



MONITORING TIMES

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MONITORING THE SOVIET SATELLITES

By Mike Smithwick

For years the Russians have been watching us, now we can watch them! With help from their powerful network of Molniya television satellites, even the most modest home satellite TV terminals can eavesdrop on the latest gossip from Moscow, catch the current fads in the Ukraine, or pick up details of the latest in state-of-the-art tractor repair.

Just what is Molniya, and how is it that U.S. stations can copy it? The Molniya series of satellites form a communications bridge between Moscow and the Western reaches of the Soviet Union. First and foremost it is a television satellite, not at all unlike our own DOMSATs (DOMestic SATellites) such as COMSTAR or SATCOM. But, unlike the DOMSATs, Molniya carries just one television channel (hey, it prevents arguments about what to watch) mixed with a host of other communication services.

But what really makes Molniya unique is its unusual orbit (dubbed a "Molniya" orbit). With an inclination of 66 degrees, perigee of 280 miles, and an apogee of 23,400 miles the satellite presents itself as a moving target to whoever wishes to watch it, unlike the stationary U.S. satellites.

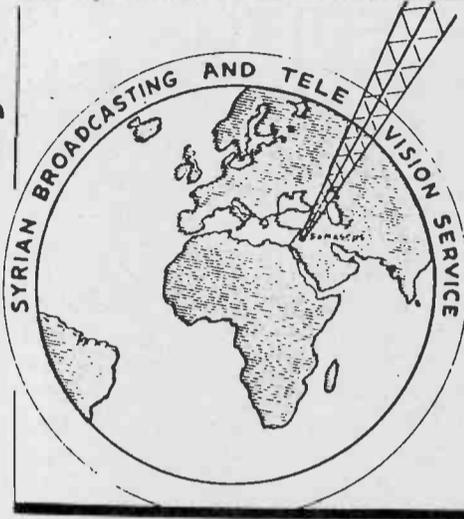
Orbiting the earth every 12 hours, the satellites reach apogee twice

each day, first over central Russia, then over northern Canada. It is this Canadian peak which we are interested in, as this is where the satellites are activated for broadcasting.

Because of the nature of the orbit, 4 satellites are required for a full day's broadcasting. Each is turned on for 6 hours, beginning at 1 hour before apogee and lasting to 5 hours past apogee. At this time the next satellite is rising, and is activated for the next 6 hours.

The Canadian apogee is what permits stateside watchers to "see" the Molniya. The reason why they are used at this point, instead of the more logical Russian apogee is twofold: First, these satellites form a backup link for the famous "hot-line" between Washington and Moscow. The second reason, it is believed, is to provide television to the boys overseas in Cuba.

Such wide-ranging coverage necessitates both a wide beamwidth on part of Molniya's antennas, and a high transmitter power in order to make up for the lower gain of the antennas. What this all means is that the transmitted signal is comparable to stateside DOMSATs, with a signal strength of about +32 dBw over the entire country. The higher-than-usual output power is also required to compensate for the deficiencies of Soviet microwave technology.



So, while we copy the Molniya signals with our 3 and 4 meter dishes, the Soviet ground stations use 12 meter systems. The television signal may be found slightly below channel 9 on the home satellite receiver at a frequency of 3775 MHz.

Located on a 7.5 MHz subcarrier is the Russian National Radio Service. This can be copied in the same way as the U.S. DOMSAT subcarrier services. Narrow band telephone and telegraph services are located in both the 800 to 1000 MHz and 3665 MHz regions of the band. A simple HF receiver should permit one to copy the 3665 MHz services.

By now you may be asking yourselves, "Don't I need a Russian TV set to copy the pictures?" Not really. While the video is broadcast in the international SECAM format, standard U.S. NTSC sets can display a surprisingly usable picture. Older sets work better than the newer models since many newer sets lack the fine picture adjustment controls required to steady the picture (leaving the duty to digital circuitry which can't seem to lock up on the Soviet video).

SWL WORLD WATCH

WE ARE PROUD TO ANNOUNCE AN INFORMATIVE NEW BROADCASTING COLUMN BY KEN WOOD BEGINNING IN THIS ISSUE ON PAGE 25.

Unfortunately, both the sound and color are incompatible with U.S. standards. The audio is "pulse width modulated" within the video horizontal blanking signal. Simple circuit designs are available to decode the audio, but color would still need a SECAM monitor.

Actually, there are 2 audio channels. They can be used for either bi-lingual broadcasts or, more commonly, one channel is used for video cueing instructions from the Moscow studios.

TRACKING THE BIRDS

As seen from the ground, the satellites trace out a lopsided "U" in the sky and, as with all satellites, the exact location of the "U" is dependent upon the station's location, time of day, and time of year. To further complicate matters, each Molniya resides in a slightly different orbit from the rest.

The first step is to orient the antenna north towards the sub-satellite point at apogee. For Molniya, this point is Mansel Island, located in Hudson Bay, Canada. Remember to use Great Circle directions and to mark the antenna platform

Cont'd on p-4

See **NEW ARRIVALS** for announcement of **three new receivers!**



NOVOSTI evening news. Map in background is Lebanon.

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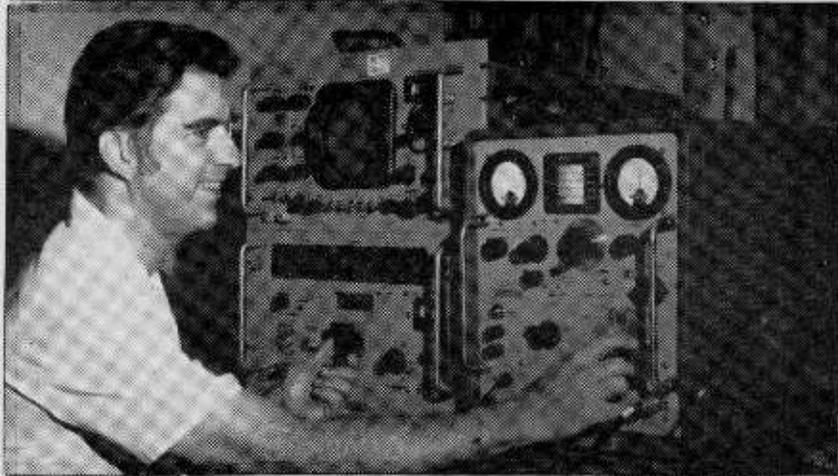


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FROM THE EDITOR



On The Subject of Kits

The editorial in the November '84 issue ("To Build or Not to Build") elicited a great deal of mail from MT readers. A considerable majority would like to see Grove Enterprises offer kits for the home radio enthusiast.

We appreciated the considered caveats which were sent as well, such as stipulating to the prospective builder that he would be responsible for wiring errors and component damage, that kits returned for repair would require prepaid postage, and so on.

Nonetheless, I feel that there was enough encouraging response to the query to consider seriously the offering of simple (or even advanced) kits. Only one question remains: **What kits would you like to see?**



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



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

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

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

Whatever Happened To Lafayette? ...a follow-up

Thanks to the many MT readers who sent information on the present status of the once-expansive Lafayette Radio and Electronics chain. According to our writers, approximately a dozen Lafayette retail outlets still remain in the New York City area; even the Syosset and Long Island home stores are closed. The Circuit City chain is the vestige of the rest.

The complexion is changed, however; no parts are offered, no catalog for mail order, and no Lafayette brand...just established brand-name consumer merchandise now occupies the counters of the once-famous Lafayette hobby stores.

THANKS!

I only wish I could respond individually to all of you who take the time to send your thoughts, news clippings, and other helpful items for our benefit and to share with fellow MT readers.

Please accept our appreciation in this impersonal form; we are grateful for your contributions.

Bob

GUEST EDITORIAL

CITIZENS BAND RADIO: Take Another Listen

- AN EDITORIAL REPLY -

Citizens Band radio, or "CB," has not quite turned out to be what it was originally intended to be, as most people in the monitoring hobby are well aware. So it was no surprise to find in the November issue of MT a number of quite negative opinions in regards to CB and having a CB column in MT. I am somewhat certain that those who dislike CB are probably residents of metropolitan areas, and therefore have not been exposed to CB "outside-the-city," where Citizens Band radio takes on a much different and positive form.

I, too, being a life-long resident of a metropolitan area (Washington, D.C.), have been totally turned off by what I hear on the CB airwaves. Ninety-five percent of all transmissions seem to occur only on channel 19, and consist only of people "yelling" all sorts of inane and rude comments at each other as to another's driving ability, and the "pair of nice legs" they are looking down on from their truck. Most of these people have probably never switched their CB to any other channel other than 19!

There exists, however, a whole other world to CBing, completely opposite of the "channel 19" mentality, which I was not previously fully aware of until my recent camping trip through New England. There, in rural America, throughout the backwoods of Maine, New Hampshire and Vermont, CB radio is the life-line of many small towns. And the airwaves in the country are so static-free and interference-free, you have to turn off your noise blanker to tell if your radio is working!

We were camping in a state park in northeast Maine, and found ourselves wondering where we might find a coin laundry. Since towns in this part of Maine are about twenty miles apart on average, it is wise to

know if a particular town has what you need before driving all that distance.

I was able to locate the laundromat by using the CB there at the campsite. Of all forty channels, on only one did I hear someone. After he had finished his communication (he was helping a man repair a tractor over the radio) I established contact. It was through this person that I learned of the many radio (CB) networks throughout the area. He said there were no laundries in Perry, but that I should drop down to channel (#) because "that's where the Eastport folks hang out." He added, "Or you might try down in Machias. The Machias folks use channel (#)."

This is only one example of the value and utility of CB: providing a "link" among townspeople and between neighboring towns. It was not until that night, when I was sitting around the campfire scanning the bands with my Uniden CR 2021 communications receiver, that I made my most interesting discovery concerning CB activity. I found half a dozen CB frequencies that were buzzing with networks, from towns as far away as fifty miles.

A net of elderly women were planning a church activity and exchanging recipes; a net of school children were talking about a homework assignment; and most interesting: music!! A CB pirate station? No, not by a long shot. This was a net where the people sang and played musical instruments live on-the-air for the others. The songs were mostly religious or traditional.

These "net" users ranged in age (judging by their voices) from under ten to over seventy. They were on the air every night.

I discovered CB networks like these throughout my travels, and must conclude that there are thousands all across the United States. With a good antenna there is much to be heard on the CB frequencies, and that is at least one justification for a column on CB in Monitoring Times.

Have you ever tuned into a SSB net on a CB frequency? You will probably be surprised to hear little difference between a SSB net on CB and a net on the 2-Meter "ham" band. Topics on both often concern radio equipment, antennas, and repairs. The SSB CBers seem to be polite and serious, as

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Viewpoint

A Reader's Comments on PROJECT ELF

Most people can "see" a flickering light at the scan rate of 60 interlaced fields per second. The normal hearing rates run from a "thumping" below 16 Hz to the mosquito-whine above 12,000 Hz.

Because of the time factor in ion-exchange and transfer, data is encoded into a log-curve read-out for transmission and data processing. This is why every sense has a "decibel factor," when analyzed by lab equipment. You are measuring the log encoding.

There are physical constants involved, most

GUEST EDITORIAL: CB

compared with channel 19ers.

Currently there is virtually nowhere to turn to obtain advice, assistance or knowledge about CB as a hobby. I feel that a monthly column in MT by a knowledgeable and responsible individual would be a great help to those of us who want more information, such as ways to legally increase transmitting range, product reviews, things to build, and articles on interesting nets in America.

And what about news on REACT? Here in the Washington area REACT is large, effective, well organized and respected by local law enforcement agencies. I for one would like to know more about REACT.

I hope I have convinced some of you who despise CB that there is much more to CB radio than "Breaker one-nine for a smokey report." Beyond the cities and beltways there exists a fascinating monitoring opportunity. I hope that Bob Grove can at least give a CB column a trial-run for about six months or so. Reader REACTiOn will determine its fate. How about it, Bob?

Michael Prosisie
Greenbelt, MD

(How about it, readers? Can we restore some dignity to the much maligned CB service? Michael Prosisie's plea is heartfelt; we receive many inquiries for CB'ers looking for legitimate technical help.)

involving "ion pumping" rates in living tissue. For example, work done on the giant squid neuron system shows a pulse velocity of a meter in 1/5 seconds.

As a result, there is a practical limit on the highest frequency the human nervous system can handle. I have not seen any top value published. My own observations on vision and touch in my body suggest a top value of about 70 Hz.

I think you see the thrust of my comments. For once, the environmentalists were correct...They may have been wrong as to their reason and logic, but they were right as to cause. In my view, the odds are about 99/1 that all vertebrate life will be profoundly affected by megawatt electromagnetic and electrostatic fields @ 73 Hz--for scores of miles around the antennas of the ELF systems.

I had not thought that any sane physicist could design and implement a system which is in the low audio range. Are modern scientists so completely enclosed in their specialties that they cannot see the impact of their math constructs on life forms...?

This harks back to the story in the old "Colliers" of the ultimate weapon. All parties used it at the same moment. A radio signal which blocked the human pulse. The hero came up from an abandoned lead mine to find that it was awful quiet out there...

I would suggest you cultivate contacts in the areas of biophysics and zoology in the ham radio hobby in W9 land, because the first months of operation of ELF will be extremely interesting!

(Name withheld)

>>><<<<

Fine periodical, your MT. There's no wasted printing and even the minimal commercials are likeable. Good coverage of things I like.

A number of us purchased Bob Newbould's "Scanning the Three Rivers" thanks to your review. It is a first rate publication.

Gerry French, Pittsburgh, PA

>>><<<<

In regards to "Facts, Fables and Fun," about the possible derivation of the word Ham. I am truly shocked that nobody really knows - Except Me.

Now I shall share my secret with the world.

The word Ham comes from the founding fathers of radio: Hertz and Marconi. Hence - HAM.

P.S. Keep up the good

publishing of a great newspaper.

Hank Kaufman
Bartonville, IL

>>><<<

May I add a word about "ham"? It's not important to know how the word was derived. What's important is to know how it's used.

The vast majority of English speaking persons use "ham" to identify a bum-bling, stumbling, over-acting underachiever who vainly tries to merit the approbation of his peers. It's used in derisive contempt. That's why, when anyone calls me a "ham," I politely inquire if his mother has even the slightest idea of who his father may have been. After all, he was the one who initiated the exchange of insults!

And I agree with KR6A in his saying that there are "hams" who, unfortunately, possess Amateur Radio licenses. Too many, indeed!

Carl C. Crummeller, W5JJ,
An Amateur of Radio Communication and Technology

>>><<<

This is in regard to the coverage of CB radio operations and the frequencies from 27.405 to 28.000 in your publication.

Any group of people will have some bad apples but that doesn't make them all bad. Had I not become interested in CB radio I

Cont'd on p.35

ERRATA:

We inadvertently omitted the chart describing BC210 and SX-200 test frequency coverage referred to

BC210/SX-200 SIGNAL GENERATOR TEST FREQUENCY RANGES.

SIS/GEN. TEST FREQUENCY RANGE IN MHZ	*PROGRAMMED FREQUENCY RANGE IN MHZ	
	BC 210	SX-200
19.2 - 36.7	30.0 - 47.5	0 - 0
36.7 - 39.2	47.5 - 50.0	26.0 - 28.5
39.2 - 77.3	0 - 0	28.5 - 88.0
** 77.3 - 118.7	0 - 0	0 - 0
118.7 - 135.2	0 - 0	108.0 - 124.5
135.2 - 163.2	146.0 - 174.0	124.5 - 152.5
163.2 - 190.7	0 - 0	152.5 - 180.0
** 190.7 - 390.7	0 - 0	0 - 0
390.7 - 405.2	0 - 0	380.0 - 394.5
405.2 - 501.2	416.0 - 512.0	394.5 - 490.5
501.2 - 524.7	0 - 0	490.5 - 514.0
* BC 210 PROGRAM 10.8 MHZ HIGHER IN SIGNAL GENERATOR MODE. EXAMPLE PROGRAMMED 40.8 MHZ = 30.0 MHZ SIGNAL OR TEST FREQUENCY.		
* SX-200 PROGRAM 10.7 MHZ LOWER IN SIGNAL GENERATOR MODE. EXAMPLE PROGRAMMED 40.3 MHZ = 51.0 MHZ SIGNAL OR TEST FREQUENCY.		
** NOT PROGRAMMABLE AS TEST FREQUENCIES.		

ROGER NEVITT PETERSON 1917-1984

Short-wave columnist Roger Peterson died November 18, 1984 at the age of 67 after a long bout with cancer. As editor of the "Listening to the World" column, his professionalism and knowledge will be missed by our readers.

A graduate of Norwich University and the Military College of Vermont, Peterson flew 30 missions in B17 bombers for the Eighth Air Force during World War II, including a leadership role in the first mass daylight raid on Berlin.

Awarded the Distinguished Flying Cross, the Air Medal, and the Purple Heart, Peterson was later shot down over Germany and was held P.O.W. until his escape, after which he retired from the Air Force as a Major.

Mr. Peterson went into the advertising professional after the war, receiving the first "Agency Man of the Year" award from the Business and Professional Advertising Association in 1965. He spent the final ten years of his career as a vice president of St. Vincent, Milone and McConnells Advertising in New York.

He is survived by his wife Lyane, a daughter Elizabeth, two sons, Ross and Gregory, and his mother, Mary.

by Rene Borde on p.32 of the December Viewpoint. Here is the chart he provided.

SOVIET SATS from p.1

so the dish may be repositioned at a later date.

The elevation at apogee depends upon one's own latitude and the particular satellite. During recent observations I found the apogee at approximately 52-1/2 degrees for my latitude (38-1/2 degrees). This could vary one or two degrees depending on which satellite is in view. One recent pass I observed began with switch-on at 52 degrees, and switch-off at 68-1/2 degrees.

As if all of this weren't complicated enough, the Molniya orbit is not exactly 12 hours, but instead falls 2 minutes, 10 seconds short. Which means that the satellite will repeat its track 4 minutes 20 seconds earlier each day. As you can see, good records are very important for finding the satellites from one night to the next.

The best time for observation is during the satellite's apogee when it moves the slowest; as long as 45 minutes may elapse before the antenna needs to be readjusted. However, as the bird comes gliding down towards perigee, it will be in view for no more than 10 minutes at a time.

"TV GUIDE"

The programming on the satellite ranges from the hum-drum to the dull, demonstrating a startling poverty of imagination, much like American television. Of course, for us westerners, no matter what is shown, the glimpse of Soviet society as they see it is quite extraordinary.

My receiving system consists of a 4 meter dish and a 100 degree LNA. This gives me pictures at apogee, with no more than 10% snow, often snow-free at perigee. The signal is right-hand circularly polarized, so a circular feed would improve the picture but certainly is not a necessity.

The programming day begins at 21:00 UTC with the

Vremyi news broadcast, sponsored by TASS. The schedule is varied, but typically the news will be followed by chess updates, exercise programs, documentaries on Soviet life, and a movie. And true to form, there is the occasional propaganda piece.

One recent program tried to equate the United States with Nazi Germany, showing a dollar sign with a Swastika, and the Dove of Peace superimposed onto the Hammer and Sickle. Watching this level of material reminds us all how powerful television can be, especially in a society which teaches unquestioning faith in its government.

One of the many interesting little details of Soviet TV is that the programming rarely ends on the hour or half-hour as ours does. Instead, a program might end 17 minutes past the hour, with the next one immediately following.

When a Molniya reaches the end of its operational pass, you should be able to observe the switchover. Without warning, the programming will suddenly be interrupted with the "ORBITA" logo and a set of color-bars. The pattern will last for about 2 minutes before the spacecraft is turned off.

At this time, about 200 Soviet dishes are swinging over to catch the next satellite on its ascending node. If you know exactly where to find it, you should be able to catch the exact moment of activation. The bars and logo will repeat themselves, and the previous program will resume exactly where it left off.

Watching the Molniya can be both fascinating and frustrating. Even without the audio (that is, if you could understand Russian) you will find that it is true that "a picture is worth a thousand words." And you will undoubtedly see many things which you know just ain't so. But remember, the purpose of Soviet television is not to entertain,

ORBITA-1 logo.



but to present to the citizens the world as the Soviet government wants them to see it.

Check in with Molniya when Chernenko dies; it could be quite revealing. Also, should you want some recognition for your work, give the local TV station a call. I'm sure that a spot on the evening news will come easy.

I would like to hear from anyone else who is successful, as I am particularly interested in getting any material on the Soviet space program. I may be reached at 25215 La Loma Drive, Los Altos Hills, CA 94022.

GRENADA AND THE CARIBBEAN PEACEKEEPERS

By Chuck Robertson

Not many people realize that U.S. Troops are still active on the island nation of Grenada. No, they're not looking for Cuban strongholds or arms caches hidden in mountain caves; rather, the purpose of the remaining troops is to provide engineers and construction workers to help rebuild structures destroyed during the October 1983 invasion, as well as other projects such as the completion of the Point Saline airstrip first begun by the Cubans.

But of much greater interest is the ongoing training of a six-nation, 390 man Caribbean peacekeeping force. Antigua, Barbados, Dominica, Jamaica, St. Lucia and St. Vincent all took part in the invasion along with U.S. troops. Additionally, New Zealand, Canada, Trinidad and Tobago, and other independent Caribbean Commonwealth states have volunteered soldiers and constables to the joint regional security force.

The U.S. objective is to train and outfit a permanent Caribbean military organization which can protect the region from Cuban and "outside" interference.

During the spring of 1984 low band skip from Grenada was very common; Caribbean peacekeeping operations were logged on many frequencies (see Table A). U.S. troops were heard along with a menagerie of British West Indies dialects.

Cooperation among the various nationalities was excellent, although the Americans were clearly running the show. Most radio bases were manned by U.S. troops, although there were also some Caribbean bases, or "Sunrays," as they are

called.

Training classes to familiarize Caribbean troops with U.S. weapons, vehicles, radios and techniques were in evidence. One U.S. base, November 50, was heard asking Telescope, "Is there a chance we can send on personnel down for that M-16 class?" The American jeeps, trucks, rifles and radios are all part of a \$15 million U.S. aid package (which includes reconstruction projects). More aid packages are expected.

About 150 U.S. military police are thought to be on the island along with 150 logistics, medical, and administrative personnel. These statistics may be out of date, but from the number and variety of comms heard it's certain that there are many U.S. personnel actively participating in training, construction projects, and law enforcement.

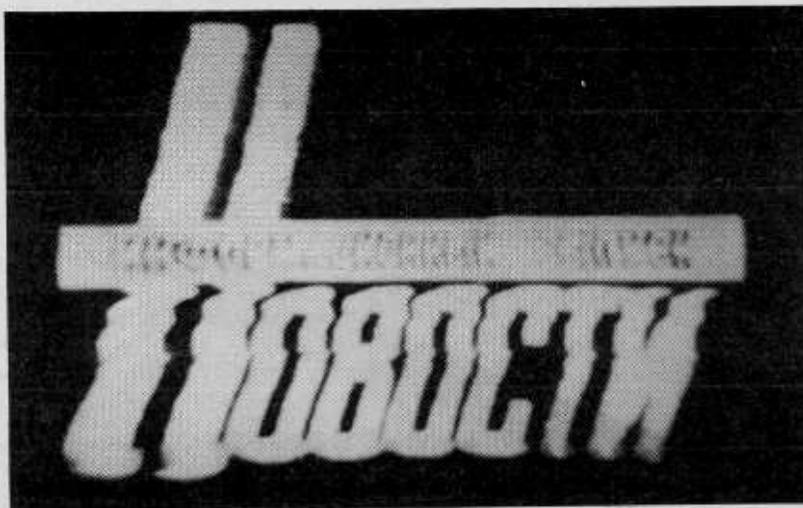
England, although upset at not being foretold of the October 25th invasion, has also likely sent police and technical volunteers.

TABLE A (Freq. MHz)

30.15	Main Channel
31.15	WBFM & SSB
31.85	Main Channel
32.43	Active
33.30	Main Channel
34.80	Active
36.20	Active
36.40	DVP type scrambling

The frequencies 30.15, 31.85 and 33.30 were the main channels; all bases were heard on them. The channel 31.15 carried long lists of parts and alternated between WBFM and SSB emissions!

The channels 32.43, 34.80 and 36.20 had only infrequent comms. Of special interest were the comms on



Lead-in to the NOVOSTI.

GRENADA

36.40 where US. officers were heard talking in the clear, then they switched to digital scrambling.

This scrambling isn't Digital Voice Protection (a type of scrambling developed by Motorola for law enforcement). More likely it's DES-Fed (Data Encryption Standard-Federal). It sounds similar to DVP (tone burst followed by static), but DES is more "scrambled," and so more secure and harder to crack.

The U.S. military makes wide use of DES scrambling here in the U.S., and apparently outside the U.S., too!

TABLE B
LOCATIONS & DESIGNATORS

- Sauteurs Base=City on the Northern coast of Grenada
- Telescope=(Base) Telescope Point on the East coast
- Grenville=(Base) City on the Eastern coast
- Mine=Compound
- Lima 32=Caribbean base, also called Sunray 32
- Lima 32 Alpha=Caribbean patrol, may be Jamaican
- Sauteurs 62=Roving patrol
- Sauteurs 66=Roving patrol on 30.15, 33.30 & 31.85
- Mike Papa Thompson=Military Police, officer Thompson
- Victor=vehicles, usually jeeps and trucks
- Whiskey=Caribbean officers (30.15 & 32.43)
- Uniform=officers (31.15 & 31.85)
- November=officers (33.30)

After years of neglect, fourteen major police stations are being reopened around the island. Grenadian policemen are also undergoing training with the joint forces.

The Grenadian operations on 31.85 occasionally suffered interference from a Jamaican business which shared the same frequency. Both "walked on" each other, but Jamaica usually won out. The frequency 31.85 MHz is excellent to program in your scanner. There are many operations on this frequency such as the Mexican State Police repeaters, domestic U.S. military comms in the Washington D.C. area, Jamaican business, and Grenada operations.

In the future we can expect to hear more Caribbean military maneuvers and training exercises on Grenada and the other six participating island nations.

January is usually a low point for the reception of long haul low band skip. But February marks its return and March and April

LISTENING ABOVE 1 GHz

By Al Smith,
Box 280
Wamsutter, WY 82336

One of the electromagnetic spectra that's not widely monitored by hobbyists is above 1 GHz (1000 MHz). Microwaves, defined as 1-100 GHz--or 30 cm to 3 mm wavelengths--are the domain of most space and satellite communications, subscription media services, domestic utilities, radars and radioastronomy.

Most terrestrial microwaves carry to 20 or 30 miles by line of sight, although tropospheric ducting near 1000 miles is possible.

SURPLUS GEAR

Probably the main reason microwaves haven't attracted monitors is the scarcity of appropriate receivers; their design is an exacting science and relatively few have appeared as surplus.

