MONITORING THE AWACS NET

By Robert J. Lewallyn

"DEMON 14, DRAGNET BRAVO paints triple bogies southwest your position at level 050. DRAGNET BATTLESTAFF is requesting you make ELINT sweep from level 200 and rotate to terminate at Nellis. Be advised BATTLESTAFF is requesting you say your tac comms freq on UNIFORM, and will be monitoring UNIFORM 376.2 with your flight vectors. How copy me? Over."

"DEMON 14 has Charlie Dopey BRAVO. My UNIFORM ops will be 391.8 - repeat 391.8 on UNIFORM. Beginning descent to level 200 at high-Mach, I'll maintain 5600 upper on HOTEL as our primary with you, with 15891 as secondary. Switching to BATTLESTAFF ops now. DEMON 14 out." The carrier drops with a pop, but other strange-sounding ID's soon pop up on frequency.

Don't look so bewildered. If you have ever intercepted signals similar to these on your HF receiver, you have gained a brief glance into one of the most interesting aspects of USAF communications monitoring - the flight operations of Tactical Air Command E-3A Sentry AWACS aircraft.

Actually, AWACS are not a new development, counter to what the American media might lead you to believe. The acronym itself refers to Airborne Warning and Control System, and denotes any aircraft capable of tracking airborne vehicles via radar, and to relay these tracking/vectoring data to combat units and vehicles.

In its essence, AWACS is an airborne tactical battlefield command center. One of the first was the Grumman E-1B Tracer, a twin-piston engined machine in service with US Navy task groups since 1956. The UK and USSR also have several AWACS types in service, both shipboard and land based. Our E-3A Sentry began July 8, 1971 with the eventual selection of 24 Boeing 707-720/32B for intercontinental basic airframes for conversion to AWACS configuration.

The most obvious physical characteristic of the airframe is a 30-foot diameter rotating radome mounted on top of struts above the rear of the aircraft forward of the vertical stabilizer. It is this radome which houses the "eyes" and "ears" of the Sentry, a Westinghouse AN/APY-1 S-band pulsed Doppler Surveillance radar and IFF/TADIL-C fighter control/data link radar.

While exact specifications of the Westinghouse unit are highly classified, it is known that maximum acquisition range is in excess of 250 miles.

The inside of the Sentry is an electronic buffet's heaven, to say the least. An IBM 4Pi CC-1 mainframe handles data from the radars and all console stations, making information available at all terminals. Seven UHF military/government, three VHF AM civil aviation, a VHF FM, and two HF SSB transceivers are operable from the fuselage section (aside from standard cockpit avionics), all capable of handling either clear or encrypted voice.

In spite of its weight (325,000 lbs uninstalled), the E-3A may orbit a station point 1000 miles from base for 6 hours at altitudes in excess of 29,000 ft, retaining sufficient fuel for a return home at 530 mph...without refueling.

NATO E-3As and all subsequently produced USAF models are equipped with RTTY terminals and an extra Collins HF radio to better cope with a largely maritime environment.

Late model Sentries are fitted with the IBM CC-2 computer, having quadruple the capacity of its older brother, along with an underwing hardpoint just inside of each inboard turbofan for attachment of defensive munitions.

A major improvement is the JTIDS transceiver (Joint Tactical Information Dis-

tribution System), a digital data transfer system capable of simultaneous accommodation of up to 96,000 users. If you are ready to give AWACS monitoring a try, read on. Easiest of AWACS communications to hear are those from various 552nd AWACS E-3As on training flights over the North American continent.

These E-3As will identify as EGDY #, and are often monitored running phone patches via the Scott AFB Airways station in Belvidere, IL, with the following Airways stations serving as secondary guards: McClellan AFB, CA; MacDill AFB, FL; and Loring AFB, ME.

Frequencies in the 11 MHz range are heavily used, including USAF Airways channels 11176, 11179, 11180, and 11182 kHz USB. The frequency of 11214 kHz USB is often used for direct links with RAYMOND 24 (TAC Command Post at Tinker AFB), in addition to serving as an international channel between multiple E-3A flights.

(CONTINUED ON PAGE 2)
**AMATEUR TIMES**

**Monitoring Network**

In a previous issue we suggested the possibility that readers of Monitoring Times who are also active amateur radio operators might be interested in starting an on-air net to exchange monitoring information.

Such a net could also provide a great deal of useful information for SWL's who could listen in, participating with their own receivers.

Let's try Wednesday evenings for starters, 0100 (9 PM EDT) on 14316 (+5) kHz beginning July 13, 1983.

Alternate dates, times and frequencies will be discussed at that time and announced in MT.

Net control will be Bob Grove, W4NPQ.

**AWACS**

In overseas operational missions, E-3As will run patches to involved support stations and units, usually via any one of a number of USAF Airways stations located abroad. For a very complete list of USAF Airways stations and frequencies, refer to pages 14-16 of Grove's Shortwave Frequency Directory.

Note that AWACS a/c do not use EDGY-series callsigns, instead using single word ID's sometimes followed by a digit, such as ALLIGATOR, CONCAVE, ICE CREAM, etc.

When attempting to verify a particular ID as being that of an E-3A, listen for patches to either the 956th or 966th AWACS (the two squadrons composing the 552nd AWACW) or the following support units: 960th AWAC/SS, NAS/Keflavik, Iceland; 961st AWAC/SS, Kadena AB, Okinawa; and the 962nd AWAC/SS, Elmendorf AFB, Alaska.

The exchange of technical lingo between Sentry personnel and their maintenance unit is unmistakable, especially if it deals with the extremely sophisticated radar equipment!

Hobbyists listening in for E-3A tactical combat will do well to keep watch over common TAC channels, listed in full on page 11 of Grove's ShFD.

整天 flights under NORAD command, Sentry aircraft will often use 4872, 6782, 9023, 9793, 11441, 14894, and 25085 kHz USB for direct comms with FERTILE, the NORAD Air Defense System Network Center at Fort Lee AFS, VA.

E-3As on NORAD missions will most often use DRAGNET-series ID's, with suffixes such as SUR-VEILLANCE, ALPHA, BRAVO, and BATTLESTAFF denoting specific on-board console stations.

The most intriguing and hardest to hear of all E-3A mission types are war games conducted on the USAF TAC Weapons ranges at Fort Irwin, CA and Nellis AFB, NV. The Nellis AFB reservation alone covers some 3 million acres and above it abound military aircraft of every description from most NATO forces participating in the "RED FLAG" combat exercises. The initial paragraphs of this article were just a sample of what goes on during a day's fun and games on the range. Communications similar to these have been heard on 5700, 6706, 7460, 9568, and 11610 kHz USB, not to mention several common TAC frequencies and a myriad of one-time-only discrete channels.

Familiarize yourself with USAF radio procedure by monitoring regular Airway traffic. Don't be afraid to let a radio sit on a channel for a time or two. If chatter is heard and above all, be patient and keep your ears open!"
Bob, I don’t have much time at the present but I want to tell you that your paper MONITORING TIMES is the best thing for all types of radios that I have ever seen. Keep up the good work. You also do a great business for anyone connected with any type of communications.

M. F. Rockefeller
Lexington, KY

Keep being one to resist wading into a controversy, here are my thoughts:

1. Radio direction finding techniques are legal.

2. Mysterious numbers stations, beacons, illegal communication and sources of interference are not using the airwaves for the purposes for which they were intended.

3. What is the reasoning behind Section 605 of the 1994 Communication Act? Is it not to protect only the licit users of the radio waves?

4. Would the President and other Government officials give unscrambled or uncoded important information over the air? I hope not.

5. As far as I am concerned, criminal transmissions are fair game. Why protect them? If Ham and SWLers can aid law enforcement groups do we not have the responsibility as well as the right to do so?

Ruth Hanly White Plains, N.Y.

Dear Bob,

"Those Spy Stations" I have been picking up one of those mysterious "numbers" stations here in New Zealand. Transmitting on 9,435 between 21:30-21:40 UTC (GMT) it consists of: (i) A female voice with American accent (ii) Numbers in groups of three (iii) A consistency in delivery that suggests to me that the transmission was pre-taped and then the tape was transmitted.

Incidentally, another reason I’d suggest a magazine, periodically I clean out the shack, and dispose of old mags. First thought I go through each and remove those items I’d like to keep. It’s a great deal easier to xerox a mag page and store it, than to throw out a newspaper article. Also, colored articles show better on mag print (and copy better) than newsprint.

Incidentally, I’m an LW, HF fan, and I'm just getting into satellite, building my own LNA, mixer, IF strip etc. I’d like to see some articles on links and downlink for military and commercial satellites.

Anyway, whatever you do, don’t decrease the number of articles on old tubes. It’s well regisited to see that you picked up Hank Bennett. I’ve enjoyed reading his articles in PE for many years.

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I recently learned that a 59,25 reduction of your MONITORING TIMES gives me 8-1/2" x 11" copies that I like in regular binders. Newspapers have always been difficult to file.

Rene Borde
Sunnyvale, CA

(Good idea Rene! Thanks for sharing it with our readers...Bob)

Dear Bob,

THANK YOU, THANK YOU. I have just got the Mar/Apr issue of MT in my mail box (despite the efforts of the APO mailing system to deny me of simple pleasures while serving overseas with the U.S.A.F.). Enclosed is a check for a year’s subscription to your magazine. I am impressed with the issue that I received. It is about time that someone took the hint and gave us SWLers/Others a periodical that wasn’t overpriced, filled with ads, news that’s 4 months old, etc., etc.,

I have a consent to make the proposal to start a home brewing magazine. I must disagree with Mr. Ken Greenberg’s letter in the Mar/Apr MT. I find now that the supply of parts and parts suppliers are darn near unlimited. Home brew is NOT dead. Far from it in many ways alive and kicking. Computers and hobby electronics is responsible for a lot of this parts bonanza that we have available to us today. I do not like computers (I have owned two and find that they are very STUPID) but we must give some credit where credit is due. Along with MT in today’s mail, I received three electronics parts catalogs from three different dealers, namely: Circuit Specialist, JaseCo, and Digi-Key. That isn’t even the tip of the iceberg.

Parts abound. Granted you may not find the 455KHz IF cans used in a Hallicrafters RX 40 years ago, but who wants or needs those IF cans except people trying to restore old radios? I belong to the G-ORP-Club here in the UK. This is a home-brew-aholics dream club. The membership (allegedly over 2000) builds regularly. Granted it is an amateur radio type club, but we build things, and that’s home brewing. The UK has radio hams (hamfestes) have a multitude of parts suppliers that help us out with those hard to find articles. Buying resistors and capacitors in bulk (10 or 20 of preselected common values) help out a lot. Transistors, filters, LEDs, etc. are everywhere. I believe that the “one-of-a-kind” type project (near Ham Radio Fag) isn’t worth building anyway. The fun in building is being innovative. Most beginners (and some advanced builders, too) are afraid to try what they have on hand in the junk box or on an old printed circuit board that is laying around the garage. I find that my greatest source of parts is from old radios, scanners, CB sets (and Hygain boards), tape recorders, etc., that I acquired over 20 months and years.

I believe that if a project works the first time it’s fired up, I did something wrong. I have learned about electronics by troubleshooting my own mistakes (and those of others) than I ever did in my 3 years of college or the A.F. tech schools.

Home brewing should be fun. The beginner should have the first few projects work (the first time, builds confidence). Being fun doesn’t means forsaking the challenges of trying to figure out what went wrong if the project doesn’t work.

That is where the builder LEARNS about electronic theory and sound techniques. If there is a teacher, it is not only for computers. It takes logic to understand what is not working right in a project and why.

Incidentally, Bob, that a home brew magazine is really what’s needed to fill the void created by the Ham magazines and the computer mag - I have nothing to applaud today. For one, I will subscribe upon receipt by word-of-mouth that you are going to launch a home brew magazine. Congratulations on MT, it’s really good. Rich Arland.

(The following letter reproduced in its entirety. Reader Mike McCloskey has some excellent suggestions. What do the rest of you have to say? See respective article. Let’s see some of the articles Mike recommends)

When I sent for my sample copy of MT I had no intention of subscribing. As I figured it was probably just another ripoff on the SWLer. Boy was I wrong! Please enter my subscription for two years anyway. Like many others, I’ve become disenchanted with many magazines because they changed their format to computers. I recognize that computers have their place in DXing, such as keeping logs, antenna directions, as well as using them for Kenya zine type readers. I even went out and bought a T199/A4. Now if I can figure out how to program the character-pattered computer do, and interface it to my receivers, I’ll have it made.

In response to several readers incidentally, a monthly publication, and to including home projects in MT, may I make a suggestion? First, keep the every other month publication (at least for the next year or so), and go to a magazine format. Along with the usual DX comments and articles, add in one computercade per quarterly, a computer interface You Computer To Your Receiver, or How To Program Your Computer For DX Log, Reading Horse or MT Lowers, etc. Two or three home brew projects, complete with parts lists and suppliers. Maybe make one of those projects be an old tube project for the novice who want this type of article (re: Ken Greenberg’s letter Mar/Apr MT). I believe that one year's reception would increase by leaps and bounds, and you could go to a monthly mag. Put the issue to a voice with some skill to say.

Whatever you do, don’t decrease the number of articles on old tubes. It’s well regisited to see that you picked up Hank Bennett. I’ve enjoyed reading his articles in PE for many years.

Incidentally, another reason I’d suggest a magazine, periodically I clean out the shack, and dispose of old mags. First thought I go through each and remove those items I’d like to keep. It’s a great deal easier to xerox a mag page and store it, than to throw out a newspaper article. Also, colored articles show better on mag print (and copy better) than newsprint.

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Solar storms and flares—electromagnetic eruptions on the sun’s surface—often have profound effects on earth communications.

Within 5-10 minutes of the event, X-rays bombarding the upper ionosphere (D layer) creating sudden ionospheric disturbances (SID's) which may last for hours. The results include abrupt shifts in radio wave paths which produce shortwave fadesout (SWF's).

Geomagnetic storms may cause power surges in long-distance lines, disrupt homing pigeons, decay satellite orbits, affect aerial magnetic surveys and induce the aurorae (northern and southern lights). But by monitoring the propagation forecasts on time and frequency standard WWV, Boulder, Co. (5, 10, 15 and 20 MHz) at 16 and 18 minutes past each hour, you can read right out on top of things.

Conditions are stable if you hear, “No adverse propagation in existence at this time.” However, a poor report (PC) caused by a solar-flare induced proton storm might elicit an announcement like this: “Solar terrestrial indices for 16 July 1983 follow. Solar flux 140, estimated A index 15 (repeated). The Boulder K index 1200 UTC on 11 July is 3; repeat, 3.” The announcement might continue, “Solar terrestrial conditions for last 24 hours: solar activity was low; the geomagnetic field was active to occasionally unsettled. The A index for the next 24 hours: The solar activity will continue to be low; the geomagnetic field will be unsettled.”

How do we interpret the technical vernacular? Simple, once we define the terms.

SOLAR FLUX: Intensity of arriving energy (“solar wind”)

POLARITY INDEX: Average of 24 hour K Indices; updated at 0000 UTC (See Table)

K INDEX: Scale of 0-9, updated every 3 hours starting 0000 UTC (See Table)

SOLAR ACTIVITY: Proton, gamma rays or X-ray solar emission

GEOMAGNETIC FIELD: Effects on the earth’s magnetic field

FORECAST: Predictions for future solar and geomagnetic events.

