS FROM PACIFIC p.16**

**NEW CALEDONIA**

Amidst the coconut palms and aquamarine waters, New Caledonia is the "Paris of the Pacific."

Broadcasting in French, RADIO NOUMEA is a lively, fast-paced broadcaster on 3355 and 7170 kHz using 20 kW.

Nightly from 0730 until 1130 GMT you can hear popular Top 40 music of the U.S. and occasional island music.

To receive the station QSL letter try sending your French report and two or three IRC's to RFO RADIO MOUMEA, Boite Postal G-3, Noumea, New Caledonia.

If French is Greek to you, the station will gladly accept taped cassettes of their programming.

**VANUATU**

East of the Coral Sea, 80 islands scattered north to south comprise Vanuatu. Formerly New Hebrides, this archipelago was granted independence from Britain and France in 1980.

Transmitting from Malapoa, RADIO VANUATU broadcast on 3945 kHz using 10 kW and 7260 kHz at 2.5 kW. Programs are mixed with French, English, and Bislama, a Pidgin dialect.

Try monitoring by 0700 GMT in North America to hear news and pop, island, and easy listening music.

Don't forget at least 2 IRC's and send your report to: RADIO VANUATU, P.O.Box 49, Port-Vila, Vanuatu.

**COOK ISLANDS**

The unspoiled lifestyle of the Cook Islands have retained the charm and magic of Polynesia.

As many SWL's know, RADIO COOK ISLANDS is among the most-sought-after DX stations. The station only uses 500 watts on 11760 kHz.

The Cooks are heard regularly in North America and persistence is the key to log this station. Fade-in to North America is normally by 0700 GMT.

Listen for national news in English and Maori on the hour. The station also

**BROADCASTING:**

**SOUNDS FROM PACIFIC p.29**

airs island, pop, and easy listening music. The station ID is: "This is the Radio Cook Islands calling." When in session, Cook Radio relays the island parliament sessions as well as frequency broadcast from Radio New Zealand and Radio Australia.

Send your reception reports and two or three IRC's to: RADIO COOK ISLANDS, Box 126, Ajarua, Rarotonga, Cook Islands.

**TAHITI**

Haunting, hypnotic or seductive--all describe the music of Tahiti, the very heart of Polynesia and the best example of south sea island music. It is heard nightly broadcasting with 20 kW from Papeete beginning at 0300 GMT on 15170 and 11825 kHz until sign off at 0730 GMT.

Programs in French and Tahitian consist of news, pop music and beautiful island music. Signoff at 0730 includes both French and Tahitian anthems.

Send your reports and two IRC's to RFO RADIO TAHITI, Boite Postal 125, Papeete, Tahiti.

**NEXT MONTH: QSL'ing the Land Down Under**

**BROADCASTING:**

**HANK BENNETT from p.16**

wife was seriously injured but she is recovering.

Mr. Ferrell was my first chief editor when I began writing for Popular Electronics magazine back in 1954 and we remained together for many years until he left to form his own business.

Many DXers have had business dealings with Gilfer Associates in the past and Mrs. Ferrell has informed us that she intends to continue serving the short-wave listening fraternity.

Our collective sympathy is extended to Mrs. Ferrell and the family.

Another death was recently reported by Associated Press of a person who made headlines in 1912. Harold Cottam, the wireless operator whose relay of the first news of the Titanic disaster in that year helped save over 700 people aboard the doomed British lines, passed away in Nottingham, England, at the age of 93.

Cottam was wireless operator on the British liner Carpathia, steaming about 58 miles from the Titanic.

**BROADCASTING:**

**ENGLISH LANGUAGE from p.17**

well-known "English by Radio" teaching session. These can be very interesting if you want to know how things are said in a foreign language!

One very special broadcast is dear to the heart of a "true-blue" Brit: the 2130-2200 segment Tuesdays and Fridays, "BBC Calling the Falklands," a rather old-fashioned "personal" level of radio programming, reminiscent of earlier days of broadcasting I feel.

We seem to have lost the personal touch in much modern programming, especially on shortwave. The only exception to this seems to be the Radio Nederland "Happy Station" broadcast on Sundays, hosted by Tom Meyer.

The Falklands program certainly became exciting--and poignant--during the tragic recent war with Argentina: I'm sure many of you tuned in during those tense days of conflict and had a "ringside seat" on a current flashpoint of war. Along with the current D-day reminiscences, it serves to remind us that freedom is always bought with a price of human lives.