Surplus microwave receivers are mainly of two types. Satellite telemetry receivers, often with interchangeable tuning heads for 1.43-1.53 Gz, 1.7-1.8 GHz, and 2.2-2.3 GHz and thermal noise figures of 10dB are rare. These are implemented best with a low noise amplifier (LNA) and/or an astro-tracking antenna.

More common are test receivers known as RI-FI (radio interference - field intensity) or EMI/RFI (electromagnetic interference/radio frequency interference) equipment. These tune 1-10 GHz or above with noise figures of 9-12 dB, precisely measure microvolt signal levels and have VHF range IF outputs for monitoring on a VHF receiver. Equipment for 1.2-1.35 GHz, 4.4-5.0 GHz and 8.6-9.6 GHz is also common surplus.

Microwave receivers bring high markup for resale to laboratories, so a good option on buying surplus material is direct from Defense Property Disposal Service (inquire of DoD Surplus Sales, P.O. Box 1370, Battle Creek, MI 49016).

BAND CHARACTERISTICS

Microwave communications differ from those at lower frequencies in several respects: line of sight

may bring these Caribbean Peacekeeper comms back to the states.

Even if Grenada isn't heard this spring there's no telling what will turn up in the skip avalanche. Perhaps something completely new and unexpected!

(los) routing only; higher path loss; inapplicability of solid-dielectric coaxial transmission lines (except for runs of several wavelengths or less); general use of wideband modulation; and narrow antenna beamwidths in point-to-point circuits.

Most communications are concentrated from 1 to 15 GHz because higher frequency propagation washes out more readily with humidity/temperature changes.

Some high power military systems and DX'ing hams exploit tropospheric refractions or earth-moon-earth paths for extended range, but aside from those and satellite communications, the bulk of microwave activity is by terrestrial line-of-sight paths.

Unlike VHF/UHF, microwaves cannot transverse hills, buildings or trees. Path loss increases approximately as the inverse square of the frequency to about 3 GHz, and more linearly thereafter. Microwave propagation is similar to light.

ATT and other utility microwave multiplex towers link 200 mile hops. Extended range radars sweep up to several hundred miles. Lesser-power local media subscription services may cover a 35 mile radius.

ANTENNAS AND TRANSMISSION LINES

Antenna/transmission line configurations differ from VHF/UHF as well. Solid dielectric coax is very lossy above 1 GHz because of dielectric absorption and reflective losses engendered by its dimensions with respect to wavelength.

Small air or gas dielectric coax is usable below 3 GHz, but waveguides come into favor at higher frequencies. N, C, SMA and GR (Genrad) coaxial connectors are favored at microwave. A common UHF (PL-259) type connector is too lossy to use above 1 GHz where weak signals are the norm.

High gain (> 20dBd) antennas are common in microwave communications where propagation favors linear or circularly polarized antennas. Pencil beamwidths are the norm on longer utilities circuits, which are unheard more than a few degrees offbeam. Subscription media links, scientific and direct broadcast satellites, and most hams use wider beams.

Low noise amplifiers (LNA's) are used for satellite reception.

MODULATION TYPES

Wideband FM, AM and pulse techniques dominate microwave, exchanging much more data than is possible

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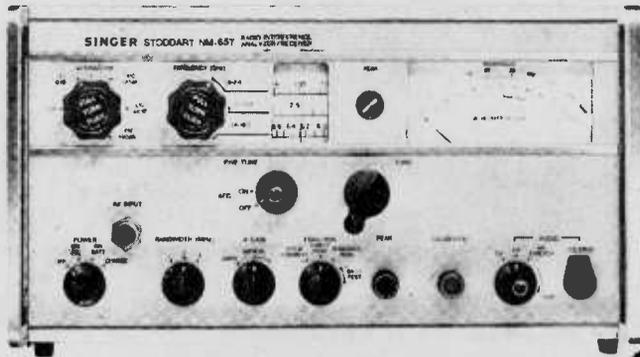
LISTENING ABOVE 1 GHz

at lower frequencies. In fact, as James Bamford notes in *Puzzle Palace*, virtually all non-local telephone carriers make one or many microwave hops.

These signals are frequency division multiplexed (FDM) and/or time division multiplexed (TDM) and are processed digitally as pulse amplitude modulation (PAM), pulse code modulation (PCM), pulse duration modulation (PDM) or pulse position modulation (PPM). Media carriers use FM and AM video of 4 to 40 MHz bandwidth, 15 kHz to 300 kHz deviation FM audio, FDM/FSK data, PSK data, and FM FAX. Radar's pulse repetition rates (PRR) vary from 400 to 4000 per second.

THE NEW FRONTIER

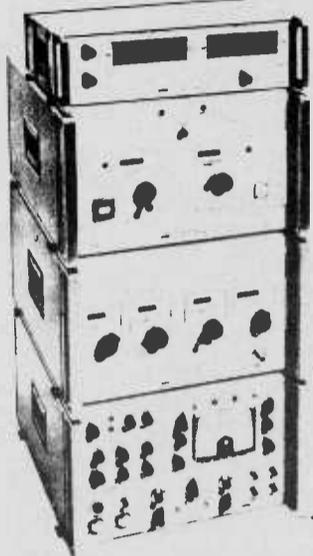
There are a lot of experimenters working above 1 GHz where FCC section 47, part 15 permits 100 mW unlicensed transmitters and where the atmospheric/cosmic noise minima around 23 cm wavelength benefit 1296 MHz EME (moonbounce) operators and 1420 MHz hydrogen line radioastronomy; where engineers work on +40dBm 1300



SINGER NM65T RFI RECEIVER



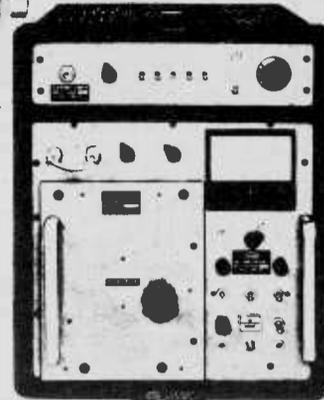
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EMA 910



POLARAD CFI



ACL TR-104

MHz power transistors; and where many special media and television services are accessed.

MICROWAVE FREQUENCY USAGES

- 1.0-1.2 business/mobile/aeronautical
- 1.215-1.300 amateur radio
- 1.22-1.35 L-band military radars
- 1.296 amateur DX, EME pathloss 245 dB, LNA useful
- 1.420 monochromatic hydrogen line radioastronomy
- 1.420, .405, .751, .786 hydrogen maser resonators
- 1.427-1.435 business/mobile/aeronautical allocation
- 1.435-1.535 satellite telemetry
- 1.535-1.559 satellite communications
- 1.612-1.727 hydroxyl spectral lines radioastronomy
- 1.635-1.660 satellite communications
- 1.660-1.690 weathersondes
- 1.690-1.700 meteorological satellites
- 1.6910 GOES satellite FM FAX
- 1.6945 METEOSAT satellite FM FAX
- 1.6980 NOAA8 satellite on command only
- 1.700-1.710 space research
- 1.7020 NOAA8 satellite on command only
- 1.710-1.850 government
- 1.7757, 1.8318 USAF space shuttle uplinks pulse modulation
- 1.990-2.110 studio to transmitter links and intercity relays
- 2.0419, 2.1064 NASA space shuttle uplinks pulse modulation
- 2.110-2.180 public common carrier; PTP, omni, TV
- 2.180-2.200 PTP fixed
- 2.200-2.290 government
- 2.2050 NASA space shuttle FM
- 2.2090 GOES 4 satellite on command only
- 2.209086 GOES 5, 6 satellites on command only
- 2.2110 NIMBUS 7, TDRS 1 satellites on command only
- 2.2140 GOES 4, 5, 6 satellites on command only
- 2.2150 NASA space shuttle TV
- 2.2155 ISEE 1 satellite on command only
- 2.2175 NASA space shuttle pulse modulation
- 2.2295 LANDSAT 2 satellite on command only
- 2.2325 TDRS1 on command only
- 2.2498 IUE satellite on command only
- 2.2500 NASA space shuttle downlink FM
- 2.2530 IRAS satellite on command only
- 2.2608 ISEE2 satellite on command only
- 2.2648 ISEE1 satellite on command only
- 2.2655 LANDSAT 4 satellite
- 2.2735 NIMBUS 7 satellite on command only
- 2.2760 NASA beacon on the moon
- 2.2875 NASA space shuttle pulse modulation, LANDSAT 4 satellite
- 2.290-2.300 space research
- 2.300-2.450 amateur radio

GALAXY ELECTRONICS

BOX 1202-67 EBER AVE., AKRON, OHIO 44309

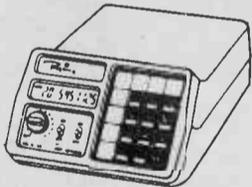
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- R-1000 200 khz 30 mhz, Digital Receiver... 409.50
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- PANASONIC RF-799 AM/FM/SW, Digital, 10 Memos, MORE!!... 229.50
- RFB-300 1 6 30 mhz, Digital, Much More!!... 214.50
- RFB-600 1 6 30 mhz, Digital, Memos, Scans... 429.50
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- BEARCAT DX-1000 10 khz 30 mhz, Digital/Mem... 474.50
- SONY 2002 AM/FM/SW, Digital, Memos, Scans... 219.50
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LISTENING ABOVE 1 GHz

2.304	amateur DX
2.375	ATV
2.400-2.450	amateur RM repeaters
2.401	Oscar 9 satellite beacon
2.450	microwave ovens
2.450-2.500	radar
2.500-2.690	instructional TV
2.560-2.590	INSAT TV-1 direct broadcasting satellite
2.600-2.630	INSAT TV-2 " " "
2.690-2.700	radio astronomy
2.8	10.7 cm solar flux noise maxima
3.000-3.246	10 cm radars
3.300-3.500	amateur radio
3.456	amateur DX
3.700-4.200	ATT multiplex and others
3.700-4.200	media satellites downlink
4.4-5.100	military systems and meteorological 6 cm radars
5.460-5.650	6 cm radars
5.650-5.925	amateur radio
5.760	amateur DX
5.925-6.425	ATT multiplex and others
5.925-6.425	media satellites uplink
7.125-8.400	military los systems
7.250-7.750	Defense Satellite Communications System downlink
7.900-8.400	" " " " uplink
8.500-9.600	X band military radars
9.192, .631, .770	cesum atomic-beam resonators
9.320-9.500	3 cm marine radars
10.000-10.500	amateur radio
10.700-11.700	ATT multiplex and others
10.700-10.950	communications satellite downlink
11.200-11.450	" " "
11.700-12.450	direct broadcast TV broadcasting allocation
12.500-12.750	communications satellite uplink
12.700-12.950	CARS CATV link.
14.000-14.500	satellite uplink
16.000-16.500	18mm surveillance radars
17.700-21.200	satellite uplink allocation
24.000-25.250	amateur radio
36.000-39.000	8mm surveillance radars
48.000-50.000	amateur radio
71.000-76.000	" "

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 J.I.C.L. - L.A. CORP. - 17120 Edwards Rd., Cerritos, CA 90701 (receivers)
 MCGRAW HILL BOOK CO - P.O. Box 400, Hightstown, NJ 08520 (Radio Handbook, William Orr; Antenna Handbook, Jasik) antenna designs
 MHz ELECTRONICS - 2111 W. Camelback Road, Phoenix, AZ 85015 (surplus)
 PHILLIPS-TECH - P.O. Box 34772, Phoenix, AZ 85067 (receivers)
 SLEP ELECTRONICS CO - P.O. Box 100, Otto, NC 28763 (surplus)
 TUCKER ELECTRONICS CO - P.O. Box 461060, Garland, TX 75046 (reconditoned instruments)
 WATKINS-JOHNSON - 3333 Hillview Avenue, Palo Alto, CA 94304 (LNAs, receivers)

SURPLUS RECEIVERS

MANUFACTURER MODEL	RANGE	TUNING	IF OUTPUT	AUDIO	VIDEO	MHz	BW	AFC
ASTROCOM LABS SR209A	1.43-1.53	plug-in	30 MHz	yes	yes	30kHz thro		yes
ASTROCOM LABS TRI04A	1.70-1.80	tuning				3 MHz		
	2.20-2.30	heads				plug-ins		
EMPIRE NF112	0.9-10.0	4 plug-ins	no	yes	yes	1/5 MHz		yes
POLARAD CFI	0.95-10.0	4 plug-ins	no	yes	yes	1/4/10 MHz		yes
POLARAD FIM2	1.0-10.0	4 plug-ins	no	yes	yes			
SINGER EMA910	1.0-10.5	four bands	60 MHz	yes	yes	1/2/5 MHz		yes
SINGER EMA910-12	10.0-26.5	freq extender						
SINGER EMA3100		digital freq display	1.0-26.5 GHz					
STODDART NM62A,B	1.0-10.5	four bands	60/160 MHz	yes	yes	0.5/5 MHz		yes
STODDART NM65T	1.0-10.0	three bands	no	yes	no	1/2/6 MHz		yes

BAND	GHz	WAVEGUIDE SIZE, in.	FLANGE
L	1.12- 2.7	6.5 x 3.25	UG434A/U, UG435/U, UG437A
S	2.6 - 3.95	3.0 x 1.50	UG53/U
G	3.95- 5.85	1.87 x 0.87	UG149/U
C	4.9 - 7.05	1.59 x 0.795	
J	5.85- 8.2	1.37 x 0.62	UG344/U
H	7.05-10.0	1.12 x 0.497	UG51/U
X	8.2 -12.4	0.9 x 0.45	UG39/U
M	10.0 -15.0	0.75 x 0.375	WR75
P(Ku)	12.4 -18.0	0.62 x 0.31	UG419/U
N	15.0 -22.0	0.51 x 0.255	
K	18.0 -26.5	0.42 x 0.21	UG595/U
R	26.5 -40.0	0.28 x 0.14	UG599/U

COAX dB LOSS PER 10 FEET

		1 GHz	2 GHz	5 GHz	10 GHz
51	RG9/U	0.8 dB	1.4 dB	2.5 dB	4.4 dB
75	RG11A/U	0.8 dB	1.3 dB	2.4 dB	4.5 dB
71	RG3B/U	0.4 dB	0.7 dB	1.3 dB	2.2 dB
125	RG63B/U	0.6 dB	1.1 dB	2.0 dB	3.7 dB
52	RG217/U	0.6 dB	1.0 dB	1.9 dB	3.5 dB

EQUIPMENT SUPPLIERS

AMERICAN ELECTRONIC LABORATORIES - P.O. Box 552, Lansdale, PA 19446 (microwave antennas)
 ADVANCED RECEIVER RESEARCH - Box 1242, Burlington, CT 06013 (receivers)
 CALIFORNIA AMPLIFIER - 3481 Old Conejo Road, Newbury Park, CA 91320 (LNA)
 DATA SERVICE CO - 3110 Evelyn St., Roseville, MN 55113 (receivers, books)
 R. L. DRAKE CO - 540 Richard St., Miamisburg, OH 45432 (LNA, TVRO)
 ELECTRONIC SURVEILLANCE COMPONENTS, INC - 991 Commercial St., Palo Alto, CA 94303 (microwave oscillators)
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Simple, inexpensive and effective...

A FILING SYSTEM FOR MT ARTICLES

By Maury Midlo

Information retrieval is really the "bottom line" of most home and small-business computer systems. Regardless of their theoretical math capabilities, most of these expansive collections of hardware and software are not used for "number crunching," but as electronic file cabinets.

What follows is a far simpler and less expensive information retrieval system that you tailor to your own needs and interests without learning programming or spending a small fortune.

WHAT ARE THE ADVANTAGES?

A single article you've clipped from MT or any other publication may contain a variety of information that cannot reasonably be filed under one general heading. If you're like most readers of MT there's information in every issue you just know you'll want to refer to again in the future.

Even if you have the space to keep the entire issue, you'll eventually have a stack of newsprint that defies management. So you cut out the articles you want to save and soon you have a file - or a pile - requiring constant shuffling, with resulting high wear and tear for both the clippings--and your composure!

The information retrieval system that can solve this problem is the "C.C.F.F." method--Clip it, Categorize it, File it, and FIND it! Instead of a keyboard, CPU and mega-byte memory, all you'll need is a pencil and a legal pad.

AND HERE'S HOW IT WORKS

First, make a list of all the broad general categories in which you're interested; arrange them in alphabetical order something like this:

- ANTENNAS
- CLANDESTINE & NUMBERS
- COMPUTER INTERFACE
- FCC
- FREQUENCIES
- MILITARY COMMUNICATIONS
- PIRATES
- RECEIVERS
- RTTY
- SATELLITES & SPACE
- SCANNERS
- SERVICE & MAINTENANCE
- SHORTWAVE LISTENING
- UTILITIES

Don't worry about whether the list is all-inclusive; you can always add new categories later.

Now give each category a home of its own. It can be a page of a legal pad, a 3x5" or 4x6" index card, a loose-leaf page in a 3-ring binder, or a sheet in a notebook. Obviously, the index cards and 3-ring binders make easier the later additions of new categories in alphabetical order, but leaving generous empty space between categories on a legal pad meets the same need.

Office supply companies and large drug stores sell A-to-Z index tabs for file cards and 3-ring binders. These will expedite access to the alphabetized categories.

The next step is to number your collection of clippings and articles starting with 1 and counting up until each item you want to file has a number. Try to place the sequential numbers in approximately the same place on the right-hand edge or margin of each clipping so when they're all in a file folder or side-opening envelope it's easy to flip through the numbers to find the one you want (Sure, lefties, use the left edge or margin if you prefer).

Thirdly, record the title or subject of each of your clipped articles. Use a legal pad, or a pre-numbered blank business form if you can find one (I use a chain drug store daily prescription record form which has blank lines numbered 1 through 100).

Write in the title of the article beside each number, or use your own description of the contents of the article if the title or headline doesn't really say what's covered that's of interest to you.

Finally, enter each clipping number on the category cards or pages that describe the contents. If your clipping number 1 is an article about surplus military receivers, put the number 1 on the Category cards or pages headed "Military Communications" and "Receivers." If your second article concerns international shortwave broadcasts, put the number 2 on the category cards or pages for "Frequencies" and "Shortwave Listening." Some article numbers will go in only one category while others will fall into several.

When you're finished, a glance at each category heading will give you the numbers of all your articles that contain information on that subject. Suppose the time comes when you're looking for something on repairing teletype equipment. Check your "RTTY" and "Service & Maintenance" Categories. If there's a common number listed in both categories, that's the article you want. Thus, you've effectively cross-referenced your material to avoid having to look through all your "Service & Maintenance" articles to find the one the covers RTTY equipment.

Whenever you add a new clipping to your file, assign it the next unused sequential number, enter the article title or description on your numbered list, and place the clipping number on the appropriate Category card or page. It will only take a few seconds to make

the entries so your file will always be up-to-date.

It would also be possible to maintain the file without keeping the numbered list or article titles. You'd just look at the last item you added to the file to learn the next available number. However, as the file grows it will be handy to have the title/description list to confirm that what you find on the Category page or card is or isn't what you want without having to actually remove the article from the bulky clipping folder or envelope.

Here's hoping the "C.C.F.F." information retrieval system contributes as much enjoyment to your hobby as it has to mine!



by Don Schimmel

I have selected several of this month's intercepts for some additional comments because the transmissions were quite unusual. The first of these was on 16630 kHz at 211408Z. With the receiver in the AM mode, the signal covered approximately 8-10 kHz and was composed of a number of audio tones.

The rate of variance in the tones was rather slow and irregular, giving the impression that the transmission was being hand-poked. Periodically, the signal would sound like a series of dits without the varying tones.

I do not think it was "Piccolo" because the signal could be heard with the BFO off. According to the 6th Edition of CONFIDENTIAL FREQUENCY LIST by Ferrell, "Piccolo" dates back to the 1960's and has been used by the British Diplomatic Service for traffic for their embassies. There is reportedly also a Russian version.

The transmission reminded me of a signal I heard some 30-35 years ago. As I recall it, someone at the time said they thought it was a Belgian or French RTTY system which I think was called "Coquolet" (spelling doubtful). I tried to print out the 16630 kHz transmission with my Info Tech M-600 demodulator but with no luck.

A real surprise was observed on 16446.8 kHz with a triple-header numbers transmission. At 201334Z

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UTILITY INTRIGUE

there was a CW callup of 255 255 255 255 255 I12 I12 and then the sequence was repeated. This continued for a while and then BT 177 BT was sent followed by a text of 5 figure groups.

All numbers were sent full except zero which was sent cut as the letter T. The end of message was signified with AR AR and the message then repeated. Upon completion of the repeat another message was transmitted and it also was repeated. During this repeat I became aware that there was another transmission immediately under the louder and and it was also 5 figure groups.

After listening to this latter one for a few moments, it was apparent that there was yet another carrier under this second numbers transmission. By tuning a hair to one side of the CW transmissions it was possible to hear a Spanish-speaking female transmitting 5 figure group traffic. The CW carriers went off as each completed its traffic and finally at 201421Z the voice signal went off. There were no further transmissions of either type.

This perhaps suggests there may have been some kind of coupling between transmitter control lines. In any event, it was most unusual to hear three numbers transmissions on the same frequency at the same time.

Those of you who own Commodore 64 computers may be interested to learn that Commodore now has a Technical Package for the C-64 at a cost of \$25.00 post-paid. The package contains schematics, drawings and parts list, trouble shooting guides, waveforms and voltage readings. The

package can be ordered from the following address:
COMMODORE BUSINESS MACHINES
 C-2654
 West Chester, PA 19380

As mentioned last month, it is necessary to utilize abbreviations to make maximum use of allotted column space. While most of these designators are perhaps self-explanatory, we did not want newcomers to SWL to be overwhelmed by yet another batch of alphabet soup! Therefore we are providing a breakout of the meanings. A reminder that additional abbreviation lists appeared in MT June and August 1984 issues.

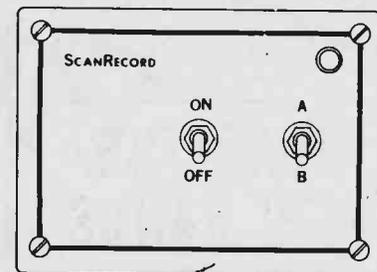
AF	AIRFORCE
ALLOC	ALLOCATION
CHARAC	CHARACTER(S)
DTOI	DATE/TIME OF INTERCEPT
EMB	EMBASSY(S)
ETA	ESTIMATED TIME OF ARRIVAL
ETD	ESTIMATED TIME OF DEPARTURE
F, FIG	FIGURE(S)
FOLL	FOLLOWED, FOLLOWING
GND	GROUND
GRP	GROUP(S)
HDNG	HEADING
HRD	HEARD
IDENT	IDENTIFICATION
INFO	INFORMATION
L, LTR	LETTER(S)
LA	LATIN AMERICAN
LANG	LANGUAGE
MIN	MINUTE(S)
MINFORNAFF	MINISTRY OF FOREIGN AFFAIRS
MSG	MESSAGE(S)
NBR	NUMBER(S)
OPR	OPERATOR
POSS	POSSIBLE
PREV	PREVIOUS(LY)
PT	PLAINTEXT
RPT	REPEAT(S)
RPTING	REPEATING
SS	SPANISH LANGUAGE
SPEC	SPECIAL
STN	STATION(S)
TFC	TRAFFIC
UNIDEN	UNIDENTIFIED
VY	VERY
XSMN	TRANSMISSION
XMTR	TRANSMITTER

10708.9	060240	RTTY 50-170/ZRH DE NAU,RY'S (SAN JUAN)
10887.5	060237	CW/5L GRPS, SPEC CHARAC IM AA OE OT
12612.8	132353	CW/GERMAN PLAIN TEXT TFC
12901.1	140001	RTTY 50-170/WX IN PORTUGUESE LANGUAGE
13150	051247	USB VOICE/SS MALES TALKING RE QUANTITIES OF UNIDEN MATERIAL (IN GRAMS)
13245	131306	VOICE USB/AIR-GND US AF,WX & PHONE PATCH
13283.5	052341	CW/CLP2 (PANAMA) DE CLP1 (HAVANA,CUBA)
13292	051831	CW/5L GRPS, SPEC CHARAC AA IM OE OT
13294	131235	CW/5F GRPS, 3 4 5 6 7 SENT FULL, 1 2 8 9 0 SENT CUT AS A U D N T
13327	202050	CQ DE CLA (HAVANA CUBA)
13370.2	16229	RTTY 75-170/DE NBA (PANAMA) SENDS SPANISH PT EXERCISE MSGS
13385	172359	CW/5F GRPS, ZERO CUT AS T
13388.2	201220	RTTY 50-170/5F GRPS,TFC TO EMBACUBA IN GUYANA, CIPHER MSGS THEN INTO PRESS ITEMS.
13989	270116	CW/CLP55 (?) DE CLP1 (HAVANA CUBA)
16284	041830	CW/5L GRPS
16438.7	161931	RTTY 75-170/CODED WX
16446.6	191853	RTTY 50-170/YBU, 5L GRPS
16447	191915	CW/ORS, CALLS REPEATEDLY AND SENDS QSY19, QSY23, QSY21, QRX 21ROO.
16447.1	242012	FSK CW/RPTS 2 GRPS OVER AND OVER
16449.5	210005	USB VOICE/DOCTOR ASKING CAPTAIN OF SHIP RE CONDITON/TREATMENT OF INJURED PERSON
16456.5	191851	RTTY 50-170/GMN(TEST TAPE) POSS WRKNG STN ON 16446.6 KHZ
16465.6	112009	USB VOICE/CONVERSATION BETWEEN TWO MALES IN GREEK LANGUAGE
16627	211400	CW/Z5T DE Q2A, 5F GRPS
16765.6	211145	CW/POLISH LANGUAGE PT MSG
16839.5	201741	CW/UYDQ DE UKSE (SOVIET SHIPS) ODESSA IN HEADING OF MSG, RUSSIAN PT
16870	201734	CW/WX IN ENGLISH
16902	211243	CW/DE PCH60 (SCHEVENINGEN RDO NETHERLANDS)
18091.7	211155	RTTY 50-170/CQ DE LR084 (NATIONAL WX SVC BUENOS AIRES ARGENTINA)
18454	112017	RTTY 50-170/5F GRPS, MINREX HAVANA TO EMB CUBA ZAMBIA

ITEMS LOGGED DURING OCTOBER 1984		
KHZ	DTOI	MODE/IDENTIFICATION AND COMMENTS
4202	110015	CW/? DE GNAQ (BRITISH SHIP)
4247	051156	CW/VVV DE KPH (SANFRANCISCO, CA)
4444	170205	AM VOICE/SS FEMALE, 5F GRPS
4634	050219	CW/5F GRPS, SENDS VA WHEN RPTNG GRPS
4782	050215	MCW/5L GRPS,6 GRPS IN MSG,SENT VY SLOW
6348	051211	CW/CQ DE KFS (SAN FRANCISCO, CA)
6464	051213	CW/VVV DE VIS3 (SIDNEY, AUSTRALIA)
6521.4	051223	USB VOICE/MSGs ABOUT LOADING BARGES
6931.1	130116	CW/BRF2 DE BRF25 (CHINA ALLOCATION)
6933.7	120021	USB VOICE/SS MALE SENDING 5F GRPS TO SS FEMALE
6960	051229	CW/58 DE 28, SAME AS 7610 ACTIVITY HRD 1983
6968.1	050209	RTTY 50-170/DE NAU, RY'S (SAN JUAN PR)
6985.2	270106	CW/BLA DE TAN QSA IMI,PREV HRD IN 1983
7416.6	130135	RTTY 50-170/AF TFC FRENCH LANG.CAYENNE MENTIONED IN HDNG OF MSGS.
7476.6	130142	RTTY 75-170/PRESS ITEMS IN ENGLISH
8971.6	210025	USB VOICE/4SH THIS IS 7PV STANDBY YOUR SECURE CIRCUIT
10406	090048	RTTY 50-170/DE 6VU,RY'S(DAKAR SENEGAL)

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 SOMETHING HAPPENED!**

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



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

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

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

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 (404) 376-3712

UTILITY INTRIGUE

18950.2	241623	CW/5L GRPS, BVC DE BVG (CHINA ALLOC)
19614.5	212004	RTTY 75-170/CXR (MONTEVIDEO URUGUAY) DE NBA (BALBOA PANAMA)
20043.7	211333	RTTY 70-170/TFC TO CLP1 (HAVANA CUBA) FROM SIERRA LEONE, CONACRY, BISSAU
20350	211321	RTTY 75-170/PANAMA TESTING WITH MONTEVIDEO
20470.1	211317	RTTY 75-170/NBA (BALBOA) DE CXR (MONTEVIDEO)
22390	211206	CW/VVU DE FUF (FORT DE FRANCE NAVAL RDO MARTINIQUE)

155.955	(R)Kitsap Co Public works
152.090	(Paging)Radio Com- mon carrier
152.210	(Paging)" " "
152.300	Taxi service
152.005	(P)Hospital paging
152.150	(Paging) Radio Com- mon Carrier
152.330	Taxi Service
460.450	(R)King Co Sheriff
460.500	(R)" " "
460.400	(R)" " "
460.475	(R)Seattle PD
460.775	(R)Business
460.525	(R)Fire
460.150	(R)Business
460.675	(R)Business
155.925	Kent PD
146.610	(R)Amateur rpttr
147.080	(R)" "
454.225	(R)Mobile phone
454.350	(R)" "
454.250	(R)" "
454.075	(R)" "
454.650	(R)" "

FAIRBANKS, ALASKA

155.010	Fairbanks PD
155.130	North Pole PD
155.250	U. of Alaska PD
155.370	Fairbanks PD
154.010	Steese VFD
154.190	U. of Alaska FD
154.430	Fairbanks FD
162.550	(WXJ 81) NOAA weatheradio
454.025	(R)Communications Equipment (Mobile phone)
173.4125	Ft. Wainwright FD
173.4875	Ft. Wainwright MP

- SCANNING - →

THE GREAT WEST COAST DXPEDITION

Part II

by Norm Schrein,
Fox Marketing, Inc.
4518 Taylorsville Rd.
Dayton, OH 45424

In the November issue this special feature started in Dayton, Ohio to Los Angeles to San Diego to Seattle, into British Columbia and Alberta and finally on to Alaska. This month's special will concentrate on frequencies monitored at the Seattle International Airport, Juneau, Fairbanks, and Anchorage, Alaska. Next month's "Tune in Canada" column will cover the remaining Canadian frequencies monitored.