As a general rule, when the A index reaches 30 (K of 4 or greater) minor solar activity is occurring. As these indices rise, so will the solar influence on terrestrial communications.

**SOLAR INDICES AND THEIR INTERPRETATION**

- K 012 345 678 9 A 0 3 7 15 27 48 80 140 240 400
- A 0-7, K 0-2 equals QUIET
- A 2-3, K 3-4 equals PARTIALLY SETTLED
- A 15-30, K 4-5 equals SETTLED
- A 30-50, K 6-9 equals MINOR STORM
- A 50-90, K 9-9 equals MAJOR STORM

Solar activity will be announced by levels “very low” through “very high.” A solar flare of magnitude greater than X 5 may be declared as an event on WWV. A X 5-25 flare observed at 15 July at 1620 UTC.

Flare intensities are rated according to the following scale:

- C: Great
- M: Greater
- X: Typical Range
- F: Faint
- N: Normal
- B: Brilliant

- 1-5 Importance (solar surface affected)

- Solar flares produce shock waves which travel at speeds of 500-1000 kilometers per second, reaching the earth 24-50 hours later.

Proton events travel much faster, reaching the earth in 3 to 10 hours. Due to the concentration of magnetic lines of force at the earth's poles, the polar caps are far more susceptible to the solar storm. The aurora is a visible effect of a proton storm.

Solar flares at the poles will cause far more profound effects on communications than at the mid latitudes. “Aurora” is a popular communications medium for amateurs reflecting signals over greater-than-normal distances.

Still, HF signals may be seriously altered or absorbed by the energized upper layers of the earth’s ionosphere and magnetosphere. With the information you now have at your fingertips, you may be able to predict when worldwide communications may be disrupted, affecting your listening to shortwave signals.


**SURVIVAL COMMUNICATIONS...**

By Mark Johnson

One of the first problems facing any newcomer to survival communications monitoring is knowing what to listen to and where to find it.

Fortunately a number of excellent frequency directories are available which will help in locating the frequencies most useful for civilian, federal and military agencies during an emergency. Notable among these are the PREDENTIAL FREQUENCY LIST, the FEDERAL FREQUENCY DIRECTORY and SHORTWAVE FREQUENCY DIRECTORY, both edited by Bob Grover; the TRAVEL CALL series edited by Gene Hughes; and the CONFLICTIONAL FREQUENCY LIST by Oliver P. Ferrell.

A new publication by Tom Kneitel, the NATIONAL DIRECTOR for Shortwave Radio FREQUENCIES, is especially useful in locating the frequencies used in each state by the various agencies that would be activated during an emergency.

Accurate weather information is a must during any survival endeavor so the survivalist should begin his communications monitoring with the various agencies and services that provide this information.

There are several sources but the most common are, in order of importance, NOAA Weather Radio, Transcribed Weather Broadcasts (TWEBS), VOLMET and coastal stations.

The following sources are the most useful and well-known. This service of the Department of Commerce provides continuous broadcasts of the latest weather and other information available from National Weather Service offices around the country.

- NOAA broadcasts are revised every one to three hours, or more often if conditions warrant. Most of the stations operate on 24 hour basis and can be heard on either 162.400 or 162.500 MHz.
- NOAA Weather Radio is important for another reason. In 1974 a White House policy statement designated this service as the "Official Government-Sponsored radio system to provide direct warnings of natural disasters and nuclear attack into homes equipped for the broadcast service.
- If the NOAA broadcasts are unavailable or reception is poor, the survivalist can try tuning the low frequency band between 190 and 500 kHz for stations offering TWEBS. These broadcasts are aimed primarily at aviators and differ from the NOAA broadcasts in the language used to describe the weather conditions.
- Examples of stations offering such broadcasts are listed below. A more comprehensive list of these stations is found in Kneitel's survival directory.

**TWO VOLMET stations**

Oakland Radio and New York Radio, are easily heard throughout the U.S. The schedules for these two stations are given below.

New York Radio - 3485, 6904, 10051, 1337 kHz on the hour and half hour.

- Oakland Radio - 2663, 6679, 8828, 12892 kHz, 0300 and 3000 UTC.

In emergencies law enforcement personnel, fire departments, medical services and highway maintenance crews.

Coastal stations operated by the U.S. Navy, the U.S. Coast Guard and private corporations such as the NATIONAL BROADCASTING COMPANY, transmit weather information on the shortwave bands and provide weather information. However, much of the information contained in these broadcasts is aimed at ships at sea and will be little use to the survivalist. More information on these stations, for those who are interested, can be found in the CONFLICTIONAL FREQUENCY LIST by Oliver P. Ferrell and the SHORTWAVE FREQUENCY DIRECTORY by Bob Grover.

After weather information the survivalist will want to keep track of the activities of the various public safety agencies that will be operating during an emergency. This includes law enforcement personnel, fire departments, medical services and highway maintenance crews.

In emergencies law enforcement personnel are usually the first to become involved so the survivalist will want to monitor as much as possible. In addition to the channels used by government communications the survivalist should monitor those used by detectives, narcotics teams and tactical units such as SWAT.

Channels used for inter-system or intercity communications (often 155.370 MHz) as well as those used by county and state police should also be checked on a regular basis. Those living in small or rural communities may find that only one or two frequencies are needed.
According to the December 1982 issue of the JOURNAL OF CIVIL DEFENSE, fire departments are the backbone of civil defense. This probably comes as no surprise to fire buffs, but it may be something of a shock to the survivalist who is unfamiliar with exactly what services to monitor.

Since firefighters are trained to handle situations ranging from chemical spills to drownings to radio emergencies, it is important to monitor their communications.

The survivalist should pay particular attention to the channel used by emergency fire equipment as well as any frequencies used at the scene to coordinate the activities of the firefighters.

The frequency (often 154.370 MHz) should also be monitored from time to time if one is used.

Medical services including hospitals and ambulances always become involved in emergencies and should be monitored. In some areas the ambulance personnel also perform medical procedures.

Frequencies to note are 155.280, 155.340 and 460.000 MHz (base). In Europe, a frequency of 463.000 kHz is also used.

Related to medical services are search and rescue units which become involved in certain emergencies. These units may be special rescue boats, groups that specialize in search and rescue, members of a ski patrol or simply a group of volunteers with no formal training, who are on call.

Highway maintenance crews are also important during emergencies. In the local and state highway departments are excellent sources of information about current weather and road conditions. Also since most maintenance crews are tied into the state and federal civil defense agencies, they should be monitored closely in the event of a widespread disaster.

It would be impossible to list the frequencies used by every public safety agency in the U.S. It is recommended that the survivalist consult the appropriate manual for his POLICE CALL directory for his state as well as other publications such as Kneitel's survival directory for the frequencies used in his area.

Civil defense communications are notoriously difficult to monitor since the frequencies are hard to find and are infrequently used. During a hair-raising emergency, once again Kneitel comes through by listing the frequencies used by state civil defense agencies in those states that have such organizations.

The Federal Emergency Management Agency (FEMA) maintains an extensive HF network that can be easily monitored on a communications receiver. Basically, FEMA is a civil defense organization and is responsible for maintaining communications during an emergency.

Typical frequencies are 4604.5211, 10493 (primary), 12216, 12909 and 20026 kHz (USB).

More HF listings are in Grids & Hope: A HAM RADIO FREQUENCY DIRECTORY.

The Red Cross, while not primarily a civil defense organization, is involved in a variety of disaster relief and public information about the current frequency used by the American National Red Cross is 47.420 MHz with backups on 47.580 and 47.660 MHz.

Additionally, the International Red Cross maintains an emergency radio network from its headquarters in Versoix, Switzerland. The primary frequency is 26705 kHz (USB).

Depending on the type and severity of the emergency certain federal agencies will become involved. The survivalist should pay particular attention to the so-called 'fire control' agencies such as the Bureau of Land Management (BLM), the Department of the Interior fire crews and the Interior's National Emergency Fire Cache (BFC) headquarter in Boise, Idaho.

The frequencies for each of these agencies can be found in Kneitel's survival directory and in the pages of Hughes' POLICE CALL DIRECTORY. It should be noted that those listed for the BLM and the Department of the Interior may vary in some areas.

The Environmental Protection Agency (EPA) and Nuclear Regulatory Commission (NRC) are important for the survivalist to monitor in the event of environmental emergencies. Accidents involving toxic chemicals, hazardous wastes or nuclear plants create serious health hazards and prompt a quick response from these agencies.

Frequencies used by the EPA are 4125, 2125, 4755 and 165-1125 kHz.

The NRC uses 168-050, 168-200, 168-600, 168-625, 169-100 and 170.000 MHz.

Survivalists may also wish to tune the new Disaster Service communications frequencies, all upper sideband (kHz):

2336 2411 2414 2421 2422 2439 2463 2466 2471 2474 2487 2511 2525 2569 2587 2603 7802 7805 7832 7835 7874 7980 7805 7832 7935 7987 7412 (as listened to during satellite entries), the Strategic Air Command (SAC) and the Tactical Air Command (TAC).

Exhaustive lists of frequencies for all these agencies and more are found in Grove's directory.

The CAP is involved in search and rescue operations, civil
Visual Monitoring --
The World Of Amateur Television (part III)

By John Edwards

In Parts I and II we learned some basic facts about amateur television; now it's time to find out what there is to see.

As with every other form of radio mode, the most popular ATV activity is ragchewing. Perhaps watching the participants chew a rag is a more accurate description. In any event, the added dimension of sight certainly gives the art of radio conversation a new twist.

For instance, many ATV'ers have patched videocassette players and film chains (devices that convert motion picture images into video) into their systems. With the exception of music, all sorts of non-informatonal programs are aired. One word of warning: beware of ATV operators who have just returned from vacations, since you may end up being a captive audience for hours of family-travel films. Unfortunately, birthday party films are a hazard at any time.

REPEATERS

The history of ATV repeaters (which because of their strong signals are the easiest way to monitor ATV) is closely linked to that of FM voice machines. Like FMers, ATV'ers needed to expand the coverage of TV stations through direct transmissions. They also wanted the side benefits of having a common frequency to monitor ATV. Also, like FM repeaters, ATV machines have played an important public service role. A good example is Cherryville, New Jersey's ATV repeater.

Trustee Charles Kosman, WBENOV, explains how his machine helped officials keep watch on a local mailing list and, by paying dues, helped the development of a local ATV club. Also, like FM repeater, ATV machines have played an important public service role.

CONCLUSION

All of these video prototechnics bring out the point that ATV'ers are experimenters in the true sense of the word. While only a Technician-class license is required, Advanced and Extra-class holders are far more common on ATV. Most of the time, of course, is to the fact that originally you had to be pretty smart to get on the mode. That's changing now, to the regret of some. But if anything, most ATV'ers are now glad that the availability of components is bringing more activity.

As one west coast ham summed up the situation, "It seems that we old timers have just about solved all the problems for the newcomers. About the only thing we haven't been able to fix is the problem of looking presentable on television during a 3 AM QSO.

Knowing ATV'ers, they're probably working on it."

Shortwave Viewing With SSTV

Monitoring Times is pleased to present this guest article by Dave Ingram, popular columnist for QST Magazine.

As we all know, shortwave monitoring offers something for everyone. There's foreign broadcasting, government communications, law enforcement, survivalists, hobbists, clandestine, RTTY monitoring, and much more.

One special interest involves watching long distance video communications by the concept known as "slow scan television.

Present SSTV activity is primarily centered around amateur radio operations on the 80, 40 and 10 meter bands. The majority of these personalized VHF quite impressive video operations are conducted around 3,845, 14,430, and 28,600 kHz, with 14,430 kHz being a hotbed of activity evenings and weekends.

During a typical evening's activity one might see pictures of an Alaskan sunset from the window of an amateur in that area, views of the Mexican pyramids or streets in quaint Mexican villages, or scenes of a party at an amateur's home in the Bahamas, plus many views of equipment setups.

The activity becomes most profound when SSTV'ers arrive home for the evening and continues until one by one they fall asleep or trek off for family activities.

The unique aspect of these visual communications is their worldwide range--televisions picture received and received over thousands of miles via regular (HF) shortwave bands rather than via VHF channels or satellites.

The exciting news concerning SSTV for readers of MONITORING TIMES is you can "look in" on this action with the aid of an SSTV scan converter and your existing HF receiver.

HOW IT'S DONE

The concepts of slow scan TV involve storing a conventional type TV picture, lowering it down approximately 1000 times and transmitting the resultant tones via conventional HF equipment. As a result of this "deceleration process", the television's normal 4 MHz bandwidth decreases significantly.

Another change, employing frequency shifts, then allows the TV pictures to encompass the range of 1200 to 2200 Hz.

When heard on the shortwave bands, these SSTV pictures sound similar in nature to RTTY transmissions. SSTV, however, can be recognized by its slightly more "musical" nature and an obvious "blip" of 1200 Hz approximately each 8 seconds.

One of the most profound trade-offs in SSTV's voice band pictures is the exclusion of movement. This means the views are transmitted as a group of "still" (similar to a slide show) rather than moving images. Yet, even with this trade-off, SSTV is unique in the fact it permits worldwide visual communications without the aid of wideband satellite relays.

HOW YOU CAN WATCH

Reception of SSTV signals today is best accomplished with the aid of a digital scan converter. New, these units vary in price from about $450 to $900 and are available from such companies as Microcraft and Robot Research (both of which advertise monthly in amateur radio magazines).

The Robot Research model 400 unit and its color equivalent are outstanding and reliable performers which are used by radio amateurs around the world.

(continued on page 25)
(New Antennas from pg. 5)
nals and FM broadcast signals are often circularly polarized, readily-receivable on horizontal antennas.
But what if we trim the antenna down somewhat for VHF/FM communications applications? To establish the fundamental frequency for the dipole simply divide 468 by the lowest frequency of interest. Thus, a 50 MHz antenna would be 9.36 feet long. Using aluminum tubing or other thick diameter conductor like pipe, the antenna will show excellent bandwidth of probably 20% or so.

Now here's where the trick comes in. Odd harmonics of the fundamental frequency will also be closely matched by the antenna. That's right; use the 50 MHz design, connected directly to low-loss coax, for reception of a band-high band, military aircraft and VHF as well (50, 150, 250, 350, 450 MHz)!

In this direct-feed configuration, the dipole is center-fed and no balun transformer is needed.

Imagine? You bet! Will it work? I don't know. Let's try it!

What if we bend the dipole into a coil (without joining the ends)? Will we have an all-band directional scanner antenna? I don't know. Let's hear from our incurable experimenters out there with their favorite antennas designs!

---

**SWL HEADQUARTERS**

**ELECTRONIC EQUIPMENT BANK THE NAME IN SHORTWAVE LISTENING**

### KENWOOD R-2000

- At 50 Hz to 30 MHz
- All mode AM-CW-SSB-FM
- 10 Memories (Memories Mode)
- Memory Backup
- Memory Scan
- Programmable Band Scan
- 24 Hour Clock-Timer

**NET $599.95 EEB $549.00**

Optional filters — call for a quote. Optional RIT to be announced. EEB now provides on extended 90-day warranty.

