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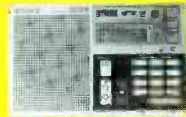


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- 100KHz-30MHz
- Keyboard entry
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- Wide dynamic range
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FREE: ICOM options will be installed at no additional charge with purchase of NEW ICR71A.

MEC-Commodore computer control Interface System. 705 Memories Auto Log. See our MEC Ads or call for more details.

INTRODUCTORY PRICE \$199.95
EX309 Required (Not Included).

R71 (HP) High Performance. EEB has the reputation of excellence when it comes to R71A modifications. Many of our modifications are proprietary and not offered by any other source.

EEB now offers a package deal including our most popular option, it's known as the R71 (HP) High Performance, and includes the following:

1. 24 Hour bench test. Realignment for optimum performance and 6 month warranty. COST \$40.00
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R71A as it comes from ICOM \$699
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Commercial Receiver VHF-UHF 25-2000 MHz SAVE \$100.00



Commercial quality scanning receiver. Same high quality as the world class R71A Receiver.

- 25-2000 MHz coverage
- Precise frequency entry via keyboard or tuning knob
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- Scan-Memory-Mode-Select Memory-Frequency
- 5 tuning speeds: 1, 1.0, 5, 10, 12.5, 25 KHz
- Narrow/Wide filter selection
- Memory Back-up
- Noise Blanker
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Watch for ICOM full page Ads for more details.

EEB engineers are developing options for the enhancement of the R7000 performance-computer control video output, filter options and more. Call or Write for details.

R7000 LIST \$949.00

INTRODUCTORY SALE PRICE **\$849.00**



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\$519.95
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NEW LOW PRICE
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- Satellite T.V. Analyser.
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- You can even watch television programs by plugging in a video monitor into the optional video output. \$25.00
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- Plus there's much more, including a 24-hour clock, multiplexed output, LCD readout, signal strength graph, and an AC power adapter.



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Regency® Z60-EA

List price \$299.95/CE price \$179.95/SPECIAL
8-Band, 60 Channel • No-crystal scanner
Bands: 30-50, 88-108, 118-136, 144-174, 440-512 MHz.
The Regency Z60 covers all the public service bands plus aircraft and FM music for a total of eight bands. The Z60 also features an alarm clock and priority control as well as AC/DC operation. Order today.

Regency® Z45-EA

List price \$259.95/CE price \$159.95/SPECIAL
7-Band, 45 Channel • No-crystal scanner
Bands: 30-50, 118-136, 144-174, 440-512 MHz.
The Regency Z45 is very similar to the Z60 model listed above however it does not have the commercial FM broadcast band. The Z45, now at a special price from Communications Electronics.

Regency® RH250B-EA

List price \$613.00/CE price \$329.95/SPECIAL
10 Channel • 25 Watt Transceiver • Priority
The Regency RH250B is a ten-channel VHF land mobile transceiver designed to cover any frequency between 150 to 162 MHz. Since this radio is synthesized, no expensive crystals are needed to store up to ten frequencies without battery backup. All radios come with CTCSS tone and scanning capabilities. A monitor and night/day switch is also standard. This transceiver even has a priority function. The RH250 makes an ideal radio for any police or fire department volunteer because of its low cost and high performance. A UHF version of the same radio called the RU150B covers 450-482 MHz, but the cost is \$449.95. To get technician programming instructions, order a service manual from CE with your radio system.

NEW! Bearcat® 50XL-EA

List price \$199.95/CE price \$114.95/SPECIAL
10-Band, 10 Channel • Handheld scanner
Bands: 29.7-54, 136-174, 406-512 MHz.
The Uniden Bearcat 50XL is an economical, hand-held scanner with 10 channels covering ten frequency bands. It features a keyboard lock switch to prevent accidental entry and more. Also order part # BP50 which is a rechargeable battery pack for \$14.95, a plug-in wall charger, part # AD100 for \$14.95, a carrying case part # VC001 for \$14.95 and also order optional cigarette lighter cable part # PS001 for \$14.95.

NEW! Regency® XL156-EA

List price \$239.95/CE price \$129.95/SPECIAL
6-Band, 10 Channel • No-crystal Scanner
Search • Lockout • Priority • AC/DC
Bands: 30-50, 144-174, 440-512 MHz.
Cover your choice of over 15,000 frequencies on 10 channels at the touch of your finger. Display messages. External speaker jack. Telescoping antenna. External antenna jack. AC/DC.

NEW! Regency® R1060-EA

List price \$149.95/CE price \$92.95/SPECIAL
6-Band, 10 Channel • Crystalless • AC only
Bands: 30-50, 144-174, 440-512 MHz.
Now you can enjoy computerized scanner versatility at a price that's less than some crystal units. The Regency R1060 lets you in on all the action of police, fire, weather, and emergency calls. You'll even hear mobile telephones.

Bearcat® DX1000-EA

List price \$649.95/CE price \$349.95/SPECIAL
Frequency range 10 KHz to 30 MHz.
The Bearcat DX1000 shortwave radio makes tuning in London as easy as dialing a phone. It features PLL synthesized accuracy, two time zone 24-hour digital quartz clock and a built-in timer to wake you to your favorite shortwave station. It can be programmed to activate peripheral equipment like a tape recorder to record up to five different broadcasts, any frequency, any mode, while you are asleep or at work. It will receive AM, LSB, USB, CW and FM broadcasts.

There's never been an easier way to hear what the world has to say. With the Bearcat DX1000 shortwave receiver, you now have direct access to the world.

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List price \$369.95/CE price \$214.95/SPECIAL
8-Band, 45 Channel • No Crystal scanner
Search • Lockout • Priority • Scan delay
Sidelit liquid crystal display • EAROM Memory
New Direct Channel Access Feature
Bands: 30-50, 118-136, 144-174, 406-420, 440-512 MHz.
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NEW! Bearcat® 100XL-EA

List price \$349.95/CE price \$203.95/SPECIAL
9-Band, 16 Channel • Priority • Scan Delay
Search • Limit • Hold • Lockout • AC/DC
Frequency range: 30-50, 118-174, 406-512 MHz.
The world's first no-crystal handheld scanner now has a LCD channel display with backlight for low light use and aircraft band coverage at the same low price. Size is 1 3/4" x 7 1/2" x 2 1/2". The Bearcat 100XL has wide frequency coverage that includes all public service bands (Low, High, UHF and "T" bands), the AM aircraft band, the 2-meter and 70 cm. amateur bands, plus military and federal government frequencies. Wow...what a scanner!
Included in our low CE price is a sturdy carrying case, earphone, battery charger/AC adapter, six AA ni-cad batteries and flexible antenna. Order your scanner now.

Bearcat® 210XW-EA

List price \$339.95/CE price \$209.95/SPECIAL
8-Band, 20 Channel • No-crystal scanner
Automatic Weather • Search/Scan • AC/DC
Frequency range: 30-50, 136-174, 406-512 MHz.
The new Bearcat 210XW is an advanced third generation scanner with great performance at a low CE price.