SEATTLE:

Henry M. Jackson International Airport	
118.000	ATIS
122.950	UNICOM
119.200	Appr/Dprt
120.400	" / "
123.900	" / "
119.900	Tower
121.700	Ground
128.000	Clearance/Pre Taxi
116.800	VOR
110.300	ILS Runway 34 R

Boeing Field/King Co. International Airport	
127.750	ATIS
123.650	Flight Service
122.500	" "
129.100	Aeronautical Radio
131.200	" "
130.825	" "

JUNEAU, ALASKA

155.250	Troopers (F-1)
155.370	Juneau PD
155.790	(R)Troopers (F-2)
156.210	(R)Juneau PD (F-1)
154.965	Juneau FD (F-1)
155.760	" " (F-3)
155.955	" " (F-2)
162.550	(WXJ 25) NOAA weatheradio
451.500	(R)Glacier State Telephone Co
156.900	(NMJ 1) USCG
152.390	Haida Cab Co
109.900	Juneau Int'l (DME)
118.700	Juneau Flight Svc
120.700	Juneau ATIS
122.200	Juneau Flight Svc

DENALI NATIONAL PARK (Mt. McKinley)

1600 kHz	Park information
166.300	(R)US Interior Dept
462.025	(R)Westours Motor Coach Co
461.325	(R)Tundra Tours

ANCHORAGE, ALASKA

164.625	Alaska RR (US Dept of Transportation)
165.2625	same
166.375	same
171.725	same
155.010	Anchorage PD
155.415	(R)Troopers
155.430	Anchorage PD (F-2)
155.505	(R)Troopers
155.640	Anchorage PD
154.130	Anchorage FD
154.250	Anchorage FD
155.160	Arctic Medical Transportation
461.125	(R)Arctic K-9 Svc
155.340	Providence Hosptl
453.000	Anchorage Times (reporters)

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a highly detailed
and accurate
National Scanner Manual

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Civil Defense ■ Conservation
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State Transportation/Highway

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News Media/Traffic Copters
Hollywood ■ Nat'l Itinerants
Air. Marine, Ski Areas/Patrols

Fire/E.M.S. ■ REACT Teams
Weather ■ Travelers Info Svc.
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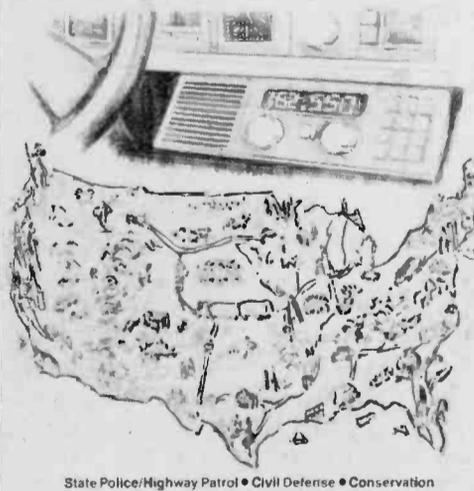
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MONITOR AMERICA

The Communications/Travel Guide • '85-'86



State Police/Highway Patrol ■ Civil Defense ■ Conservation
Monitoring Laws ■ AM/FM Radio ■ Road Maps ■ Emergency
Numbers ■ Sports & Amusements ■ National Parks ■ Forests and
Monuments ■ News Media/Traffic Copters ■ NOAA Weather
Major Metro Areas

SCANNING: DXPEDITION

- 162.550 (KEC 42) NOAA
Weatheradio
- 153.470 Alaska Pipeline Co
- 129.100 Alaska Aviation Rdo
- 129.500 same
- 111.000 Anchorage Inter-
national VOT
- 114.300 (ANC)Anchorage VOR
- 118.400 A.Internat'l ATIS
- 118.600 A.Internat'l Appr/
Dprt
- 119.200 Anchorage Center
- 119.700 same
- 121.900 A.Internat'l (Grnd)

More Alaskan frequen-
cies are presented in the
new Fox Scanner Radio List-
ings for that state.

**...and back to KANSAS CITY
International Airport**

- 128.350 ATIS
- 122.950 UNICOM
- 122.100 KC Flight Service
- 126.600 Appr/Dprt
- 124.700 Appr/Dprt
- 118.100 Tower
- 125.750 Tower
- 121.800 Ground
- 121.650 Ground
- 112.600 VOR
- 135.700 Clearance

Although I listen to
scanners quite a lot for a
living, it is always fun to
bring one along on a trip in
order to confirm that the
rest of the world has the
same problems as relayed
over two way radio. "Dis-
patcher send the traffic
light truck to 5th and Main.
The lights are red in all
directions and creating
quite a mess."



by James R. Hay

In response to a
request which I received
recently, this month's
column will be devoted to
the International Morse
Code. Some readers may have
heard the terms Continental
Code and International Code.
The code with which we are
familiar - that using dots
and dashes - is the Inter-
national Code. The Continen-
tal Code was developed for
and used by North American
railways. It was based on
clicking rather than tones.

INTERNATIONAL MORSE CODE

- | | |
|--------|--------|
| A .- | N -. |
| B -... | O --- |
| C -.-. | P ---. |
| D -.. | Q ---. |
| E . | R -.. |
| F ..- | S ... |

- | | |
|--------|--------|
| G --. | T - |
| H | U ..- |
| I .. | V ...- |
| J .--- | W --- |
| K -.- | X ---. |
| L -.-. | Y ---. |
| M -- | Z ---. |

- | | |
|---------|---------|
| 1 .---- | 6 -.... |
| 2 ..--- | 7 ---.. |
| 3 ...-- | 8 ---.. |
| 4- | 9 ----. |
| 5 | 0 ----. |

Where there can be no
mistaking of shortened
figures for letters, such as
in texts which contain all
figures as in meteorological
networks, the following
shortened figures are often
used.

- | | |
|---------|---------|
| 1 .- | 6 -.... |
| 2 ..- | 7 -... |
| 3 ...- | 8 -.. |
| 4- | 9 -. |
| 5 | 0 - |

ACCENTED FOREIGN LETTERS

- | |
|------------------|
| accented e ..-.. |
| ä or æ ..-. |
| ā or â ..-.- |
| ch ---- |
| ñ ..-.- |
| ö or ó ---. |
| ü ..-. |

PUNCTUATION MARKS

- | | |
|---------------------------------------|---------|
| Period | ..-.- |
| Comma | ---.- |
| Colon or division
sign | ----. |
| Question mark | ...-. |
| Apostrophe | ..-.- |
| Hyphen, dash or sub-
traction sign |- |
| Fraction bar or
division sign | ..-. |
| Left hand
parenthesis | ..-.- |
| Right hand " | ..-.- |
| Quotation mark | ..-.- |
| Double hyphen or
equal sign |- |
| Understood |- |
| Error signal | |
| Cross or addition
sign | ..-.- |
| Invitation to
transmit | ..- |
| Wait | ..-.- |
| End of work | ..-.- |
| Starting signal | ..-.- |
| Multiplication sign | ..-.- |
| End of message | ..-.- |
| Distress Signal ("SOS") | ...-.-. |

These are the most com-
monly heard characters in
Morse code. I have listed
the various procedural sig-
nals (prosigns) as charac-
ters rather than giving the
prosign letter equivalent;
for example it is better to
know and recognize the dis-
tress signal as ...-.-...
than SOS although it can be
written in that way. The
same holds true with AR, AS,

SK, AAA, etc..

The best place to get
practice in receiving code
is by listening to the
regular broadcasts from
coastal stations. Traffic
lists are good practice
since callsigns are
repeated.

As always your corre-
spondence is welcome. Please
direct your letters, sugges-
tions, etc., to James R.
Hay, 141 St. John's Blvd.,
Pointe Claire, P.Q., Canada,
H9S 4Z2.

**QSL'ING
THE COASTALS**

Readers who enjoy moni-
toring the coastal marine
radio operators might be
interested in knowing that
many of them are reliable
verifiers of reception
reports.

To receive a veri or
QSL, be sure to mention time
of intercept and frequency
as well as a signal report.
Do not quote from the
messages you intercepted,
however, in order to avoid
raised eyebrows about
violating the secrecy provi-
sions of the Communications
Act!

**TELL YOUR FRIENDS
ABOUT MT.
Send a Gift
Subscription!**

Send your report along
with an SASE for reply to
the appropriate coastal
station. Several of the more
commonly heard are listed
here for your convenience.

Thanks to MT writer Sam
W. Lambert for supplying
this list.

- KMI (Dixon California Radio)
- WOM (Pennsuko Florida Radio)
- WOO (Ocean Gate NJ Radio)
- American Telephone
and Telegraph Co.
- 5 World Trade Center
New York, NY 10048

- WLO (Mobile Alabama Radio)
- Mobile Marine Radio Inc.
- 7700 Rinla Ave.
Mobile, AL 36619

- WNU (Slidell Louisiana Radio)
- TRT Telecommunications Corp.
- 1747 Pennsylvania Ave. NW
Washington, DC 20006

- WCC (Chatham Mass. Radio)
- RCA Global Communications
Inc., Marine Dept.
- 60 Broad Street
New York, NY 10004

DXER'S DIRECTORY

Most radio listeners are undertaking their hobby
in a vacuum ... out of contact with other
listeners in their locale. Few would argue that
the DXing hobby is more enjoyable and productive
when you know other listeners in your area with
whom you can discuss mutual interests. The
problem has always been; How do you find other
listeners with similar interests in your area?

Universal is pleased to present a solution! We
are presently compiling a directory of listeners.
This computer-based list will offer accurate and
current information on active listeners,
including name, address, phone number, type of
listening, and club affiliations. The directory
will also include a list of all large and small
listening clubs.

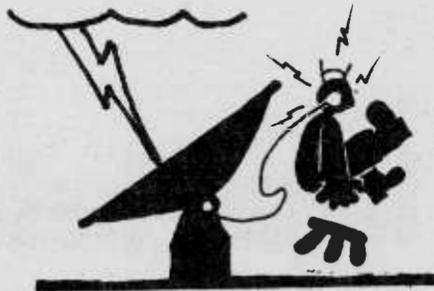
We need your help to make it happen! WE WANT TO
INCLUDE YOU IN THE NEXT EDITION. Please send a
SASE to receive your free registration form.
Your listing will be without charge. You will
be notified when the directory is available, but
you are under NO OBLIGATION to buy one. It costs
nothing to be listed. We will even include a
photo of you and/or your "shack" if you care to
send one! We would like your information whether
you wish to buy the directory or not. So help us
bring DXers together! Send a SASE for full info.!



UNIVERSAL SHORTWAVE RADIO

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SIGNALS FROM SPACE



by Larry Van Horn

Last month I started a series of articles on geostationary communications satellites, beginning with the Russian Gorizont system. This month I will talk about the Raduga and Ekran geostationary satellites.

Raduga (Russian for rainbow) satellites operate in the 6/3 GHz and 8/7 GHz bands. The breakdown of the downlink transmissions is as follows: 6/3 GHz--3675, 3775, 3875 MHz, and in the 8/7 GHz--7250 to 7750 MHz for military communications.

The only video that has been reported from a Raduga satellite has been from Statsionar 3 (85E). The 3875 transponder on this bird has carried video for India on a northern hemispheric beam. Based on other information I have on the Raduga system, I would imagine that some Soviet 1st and 2nd programs should be visible. Those of you who are so equipped might want to check out the following locations for Raduga satellite signals:

- Statsionar 2 (35E)
- Statsionar 9 (45E)
- Statsionar 3 (85E)
- Statsionar 8 (25W)

I believe that eventually another Raduga satellite will be located at Statsionar 10 (170W).

That Statsionar 7 position at 99E has been solely occupied by the Ekran (Russian for screen) since its inception. These satellites are used to relay TV to the far reaches of the Soviet Union including the Soviet Navy and merchant ships.

Ekran satellites were introduced in October 1976. These satellites relay programs of the Central Television Service to isolated communities in Siberia and the Far North. Ekran relays color and black and white television programs to an area approximately 3,500,000 miles.

The uplink for the satellite is in the 6.2 GHz range. The downlink is from 702-726 MHz with a center frequency of 714 MHz. This system and the Molniya high orbit satellites downlink their signals to the Orbita ground system.

The satellite carries one transponder with a bandwidth of 24 MHz. More than

likely, the Soviet 1st TV program is carried on the following schedule.

UTC
MON-FRI 0700-1000, 1400-2100
SAT/SUN 0600-2100

On some days of the week programming may run as late as 0200.

I would like to hear from those listeners within the visibility ranges of the Gorizont, Ekran, and Raduga satellites. More information on these comsats would be appreciated so that others can view them. Send your information to: Signals from Space, 1111 N. Carrier Pkwy, B-107, Grand Prairie, TX 75050.

Over the last couple of months I have received numerous requests for information on antennas that can be used to receive 225-400 MHz milsat activity. My mailbox runneth over. I thought I'd try to narrow down some possibilities for MT readers.

For those of you who are not construction oriented there are a couple possibilities. By far the most commonly used antenna would be the ground plane. A Hustler discone or other broad band ground plane type antenna should give you moderate results. The Grove OMNI II is in wide use for 225-400 MHz and reportedly works well.

Please remember that you must use low loss coax to your receiver. Do not try to get away with RG-58 coax as the losses are too great at these frequencies.

The use of a good antenna and the results you will achieve depend directly on the receiver sensitivity of your setup. Poor sensitivity can be improved by the addition of a preamp. I noticed Bob sells a preamp with a reasonable cost through Grove Enterprises.

My second suggestion for antennas is the use of a broadband beam. The design most desirable is that of a log periodic type antenna. As of now the only one that I know of that fits the bill is Grove Enterprises' Scanner Beam.

The use of an antenna of this type gives you the capability to direct the

receiving beam (important to determine which satellite you are listening to for Signals from Space reports) and some gain improvement to the receiver to help sensitivity problems.

For those of you who feel so inclined to roll your own, I will refer you to the 225-400 MHz homebrewed antenna in MT February 1984 pg 27. This antenna with some modification should give you good results. I personally would not want as many elements as the article describes as this reduces the usable bandwidth of your antenna.

The plans do give valuable information, however, to the experimenter.

Imagine, for a moment, that you had access to a telescope in space. An instrument that, although only 18" in diameter, is able to out-perform many of the big telescopes on Earth. An instrument that is free from light pollution, can detect stars down to the 23rd magnitude with a 10 hour exposure, and can achieve a photographic resolution close to the diffraction limit - only .3 seconds of arc. A telescope that has perfect seeing, 24 hours a day, 365-1/4 days a year. A telescope that can see the UV as well as IR wavelengths.

Now imagine being able to receive pictures from such a satellite in your own home, using only simple amateur radio equipment. Soon, all this will be more than just imagination.

The Amateur Space Telescope is currently under development by teams of faculty and students at Rensselaer Polytechnic Institute and the University of Rochester. The AST should be ready for launch by the end of 1985.

Once in orbit, the AST will broadcast data and pictures over frequencies in

the amateur satellite band.

The AST project is being coordinated and funded by the Independent Space Research Group, Inc. (ISRG), a non-profit membership organization that was formed to build a continuing series of privately financed astronomical satellites.

The Amateur Space Telescope will be 9 cu.ft. in volume, weigh 175 lbs., and carry an 18'd Ritchey-Chretien Cassegrain telescope, two solid state TV cameras, a small spectrograph, and the usual control and communications hardware.

Anyone with about \$400 worth of equipment will be able to receive pictures and data directly from the AST. Monitors will be able to record and display signals on a black and white TV set or homemade photographic printer. The equipment will be similar to that used for amateur radio slow scan television.

For those of you desiring more information on AST or ISRG membership information, write to: ISRG, P.O. Box 1246, Troy, NY 12180. Be sure to tell them you saw it in Signals from Space and Monitoring Times.

On a personal note to this column's readership, Uncle Sam will be transferring the family and me in February, 1985. It has been an interesting tour here in the Dallas-Ft. Worth area and we have enjoyed meeting MT readers and other hobbyists in the area. We will be moving to the Jacksonville, FL, area in March where I will be stationed at NAS Cecil Field. Those of you reading this column should not send any mail to the Grand Prairie address after February 10, 1985. I will inform Bob and the MT staff of my new mailing address as soon as we arrive in Jacksonville and get the family settled.

Radio Stations Offer Program Programs

KAMT-AM, a Tacoma, Washington broadcaster, is the first of 485 standard AM broadcasters to experimentally transmit entertainment and educational software via the airwaves.

A joint agreement between Microperipheral Corporation and Learfield Communications Corporation of Jefferson City, Missouri is providing the stations with airable-format programs for personal computers.

Called Softcasting, the customer must have a \$60 interface in order to load the software.

DALLAS HAMS' MONITORING NET

The Dallas Area Monitoring Net offers interesting listening for local scanner enthusiasts. Comprised largely of serious SWL's and intrepid VHF/UHF buffs, the net meets on the second and fourth Sunday night of the month at 8 PM Central time.

Using a local repeater which can be heard on 145.15 MHz FM, the participants discuss all areas of monitoring the spectrum. Listeners-in and licensed amateur participation is invited.

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BEHIND THE DIALS

The REGENCY HX-1000 Scanner

By John Comstock N5HIM
Stillwater, OK

It doesn't take much detective work to figure out what took a full year for the HX-1000 to get from those 1983 company flyers to the public. Those early ads say the scanner would have 20 channels; Regency added another 10. Even the box it comes in has a little "30" sticker covering the original "20" indication.

While the HX-1000 is the third programmable hand-held (following in the footsteps of the Bearcat 100 and Radio Shack Realistic PRO-30), Regency will soon make another programmable hand-held: The HX-3000, which will cover 25-512 MHz continuously.

OUT OF BAND RECEPTION

One of the most popular sports among scanner enthusiasts is tricking their radios outside of the manufacturers' stated limits. A friend of mine says he was able to directly program his HX-1000 to receive 26-66, 118-196 and 305-544 MHz! I have confirmed 30-56, 118-180 and 400-520 MHz myself.

Naturally, all reception is in the FM mode, so even if the receiver is capable of detecting aircraft (civilian or military), the AM modulation will normally be distorted or unreadable.

SPECIFICATIONS

The Regency HX-1000 is a hand-held, programmable scanner with dimensions and cosmetics closely resembling many professional or amateur radio transceivers. It operates just like any other Regency synthesized scanner and has many of the same advantages and disadvantages.

One of the main disadvantages I've found is no direct-channel access. Stepping to a channel manually after hearing something important can be time-wasting and can lead to missed transmissions.

This handheld has excellent specifications as shown below:

MANUFACTURER'S PUBLISHED SPECIFICATIONS

Sensitivity (12 dB Sinad)
LO VHF (30-50 MHz), 0.5 V
HI VHF (144-174 MHz), 0.5 V
UHF (440-512 MHz), 0.7 V

Selectivity ± 7.5 kHz @ 6 dB
 ± 18 kHz @ 50 dB

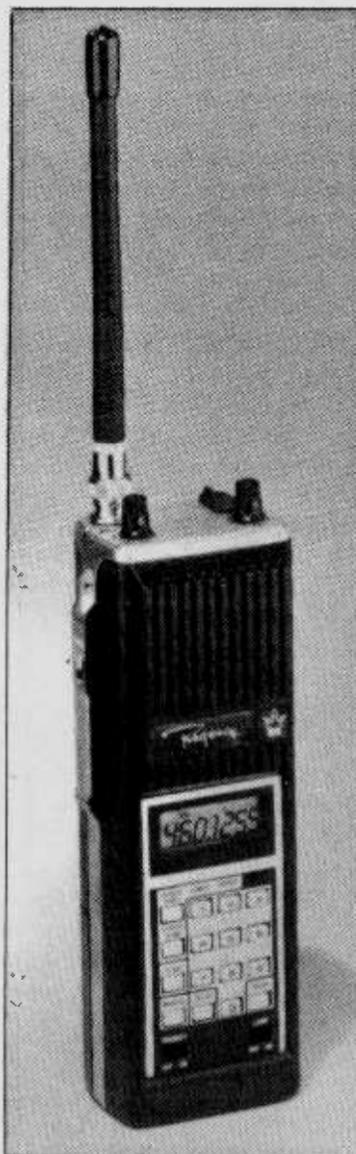
Scanning Rate approx. 16 channels per second

Audio Output .2W @ 10%, or less Distortion

DC Power Requirements 9.6VDC (or internal batteries)

SENSITIVITY

From my on-the-street tests, this scanner has no



would be nice...) it is nice to keep a close tab on your favorite department.

The night light also helps professionals and die-hard enthusiasts who might find them in the pitch-dark trying to reprogram or figure out who's talking.

The LCD display shows priority, delay and low battery as well as frequency and channels being scanned. The display window will also show the time by depressing the clock switch (the clock switch, located on the side, looks suspiciously like a transmit bar!)

Every rubber-sealed keyboard button beeps when depressed, handy to know if you've mistakenly contacted a switch. However, you can prevent all those mishaps by using the keyboard lockout switch. From my experience, many of the unwanted keystrokes with the Bearcat 100 were caused by trying to place it in the back pocket. The HX-1000 is supplied with a nice, long belt clip as well.

POWER SUPPLY

This scanner has two methods of recharging the ni-cad battery pack. The supplied wall charger takes about 10 hours, but the scanner can be charged while on; making it ideal for those wishing to monitor all night.

A drop-in fast charger is available as an option, but to access the fast-charge contacts requires the removal of the case.

Another very nice feature is a BNC antenna connector. I think the scanner manufacturers are slowly realizing that Motorola-type connectors just don't work that well. Besides that, it's nice to be able to quickly change antennas with a firm connection.

While the suggested retail price of the feature-packed HX-1000 is about \$329, it can be bought for less.

IN CONCLUSION

I think the HX 1000 was well worth the wait. Not only is it a great handheld, but it has such good selectivity and sensitivity, plus a BNC connector, that it makes a dandy mobile rig. Since the scanner works while charging, it could fill the requirements for base, mobile and portable in one handy radio. And it's tough; I've dropped mine several times from belt height and it just keeps on working fine!

rival for selectivity and very few in VHF sensitivity. The scanner's rubber-duckie antenna is apparently tuned to VHF high-band; low-band reception suffers when that antenna is used, and UHF signals are sometimes hard to receive as well.

SELECTIVITY

For the last two months I've taken this scanner to all those dreaded places in Oklahoma City that drive every other scanner into intermod. Two places in particular are big offenders; a TV tower with 63 transmitters and the downtown area.

Almost every scanner I work with trashes out within a few miles of either place! However, the HX-1000 just keeps on scanning the programmed frequencies no matter where I take it. With other scanners the TV tower with the 500-watt 162.400 MHz NOAA weather transmitter can be heard on the local fire channel; but the HX-1000 is so selective it was picking up the Enid weather service transmitter (about 60 miles away) on 162.475!

This scanner will lock up when it's within 10 feet or so of a video game. Other than that, it has many features I personally couldn't live without.