### YAESS FRG-7700*

**LIST $549**

Our Best Seller!

- DD-9 kHz-30MHz
- All mode AM-CW-SSB-FM
- Digital Frequency and clock

**SALE $499**

**Options:**
- KX-7100 Active Antenna $99
- MA-7100 12 Channel Memory $495
- FM-7100 Antenna Tuner $99
- HF-5 VHF-10 Low Pass Filter $20
- DC-7100 12 VDC Kit $48

**ACKNOWLEDGMENTS**

*EEB now provides on extended 90-day warranty, effectively doubling your warranty, 6 months parts and labor at NO COST TO YOU.

### KENWOOD R-1000 & R-600

**COMMUNICATIONS RECEIVERS**

AM, SSB, and CW modes. Built-in noise blanker. PLL synthesizer covers 10 bands between 200 kHz to 30 MHz. Ideal 3-stage, IF filters for receiver mode. Power requirements 14, 20, 220 VAC, 50/60 Hz 12 VDC option.

**R-600 Sale $329**

R-1000 Sale $429

---

**WORLD RADIO TV HANDBOOK 1983**


**$17.50 postal paid (USA) (Book Rate)**

Money order or cashiers check will expedite your shipment.

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**COAX TO SCANNER**

(BITS cont'ed from pg 20)
to the Census Machine which had a pin for every possible hole, the handle of the machine was then pulled down. Where there was a hole, the pin (which was spring loaded) passed through to make electrical contact with a cup of mercury. This caused a counter connected to that cup to add one (1).

There were 40 counters like clocks (printing was not yet in use for "computer output." That electrical impulse also opened the lid of the sorting box so that the operator could hand place the cards in the box and resume their duties—a crude form of sorting.

In time for the 1890 census, Hollerith had improved upon the conductor's punch and was using a desktop punch. Some people felt that the machines undercounted, but members of the scientific community stated (and proved) that the 1890 census was the most accurate to date. Now it took less than 3 years to count 62 million Americans, while the 1880 census took over 7 years to complete!

Next, Hollerith improved the punched cards used to give the present standards of 80 columns, in 1894. In 1896 he founded the COMPUTING TABULATING RECORDING MACHINE Co. Later, he helped the Russian government establish their census as well as helping other businesses with his systems. By 1900 the census machine was improved still further, but the cards needed to be hand-fed. He solved this problem in 1910 when his machines became hoper fed.

All this time his business had been growing to the point where one person could not handle it alone, so Hollerith sold his business. In 1917 it merged with other smaller firms and entered the Canadian market as the International Business Machines Co., Ltd., known today as IBM.

Until this time most applications were of a business nature, but in 1927 the British National Almanac office used a Hollerith machine to process lunar position information at noon and midnight for all dates between 1935 and 2000 A.D.

(To be concluded next issue)

---

**DA-100 D MCKAY DYMKE**

**ALL WAVE RECEIVER ANTENNA**

**SALE $50**

(109.0 MHz) when purchased with any radio from EEB.

**LIST $159**

**SALE $139**

---

**G.E. WORLD MONITOR II**

Best Buy under $250

- 6 Bands 150 kHz to 3 MHz: SWL/MF-FM
- Word Power 600 kHz 500 kHz
- DC operation from internal batteries
- EEB test results show this receiver to be superior to most selling up to $300 Physical layout and electrical specifications similar to the popular Panasonic RP-2900.

**LIST $349.00**

**SALE $299.00**

**NOWS 209.9h HURRY LIMITED SUPPLY**

---

**STEVE MARTIN**

**COAX TO RECEIVER**

The Grove dipole configured for reception only

---

**9\text{4}^\circ**

**COAX TO SCANNER**

**22^\circ**

**TV BALUN**

**45^\circ**

**COAX TO RECEIVER**

---

**I COM R-70**

You have read the details on this revolutionary receiver. It's getting rave reviews.

- Frequency Range 300 kHz-32MHz
- Pass Band Tuning
- Notch Filter
- Computer Compatible
- Fully Synthesized
- Noise Blanker Wide/Narrow

**LIST $749**

**SALE $649.00**

The Bestjust got better

*Now EEB offers an EXCLUSIVE upgraded $70 SWL with AM bandwidth of 6 and 2.3 kHz giving you that sharp filter for crowded bands! EEB now provides an extended 90-day warranty, effectively doubling your warranty, 6 months parts and labor at NO COST TO YOU.

**ANOTHER EEB EXCLUSIVE**

*EEB is ICOM's mid-Atlantic unauthorized service center.

---

**SONY ICF 2001**

Microcomputer and Synthesizer offer best value in its class.

Features quartz crystal locked PLL frequency synthesizer and dual conversion super-heterodyne circuitry plus "standby-reception" capability. The microcomputer gives you four tuning methods, direct access, memory, autostart, and manual tune. Much, much more.

**LIST $349.00**

**SALE $299.00**

**NOWS 209.9h HURRY LIMITED SUPPLY**

---

**DA-100 D MCKAY DYMKE**

**ALL WAVE RECEIVER ANTENNA**

**$50**

**off ($49.00) when purchased with any radio from EEB.**

---

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Virginia 703-935-3355
BROADCASTING

RED FACES AT RADIO MOSCOW

Shortwave listeners worldwide could hardly believe their ears Monday night when 30 English-language announcers, including Vladimir Danchev, announced, "The population of Afghanistan plays an increasing role in defending the country's territory against Soviet occupiers."

Subsequent news bulletin throughout the evening referred to "bombs infiltrated from the Soviet Union" and "struggle against Soviet Invaders."

While official news releases from the service described the bulletin as a "personal mistake," privately, insiders called the startling accusations "an act of sabotage."

Experts at the BBC monitoring station revealed that a similar "mistake" had been made a week earlier. Danchev nor longer works for Radio Moscow.

VOA FEEDER SCHEDULE

How do international broadcasters get newsmaking features from their offices to worldwide transmitters in time? By radio, of course!

Nearly all broadcasters use suppressed carrier double sideband (independent sideband or ISB), often running separate program feeds on each sideband simultaneously.

Reproduced here is the schedule for Voice of America feeds used in early summer 1983.

Have you received a QSL card from Radio Canada International as yet? The station has begun a new verifying policy which is optional, to say the least. Your Editor isn't sure exactly how this new policy is instated, but do I feel that it is going to serve the needs of the SWL to any great degree, but it is what they are presently offering and I guess we must learn to live with it. Here's how it works.

The station will send you, upon request, their schedule of programs and frequencies and a copy of their station QSL card with none of the blanks filled in. At this point you have a QSL (the word is on the front) with none of the pertinent data (on the reverse) filled in, such as date, time, frequency.

Now you have a QSL that you can hang in your shack for the world to admire. But, wait, it is not a QSL...yet. You must complete the reverse side yourself, filling in all of the necessary elements, including program details, and return it to RCI. If they find your report to be correct, it will be returned to you.

I assume that someone will actually have to authenticate the QSL with a station signature although this was not mentioned in their information sheet. Once more thing - the only time, according to the station, that this QSL card will be available with the mailing of the summer/fall program schedule. It will "not be available at any other time" according to RCI.

Get yours today. Send your request for their schedule and QSL card to Audience and Public Relations, Radio Canada International, P.O. Box 6000, Montreal, Quebec, Canada H3C 3A8.

In our last column we mentioned that Radio Baghdad, Iraq, was requesting reception reports on cassette tape and that the tapes would be returned with recordings of Iraqi music. Now we learn from a European source that the import and export of audio cassettes to and from Iraq has been forbidden and is only permitted in bulk quantities by official state organizations.

Radio Sweden reports that they have been doing something to do with Ayatollah Khomeiny's successful use of cassettes smuggled from his exile in France overthrowing the Shah of Iran. However, music from all parts of the world is sold in Baghdad shops. For the present, your reception reports to Iraq in writing.

Lawrence Cotariu (8041 North Bexley Avenue, Skokie, IL 60076) is interested in having a lot of publicity given to the shortwave listening hobby since the year 1983, has been declared as World Communications Year by an act of the United Nations. Larry states that to the best of his knowledge, no manufacturer or dealer of SWL equipment is offering any promotions on the hobby. Shortwave listening is big business in many parts of the world but right here at home many people are totally unaware that they can tune in such far-away places as Moscow, Melbourne, Tel Aviv, Johannesburg, Tokyo, and Rio Janeiro. If any of our readers would like to possibly work with Larry on a project of this type, please contact him directly.

John Kapino, WDXIAM (86 South Quinsigamond Avenue, Shrewsbury, MA 01545) has begun a hobby on an experimental basis, to see if the need and desire for such a publication is warranted.

If you have radio-related items that you'd like to trade for other items, write to John with your list and your desires. For these items there is no charge but please send John return postage.

Radio has operators try to work every state, and to obtain QSLs proving that fact. SWLs try to verify every country in the world. Here's a new twist.

Yesterday, we noticed in the newspaper an ad: "We'll get some shortwave "bean". We'll get some shortwave "beler". We'll get some shortwave "DXing on that band."

TEN WATT S? A short-wave broadcast station that runs only 10 watts? Honest, it's true. Don Paul of Mesa, Arizona,...reports good reception of 10-watt CFKX in Vancouver, British Columbia, at 0700 on 6080 kHz. East Coasters will find this one a real challenge. Your editor has never logged it. But maybe this east-west half of our country should stand an even chance to get it.

(Continued on page 10)
NEW ARRIVALS!

1 BEVY OF BEARCATS

Electra Company of Cumberland, Indiana, has unleashed a barrage of new products in time for the annual Consumer Electronic Show (CES) in Chicago. A brief rundown follows:

BC-151 Sixteen-channel, programmable scanner; 30-50, 136-144, 406-512 MHz; scan delay, lockout, direct channel access; $249.95.

BC-260 Compact mobile, ten-channel, programmable scanner, all-steel cabinet with mounting bracket, 3 watts audio, memory backout during power outage, bright fluorescent display with dial switch, electro-luminescent keyboard backlighting for night viewing, audible "chirp" key commands, priority, weather key, search, lockout, direct channel access; $399.95.

DX-1000 General coverage receiver, 10 kHz-30 MHz, direct keyboard entry plus knob tuning, 10 memory frequencies; AM, FM, USB, LSB, CW; selectable filters, 12/24 hour clock; multi-frequency/time auto-matic record control; up/down frequency stepping in any increments 1-99 kHz; $599.95. Made overseas for Electra; big competition for the R-2000!

BC-5/6 Hand-held crystal scanner; six channels; low, high, UHF and aircraft bands; 300 aw. audio; scan delay, LED channel markers; lockout; comes with rubber-ducky antenna and BNC connector for external antenna.

A new release from Uniden Corporation of America (6045 Castille Court, Indianapolis, IN 46250) looks remarkably similar to the discontinued Sony ICF-2001.

Designated the CR-2021, the radio features LCD readout, digital frequency entry, 150-29999 kHz AM/CW/SSB and 76-108 kHz FM bands, step tuning, LED tuning strength indicator, antenna tuning, RF gain switch and an SSB/CW fine tune control.

An improvement over its predecessor, however, is the inclusion of narrow/wide IF filter switching, 12 memory channels and rotary volume and tone controls.

The receiver has triple conversion and a built-in whip. $299.95.

IS THE CR-2021 HERELY A SONY LOOKALIKE? WE'LL HAVE A COMPLETE PRODUCT REVIEW IN THE NEXT ISSUE!

SONY ICF-2002

The long-awaited replacement for the popular Sony ICF-2001 has been formally announced by that manufacturer.

Due for an August release, the ICF-2002 will be even more of a bargain than its popular predecessor.

With the 6/memory channels of direct-entry frequency synthesis, the new entry is the same size as the miniature ICF-7600 and is packaged in a handsome brushed chrome decor.

Battery consumption is much better than the previous model, with 20 hours expected on the inexpensive AA cells (4 required; 4 for the circuitry and 2 for the memory). An optional 4.5 V AC adaptor is available.

A special "Band Select" memory for scanning international broadcast bands, with 3 kHz separation on longwave, 10 kHz on medium wave and 5 kHz on shortwave.

Additionally, a tunable SBO allows fine tuning SSB and CW signals. Dual purpose presets on the keyboard provide an additional level of function convenience not found on earlier models.

The new ICF-2002 includes a 12/24 hour LCD quartz clock as part of its frequency display. A dual-function timer acts as a sleep switch and alarm as well as a recording activator.

Frequency range for the new Sony is 153 kHz-30 MHz (AM/CW/SSB) and 76-108 kHz (FM). Sensitivity is specified as 1 microvolt for 6 dB signal-to-noise ratio at 10 kHz; image ratio at that frequency is 72 dB, with selectivity of 3 kHz @ -60 dB and 6 kHz @ -60 dB.

Perhaps most impressive is the low price of the new pocket model, expected to list for only $249.

SOUND WALKER

Recently, a new generation of short-distance personal communications has appeared on the market: headset transceivers. Operating in the 49 MHz license-free band (49.83-49.89 MHz), these low power transceivers afford reliable short-range communication for bikers, athletic events, antenna installers and other users who depend upon keeping in touch.

We decided to take a look at one of the most recent entries, the Walk-Phone from OHRA. Unlike the other units, the Walk-Phone features full duplex operation.

Just like a telephone, the units simultaneously transmit and receive misspelled words, no noisy VOX circuits.

Our field tests verified reliable communications in excess of 1/4 mile, even around a mountain bend. While car-to-car contact would be expected to be reduced somewhat because of metal interference, the units provided excellent hands-free operation in a caravan or typical traffic pattern.

For battery conservation, a standby mode permits monitoring for calls with the transmitter shut down. Current drain is typically 25 ma. on receive, 60 ma. on transmit.

The headsets are extremely lightweight and comfortable; the compact body unit is conveniently attached to a belt by a secure strap.

Disadvantages include, of course, the restriction of the system to two units; more than that and you would receive interference from two units transmitting on the same frequency.

But for the vast majority of applications where a pair of reliable, short-range transceiving headsets are required, the OHRA units will provide excellent performance.

(Walk-Phone, $159.90 per pair from OHRA Corporation, Dept. FT, 3555 Lomita Blvd., Torrance, CA 90501.)

Page 9 Monitoring Times July/August, 1983

OHRA WALKPHONE
Page 10 Monitoring Times
(broadcasting from pg. 8)

The Falkland Islands Broadcasting Station in Stanley is operating on 3958 kHz where it has been for years. It is now rated at 3500 watts and its signal is being widely reported in Australia, New Zealand, and in many areas of the U.S., including both coasts. You say you can't fight with radio FM, though.

They reportedly have a Breakfast Show at 0845-0900, a BBC news relay at 0900, a British Royal Review at 0910, and weather at 0915 along with the latest in British pop music. This is primarily for British forces and local kids.

Harold Ort, Jr., of Fort Wadsworth, Staten Island, N.Y., has heard a station that he believes is being heard on 5000 kHz around 0949 with a male announcer in English giving weather. He is working on a listing for JYJ in Koganej, Japan, which is likely a candidate.

Harold also reports good DX reports of Radio Tahiti, Papeete, on 15,170 kHz with French, Tahitian, and Polynesian music and even a few cell-in telephone conversations. The usual fast drum beats and flutes can also be heard around 0300.