NEW! Bearcat® 145XL-EA

List price \$179.95/CE price \$102.95/SPECIAL
10 Band, 16 channel • AC/DC • Instant Weather
Frequency range: 29-54, 136-174, 420-512 MHz.
The Bearcat 145XL makes a great first scanner. Its low cost and high performance lets you hear all the action with the touch of a key. Order your scanner from CE today.

TEST ANY SCANNER

Test any scanner purchased from Communications Electronics™ for 31 days before you decide to keep it. If for any reason you are not completely satisfied, return it in original condition with all parts in 31 days, for a prompt refund (less shipping/handling charges and rebate credits).

NEW! Bearcat® 800XLT-EA

List price \$499.95/CE price \$317.95
12-Band, 40 Channel • No-crystal scanner
Priority control • Search/Scan • AC/DC
Bands: 29-54, 118-174, 406-512, 806-912 MHz.
The Uniden 800XLT receives 40 channels in two banks. Scans 15 channels per second. Size 9 1/2" x 4 1/2" x 1 1/2".

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Panasonic RF-2600-EA Shortwave receiver... \$179.95
RD95-EA Uniden Remote mount Radar Detector... \$128.95
RD55-EA Uniden Visor mount Radar Detector... \$98.95
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BC-WA-EA Bearcat Weather Alert... \$49.95
DX1000-EA Bearcat shortwave receiver SALE... \$349.95
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Add \$12.00 shipping per shortwave receiver.
Add \$7.00 shipping per scanner and \$3.00 per antenna.

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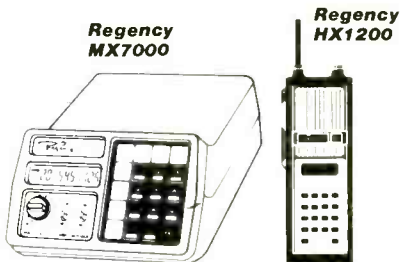
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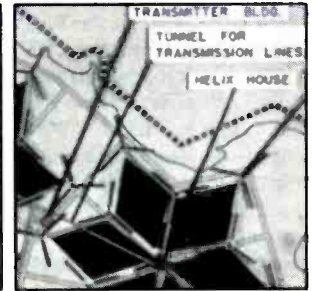
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*This month's cover: Radio tracking and other communications are prevalent in America's national wildlife refuges. See story on page 16. Photo by Gerry Atwell. U.S. Fish and Wildlife Service.***DEPARTMENTS**

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My Life In The Company Of Fourth World Royalty

When Gerry Dexter told me that he was writing a story for us about DX'ing the world's smallest nations (his story is in this issue), he rattled off some of those little places that he was going to include—Mauritius, Kiribati, The Cook Islands, and even the ultimate micro-nation, Vatican City. That made me think about some of the *really* obscure, little-known, oddball and offbeat "nations" of the world that DX fans ought to be thinking about, what with so many of the regular "rare" nations becoming slightly more commonplace. *Everybody*, it seems, is starting to log the Falkland Islands Broadcasting Service.

For instance, take the Hutt River Province. You've probably never heard of this 18,500 acre nation created in April of 1970 when a wealthy wheat farmer decided to secede his ranch from Australia and establish it as a sovereign state. Since then, the Hutt River Province (located at 28-05 S, 114-27 N) has, under the guidance of its ruler, Prince Leonard, issued postage stamps and coinage and has attracted many tourists. I mentioned that this would be the ideal kind of place to send a DX'pedition since it remains undiscovered by the world's communications enthusiasts. Now *that* would be a new nation to ring the ol' bell, wouldn't it?

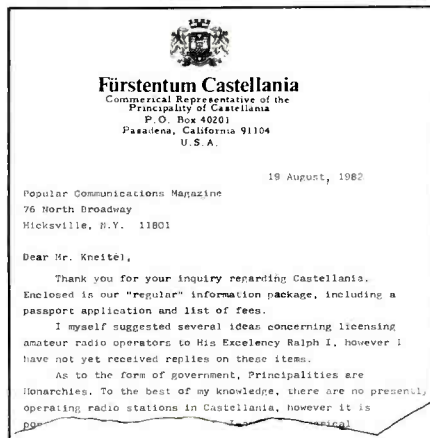
Another prospective boon to DX'ers looked to be the Principality of Castellania. Headquartered in Vienna (Austria, not the Vienna in Virginia), in 1982 this nation announced an aggressive marketing program in order to sell postage stamps, citizenships, and various other materials. Since Castellania was said to be located in the Pacific, it seemed to me to be a wonderful spot to hold up to the world as a newly discovered DX haven.

Finding that the nation had a commercial representative in Pasadena (California, not Austria), I immediately wrote to ask about putting a station on the air, thus becoming the first (and perhaps only) Castellanian broadcaster and Ham operator. On August 19, 1982, Nelson H. White, the Castellanian Commercial Representative wrote to me to say, "I myself suggested several ideas concerning licensing amateur radio operators to His Excellency Ralph I, however I have not yet received replies on these items." Ah, the little annoyances connected with awaiting the decisions of royalty!

Thusfar, I am still awaiting His Excellency, Ralph, to get his act together and let me know how I can offer Castellania to the DX world. Unfortunately, I have never been able to find out the exact location in the Pacific of his new nation. None of the literature they sent offers the slightest hint, although it does mention "underwater cities" and "the floating land which is either anchored in the sea bed or not



Hutt River Province is located in Western Australia. It's an independent nation that issues its own money and postage stamps.



A letter from the Principality of Castellania has led me to await the pleasure of His Excellency, Ralph, for almost four years. The future of Ham radio and broadcasting there hangs on his decision.

anchored, enabling access to the submarine state territory."

If I ever hear from Ralph or his minions, rest assured that I will dry out the letter and let you know the status of getting this place on the air.

New hope for the world's DX'ers was more

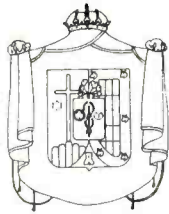
The official coat of arms for Castellania shows ocean waves at the castle's front gate. There is some suspicion that this nation may be located mostly underwater.



Castellania has nice postage stamps, but will they stick to QSL cards being sent from 20,000 fathoms?

recently awakened when I spotted an ad from yet another emerging "Fourth World" minination, the Imperial Government of Topa Inca. According to Topa Inca's ad in the December '85 *Soldier of Fortune* magazine, they had "diplomatic as well as government positions" available to "qualified individuals." That was certainly a description of your's truly, being highly qualified and most definitely an individual. Since Topa Inca wanted a piddling \$3 sent to its El Paso address for details, I quickly asked for more information. In actual fact, I had grown tired of waiting for

**THE
IMPERIAL
GOVERNMENT
OF
TOPA INCA**



is actively seeking active duty/retired military personnel to staff its various military orders, national guard, and special forces. Diplomatic as well as government positions are also available to qualified individuals. (Most appointments do *not* require travel or extraordinary expenses on the part of the applicant.)

For a detailed list of openings accompanied by a detailed explanation, write to:

**Imperial Government of Topa Inca
ATTN: Prince Giacomo
3310 Tyrone
El Paso, Texas 79925**

Send \$3.00 cash or check to cover printing and handling charges of the portfolio. All inquiries will be answered.