FEATURES

A strong selling point to me is the priority. Even though I have now outgrown a one-channel priority (three

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Dealer inquiries invited



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NEW ARRIVALS

Yaesu Introduces New Short-Wave Receiver

Yaesu-Musen Corporation, manufacturers of the popular FRG-7700 general coverage receiver, has announced the release of their new generation receiver.

The FRG-8800 has many refinements over its predecessor, including keypad frequency entry; scan and search functions; standard 12-channel memory; fully-synthesized tuning with selectable increments depending upon mode; FM and squelch; a noise blanker effective on the Russian woodpecker; frequency read-out to 100 hertz; a bright, back-lighted, green, liquid crystal display; and an audio tone control.

Frequency coverage is continuous from 150 kHz through 30 MHz, and an optional plug-in converter automatically provides additional 118-174 MHz reception with appropriate frequency display.

Both AM and CW modes may select wide or narrow bandwidths, while 2.7 kHz bandwidth is used for SSB.

The FRG-8800 features up-conversion to a 47 MHz first IF to eliminate first-order images. An analog AGC line is available from the back for signal voting from memorized channels.

An RS-232 computer port is provided for custom addressing through a home PC; an interface is expected soon.

The receiver's availability was imminent at press time and is expected to list for under \$650 to

compete with both the Kenwood R-2000 and the ICOM R-71A. Yaesu's goal was to provide a receiver with performance specifications between these two popular models.

Two New Scanners From Regency

Regency Electronics, prominent manufacturer of scanning receivers, has announced the release of two new programmable scanners.

The model MX-4000 is a 20-channel base or mobile unit with priority and search with coverage of the following bands: 30-50, 118-135, 144-174, 440-512 and 800-950 MHz. An LCD display shows frequency and other functional callouts.



Similar in concept is the hand-held version, model HX-2000. Equipped with two rubber duckie antennas for short range and full range, the 2000 has all frequencies of the MX-4000 with the exception of 30-50 MHz low band.

No retail prices were available at press time. A Regency spokesman said that the two new units would probably be available by the first of the year. Grove Enterprises will carry the unit as will a number of other MT advertisers.

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	Bank card No. _____ Exp. date _____		
Signature _____			

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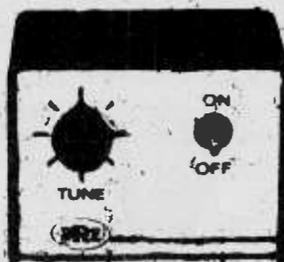
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Army Gets New RDF System

Ready for some state-of-the-art direction finding? The U.S. Army is sporting this new AN/TRQ-32(V)1 system, appropriately called "SWL" (Signals Warfare Laboratory)!

Contracted to Magnavox and developed through efforts of specialists at Vint Hill Farms and Warrenton, Virginia, the mobile multi-station, ground-based direction finding and intercept system is designed for a tactical environment and shown here mounted on the new M-1028A1 (CUCV) 1-1/2 ton truck.

The technical types among our readers will recognize the familiar switched-Adcock array antenna, and we'd all love to have a look inside!



The Evolution of Television

From Spinning Discs To Glowing Crystals

by Suzanne Cushman,
The Bohle Company

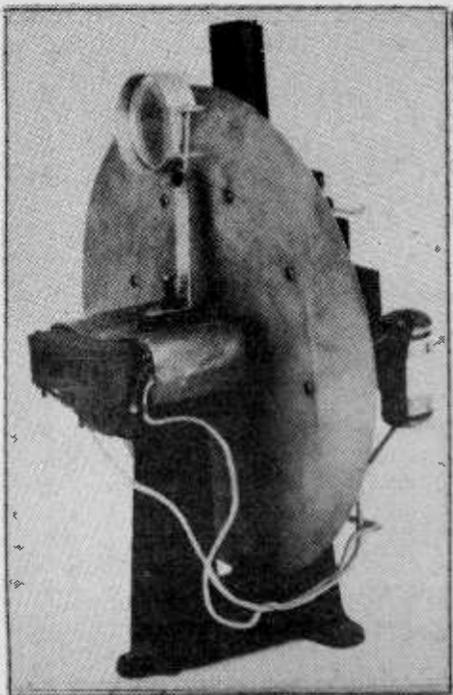
Although TV is often considered a modern phenomenon, today's sets trace their roots back to the 1920's and 1930's when TV's were usually sold as kits to be assembled on the kitchen table. It was a period known at TV's mechanical era because TV sets produced pictures by purely mechanical means.

With the introduction of the cathode ray (picture) tube in the late 1930's, the pre-World War II electronic era was initiated. The advanced technology developed during World War II created a third era, the post war electronic era. The Epsom Elf represents the latest development in the fourth period, the first color flat screen LCD TV.

Just how far TV technology has progressed is exemplified by the 1928 Insuline Corporation of America kit from the mechanical era. The kit sold for \$37.50 and according to its advertising "could be assembled in 15 minutes. The final product looked suspiciously like an electric fan!

In those days TV viewers, or "lookers-in" as they were called, were mostly electronics buffs and tinkerers. Sets of this era produced pictures by a combination of a spinning wheel with holes in it and glowing lights behind the wheel. Light flashing through holes in the spinning wheel produced an image.

All sets of this time were television attachments for radios, called "radio-visor." In those infant



MECHANICAL ERA, See-All Televisor, 14"x12"x9", 1931

days of TV, radio stations provided what few television broadcasts there were, transmitting the picture and sound portions separately.

Television made a great leap forward in the late 1930's when the first all-electronic sets hit the market. The first electronic sets were sold to the public in mid-1938, followed in December 1938 by the first factory assembled kit, the Dumont Model 180, a table top set with an 8 x 10-inch screen, which was one of the largest screen sizes offered to the public during the pre-war era.



PRE-WAR ELECTRONIC ERA, RCA TRK-12, 39"x34.5"x20", 1939

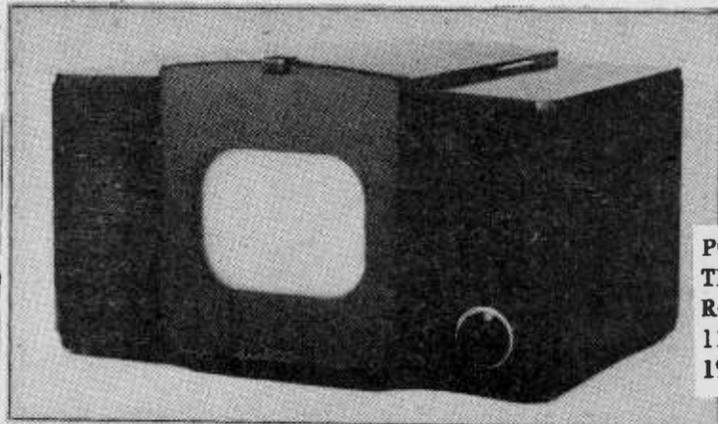
Viewing in those pre-war days was still very limited compared to today's era of constant programming.

"People were so fascinated by television that department store demonstrations caused near riots," says TV collector Arnold Chase of Hartford, Connecticut. "Often there was nothing to watch but test patterns, but people would watch them for hours."

Many viewers were purchasing attachments to be used with special "television-ready" radios.

"They viewed television as an accessory for radios," Chase explains. "And, in fact, television sets for the most part were featured as radio-television combinations. The first real hint of what television might become was at the New York World's Fair in 1939, when RCA exhibited its line of TV's following the start of daily public broadcasts and actually placed four models on sale."

Only 5,000 TV's were produced by over a dozen



POST-WAR ELECTRONIC ERA, RCA 630-TS, 13"x25"x18", 1946

manufacturers between 1938 and 1941, including kits and radio attachments.

World War II intervened shortly after the World's Fair and interrupted television's progress. But the interruption turned out to be both the best and worst of fates for TV. On the one hand, development of TV's for the public virtually stopped. On the other hand, rapid advances during the war in radar and other branches of electronics set the stage for the next and, up until then, the greatest era in TV's evolution.

It was the post-war electronic era, ushered in by RCA in 1946 with its Model 630TS, known as the "Model T of the television industry." The 630TS was the first mass-produced television set. Priced at \$350, it featured a 10-inch picture tube, 13 channels and highly improved reception.

RCA was the only company producing TV's when it introduced the 630TS, but the new set caught on so quickly that more than 100 companies had entered the field a year later. Sales climbed to 50,000 by mid-1947 and more than 150,000 by the end of the year.

In what would be known today as "an industry shake-out," the number of companies dropped to a few dozen at the end of 1948. But sales figures rose to four million in 1949 and 10 million in 1950.

The post-war electronics era has also been responsible for some of the least successful and most bizarre television sets. CBS/Columbia, for example, introduced the first color set available to the public with its Columbia 12CC2 in 1951. The set relied on an internal spinning wheel to generate colors.

Unlike today's "compatible" color system, the CBS system's color broadcast could only be received by the handful of color sets sold. The millions of black and white sets in use at the time were unable to receive color shows as they do today. After a few disappointing months of sales, production of the sets stop-

ped, as did the color broadcasts. The sets that had been sold were reportedly recalled and destroyed. Only two known sets survived.

Another distinguished failure was the Col-R-Tel Adapter of 1955. It enabled a black and white set to receive broadcasts in full color through addition of a spinning wheel much like that of the unsuccessful Columbia set. Some viewers said the huge, loud spinning wheel was more entertaining than some of the TV programs, and the set sold poorly. The manufacturer, Color Converter, Inc., went out of business after a year.

One of the oddest-looking sets was the Philco Predicta of 1958, which looked like a water cooler with a detached picture tube perched on top of a short pole neck. The Predicta played well and was considered by many to be technically superior to other TV's of the time, but the public didn't accept its peculiar appearance so the set was taken off the market.

Variations since then have included hosts of changes in the styling and accessories of television. TV's have been combined with stereos, AM-FM radios, videotape recorders and other accoutrements; they have been built smaller for portability and larger for mass viewing.

Chase considers the first flat-screen color TV, with its advanced LCD technology, to be a breakthrough.

Whereas conventional sets rely on the bulky cathode ray tube to create an image, the Epsom Elf uses a wafer-thin panel of liquid crystals sandwiched between glass.

To create the set, Epsom engineers had to develop both a new type of liquid crystals that would receive color broadcasts and a process for incorporating thin film transistors (TFT's) into the same panel with the liquid crystals. The glowing liquid crystals of the Epsom Elf produce a sharp color image on a set

THE EVOLUTION OF TV



LCD ERA, Epson Elf, 3.15x6.3x1.22, 1984

just over an inch thick -- using considerably less electrical power than is required by a cathode ray tube.

"Flat-screen sets have been the dream of television engineers, who for decades have wanted to escape from the bulky size and large power requirements of cathode ray tubes," Chase says. "This new LCD technology is the answer to their dreams."

ANOTHER SECURE INSTALLATION

One of our readers has reported an interesting incident which we shall relate as told to us.

In rural New Kent County, Virginia, about 20 miles east of Richmond, the Southern Railroad crosses the Pamunkey River (which becomes the York River downstream).

A historical site known as the White House marks a plantation which is the birthplace of Martha Washington. Later on the same site, General George B. McClelland repelled the Union Army en route to Richmond.

Now, the expanse is covered with an array of antennas and closely guarded by security personnel. A sign clearly advises, "Property of U.S. Government--no trespassing."

Our intrepid reporter attempted to take some snapshots of the installation but was abruptly halted by an armed guard demanding that the camera and its owner should depart immediately from the premises or he would be explaining to a federal judge why he was interested in taking photos of a government installation.

Any of our readers know the identity and use of this intriguing site?

AIRFONE: Disconnected

There is a mad scramble among investors to get a piece of the emerging 800 MHz band. One fortune hunter was Airfone, whose air-to-ground payphone looked like a sure thing until the FCC announced very recently that the system was a luxury, not a necessity.

Airfone may continue to use the system in keeping with their experimental license on board those airlines on which it has been installed for the remainder of their one-year license.

With a multimillion dollar investment, Airfone is expected to push for the service but it would appear that the 800 MHz airline pay telephone service has been grounded.



AIRFONE: No more smiles across the miles.

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What's On 72-76 MHz?

By Ed Soomre

Located between television broadcast channels 4 and 5 is a unique portion of spectrum: 72-76 MHz. Its primary use is for point-to-point communications. Secondary uses include industrial low power two-way communications, radio call boxes and other specialized communications.

Frequencies are assigned every 20 kilohertz from 72.02-72.98 MHz, every 40 kilohertz from 75.42-75.58 MHz, and every 20 kilohertz from 75.62-75.98 MHz.

The FCC has designated this band for fixed operational stations in the aeronautical, public safety, industrial, land transportation, common carrier, and maritime mobile bands. Its use is subject to conditions of non-interference with TV broadcasting or other radio services, reduced transmitter output power, restricted antenna radiation patterns, and the use of proper emission.

BACK TO BASICS

Point-to-point communications between bases (con-

trol stations) and remote transceiver sites usually use two radio frequencies: the uplink frequency (base to remote transceiver) and downlink frequency (transceiver back to base). The remote transceiver is controlled at the base as if it were located right there.

Users of this band include Class C Citizens Band Radio Service for radio controlled aircraft, auditory training devices (used in institutional educational programs for handicapped persons), control of industrial heating equipment, radio communications developmental and test equipment and radio alarm systems (radio call boxes and fire alarm boxes).

Most likely the listener will hear the two major users: point-to-point communications (usually the downlink) and radio alarm systems. Highly directional antennas are used, but if the listener is located in the path between them, reception may be excellent.

Radio alarm system reception is best near a

highway (for radio call boxes) or in a large metropolitan area (for fire alarm boxes). Most of these low-powered systems use omnidirectional antennas to transmit a series of tones for short periods of time. Many radio alarm system boxes are powered by batteries charged from solar energy.

Low-power industrial communications and paging can often be received near the factories or warehouses.

RECEIVING EQUIPMENT

The Regency MX5000 is an excellent receiver for this band, covering both AM and FM modes. Converters such as the Hamtronics CVR-72 can be connected to a conventional programmable scanner to receive this band in the 150-154 MHz range.

An omnidirectional scanner antenna (such as the Grove Omni II) can be used with very good results. For even better reception, a directional antenna (such as the Grove Scanner Beam II) and a preamplifier (such as the Grove Power Ant or Signal Amp II) is recommended since the antenna can be aimed at the transmitter location.

twenty-first century.

We make no apologies in introducing these esoteric subjects to MONITORING TIMES' readers; many are serious communicators who have personal and private requirements for absolute message security. We know that some among you already have at your disposal the hardware to encrypt and decrypt telecommunications using these modern techniques.

Our objective is to put you on the right track in obtaining the software necessary for their application. We hope to be able to direct you toward some simple means of "getting on the air," as well as encourage you to participate in and contribute to ongoing cryptographic development.

But first, let us examine some paradoxes and observations regarding the subject.

With the coming of the home computer microprocessor and its associated modem, the ordinary citizen may send messages in secure form without fear of their being compromised upon interception. Of course, there must be similarly programmed personal computers (PC's) on both ends of the circuit in order to effect the encryption and decryption process. But with the wide usage of home computers these days, soon virtually everyone will possess these means.

This is not a subject

A citizens band or low band ground plane can be used by cutting down the radiator (vertical element) and radials to approximately 32".

HBO TO SCRAMBLE

Home Box Office (HBO), a leading pay TV satellite program source, has announced that it has begun shipment of its high-security descrambling systems to authorized cable companies nationwide.

The present descrambling equipment is prohibitively expensive for individual subscribers to own, but due to a new law, it will become available in the future.

While the disappearance of HBO from the quarry of home TVRO enthusiasts will have an impact, there are still approximately 80 channels from which home satellite terminals may choose other sources of entertainment.

The new scrambling system is considered the most advanced type of encryption outside of the Pentagon and is unbreakable, or so say the developers at M/A-COM, a prominent encryption device manufacturer.

directed particularly to computer wienies or cryptic groupies, but to communicators. And that means almost anyone. Anyone who uses a telephone, or common carrier circuits, domestic and international. Anyone who uses a short-wave radio. Anyone who uses the mail.

A LITTLE PHILOSOPHY

Who said we necessarily have to transmit our encrypted messages by wire? We can encrypt onto the printed page or onto floppy disks or magnetic tape cassettes or even onto EPROM microchips and mail them to Aunt Agatha in Prairie Junction for her to decode using the kitchen computer.

Incidentally, there are some ancient regulations in the United States and elsewhere intended to prohibit the general public use of encrypted messages on short-wave circuits, amateur and citizens band radio. Many radio teletype (RTTY) enthusiasts ignore these regulations, however, and go right ahead and use encryption on the airways. There has not been a serious U.S. test case in years wherein the use of cryptographic messages alone has caused the communicator to be "busted."

There have been a few cases wherein heavy handed U.S. bureaucrats have

UNBREAKABLE CODES

by The Lazy Dog

(Ed. Note: Lazy Dog is a code name for this former member of the intelligence community. His credentials are unimpeachable and his personal insights reflected in this article are well worth reading. This two-part article will be concluded next month.)

From time to time MONITORING TIMES' editorials and features touch on the subjects of cryptology and secure telecommunications. These articles have been especially interesting to short-wave listeners, radio communicators, and to many of MT's general readers who are concerned with achieving message privacy. The contributors of these articles are to be commended in exposing subscribers to the general world of the classic cryptography of earlier years -- prior to the Korean War.

Such crypto-systems were, for the most part, simple substitution codes using paper and pencil manipulations. Some used random character generators whose outputs were joined with straight texts through the Vigenere tables to form decryptable gibberish (See MT, July 1984, p.13, "The Hawker and the OSS").

Later, super secret mechanical or electro-

mechanical crypto machines were employed. Notable among these were the WWI German "Enigma Machine" and similar devices used by the U.S. military. Although the algorithm complexity of these boxes was of a high order they are, by today's standards of high-speed computer cryptanalysis, fairly easy to crack.

Crypto code clerks were instructed to defend these cipher methods, the code keys, and the machines with their lives -- never to let them fall into enemy hands.

Shortly after the Korean War, however, there came a renaissance in cryptography: the so-called "unbreakable" coding being used by government, and industry today. Surrounding this science and technology are such buzz phrases as "pseudo-random algorithms based on the products of very large prime numbers," "trapdoor knapsack public key cryptosystems," "secure key distribution systems," "message authentication," and "the data encryption standard."

Yes, many of these modern cryptographic systems are truly unbreakable. And analysis by experts indicate that they will remain unbreakable even after cryptoanalytic attack by the successors to the very high speed Cray computers which may be postulated into the

UNBREAKABLE CODES

attempted to harass or intimidate users of encrypted radio transmissions. Those users who have stood up on their hind feet, however, and have said, in effect, "up your nose with a rubber hose," have found that the bureaucrats curl up and skulk away, never to be heard from again.

The general consensus among constitutional lawyers, and even within the U.S. Justice Department, is that these prohibitive regulations are outmoded, unenforceable, unconstitutional and contrary to our general concept of freedom of speech and privacy; and hence should be stricken from the books.

There are no prohibitions against transmitting messages in the Gaelic, Fijian, Swahili, or Serbo-Croatian languages. Cryptography is just another language; albeit a language wherein means are taken to seal its contents from unwanted intrusion.

The right to encrypt is a basic human right. Just as is the right to life, liberty and the pursuit of happiness. The use of encryption does not necessarily imply subversion, moral turpitude, of nefarious activity. Don't let anyone tell you otherwise. In this day and time of rampant interception, one almost has the obligation to encrypt.

We have heard it said now and again that, "If I've done nothing bad, who cares if my messages are intercepted and read; I've got nothing to hide." This, of course, is a silly, simplistic argument by the Pollyannas of the land. Everyone has something to hide, else we would not have window shades.

Information is power; and if we give it away to those who might use it against us, or who may wish to intimidate us -- even information which is seemingly innocuous -- we defraud ourselves. We hereby encourage all readers to encrypt whenever practicable.

That is the key word of this treatise: practicable. Never before in the history of man has the ordinary citizen had at his disposal a relatively inexpensive, swift, and practicable means of sealing his written communications, telegraphic or otherwise, from the unwanted intrusion of high institutions and governments.

Two technologies in conjunction have fallen together in this new age, providing the practical

application of truly private communications. One is the wide-spread possession of home computers by ordinary folk. The other is the development of the "unbreakable" cipher systems.

PARADOX NUMBER ONE:

How can I, with my little Radio Shack Computer, my Apple IIe, my Commodore 64, my IBM PC or whatever, begin to pit my miniscule encryption capability against the multi-million dollar, nano-second, number crunching main frames of the big boys and still maintain secure communications?

"That's just it," said a noted cryptanalyst of current industry, "the code makers have far outrun the code breakers." You, with your little peanut whistle,

can blast the Goliath nasties right off the map. Such is the nature of the new cryptology.

The Philistines of big government for several years tried to keep the mathematics of modern encryption out of the hands of the public. Tough knobs! "The Genie is out of the bottle, and you can't stuff him back," remarked a Ph.D.-type crypto specialist. It is rather like trying to put a Top Secret stamp on the multiplication table!

PARADOX NUMBER TWO:

The crypto systems of yesteryear were highly subject to compromise and cracking should an adversary capture your coding method, your crypto-machine, or your algorithm. The new systems,

though infinitely more secure, are not compromised if the "other side" gets hold of your machine, or even gets hold of your encryption program! How do you like them apples?

One could actually give the plans of his crypto-machine and the cipher programs to the Soviets, the NSA, your mother-in-law, or the little boy who lives down the lane; and still, your code can't be broken -- even by the brainy guys who devised your system. This is provided, of course, that you do not give away the decryption key which you may devise and change now and then -- grade "B" movies to the contrary!

NEXT MONTH: How to get started in cryptography

When you need to hear the action from wherever you are, Regency delivers. Our portable scanners keep you in touch with the local news. Whether it's bank hold ups, three alarm fires, weather, business, marine radio, or aircraft calls, Regency portables bring you the on the scene action. While it's happening from where it's happening... in your neighborhood.

PROGRAMMABILITY WITH A CHOICE

Regency offers you two new exciting keyboard programmable hand held scanners. First there's the HX2000 20 channel, no crystal scanner. It offers UHF and VHF ranges with the important addition of 800 MHz and aircraft frequencies. And with features like search and scan, priority, liquid crystal display, and selectable search

increments, the HX2000 is a sure winner. If you don't need the extended coverage, there's the HX1000. It let's you cover your choice of over 15,000 frequencies on 30 channels at the touch of your finger. No crystals are necessary. Six band coverage, search and scan, priority control, and a liquid crystal display with special programming messages and clock are all part of the package. And with the sealed rubber keyboard and die-cast aluminum chassis, the HX1000 is the most rugged and durable hand held on the market.

CRYSTAL-CLEAR

If you don't need all the features of programmables, but you want the convenience of portability, we've got you covered. Our two crystal controlled hand held scanners, the HX650 and HX750, offer

six channels, individual channel lock outs, LED channel indicators, step control, two antennas and an adaptor/charger. Both cover VHF high and low, UHF and "T" public service bands, with the HX750 offering the additional coverage of VHF aircraft band.

DECIDE FOR YOURSELF

Your Regency Scanner dealer would be happy to give you a free demonstration of these and other new Regency Scanners. Stop in today. Or, write Regency Electronics, 7707 Records St., Indpls., IN 46226.

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Indianapolis, IN 46226

"IT'S FOR YOU"

How To Pick The Best Personal Communications Option

—by Doug Lang—
and Lee Greathouse

Reprinted from October, 1984, *Personal Communications Magazine* by permission of the author and of the publisher, FutureComm Publications, Inc. 4005 Williamsburg Court, Fairfax, VA 22032. 703/352-1200.

The cellular car telephone—the latest technological craze—may be the best answer to your communication needs. But before you rush out and buy one, review all the options. More than 10 devices are available today that you can use for one- or two-way communication. Which is right for you?

The first question you have to ask yourself is, "Do I need to be immediately available at all times to my clients, associates, office or home?" If not, you should investigate some of the less costly personal-communications devices described below.

1. Tone-only pager. This most basic, one-way communications unit is useful only where there is a central office or a dispatcher to act as a conduit between you and the person who needs to reach you. Beepers have limited capability in situations that require direct response. You may be able to reach a phone in 10 seconds to call and find out your message. But it could take an hour or more if your pager beeped while you are stuck in traffic.

One example of an occasion in which a tone-only beeper can be useful in an emergency is the case of elderly parents who want to be able to contact their children if an urgent problem develops at the parents' home. If the beeper goes off, the adult children know where the message is coming from and that something is wrong.

WORLD'S LARGEST CAR STEREO?

John Hanna has some imagination. As an enterprising entrepreneur with the philosophy, "You are what you sell," Hanna converted his 40 by 18 foot storefront into an Alpine 7347 look-alike.

Needless to say, this is one Columbia, South Carolina, Business that really get double-takes from passing motorists!



Adding Speech to the Beep

2. Voice pager. A voice pager has the added capability of relaying short spoken messages and thereby resolving a problem immediately, for example, by saying, "Dr. Jones—call Radiology," or "Jack, stop by the River Road Sunoco on the way home."

3. Alphanumeric pager. An alphanumeric pager displays short written messages that can contain both numerals and letters. Addresses or telephone numbers can be reviewed again and again. The party attempting to find you must first go call a central number and dictate his message to a human operator who types the message into a computer and transmits it over the air.

4. Numeric pager. A numeric pager allows the caller to enter his telephone number directly by using the Touch-Tone® on his telephone. Most such pagers will store up to four complete telephone numbers, including area codes. The disadvantage of the numeric pager is that—unless you recognize the phone number—you won't know who has called or how urgent his call is.

5. Nationwide alphanumeric pager. A nationwide alphanumeric pager on a 900 MHz frequency has just been introduced by Millicom. Other manufacturers are sure to follow. This pager can receive words and numbers in cities around the country. With the "silent-receive" option you can find a lawyer in a courtroom in Chicago without disturbing him or a get a message to the driver of a parts-delivery truck at a noisy auto body shop in Philadelphia—all from your office in Washington. Some of these pagers have an option for "vibrating alert," which signals the user with a vibration instead of a beep.

How You Can Talk Back

6. Two-way communications. The world of two-way communications is basically divided between radios that use private and non-private channels. "Non-private" does not mean that the whole world is listening to your conversation. It means that another person with a radio similar to yours can tune to the channel you are on and listen to what you say. Operator-assisted and direct-dial radio common carrier *mobile*, and *portable-mobile* and *two-way mobile* (unit to base) telephones fall in this category.

7. Operator-assisted car telephone. The two nice features of operator-assisted car telephones are that (1) your hands are free from having to dial the number and, (2) the oper-

ator can take a message if you do not answer the phone.