Canada is represented in our mailbag in the person of James Howlett of Hamilton, Ontario. He has been DXing for 14 years and has over 50 contacts verified without counting any relays. James reports hearing Radio Canada on 5010 kHz at 0550-0535 with horse news and editorials in French.

He'd also like some information on "The Voice of the Socialist Libyan Arab Republic" that he has heard on 2393 kHz with station ID and Arabic music. If you can help James, please drop him a note at 500 East St., Hamilton, and his ZIP there is L8T-347.

Radio Norway reports that the last new 500 kW transmitters will be in final test stages this summer and that they hope to place them in service in September. Each is now underway for yet another shortwave station to be located in Sveio, just north of Kristiansand. The target date here is 1986-1987.

European listeners are being advised to listen for the new medium wave outlet on 1214 kHz with a power of 2300-0000. The power is said to be 1,200,000 watts! East Coast listeners might also be able to hear this one during early evening hours in the coming fall and winter months.

A United Press report indicates that a group of British radio amateurs has disappeared in the South China Sea after reporting that they were under attack. Amateur operators in Hong Kong say they received an SOS from the group, who said that their yacht was under attack and fired off the Spratly Islands.

The islands are between the Philippines and Vietnam and disputed by China and Vietnam. This could have been an attempted "expedition" to the islands.

Marshall Sosera of Cherrill Hill, New Jersey, gave his mailman a QSL card. So what's the story? The mailman is your editor; Mr. Sosera is one of my "customers." We have a list in the first column and left a QSL in his letter box indicating his approval of the column. At my age, you get your QSLs any way that you can get them!

In addition to those persons whom we have already seen in this column, we would like to credit Sweden Calling DXers, the Association of DX Reporters, and Radio Canada for their contributions. We would also like to remind other clubs that you are welcome to write in to us with news notes that you'd like to have in print. We're here to serve everyone.

******

DX'ING THE FM BAND

By Danny Buntin

Dear Danny:

Thank you very much for writing to WFCR. In regards to your reception report, you are absolutely correct with your data.

Nearly every summer WFCR receives reports from listeners in distant areas. Mostly from Florida etc. Yours is the first skip report from Oklahoma. Congratulations and keep up the good work.

Sincerely,

Charles Ferguson
Chief Engineer

An FM DX QSL is likely to be a letterhead from the chief engineer.
The best times of the year for trop are May-June and September-October. Any time of day is possible with afternoons least likely.

The most favorable parts of the country for trop are the Great Plains, around the Great Lakes and along the Gulf of Mexico coasts. A classic Gulf trop opening will have the Texas DX’ers catching the Florida FN stations. West of the Rockies products do least trop because of the arid, mountainous terrain. Since conditions have to be just right, not all likely-looking weather systems form trop.

There are two other forms of FN DX; they are not as prominent as the previous two. One is scatter meter. A briefly-ionized trail of debris is left behind when setors enter the earth’s stratosphere. These signals that result are week, brief and choppy. Most only last a second or two. Exceptional events last up to a minute or two. This is a danger, making station identification more likely. Distances receivable are similar to Es.

The other form is aurora reception. DX’ers in the North are naturally more likely to receive it. Signals are weak, often garbled because of Es. One station tries to dominate a channel. Most likely times for reception are March-April and September-October.

FN DX equipment need not be elaborate, though it stands to reason that quality sets will achieve the best results. The signals are nothing better than a stereo receiver or tuner hooked up to an outdoor FN beam antenna and a rotator.

If you find arrangement do not permit an outdoor antenna, don’t despair. Simply bring the beam indoors and set it at ceiling level while making it hand-rotateable.

One Oklahoma DX’er who did this experienced trop reception out to 1,000 miles—and only a 10 watt power output---via Es.

For those on a budget, inexpensive portables with no external elements are a good idea. The internal antenna should be avoided. A good choice would be Radio Shack’s Mini-Tuner TR-102 and WR Rabitt ears. Good transmission lines to choose from are fully-shielded 75 or types such as RG-11 (loveloy loss), RG-6, RG-9 and shielded twin lead. 300 ohm coax is flat twin lead should be avoided because of signal loss when near metal and when wet. It also is not as durable as coax.

For those interested in pursuing FN DX, membership in the Worldwide TV-FM DX Association is a great aid. The club puts out a monthly publication. More information is available by writing WTDFA, P. O. Box 514, Buffalo, NY 14205. Yearly dues are $15.

**VHF SATELLITES**

by Bob Grove

Readers often ask: “Is it possible to hear satellites without special equipment?” The answer is a resounding “Yes!”

Many listeners have reported tones in the 149.50-150.00 MHz range of their scanners. In most cases, this is actually the US Navy Transit (NAVAST) navigation satellite sending its telemetry to military vessels for accurate bearings.

Russian COSMOS and navigational satellites are also reported to be using this part of the spectrum.

Another spot to look is 161.99-162 MHz for similar data transmissions. And we have discussed the AT-5 and ATS-3 NASA communications satellite with voice and data reported on 135.755 and 136.600 MHz (see adacent article). 

Listeners with 136-138 MHz coverage may wish to search those ranges for any number of data and telemetry transmissions from mapping and weather satellites. Here in Brastown, North Carolina using only a Scanner Beam, PRE-1 preamp and an outdoor band-programmed 3 meter 300 we have heard satellite signals on the following frequencies (MHz):

- 136.000 136.110 136.200 136.230
- 136.300 136.440 136.500 136.620
- 136.650
- 136.695 136.725 136.750 136.767
- 136.800
- 136.900 136.960 136.980
- 137.000 137.100 137.170
- 137.180
- 137.195 137.205 137.220 137.300
- 137.325
- 137.420 137.440 137.460 137.480
- 137.500
- 137.620 137.700 137.780 137.850

Satellites may be seen by many technological countries of the world, and most often United States, Canada, Russia, Japan, Great Britain and France. Some signals are very faint while others (137.500) seem strong enough to knock your scanner off the table!

A directional antenna is not necessary; in fact, when the satellites are nearly overhead where they are strongest—a directional antenna is no longer directional!

An excellent omnidirectional antenna is the dishcone; they provide not only out-of-band coverage, but normal scanner bands as well. Discones are available from several manufacturers including Grove Enterprises (GAN-6).

While most of these signals are indecipherable to us, rest assured that someone out there is copying them. For the most part, they are benign-weather communications, geoligical exploration, communications experimentation—but some are undoubtedly of a tactical nature.

Finally, American and Russian hams have put their own satellites in orbit. Listen for OSCAR’s (U.S.) beacon on 145.825 and 435.025 MHz. If you have a shortwave receiver, you can hear the hams’ downlink frequencies between 29.4 and 29.9 MHz.

Phase III is operational; listen for beacon at 145.812 and 145.990 and downlink communications around 145.900.

Interested listeners may wish to tune in on the AMSAT ham network: Wednesday 2100-2300 Eastern from 3650 kHz LSB; Sunday 1300 UTC on 14228 kHz USB and 1900 UTC on 21280 kHz USB.

Newcomers to the fascinating military VHF aeronautical bands are often disappointed at the lack of activity there. After all, their scanners explode with activity when tuned to the civilian 118-136 aircraft band.

Several factors are responsible for the diminished returns, including: poor reception for fewer aircraft then civilian; VHF signals are more line-of-sight and attenuate more quickly; conventional scanner antennas don’t work well in the 225-400 MHz range; cox lines are more lossy at VHF than at HF; military transmissions are likely to be brief, with no intercep- tion; fewer frequencies are in use in a given geographical area making search unproductive.

What does the inisiiable hobby listener do to hear these fleeting signals?

1. Use an outside antenna designed for 225-400 MHz reception. A ground plane with 10’ elements works fine such as a converted Radio Shack 20-76 (although it will not work well on other ranges); a good discone like the Grove ANT-6; or the Grove ANT-1 Scanner Beam. The two Grove products will work on all normal scanner ranges as well as the 225-400 MHz band.

2. Acquire lists of frequencies used by nearby military bases and airport control towers. This cannot be obtained from the agencies, try publications like Tom Kneitel’s “Top Secret Regis- try” or locate a copy of Grove’s “Federal Frequency Directory.”

3. Try programming the following frequencies, in use over most of the United States (conversion frequencies included in parentheses for those of you using the Grove Scanset): 226.6 (128.6); 241.0 (123.0); 243.0 (125.0); 254.4 (129.4); 257.8 (131.8); 272.7 (128.7); 311.0 (132.0); 361.5 (129.3); 361.8 (129.8).

4. If you encounter a “birdie” (spurious signal) on one of the frequencies, add a sub filter 0.005 to the entry (123.0 could be either 122.995 or 123.005) signals may be slightly weaker, but at least receivable.

5. Add an external preamplifier to increase the apparent strength of incoming signals.


---

**KNOCK OUT IMAGE INTERFERENCE**

Now you can tune out strong interfering signals such as mobile telephone, aircraft, FM, ham radio or weather band broadcasts and avoid front and overheadQ signal for only in your own transcription.

The Capri Electronics RF Notch Filter can be used with any scanner that is capable of receiving the antenna jack. No modifications to your scanner are necessary. The filter will work with 28 MHz, 50 MHz, 144 MHz and 432 MHz. These frequencies are the most likely to cause interference.

The easy tune, calibrated dial lets you move the notch to any frequency from 78 MHz to 1225 MHz. The notch depth is 40 dB at 142 MHz and the VHF insertion loss is less than 1 dB (0.5 dB typical).

Your complete satisfaction is guaranteed. Order direct, 142 MHz today for only $19.50 plus $2.00 shipping and handling cost.

Mail and phone orders are welcome. Send check or money order or we can ship UPS COD. We also accept VISA and MasterCard orders. Include your card number and expiration date on cashier's check of $25 or less, exchange orders will be sent on request.

**CAPRI ELECTRONICS**

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Canon, Ga 30520 (404) 376-3712

---

www.americanradiohistory.com
The Port of Churchill uses VHF frequencies of 156.400, 156.500, and 156.600 kHz for Port Operations.

WESTERN ARCTIC

In the western arctic, information about the various oil company frequencies is quite hard to come by; however, two frequencies on which bases and/or oil rigs have been heard are 16377 and 13420 kHz.

In the Athabasca-McKenzie River area there are five stations which operate on the frequency 5803 kHz. These are: VFF F7 Fort Chipewyan, Alta. VFF 6 Fort Simpson, N.W.T. VFN 3 Hay River, N.W.T. VFD 8 Norman Wells, N.W.T. NYD 21 Tuktoyaktuk, N.W.T.

Hay River is also equipped with 156.800 and 161.800 MHz. The Canadian Coast Guard operates three other coast stations in the arctic: VFC Cambridge Bay, VFP 6 Coppermine, and VFA Inuvik, N.W.T. Each of these stations is equipped with 2182 kHz and 4363.6 kHz. Inuvik and Cambridge Bay also have 2598 kHz and 5003 kHz. Inuvik, in addition, has 6335.5 kHz, and the same two VHF frequencies as Hay River. Two telegraphy frequencies are in use at Cambridge Bay: 6351.5 and 12671 kHz.

The Port of Porte-de-la-Baleine and WVB 53 Cold Bay and WDU 23 Sitka are both on 2312, WDU 26 Cordova and WVB 56 Ketchikan are both on 2397, and WDU 23 Kodiak uses 2389 kHz.

On HF, 8802.6 and 6599.5 are shared by WMT 43 King Salmon, KWL 39 Port Walter, and KML 21 Juneau, and 4125 MHz are shared by WBD 29 Kodka, KGB 91 Yakute, KGB 58 Annette, and KGB 95 Cold Bay.

STATION KXW Anchorage operates on 8291.1 kHz. The U.S. Naval station at Adak (NOX) can be heard on 500 and 450 kHz, and Kodiak (NOJ) on 500 and 470 kHz, both in CW, as well as on the following frequencies for Kodiak:

4143.6 4428.7
6218.6 6518.8
6521.9 8294.2
8718.9 8765.4
8768.5 kHz.

(DX'ing Ships on pg 13)
DX'ING SHIPS IN THE ARCTIC
By James R. Hay

In addition to the many coast stations which are found in the Arctic, there are quite a few DX stations which are located in the Arctic. The Canadian Coast Guard uses a fleet of icebreakers in the Arctic during the navigation season to help commercial ships.

The following Swedish icebreakers are also ships to listen for in northern Europe:

- SHPO - Ale
- BBPM - Ejord
- SCSV - Thule
- SHPR - Atle
- SBXQ - Oden
- SDIA - Ymer
- SBPT - Frej
- SKCD - Thule

The following U.S. Coast Guard ships which can likely be heard from Alaska include:

- NRPN USCGC Ironwood
- NLBH USCGC Cape Romain
- NODL USCGC Firebush
- NRUC USCGC Storis
- NRFY USCGC Flanmore
- NODU USCGC Sedge
- NRFJ USCGC Northwind
- USCG USCGC Sand Tracker
- USCGC Cape Coral

Among the cruise ships which visit the Arctic are:

- BCCG Cunard Princess
- SKMW Lindblad Explorer
- PJSU Rotterdam
- PJSF Statendam
- LFSA Sagafjord
- ELBM9Tropicale
- PGEF
- Island Princess
- Sun Princess
- Pacific Princess

(Yes, this is the "Love Boat").

Other ships which may be heard include:

- VY7841 Robert LeMee
- VODJ Fred J. Agnew
- VCLM M/V Arctic
- VXXM Arctic Trader
- VYBL A. C. Crosbie
- V6GB Chelesy Crosby
- VCDE Sir John Crosbie
- VCRJ Irving Eskimo
- VCTH Irving Ocean
- VYMD Edgar Jourdain
- VGLN Irving Arctic
- VGLW M/V Magellan
- PGEF Neddrill II
- C23946 Pandora II
- VDPV Polar Prince
- VBX2 Jos. Simard
- VCRJ Rugger Simard
- LRAH Skauvann
- VGZK Lefrene
- HPFD Texaco Alaska
- OKT Arctic Skout

DXING SHIPS IN THE ARCTIC
by R. F. Heard

Recent computer analysis has yielded some interesting data concerning encrypted FSK RTTY from military bases.

The primary encrypted RTTY mode used by the US Navy is 75 baud with a unit code of 7.00; thus, it is 106 words per minute.

If it were not for a termocodified, 106 WPM would be readily readable with a standard 100 WPM reader or demodulator.

In the encrypted mode, the start and stop bits are not encrypted, and each 15th character is commonly a complete pause without a start/stop bit.

When idling, however, blanks separated by pauses one bit in length are transmitted. The usual shift is 850 Hz, sometimes 170 Hz.

When a channel comes up as a fleet MULCAST (Multiple Channel Broadcast) transmission, the shift is 85 Hz. These modes are common on many HF frequencies.

The U.S. Navy also uses encrypted 50 baud/71.4 WPM (7.00 unit code); in this mode, even the start/stop bits are encrypted. Similar to the 106 WPM transmissions, if it were not for encryption, this baud rate could be copied by a standard 67 WPM machine.

When heard in the HF spectrum, shift is usually 850 Hz; examples are often simultaneously (simultaneously transmitted) on 7450, 10390, and 11689 kHz.