This ad caught my eye. I hoped it would lead to a new DX country for POP'COMM readers.

Castellania's royalty to act and I wrote to Topa Inca asking how I might secure the position of "Minister of Posts and Telegraphs."

Like, what the hell; I might as well be in a position to grant Topa Incan broadcasting and Ham licenses to all of my readers.

The Imperial Government of Topa Inca wrote to say that "this ancient government ruled from the fortress city of Cuzco from 1397 to 1464 with Topa Inca Yupanqui as its autocrat." Even though this didn't say where Topa Inca was located these days, I figure that at least its deposed ruler was able to find work as a singing mouse on the old *Ed Sullivan Show*.

Yes, they advised, government positions were available, including several slots on the Supreme Court, a spot as Ambassador and Consul-General of the Imperial Diplomatic Service, and even Lord Minister in the Ministry of the Empire. Although the spot as Minister of Posts and Telecommunications wasn't specifically mentioned in their literature, they did state that "Prince Giacomo will create other ministries from time to time according to the needs of the Empire."

There was hope, but I did despair at the thought of again awaiting the pleasure of royalty, still smarting from the apparent snub I had received from the Royal House of Castellania. There was no specific fee mentioned to secure this post, although the literature noted that "The Imperial Government of Topa Inca welcomes gifts as a part of any donation which might be given," further commenting that "gifts must be befitting an Imperial Government."

Some of the donations they suggested included a VCR (VHS format only), video camera, color TV, Kitchen-Aid Mixer, a word processor and printer, a late 1960's Rolls Royce Silver Cloud, or the design for an imperial flag.

Not having any of the above to spare, I dashed out a check in the amount of \$20 (American) and sent it, along with my application, to Topa Inca. Then I settled in for what I felt would be a long wait while Prince Giacomo decided my fate and if I was qualified and an individual.

In this case, I didn't have to wait long at all. Within days I received an official letter from Raul Gonzalez, writing "for His Highness, Prince Giacomo." This letter, written on a parchment-like paper with a fancy letterhead, was as impressive as it was direct and to the point. Frankly, when I opened the letter and my refused check fluttered out and landed in my bowl of Wheaties, I surmised that I had probably really blown it this time. My guess was correct. Obviously, my pitiful donation was more of an affront than something "befitting an Imperial Government."

Mr. Gonzalez, the royal major-domo, flatly told me, "we are unable to accept your donation for such an important position at the ministerial level. We encourage all applicants to be as creative as possible concerning donation requirements."

Gonzalez did offer me a way of saving face that was slightly better than shaking my hand before handing me the Luger containing the single cartridge. He said that if I performed certain specified "religious obligations" for a period of ten years, they might (upon my providing suitable proof of such performance accompanied by at least a \$50 donation) reconsider me for the position.

Anxious to nail down this important ministerial post in order to bring happiness to the DX world, I decided to commence the rigorous ten year schedule of "obligations" in order to bring about the spiritual catharsis necessary to prove to His Highness that I was duly contrite. I was comforted by the fact that at least they hadn't demanded that I crawl to Mecca on my hands and knees, nor want me to travel to Stonehenge to dance around bonfires at the equinoxes.

I hadn't even made my first "obligation" when, in early January, I received another letter from the Imperial Government of Topa Inca. No fancy letterhead this time, and adios Raul Gonzalez, too. A plain sheet of cheap white paper contained an unsigned letter from a Ben Johnson, who said that he replaced the Right Honorable Mr. Gonzalez.

Johnson broke the bad news to me with

Empire strikes slack! After 700 years of glory, Topa Inca's final whimper came in response to my effort to put it on the world's DX maps.

6 January 1986

Dear Sir

My name is Ben Johnson and I have replaced Mr. Raul Gonzalez. My duties are to return all correspondence and inquiries. There is no more Imperial Gov. of Topa Inca. The 'government' was such a financial failure that it was given up. The February issue will be the last issue

advertisement



A fancy letterhead informed me that I was in trouble with royalty.

neither fanfare nor flourish, "There's no more Imperial Gov. of Topa Inca. The 'government' was such a financial failure that it was given up. The February issue [of *Soldier of Fortune*] will be the last issue for the advertisement."

Seemed like a poor reason to call off a whole government. Good thing they don't follow those policies in Washington! Oh, well. Johnson went on to note, "It just so happened that the prince is a lousy businessman . . .

I am sorry but as a matter of honesty, I cannot reveal any info on my own."

So there it was. Not only did my unworthy \$20 (attempted) donation to the Imperial Government offend His Highness, it may have served only to contribute to the fall of the Royal House of Prince Giacomo, and, indeed, bring an untimely collapse to the 700-year-old Topa Incan empire.

Do I feel rotten about it? Damn right, I do. Wouldn't you? The way things look now, if and when Castellania's Prince Ralph gets wind of what I did (you know how royalty loves to gossip), there'll be little reason for any of us to continue holding out any hope for Castellanian licenses to come through for operation above or below the water level, even at low tide. I'll be declared *persona non grata* throughout every Fourth World nation!

The sacrifices I'm willing to make for my readers and for the DX cause are far more than you know, dear friends.

MAILBAG LETTERS TO THE EDITOR

The most interesting questions we receive will be answered here in each issue. Address your questions to: Tom Kneitel, Editor, Popular Communications magazine, 76 North Broadway, Hicksville, NY 11801.

Assaulted Batteries

I purchased a pair of military surplus AN/PRC-77 transceivers to fill a certain communications need I have. There are, however, problems in locating the special batteries these units require. That makes them rather useless. Is there a source for these batteries?

G.V. Gonzalez
Levy County, FL

While military surplus transceivers are rugged and versatile, not all of them go willingly and quickly into civilian life. Besides uniquely military cables, connectors and crystals many utilize, they often crave unusual sources of energy, including batteries that may have been specially created for specific pieces of equipment. The battery dilemma for many of the most popular military surplus transceivers is probably best solved by using an adapter unit that permits you to use standard commercial batteries. Battery adapters are available for the following transceivers: BC-611, SCR-536, SCR-625, AN/PRC-6, -8, -9, -10, -25, -26, -74, -77, and the AN/PRT-4. The one source for these that I know of is TNM Enterprises, P.O. Box 2331, Anaheim, CA 92804. I've used these adapters and have found them to be an excellent and convenient short cut. TNM can provide additional details, pricing, and ordering information. — Editor

Disc Must Be The Place For Statistics

Many times it's mentioned that communications receivers, scanners, and monitoring accessories are being sold in record numbers. Could you be more specific about "record numbers"?

Anthony Wilson
Berwyn, IL

Two record numbers that immediately come to mind are Elektra EKS-74062 and Columbia M-34549. — Editor

We Hope Twitty Is Witty!

As a major league fan of country music, I'm planning a vacation to the Nashville area. I'd like to bring along my hand-held scanner and was hoping that POP'COMM might suggest some relevant frequencies to monitor.