8. Operator-assisted portable telephone. The operator-assisted portable offers the same features as No. 7 but allows you to be on the move away from your car. This device combines an answering service and a pager in one unit. In the world of two-way communications, the operator-assisted alternative is also the least expensive option, ranging from \$15 to \$20 per month for basic service (which includes 60 to 75 minutes of telephone calls) plus 15 to 20 cents for each additional minute.

The radio common carrier network operates in the U.S., Hawaii, Puerto Rico, Guam and the Virgin Islands and, therefore, offers the widest usage. The network even operates (sometimes with distortion) inside buildings, restaurants, cabs, private planes and boats.

9. 800 MHz specialized mobile radio system (SMRS), a *private* service, offers businesses both vehicle-to-base and direct telephone call capacity in one mobile radio.

Such systems combine the best of both worlds. Upon receiving instructions to deliver paperwork to "Mrs. Jones," a driver can telephone a nearby client to see if he can make a delivery on the way. On instructions to deliver an emergency load of sauce to Harry's Pizzeria, the driver can telephone ahead to ensure that payment will be ready when he arrives.

10. Conventional 800 MHz SMR systems can only handle a limited number of telephone calls at a time. The reason is, the system may have only a single channel, or may have only a few, from which the user selects one manually. A caller has to wait until someone else is finished talking before he can make a call. This limited capacity also creates difficulty for those trying to reach a conventional mobile unit because the line must be free in order for the mobile to ring.

11. Trunked 800 MHz SMR systems operate on a minimum of five channels, and a computer automatically searches for a vacant channel whenever a user tries to place a call. Because a caller has immediate access to several channels, his chances of seizing an unused channel are vastly increased. More and more of these SMRs are going into service, increasing the chance that you can find one in your area. Currently, 800 MHz SMR calls cost 30 to 40 cents a minute—double the cost of operator-assisted radio services.

Cellular—No Limits

12. Cellular radio telephone technology has overcome most of the limitations of radio telephone service by offering nearly guaranteed availability of a telephone line, direct-dial capacity and conversation privacy. Even though another cellular user cannot listen to your conversation, someone with an appropriate frequency scanner can still listen in on a cellular conversation.

At this time cellular is limited to large urban areas. Service to smaller cities or an inter-city network might be long in coming.

Of all the personal communications radio services, cellular is the most expensive. Typical costs are \$35 per month and 40 cents a minute—although these rates are lower in some areas. The phones themselves cost about \$2,000, a price that is also coming down.

13. The portable cellular phone is still in its infancy. Models now available are limited to about 8 hours of "on" time plus 20 to 30 minutes of "talk" time between charges because of their limited battery life. Portables are also fairly ineffective inside buildings. The operator-assisted portable may be more effective at penetrating buildings because of its lower operating frequencies.

True Personal Communications

If you find that you need to keep in touch while you are on the move, the latest technological devices on the market—from the simple beeper to the cellular portable—give you plenty of options to choose from. Before you make any purchase, analyze how the service you plan to purchase can make your business more efficient and save you time. Also, make sure that the cost of the service is not more expensive than its value to you. Saving you time, money and worry—and increasing your pursuit of the good life, liberty and happiness—that's what true personal communications is all about.

Doug Lang is president of TCI-High Technology Store, Div. Lang Group Enterprise, 1816 New Hampshire Ave. NW, Suite 101, Washington, DC 20009, 202/483-1193.

Perspectives On Radio

...a little history

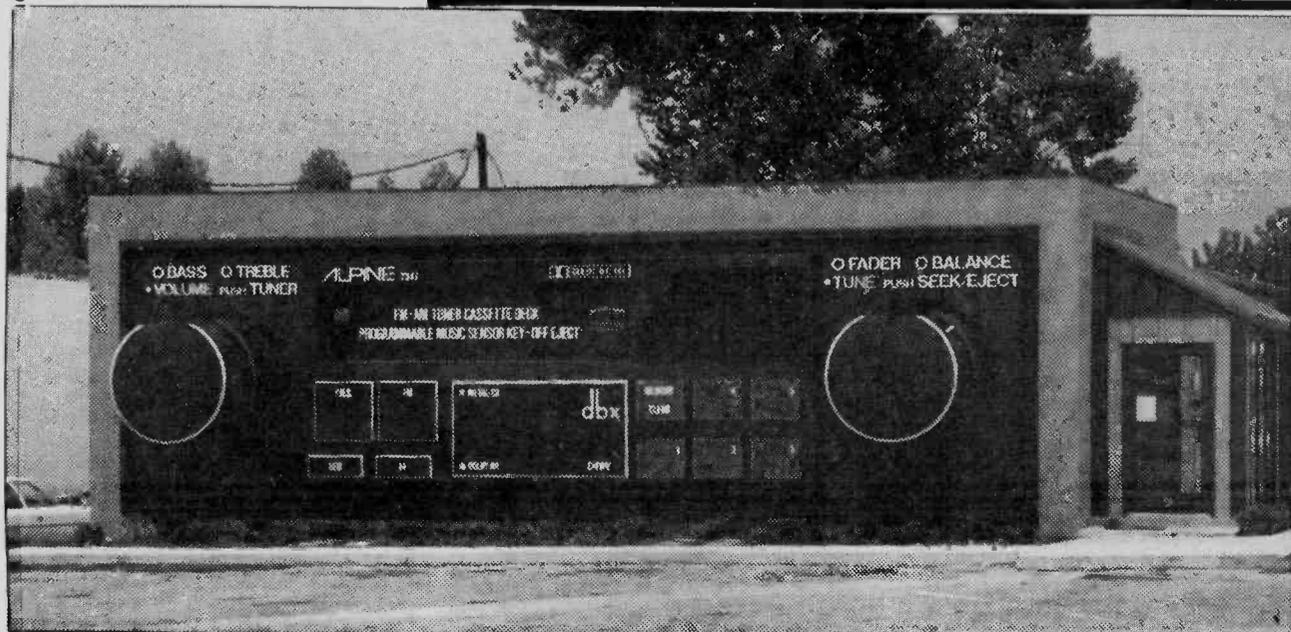
By W. Clem Small, KR6A

WHY 500 KHz?

Recently a MT reader, D.K. deNeuf, asked the interesting question, "Who Decided and Why?" about how a number of things in electrical, electronic and radio practice got started.¹

One of the items considered in that article concerned why the maritime international calling and distress frequency came to be 500 kHz. Reader deNeuf recalled reading somewhere that the selection of the frequency in question was perhaps determined by a consideration of the distance between masts on a ship and what wavelength this might best fit.

Let's think for a minute. Most antennas we'd consider for this application would be one-half wavelength long; 500 kHz is 600 meters in wavelength, so a one-half-wavelength antenna would be 300 meters (1000



PERSPECTIVES ON RADIO

feet) in length. Would ships in those early days, around the turn of the century, have had that kind of space between masts?

The length of the antenna would be a bit shorter (actually 285 meters) due to the velocity factor correction; also, the length of the lead-in wire would contribute to antenna length, reducing the actual "between mast" length needed. In those days, the antennas were not just a single wire, but a flat "ribbon" of 2 to 6 wires spaced over a width of from 2.5 to 3.5 feet (.75 to 1 meter). This multiwire construction increased the capacity of the antenna, like a top-loading device, and that reduced the length needed for resonance of a half-wave antenna.

So, was the length between masts in the old days sufficient for such antennas? David Sarnoff, in a 1914 article on radio traffic problems², said, "If it were possible to take full advantage of the available space on vessels, the receiving and transmitting range would be considerably increased, but if full advantage were taken of the distance between masts on a good many of the transoceanic liners, the natural period of the antenna would probably be very nearly 600 meters..."

Marriott, in the same article as Sarnoff, reported on "the natural periods (of the antennae) of about 102 vessels equipped with antennae occupying the space between the masts. These were mostly for United States coastwise ships. From the data given, it will be seen that the natural wavelength thus varies from 210 to 550 meters, the average being 370 meters; and with ample coupling inductances in series with these antennae the circuits wavelengths varies between 280 and 600 meters. It is clear that these vessels could use without difficulty the wide range of wavelengths between 280 and 600 meters."

Davis, commenting in the same paper as Sarnoff and Marriott, pointed out that regulations then in existence required ships to use 600 meters if possible, and "...if they failed that..." they were to use 1800 meters for their communications. He noted that small ships couldn't mount enough antenna length for 1800 meters.

The shorter wavelengths used in those days went as "short" as 300 meters,

allowing their use on the ships. However, the use of 300 meters for communications was not too practical in those days according to many of the operators, due to ineffective functioning of the equipment developed at that time and to the difficulty of obtaining it.

In those days prior to the exploitation of ionospheric skip, the longer the wavelength of your signal, the more reliable was your communication (generally). This was true if your antenna was long enough to fit your wavelength. As a practical matter, 600 meters seemed to be the longest effective wavelength on which all ships, small and large, could be expected to successfully operate.

Bucher, in his 1917 Practical Wireless Telegraphy³, points out that the "standard transmitters of the Marconi Company are designed for the use of 300, 450 and 600 meter waves." Bucher says that longer antennas could be made to accommodate 600 meters with capacity tuning and the shorter ones could handle 600 meters with inductive loading. He further tells us that if the length available for the antenna "is less than 125 feet, the inverted L aerial is employed, but if it exceeds 125 feet, the lead-ins are attached to the center. This permits the use of the three standard waves..." Of course none of this tells us definitively who decided on 500 kHz and why, but it does give us some food for thought, don't you think?

Next we'll explore the question of why the field of radio communication was located in the medium to very low frequency end of the wavelength spectrum anyhow. You may be surprised at the answer.

REFERENCES

1. D.K. deNeuf, WALSPM, Who Decided and Why?, Monitoring Times, Vol. 3, no. 7, July 1984, pp. 11.
2. Sarnoff, David, Radio Traffic, Proceedings of the Institute of Radio Engineers, Vol. 2, no. 4, Dec. 1914, pp. 273.
3. Bucher, Elmer E., Practical Wireless Telegraphy, Wireless Press, New York, 1917.

☞ Would MT readers enjoy a regular series on the history and development of radio? Be sure to write in and let us know.

ARMSTRONG'S CONTRIBUTION TO RADIO

By D. K. deNeuf, WALSPM

Major Edwin H. Armstrong achieved worldwide recognition for his developments in regenerative circuitry and probably most of all for his method of frequency modulation.

One of his papers published by the Institute of Radio Engineers (now IEEE) in August 1927 was entitled, "METHOD OF REDUCING THE EFFECT OF ATMOSPHERIC DISTURBANCES." In it he outlined his system for reducing static (QRN) on the reception of "long waves" used in transoceanic telegraphic signalling.

Part of it reads "...In general, on the long waves... a small frequency variation... is sufficient; on the shorter waves a greater variation... is necessary..."

At the time he wrote this, probably circa 1926, there were no commercial circuits employing short-waves despite amateurs having used them successfully for some time. Apparently Armstrong foresaw their eventual application some time before commercial interests began to introduce them on international circuits - about 1929. His method employed two signaling frequencies - one for "mark" and the other for "space."

In any event it appears that Armstrong dropped his interest in the telegraphic field and went on to other things, among them frequency modulation. His innovative system was announced in 1936. It provided the first practical system of minimizing the effects of external electrical disturbances which plagued the reception of amplitude modulated

signals.

Early in WW2 somebody in the US Signal Corps decided that Armstrong's original "two frequency" keying technique should be developed for high frequency point-to-point telegraphic signalling and contracted with Bell Labs and Press Wireless to bring it into being.

PW was the first commercial carrier to employ the new technique which was called "FSK" (frequency shift keying) on radiotelegraph circuits. It also applied the FSK system to AM modulated transmitters, deriving therefrom both a telegraph and voice channel from the same transmitter simultaneously.

Its famous "PX" mobile transmitter which accompanied the Normandy invasion in WW2 and which went hand-in-hand with the troops all the way to Berlin transmitted all of the press correspondent's "hard copy" (written dispatches) as well as voice commentaries on the spot carried by NBC, CBS, and MBS.

The method of combining FSK and voice was called "MODUPLEX" and a patent on it was issued to Dick Hiltferty (W5TOS) who was PW's Chief Engineer.

Within a few years after WW2 "FSK" became standard technique on point-to-point radiotelegraph circuits the world over. All this took place before Armstrong's death in 1956, but he was so deeply involved in his lengthy battle with RCA and his financial problems it seems possible he completely forgot about his early important contribution to the advancement of radiotelegraphy.

Need A Scanner Repaired?

It is not the policy of MT to endorse any commercial enterprise, but we do bring to the attention of our readers companies which offer service which seems to be of unusual interest to MT subscribers.

An information-filled packet from just such a company was in today's mail: Gerry Oliver, owner of G and G Communications, 6518 Main Road, Dept. MT, Stafford, NY 14143 (phone 716-343-2818).

Gerry's services include a scanner crystal exchange, repair on all

makes of scanners, service notes and parts for repair, and business band radio repair as well.

Gerry enjoys swapping information with scanner experimenters; he would appreciate information on s-meter additions that work. He also has quite a number of scanner chassis for parts salvage.

While we cannot vouch for G and G Communications, his unusual breadth of interest is certainly worth sharing with fellow listeners.

PAGING PANORAMA

Everywhere in the country one can turn on a scanner and hear paging from somewhere. If line-of-sight high band or UHF paging is not likely, then skip is probably rolling in on low band.

Recently, Telocator, a nationwide paging entity, proposed channel identifiers which would follow a logical

pattern: Each channel would be given a number representing the first digit of the frequency.

A comprehensive list of paging frequencies used across the U.S. is provided below, along with Telocator's proposed channel identifiers.

(Courtesy Radio Communications Report, 12/3/84).



Channel	Frequency (MHz)	Channel	Frequency (MHz)
P3-1	35.20	P9-1	931.0125
P1	35.22	P9-2	931.0375
P3-3	35.24	P9-3	931.0625
P3-4	35.26	P9-4	931.0875
P3-5	35.30	P9-5	931.1125
P3-6	35.34	P9-6	931.1375
P3-7	35.38	P9-7	931.1625
P3-8	35.42	P9-8	931.1875
P3-9	35.46	P9-9	931.2125
P3-10	35.50	P9-10	931.2375
P3-11	35.54	P9-11	931.2625
P3-12	35.56	P9-12	931.2875
P2	35.58	P9-13	931.3125
P3-14	35.60	P9-14	931.3375
P3-15	35.62	P9-15	931.3625
P3-16	35.66	P9-16	931.3875
		P9-17	931.4125
		P9-18	931.4375
		P9-19	931.4625
		P9-20	931.4875

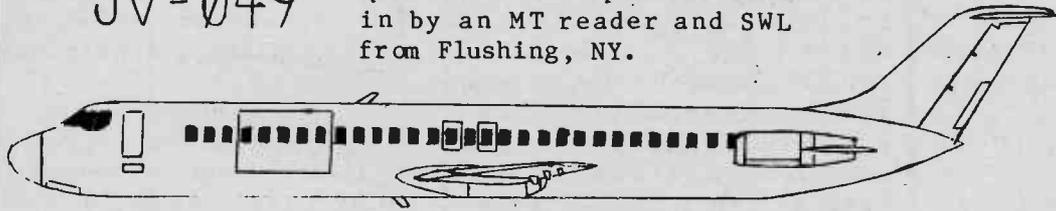
Channel	Frequency (MHz)	Channel	Frequency (MHz)
P4-1	43.20	P9-21	931.5125
P3	43.22	P9-22	931.5375
P4-3	43.24	P9-23	931.5625
P4-4	43.26	P9-24	931.5875
P4-5	43.30	P9-25	931.6125
P4-6	43.34	P9-26	931.6375
P4-7	43.38	P9-27	931.6625
P4-8	43.42	P9-28	931.6875
P4-9	43.46	P9-29	931.7125
P4-10	43.50	P9-30	931.7375
P4-11	43.54	P9-31	931.7625
P4-12	43.56	P9-32	931.7875
P4	43.58	P9-33	931.8125
P4-14	43.60	P9-34	931.8375
P4-15	43.62	P9-35	931.8625
P4-16	43.66	P9-36	931.8875*
P5	152.24	P9-37	931.9125*
P1-2	152.84	P9-38	931.9375*
P1-3	158.10	P9-39	931.9625
P6	158.70	P9-40	931.9875

* Reserved for Nationwide Paging System

Military QSL Card

JV-049

Yes, even the military QSL's! This example was sent in by an MT reader and SWL from Flushing, NY.



AIRCRAFT OF THE U.S. NAVY RESERVES VR-58

THIS WILL CONFIRM YOUR RECEPTION OF AIRCRAFT JV-049 ON 02 JUNE kHz 11176 AT 0302Z GMT ON 02 JUNE 1949

AIRCRAFT TYPE C-43 A/C POSITION NORTH PACIFIC

REMARKS:

NAVY C-43 SKYTRAIN ON RETURN FROM WESTERN PACIFIC TRIP TO NAS JACKSONVILLE, FL. AC-CDR RD MCKENZIE M-5310N UNCLAS

Signed *J.C. Lumsden*

A3F

New Mode Designators

More than frequency allocations were discussed at the World Administrative Radio Conference held in Geneva in 1979 (WARC '79). The old familiar emission

mode designators (A3, F1, etc.) were supplanted by a new list.

We would like to thank CQ Magazine for this concise list published in their October 1984 issue.

OLD AND NEW EMISSION DESIGNATIONS

Old	New	Emission Description	First Character (type of emission modulation)
A0	N0N	Unmodulated, with no information transmitted	A = amplitude modulation, double-sideband
A1	A1A	Telegraphy keyed on and off, for aural reception	C = vestigial sidebands
A2	A2A	Amplitude-modulated telegraphy keyed on and off, for aural reception. Tone(s) modulation.	F = frequency modulation
	A2D	Amplitude-modulated double-sideband single channel containing digital information and using a modulating subcarrier for data transmission, telemetry, or telecommand.	J = single-sideband, suppressed carrier
A2J	J2A	Amplitude modulation by tone(s) keyed on and off. Single-sideband, suppressed carrier. Single channel containing digital information and using a modulating subcarrier to transmit telegraphy for aural reception.	N = unmodulated carrier emission
	J2D	Single-sideband suppressed-carrier single channel containing digital information and using a modulating subcarrier to transmit data, telemetry, or telecommand.	P = sequence of unmodulated pulses
A3	A3E	Double-sideband amplitude-modulated single channel containing analog information. Telephony (voice).	
A3J	J3E	Single-sideband, suppressed-carrier, amplitude-modulated single channel containing analog information. Telephony (voice).	
A4	A3C	Double-sideband amplitude-modulated single channel containing analog information. Facsimile images for viewing in a permanent form.	
A5	C3F	Single channel containing analog information and vestigial (imperfect, one sideband suppressed) sidebands. Television images for viewing in a temporary form.	

Double-sideband amplitude-modulated single channel containing analog information. Television images for viewing in a temporary form.

Unmodulated, with no information transmitted. Switched between two frequencies. Single-channel frequency modulation containing digital information, without using a modulating subcarrier. Telegraphy for automatic reception. Commonly referred to as frequency-shift keying (FSK) radioteletype.

Frequency/phase modulated by switching tones. A single channel containing digital information, using a modulating subcarrier. Telegraphy for aural reception.

Frequency/phase modulated by switching tones. A single channel containing digital information, using a modulating subcarrier. Data transmission, telemetry, or telecommand. Commonly referred to as audio frequency-shift keying (AFSK) radioteletype.

Frequency/phase modulated by switching tones. A single channel containing digital information, using a modulating subcarrier. Data transmission, telemetry, or telecommand.

Frequency/phase-modulated single channel containing analog information. Telephony (voice).

Frequency/phase-modulated single channel containing analog information. Facsimile images for viewing in a permanent form.

Frequency/phase-modulated single channel containing analog information. Television images for viewing in a temporary form.

Sequence of unmodulated pulses in a single channel containing digital information, without using a modulating subcarrier. Commonly referred to as pulse telegraphy.

NEW MODE DESIGNATORS**Second Character (nature of modulation signal)**

- 0 = no modulating signal
- 1 = a single channel containing digital information, without using a modulating subcarrier
- 2 = single channel containing digital information, using a modulating subcarrier
- 3 = a single channel containing analog information

Third Character (type of transmitted information)

- A = telegraphy for aural reception
- B = telegraphy for automatic reception
- C = facsimile
- D = data transmission, telemetry, telecommand
- E = telephony
- F = television
- N = no information transmitted

CLUB CORNER

Paul Swearingen
7310 Ensign Ave
Sun Valley, CA 91352

This month we'll profile two DX clubs of international stature and one which caters to a very specific, regional audience.

NASWA

NASWA, the North American Short Wave Association, has been serving SW enthusiasts since 1961. Its 2,100 members are scattered throughout the world. The monthly bulletin, *FRENDX*, averages 56 pages of high-quality articles and loggings columns.

Using *FRENDX*, members can buy and sell equipment, find out the latest about equipment -- stations, propagation, and other technical topics -- keep up with the latest loggings and programs on shortwave -- compare one's DX'ing expertise and totals with others -- and in general keep up with the latest-breaking information about SWL. NASWA even offers a mid-month newsletter, *Update*, containing hot news about the latest SWL happenings.

For the newcomer to the hobby, the 132-page handbook *DX'ing According to NASWA* will bring the reader abreast of basic DX'ing techniques and other vital information.

NASWA began in 1961 as "NASA" and included broadcast band coverage at first. As the club grew and its scope and purpose clarified, members voted to limit the coverage of *FRENDX* to SWBC only, and later the same year, 1966, another letter was added to the club's acronym to avoid confusion with the space agency. By 1969 the club could boast of 450 members.

Three years later, *FRENDX* became one of the very first radio club bulletins to be published in a 5-1/2" x 8-1/2" offset magazine. As the club grew, duties were spread out among volunteers, with publisher-executive officer William E. Oliver heading up the efforts of the five-member

Executive Council and the many editors and contributors.

If you'd like to examine a copy of *FRENDX/Update* before joining NASWA, send a dollar to NASWA - P.O. Box 13 - Liberty, IN 47353 (overseas - send \$2.00 so that the copy may be sent by airmail). If you'd like to shoot the works and join today, send \$16 to NASWA - 45 Wildflower Road - Levittown, PA 19057 (add \$4 if you'd like to receive *UPDATE* also). If you live overseas, send an inquiry as to current rates.

IRCA

IRCA (the International Radio Club of America) was formed just a few years after NASWA as an offshoot from the National Radio Club. A group of DX'ers who felt that the policies of the NRC were not in their best interests decided to form a separate broadcast band club in 1964 after NRC's Denver convention. At first, the members attempted to represent their club as the true successor to the NRC, but after some internal problems were resolved, the club gradually settled into its role as a friendly rival to the older NRC.

The IRCA club bulletin, *DX Monitor*, includes loggings columns, articles, features, clippings, and BCB (broadcast band) update material. It is published 34 times per year, or weekly September through March and less frequently through the "off" months of the spring and summer.

Many members live in the western states, and the club has received a rather undeserved reputation as being a "west-coast" club, but with a large contingent of members located in the Great Lakes area and evenly distributed throughout the rest of the U.S., and even overseas, the coverage of

the club is world-wide.

If your DX interests include the BCB, you should consider joining IRCA. For a sample copy of *DX Monitor*, send 50¢ to IRCA - P. O. Box 26254 - San Francisco, CA 94126, or better yet, send \$7.50 for a 10-issue trial membership, which includes a new-member packet. A full-year membership to the U.S. costs \$20.

DX MIDAMERICA

DX Midamerica has survived for three years to evolve into a club which specializes in Hot Tips (the name of the club bulletin) for broadcast band DX'ers living in the six-state region centering around southern Wisconsin. Publisher John J. Rieger oversees the operation of the 15-times-per-year bulletin, which includes articles and loggings of BCB stations plus a limited amount of SW, FM and TV information.

If you'd like to join this interesting club, send \$11 to him at 1586 South 82nd Street - West Allis, WI 53214.

>>><<<

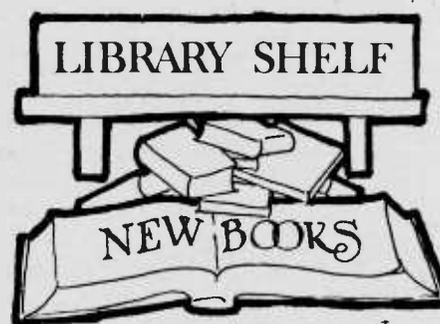
We'd like to note that José G. Barr is retiring from his job as publisher of the *ANARC Newsletter*, with NRC's Mike Knitter taking over that task. Mr. Barr will continue to manage the mailing lists, sample copies, and the Club list. (Some "retirement," hi!) Thanks for a job well-done, José!

A few meetings will be coming up in January -- send an SASE for meeting information to WADXA (Washington, D.C. Area DX Association) - 606 Forest Glen - Silver Spring, MD 20901; the RCMA greater Los Angeles chapter will gather at Mercury Savings and Loan - Valley View and Lincoln - Buena Park, CA on January 25. Send an SASE to Eric J. Christenson - P.O. Box 3962 - Santa Fe Springs, CA 90670 for more info.

Plan your summer vacation around the July 19-22 ANARC convention in Milwaukee, WI, to be hosted by the National Radio Club. For details, send an SASE to ANARCON '85 - P. O. Box 24 - Cambridge, WI 53523. The 1986 convention will be hosted by Ian McFarland and Radio Canada International in Montreal July 18-20.

Thanks to the *ANARC Newsletter* for the above listings; if your club has a happening that you'd like to see listed in this column, send it to me by the tenth of the month preceding publication of MT. Our next deadline, January 10, will be for the March issue of

MT. I appreciate the club bulletins being sent to me by various organizations, but remember that news of events published in club bulletins seems to reach me too late for publication. Until next time, the best of DX to you all!

**ERRATA:**

In an earlier column, we listed Century Print Shop (6059 Essex St, Riverside, CA 92504) as being a source of instruction manuals and schematics and the *Beacon Guide Update*. We have been advised by owner Don Erickson that none is available from him.

We have determined, however, that a limited number of the legendary **FEDERAL FREQUENCY DIRECTORY** are in stock. Send Don an SASE to inquire as to present cost.

To order the **BEACON GUIDE UPDATE** send \$3 to Ken Stryker, 6350 N. Hayne Ave., Chicago, IL 60659.

THE ARRL HANDBOOK--62ND EDITION (1024 pages, 8-1/2" x 11", softbound; \$14.95 includes bookrate shipping from Grove Enterprises)

For the better part of a century the annual **RADIO AMATEURS HANDBOOK**, published by the American Radio Relay League, has enjoyed a well-deserved reputation as the ultimate reference on all aspects of radio communications. This 62nd edition is no exception.