Canadian military station CFB in Halifax (actually Mill Cove) also uses 75 baud (7.00 unit code), 106 WPM, 850 Hz RTTY, and they also encrypt their start/stop bits.

CFM makes two encrypted simulkey broadcasts:

(1) 4347, 6425, 8542, 12814, 17084, and 73.5 kHz; and
(2) 4225, 6450, 8662, 12985, 16880, 22337, and 133.15 kHz.

(128K RAM.)
EXPERIMENTER'S

WORKSHOP

ASSEMBLE THIS SIMPLE INDOOR SCANNER ANTENNA

By Bob Grove

Many apartment dwellers would like to improve their scanner reception but are unable to erect outside antennas.

While the little collapsible whip provided with scanners does a remarkable job for local reception, some improvement may be realized with a specially-designed extension antenna system.

Recently, two solid weekends were devoted to experimentally developing a simple, inexpensive indoor scanner antenna which offered some improvement over that little whip.

While the reception will not be anywhere near that provided by a full-sized outdoor antenna, some improvement may be offered, especially if the antenna is hung or taped high on an outside wall or against a window.

Mount with the appropriate elements vertical and horizontal as shown, running the coax away horizontally for at least 2-3 feet.

Try to stay away from electrical wiring, heat and air ducting, and other large metallic surfaces.

Experiment with several alternate locations while listening on various frequencies to weak signals of interest for best compromise reception.

There are no tricks; absolutely any kind of wire may be used, insulated, stranded, solid, thick or thin...it doesn't matter.

Coax may be any variety because the run will be short—a few feet at most. If you can find attic space, then go for a full-sized antenna and good coax.

Give the little Grove indoor scanner antenna try and let us hear of your successes and improvements so that we can pass the information on to our readers in Monitoring Times!

IMPROVING THE BEARCATS

by Art Kimball

RECORDING OFF THE AIR

While the easiest method to record is to place the tape recorder microphone near the speaker of the scanner, quality is often unacceptable...not mention the inconvenience of picking up room noises along with the scanner audio.

The following device not only allows direct coupling of the line output to the recorder, but also isolates the recorder from scanner ground on the audio line thereby eliminating hum and the need for the uncoupling capacitors suggested by Electra.

The solution is a simple audio output or audio driver transformer in the record line. The specifications are not at all critical.

In tests, I have used one with 10K Primary and 2K Secondary and one with 1K Primary and 500 Ohm Secondary. The main consideration is size.

Radio Shack has one that is nearly perfect (Part No. 273-1380) for $1.29. A Calectro Model D1-728 or D1-722 also works fine and can be found at most electronics stores. Just ask for the smallest audio driver transformer they carry with a 1K to 10K Primary.

Connection is extremely simple. First cut off the center tap leads (if there are any) from both sides of...
Page 15 Monitoring Times July/August, 1983

BEHIND THE DIALS

ELECTRICAL PROTECTION AND FILTERING FROM ESP

Of increasing importance in today’s solid state age is protection of vulnerable electronic equipment from AC-line-carrying high voltage spikes.

Perhaps of equal importance with the widening distribution of computer equipment is relief from radio frequency interference (RFI).

One company which specializes in such add-on devices is Electronic Specialists, Incorporated (171 S. Kein St., Dept. MT, Natick, MA 01760).

Their free catalog lists an extensive depth of products for CB, AC, and scanner and computer protection. These products include equipment isolators, AC power line filters, and suppressors and antenna filters.

We recently sampled two of these products, the models SFK33N and SFK33S, for a lab test here at MT headquarters.

[BEARCAT con’t from pg 14]

The transformer. Connect the Secondary side to the scanner record output, and the Primary to the microphone input of the tape recorder.

If both sides of the transformer have a wire that is the same color, consider them isolated ground returns to the cable shields.

You may wish to attach a mini phone plug to one side of the transformer and a mini phone jack to the other. (If you want to make this an integral part of the patch cord, you can, instead, attach the one side to one end of a patch cord with a plug on the other end.)

If the recorder you are using has only a microphone input, you will probably need some attenuation. Experiment with various known resistors in series on the “hot” side of the output of the transformer, until you find one that gives you the best level. If your recorder has a line input, you won’t have to bother with this.

The entire device can be wrapped in electrician’s tape to prevent shorting, or with a little ingenuity, you can find a small plastic jewelry box (such as the kind a very small tie tack or pin comes in) and install the transformer in it with a plug attached to the box and a jack on the other end.

This neat package allows you to use any patch cord with it. I stole such a box from my wife for my installation. (See photo!)

The hum-immune scanner recorder coupler

Schematic diagram of recorder coupler

The SFK33N (823.5), is a quad balanced-pi section filter with internal spike protection (Panasonic’s metal oxide varistors) featuring up to 65 dB attenuation of noise in the 10 kHz-200MHz range.

Spike protection of up to 9000 amps instantaneous is provided with ten amps (1290 watts) circuit load.

The SFK33S (626.95) provides dual pi section filtering and no MVR transient clamping.

Putting them to the test

Several separate experiments were performed to test the noise filtering capability of the two units. We found that the filters worked best when installed on the AC cord of the offending appliance rather than on the affected receiver (although some relief was noted that way, too).

This is no doubt due to the early prevention of the RFI from reaching the power lines where it can be radiated (an ounce of prevention...)

vvention....)

...has hushtype motors (hand drills, sweepers) are particularly troublesome, and the ESP filters installed on their cords were quite effective in reducing their interference, especially when the cords were wrapped tightly to provide additional clamping.

Oddly enough, the filters seemed to be more effective when used on two wire appliances than those with a third wire ground.

Computer-generated RFI was considerably reduced, especially when compared to another brand selling at greater cost.

Page 16
By Larry L. Ledlow, Jr.

In Part 1 we introduced the unique characteristics of the extremely low frequency (ELF) band, including ability to penetrate earth and water and to propagate over very long distances relatively unattenuated.

We also discussed some of its disadvantages including noise from lightning and ionospheric phenomena. Furthermore, the bandwidth available for communicating at ELF is extremely limited. The Navy feels that despite its disadvantages, ELF may serve a useful role in maintaining communications with its submarines, allowing them to be submerged at safe depths.

In Part 2 we are concerned with how to transmit ELF signals, we will now consider the construction of antennas. Before describing particular types of antennas, a review of certain ELF antenna fundamentals is necessary, because many concepts are familiar to the antenna designer working with higher frequency ranges must be handled differently. Antenna gain and antenna pattern, for example, need special consideration at ELF.

Any radio frequency signal is sent via electromagnetic waves. There are BOTH electric and magnetic field components to the waves, each at right angles to the other. Familiar receiving antennas (half wave polarizers, for example) take advantage of the electric field in order to induce a current in the antenna. At ELF it is sometimes advantageous to detect the magnetic field. A rotating used magnetic field antenna is the loop antenna. Broadcast band and LF DXers are familiar with this type of antenna. Far (i.e., many wavelengths) from the source of an electromagnetic signal, the waves are essentially flat; we call these electromagnetic waves plane waves. When detecting plane waves a receiving antenna, whether electric or magnetic, should be aligned such that it is sensitive to the appropriate field component. In other words, if we want to use a yagi ("yagi") antenna we should align our antenna so that it lies in the same plane as the electric field component. By convention, we say that if the electric field of the e-m wave is vertical with respect to the surface of the earth, then the wave is vertically polarized.

Closely related to the source, however, the relationship between the field components and the direction of propagation is no longer so simple as the case with ELF, because wavelengths are on the order of 1000 miles, and the receiver will intercept many wavelengths from the transmitter. Thus, the choice between a magnetic or electric type of antenna may be different, and its alignment for maximum effectiveness would be different.

We also have to consider that the antennas used may be within a conducting medium—a submarine’s antenna is surrounded by seawater, for example. Then, terms used in conventional systems such as antenna pattern, length, gain, and radiated power become misleading.

It is necessary to go back to very basic concepts. By doing so, scientists have come up with the following definitions for describing antennas.

Receiving antenna sensitivity is expressed as the equivalent noise field (ENF), the root mean square (RMS) open circuit noise voltage of the antenna divided by the effective length of the antenna. In principle, the LOWER the ENF the HIGHER the sensitivity.

The effective length of the antenna is the ratio between the output voltage and the arriving electric field strength of the signal, considering both direction and polarization of that wave. How is this calculated? Does this read like a physics text so far? Do not despair, we are just getting to the good part.

With regard to antenna efficiency, a general rule of thumb is that the greater the physical size, the more efficient an antenna will be. Since ELF wavelengths range from 1000 to 10000 km, it is not unreasonable to expect practical-size ELF antennas to be very inefficient. Simple power inefficiency does not make an antenna unusable, however. Other factors such as cost of construction and space availability may make an antenna acceptable even without much power efficiency.

Furthermore, power efficiency is not a consideration when receiving antennas. If an antenna is sensitive enough (i.e., the ENF is low enough) for atmospheric noise to be received, then it is generally acceptable for receiving communications. However, ELF receiving antennas in this sort would be unsuitable for transmission, because an antenna current high enough for transmitting would probably melt the antenna conductors or, at the very least, lead to voltage breakdown of the insulating material.

Many problems encountered with VLF antennas are the incorrect size. Designers are familiar with antenna size. This is a new concept to ELF systems. Even at VLF, high radiating efficiencies and high power can only be achieved with huge structures. For example, a VLF facility at Cutler, Maine, is in the form of an umbrella-shaped, top loaded vertical monopole, each about 2 km in diameter and 250 km high! It’s high efficiency grounding system uses 3000 km of copper wire. At 20 kHz its radiating efficiency is about 86% and it has a voltage breakdown-limited radiated power of nearly 2 megawatts.

ELF, where the wavelength is 100 times greater, it can be seen that construction problems become almost insurmountable. Calculations have been done to show that at 100 Hz the Cutler antenna would radiate a power of only 15.6 milliwatts! The radiation efficiencies drops by 86% when compared to 1000 Hz.

Vertical antennas, such as those constructed at the Cutler, Maine, facility, are clearly unacceptable for ELF transmission.

One type of antenna does, however, appear to be favored over others for ELF transmission—the horizontal electric antenna. Basically, this antenna consists of very long, insulated wires running parallel to the earth’s surface. Each end is grounded, and at the center of the wire the transmitter is connected.

The advantages of a horizontal electric antenna over others depend on its use of the ground to provide a return path for the current. Airborne transmitting antennas are at a disadvantage because no grounding is possible. The choice for an ELF antenna in an aircraft is limited to a vertical and a horizontal magnetic one. Both pose severe size and weight problems for anything other than very short range communications, as we shall see later.

A third interesting idea proposed by M. S. Morgan in 1960 was the use of an island as a natural ELF antenna. Microwave TV enthusiasts may be familiar with slot antennas. A microwave slot antenna consists of narrow holes, or slots, cut into a large sheet of metal which serves as a ground plane for the antenna. In fact, there is a great difference between the conductivity of the slots (2 conductivity) and the metal (very high conductivity), the slots will tend to radiate if they are the correct size.

Morgan’s idea is that an island is of much lower conductivity than the surrounding seawater and can therefore be used as a slot in a large ground plane. If the island...
is long and narrow, it begins to behave very much like a conventional slot. By placing a transmitter in the middle of the island, and with its terminals grounded in the ocean at both ends, the island can radiate a signal! Unfortunately, it has been demonstrated that this method offers no more power than a transmitter grounded with the same length of cable on a very large area of soil with the same conductivity as the island. And there is no island on earth which meets the required conductivity difference between the island and the ocean. A loop antenna comes to mind. With all practical considerations, the distance a loop antenna may be used to transmit over is considerably less than that of a large, fixed array (100 km versus 10,000 km). This is because the necessary antenna dimensions and/or current values required to generate relatively high field strengths at great distances. 

In order to be competitive with a large ELF array, a loop would have to have a magnetic moment of about 400,000,000,000 ampere-square meters. What does this mean? The significance is better demonstrated through example. Suppose an aircraft loop antenna encircled an area of 10 square meters (approximately the maximum we might expect an airplane to accommodate). The current required for the loop would be 4,000,000,000 amperes!! And even if the area of the loop were increased to 1 million square meters, the current would still have to be 400,000 amperes.

There are two kinds of loops to consider—the air core loop and the ferromagnetic core loop. One "unusual" suggestion by one researcher involves an air core loop some 2 meters in diameter, weighing almost 5000 pounds. This loop would dissipate more than 8.5 kw. A ferromagnetic core loop with the same signal strength would require a cylinder 2.5 meters in diameter and 8.5 meters long. This antenna would weigh as much as 6580 pounds and at 60 Hz would dissipate approximately 6.5 kw.

There are other problems associated with ELF loop antennas in mobile applications. In particular, interference problems with the other electronic systems in a vehicle would be extremely difficult to solve. Earlier we discussed a horizontal electric dipole. Conceivably, we could have a VERTICAL electric dipole suspended, say, from a helicopter or a balloon. It turns out that the power, weight, and maximum voltage of a vertical dipole are well within practical limits.

But, it would be necessary to have the antenna hang vertically, and with vertical motion this would be unlikely. If the antenna were to remain motionless it would be better to have a horizontal electric dipole on the ground. Other problems, such as establishing a feedpoint in the center wire far away from the aircraft may degrade system performance even further.

The additional concern with ELF transmitting design is that of safety. It is possible to generate a horizontal electric field at the surface of the earth of sufficient intensity to be dangerous. Even a much smaller field can be dangerous if a person touches a long metal conductor (e.g., a wire fence) running parallel to the antenna wire. Therefore, the maximum horizontal electric field must be limited to a small enough value so that relatively few structures near the antenna would be long enough to establish dangerous potentials.

To a certain extent, the large scale ELF facility is very much like an electric power distribution system. One significant difference, though, is that the ELF antenna is a one way conductor of current with the return path via the ground.

A power system is balanced with respect to ground, consisting of parallel conductors with a net current flow very much less than that in an ELF transmission system.

Interference. It is expected that a system may affect power distribution systems, telephone networks, railway signaling systems, pipelines, and any other system where long conductors are an integral part. Installation of appropriate isolation transformers may considerably retard or not eliminate, interference with these systems.

But what about the magnetic fields induced by a large ELF antenna? It has not been demonstrated that there are detrimental effects of strong magnetic fields on plants, animals, or people. Further, interference should only effect sensitive electrical instruments. The US Navy has been very concerned with these problems and their solutions for many years because of their development of their SANGUINE/SEARFAER systems.

 ELF transmitting antennas, then, have special problems to overcome. In particular, size, weight, and current requirements are their principle disadvantages. The ELF receiving antennas also have special problems, but these are generally not the same as with transmitting antennas. ELF receiving antennas do require certain design considerations, and therefore deserve a detailed look. In Part 3 we will study these considerations.

This figure illustrates that as distance from an antenna increases to many wavelengths, the wavefronts change from spherical to plane in shape. In many calculations, antennas are simplified with plane waves. Unfortunately, with terrestrial ELF propagation we are never very many wavelengths away and so have more complex problems.
A Tornado Warning has been issued for LaSalle and Putnam Counties in Illinois. At 5:00 P.M., a tornado was sighted 35 miles north of Peoria moving northeast at 25 MPH. Radar has confirmed this storm.