Ray LaCroix
Abilene, KS

The Nashville Network operations can be monitored on 463.2125, 463.2375,

463.3375, and 463.4125 MHz. If you're near Opryland, the security operations are on 464.925 MHz, with other functions there on 464.375 and 464.875. Opryland Hotel paging takes place on 464.4125 MHz. The Oak Ridge Boys communicate on 464.225 MHz; their wireless microphones are reported to be on 169.425 and 169.925 MHz. That should keep you busy for a while! — Editor

Investigation Bureau

The Georgia Bureau of Investigation (GBI), an agency operated by the State of Georgia, is tough to pin-down on a scanner. I know that this agency operates on 155.505 MHz, and I assume that they also use other frequencies in addition to that one. The problem is that I've exhausted all reasonable means of learning what those frequencies might be. Now, in desperation, I'm turning to POP'COMM to ferret-out this information for me. Think you're up to it?

E.B. Solie
Statesboro, GA

Happy to hear that you don't consider us to be a "reasonable means" for finding out things. We agree with your opinion; chances are that there are few others who would be able to advise you to check out 154.665, 154.68, 154.695, 154.815, and 154.935 MHz for this publicity-shy agency. — Editor

Decked By A Hull Of A Problem

On TV news broadcasts, I've noticed that there are hand-held transceivers in use aboard U.S. Navy ships. I asked a few sailors about the frequency used and none had any information. Do you?

Harry Reynolds
Newport News, VA

It doesn't seem that there is any single frequency in use throughout the entire fleet. For instance, the duty frequency for the USS L.Y. SPEAR (AS-36) is 139.525 (repeater input on 140.25). But the USS TEXAS (CGN-39) and USS DAHLGREN (DDG-43) use 140.275, while the USS RICHARD E. BYRD (DDG-23) and USS YELLOWSTONE (AD-41) are on 139.475 MHz. Put your scanner into "search/scan" mode and run through the 139 to 141 MHz spectrum. If you're in range of any of these low-power transceivers, you'll probably find them around those frequencies. — Editor

Mystery Band?

Why would a manufacturer make an FM broadcast converter for 42 to 50 MHz? The 42 to 50 MHz band is for two-way communications, while 88 to 108 MHz is for FM

broadcasting. I came across this device, made by Pilot Radio Corp., in the garage of a relative who had no idea what it was for.

Alvin Yarmy
Skokie, IL

I don't think that you'll find very many manufacturers producing it today, however, 35 years ago it may have been a hot item. The 42 to 50 MHz band was originally set aside for FM broadcasting, but soon after World War II the existing 88 to 108 MHz band was established for the service and 42 to 50 MHz was given over for communications uses. — Editor

Three Ways To Skin A Cat

I know about one-way transmissions (broadcasts), and even two-way radio, but I wonder if you can explain what is meant by this new term I've heard called three-way radio. It makes no logical sense to me and I can't figure it out.

Karl Jensen
Tecumseh, NE

Although not a term used very often, it's nothing new. Motorola's ads mentioned it in connection with FM communications at least as long ago as the mid-1940's. It means the ability of one mobile unit to communicate with another through a base station with repeating facilities. It may also now include the ability of the mobile units to have short range "direct" communications on the repeater output frequency. Most people would generally classify these abilities as being part of a two-way system and let it go at that, although it is a clever and exotic term which, when used, is a great conversation starter. — Editor.

License-Free Radio?

How can I obtain a license to be a disc jockey at a local FM station?

Bill Maisels
Tampa, FL

You don't need a license to be an announcer or disc jockey, or do any other on-the-air duties as a performer at an AM/FM/TV station. You'd need a permit if you were going to be doing certain limited functions affecting the transmitter's operation. This may be what you're thinking of since, at some of the smaller stations, the DJ or announcer may well be required to throw some switches or twist a few knobs as part of the job; that's where an FCC permit (it's not a license) comes in. You can call any FCC field office and ask them to send you a Form 753, then fill it out and return it by mail. The FCC application asks you to certify that you'll become familiar with the station's operating requirements and that you'll keep a written log of your activities. There isn't any fee or exam for the permit, and it's issued on a lifetime basis (unless the FCC suspends or revokes it for a cause). — Editor

RC



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SONY

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- 2002 Call for price
- 4910 Call for price
- AN-1 Ant 75.95 (+ \$4)

PANASONIC

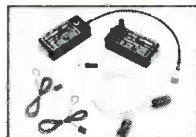
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ANTENNAS



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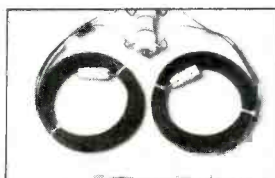
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"World Radio TV Handbook 1986" The bible of shortwave listening \$19.95

"Tropical Bands Survey." Latest ed. from Danish SW Clubs Intl. lists brct. stations, 2000-5900 kHz, with scheds, locations etc. \$4.50

"Radio Beacon Handbook." 252p. listing of over 9000 mw and lw radio beacons (150-1900 kHz); inc. call signs, freq., etc. \$14.95

"Medium Wave (IRCA) Almanac." Insiders book for 540-1600K C DX; talk programs, music, religious; football, baseball, \$9.00

"Radio Receiver-Chance or Choice." Tests of 75 top receivers by radio engineer R. Lichte for easy, accurate comparison. 256p. \$18.50

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Tide Turning In "Cellwars"?

It's much too early to claim any victory in the battle to keep the cellular phone industry from taking away the traditional American right to use radio receivers . . . but there is some interesting and positive movement. At long last the House Judiciary Committee has allowed opposition testimony. I have no doubt that this breakthrough has occurred solely because of the number of letters and inquiries to members of the House and Senate about his legislation. At the recent hearing Terry Cogan of the Association of North American Radio Clubs proved to be a most articulate and informed spokesperson on our behalf. Not only did he make it clear that anyone with an \$80 TV can tune-in cellular phone calls with the UHF tuner, he confronted the cellular industry about their false claims of the cost of encryption. By demonstrating a five dollar speech inversion chip and a forty dollar digital encryption chip he undoubtedly caused a number of red faces amongst the AT&T and House Judiciary staff group. Their bluff had finally been called on the claim that it would take \$2,000 per mobile phone to encrypt conversations.

As Alan Dorhoffer recently editorialized in the sister publication of *POP'COMM, CQ*, . . . "The Emperor has no clothes." This sophisticated, magic carpet cellular phone—the system that AT&T and others have been predicting we would all be carrying on our belts by 1990—has now been exposed for what it is, ordinary FM radio transmission that you can listen to with your K-Mart TV set!

Let me hasten to add that this battle is far from over. The cellular folks still want to "legislate reality." If we don't keep writing and contacting our Senators and Congressmen, it still might happen. Then a new era of government regulation will have begun. For the first time we will have laws restricting radio listening and, perhaps, even the type of radio receiver you can buy without a special permit. The fundamental changes proposed by the Electronic Communications Privacy Act of 1985 could have a devastating effect on radio monitoring for decades to come. For me, that's worth a few minutes with my typewriter and a few postage stamps.

Scanner Horizons

Most of us who own scanner radios started out with a singular purpose: Volunteer firemen who wanted to monitor their dispatch channel; Hams who wanted to scan local repeaters; People just interested in the goings on of their local police. The fact is that the majority of scanner users rarely ever stray from the communications they bought the scanner to monitor. And there's certainly nothing wrong with that. But for those of us with a little time and adventure, there is a vast world out there . . .