**BITS from p.22**

The previous statement mentioned a "DATA statement pointer" (how the system knows where it last got data from). It is a tag the system places on the data and on the variable linking the two together, one pointing to the other.

Some BASICS (CBASIC comes to mind) allow you to reset the pointer to the beginning of the data list using a RESTORE statement whose syntax is:

**Line number RESTORE**

This comes in extremely handy when you are using a table on constants which must be read over and over. Consider the following:

110 DATA 1,2,3,4,10,56,78,99,100,1,15,26

200 READ AZ,BZ,CZ

290 RESTORE

300 READ DZ,EZ,FZ,GZ

This produces the following output:

AZ=1 BZ=2 CZ=3 DZ=1 EZ=2 FZ=3 GZ=4

If the RESTORE statement is not used the output would be:

AZ=1 BZ=2 CZ=3 DZ=4 EZ=10 FZ=56 GZ=78

**MONTHLY SUMMARY OF MAIN INTERNATIONAL BROADCASTERS:**

BRITAIN: BBC	1100-1330	21710	21660	15215	15070	11775
		6195				
	2000-0000	15260	11750	6175		
	0000-0300	11750	9515	6175	6130	6005
		5975				
	0500-0630	9510	6175	5975		
RADIO AUSTRALIA	1100-1600	11800	11710	9580		
ECUADOR: HCJB	1200-1430	26020	17890	15115	11740	
	0030-0700	15155	11910	9745		
USA: VOA	1700-2300	15600	15580	15445		
	0000-0600	15205	11740	9650	6130	5995
SOUTH AFRICA	0200-0256	11730	9615	5980		

**VOICE OF AMERICA**

0000-0400 to Caribbean & Americas: 5995 6130 9650 11740 15205 17640 17730

1600-2200 to Africa: 6040 6045 7195 9575 9620 15205 15410 15445 15580 15600 17785 17870 21485 21680 21840 26000 26040

0300-0800: 3990 5995 6035 6080 6095 6125 7170 7280 9530 9670 9745 11835 11915 15240 15600 (Variable frequencies during time period stated.)

PRESS CONFERENCE USA	Sat:	1930/0230
SPOTLIGHT	Sun:	0130
AMERICAN VIEWPOINT	Sat:	1810/0210
CARIBBEAN REPORT	Mon,Fri:	0010
ISSUES IN THE NEWS	Sun:	0230
NEWSLINE	Mon,Fri:	0010/0400/0500/0700
INTERNATIONAL VIEWPOINTS	Sun:	2110/0010
REPORT TO THE AMERICAS	Mon-Fri:	0110

**EXPERIMENTERS WORKSHOP:**

**ADD COR TO YOUR SCANNER p.26**

is available to control the recorder's play motor. This jack is connected through a cable with appropriate plugs at both ends to the COR's stereo jack which, in turn, is connected to the normally-open contacts of the relay.

A tape counter is a nice feature to have on your recorder as you will be able to know at a glance if activity was recorded.

**CONNECTING THE AUDIO**

A shielded cable with mating plugs connects between the mike input of your recorder and the audio output of your receiver. If

your recorder has automatic recording level, adjustments will be simplified; otherwise, you will have to experiment with receiver volume control and the like.

A resistor attenuation network (resistors R3, R4 and R5) giving 75 dB of attenuation was needed for my Realistic CTR-41 cassette recorder. Varying the value of resistor R5 from 5K to 100K will yield attenuation values ranging from 40 dB to 100 dB for an input impedance of 8 ohms and an output impedance of 1000 ohms (mike input impedance of CTR-41).

Finally, a switch to turn the external speaker on and off will be handy to avoid being awakened by activity during the night!