Heavy rain will continue to move into east-central Mississippi and a flash flood warning has been issued." A few tornadoes are possible from the Gulf Coast of the state to 100 miles inland.

An earthquake of magnitude 7.3 has occurred in Tokyo, Japan. A possible Taunsk (tidal wave) may develop within the next 12 hours and head towards Hawaii.

Such are some of the bulletins issued from various National Weather Service Offices in the United States. Storms and other natural phenomena can cause numerous injuries and extensive property damage. Since the late 1940's it has been the goal of the Weather Bureau to provide enough warning to the public so that people may take necessary precautions to protect themselves and their property.

While tornadoes have been known to occur in nearly every part of the world, they are most numerous in the Great Plains of the United States. One reason is the proximity of the Gulf of Mexico to the Great Plains.

The Gulf supplies abundant moisture that feeds the developing storms over the middle of the country. Giant cumulonimbus clouds, the spawn of the tornado, achieve heights of 50,000 feet in the Plains. The Rocky Mountains help channel the Gulf moisture into the Central Plains. Additionally, the jet stream provides the spinning motion necessary for the funnel cloud.

Tornadoes can occur any time of the night or day, but in the Midwest they occur just before the time of the highest temperature: between 4:00 P.M. and 8:00 P.M.

On the average, 625 tornadoes are reported each year in the United States, but the figure continues to rise.

Hurricane Betsy, which occurred between August 27th and September 12th, 1965, will long be remembered for the destruction it brought to Louisiana. Betsy passed through the Bahamas, but modest tides and adequate precautionary measures prevented serious damage. As it crossed the Florida Keys, flooding and high winds hit areas south of Ft. Lauderdale. Wind gusts in the Keys were estimated to be about 160 MPH.

On moving into the Gulf of Mexico, Betsy changed course to a more northwesterly direction and accelerated its forward speed. The storm reached the New Orleans area in the afternoon of September 9th with an eye 40 miles in diameter. Damage from Betsy in Louisiana alone amounted to over one billion dollars!

BE PREPARED

The National Weather Radio Service is operated by the National Oceanic and Atmospheric Administration (NOAA) of the United States Department of Commerce. It provides continuous broadcasts of the latest weather information directly from National Weather Service Offices.

Taped weather messages are repeated every 4 to 6 minutes and routinely revised 1 to 3 hours, or more frequently if needed. Most stations operate 24 hours daily.

The broadcasts are written to cater to the needs of the people within the receiving area. For example: stations along the sea coast and Great Lakes include special weather information for boaters, fishermen and others engaged in marine activities.

Inland broadcasts often provide information for farmers.

During severe weather, National Weather Forecasters interrupt routine weather forecasts and substitute special warning messages. Such receivers sound an alarm indicating an emergency exists, alerting the listener to turn the receiver up to an audible volume or, when operated in a muted mode, are automatically turned on so that the warning message is heard.

NOAA Weather Radio Broadcasts are made on one of seven VHF FM frequencies: 162.400, 162.425, 162.450, 162.475, 162.500, 162.525 and 162.550 MHz.

The National Weather Service operates more than 350 stations: approximately 90% of the nation's population is within listening range.

Weather radio receivers, both crystal-controlled and tuneable, are available in a variety of styles and prices. Recommended are receivers with a 0.5 to 1.0 Microvolt sensitivity for 2C Decibel quieting, selectivity of 45 to 80 db down - 25 kHz, tuneable or switchable to all frequencies, warning alarm features, dual power source of AC/battery (with automatic switch-over to battery during commercial AC power outages) and collapsible or fixed indoor telescoping antenna with provision for external input connection.

When the receiving antenna is inside the building, some of the signal will be absorbed or reflected by the material which makes up the building.

In fringe areas, placing the radio and attached antenna close to a window on the side of the building from which the broadcast comes will often substantially improve reception.

The use of a properly matched outside antenna will improve the reception of the broadcast. The range and clarity of the reception is dependent upon the antenna height and its orientation.

Weather radio transmits a vertically-polarized signal; therefore, a matching receiving antenna (elements up and down, perpendicular to the ground) that will receive signals in the 130-175 MHz range will give best reception. ~

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Tune In Canada
by Norman H. Schrei.

The first edition of the "Tune in Canada" column brought in a fair amount of response, and surprisingly, not all of it from Canada.

From Melochville, Quebec, a reader informs me that the Saint Lawrence Seaway Authority utilizes the frequencies 140.400 MHz and call sign VDX 20 in that area. The microfiche reveals the company code of 200840 and other frequencies which are licensed to the same agency: 141.735/139.695 call VDX 21, also 156.800 MHz call sign VDX 21.

In Iroquois, Ontario the agency is licensed for the following frequencies and call sign VDX 21, also 156.45 0 call VDX 21, 156.550 call VDX 21, 156.800 , call VDX 21, 170.730 call VDX 21, 465.1625 call VDX 21.

Another reader writes with information on the RCMP which in the Windsor, Ontario area has a simplex operation on the following frequencies: 161.35 MHz, 140.315 MHz, 141.400 MHz and 140.430 MHz. All stations use the call sign XJ 20 and the associated company code is 006426.

He also reports that CBET TV (Channel 9) uses the frequency of 459.600 MHz. I did find a frequency in Windsor, and suppose that is the station in question, but would like to have more information. The call letters are VCY 20 and the company code is 600855.

Speaking of Windsor, I was there lately doing research on an upcoming directory. While there I tuned around a few frequencies. This frequency is used by radio station CKLW to send the programming from their studios in downtown Windsor out to transmitter sites by way of the state of Illinois comes information concerning frequencies in various areas of Canada. The first reported frequency comes from Kel- ling, Bask. And that is 459.600 MHz and call sign XNL 576. This station is supposed to be used by Adams Argo Center, Ltd.

One listing which he did send me located on the microfiche: Station XLK 471 operating on 40.600 MHz in Lundy, NE. This station is supposedly operated by the Atmospheric and Environmental Service and the company code is 021971. That same call letter and company code comes along with another frequency in Lundy, that being the frequency pair 451.2875/456.2875.

Here are a few mysterious frequencies that I have not identified as yet in the National Radio Club Convention.

Leor Day weekend is slated for the 1983 National Radio Club convention to be held in Enfield, Connecticut.

NRC is one of the oldest listening clubs in the country, specializing in AM broadcast band DX'ing. Interested members and readers may learn more about the club and its convention by writing: National Radio Club, 1983 Convention, P.O. Box 116, Poquonock, CT 06064.

Toronto area, and again reader input would be most helpful.

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<tr>
<th>Frequency MHz</th>
<th>Call sign</th>
<th>Co. Code</th>
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<tr>
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<tr>
<td>401.7279</td>
<td>CF</td>
<td>500100</td>
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<tr>
<td>143.795</td>
<td>CJ7 774</td>
<td>836281</td>
</tr>
</tbody>
</table>

I do believe that the majority of the above (especially company codes 900074 and 006074 are mobile telephone or telephone company related and I believe that a couple are police frequencies. Now for information that can be identified: this list comes out of the Chatham, Ontario area.

<table>
<thead>
<tr>
<th>FREQ</th>
<th>CLASS</th>
<th>USER</th>
</tr>
</thead>
<tbody>
<tr>
<td>42.060/42.220</td>
<td>XJB 76</td>
<td>Ontario Provincial PD</td>
</tr>
<tr>
<td>46.680</td>
<td>XJB 80</td>
<td>Ontario Natural Resour.</td>
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<tr>
<td>46.700</td>
<td>XJB 80</td>
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<td>Ontario Natural Resour.</td>
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<td>140.190</td>
<td>XJL 214</td>
<td>RCMP</td>
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<tr>
<td>140.310</td>
<td>XJL 214</td>
<td>RCMP</td>
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<tr>
<td>140.400</td>
<td>XJL 214</td>
<td>RCMP</td>
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<tr>
<td>140.490</td>
<td>XJL 214</td>
<td>RCMP</td>
</tr>
<tr>
<td>140.970</td>
<td>XJL 214</td>
<td>RCMP</td>
</tr>
<tr>
<td>141.435/139.155</td>
<td>XJP 202</td>
<td>Ontario Provincial PD</td>
</tr>
<tr>
<td>141.435/139.155</td>
<td>XJP 202</td>
<td>Ontario Provincial PD</td>
</tr>
<tr>
<td>141.690/139.455</td>
<td>XJP 202</td>
<td>Ontario Provincial PD</td>
</tr>
<tr>
<td>142.770/138.750</td>
<td>XJP 202</td>
<td>Ontario Provincial PD</td>
</tr>
<tr>
<td>142.770/148.750</td>
<td>XJL 496</td>
<td>Chatham Police Dept.</td>
</tr>
<tr>
<td>143.655/139.065</td>
<td>XJP 202</td>
<td>Ontario Provincial PD</td>
</tr>
<tr>
<td>153.770</td>
<td>XJH 384</td>
<td>Chatham Fire Dept.</td>
</tr>
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<td>154.070</td>
<td>XJL 511</td>
<td>Chatham Fire Dept.</td>
</tr>
<tr>
<td>154.325</td>
<td>XJH 377</td>
<td>Chatham Fire Dept.</td>
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<td>XJH 377</td>
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</tr>
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<td>Chatham Fire Dept.</td>
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<tr>
<td>160.355</td>
<td>CHB 635</td>
<td>Canadian Natural RR</td>
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<td>161.115</td>
<td>CZA 507</td>
<td>Canadian Pacific RR</td>
</tr>
<tr>
<td>161.415</td>
<td>CAZ 345</td>
<td>Canadian Natural RR</td>
</tr>
</tbody>
</table>

For more information on this or other SWL products write to:

NRD-515

The Ultimate
Coverage 100 kHz to 30.0 MHz
NRD-515 RECEPTOR $995
NRD-518 96 channel Memory $924
The Japan Radio NRD-515 offers more features than any other receiver in its class. NRC has earned a reputation for outstanding quality and unexcelled performance. Key features include:

- Digital WD with Phase Lock Loop synthesizer combined with a photo-type rotary encoder results in tuning totally free of backlash, reading error and secular variation.
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- All solid-state design using the newest components, including low-power Schottky TTL ICs and CMOS ICs. Extremely stable... great for RTTY.
- Effective Pass-Band tuning is provided to eliminate adjacent channel interference during CW and SSB reception. ONE YEAR Limited warranty!
- Selectivity can be controlled independently of mode. Any filter can be used in any mode. 6 kHz and 2.4 kHz provided, 6 kHz and others available.
- Delta Tune for fine adjustment of receive frequency.
- External VFO input. Three position attenuator, HF and LF controls.
- A wide selection of outputs for RTTY demodulator, recorders, etc.

www.americanradiohistory.com
Additionally, Gilles reports reception of US skip on the following frequencies late afternoons: 30.56 (page), 38.695, 38.79, 30.74 (Morgan City), 31.35 (page), 33.78, 35.22 (page), 35.38 (telephone) and 35.58 (page/telephone).

All right, Canadian listeners, the column is yours!
"Los Numeros"
32444 69213 88816 52196 6301 94216
Havana Moon

CORRECTION
Page 4 -- MT May/June, 1983. The first full paragraph of column 2 should have read:
"There has been, for the past several months a 4-digit "Spanish" transmission at 00002 on 11532 kHz with a parallel transmission on 9875 kHz. Is it possible that this 11532 kHz transmission began on the wrong frequency? This has happened on numerous occasions with 4-digit "Spanish" transmissions."

THE VOICE SPEAKS OUT
By Havana Moon

"...It's a lengthy series of questions that have been presented to the VOICE. Perhaps the answers will be revealing."

***

Sound familiar? It should! This was the terminus of REQUIEM FOR A GLL in the May/June edition of MT. Some of those questions have now been answered. Here's what the VOICE has to say:

Q: Do you have an explanation for the Morse code, heard, on 11895 kHz?
A: VOA uses 11895 kHz from 0000-0300 UTC for Spanish broadcasts to Latin America. The transmission was observed approximately one hour after our sign-off and has no connection with the VOA. It should be noted that Radio Portugal has had an assignment on this frequency from 0400-0700 UTC effective March 6. It is possible that this station was checking out equipment and/or operating staff early on a Friday morning in anticipation of a new broadcast to begin the following Sunday morning.

Q: Would it be possible to activate a VOA transmitter in a "down-time" state from a remote site?
A: No. Although today's technology can be utilized to operate "unsanned" transmitter sites, there is no such facility within the VOA broadcasting system.

Q: Would it be possible to inject extraneous audio signals to a VOA circuit from a remote site?
A: VOA provides program material from the Washington studios to domestic and overseas relay stations in several ways. These include commercial satellite circuits, commercial terrestrial circuits, a VOA microwave system, and by short wave feeds. Since these are not secure circuits, it is conceivable but extremely unlikely that extraneous audio signals could be injected. Does VOA have an intruder or encroachment watch in regards to frequencies used by the VOA?
A: VOA does not have an intruder or encroachment watch in the sense of your question. In view of the existing international procedure for assigning frequencies and the congestion in the shortwave broadcast bands, it is extremely unlikely that a broadcaster is afforded (the) luxury of exclusive use of any frequency. VOA does have a worldwide network of monitors who regularly report on the reception quality of VOA broadcasts. When interference from another broadcaster is reported, the merits of the specific case are evaluated. VOA might adjust its schedule if possible or we might request the other broadcaster to make a schedule adjustment.

Q: What actions are taken when unusual incidents occur on VOA frequencies?
A: All VOA frequencies are monitored. VOA may monitor thousands of call signs, motorized, radio and television stations, and VOA transmission sources on a 24-hour basis. We have indications that prior to March 6, 1983, Radio Moscow used this frequency from 0330 to 0700 UTC for an African Service. We also know that Radio Free Europe used this frequency from 0400 to 0600 UTC. Effective March 6, Radio Portugal scheduled to use 11895 kHz from 0400-0700 UTC. Either of these organizations could have been the source of the transmissions.

Q: Can you provide a list of all VOA relay and/or feeder frequencies?
A: Enclosed are lists of the VOA broadcasting frequencies and fixed (feeder) frequencies for the summer broadcast season, March 6, 1983 to September 24, 1983. (reprinted from page 22.)

Q: Are all VOA frequencies registered with the ITU?
A: All VOA transmissions are notifying the ITU. Each frequency is registered with the ITU in accordance with the relevant Radio Regulations.

***

And what about the strange incident involving an "English numbers" transmission and a VOA(?) news broadcast?

As stated in the May/June issue of Monitoring Times, we're still waiting for a reply on that one.

AROUND AND ABOUT...

Q: Would it appear that the frequencies of 3800 and 4200 kHz are now the most active 5-digit Spanish frequencies? One of these 5-digit and 5135 kHz has been terminated. Perhaps 3090 kHz is not as dead as first reported.

NEW LISTENING ADVENTURES

HEAR MORE THAN EVER BEFORE WITH THE NEW M-600A MULTI-MODE DECODER $779.95

Simple connections to your shortwave receiver and video monitor or printer will let you monitor thousands of Morse and Radioteletype signals in Marine, Commercial, Government, Military and Press Services. Converts standard CW and RTTY plus low and high speed ASCII, non-standard shift RTTY, bit-inverted RTTY and TOR (Telex Over Radio FEC & ARQ). Teletype line, MI-188 or RS232 provided: optional parallel printer port available.