Greatly expanded over last year's edition, this enormous compendium now includes an extensive section on radio direction finding antennas and techniques, an extensive offering of printed circuit layouts for home projects, many new circuits and discussions of emerging technologies such as amplitude compandered sideband (ACSB) and digital communications, and updated treatments of the traditional chapters on receivers, transmitters, amplifiers, test equipment, antennas and transmission lines, space communications, modulation principles and the basics of radio and electronics.

The wealth of information contained within the pages of the *ARRL Handbook* is unequalled in the annals



BROADCASTING...

HANK BENNETT ON SHORTWAVE

of publishing; it is truly the penultimate reference for the technically-oriented experimenter.

BASIC RADIO ELECTRONICS by Sam Kelly (5" x 8", 344 pages, paperbound; TAB #1542, \$14.95 from Grove Enterprises).

Now that you have gotten interested in radio you probably have had your curiosity piqued. What did the early receivers look like? How do radio signals travel? What are all of those components and what do they do?

Are you ready to learn more about transistors, integrated circuits and basic radio theory? Would you like to build some clever home projects designed around your monitoring interests?

This fine little book by Sam Kelly is an outstanding example of how an inveterate experimenter can convey his wisdom and expertise in a concise, easy-to-understand manner at a reasonable price.

Liberal illustrated with vintage and modern photos, useful data tables, explanatory diagrams, and with dozens of projects for testing, receiving, transmitting, direction finding, building antennas and monitoring equipment and accessories, we recommend this book most heartily.

STATE LAWS REGARDING SCANNER RADIOS

This free brochure is a tabularized list of state laws governing the ownership and use of scanners. The handy reference is entitled, "Summary of State Laws Regarding Ownership and Use of Scanner Radios" and is available by writing SCAN, 240 Fencil Lane, Dept. MT, Hillside, IL 60162.

THE DANDY DIPOLE by Daniel Bostick and Donald Shatraw (23 pages, 8-1/2" x 11", paperbound; \$3.95 from Microwave Filter Co., 6743 Kinne St., Dept. MT, E. Syracuse, NY 13057).

While designed primarily as a sales aid for amateur radio stores stocking MFC components for antennas, the little guide does have several pages of useful information concerning the design of dipoles, including height, length, materials and traps.

Convenient look-up charts and formulas make pruning to optimum length easier for the ham. Dealers may wish to inquire as to quantity discounts for resale of the booklet.

FREQUENCIES - Exact?

How important is it that frequencies should be exact when sending reception reports to stations? I mean precisely exact? There have been a lot of comments on this subject through the years, both pro and con.

Back in the days when I began DX'ing it wasn't always easy to get an exact frequency of any station to which you were tuned. More than likely, you had three choices: Tune in a station and hope that they would give their frequency on the air; look up the frequency in a reference source and hope that they hadn't changed frequency; plot the frequency with a graph or chart.

The latter could be accomplished if your receiver had that deluxe feature: bandspread. The graphs would be plotted provided you had checkpoints with known fixed frequencies such as WWV or CHU.

If you had a receiver with no bandspread, as I had in my early days, your frequencies had to be approximated, and some of them were likely to be w-a-a-y off. In fact, on my very first receiver, I used to listen to WIXAL (later WRUL) on a frequency somewhere around 1550 kHz when it was, in fact, in the 6 MHz band!

It is important, of course, that all frequencies in reception reports be accurate or, at best, reasonably close. But how about reports to a shortwave column? How accurate should they be? Again, we feel that they should be as accurate as possible but only to a whole number.

In my shortwave column days we had a reporter who

insisted upon giving frequencies of some of his reports down to the third decimal point. Accuracy is one thing but his version of it left everyone else stone cold. What's more, he expected me to print his third decimal frequencies--which I didn't!

Granted, at times it becomes very important to know exactly what frequency is being used. On one occasion when I was working WAR during one of those military-ham radio weekends, we would try to get as close to the edge of the band as possible without actually sliding over into no-no territory. I had a military surplus crystal in my little 25-watt rig and the frequency stamped on it was 7000.0 kcs. Of course, I believed it. After all, the military wouldn't lie to me, would they?

I made contact with WAR, had the short QSO, and shortly after received my prized WAR QSL. Another couple of days passed and I also became the recipient, unhappily, of a ham-radio-style citation from the monitoring station in Allegan, Michigan, that I had worked WAR on 6999.85 kilocycles! I promised never to use that crystal again and I never have, though I still have it in my possession.

Exact frequency reporting is important but not to the extent that you have to try and show off your smarts by going out to three decimal points. After all, most of the stations have their own frequency measuring devices. Besides, what guarantee do you have that YOUR own frequency measuring equipment is as accurate as you'd like to believe that it is? Better to stick to whole numbers or, at the extreme, stick to the standard accepted fractions. You aren't going to lose out on that hope-for QSL if you're a few points off.

We're going to put the brakes on our brain stumpers and nostalgia questions, at least for the present, despite the interest that it seems to be generating. Perhaps we shall return with another round of them at a later date. I hope that by next month we'll know who the winner is in this recent quiz (right now we have a three-way race going for first place) and as soon as all the entries are in we'll give you the answers. How-

ever, I still have one more that I can't resist and this will be the parting shot for the present.

Some 30 to 35 years ago we had a neighbor about two blocks away who often passed our house. We lived next door to a small neighborhood store at the time. The store is long gone but we're still here. The neighbor in question is also long gone from the area though he returns for visits now and then. He would stop in front of our house and raise a racket and tease our dogs something fierce. We'd holler at him to quit and he'd go home. We also suspect this same person of once tying the back bumper of our car to the tree in front of the house. I don't know if he wanted the bumper to come loose or have us pull the tree over. Actually neither happened. The rope broke.

Question: Who was he? He's been famous in TV for years. One clue and that's all. When he lived here he was Eugene Orowitz. Anyone recognize him?

Now we can sympathize with all you apartment dwellers. For years I've had letters from DXers who lived in apartment buildings and they all had the same question: What kind of an antenna can I have? The landlord says no outside wires.

We're temporarily baby-sitting an apartment for someone else and I'm finding out first hand what you people have been complaining about all these years. I can't get anything either. The first weekend here I finally got enough energy coming in to get WOR at midnight Saturday evening with Joe Franklin's Show, then had the security people at the door because the receiver being on after 11 PM disturbed someone nearby. There just ain't no justice!

Radio Pyongyang Schedule

MT reader Carl Smith of Fresno, California, recently shared this list of Pyongyang, North Korea broadcasting frequencies and times for American listeners.

TIME AND FREQUENCY SCHEDULE		
GMT	FREQ. KHZ	
11.00-13.00	9745	9977
23.00-1.00	9745	15230

..a new column

SWL WORLD WATCH

by Ken Wood

(A decade of intensive monitoring by an expert has resulted in a writing style that is authoritative, accurate and interesting to read. We welcome this new name to the pages of Monitoring Times and invite reader comments which will be forwarded to the author.)

World Watch is a new MONITORING TIMES column designed to keep you up to date on shortwave broadcast DX'ing and listening. There has been a great increase in shortwave interest in the U.S. over the past few years and many people are discovering the likes of the BBC, Swiss Radio International and so on. If you haven't tuned around the shortwave broadcasting bands, I hope you'll give it a try.

Your editor, incidentally, has been an SWL for nearly a dozen years and currently uses an FRG-7700 receiver with a 75 foot longwire antenna. So, off we go.

TOP O' THE LINE -- If you've been unsuccessful in hearing Madagascar's government outlet, try 5.010 just before 0300 UTC. Radio Madagaskara is being noted at very good strength lately with programs in the Malagasy language.

It has been missing for a while but the unlicensed Voice of Arab Lebanon is operating on shortwave again, using its former frequency of 6.233. Best possibility for hearing this one is likely to be around 0300. It may do fairly well on the East Coast of North America. Overseas subscribers might have luck between 1300 to past 1800 UTC.

A new outlet of Radio Senegal is on 4.951 in French and local languages and audible during late afternoons up until 0000 sign-off. Sign on is at 0600 so it's normally possible to hear both ends of the transmission. 4.951 is programmed separately, except for newscasts, from the long-used 4.890 frequency.

MULTI-HOPS - Radio Damascus, Syria, has replaced 7.365 with 7.425 for daytime (our evenings) use. 12.085 is scheduled during our daytimes. Pro-

gramming is entirely in Arabic. It has now been several months since Syria returned to shortwave but QSLs still seem few and far between.

Radio Bangladesh is now using 250 kilowatts for its overseas services. The best bets for North American reception would seem to be English from 1230 to 1300 on 15.180 and 17.670. Bangladesh has never been an easy catch in the USA so it will be interesting to see what difference the new higher power makes.

Insomniacs might want to try for A Voz do Sao Vicente in the Cape Verde Islands around 0800 on 3.931. The ham QRM should be less at that hour than at the 0000 sign-off which can occasionally be heard during the winter months. The 0000 sign-off time will vary by a minute or two and the frequency is also slightly variable.

The notorious non-verifier Radio Botswana is a pretty easy catch from shortly before 0400 with its famous barnyard noises interval signal. Frequencies are 7.255 (used by Nigeria from 0500) and 4.848.

Radio Korea at Seoul has been running test broadcasts recently on the new 22 meter band frequency of 13.665 between 0745 and 0830. They did this once before. Outside of the West Coast there's not much chance of hearing this frequency at this hour during the winter months.

The Voice of Germany is getting ready to implement their new relay base at Trincomalle in Sri Lanka. Check these times and frequencies: 0000-0315 on 17.800, 0100-0300 on 15.105, 0545-1000 on 15.105, 0545-0900 on 17.845, 0915-1030 on 15.215 and 15.105, 0945-1400 on 9.545, 1115-1230 on 9.510, 1230-1430 on 7.265, 1345-1800 on 6.160, 1415-1700 on 7.200, 1800-2000 on 11.765, 1845-2045 on 11.705, 2000-0100 on 6.060, 2045-2200 on 6.185 and 2200-0000

on 7.110.

No official start date is known at this time but it should be on soon, at least on a test basis.

UAE Radio at Dubai in the United Arab Emirates has English scheduled on 11.955, 15.300 and 15.320 from 1600 to 1645 and also at 1330 on 15.320, 17.775 and 21.605.

The Voice of Greece has been heard recently during local evenings (from about 0100) on 6.205. The station had earlier used 6.225.

The International Service of Equatorial Guinea can be heard on approximately 15.107 until sign-off at 2200. Most of the programs are in Spanish but there are some English language religious programs included in the schedule.

The national stations of Cameroon sign on around 0430 and can all often be heard simultaneously. This includes Buea on 3.970, Bafoussam on 4.000, Bertoua on 4.750, Douala on 4.795, Yaounde on 4.850 and Garoua on 5.010. A newscast in English is carried at 0500.

Radio Mexico International is currently being heard on 17.765 until about 2300 playing Mexican musical selections. If you don't find them there, try 9.705 as a possible alternate.

Las Voz de Guatemala on 6.180 is active again but signs off at 0000 or even earlier. An alternate frequency may be 9.760. Programs are all Spanish.

The Ecuadorian Radio Baha'i from Otavalo has been testing on 4.996 (sometimes 4.990) in the evenings. Can't say why as they've already been on the air for a couple of years. Perhaps a new transmitter. Radio Catolica on 5.055 has upped power from Quito and is quite well heard now, again in local evenings. Watch out for TIFC in Costa Rica on the same frequency.

There are a number of changes in Papua New Guinea. Radio Chimbu in Kundiawa on 2.376 is actually named Radio Simbu. Radio West New

Britain at Kimbe has moved from 2.340 to 3.235, Radio Manus at Lorengau has left 2.428 for 3.315, Radio Northern in Popengetta has dropped 2.468 and moved to 3.345, Radio Western Highlands at Mt. Hagan is changing from 2.450 to 3.375. During favorable conditions many of these should be heard in the midwest or east around 1200 UTC.

The Venezuelan Radio Valera has been reactivated and should be heard easily until 0400 on 4.840.

KNLS in Alaska is currently scheduled in English from 0700 to 0930 on 6.170; Mandarin from 0930-1230 on 6.170; Russian from 1230-1500 also on 6.170; from 1500 to 1730 in Russian on 7.355; and in English on 7.355 from 1730 to 2000.

Radio Nacional del Paraguay has been providing excellent reception lately on 9.735 until 0230 sign-off. It's all in Spanish but there's some very nice music included.

Radio Algeria has also been heard widely of late, mainly around 2000 on frequencies including 9.510, 9.660, 15.160, 15.215 and 17.745 in Spanish, French and English at various times. Frequencies tend to be somewhat variable.

Radio Nationale du Tchadienne at N'djamena continues to operate on 4.904.5 and can often be heard from sign-on in French just prior to 0500.

Libya continues to expand its frequency usage, including 3.200, 9.890 and 17.940 for the Socialist People's Libyan Arab Jamahiriya Broadcasting Corporation (SPLAJB); 11.816 and 15.450 for the English Radio Jamahiriya service; and 15.415 for the Voice of the Arab Homeland service. Try mid to late afternoon local time on the higher frequencies and from around 0200 on the lower frequencies.

One of the few stations from Uruguay currently active is Radio El Espectador on 11.835; sometimes their Spanish broadcasts are audible around 0100.

Tunisia has increased its shortwave activity in recent months. You may find Radio Television Tunisienne on 7.225 around 0500 in Arabic. There's no known English programming from this one.

AREA SCOPE - Catching the Central American flash-points.

Belize. This country isn't involved much in the Central American conflict (aside from a long dispute with Guatemala now on the back burner). Radio Belize



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COMMENTS AND SUGGESTIONS ON HOW TO IMPROVE THIS
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P.O. BOX 333
TRIPOLI - S.P.L.A.J.

EUROPEAN BRANCH OFFICE
RADIO JAMAHIRIYA
P.O. BOX 17
HAMRUN - MALTA

is on in English on 3.285 and audible most nights until after the last news-cast at 0500.

Costa Rica. Several Costa Rican stations put in good signals. Radio Reloj on 4.832 and 6.006 is on the air 24 hours a day; Radio Columbia on 4.850 and Radio Impacto on 6.150 have both come on the air since the Central American problem began to grow and can be heard at strong levels well into the evenings.

Religious station TIFC uses 5.055, 6.175 and 9.645 with reception most reliable on 5.055 from 0955 sign-on and again in late afternoons 'til 0330. TIFC is the only one of the four to use any English.

English broadcasts from Radio Havana Cuba cover Central American developments thoroughly, although from a one-sided viewpoint. Transmissions to North America are at 0100 to 0450 on 5.140; 0330 to 0600 on 6.090; and 0630 to 0800 on 9.525. Additionally, Cuba broadcasts in English to the Caribbean from 2050 to 2140 on 17.750 and 15.300 as well as from 0100 to 0600 on 11.725.

El Salvador's government outlet, Radio El Salvador (sometimes calling itself Radio El Salvador International), may be heard evenings on 9.587 with relays of its medium wave programs.

Guatemala. Activity is noted from Radio Nacional on 6.180 plus the usual other outlets such as Radio Tezulutlan on 4.835, Radio Mam on 4.825 and Radio Chortis on 3.380 in Spanish and Indian languages.

Religious broadcaster Radio Cultural, TGNA, on 3.300 has some English. Local evenings are best times for these.

Honduras. Try Radio Luz y Vida on 3.251, La Voz de Mosquitia on 4.910 and La Voz Evangelica on 4.820. Only HRVC (4.820) has any daily English (at 0300). All three are religious stations.

Mexico. Radio Mexico International was mentioned earlier. Activity can sometimes be found from XEWW--La Voz de America Latina--on 6.165, 9.515 and 15.160. Broadcasts from the other listed Mexican stations are very spotty.

La Voz de Nicaragua has English at 0100 and 0400 on 6.015 but there's a very strong heterodyne or tone always on this frequency and it wouldn't be surprising to discover the interference is intentional.

ENGLISH LANGUAGE BROADCASTS by Tom Williamson

EUROPE REVISITED!

Let's take a look at this continent once again, this time at some recent new program data for less prominent broadcasters.

SWITZERLAND

The SRI has two daily transmission periods directed to the American continent: at 0145 on 6135, 9635, 9725 and 11715 kHz; 1315 on 21570 kHz...these to eastern North America. Then at 0430 on 9725 and 11715 kHz to western North America. (All 30 minute English broadcasts.) The 9725 kHz fre-

Radio Sandino in Managua operates on 6.200 24 hours a day and puts in a good signal despite some occasional utility station interference. There aren't any English programs from this station however.

For Central American clandestines, tune around for the FDN's Radio Quince de Septiembre, on periodically between 0000 and 0400, often around 5.555. Radio Monimbo, another anti-Nicaraguan, maintains a steady schedule of 0000-0100 and 0200-0300 on 6.230.

The F.M.L.N.'s Radio Venceremos can often be found around 6.555, and occasionally Radio Farabundo Marti will show up in the evenings around 6.980 or 7.030 variable.

Times and frequencies will vary so a little fishing is required. Unfortunately, these anti-government stations feature little, if any, English.

NEWS NOTES - By the time you read this the new Flevo transmitting station of Radio Netherlands should be on the air. The two newest U.S. broadcasters--WMLK in Bethel, Pennsylvania and KCBI in Dallas, Texas--should be starting tests or have begun regular broadcasts.

Both are religious outlets and will use mostly frequencies in the 16 and 19 meter bands. Specific schedules for the December-March period haven't been received.

JEEVES SAYS - Thanks for giving us your attention. Jeeves and I both want to encourage you to participate in this column. Loggings that you feel would be of interest to the Monitoring Times readership would be very welcome. You can send them to Monitoring Times headquarters and we'll try to include as many as possible.

Til next month, 73's. ❧

quency uses a 500 KW transmitter, most powerful of the Swiss short-wave service stations.

You may be interested to know that they are commencing an exciting new CONTEST for shortwave listeners in February 1985. This will include a set of questions (not certain about the content, perhaps about Switzerland's history or geography), and if you submit correct written answers, you may receive picture cards of the different "Cantons" of Switzerland. Also there will be a selection of correct answers to decide who shall receive the PRIZES! (Which, incidentally, include a free trip to Switzerland for a week!)

GREECE

ERT, the Greek Radio & Television, is on the air to North America as follows: 0000 on 9865, 9420, 11645 kHz; and at 0200 on the same frequencies. Then at 1200 and 1500 on 9420, 15630, 11645 kHz. These are 100 KW stations except for the 11645 kHz channel which uses a 250 KW transmitter. (Other things being equal--which often they are NOT!--the 250 KW should put in a more reliable signal, but the end result depends more on propagation of the frequency than the mere power output.)

These broadcasts are in Greek and English languages, and include interesting news viewpoints not always available elsewhere; and, of course, some of their beautiful Greek folk music.)

PORTUGAL (Lisbon)

Radio Portugal has been heard lately with good signals, despite bad propagation conditions, in their evening service to North America at 0300 on 6060 and 9560 kHz, the latter channel being superior. They are also advising 6075 and 9575 kHz at 0530 to western North America.

The programs include news bulletins (often poorly read and with a strong tendency to muddle up rather unrelated items in rapid sequence!). Also there are interesting talks about the culture, history and geography of the land.

SPAIN

REE (Radio Exterior de Espana) has two daily English broadcasts to North America: 0000-0200 and 0500-0600 on 9630 and 11880 kHz.

These two frequencies are used by the big 350 KW transmitter at Noblejas near the famous old town of Toledo (famous for its steel swords!). Madrid certainly

puts in a reliable powerful signal most of the year, and the programs contain lengthy, somewhat rambling, news bulletins. There are many other interesting items such as:

Current events in "Panorama," a 20 minute report-interview program on political events and the arts.

Music--Just after the news, folk music of different areas is heard. On Fridays "Musical Date" brings groups and singers who have made an impact in Spain. Items from the Spanish hit parade may also be heard.

"Learning Spanish," for the serious student of the language at 51 minutes past the hour.

Visiting Spain? Following the music there is something of interest about geography, culture, customs, history, etc...also on Thursdays at this hour, "Shopping in Spain" or "Tourist Newsletter." Every Friday there is "Spanish Cookbook" at the end of "Panorama"...try their ideas!

Weekend programs include "Highlights of the Week" (events in Spain over the previous seven days), "Sports Roundup," and "Radio Club" which will answer listeners letters and musical requests. This is well worth trying out, since you can ask for genuine examples of the incredibly-rich musical folklore of Spain; most foreigners are hopelessly ignorant of the real music, and it's quite fascinating!

Finally, there is "DX program" for the shortwave fans.

CURRENT TRENDS...

A new type of program is becoming popular with short-wave broadcasters: the listener's phone-in. Well-known to North American domestic stations for years, only recently has the idea been used on shortwave; originated, I believe, by the Dutch World Broadcasting system in Hilversum. Your editor took part in the first of these. It was good fun to talk to the editors of well-known programs.

Since that time the BBC has had phone-ins from Mrs. Thatcher, Yehudi Menuhin, King Hussein, and others.

Recently, HCJB (Quito, Ecuador) ran one of these broadcasts.

Keep your eyes open for more of this type of listener-oriented broadcast, which can only do good for international relations!

Next month we will present an updated, complete list of all English-language broadcasts from EUROPE. See you then! ❧

Insights Into...

World Christian Broadcasting

By Phillip M. Dampier

In 1976 a group of Christian men formed a new broadcasting organization, the World Christian Broadcasting Corporation (WCBC), founded to assist the churches of Christ throughout North America to extend their missionary outreach.

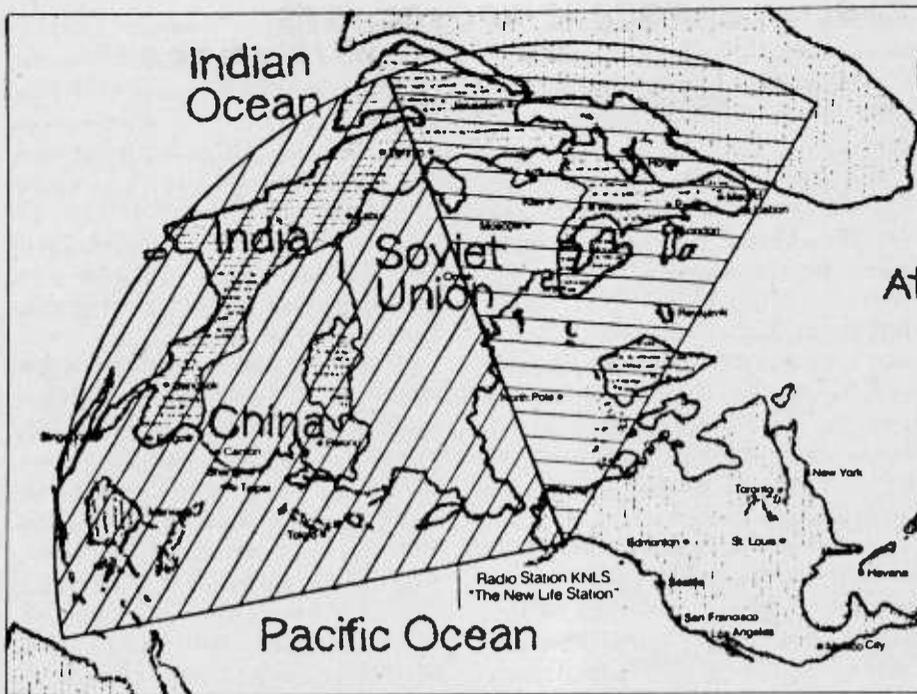
KNLS, the New Life Station as they proudly call themselves, is the first of several stations that the WCBC plans to erect. The churches of Christ do not advocate denominational religion and have views to which the denominations operating international broadcast stations are hostile; many of their programs have been terminated because of their content.

It was decided that shortwave broadcasting would be the most effective way to reach their broadcast targets, starting with the U.S.S.R. and the People's Republic of China. WCBC built KNLS in the small community (about 150 people) known as Anchor Point, 120 air miles southwest of Anchorage, Alaska, on the Kenai Peninsula to insure coverage into most of Asia and Eastern Europe.

The WCBC was granted a construction permit to start building KNLS in May, 1982. Plans called for a single 100 kw shortwave transmitter and two antennas.

Unfortunately, delays and other mishaps soon appeared. There was some question as to whether or not the WCBC and KNLS was an official voice for churches of Christ missionaries.

No sooner was that problem settled than a protest by the local populace brought out concerns about possible dangerous radiation from the 100 kw transmitter affecting human and animal



Radio Station KNLS—the "New Life Station"
Great Circle Map of Broadcast Coverage
Centered on Anchor Point, Alaska

population, especially birds. These problems were also cleared up.

ARSON

One of the most serious problems was an attempt to burn down the station about a year ago. The fire was not too extensive and it did not cause any major delays. The broadcasts of KNLS commenced in late summer of 1983.

Francis M. Perry, Station Manager of KNLS, told this author that original plans called for only Mandarin Chinese and Russian language programming. English language programming was added at the last minute by way of a 2-1/2 hour daily program. Ukrainian programming is also part of KNLS's future plans.

KNLS uses no interval/tuning signal. Mr. Perry told the author, "We used the original and short-lived tuning signal, 'Go Tell It On the Mountain,' only for the first on-air tests."

Mr. Perry was an engineer for the General Electric Company for 16 years (1948 to 1964) in upstate New York. He left GE to go into the foreign service with the State Department. "I was an Engineering Consultant to foreign governments building radio communication

networks for a number of years. I spent most of my time in Pakistan and Thailand." He admits, "Building radio station KNLS has been more exciting than anything else I have ever done."

One of the non-technical problems that KNLS has had is in respect to their location. KNLS houses main broadcast offices in Anchor Point, Alaska; main headquarters are located in Abilene, Texas; and programming is prepared in Cuyahoga Falls, Ohio.

Unfortunately, serious technical problems also were making themselves known. Mr. Perry told me of their present plight. "We have a well-equipped production room that is badly affected by radio frequency interference (RFI) from our own transmitting antenna. It gets into our 'on-air' console from where the broadcast tapes are played. Sometimes, this equipment gets so full of our own RFI, that our own radio frequency signals are detected and amplified and mixed (out-of-phase) with the audio coming from the tape players. As a result, there is sometimes distortion, motorboating sounds, high pitched oscillations, etc."

Mr. Perry goes on to say, "The audio...is processed to keep...our modulation up near 100% most of the time with maximum power in our sidebands. The audio processing automatically brings up the volume on low level tapes, but when RFI is high it, too, is also increased."

"We are working hard to eliminate the RFI problem. Ordinary copper rods driven into the ground do not suffice as our Alaskan soil is virtually non-conductive. We will be drilling a well next to the transmitter down into

the water table of the land. We think this will help in getting rid of most of the RFI problems."

RFI is worse on higher frequencies. "In September, we will drop our frequency from the 25 meter band and move all of our operations to the 41 and 49 meter bands. The new frequency will be 7355 kHz or thereabouts."