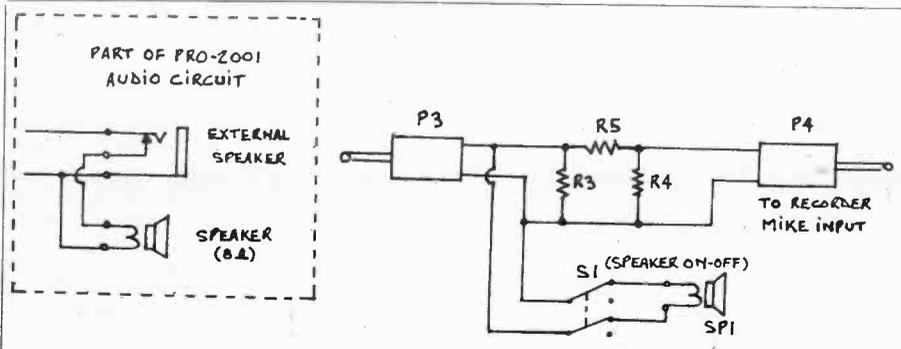


FIGURE 'B' - EXTERNAL SPEAKER & AUDIO CONTROL BOX

- P3: 1/4" 2 CONDUCTORS PLUG (RS 274-1536)
- P4: PLUG TO MATCH YOUR RECORDER 'MIKE' INPUT
- R3: 8Ω 1W.
- R4: 1K 1/2W.
- R5: 25K 1/2W. (SEE TEXT)
- S1: D.P.D.T. SWITCH
- SPI: 8Ω SPEAKER

This completes INPUT and OUTPUT for now. We will come back to this subject again once we've gotten through other subjects. Next month we'll discuss "comparison, Boolean operations and the IF (BRANCHING) statements. As always, I'm available by mail at P.O.Box 203, Roselle Park, NJ 07204, and on the air per the schedule given previously.

**LISTENERS LOG from p.20**

	DESCRIPTION	FREQUENCY
ATLANTIC CTY	PD	156.0900
ATLANTIC CTY	PD	453.6000
ATLANTIC CTY	PD	155.8500
ATLANTIC CTY	PD	155.4150
ATLANTIC CTY	PD	155.3100
ATLANTIC CTY	PD	155.9700
ATLANTIC CTY	PD	DISPATCH 155.1300
ATLANTIC CTY	PD	F1 460.1500
ATLANTIC CTY	PD	F2 460.4250
ATLANTIC CTY	PD	MUTUAL AID 156.2100
CAPE MAY	PD	155.0700
CAPE MAY	PD	155.7000
CAPE MAY	PD	156.2100
EWING	FD	154.2950
EWING	FD	154.4300
EWING	PD	453.9750
GRDN ST PKWY	TURNPIKE ATH CAR/CAR	154.9500
GRDN ST PKWY	TURNPIKE ATH DISPATCH	154.9050
GRDN ST PKWY	TURNPIKE ATH MOBILE	158.9100
JERSEY CITY	FD	460.6000
JERSEY CITY	FD	460.5500
LAN CTY XPWY	TURNPIKE ATH	453.9000
LAN CTY XPWY	TURNPIKE ATH	453.7000
MERCER CO	PD	F1 154.4300
MERCER CO	PD	F2 154.2950
NEWJARK	FD	154.1300
NEW JERSEY	PORT AUTH.	154.1000
NEW JERSEY	PORT AUTH.	BRIDGES 460.3750
NEW JERSEY	STATE PD	39.8000
NEW JERSEY	STATE PD	45.0000
NEW JERSEY	STATE PD	39.7600
NEW JERSEY	STATE PD	CENTRAL 155.4450
NEW JERSEY	STATE PD	CONFNTL SQ 460.0500
NEW JERSEY	STATE PD	CONFNTL SQ 460.0750
NEW JERSEY	STATE PD	CONFNTL SQ 460.1000
NEW JERSEY	STATE PD	F1 SOUTH 44.9400
NEW JERSEY	STATE PD	F2 CENTRAL 44.6200
NEW JERSEY	STATE PD	F3 SOUTH 44.6600
NEW JERSEY	STATE PD	F4 44.9800
NEW JERSEY	STATE PD	F5 44.7800
NEW JERSEY	STATE PD	HANDHELD 154.6800
NEW JERSEY	STATE PD	NARCOTICS 460.5000
NEW JERSEY	STATE PD	NORTH 155.4600
NEW JERSEY	STATE PD	SOUTH 154.9200
NJ TURNPIKE	TURNPIKE ATH	154.8300
NJ TURNPIKE	TURNPIKE ATH CAR/CAR	154.9350
NJ TURNPIKE	TURNPIKE ATH DISPATCH	155.1900
PRINCETON	PD	159.0900
PRINCETON	PD	155.6400
PRINCETON	PD	453.6750
PRINCETON	PD	155.6550
PRINCETON	PD	UNIVERSITY 155.4150
PRINCETON	PD	UNIVERSITY 155.3400
TRENTON	FD	F1 460.3750
TRENTON	FD	F1 460.5750
TRENTON	FD	F2 460.6000
TRENTON	FD	F2 460.6000
TRENTON	PD	453.3750
TRENTON	PD	453.3750
TRENTON	PD	453.2250
TRENTON	PD	453.2250
TRENTON	PD	SURV. 453.4250
TRENTON	PD	SURV. 453.4250
TRENTON	PSYCH HOSP	BASE 500.9875
TRENTON	PSYCH HOSP	MOBILE 503.9875