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Reynoldsburg, OH 43068

THANKS TO...

On occasion, Bob Grove, editor of Monitoring Times, receives informative material for which the sender does not want to be identified. Most often (and desirable) are identifications of federal frequencies restricted from public access. While all federal government frequencies are now classified "Confidential" (including those previously released as "Unclassified"), dissemination among individuals once they are obtained is not unlawful!

Perhaps most coveted of all would be a recent run of the IRAC GME, the unexposed Government Master File, in any form: microfiche, computer tape or printout.

We appreciate these gestures and assure such sources that their anonymity will be protected.

CRYPTO ALPHABET...

Rumors circulate that some of you are attempting to recover the CM crypto alphabet. In regards to transcriptions monitored first on 3060 and 3090 kHz and now on 3890 and 4100 kHz, some number groups equate as follows: A/1, N/2, D/3, U/4, W/5, R/6, 1/7, G/8, M/9 and T/0.

Radio: Havana Moon
The complete book of oscilloscopes by Stan Prentiss (Tap 1532P, 5" x 8-1/4", 230 pages, $10.95 from TAB Books, P.O. Box 1724, Montrose, PA 17754). For many of us the oscilloscope remains a mystery in spite of its well-earned reputation as the most useful test instrument ever developed.

Prentiss' new publication helps clear up some of that mystery in a straightforward, step-by-step manner, starting with the basics and advancing through spectrum analysis and time-domain reflectometry.

Chapters include waveform and analysis, vectorscopes, signal processing, digital and signature analysis, video, patterns, and many other aspects of visual identification. "Oscilloscopes" is authoritatively written and profusely-illustrated.


Assembled through cooperation of official administrators, NTIA/IRAC microfiche research and on-site inspection, "Systems" is one of the most accurate frequency listings we have seen.

Future publications for the same region will home in on broadcast and utilities.

The Sounds of Frequent Pirate Radio (cassette) (90 minutes; $5 postpaid from Magic Media, Dept. MT, PO Box 695, Asherst, MA 01004).

For many amateur radio enthusiasts of free radio, this new high-quality tape is a goldmine of avant-garde programming. Recorded on cassette tape and mastered in a wide array of original programming is presented. Listen to Radio Libre, Radio Renaud, Radio Solidarite, Frequency Gale (yes, that's right), Radio Ripeote and Radio Arabe-Belze.

A unique collection for your cassette player...if you understand French!

Inside Your Computer by P.R. Sinclair (5-1/2" x 8-1/2", 80 pages, softbound; $12.97 from Payne Green, Inc., Dept. MT, Peterborough, NH 03458).

Intended as a tutorial instruction for the beginner, "Inside" takes a comprehensive look at the inner workings of the home computer.

For the novice, the glossary will prove helpful in understanding terms like overflow, matrix, binary code, operating system, complex equipment, writing and hardware descriptions will provide greater user familiarity with this complex equipment.

Fox Scanner Radio Listings edited by Norsan H. Schrein (8-1/2" x 11"), 80-100 pages, softbound; ordering information 1-800-543-7692. Scanner enthusiasts will be pleased to hear that MT columnist Nora Schrein is now affiliated with Fox Market and is expanding his prolific collection of frequency directories.

Recently added are the Columbus, Ohio area edition (RL00901) and Detroit/Windsor edition (RL00801).

As with Schrein's other directories (reviewed earlier in previous MT book sections) the new publications are up-to-date and cross-referenced by agency, callsign and frequency.

It is Schrein's intent to automatically scan and publish scanner data for all major metropolitan areas in the country, and his editions so far are an excellent start.

Domestic Log State-City Index edited by Michael G. Knitter and John Clements (8-1/2" x 11"), 54 pages, softbound; $8.50 postpaid USA from the National Radio Club, Dept. MT, PO Box 24, Cambridge, WI 53523.

Although designed to stand alone, this book makes an ideal supplement to the successful NRC Domestic Log, listed by frequency ($9.50, same page). The Index is based by state of AM broadcasters of the US and Canada, 540-1610 kHz. It is organized in sequential order by state, city, callign and frequency.

Fox Scanner Directory wrote: For many Automatic Radio Broadcasting of the US and Canada, 540-1610 kHz. It is organized in sequential order by state, city, callign and frequency.

Fox Scanner Directory for all states and frequencies will be included.

The handy directory concentrates on signals to be heard in the 9 Ohio and 7 Michigan counties which surround the Detroit metropolitan area.

Two cross-reference sections in order of frequency and callign are included for all services except business (available separately). See ad on this page.

Scanner Frequency Directory

Attention All Northwest Ohio & SE Michigan Scanner Users: Our 1983-84 Edition is ready!!

Greatly expanded and improved, this 54-page book contains as many entries & features as last year's edition.

Fox Scanner Frequency Directory


MICH: Hillsdale-Lenawee-Monroe Washtenaw-Wayne & also Oakland & Macomb to 14 Mi.

Covers: Police-Free-Fire-Local Govt Federal-Business-Mobile Phone Utilities-Aircraft-Railroads Medical-Master & more!!

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MANY READERS will be disturbed—and saddened—to learn that one of our regular writers, John Demmitt, is a prison inmate.

John accepts his incarceration philosophically. He does not look for sympathy. But he does hope to be accepted for what he can offer MT readers. This special article is an example of his commendable openness.

A TIME TO REFLECT
By John N. Demmitt

Many DX'ers and SWL's know that my QTH is a state prison. I have been asked to tell what prison life is like so potential newcomers will have second thoughts about doing things which say put them in the same position I am now.

I feel I can do this because of the genuine and sincere friendship I enjoy from the many DX'ers and SWL's who have accepted me for the person I am and not for what I was. From Maine to Florida, California to Idaho, points in between and across the world, many of you have touched my heart with your warm friendship.

It is in appreciation of this fact that I dedicate this article to my very dear and special friends.

... Upon entering prison gates the first thing that strikes me is my life saw huge stone buildings with bars surrounded by a tall fence topped with barbed wire. Even though it was a warm day in June, I felt cold and empty.

The first thing I received was a number to replace my name. Not only is that number impersonal, it stigmatizes a person to a dogmatic state. To further remind me that I was an inmate, I was issued prison clothing: a brown hat, a brown shirt, a brown pair of pants, a brown pair of socks and a brown pair of shoes. I hate brown!

I was then assigned a cell with a commode which leaked, a sink with green water marks, a rusty cabinet, a bed with stretched springs and a thin mattress. The floor was covered with dust and dirt which served as hiding places for roaches and waterbugs. I could stand in the center of the room and touch all four walls.

Along with the cold and emptiness came loneliness. When you go to prison you learn who your true friends are. You don't have many and the longer you're behind bars, the fewer friends you have.

You lose family members also and your car will be too ashamed and embarrassed to write or visit. Some will simply want to have nothing to do with you anymore. Letters will get fewer and fewer as time goes on.

Loneliness soon changes to depression when the letters stop coming. The letters are the only you have with the outside world but no one out there seems to realize just how important that correspondence is to an inmate.

Suicide comes after severe depression. It's more common than the public is led to believe. Prison officials keep such things under wraps in the name of security so that embarrassing investigations aren't launched. Prison officials do not want the public to learn of the corruption and violence which is very common in the prison system.

Overcrowding has an effect on all prisoners, even those not celling with another inmate. The food budget designed for a population last year must now feed twice as many inmates.

Starchy foods are often served to keep the weight on inmates.

... I know there is a different taste in prison. Pork patties taste like sawdust; mashed potatoes taste like air and sardines vegetable over-cooked to the point where they seldom have any taste at all.

There is no privacy in prison—none at all. Doors are designed so anyone passing by can see the entire room. There are no closed areas to be alone. There is always noise—noise from inmates shouting threats and obscenities across the cell block fills the ears day and night.

You may wake up to hear two cellmates fighting over whether the light should be on or off. Some nights are so noisy you might not even get to sleep.

Every night at least once an hour a powerful beam of light hits your eyes as the guard takes inventory of the prison warehouse.

There is nothing private in prison. Letters are opened to check for contraband and sometimes read even though it's against the law. The message in the envelope saying "opened by mistake" excuses the break-

(continued on page 24)
Hear Shortwave On A Portable Radio

By John H. Demmitt

How many times have you been unable to listen to your favorite shortwave programs because your communications equipment was either too small or bulky to take with you? Have you ever gone hunting, fishing or traveled a long distance in your car and wondered if you could be listening to the shortwave bands?

Now there is a way you can have a shortwave receiver and operate it as if it was a penny for you! You do not need a background in electronics to have a handy portable shortwave receiver you can take wherever you go.

All you need is an old pocket portable radio, a length of wire and a screwdriver. If you have these items you will soon be listening to shortwave.

After performing this simple operation your AM radio will receive all of the medium wave broadcast stations; however, once the procedure is reversed, reception will be back to normal.

Most people have an extra radio or two around the house which is no longer used, so I urge you to use the receiver you no longer need.

We begin by placing a fresh battery in the transistor radio so we know that the radio is fully operational.

Remove the back of the radio so the screws of the main tuning capacitor are exposed.

Step One
Locate the strongest station on the high end of the AM band and adjust the tuning knob slightly to the lower side of the frequency so that it can still be heard, even though it is now weaker.

Now look at the screws of the tuning capacitor. If the radio is an AM/FM, it will have four screws. Avoid the two closest to the coils.

With a small screwdriver carefully turn one of the screws of the tuning capacitor and adjust slightly, remembering the position so you may return to it should this not be the correct screw.

If the station is getting very loud and with further tuning the station should disappear completely. If the station only gets weaker, reverse the screw which is being adjusted, go to the other screw. When you are adjusting the correct screw (oscillator) the station will be at maximum power and lower on the dial.

Keep adjusting slowly, remembering to keep resetting the dial lower each time. At one point the station will start to rise. Back up and take the station to its lowest frequency.

If you go to the other screw (R.F.) on the AM side of the tuning capacitor and adjust it until the station can be heard strongly. You will then have to turn the volume up as the frequency is lowered.

Near the tuning capacitor is a can (mixture coil) and an adjustment made here will allow the receiver to go even lower in frequency. Locate this through trial and error, remembering to keep the adjustment away from where you started should the adjustment have no effect.

When you find the correct can, turn the adjustment all the way in the direction which lowers the frequency.

Step Two
Take a length of insulation on solid braid wire and wrap several turns around the coil of the ferrite antenna rod starting at one end and run the excess out through the hole in the back of the radio cover and bend the end.

For the next and most important adjustment, wait until the hours of darkness, ideally from 7:00 P.M. until 11:00 P.M. local time. Propagation is good and many stations are on the air and you will be able to identify the stations you hear.

Step Three
Without using an external antenna, tune the dial of your new shortwave receiver to the upper portion of the band. Turn the volume up and tune very slowly until you hear a group of broadcast stations.

When you hear these, tune back and forth until you have a rough idea where the center of this group of frequencies is. Now go back to the R.F. screw on the tuning capacitor. Tune the screw for the loudest level. Reception will be better on the higher end of the dial so stay with this group of frequencies. Chances are that most radios will pick up either the 31 or 49 meter bands. Depending on the receiver you use, you may be able to pick up lots more.

To improve reception you can connect a 25-100 ohm resistor in parallel to the length of wire which extends from the radio. Another method which can be used if an antenna is not available to it is to use the telephone, telephone wire, or other large metal objects. You may even want to experiment by placing a large metal plate in front of the radio until the radio is covered. This inductor antenna works very well.

Your new shortwave radio will be as well received as an expensive communications receiver, but it will pull in those high-powered stations such as VOA, AFRTS, BBC, Voice of Germany, Nederlands, Moscow, Albania, Cuba, WW, CHU and many, many more.

It may surprise you to know that at times you can even find good DX signals on this type of shortwave radio. Now you may take shortwave with you wherever you go.

(For those who may have questions or who may require additional explanations please feel free to write author.)

JAPANESE CODE NETWORK REPORTED

Sonder Dave Shite W1SZJ reports hearing several networks using Kana (Japanese characters). The common frequency is 3700 kHz and used, right at the bottom end of the amateur 80-meter Novice band.

Dave says that the nets are regular; copied evenings between 0045-0215 UTC following at least 4 distinct schedules. Could these be illegal fishing or whaling nets? They appear to be from fixed locations rather than mobiles.

Listeners with additional information are invited to share their findings in the pages of Monitoring Times.

Thanks, Dave, for sending this interesting item in.
By Lani Petitt

(Spy Centre editor for A*C+E*)

Writing an article for a respected publication like Monitoring Times is indeed an honor, and utilities buffs find it a necessary part of their DX libraries. And, of course, those of us into “spy-chasing”, are great fans of the mysterious Ham World! (Thanks for the nice comments about A*C+E*, H.M.)

The following guide to spy packages broadcasts has been compiled from loggings by A*C+E* members, with some gleanings from Spence Naylor’s fine utilities column in ASWLC.

Special recognition here goes to David Markwick, A*C+E*’s spy expert in the U.K. for his regular reports of GG (German) and RR (Russian)-type broadcasts that are not so easily heard in this country.

Most transmissions are full carrier AM, although some SSB is reported.

There are different formats and voices within a language, yet there are striking similarities between broadcasts of differing languages. Sometimes the spy may be a mistake, and we learn from that.

It is all very intriguing for would-be detectives who wonder: “Why does the YL (female) of GG 5-digit broadcasts on 2966 sometimes transmit in English (EE)? Or, “Why are the clicks heard with one the SS/5 spies at about the rate of 78 rpm’s? Don’t they have a tape recorder?”

The common 4-digit Spanish (SS/4) spy has revealed some interesting facts in recent weeks. Transmissions are on the following frequencies, often with two in parallel: 4305, 4670, 5810, 6840, 8417, 9072, 10700, 11532, 13450, 14640, and sometimes a few kHz.

There are other two spies definitely related to the SS/4. One is the SS/3 on 10570/13808, which comes on with time pips at 0125, and every day. At 0130 there is a longer tone, and the YL of SS/4 fame comes on with 3 or 4 groups of 3 digits, repeating them over and over until 0140. And at 0235, there are the same identical pips and format, but with CW from 0300-0400.

The CW is very slow, and gives the 2 to 4 groups of 4 letters and numbers over and over. This CW spy uses only 8 different letters and 2 different numbers in all its broadcasts. It takes 10 figures...exactly the same as any voice spy uses!

While working on this article, I made an interesting new discovery. CW/4 was heard on 9566, at 0208, with traffic; and the next day at 0308 a different CW/4 spy was busy for at least an hour on 11440, with traffic too.

They both used the same 10 figures that the 6840’s CW spy uses, and in the same too-slow manner. Does this make the GG/5 a cousin to the SS/4?

Now it’s your turn to look for spies! Transmissions usually begin on the hour, fifteen after the hour and sometimes the half-hour. If you use an antenna like I do, you can put the frequencies in memory and then check them periodically.

CC-Chinese, EE-English, GG-German, RR-Russian, SS-Spanish, CW-Morse Code, and PH-phonetic alphabet used by any language broadcasts such as “Kilo Papa Alpha 2” or “Papa November”). An item followed by * has been reported more than once this year. Those marked *** are heard, and likely to be found again if you check regularly. A triple *** indicates a very regular, almost daily spy transmission.