• **Railroads** Did you know that most railroads still use the world "highball" to dispatch their trains at full speed ahead? You can hear it every day on the 160 MHz railroad frequencies. The term dates back to the days before semaphore signals (let alone today's in-cab signals!) when the station master hoisted a large ball on a rope to give the train a "green light." Listen in and you'll hear a lot of history.

• **Airlines** If you have a scanner that tunes in the AM aircraft band, don't assume that it is all routine communications. Listen a while and you'll start to detect the personalities, irritations, and sometimes panic. The slick airline commercials tend to make us believe it's all smiles and fun. Only a scanner listener knows the truth.

• **Ham Radio** For a person who is not a "Ham," those conversations in the 146-148 MHz range can be boring or too technical. But there is a lot more happening there—like direct ham radio links from the space shuttle, or teleconferencing discussions via satellite, even repeaters that link to worldwide HF communications. We plan to publish some "where and when" details in the future, but there is nothing stopping you from exploring a little with your scanner today.

• **News Media** It's called "ENG" . . . Electronic News Gathering. Newspapers, radio stations, TV stations . . . everyone does it. In

fact, they all listen to each other so they won't be "scooped," so you might as well also. A frequency directory or your local scanner club can direct you to the "hot" frequencies.

There is a lot out there. All you have to do is venture off your favorite monitoring channels and experiment a bit. Many SCAN members have told me that they have done this with a "retired" scanner. Their new scanner functions for their primary monitoring need while they use the older unit to explore. Automatic tape recorder activators are another great way to listen to new territory. You can review a week later what has happened on a supposedly inactive frequency and be truly surprised. Try it and you'll add an entire new dimension to scanner monitoring.

The Scanner Association Of North America—Who Are We?

Now that we are appearing in the pages of *Popular Communications*, we've been receiving many inquiries about our association. SCAN is a non-profit association which was founded in 1978 to promote scanner listening and understanding between scanner users, government, and law enforcement agencies. With over 30,000 members and the support of law enforcement agencies we've come a long way from the early beginnings of scanner radio when their use was suspect. In a way it is difficult to believe that in 1967 the scanner radio did not even exist! Today, scanners are in at least 8% of all U.S. households. That is the pace of technology in this country. During the years since our founding we have helped defeat many attacks on the right to own and use scanners, including having a Philadelphia law banning scanner sales declared unconstitutional. Through this column we'll be telling you more about SCAN in the months ahead.

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Small Spots

Here's How And Where To Tune In On The World's Tiniest Nations

BY GERRY L. DEXTER

By the title, we are not referring to catsup on your tie or a ten second radio commercial—and not to the measles, either! We're talking about those little itty-bitty countries which are represented on the shortwave broadcasting bands by radio stations of various shapes, sizes, and purposes.

The mention of small countries engaged in shortwave broadcasting brings to mind places like Denmark, Equatorial Guinea, and New Caledonia. But these countries are giants in the land mass sweepstakes compared to some others that are sending signals into the ether. Unfortunately, there aren't as many of them as there used to be. Over the years we've waved goodbye to the likes of Trinidad, Reunion, Grenada, Martinique, the Maldives (still teasing us with talk of a come-back), and way back in "ancient times" there was American Samoa and Goa, too.

Shortwave broadcasting from such "small spots" swings from low power, strictly localized and thus difficult-to-log stations to those that don't even really represent the little land from which they transmit, but are merely slaves of a foreign master. We're talking about the relay stations here, where the only localized programming may come in the form of a site identification announcement at sign on or sign off. Still, they are there and thus are fair game for the seeker of far away, remote, and romantic places on the radio.

We've put together a list of such small spots, all of them under 1,000 square miles in size. Those picked are generally considered as legitimate countries. We avoided stepping into that never-never land of "radio countries" and, therefore, places such as Zanzibar (part of Tanzania) and the Admiralty Islands (Papua New Guinea), usually considered as countries by shortwave broadcast DX'ers, aren't on this list. And just to keep you in suspense, we're going to take them in reverse order, beginning with the largest of the smallest.

#19 The Grand Duchy Of Luxembourg, tucked away between Belgium and Germany, is a major international banking center and serves as one of the capitals of the European Economic Community. Its 999 square miles were occupied by the Germans in World War II.

So was Radio Tele-Luxembourg, commonly known simply as Radio Luxembourg. The station is a commercial venture, begun in the 1930's by a garage tinkerer type. During



A rare QSL from Radio Comoros, courtesy of the John Sgrulletta collection.

the Nazi occupation its transmitters also did time in various clandestine guises. The station is located in an ancient stone tower which, in medieval times, served as the city's powder magazine.

Radio Luxembourg's Top-40 type programming can be heard in English from 0000 to 0300 on 6.090. Another good spot to catch this one is 15.350, which is active 24 hours a day and often received during U.S. afternoons. Broadcasts on this frequency are mostly in French. Reports go to Radio Tele-Luxembourg, Villa Louvigny, Parc Municipal, Luxembourg.

#18 Mauritius, in the Indian Ocean, was first occupied by the Portuguese, then the Dutch, then the French and finally England, from 1814 until independence. Its 787 square miles contain a wide mixture of Indian, Moslem, Chinese, Europeans, and Africans. Mauritius became an independent member of the British Commonwealth in 1968, despite its reliance on France for much of its aid. There is a major U.S. Naval base here.

The Mauritius Broadcasting Corporation ranks about 7.5 on the DX difficulty scale. It can be heard in the U.S. but reception runs in streaks—long periods with no loggings and then a spate of them over a few weeks. Although there are supposed to be plans for a 50 kilowatt transmitter on shortwave the power seems to be the long-time 10 kilowatts so far. Frequencies are 4.855 variable and 9.710 (usually 9.709). Sign on is at 0300 in French and Indian languages. Reports go to Mauritius Broadcasting Corporation, Louis Pasteur Street, Forest Side, Mauritius.

#17 The Federal Islamic Republic Of Comoros, with 693 square miles, is another island, parked between Mozambique and Zanzibar. It's been independent since 1975, its apron strings tied to France before that date. In 1978 supporters of continued cooperation with France hired a group of mer-

cenaries to try to overthrow the Chinese Communist style regime, but the attempt failed.

Radio Comoros is one of the most difficult of the small spots to log, seldom gracing the headphones of U.S. listeners. A 4 kilowatt transmitter operates on 3.331, where there's heavy QRM supplied by the Canadian time station CHU. Beware, too, of Rwanda on 3.330—though this one is hardly a steady performer itself. Another frequency is 7.260, but not heard any more often. Sign on is at 0300 on 3.330; 0530 and 1000 on 7.260 in Comorian and French during these time periods. Reception reports go to Radio Comoro, B.P. 250, Moroni, Grand Comoro. A 60 kilowatt shortwave transmitter is supposedly set for some time in the future.