**HELPFUL HINTS:**

**RADIO ABBREVIATIONS p. 24**

NR	number, Novice Roundup (contest)
NS	nanosecond
NTS	National Traffic System (ARRL)
NW	now, resume transmission
OB	old boy (male amateur)
OBS	Official Bulletin Station (ARRL)
OD	outside diameter
OES	Official Emergency Station (ARRL)
OG	old girl (female operator)
OM	old man (male operator)
ONLI	only
OO	Official Observer (ARRL)
OP	operate, operator
OP AMP	operational amplifier
OPR	operator
ORS	Official Relay Station (ARRL)
OSC	oscillator
OSCAR	Orbiting Satellite Carrying Amateur Radio
OT	old timer, old top, offset tuning (receiver)
OTC	Old Timer's Club

OTS	Official Traffic Station (ARRL)
OVS	Official VHF Station (ARRL)
P	pico (prefix), power, plug
PA	power amplifier, public address
PAM	pulse amplitude modulation
PATCH	telephone to amateur station interconnection device
PBL	preamble (message handling)
PC	printed circuit
PEP	peak envelope power
PEV	peak envelope voltage
pF	picoFarad
pH	picoHenry
PIA	Public Information Assistant (ARRL)
PIN	positive-intrinsic-negative (transistor)
PIO	Public Information Officer (ARRL)
PIV	peak inverse voltage
PLL	phase-locked loop
PM	phase modulation
PMOS	p-channel metal-oxide semiconductor
PNP	positive-negative-positive (transistor)
POT	potentiometer
PP	peak-to-peak

PRA	Public Relations Assistant (ARRL)
PRAC	Public Relations Advisory Committee (ARRL)
PROM	programmable read-only memory
PSE	please
PSHR	Public Service Honor Roll (ARRL)
PTO	permeability-tuned oscillator
PTT	push-to-talk
PX	press report
Q	transistor, figure of merit (tuned circuit)
QRP	low power (under 5 watts)
QUAD	four-sided antenna
R	received okay, are, period (punctuation mark), resistor
RACES	Radio Amateur Civil Emergency Service
RAM	random-access memory
RC	resistance-capacitance
R/C	radio control
RCC	Rag Chewer's Club (award)
RCVD	received okay
RCVR	receiver
RF	radio frequency
RFC	radio frequency choke
RFI	radio frequency interference
RHC	right-hand circular (polarization)
RIG	station equipment
RIT	receiver incremental tuning
RLC	resistance-inductance-capacitance
RM	rule making (FCC number for petition)
R/MIN	revolutions per minute
RMS	root mean square
ROM	read-only memory
RPT	repeat, I repeat (message handling)
RPTR	repeater
R/S	revolutions per second
RST	readability-strength-tone (signal report)
RTTY	radioteletype
RX	receiver
S	Siemens, switch, second (time)
SASE	self-addressed, stamped envelope
SEC	Section Emergency Coordinator (ARRL)
SET	Simulated Emergency Test (ARRL)
SGL	State Government Liaison (ARRL)
SHACK	radio room
SHF	super high frequency (3-30 GHz)
SHUD	should
SIG	signal, signature
SKED	schedule
SKYHOOK	antenna
SM	Section Manager (ARRL), silver mica (capacitor)
S/N	signal-to-noise (ratio)
SPDT	single-pole double-throw (switch)
SPST	single-pole single-throw (switch)
SRI	sorry
SS	Sweepstakes (contest), spread spectrum
SSB	Single-sideband (voice)
SSC	Special Service Club (ARRL)
SSI	small-scale integration
SSTV	slow-scan television
STM	Section Traffic Manager (ARRL)
SVC	service, service message prefix
SWL	shortwave listener
SWR	standing wave ratio
SX	simplex
SYNC	synchronous, synchronizing
T	zero (numeral), tera (prefix), transformer (schematic)
TA	Technical Advisor (ARRL)
TAD	Ten American Districts (award)
TC	Technical Coordinator (ARRL)
TCC	Transcontinental Corps (ARRL)
TFC	traffic (messages)
TKS	thanks
TMRW	tomorrow
TNX	thanks
TR	transmit-receive
TT	that
TTL	transistor-transistor logic
TTY	teletype
TU	thank you, terminal unit
TVI	television interference
TX	transmitter, time tick
U	you, integrated circuit (schematic)
UHF	ultra-high frequency (300-3000 MHz)
UR	your
URS	yours
USB	upper sideband (voice)
UTC	Universal Time Coordinated
UV	ultraviolet
V	volt, vacuum tube (schematic)
VCO	voltage-controlled oscillator
VCR	video cassette recorder
VDT	video display terminal
VERI	very
VFO	variable frequency oscillator
VHF	very-high frequency (30-300 MHz)
VLF	very-low frequency (3-30 kHz)
VLSI	very-large-scale integration
VMOS	vertical metal-oxide semiconductor
VOM	volt-ohm meter