Remember, these listings are only as accurate as the listener reported them. Some were heard in Europe and will not be received in the U.S. All are subject to change and some will be obsolete by the time you read this.

Happy hunting!

0000 UTC
0200 UTC
5015 GG/5* 4670 SS/4**
5040 GG/5 5810 SS/4**
9040 SS/5 6825 777* (8)
9050 SS/5 7445 PH/X
9074 SS/4* 9050 GG/5
9972 GG/5 9074 SS/4*
11532 SS/4** 9265 GG/3*
14650 GG/5* 9272 GG/5
16460 SS/4* 11532 SS/4*
3914 SS/4* 10010 UTC
4010 GG/5 4015 GG/5
4052 EE/5 5092 SS/5
4074 SS/4** 9265 GG/5*
9272 GG/5 7730 GG/5
9312 GG/5 9285 SS/4*
9332 SS/4** 9297 GG/5 0200 UTC
11352 SS/4* 4345 SS/4
12135 SS/5 4360 SS/6
13450 SS/4* 4670 SS/4*
4013 UTC
4670 SS/4 6214 EE/5
4670 PH/X 6572 SS/5
8173 GG/5 8205 SS/5
10570 SS/3*** 9059 GG/5
13008 SS/3** 9072 SS/4*
9265 GG/5* (continued on page 26)

Composition of Slow Scan TV signals, illustrating scan rates and frequencies. Horizontal sweep rate is 15 Hz. Vertical scan takes 8 seconds to produce a single 120 line picture.
The Drug Smugglers...An Update

A year ago, Monitoring Times was the first publication to expose the elaborate drug smuggler radio networks. The feature caused quite a stir among federal officials and outlaws alike. In the year following, was there any change worth noting? Yes. The increasing availability of general coverage transmitters such as the ICOM 720 and Kenwood TS-950 provided ample opportunity for evasive frequency jumping.

The notorious "Black" tune, a subsidiary of the mob, no longer concentrates its communications just below the 20 meter band (13964 and 13979 kHz) or just above (14505-14515 kHz), but may be found throughout the HF spectrum. Other rival traffickers also populate the mid and upper part of the HF spectrum with daily contacts to coordinate shipments, arrange payoffs, alert boat of Coast Guard positions and apprise fellow gangsters of the latest busts!

It is sometimes difficult to tell the good guys from the bad (you can't see their white and hata), so monitoring times presents the following frequency update resulting from extensive listening.

Khiliffy Affiliated Radio System (MARS) frequencies commonly encountered are included to avoid confusion of identification. Not all English and Spanish speaking entries are necessarily smugglers, but content of their communications was suspicious.

ENGLISH | MARS | SPANISH
--- | --- | ---
6391 | 7301 | 6930
6910 | 7312 | 6930
7370 | 7345 US | 6983 LSB
7326 US | 7370 US | 6963
7373 US | 7377 US | 7335
7322 US | 7391.5 (USN) | 7355
7407 US | 7407 US | 7410
7432.5 US | 7432 | 7450
7460 | 7460 | 7453
7470 | 7470 | 7457
7490 | 7490 | 7460
7517 | 7517 | 7470
7590 | 7590 | 7550
7605 | 7605 | 7590
7635 (CAP) | 7635 | 7645
13990 | 13990 | 13990
13992 | 13992 | 13992
14014 | 14014 | 13994
14432 | 14432 | 13996
14447 | 14447 | 13998
14452 | 14452 | 13998
14460 | 14460 | 14000
TECHNICAL TOPICS

Do you know the new UHF frequencies in use by the Nassau County, NY sheriff's office?

John J. Moran Bethpage, NY

The new frequencies in use in your area are:

477.2375 Precincts 1 and 7
477.3875 Precincts 2 and 8
477.4125 Precincts 3 and 6
477.2125 Precincts 4 and 5
477.2675 Highway Patrol
477.1875 Northside Admin.
477.2875 Southside Admin.
477.3375 Detectives
477.7375 Tactical
478.9375 Special Details

Notch filters and tuned coax stubs have failed to improve my problems with interlaced aircraft images on my Bearcat 250.

Are there other devices which I can use or purchase to help with this problem?

Brant Basinger
Alta Loma, CA

Sounds like you have real problems with those aircraft images. Since all notch filters are narrow-bandwidth devices, it's quite possible that you need to remove such of the entire microwave band. There are two possibilities: 1) Design a band-reject filter; 2) Design a high-pass filter which will remove everything below about 150 kHz or so, including low band.

Another possibility which is used on occasion is the use of two cascaded (in cascade) Scorer filters. Each is adjusted to a slightly different frequency from the other like 125 and 150 kHz.

That technique works quite well in high signal level areas like yours.

There is the possibility that the signal hear- ing is intermod resulting from a strong local signal (FM, TV, mobile phone, weather) beating with the aircraft signals producing output on high band. If this were the case, you would hear the modulation from that other station as well.

Can you use a Bearcat 210XL as a frequency counter for a DX-200 Radio Shack Shortwave receiver?

Pat Eckenrode
Ormond Beach, FL

To my knowledge you can not use any digital-display scopes on a frequency counter because the display is controlled by an algorithm program from the microprocessor, not by measuring the oscillator frequency.

Would you know of any CB publications on the market now that I may subscribe

to such or similar to the old 5-9 or CB Times?

David J. Sage
Boston, MA

Both CB Magazine and S9 Magazine folded about a year ago after an attempt to survive. At present no magazine has picked up the pieces, although Tom Kneseil's new venture with SC Magazine, Popular Communications, toughen on the CB scene somewhat.

Which scanners can be used with the Grove Scaven-
ter?

Walter F. Ahern
Fayetteville, PA

The 220-400 MHz military aircraft band is almost exclusively AM, making the domestic commercial 118-136 MHz aircraft band. For that reason, the conversion must be into a scanner that has an AM band...the 118-136 MHz band.

Could you please lead me to know if one must have an outboard antenna to have a Globescan Shortwave Converter. I have a Bearcat 350 with aircraft reception. Will it work with built-in antenna on scanner?

Betty Curran
Clifton Springs, NY

While you can not use the built-on whip which comes with your scanner for short-wave reception, a 20 (10-20 feet long) wire strung around the ceiling, between rooms or through an attic crawl space will provide worldwide reception.

Incidentally, the Bearcat 350 will work quite well with the CVR-2 Globescan.

(Viewpoint, can't from pg 3)

Bob, I want to say once more how much I appreciate the chance to get some articles published in MT. Thanks to the experience I've gotten from writing for you, I'm looking forward to a sale and just like to "Survive" magazine that will be published in October. The fact that I had been published in your magazine helped them in their decision to purchase my article. (Name withheld).

Thanks for putting together a great publication. I have purchased books and accessories from you and enjoy them all. You are correct, your publication was needed and above all your thoughtfulness to your readers is appreciated.

Don Bernard, Milwaukee, WI.

Keep up the great job on MT - last issue sure was dynamite! John Hannett, Abington, MA.

Novice License Study Guide

by Timothy M. Daniel

This book explains the practical and legal aspects of operating a scanner or calling a station on the air. Complete with information about licensing, these radio law, the FCC amateur regulations and the special terms, this guide provides the best path through the licensing world. $1.50

General License Study Guide

by Timothy M. Daniel

Covering stations of the CIA and FBI, this book contains lists of the CIA and FBI stations. $2.00

Behind the Dial

by Bob Grove

This book explains in detail what's happening on all the frequencies that shortwave listeners need to know. $2.00

Waves, Waves, Waves

Books Sales - Peterborough NH 03458

HELPFUL HINTS

ANTENNA CONNECTOR FOR HANDS-Helds

by Art Kimball

A brand new product from Radio Shack, just put on the shelves in the past couple of weeks, is made to order for owners of Bearcat Hand Held crystal scanners, but not the BC-100. Catalog Number 20-020 ($2.95) External Antenna Adapter is made for Realistic Pocket Scanner, to allow connection of a Mot- orola-type antenna plug to the unit. It also has a spade lug attached so you can use a base-station antenna with it by attaching the center conductor with an alligator clip. I have used the adapter with my Bearcat 4-6 in the car, and it works fantastically well. A mobile shop cannot do very much in this fit the Bearcat 100 (10-32 thread) or an adapter could be made to fit the BC-100. You may have to ask your local dealer to do this for you; they have been hard to come by.

MODIFYING RECEIVERS

A number of electronic specialists offer modification services for popular brands of shortwave receivers. These include Electronic Repair Shop (ERS), Radio West, and others.

For the adventurous hobby-ist, component kits are available for home refurbishing. Two outstanding sources for Kenwood and Yaesu improvements are well known:

The Fox Tango Corporation
796-6200) specializes in Yaesu equipment parts, filters and accessories. Some Heath, Drake and Collins are available.

The Users International Radio Club (Newsletter: 364 Kiltiprick Avenue, Port St. Lucie, FL 34952; ph: 305-878-7976) three issue publication: Suite N, 1532 SE Village Green Drive, Port St. Lucie, FL 34962; ph: 305-935-5545) centers on Kenwood product, equipment. Available from request catalog from these reputable companies to see what they have to offer for your rig, mentioning that you are in the area of Monitoring Times.
STOCK EXCHANGE

Note: Monitoring Times assumes no responsibility for misrepresented merchandise.

SUBSCRIBER RATES: $10 per word, paid in advance. All replies must be listing related. Ads for Stock Exchange must be received 30 days prior to publication date.

ONE-ONLY SPECIALS FROM BOB GROVE

Bearcat 100 pocket synthesized scanner, related recently in performance and condition with怀疑和，and 100 MHz range. Excellent. See above phone. $260 postpaid.

Spectrum Analyzer: Singer/Polarc Ups-4/A, 10-66,000 MHz, see the entire spectrum on video display! Manual and accessories included: excellent condition. See above photo on P. 3 Sept/Oct 82 MT, left side. Original cost approx. $15,000; yours for only $495 shipped!

Oscilloscope: cul trace Hickok CS-12100/CM-140, DC-22 MHz usable to 50 MHz, includes box, probe. Excellent. See same photo (above), right side. $395 postpaid.

Bob Grove, 140 Dog Branch Rd., Casstown, NC 28902, or call 1-800-435-8195.

SP-600-JX1 Hammarlund receiver, 55-54 MHz, complete manuals and RL-259 adapter. Very good, 2200 plus shipping. Tom Swanson, 212-782-0791.

Bearcat Thin-Scan - Aircraft/UHF, 4-channel $75. Braun T-1000 (Gold Tuner) $50 for $250. Bearcat 100, charger, screw in whip $250. Road Bourne, 4500 S. Four Mile Hill Run St. Louis, MO 63104.

Bearcat 100 with two antennas, two sets nicas, charger, etc. 1 year old, with manual and original carton. Excellent condition. $250 firm. David Gness, 16 Dow St., Salem, MA 01970.


Listen to Ohio at work-RR's, aero, business, federal government PLUS MORE! Sample newsletter $1 or SASE for details. All Ohio Scanner Club, 10 Avondale Rd., Mill, Vernon, OH 43068.

Yaesu FRG-7700 with FRT-7700 antenna, tuner and FRV-7700 VHF converter. All units in new condition. Used very few hours. $375 complete. Will ship UPS prepaid. Call 281-743-5600.

Yaesu FRG-7000 receiver in mint condition. Will ship UPS in original carton. Make offer. B. Thompson, 615-731-5500.

Collins S191 receiver, 0.1-30 MHz, winged, mint, manual, $750. I ship Dan 816-331-5525.


Shipping UPS included.

WANTED: Monitoring Times vol. 7 issues 1, 2, 3 and 5, Fred Flynn, PO Box 6381, Norfolk, VA 23504.

Pirate broadcasters, numbers stations, clandestine, mystery transmissions, drug smugglers, and other pirates are some of our interests. If you share them, join the Association of Clandestine Radio Enthusiasts, an ANARC associate club. Information for SASE.

Sample of our monthly bulletin, $1. Yearly membership, $5.50. ARCE, PO Box 452, Moorhead, MN 56560.

WANTED: for trade Hallcrafters completely restored receiver. Need DX302 or FG7. H.C. Ponder, Rt 1 Lavendale, NC 28649.

FOR SALE: 24 channel memory unit "ND-515" for use with JRC NRD-515. Excellent condition. I bought the newer 46 channel memory unit and so I have no use for it. $100. Ed Flynn, PO Box 138, Ft. Meade, MD 20755.

Realistic DX-302 for sale. 2 years old, just realigned and excellent condition. Digital frequency readout, covers 10 kHz, 38 MHz, USB, LSB and AM. Narrow and wide bandwidth selectors, adjustable RF attenuator and much more! Will take best offer! Contact Kevin John, 216 Park St., NE, Vienna, VA 22180.

Phone: (703) 938-4505.


FOR SALE: ACTIVE ANTENNA Preamp and Coupler boards with JFET (no other parts), as described in RADIO-ELECTRONICS Feb, Mar, Apr, May, June 1983. $110 each or MO, no COD, Ohio res. add 5.5% tax.

BURLANS ELECTRONS, 161 Grosvenor St., Atlanta, GA 30307.

Wanted to buy working police type radar unit. Also any non-working Motorola handy talkies for parts. Send description and asking price to O.L. Weaver, 984 San Felipe, Angleton, TX 77515.

Information Please

MONITORING TIMES WILL PRINT AT NO CHARGE (AS SPACE PERMITS) ANOUNCEMENTS AND QUESTIONS OF A NON-COMMERCIAL SERVICE NATURE. I would like to hear from everyone interested in NARA communications. All letters will be answered. Bruce M. Boston, 815 East Third Street, Beardstown, IL 62510.

The following equipment was stolen from my home in FAY: Kenwood R-2000 (SN 1850279), ICOM 780 (SN10861). Any information please forward to Kevin Pratt, 312 Randall Ave., Apt. 115, Midwest City, OK 73110.

I am interested in DXing but have been unable to find a company that sells verification report sheets which can simply be filled out and sent in for QSL cards. Don Green, Sr., 27631 Cliffwood Ave., Hayward, CA 94545.

I would like to exchange scanner frequencies with people in or near the following cities/counties that have unlimited knowledge of these areas: Battle Creek, MI (Calhoun County), Miami, FL (Dade County), Quincy, IL (Adams County), Watertown, NY (Jefferson County). Please call me at 1-419-822-5567 and ask for Kevin or write: Kevin Trickey, 312 Jackson, Delta, OH 45315.

WANTED: Any state Office of Emergency Services (OES) frequencies; also federal frequencies. Kenneth Jillson, PO Box 462, Coulterville, CA 95311.

Are there any repair companies who can service my Tennessee MDP-17? Eugene D. Krolak, Jr., 173 West Labo Rd., Carleton, MI 48117.

I am having trouble verifying such countries as Algeria, Mauritania, Tunisia, and Somalia even after follow-up reports and additional IRC's. Any suggestions? Bob Broselli, 274 Meadow Court, Pewaukee, Wi 53072.

Would like to swap California area scanner frequencies, especially LA Metro, movie studios. Dick Ferreira, 2200 N. Paradise, Compton, CA 90222.

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