#16 The Netherlands Antilles, a/k/a the "A.B.C. Islands" of Aruba, Bonaire, and Curacao, sport two broadcasters, both of which are on the "B" island, Bonaire. The three islands encompass 395 square miles and are popular tourist spots off the northern coast of South America.

Trans World Radio has one of its several installations on Bonaire. Operating frequencies include 6.145, 9.535, 9.665, 11.875, 11.895, 15.345, and 15.355. The station is best heard with its popular "Caribbean Night Call" program, in English, on Sunday and Monday at 0430 on 9.535. The address for reports is just Trans World Radio, Bonaire, Netherlands Antilles.

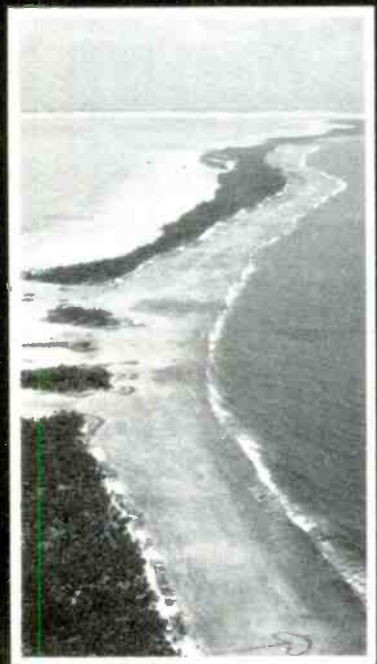
Radio Netherlands, of course, has a big relay base on Bonaire, too. It's responsible for the good reception of programs like "Happy Station" and "Media Network" in the station's North American service. That feed is currently at 0230 on 6.165 and 9.590, and 0530 on 6.165 and 9.715.

This summer we are promised shortwave from Curacao as well if, as we hope, Radio Earth gets its own station operational from this island. After that, it will be Aruba's turn!

#15 Sao Tome E Principe are two islands in the Gulf of Guinea off the East Coast of Africa. Dominated by the Portuguese since 1522, they became independent in 1975. Cocoa is big in these 372 square miles. The country receives aid from Cuba and the Soviet Union.

Radio Nacional de Sao Tome has a history of on-again, off-again operations and it's currently in an "on" state. Check 4.805 (1 kHz variable either way) for the 0530 sign on. There's a flute-like interval signal for several

TARAWA



KIRIBATI

Even when it was the Gilbert and Ellice Islands, Kiribati was a tough one to catch.

minutes prior to sign on and a single gong before regular programs start. Programs are in Portuguese and reports go to C. P. 44, Sao Tome.

#14 The Republic Of Kiribati was formerly the Gilbert and Ellice Islands of World War II Tarawa fame. Once a British colony, this group of some 30 islands totals 264 square miles. The country's name, pronounced "kir-i-bas," is a localized corruption of the word "Gilbert." But the island formerly called Gilbert has been renamed "Tungaru." You figure it out.

Radio Kiribati is hard to hear and its schedule difficult to be sure about. We think it's 1830-2000, 0000-0130 and 0600-0930 weekdays; Saturdays 1830-0130, 0000-0130 and 0600-0930; and Sundays 0000-0130, 0600-0930—sometimes on 14.802, sometimes on 9.825.

The broadcasts are transmitted on upper sideband and include some English. They're intended for the 1,300 people on Christmas Island, said to have been discovered by Captain Cook on Christmas Day, 1777. Christmas Island was the site of British-American atomic testing in the late 1950's and early 1960's. Transmitter power is 10 kilowatts. The station can be heard here, but it takes some digging and the right conditions. Re-



Radio Mediterranean uses the Voice of Germany relay station on Malta.

ports go to P.O. Box 78, Bairiki, Tarawa Atoll.

#13 Singapore Its 226 square miles were a part of the Federation of Malaysia for a time, until 1965 when Singapore decided to go it alone as an independent nation. There's a bustling, high-speed economy here, presided over by a no-nonsense government.

The Singapore Broadcasting Corporation's Radio Singapore is one of those nicely-balanced DX targets. This is not an every day log (except perhaps on the west coast), but certainly not one to charge off as being impossible or even very difficult. Try it around local sunrise on 5.052 or 11.940. The address is Caldecott Hill, Thomson Road, Singapore 1129.

The BBC Far Eastern Station also operates from Singapore and is used for both the World Service and various BBC Asian services. The schedule is too long and changeable to include here, so we'll just provide possible frequencies and you can check them during the period when reception from Asia is best in your location—3.915, 6.010, 6.025, 6.080, 6.185, 6.195, 7.120, 7.180, 9.570, 9.580, 9.725, 9.740, 11.750, 11.850, 11.865, 11.910, 11.955, 15.225, 15.280, 15.310, 15.320, 15.360, 15.380, 15.435, 17.710, and 17.880. Some of these are also used by other BBC relay stations.

#12 Guam was supposedly discovered by Magellan in 1521 and, except for Japanese occupation during the war, has been a U.S. possession since 1899. Its 209 square miles include a large air and naval base. There's local government through a legislature and governor, but the real say-so lies with the U.S. Department of the Interior.

Trans World Radio operates KTWR from Guam. Four 100 kilowatt transmitters beam religious programs to the Asiatic USSR, Japan, Indonesia, Malaysia, China, India, and other parts of Southeast Asia. Best opportunities for U.S. listeners to hear this one would currently seem to be between 1300-1600 On 9.820 in Japanese and other languages (English at 1415) and at 1100 on 9.870, with English at 1330. Address is P.O. Box CC, Agana, Guam 96910.

As Carson says, there's "more to come." Adventist World Radio recently broke

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The Cook Islands export a lot of colorful stamps.

ground for two 100 kilowatt outlets that will program religion to much the same area as does KTWR. Broadcasting is expected to begin in the summer of 1986.

#11 Commonwealth Of The Northern Marianas belongs to the United States, too, and its 181.9 square miles include the island of Saipan, which has become a popular resort for Japanese honeymooners and visitors to the war shrine. It's fully Americanized and heavily dependent upon Washington. At one time the CIA trained nationalist Chinese at a base here.

Saipan has two shortwave stations. The well-known KYOI is currently in some financial difficulty and making on-the-air appeals for \$10 donations from its listeners so it can remain on the air. Maybe you'd better go after this one if you haven't heard it yet. KYOI runs an all-rock format in Japanese with some English ID announcements. Scheduled from 0300 to 1000 on 15.190, 1000-1600 on 11.900, 1600-1900 on 9.665, 1900-2200 on 9.670, and 2200-0300 on 15.405. A new address is 1001 Bishop Street, Honolulu, Hawaii 96813.

Religious broadcaster KFBS, one of the stations of the Far East Broadcasting Company, beams to China, Russia, Indonesia, Bangladesh, India, Sri Lanka, Malaysia, and Vietnam from four 100 kilowatt transmitters. Reception here seems most likely between 1400-1600 on 9.535, 1100-1400 on 9.575, 0900-1100 on 9.620, 1300-1400 on 11.870, 1100-1300 on 11.920, and 1000-1300 on 15.125. Reports go to Box 209, Saipan, Northern Marianas 96950.