VOX	voice (or sidetone) operated xmit (transmit) control
VR	voltage regulator
VRAC	VHF Repeater Advisory Committee (ARRL)
VSWR	voltage standing wave ratio
VTVM	vacuum tube voltmeter
VUAC	VHF/UHF Advisory Committee (ARRL)
VUCC	VHF/UHF Century Club (ARRL)
VXO	variable crystal control
VY	very
W	watts
WA	word after (retransmission request)
WAC	Worked All Continents (award)
WARC	World Administrative Radio Conference
WAS	Worked All States (award)
WAT	what
WAZ	Worked All Zones (award)
WB	word before (retransmission request)
WBFM	wide-band frequency modulation
WH	whathour
WID	with
WINDOM	unique half-wave antenna
WKD	worked
WKG	working
WL	will
WPM	words per minute (code speed)
WRD	word/words
WVDC	working volts direct current
WX	weather
X	reactance
XCVR	transceiver
XFMR	transformer
XMIT	transmit
XMSN	transmission
XMTR	transmitter
XO	crystal (controlled) oscillator
XTAL	crystal
XVTR	transverter
XYL	wife/married female
Y	crystal (schematic)
YAGI	Yagi-Uda antenna
YF	wife
YIG	yttrium iron garnet (crystalline material)
YL	young lady (female operator)
YRS	years
Z	UTC/Universal Time Coordinated (ex-GMT, Zulu, etc), impedance
ZB	zero beat (frequency)
2	to
5B DXCC	Five Band DXCC (award)
5B WAC	Five Band Worked All Continents (award)
5B WAZ	Five Band Worked All Zones (award)
6B WAC	6 Band Worked All Continents (award)
33	fondest regards (between females)
73	best regards (also an amateur magazine)
88	love and kisses (between male and female)
99	keep out (do not disturb this contact)



**WORK RESUMES**  
**On Project ELF**

A recent article quoted in MT reported that environmentalists in Michigan had filed an injunction to halt antenna installations for Project ELF, an extremely low frequency (76 Hz) US Navy communications system intended for contact with submerged submarines worldwide.

MT reader Bob Skwirsk has notified us that an article in the Detroit Free Press pointed out that the U.S. District Court of Appeals has overturned that injunction and that the Navy is now resuming the installation, a wire array strung on 55-foot poles along a 100-foot wide, F-shaped corridor in Marquette and Dickinson counties.

# STOCK EXCHANGE

## PERSONAL

NOTE: Monitoring Times assumes no responsibility for misrepresented merchandise.

SUBSCRIBER RATES: \$.10 per word, paid in advance. All merchandise must be non-commercial and radio-related. Ads for Stock Exchange must be received 45 days prior to publication date.

JOIN A RADIO LISTENING CLUB. Complete information on major North American clubs for 25¢ and SASE. ASSOCIATION OF NORTH AMERICAN RADIO CLUBS, 1500 Bunbury Drive, Whittier, CA 90601.