KNLS has been beaming their signal directly over the North Pole region, an area that most broadcasters would like to avoid because of the strange effects this region has on the audio quality and signal strength of shortwave transmissions. While reception in Europe is poor, KNLS has no problems in getting listeners in Asia.

"We have received two letters from the U.S.S.R., one of which was smuggled out. We have received one letter from the People's Republic of China and it requested a Bible Correspondence Course." Strict postal controls in the U.S.S.R. allow virtually no mail from Soviet citizens, not even "greetings" letters. The situation in the People's Republic of China is improving and more mail is being permitted to leave the country.

QSLs

KNLS answers every correct reception report. Write:

KNLS RADIO
P.O. Box 473
Anchor Point, AK 99556
USA

In the future, KNLS hopes to send colorful QSL cards and souvenirs.

Many reporters to short-wave club bulletins have indicated that KNLS Russian programming is heavily jammed, less so in Chinese. No jamming was reported on English language programming. "We will look into this."

Recently, Radio Moscow called the operation of KNLS a CIA mission to create tension in the U.S.S.R. and China: "KNLS is certainly a wasted effort by this break-away Christian organization as Soviet citizens will tell you that they do not believe in a selfish God. Soviet citizens would rather build a hospital than a church, develop international and domestic peace between all mankind instead of praying and spending money on a deity...KNLS is another blatant example of how the



Transmitter building at Station KNLS from which messages are broadcast daily into China and the Soviet Union.

Reagan Administration and the Central Intelligence Agency are trying to cause internal dissention in the Soviet Union and the People's Republic of China."

KNLS transmits a total of eight hours a day of programming at present, mixing entertainment, education, and religion as a family format.

The Chinese service opens each day with 1 hour of classical music (1200 UTC). This is followed by "Let's Learn English," a thirty-minute daily segment produced by the staff at KNLS which helps the Mandarin Chinese people learn English by a variety of features like vocabulary, stories, and listener participation features.

Following the English instruction program, KNLS transmits a variety of programming including Bible readings, daily life features, etc. from 1330-1400 UTC. The daily transmission closes with a 1 hour program on American music.

A 2-1/2 hour program in Russian is much like the Mandarin Chinese program except it offers more variety. Transmissions open with "In the World of American Music," a one hour program featuring a wide variety of American musical styles, from big band to current hits. This can be heard at 0930 and 1500 UTC. Monday through Friday at 1045 UTC and 1615, KNLS transmits their standard English instruction course. But on Tuesdays and Thursdays at 1100 and 1630 UTC, KNLS transmits Advanced English language instruction courses. The Russian service closes Monday through Friday with the program "Popular Jazz" which can be heard at 1130 and 1700 UTC. This is a half hour program of jazz

hosted by Hilton Merritt. On weekends, a half hour classical music program takes the place of the jazz program.

The 2-1/2 hour daily English service opens with a syndicated 1 hour program, "Chuck Cecil's Swinging Years" (0700/1730 UTC), produced in Tarzana, California and featuring big band music. Next, Hilton Merritt hosts "Jazz E" (0800/1830 UTC), a 30 minute program of jazz music heard Monday through Friday.

On weekends, "Faith for Today" discusses a Bible subject for 15 minutes followed by "Just for Women," hosted by Jane Taylor.

RELIGIOUS PROGRAMMING

The Daily Bible Reading (1900/0830 UTC) is spoken without any interpretation. The policy of the churches of Christ state that music of praise should be sung without any instrumentation other than the human voice. Therefore, a good part of KNLS religious musical format is a capella.

On Saturday, Tuesday, and Thursday, KNLS presents "Good News in Song" (0845/1915 UTC); and on Monday, Wednesday, and Friday at those times, "Hymns from Harding" (College) can be heard. On Sundays at that time, KNLS presents "The Bible Speaks" which presents talks on Bible subjects with Dr. Rex Kyker.

At 0900/1930 on Monday, Wednesday, and Friday, KNLS broadcasts "Herald of Truth," which is the main/major churches of Christ radio broadcast with Batsell Barrett Baxter and Harold Hazelip. On Tuesday and Thursday, Daniel Barber hosts a classical music program, and on Saturday, Ray Mooney hosts "Insight," current events in the light of Bible teachings.

Finally, on Sunday,

KNLS presents "Family Living Today," which is a discussion of marriage and family life.

All of KNLS's programming opens with the tune "Chariots of Fire" followed by an identification announcement in English and the language of the program to follow.

The most-reported program by listeners in the United States is the opening of the Russian Service in the early morning hours featuring the tune, "In the Mood."

Listening to KNLS in the United States is difficult, except in the northwestern U.S.A. where signals are picked up off the back of the antenna.

Listeners/Readers can obtain free Bibles and Correspondence Courses by directing letters to Mrs. Sue Austin at the KNLS address previously given.

Future plans for WCBC include adding other short-wave stations to their network. The next station is likely to be located in the southeast United States or in the Caribbean area in order to reach into Central and South America, West Africa, and Western Europe.

Gifts can be made to the WCBC to help them continue to operate and build new stations like KNLS. Write:

Robert E. Scott, President
World Christian Broadcasting Corporation (WCBC)
Box 3857
Abilene, TX 79604

frequencies near those used by government stations in order to lure away their audience. However, this time the Sandinistas have turned the tables on their Contra tormentors by establishing Radio Sandino on 6200, a frequency very close to those of several anti-Sandinista clandestines, including the now defunct La Voz de Sandino. Although now on the air for several months, Radio Sandino is still sometimes mistaken for a clandestine broadcaster.

The best time to hear Radio Sandino is in the morning hours. Listen for news in Spanish and revolutionary music around 1200 or 1300 GMT. Radio Zinica's 2 kw transmitter in the Caribbean coastal city of Bluefields will sometimes be audible at this same time. The frequency varies somewhat, but will be in the general vicinity of 6120.

For those who want an English transmission, there is the official Voice of Nicaragua broadcasting from Managua. English programming is scheduled for 0100 and 0400 on 6015, or just slightly higher. The earlier transmission sometimes suffers from extensive QRM.

Opponents of the Sandinistas are also very active on the airwaves. Recently, Radio Monimbo, named for a Nicaraguan Indian village, took to the air on 6030. It can be heard evenings with reasonably strong signals signing on at 0000, 0100, or 0200. So far the sponsors of this station are unknown.

Oldest of the anti-Sandinista clandestines is Radio Quince de Septiembre, operated by the FDN. It is being heard here around 2300 on 6215, with some jamming present. However, other frequencies such as 5565 and 7050 may yield later-evening and also morning transmissions. Also occasionally heard is Radio Miskito on 6965. Look for it evenings broadcasting to the Miskito and other Indians of eastern Nicaragua. In addition to Miskito and Spanish, you may sometimes hear English on this one.

Not to be overlooked is Radio Impacto. While legally licensed by the government of Costa Rica, the Voice of Nicaragua has claimed this station is in fact controlled by the CIA. Reliable sources in Costa Rica say it is operated by the Contra group ARDE. Look for it mornings on 6150 with pro-ARDE programming.

Conspicuous by his absence is Comandante Cero, Eden Pastora. The former

PIRATE RADIO



by **John Santosuoso**

NICARAGUA: In the wake of the American presidential election rumors abound of a possible invasion of Nicaragua and perhaps even Cuba. As tension between Washington and Managua increases, the monitoring of both legal and clandestine Nicaraguan broadcasters should prove very interesting.

Clandestines have been known to deliberately select

BROADCASTING SCHEDULE

FREQ METER				
KHz	BAND	TIME(UTC)	SERVICE AREA	LANGUAGE
September 2 thru November 1984				
6100	49	0700-0930	Asian Pacific Coast	English
6100	49	0930-1200	Central USSR	Russian
6100	49	1200-1500	China	Chinese (Mandarin)
7355	41	1500-1730	Europe	Russian
7355	41	1730-2000	Europe	English
November 4, 1984 thru March 2, 1985 (Tentative)				
6170	49	0700-0930	Asian Pacific Coast	English
6170	49	0930-1230	China	Chinese(M)
6170	49	1230-1500	Central USSR	Russian
7355	41	1500-1730	Europe	Russian
7355	41	1730-2000	Europe	English
March 3 thru May 4, 1985 (Tentative)				
9540	31	0700-0930	Asian Pacific Coast	English
6170	49	0930-1230	China	Chinese(M)
6170	49	1230-1500	Central USSR	Russian
7355	41	1500-1730	Europe	Russian
7355	41	1730-2000	Europe	English

PIRATE RADIO

Sandinista hero, who now opposes his old friends, once was the dominant figure in ARDE. However, the alliance of ARDE with the more conservative FDN, along with Pastora's refusal to be controlled by the CIA, have led to his ouster from the ARDE leadership.

Pastora survived an assassination attempt which the Voice of Nicaragua declared was the work of the CIA, and continues his struggle the best he can. Still, the loss of American financial assistance and the summer seizure of most of his radio equipment by Costa Rican authorities have brought difficult days to the Comandante. His La Voz de Sandino and its allied station, Radio Nicaragua Libre, are now silent.

EL SALVADOR: Press reports claimed that the recent government offensive in northern El Salvador had as one of its objectives the destruction of clandestine Radio Venceremos. The offensive must have failed in this regard, as Radio Venceremos can be heard evenings around 6300 with strong signals boldly proclaiming it is broadcasting from Morazan Province. Interestingly enough, anti-Castro La Voz del CID is heard here mornings with even stronger signals. Are the two seeking the same audience?

PROGRAMMING PERSPECTIVE BY JOHN T. ARTHUR: "The Fat One has done for your radio what four years has done for your gym shoes," sputters the loudspeaker, and with a pluck of the banjo the only country-folk free radio station in North America is on the air. KFAT operates on 1560 and 41 meters from a rather remote swamp location, using the format (and some tapes) from the original KFAT-FM in Gilroy, California. Hank Williams, Johnny Cash and others are heard along with humoresque noncommercials for things such as a record which will teach you to talk CB jargon.

The Fat One is really Fred Oyster who handles programming and engineering. He says KFAT draws "a wide variety of listeners, which proves this is a commercially-viable format. Yet the original station dumped it." Fred offers to verify correct, detailed reception reports (accompanied by three 20-cent stamps) to Box 5074, Hilo, Hawaii 96720. The good looking "comin right at you" card is available in yellow or blue.

Radio Sound Wave is announcing Box 393, East

Moline, IL 61244; be sure to send postage. My black-on-yellow card came promptly. Look for them on 41 meters on sideband.

RADIO FREE INSANITY: Last spring we reported that this station had been closed by the FCC. Radio Free Insanity now informs us that its petition to have its fine reduced was partially successful. They will have to pay \$50.00 a month for ten months. That will hurt, but it could have been much worse.

ANARCHIST RADIO: Tangerine Radio's Raunchy Rick sends along more information on anarchist pirate radio in Britain. Rebel Radio is now broadcasting from Bristol Sunday evenings on FM. The striking British coal miners have their own station, Radio Arthur, which hijacks news from the legal Radio Trent.

The miners got help in establishing their station from a Dutch group who put an anarchist TV pirate on the air in Amsterdam in 1982.

Several ethnic pirates have been busted recently by the authorities, including DBC (a black station), an Arabic station, and two Turkish or Greek broadcasters.

BRITAIN AND GERMANY: A CBS News report on November 8 claimed that Britain now has approximately 130 pirate broadcasting stations, up from a total of just 30 one year ago. Of 40 stations prosecuted last year, some 38 have managed to return to the air. The number of illegal stations is twice as many as the number of legal ones, and their audience is in the millions.

The British pirates offer a great variety of programming for all tastes. There is the slick, offshore commercial pirate Laser 558, which takes its name from the medium wave frequency it uses, and also London Greek Radio, which broadcasts Greek Orthodox church services in the Greek language. One station features reggae for Jamaican immigrants, while others, such as Skyline Radio and Radio Jackie, offer rock and pop music often missing from licensed stations.

Although the legal broadcasters complain about lost advertising revenue to the commercial pirates, it looks as if pirate broadcasting is a permanent part of the British broadcasting scene.

A November 9 news report from NBC indicates a different sort of broadcasting problem in Germany. West German authorities announced

they had expelled five Romanian diplomats for plotting to blow up Radio Free Europe!

LOGGINGS: From Pennsylvania Pete Carron reports hearing a political pirate, WAXB, September 30 at 0015 GMT on 7450. That station briefly carried anti-Sandinista commentary, but then apparently suffered from equipment failure. Pete says the signal was quite strong while it lasted.

On October 21 at 0115 on 6240 Pete caught the controversial Voice of Tomorrow with a program on the Constitution and how our officials are elected. October 20 brought a strange logging on 7425 between 0100 and 0230. Pete heard what sounded like recorded religious preaching. There was no ID, and there were breaks in the transmission, probably from equipment failure.

Our own John T. Arthur snagged KRUD ("Crud Radio")

on 7414 from 0135 to 0147 GMT, October 29. The station carried heavy metal rock such as Led Zeppelin and may have announced an Alaskan address whose validity John doubts.

Hey, KRUD, if you are out there, John would like a QSL.

From Indiana Mike Troglin says he has recently logged WKUE, Tangerine Radio, and Radio Sound Wave. He found Sound Wave's SSB signal distorted and hard to tune.

On October 20 he logged the Voice of Tomorrow from 2250 to 2315 with a program about Lord Haw Haw, Britain's pro-Nazi World War II clandestine broadcaster. Mike also heard the VOT earlier in the month.

In California Chuck Boehnke heard KQRP, September 17 on 7430 from 0015 to 0045. Now, what are you hearing? Let us know!

"Los Numeros"

32444 69213 88816 52196 63811 94216

Havana Moon



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IT WOULD BE LOGICAL TO ASSUME THAT, after nearly two decades of "numbers" monitoring, the "interest level" would be at an all-time low. This, I'm happy to say, is not the situation.

One of the chief reasons is that "non-electronic" and mass circulation publications have - in a limited manner - devoted space to some of these mysteries of the spectrum.

A reliable source indicates that a major "numbers" feature is soon to appear in a "non-electronic" publication. Although I have full details, I'm not at liberty to discuss this important development any further. Keep a close watch on Monitoring Times for a future announcement.

HAVANA MOON'S MAIL BAG

Alexandria is the home of David Cutter. This Louisiana-based monitor is a regular reader and was kind enough to forward some constructive criticism and other information.

I'm taking the liberty

of publishing the majority of David's letter since other readers may be experiencing one of his problems. David's intercept is also INTRIGUING!

"..I though you might be interested in my intercept of an apparent simulcast.

"As a charter subscriber to MT I have been reading your column for some time. I enjoy reading your column, but just can't figure out what you are talking about sometimes (emphasis mine). Anyway, the following is an account of what I heard.

"Thursday night, September 27, 1984, appx 0200Z, I heard two 5 digit number stations around two different frequencies that I had programmed in my Kenwood R-2000. On 6840 kHz USB an English Female, and on 5812 kHz AM a Spanish Female. As I toggled back and forth between these two frequencies in my memory, I noticed that they appeared to be giving the same number. I would copy a number and switch freq. and just catch the end of that same number. I noted in my log that they were the same numbers at the same time - very strange. I also noted they had the same pause and everything. At the end of the groups there was a

single tone repeated several times, same on both frequencies. These groups went on for five or ten minutes and then after the single tones they started a new series of groups. I could then tell that they groups were not the same numbers on each frequency. In other words, the first part of their transmission was the same and the second part were different numbers.

"..I hope this information might be of some use to you. If it turns out to be anything exciting I would like to hear about it. Keep up the good work and I will continue reading, I might even really get into these numbers."

I really appreciate the constructive criticism and this STRANGE intercept, David. If you would be kind enough to take a few minutes to go into some detail about the areas of confusion, I'll attempt to clarify these problem areas with a personal response.

At this time I have no logical explanation for this strange intercept. It must be noted that 5812 kHz (+ or - 2 kHz) is a common 4-digit Spanish transmission frequency.

The frequencies between 6840 and 6850 kHz often yield numerous strange intercepts. Try also 3090 and 4030 kHz after 0000Z.

I really hope you do get into "numbers," David; they can be addictive!

LOST AND FOUND DEPARTMENT

This next intercept was just found buried under a pile of magazines and press releases. It's dated December 3, 1983. Although near one-year old, I think this report is still timely.

This intercept was on 6270 kHz with the voice of a YL with a "BRITISH" accent repeating, "GBZ2." This went on from about 0400 to 0430 UTC. At 0430 UTC, repeating of "GBZ2" stopped and what was heard sounded like data bursts. They lasted for about one-half second each. There were four to six of these and then no more. This YL was in the AM mode and "data" sounded like it was "super-imposed" on signal.

This New England(?) based monitor also says that ever since all the trouble in the Mid-East and elsewhere that a GREAT INCREASE in "spy numbers" has been noted on the bands.

This monitor says that the frequencies of 4670 and 3820 kHz have been very active at night.

I find this a very interesting report and regret that it has been hidden for so long. The "GBZ2" British accent is most curious as a highly qualified reporter has stated that transmissions of this type are - generally - MOSSAD (Israeli Intelligence) originated.

I've long noted British accents of "Charlie India Oscar Two" and "Kilo Papa Alpha Two" transmissions. Very curious!

BEACON INTERCEPT

Over the past few months I've heard of two or three "U" beacon intercepts on 3860 kHz. It might be worthwhile to maintain a close watch on this frequency for a few days. Let me know what you hear.

CURIOUS HAPPENING

A highly qualified writer and "numbers" monitor has just informed me that a mass circulation monthly (non-electronics) expressed an interest in a "numbers" article and then a few days later stated that they were no longer interested.

This is not the same publication mentioned earlier.

This same writer tells me that he has had much luck obtaining information on varied subjects from The Library of Congress. The ONE EXCEPTION has been this individual's request for "numbers" information. The people at the Library simply do not reply to the requests for this particular type of information.

A.C.E.

The November issue of A.C.E. - as always - carries some most interesting loggings from England. Good job, Lani. Thanks very much for the crypto and MT mention.

NEW KID ON THE BLOCK

The premiere issue of ESPIONAGE is supposed to be on the stands by this time. A check of several major markets indicate that this publication is - at this time - very difficult to locate. I could only obtain my copy by subscription.

You'll find a cipher on page 159 of this publication. The publishers state that the FIRST THREE correct solutions will receive a free, one-year subscription to ESPIONAGE.

A quick look at the cipher evidences strong indications of a simple substitution system.

ESPIONAGE is published six times a year by Leo 11 Publications, Ltd., P.O. Box 1184, Teaneck, NJ 07666.

RESCHEDULED

This time it's space limitations. Let me assure you that space will be found in the next column for that unique crypto system that I've mentioned in the last two issues.

Unfortunately, the next issue will be the last of the crypto material - response has been less than overwhelming. The crypto space will be devoted to more "numbers" and "beacon" information.

A COMING ATTRACTION

A look at a most unusual and informative pub-

IS CRYPTOLOGY YOUR GAME?

by Louis Kruh

If you are puzzled by cryptograms or interested in the number transmissions by clandestine stations and want to learn more about codes and ciphers, the American Cryptogram Association (ACA) can help.

ACA was founded in 1930 when a group of cryptogram enthusiasts decided to pool their talents to help others enjoy their hobby. Ten years later, when the U.S. Army's Signal Intelligence Service was seeking candidates with some knowledge of cryptology, it turned to ACA members.

Today, 54 years since its founding, ACA's basic purpose is still to help members learn how to solve ciphers, increase their knowledge of cryptology, and to make available materials to assist in the study of this arcane art.

The association publishes several "how to" booklets and a bimonthly magazine, The Cryptogram, which includes analytical articles and many ciphers of

lication. A behind the scene look at The Terrorist Intelligence Report.

HAPPY NEW YEAR

If you decide to partake of a Tecate or two (or three or ...) keep in mind that a little goes a long way, and better with lime and salt!

Adios,
Havana Moon y Amigas

The views expressed in this column are those of Havana Moon and do not necessarily represent the views of the Monitoring Times management, staff or readers. (Right, I don't like Tecate!...Bob)

varying degrees of difficulty to solve.

For membership information write to: ACA, 12317 Dalewood Drive, Wheaton, MD 20902.

Another source of information is Cryptologia, an eight-year old, scholarly type quarterly journal published at Rose-Hulman Institute of Technology, Terre Haute, IN 47803, and devoted to all aspects of cryptology. Areas covered include computer security, history, codes and ciphers, mathematics, military science, espionage, cipher machines and devices, literature, and ancient languages.

Features include reviews of literature and equipment, news of the crypto community, announcements of activities, challenging ciphers and new developments in the field. It has published a book describing over 2,000 U.S. patents on cryptography issued during the period 1861-1981.

A complete table of contents of the magazine's first eight years plus subscription and patent book information is available on request.

Logging 170 Meters

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

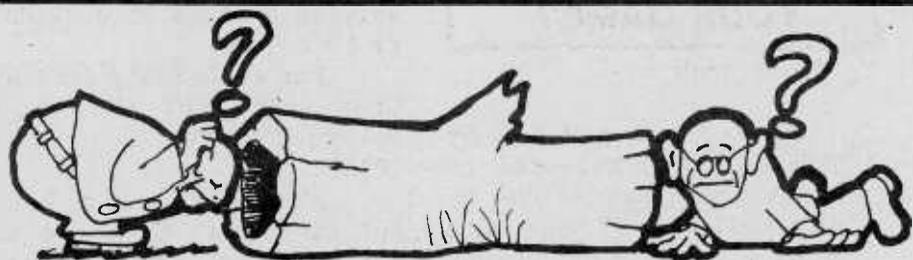
FREQ	TIME/DATE	
1610	0434 9/09	Anguilla beacon
1617	0437 9/09	pulsating beacon
1617.5	0904 9/24	Cubic Argo
1619	0100 9/08	pulsating carrier
1627	0104 9/08	pulsating carrier
1637	0345 9/18	KA81184
1641	0358 9/18	KA83795
1644	0411 9/18	KA83797
1645	0915 9/24	Cubic Argo
1646.7	0917 9/24	Cubic Argo
1647	0109 9/08	pulsating beacon
1660	0112 9/08	pulsating beacon
1671	0117 9/08	pulsating beacon
1672	0446 9/09	pulsating beacon
1682	0922 9/24	Cubic Argo
1683	0119 9/08	pulsating beacon

LOGGING 170 METERS

1694	0449	9/09	carrier w/ tone
1715	0120	9/08	ITT or IM beacon
1716	0923	9/24	Cubic Argo
1746	0122	9/08	tone every 2 secs.
1746	0448	9/09	D with long tone
1747	0925	9/24	Decca HiFix
1748	0925	9/24	Decca HiFix
1749	0123	9/08	pulsating beacon
1750	0926	9/24	Cubic Argo
1751	0152	9/04	RTTY
1754	0926	9/24	Cubic Argo
1759	0926	9/24	Cubic Argo
1759	0124	9/08	pulsating beacon
1764	0126	9/08	SEI cricket
1765	0927	9/24	Cubic Argo
1767.5	0928	9/24	Cubic Argo
1783	0505	9/09	T beacon
1790	0931	9/24	Cubic Argo
1791	0136	9/08	E beacon

Credits:

Bruce Chituck, Patuxent River, MD
 Craig Healy, Pawtucket, RI



listener's log

FT. WAYNE SCANNING

contributed by
 Jack D. Forbing KOLSB

frequencies confirmed for
 the Ft. Wayne, Indiana area.
 We are grateful to MT reader
 Jack Forbing for sharing his
 computerized loggings with
 fellow listeners.