#10 Antigua was formerly part of the British Leeward Islands and includes the islands of Barbuda and Redonda in its 171 square miles. Sugar, cotton, and tourists sustain the economy.

Antigua is the site of a joint relay station effort by The Voice of Germany and the BBC. A pair of 250 kilowatt transmitters are used here. You can usually spot Antigua relays based on the strength of the signals alone. Deutsche Welle uses Antigua for its North American broadcasts on such frequencies as 6.040 and 6.085. The BBC can be heard via

Antigua on 6.155, 6.175, 6.195, 9.510, 9.515, and 11.775. Reports should go to London or Cologne, as the case may be.

#9 Malta has been independent since the British withdrew in 1964. It and two small islands make up a combined area of 122 square miles off the southern coast of Sicily. Malta has accepted Libyan aid in the past and, as most listeners know, the Libyan Radio Jamahriya maintains an office here.

Deutsche Welle has its Cyclops relay on Malta, which features three 250 kilowatt transmitters. They're listed for use on 6.000, 6.025, 6.085, 6.100, 7.105, 7.215, 9.545, 9.565, 9.625, 9.650, 9.715, 11.705, 11.785, 11.795, 11.905, 15.260, 15.320, 15.405, 17.780, 21.590, and 21.650 at various times to various target areas.

Two other organizations have access to these transmitters for their own programs. Radio Mediterranean, operated jointly by Malta and Algeria, has English from 2230 to 2330 on 6.110. Reports go to P.O. Box 2, Valetta, Malta. International Christian Radio is on in English on 6.110 from 2030 to 2115. Reports to B.P. 521, Station F, Toronto, Ontario M4Y 2L8, Canada.

#6 The Seychelles include 85 islands totalling 107 square miles. Independent since 1976, they were British prior to that and, for a time, under the administration of Mauritius. The left-leaning government was the target of a mercenary raid in 1981, successfully repelled.

The Far East Broadcasting Association (FEBA), part of the Far East Broadcasting Company, operates another religious station from Mahe, the main island. It's another long and involved schedule, so we'll just provide the times for the English segments: Sundays 0712-0850 on 15.120 and 17.780; 1457 to 1530 (Mondays to 1600) on 11.925; 1458 to 1515 on 15.325; 1515-1530 (Mondays to 1600) on 11.865 and 15.325; 1530 to 1610 (Mondays 1600) on 11.925, 11.865, and 15.325. Reports go to Box 234, Mahe, The Seychelles.

The BBC is supposed to open up a relay in the Seychelles in 1987.

#7 The Cook Islands, 15 of them in all,

have enjoyed internal self-government since 1965 and continue very close ties with New Zealand. According to DX'ers who've had the great good fortune to have visited the islands, there's little to do in these 93 square miles but lay around and relax. Perhaps the local greeting "kia orana"—may you live on—says it all.

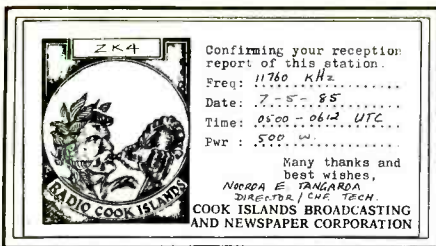
Once upon a time, Radio Raratonga, as it was known then, was one of the rarest DX targets around. As Radio Cook Islands, it's been widely heard on 11.760, but has recently cut back on its 24-hour-per-day schedule, though the exact changes aren't known. Lower sunspot counts make Raratonga more difficult, but you may still catch it deep into a summer's night. Reports go to P.O. Box 126, Avarua, Raratonga, Cook Islands.

#6 The Crown Colony Of Hong Kong, ceded by China to Britain in 1841 and due to reverse direction in the late 1990's, has long been a highly successful economic showcase. Teeming millions are squeezed into its 90 square miles and it serves as both a base for China-watchers and an important source of foreign exchange for the Beijing government.

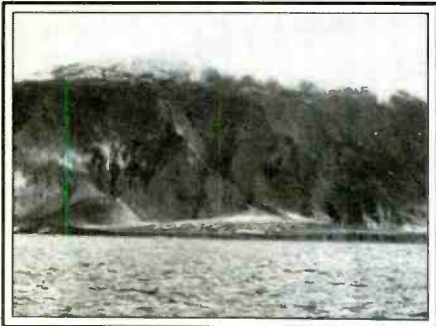
Radio TV Hong Kong used to be available all the time, as a target at least. No more. Now the station's 3.940 frequency is used only for about ten days in April every other year! That's when the South China Sea yacht races take place and RTV Hong Kong fires up its high frequency transmitter to broadcast weather and race information. The races are scheduled for 1986 and, if you get lucky, your report goes to P.O. Box 70200, Kowloon Central Post Office, Hong Kong.

If you don't get lucky you can sit back and wait for the planned BBC relay station scheduled to go on the air later this decade.

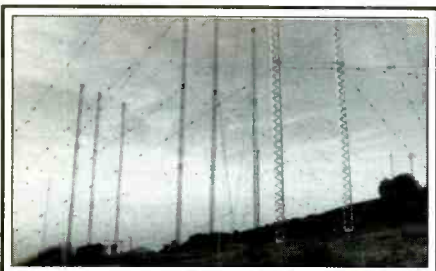
#5 Tristan Da Cunha, which we highlighted in the December, 1985 POP'COMM, downsizes us to just 40 square miles. Everybody's most wanted, Radio Tristan operates with a mere 40 watts (one watt per square mile!) on 3.290. Broadcasts are only on Sundays, Wednesdays, and Fridays from 1900 to 2205. Only four or five QSLs have ever been issued by this station. If you are good



A number of DX'ers have added cards from Radio Cook Islands to their collection in recent years.



Here's a look at Edinburg, the small community on Tristan da Cunha.



The shortwave antennas of Trans World Radio, Monaco.

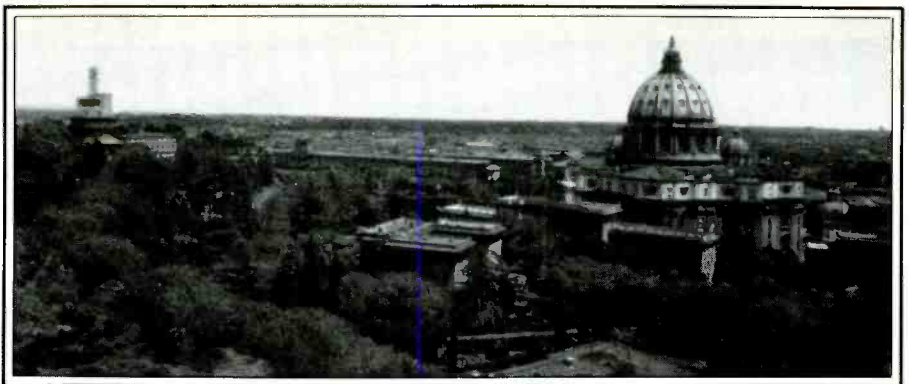
enough to log it, you're capable of finding the address yourself.

#4 Ascension Island is another tiny place sporting big towers and high power transmitters, these owned by the BBC. Ascension is administered by St. Helena (both British possessions), has an area of 34 square miles, and a population of about 500, not including the sea turtles or the thousands of sooty terns that fly in to lay their eggs every eight months.