RTTY/MORSE setup: KANTRONICS Interface, HAMTEXT Vic 20 computer and data cassette, all for \$250. (216)428-6163 days/evenings.

REGENCY D810 UHF/VHF Scanner, base antenna and signal amp, all for \$200. (216)428-6163 days/evenings.

SONY CRF1, \$1,000 new; SONY ICF2001, \$200, new; SONY 7600A, \$90, new; SONY CRF-320, \$800, used; HAMMARLUND HQ105TR, \$275, used. Trade for NR515 in new condition for some of above equipment. B.E.Maschio, 1084 E. 2nd Street, Pomona, CA 91766 (714)622-4736.

KENWOOD R1000 and R600 receivers. New! Postal Money order only \$225 and \$325. SEARS ROADTALKER base and mobile CB, \$50 each. "HANDS-FREE" 49 MHz transceivers, \$80. All shipped free. Info? Send SASE, Harold Ort, Army PAO, 663 5th Avenue, New York, NY 10022.

GROVE CVR1B Scanverter - All accessory cables - instructions and AC adapter, plus, ANT6 Discone antenna - original condition. \$50 takes all. J.H. Trachier, 7300 N. 51st Avenue, H-111, Glendale, AZ 85301 (602)939-8084.

KENWOOD R-2000 Shortwave receiver. 1 year old, excellent condition, with manual. RADIO TV HANDBOOK included. \$400. Owner deceased. Widow must sell. All wave receiving antenna, MCKAY DYMEK DA100D, mint. \$50. Cashiers check or money order. Ship UPS. Mrs. Nick Gergan, 4322 Dosey Drive, Sumter, SC 29154 (803)494-2750 (No collect calls)

One each: JAPAN RADIO Receiver NR515 with filters 5.0, 2.2, 6.0 and one separate filter 300 Hz (not installed)

One each: 96 channel memory NR518

One each: Speaker NVA518 has hardly been used.

Have bill of sale from Gilfer Radio (Nov.82, \$1820.22) Am asking \$700.00 plus \$25.00 for shipping and handling. Payment must be in Bank or U.S. Postal Money order. Please telephone 1-704-479-3547. No collect calls accepted.

BEARCAT 300 scanner. Excellent condition. All accessories. \$235 ppd. Money Order only. Coleman Clarke, 1401 Blair Mill Road #1701, Silver Spring, MD 20910

## COMMERCIAL

\$25 payment must accompany ad. Send 2 1/4" wide x 2" long camera-ready copy or we will type copy (35 words maximum).

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For Sale: ICOM R70 and ICOM GC-4 clock. Both mint, original boxes, etc. Offers to: Matthews (214) 638-9942 of- fice hours.

For Sale: RADIO SHACK DX-160 shortwave receiver. Excellent condition. \$125.00 Send Money Order: Terry Harbaugh, 1610 Mount, Winfield, KS 67156

Radio Gear for Sale: LAFAYETTE Micro P-100 (150-174 MHz tunable with two crystal positions) \$40 (or best offer). REALISTIC Patrolman Pro-1 (30-50 MHz tunable with two crystal positions) \$40 (or best offer). MOTOROLA R-1121/TRC-87 (225-400 MHz frequency-synthesized and has been modified with a built-in 120 VAC power supply, RF preamp, and speaker. \$175 (or best offer). Please contact: Brad White at (703) 931-0699

REGENCY M-100. Excellent condition, includes all parts. \$170. Write to: Jim Stroika, 4817 N. Elkhart, Milwaukee, WI 53217

SONY ICF 2001. Complete with AC adapter, antenna and complete instructions. Great condition. \$150. Contact: Antonio Petruzzo, 313 Livingston Avenue, Mamaroneck, NY 10543

For Sale: MICROFICHE READER with 1984 D.O.C. microfiche listing Govt. and non Govt. agencies and about 40 pages of call letters identifying Govt. agencies. All this for \$199.50 Cdn. ppd. Gilles Thibodeau, 3653 Montcalm St., Lac-Megantic, Quebec G6B 2H8 (819) 583-1817

# INFORMATION PLEASE

MONITORING TIMES WILL PRINT AT NO CHARGE (AS SPACE PERMITS) ANNOUNCEMENTS AND QUESTIONS OF A NON-COMMERCIAL SERVICE NATURE.