FREQ	AGENCY	DATA	CITY
379.500	AMATEUR	SIMPLEX	
829.680	AMATEUR	NATIONAL SIMPLEX	
829.620	AMATEUR	RPT OUTPUT	
829.640	AMATEUR	RPT OUTPUT	
829.660	AMATEUR	RPT OUTPUT	
829.680	AMATEUR	RPT OUTPUT	
837.340	OH STATE HIGHWAY	NORTHWEST OH REGION	OH
842.260	ISP	LOW BAND MOBILE INPUT	FORT WAYNE
842.420	ISP	ISP DISTRICT 22	FORT WAYNE
844.740	OHIO HIGHWAY PATROL	ST MARYS BASE	ST MARYS OH
844.860	OHIO HIGHWAY PATROL	MOBILE INPUT TO 44.74	ST MARYS OH
844.940	OHIO HIGHWAY PATROL	MOBILE INPUT DISTRICT 2	LIMA OH
845.220	LIMA STATE HOSPITAL		LIMA OH
845.260	OHIO HIGHWAY PATROL	BASE DISTRICT 2	LIMA OH
852.480	AMATEUR		INDIANAPOLIS
852.560	AMATEUR	INDPLS FAA ARC	INDIANAPOLIS
852.575	AMATEUR		EVANSVILLE
852.600	AMATEUR	NE IN ARC	AUBURN
852.600	AMATEUR		INDIANAPOLIS
852.680	AMATEUR	STEBEN CO ARC	ANGOLA
852.760	AMATEUR	MICHIANA ARC	SOUTH BEND
117.800	FAA	FWA OMNI	FORT WAYNE
119.100	AERO	TOWER	FORT WAYNE
119.550	FAA	CENTER	FORT WAYNE
119.850	FAA	CHICAGO APPROACH	CHICAGO
128.200	FAA	EAST APPROACH	FORT WAYNE
121.500	FAA	EMERGENCY LOCATE TX	
121.900	FAA	GROUND CONTROL BAERFIELD	FORT WAYNE
122.000	FAA	CENTER	FORT WAYNE
122.200	FAA	FLIGHT SERVICE	FORT WAYNE
122.450	FAA	FLIGHT SERVICE	FORT WAYNE
122.800	AERO	UNICOM	FORT WAYNE
122.900	AERO	AIR TO AIR	FORT WAYNE
123.100	AERO	AIR TO AIR	FORT WAYNE
126.600	FAA	WEST APPROACH BAERFIELD	FORT WAYNE
129.950	FAA	UNICOM	FORT WAYNE
143.450	USAFMARS	USAFMARS RPT	MARKEL
143.750	USAFCAP	USAFCAP SIMPLEX	
143.775	USAFMARS	USAFMARS RPT ALTERNATE	
143.950	USAFMARS	USAFMARS SIMPLEX	
143.990	USA MARS	US ARMY MARS RPT	FORT WAYNE
145.130	AMATEUR		MARION
145.310	AMATEUR		MARION

146.885	AMATEUR	HUNTINGTON CO ARS	HUNTINGTON
146.325	AMATEUR	JAY CO ARS	PORTLAND
146.625	AMATEUR	WAMS, INC.	FORT WAYNE
146.760	AMATEUR	FWRA	FORT WAYNE
146.790	AMATEUR	GRANT CO ARC	MARION
146.880	AMATEUR	ACARTS	FORT WAYNE
146.910	AMATEUR	FWRA AUTOPATCH	FORT WAYNE
146.940	AMATEUR		FORT WAYNE
146.970	AMATEUR	ADAMS CO RACES	MONROE
147.860	AMATEUR	WELLS CO R A	BLUFFTON
147.150	AMATEUR	21 R6	LIGONIER
147.180	AMATEUR	STARS	ANGOLA
147.210	AMATEUR		ANGOLA
147.360	AMATEUR	DEKALB CO CO	AUBURN
147.855	AMATEUR	ACARTS	FORT WAYNE
147.915	AMATEUR		AUBURN
148.125	USAFMARS	USAFMARS LINK	
148.150	USAFCAP	USAFCAP	FORT WAYNE
149.925	USAFCAP	AIR/GROUND	
152.830	PAGE AMERICA	PAGE SYSTEM	FORT WAYNE
152.120		PAGE SYSTEM	FORT WAYNE
154.010	FIRE	FIRE	FORT WAYNE
154.885	CITY OF FW	CITY "YELLOW"	FORT WAYNE
154.190	FWFD	CITY "FIRE 1"	FORT WAYNE
154.310	VAN WERT CO FIRE		
154.325	FWFD	CITY "FIRE 2"	FORT WAYNE
154.370	ALLEN CO OH FIRE DEPT		OH
154.415	FIRE		FORT WAYNE
154.770	ACPD		FORT WAYNE
154.880	LIMA OH POLICE DEPT		LIMA OH
154.860	ACPD		FORT WAYNE
154.890	ACPD	IND SHERIFFS FREQ	FORT WAYNE
154.935	BURNS HOSPITAL	LIMA MEMORIAL	LIMA OH
155.115	FUPD	CITY PAGING	FORT WAYNE
155.130	ACPD		FORT WAYNE
155.250	ACPD		FORT WAYNE
155.340	EMS	"IHERN"	FORT WAYNE
155.370	POLICE	POINT TO POINT	FORT WAYNE
155.445	ISP	ISP HIGH BAND	FORT WAYNE
155.475	ISP	"JIEEN" CHANNEL	FORT WAYNE
155.520	ALLEN CO OHIO SHERIFF		
155.535	FUPD	F. RPT OUTPUT	FORT WAYNE
155.550	MERCER-VANWERT SHERIFF	COUNTY SHERIFF	OH
155.610	FUPD	F1 RPT OUTPUT	FORT WAYNE
155.625	HENRY CO SHERIFF		DEFIANCE OH
155.670	FUPD	F4 RPT OUTPUT	FORT WAYNE
155.700	POLICE	STEBEN CO SHERIFF	
155.730	PUTNAM CO OH SHERIFF		OH
155.790	FUPD	F3 RPT OUTPUT	FORT WAYNE
155.820			FORT WAYNE
155.955	FW STATE HOSPITAL		FORT WAYNE
158.730	FUPD	MOBILE INPUT TO F4	FORT WAYNE
158.850	FUPD	F5 MOBILE TO MOBILE COMFORT	WAYNE
158.940	FUPD	MOBILE INPUT TO F1	FORT WAYNE
158.970	FUPD	MOBILE INPUT TO F2	FORT WAYNE
159.030	FUPD	HT INPUT TO F1	FORT WAYNE
159.210	FUPD	MOBILE INPUT TO F3	FORT WAYNE
162.690	SECRET SERVICE		
163.810	US MARSHALL	F1 MARSHALL	FORT WAYNE
163.960	FBI		FORT WAYNE
164.600	US MARSHALL	F2 MARSHALL	FORT WAYNE
165.375	ATF & SECRET SERVICE		
165.500	FAA	FAA	FORT WAYNE
171.385	USPS	POSTAL SERVICE	FORT WAYNE
224.500	AMATEUR	MCARC	PLYMOUTH
224.620	AMATEUR		INDIANAPOLIS
224.700	AMATEUR		MUNCIE
224.860	AMATEUR		WOLFLAKE
224.900	AMATEUR	PARKET CITY 220 CLUB	PARKET CITY
224.940	AMATEUR	STARS	ANGOLA
224.980	AMATEUR		INDIANAPOLIS
225.400	FAA	GROUND CONTROL	
236.600	USAF	USAF CONTROL TOWERS	
238.900	USAF AIR GUARD	IN AIR GUARD	FORT WAYNE
241.000	NATIONAL GUARD	N G TRAINING	
243.000	FAA		FORT WAYNE
255.400	FAA		FORT WAYNE
257.800	FAA		FORT WAYNE
259.700	NASA	SPACE SHUTTLE	
268.600	FAA		FORT WAYNE
261.475	NASA	SPACE SHUTTLE	
263.100	FAA		FORT WAYNE
264.900	USAF	NORAD SECONDARY	
269.100	FAA		FORT WAYNE
272.700	FAA	FLIGHT SERVICE STATIONS	
275.800	FAA	GROUND CONTROL	

TECHNICAL TOPICS

How can I prevent Lock-up among my three scanners? (M.A. Bishop, Simi Valley, CA)

You can't. At least not entirely. But there are some hints which should help reduce this common affliction which is caused by radiation from the oscillator of one scanner being interpreted as a signal by another nearby scanner.

First, don't physically tie all scanners to one antenna without using an isolating device (power splitter) like the Grove multi-coupler; this provides electrical separation.

Secondly, experiment by reassigning interfering frequencies to the other scanners; this may help by providing non-interfering oscillator combinations.

And finally, shift the frequencies slightly; on strong locals it shouldn't make much difference in apparent strength or quality. For example, if 154.905 on one scanner interferes with 165.605 on another scanner, change the two frequencies to 154.900 (lower) and 165.610 (higher). This will separate the two interfering frequencies a little, reducing the likelihood of conflict.



Can you suggest an indoor shortwave antenna for use of apartment dwellers who cannot erect an outside dipole like the Grove Skywire? (James Borton, Cheek, NY)

Sure. While no indoor antenna can match the low-cost efficiency of an outdoor dipole, there are some high-performance alternatives.

The new Grove Power Probe active antenna provides excellent longwave, shortwave, and even VHF/UHF reception for apartment dwellers. The old standby Sony AN-1 is also a good choice.

Even a 25 foot run of hookup wire run around the ceiling of your home or apartment will provide useful signal levels in most instances.

And finally, the new Grove Power Ant Plus provides signal amplification throughout the entire communications spectrum: 10 kHz-1000 MHz. A few feet of wire plugged into this signal booster can yield surprising results.

But to avoid overload, use a passive preselector like the Grove TUN-3 Mini-tuner between the antenna and the Power Ant Plus. ◆

PROFILES

MT Reader Seeks CB Equipment Donation For Humanitarian Effort

I feel that there is a great need for a marine public service radio station in the area where I live (Long Island Sound). Boat owners could call in for a signal report before they leave land to make sure their CB radio transceivers are working properly--radio transceivers are a life line for help when needed.

This radio station could also relay messages from boat owners and passengers to their families on

land as well as notify the Coast Guard or boat yards for help if necessary.

I am in need of a donated CB radio and antenna for this project because I am a retired senior citizen living on a small social security monthly income. Any equipment donation would be greatly appreciated. I look forward to hearing from interested MT readers.

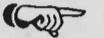
Kenneth Hand
P.O. Box 708
East Hampton, NY 11937

HELPFUL HINTS

LOGGING LIKE THE PROFESSIONALS

Ever wonder how the professionals log their quarry? Craig Wicks of Independent Newswatch recently shared a sample of his logbook with us and we thought our readers would be interested in the flexibility built into his logsheets.

While not all of the listings are included, enough is here to provide the pattern and give readers a good idea as to custom-designing your own logs.



SHORTWAVE MONITORING LOG									
SWPX No.	TIME	DATE	FREQUENCY	COUNTRY	STATION	S	I	O	RX/ANT
REMARKS									

SHORTWAVE MONITORING LOG									
DATE	UTC	FREQ	COUNTRY	STATION	S	I	O	rx/at	REMARKS
TRANSMISSION									

GMT TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
0000					
0030					
0100					
0130					

INDEPENDENT NEWS WATCH - PROGRAM SCHEDULE

FOR: _____ FROM: _____ TO: _____

MONDAY

TUESDAY

INDEPENDENT NEWS WATCH PROGRAM MONITORING SCHEDULE

FOR: _____ DATE (UTC): _____

UTC TIME	FROM	TO	COUNTRY	STATION	PROGRAM	FREQ.

EXPERIMENTER'S



WORKSHOP

LEARN MORSE CODE ON YOUR TRS-80

By Howard A. Chorost KC7AC

If you own a TRS-80 Model I and would like to learn the International Morse code, this program is for you!

HELPFUL HINTS

Or, if you prefer a professionally-printed log, the Grove BOK-4 Listeners Logsheets have built-in flexibility for all kinds of listening--shortwave, scanner and amateur.

SCA RECEPTION MADE EASY

MT reader David Wilson made an interesting discovery which he would like to share with fellow listeners.

Subsidiary Communications Authorization (SCA) is a provision by the FCC whereby additional program material, not heard on conventional stereo receivers, is transmitted to appropriately-equipped subscribers.

Some of the special services include background music, paging, educational programs and many more. It is accomplished by modulating a subcarrier of the normal FM broadcast channel, normally displaced 67 kilohertz off center frequency.

Dave has found that by plugging any general coverage receiver capable of tuning in 67 kHz (Icom R-71 or 71A, JRC NRD-515, etc.) into the audio output jack of many FM radios, he can tune in the programs. Naturally, sound reproduction is better if the receiver is equipped with the FM mode, available as an option on the ICOMs.

We must point out that this SCA-takeoff point is after the detector, and depending upon how much filtering is present by the time the audio reaches the earphone jack, little or no SCA subcarrier may be present in some receivers.

The more technically-motivated experimenter may wish to make an internal connection to his FM receiver right after the detector stage.

This program does not require any additional equipment to be added to your Model I (or Level II) other than the tape recorder that came with your computer and an external 8 ohm speaker.

While some programs use the relay in the keyboard to activate an external code practice oscillator, and others require an external audio amplifier, I set out to write a program that would relieve the Ham/computer owner from putting extra money into his system.

The tape recorder that came with the computer provides an excellent means of conveying tones when an external speaker is plugged into the "EAR" socket. "OUT 255.2" sends a tone through the "AUX" plug that is connected to the corresponding spot in the tape recorder.

When an external speaker is connected and the machine is placed in "RECORD" mode, the amplifier within the tape recorder will allow you to hear the tones without the purchase of a special audio amplifier.

Try this: Connect an external speaker to the tape

recorder and place the machine on record. (Leave in the small "REMOTE" plug and either put a tape in the machine and push "PLAY" and "RECORD," or hold in the small button inside the place where the cassette goes and then press "PLAY" and "RECORD.")

If you don't already have an external speaker, then get an old radio and take out the speaker. Then connect a phono plug to it and plug it in to the "EAR" socket of the tape recorder.

Next, type:

```
FOR I = 1 TO 100 : OUT 255.2 : OUT 255,2 : OUT 255,0 : NEXT
```

and hit Enter. (If you are using a disk system, first disable the clock with CMD"T" or the tone will sound very "buzzy.")

You should hear a tone. "OUT 255,2" sends the tone and it is reset by "OUT 255,0." The "FOR NEXT" loop allows this to go on one hundred times.

THE PROGRAM

Now that I was able to get tones out of my computer, I wrote a small program (about 2 K RAM) that

would send random characters at desired speeds in the International Morse code and, at the same time, print them on the screen. I call it the "CW Auto Tutor."

Line 130 adjusts speeds for 5, 10, 13, 15, 18, 20, 25, and 30 WPM. I calibrated the speeds using my electronic keyer, but the speeds can be changed if you want them to be "right on the money."

By raising the value of "S," the CW will be sent slower. For example, if we wanted to have the computer send at 3 or 4 WPM, we can change the 5 WPM setting in line 130 to read: IF S=3 THEN S=S*5. Consequently, by decreasing the value of "S," the CW will be sent faster.

If you think the 10 WPM setting is too slow and is really about 9 WPM, change it to something like: IF S=10 THEN S=S*1.3.

Take a look at lines 180, 240 and 250. The characters in line 180 correspond to those in lines 240 and 250 where "E" is a "dit" (dot) and "T" is a "dah" (dash). Line 200 takes a character in 180 at random, line 210 prints it, and line 220 instructs the computer

```

10 *****
20 *          CW AUTO-TUTOR          *
30 *          December 1982          *
40 * Written for Level II Model I *
50 *          TRS-80 in 2 K RAM      *
60 * by Howard A. Chorost KC7AC. *
70 *          8020 E. Birwood Rd    *
80 *          Tucson, Arizona 85715 *
90 *****
100 DEFINT A-Z: DIM A$(45): DIM B$(45): CMD"T": REM If you have a disk system, then turn
off the clock else remove the CMD"T" statement from this line
110 CLS: GOSUB 360: REM Print instructions
120 PRINT@832,"": INPUT"Enter code speed desired (5, 10, 13, 15, 18, 20, 25, 30
WPM)": S
130 IF S=5 S=S*4 ELSE IF S=10 S=S*1.5 ELSE IF S=13 S=S/2 ELSE IF S=15 S=S/3 ELSE
IF S=18 S=S/3.7 ELSE IF S=20 S=S/5 ELSE IF S=25 S=S/7 ELSE IF S=30 S=S/12 ELSE
140 PRINT@604," "
150 IF PEEK(14590)=2 THEN 120: REM is Clear depressed?
160 RESTORE: FOR I=1 TO 41
170 READ A$(I)
180 DATA A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z,1,2,3,4,5,6,7,8,9,0
,".",",","/","?","-"
190 NEXT I
200 RANDOM: R=RND(41): R#=A$(R)
210 PRINT@604,"* ";R#;" *": REM Print letter
220 FOR I=1 TO R
230 READ B$(I)
240 DATA ET,TEEE,TETE,TEE,E,EETE,TTE,EEEE,EE,ETTT,TET,ETEE,TT,TE,TTT,ETTE,TTET,E
TE,EEE,T,EET,EEET,ETT,TEET,TETT,TTEE
250 DATA ETTT,EEET,EEET,EEEE,TEEE,TEEE,TTTE,TTTT,ETET,ETEE
TT,TEETE,EETEE,TEET
260 NEXT I
270 D$=B$(R): F=LEN(D$): FOR E=1 TO F: E#=MID$(D$,E,1)
280 IF E#="T" GOTO 300: REM DAH?
290 IF E#="E" GOTO 330: REM DIT?
300 FOR L=1 TO 3*S: OUT 255,2: OUT 255,0: NEXT L: REM DAH sound
310 NEXT E
320 GOTO 140
330 FOR L=1 TO S: OUT 255,2: OUT 255,0: NEXT L: REM DIT sound
340 NEXT E
350 GOTO 140
360 REM Instructions
370 PRINT TAB(20)"C W   A U T O   -   T U T O R"
380 PRINT TAB(20)"By Howard A. Chorost   KC7AC"
390 PRINT: PRINT"Directions:"
400 PRINT"1. Plug speaker into tape recorder and Press <RECORD>"
410 PRINT"2. Hold down the <CLEAR> key to enter new speed."
420 PRINT"3. The computer will display and send random characters."
430 FOR X=15808 TO 16127: POKE X,191: NEXT X: REM White out middle of screen. If you don
't want the middle to be white, then omit this line.
440 RETURN

```

EXPERIMENTERS WORKSHOP

to stop at the CW equivalent to the character in lines 240 and 250.

At the end of line 100, I have a CMD'T' statement to disable the clock in a disk system so that the tone will not sound too "buzzy." If you have a cassette system, omit this statement.

The actual code is sent through your tape recorder by lines 270-340. 270 sorts out the "E's" and "T's"; 280 checks for "T's" and 290 for "E's." If "T," then a standard 1:3 dit/dah ratio is computed in line 300 and is sent. If "E," then 330 sends a one unit dit.

Note that the value "S" is in each of these lines (and thus the ratio) will be proportional to the desired code speed.

After a character is sent, line 350 returns to line 140 where the previous character is removed from the screen to make room for the next one. Line 150 checks to see if the CLEAR key is depressed. If it is, the program goes back to line 120 where you are prompted for a new speed entry. If you did not hit the CLEAR key, a new letter is found and the program goes on as before.

OPERATION

If you have a disk system, then type the program as shown. If you are using a cassette system, be sure to omit the CMD'T' statement at the end of line 100 or you will get a "L3" error. You also need a tape recorder and external speaker. The tape machine should be placed in RECORD mode (AUX plug and REM plug in place) and the external speaker should be plugged into the EAR socket.

Lines 360-440 contain the instructions. If you don't want to type them in, then be sure to delete the GOSUB 360 in line 110. Line 430 "whites out" the middle of the screen. If you don't want this, then omit this line. The program will not suffer any ill effects.

LIMITATIONS

You may find that you will not like the tone generated by this program. I do admit it sounds little more like a "Buzz" than a "Beep," but I find it easily copyable. Try out your own sound routines. When changing the tone, be sure not to alter the 1:3 dit/dah ratio; but if you come up with a better tone, please let me know! I would also like to hear if anyone upgraded or got his Novice license as a result of using the CW Auto-Tutor!

VIEWPOINT from p.3

probably wouldn't have acquired my amateur radio license.

As to operations from 27.405 to 28.000 MHz, they can't be truly classified as CB but are in reality just illegal radio operations. Since Monitoring Times already reports on pirate broadcasters I see no reason to leave these operations out.

Laying all the above aside, I believe most of us are interested in all over the air communications, so I vote for this coverage and any other coverage that might come up in the future.

Being interested in these operations does not mean you condone them or participate in them.

Morris Harris
Dawsonville, GA

>>><<<<

I think a short blurb on Citizens Band Radio is a good idea.

I know there is a bad stigma relating to CB for some MT readers; however, anyone who turns on a CB and just listens to Channel 19 is bound to be turned off. Sort of like grabbing a bag of fruit, finding one bad apple, then throwing the whole bag out.

I've been a scanner and SWL'er for several years and the 11 meter band is a part of the short wave spectrum. Monitoring Times covers all areas of SW so should we discriminate and pretend like the 11 meter band isn't there? Maybe next we could ignore the 19 meter band.

Besides a door stop and a boat anchor, CB radio does have some practical uses-- getting directions when driving into a city, obtaining a tow truck when your car quits.

Our local SWL'er group meets on LSB Ch 16 to exchange reception reports and frequencies.

Some amateurs get a bad taste in their mouths whenever someone speaks of CB and other amateurs use a CB rig right alongside their ham gear.

In many communities the police monitor Ch 9 day and night.

Many drunk drivers and accidents are reported to the local police over CB sets.

Let's come out of our closets about the CB 11 meter SW band. After all, it is a part of the SW spectrum.

Craig Campbell
Iowa City, IA

>>><<<<

I find MT quite informative and most interesting. My guess is that many others feel the same way because you keep growing. I often see references to MT on the USENET (a large network of computers linking many universities, industries and gateways to many other networks) newsgroup "net-ham-radio."

As per your request in the October '84 (V3, #10) page 3, I am not interested in seeing articles about CB radio.

Another item I would not care to see any more would be the constant references regarding "Bob Grove, noted communications expert, founder of Grove Enterprises and editor of MT" and the like. I find this an insult. I know who you are. I don't have to be reminded every few pages. The new reader will realize that you are somewhat intelligent for the simple fact that you advertise the products you design and manufacture in your own publication. It's a great market. Dropping the hubris remarks will greatly enhance the already good quality of MT.

Steve Beikman
Derry, NH

>>><<<<

I have been a subscriber for over two years and was hoping to continue for many more, but may have to change my mind. The reason -- far, far, too much space wasted on Army, Air Force, and Naval matters, i.e.: "SAC," "Key Notes to Army Training" (ye gods!), The OSS!, Honduran Hot Bed! Grenada! ad infinitum! I was under the impression that Monitoring Times was a civilian newspaper devoted to SWL. The last four or five issues are more like the Army "Stars and Stripes" paper.

Another point - please reduce coverage on "Utilities." Who wants to listen to the local ambulance, or city garbage dump? Please concentrate more on DX and world broadcasting. How about a list of frequencies and time of broadcasts from India?

Frederick Pedder
Orlando, FL

>>><<<<

(Column editors and prospective writers, take note! Reader Nell's comments speak for the majority of MT subscribers. Let's hear more from our authors on these subjects...Bob)

I have enjoyed every issue received to date! With my renewal, I have enclosed some feedback on various topics. I hope this information will help guide future

articles in MT!

* I very much enjoyed the articles on weather monitoring. Although I have little weather knowledge, this is a field I hope to learn more about in coming years. I would like to see a continuation of articles which relate to all facets of weather watching (i.e.: weather-net frequencies, HAM severe weather spotters, emergency weather volunteers, NOAA, etc.)

* I vote NO on the magazine format. Keep the newspaper format.

* Another NO vote on covering anything dealing with Citizens Band radio.

* I vote YES for the current MT format. Being able to read an article without hunting for the last two paragraphs is very nice.

* On the subject of kits, I vote YES! Please offer such kits. When I was only 7 or 8 years old, I was always wanting to explore the building of a HeathKit anything! I read and re-read each description of their radio kits, but that was as close as I could get to them. My parents never really understood my total interest in wanting one of those kits, plus we could not afford anything like them. Today, it's a different story, but I can't find any sources for kits.

* I would very much like to see information (or a kit) on how to build a home weather satellite receiving station (I assume this is something like a scanner radio). There must be a way to make my Bearcat scanners interface to my computer in helping collect weather data. I haven't the foggiest idea of where to start.

* On the subject of scanners, I would like to see even more articles pertaining to scanners and modifications to scanners. I believe there are a LOT of scanner listeners, we just don't speak up for fear of missing an "Action" call over the air!

* Please keep your MT format limited to only interfacing or related topics on computers. What I don't want is another computer magazine talking about RAM, disk drives, BASIC, etc!!

* Finally, I believe advertising can provide a very positive benefit to

STOCK EXCHANGE

PERSONAL

NOTE: Monitoring Times assumes no responsibility for misrepresented merchandise.

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

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

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DRAKE AL-4 for SPR-4, \$50 postpaid. Buying old radio club bulletins, old tinplate trains. Bill Smith, RFD 238W3, Locust Street, Douglas, MA 01516.

WANTED: IF Transformer, MEISSNER 16-6770, MERIT BC-376, MILLER 312-C6 or NATIONAL Q242-1. Roland Soderholm, 3646 Windmill Drive, Virginia Beach, VA 23456. Phone 1-804-427-6970.

Sell: DEFENSE ELECTRONICS TMR-5A VHF, SHF Surveillance Receiver with 5 plugins, \$350. DEFENSE ELECTRONICS TR-711C VHF, SHF Receiver \$150. SYSTRON DONNER 1017 Frequency Counter with 3 plugins DC-18 GHz \$499. Bill, P.O. Box 5308, Clearwater, FL 33518. Phone 813-442-4286.

JIL SX-100, programmable (usual bands plus 418-420 restricted gov't freqs.) Mint condition, factory warranty \$145. BEARCAT 5/6 (4 bands plus aircraft) handheld, new with nicads and charger, factory warranty \$130. BEARCAT BC3 (Hi-UHF) absolutely mint + \$85. G. Bellows, Box 1239, Charleston, SC 29402.

BOB'S BARGAIN BIN: ONE EACH! All prices include UPS shipping in U.S.

ALDEN Marinefax weather chart recorder. Brand new, factory assembled, includes extra paper, pens, belts, full literature and book. (See review in Nov/Dec 1983 MT.) Cost \$2000; sell \$950.

HEATHKIT HR-108 tube-type ham receiver, 80-10 meters AM/SSB/CW. Needs

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INFORMATION PLEASE

Monitoring Times will print at no charge (as space permits) announcements and questions of a non-commercial service nature.

NEBRASKA freqs. N. Platte and Omaha areas. Fire and railroad especially.

BALTIMORE and Metro area freqs. needed. Jim Buscher 300 McMillan Dr. NW, Washington, DC 20001.

Manuals or diagrams needed for: H.F. radio receiver, rack mount, sep. power supply, made by Manson Lab. Div., for HALLICRAFTERS CO. Model# MHR-2-S1; Digital Multimeter, Model 269 made by DIGITEC, United Systems Corp; Aircraft Radio Rec. LF/DF yr. 1939 Bu/Ships, made by RCA Radiomarine Corp. Model DZ-2 DEX-46152. M. J. Dube, 411 Colorado Blvd., Denver, CO 80206.

If interested in trading and collecting fire, police and medical patches and badges, I have several to trade. Also a patch swappers meet is in Detroit in Feb. If interested contact me, Mike Starr, Box 203, Hadley, MI 48440

WANTED: service info or parts for the following. Will copy info, pay use fee and return to you. EIP Model 350c Autohet frequency counter, 20Hz to 12.4 GHz, military surplus; PANASONIC RF2800 AM/FM/SW receiver, AM is dead, need bandswitch and whip antenna; SIMPSON Model B 16 channel VHF marine transceiver; R.L.DRAKE R4B ham receiver; MIDLAND CB 13-955; LAFAYETTE reel to reel recorder, Model RK825; and RADIO SHACK DB 21-566. Contact: Mike Adams, ACS Electronics, 6333 Hwy 2321, Panama City, FL 32404.

Can anyone supply me with a SWL logging/database program for a Kaypro 2 (CP/M) computer? Must be easy to use

VIEWPOINT

both publishers and readers. Sometimes it is very hard for people like myself to "Break into Radio Communications" and just knowing who the manufacturers and distributors are can be of great benefit. Plus product names, phone numbers, etc. give us a start in finding more information.

Thank you for taking the time to read my comments. I hope they will at least give you the feeling of one of your readers. Just keep the MT rolling and best of luck in 1985!

John D. Nell
Alton, IL

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I have several comments to add to the articles about the MX-5000 that appeared in MT (Oct. 1984).

(1) Concerning the use of the MX-5000 at 800 MHz, the article is incorrect. For image reception, twice the IF frequency must be added or subtracted. Thus the method described cannot work if the IF is 750 MHz.

(2) When using the "semi-automatic frequency stepping" described on pg. 12, fast speed can be obtained by pushing the speed button once while holding down the up or down button. But once one lets up on the up or down button, the set reverts to slow speed.

(3) An easier way for quick single-frequency entry is to replace the up and down button procedure to stop the "CH" prompt by using instead: NFM, WFM, or AM (use mode desired) and enter to stop the "CH" prompt.

(4) Sometimes the set does not prompt when setting the upper search limit. Press "2, enter" to get the prompt.

Dave Wilson

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and "idiot-proof"! Thanks, Paul Ceruzzi, 3013 Jennings Road, Kensington, MD 20895.

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