Contact wanted for Montreal, and northern state of Maine freq. to be checked out. Gilles Thibodeau, 3653 Montcalm, lac-Megantic, Quebec G6B 2H8

I have numerous C-90 cassette recordings of the Control Tower for Atlanta Int'l Airport plus other VHF/HF aircraft related subjects. Will make copies for anyone interested who will include the proper return postage for each tape requested. For complete list, send long SASE to: Mark Holmes; 5288-A Oldfield Road; College Park, GA 30349.

PEN PALS WANTED: I would like to correspond with ANYONE who is interested in SCAN/SWL monitoring or ham

radio. I really enjoy letter writing! Please write-- Nathan Bollinger, Rt 1 Box 231, Mt. Ulla, NC 28125

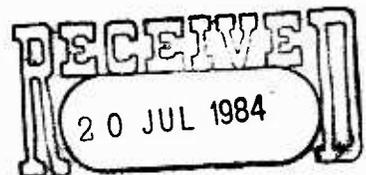
Need FEB, MARCH, APRIL 1984 MONITORING TIMES issues. Also, anyone in Watertown, NY or Quincy, IL or Battle Creek, MI--I have excellent scanner frequency lists for those areas. I would like your list in exchange for mine. Kevin Trickey, 312 Jackson, Delta, OH 43515.

Can someone repair my Johnson Monoscan UHF scanner? The off-on volume control will not operate and E.F. Johnson will not fix it. Jerry Dehoney, Boy Scouts of America, Gateway Centre, Tower II Suite 1017, 400 State Avenue, Kansas City, KS 66101-2483.

Has anyone a suggestion for connecting an S-meter to a Bearcat 20/20 scanner? Thomas Allen, 427 S. Simmons #15, Welsh, LA 70591

### IMPEDANCE MATCHING from p.22

```
750 GOTO 650
900 CLS
903 PRINT "PI-L NETWORK DESIGN"
905 INPUT "RI="; RE
910 INPUT "R2="; RF
920 INPUT "G="; G
930 IF (G*2)<((RF/RE)-1) THEN GOTO 1640
940 IF (G*2)<((RF/RE)-1) THEN GOTO 1640
970 RM=SQR(RE*RF)
980 OL=SQR((RM/RF)-1)
990 XF=OL*RF
1000 XP=RM/CL
1010 QP=QC/CL
1030 QD=((RE*QP)-SQR((RE*RM*QP*QP)-((RE-RM)*(RE-RM)))/(RE-RM)
1035 QE=QP/OD
1036 IF RE=RM THEN GOTO 1100
1040 XG=RE/OD
1050 XH=RM/CE
1060 XI=(RF*OP)/((OD*OD)+1)
1070 GOTO 1150
1100 XG=(2*RE)/OP
1120 XH=(2*RM)/QP
1130 XI=(PE*QP)/(CE*QP/4+1)
1150 XJ=(XH*XP)/(XH+XP)
1200 PRINT "XC1="; XG
1210 PRINT "XL1="; XI
1230 PRINT "XC2="; XJ
1235 PRINT "XL2="; XJ
1240 INPUT "RUN TO PRINTER Y/N?"; DS
1250 IF DS="Y" THEN GOTO 1500
1260 INPUT "MHZ="; F
1280 CE=(1/(XG*2*PI*F))*1E6
1290 QD=(1/(XJ*2*PI*F))*1E6
1300 LB=XI/(2*PI*F)
1310 LC=XF/(2*PI*F)
1320 PRINT "C1 (PF)="; OD
1330 PRINT "L1 (UH)="; LB
1340 PRINT "C2 (PF)="; CE
1350 PRINT "L2 (UH)="; LC
1360 IF DS="Y" THEN GOTO 1600
1370 GOTO 1260
1500 PRINT "PI-L NETWORK VALUES":PRINT#-2
1510 PRINT "PI","RE","RF","G"
1520 PRINT "PE,RF,QC:PRINT#-2
1530 PRINT "XC1","XL1","XC2","XL2"
1540 PRINT "XG,XI,XJ,XF"
1550 PRINT "PPINT #2,"C1(PF)","L1(UH)","C2(PF)","L2(UH)","MHZ"
1560 GOTO 1260
1600 PRINT "CD,LR,CF,LC,F"
1610 GOTO 1260
1620 PRINT "NO SOLUTION"
1630 GOTO 903
1640 END
```



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