There are four 250 kilowatt BBC transmitters here and too many potential frequencies to list. Most commonly heard is probably 15.260, with the World Service in the afternoon, U.S. time. These facilities are also used by the Voice of America, listed for 21.490—a better way to go if you want the Ascension site on a QSL card.

#3 Montserrat, back in the Caribbean, is also an ex-British colony. Its 33 square miles contain about 15,000 people, about 2,000 living in Plymouth, the capital. There's a noticeable Irish influence said to be due to a mass influx of Irish who left St. Kitts en masse back in the 1630's in order to get away from the British.

Deutsche Welle operates a relay on Montserrat, but it's a peanut whistle, as far as relay stations go. DW uses only 50 kilowatts for this



This view shows Vatican City, smallest of the countries on our list, with SWBC transmitters.

one, which operates on 9.545, 11.705, 11.810, and 11.865. Listen for Deutsche Welle programming on these channels and a site identification at sign on or sign off.

#2 The Principality Of Monaco. Okay, now we're talking square acres! And Monaco has but 600 of them. Monaco is well known for its casino, wealthy tourists, and the storybook life and tragic death of Princess Grace. At one time Radio Monte Carlo could be heard on shortwaves from Monaco, but it left the scene a number of years ago.

Fortunately, Trans World Radio keeps Monaco active on the bands. You can tune for TWR in English at 0735-0900 on 7.160, 0900-1100 on 9.610, and 1800-1830 on 9.495. Reports go to B.P. 349, Monte Carlo 98007, Monaco Cedex.

#1 Vatican City State. Just 108.7 acres, the Vatican is a city within a city. It has its own

railway, post office, coinage, and several buildings within Rome which also enjoy extra-territorial status. The Italians have police powers within St. Peter's Square.

Vatican Radio was featured in the March, 1985 POP'COMM, but we'll repeat the North American schedule. It's from 0050 to 0110 on 6.015, 9.605, and 11.845. You can also hear Vatican Radio frequently in the afternoons on 15.120. There are two English broadcasts, at 1545 and 2045. The address is simply Vatican Radio, Vatican City.

So there they are. Nineteen of the teeniest, tiniest countries to tune for on the shortwave broadcasting bands. Some are easy, one or two well-nigh impossible, most ranked somewhere between the extremes. Small as they are, a number of them will represent some big entries into your log—once you've landed them. Good luck!

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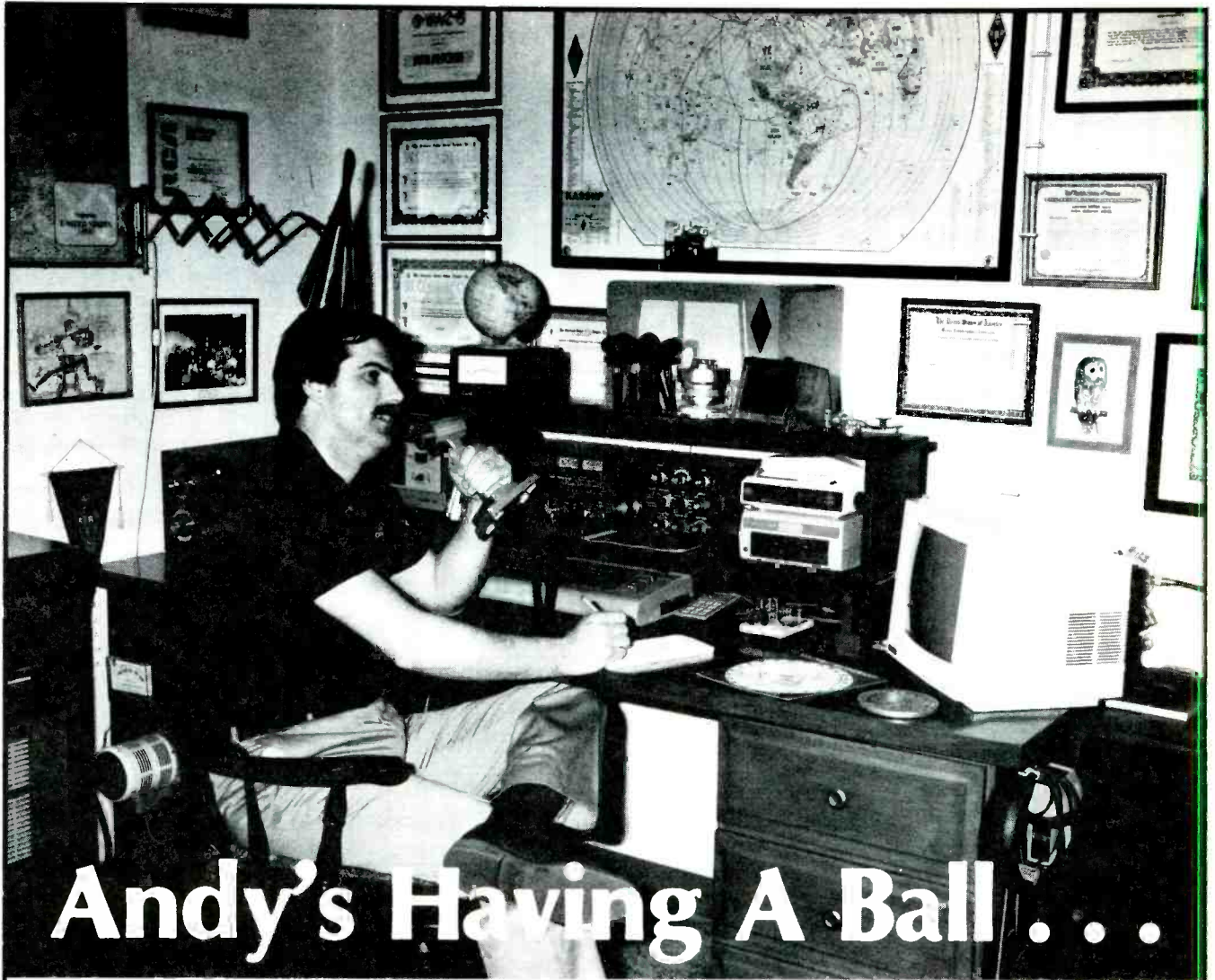
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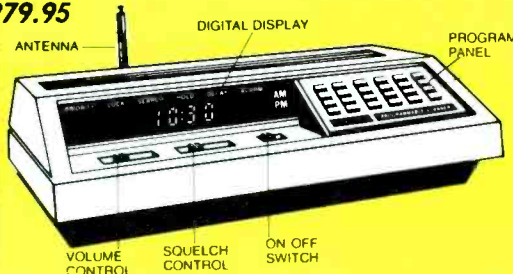
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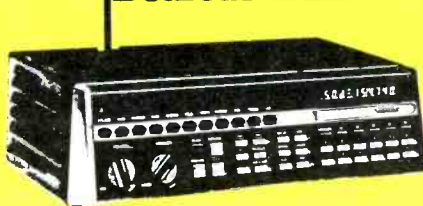
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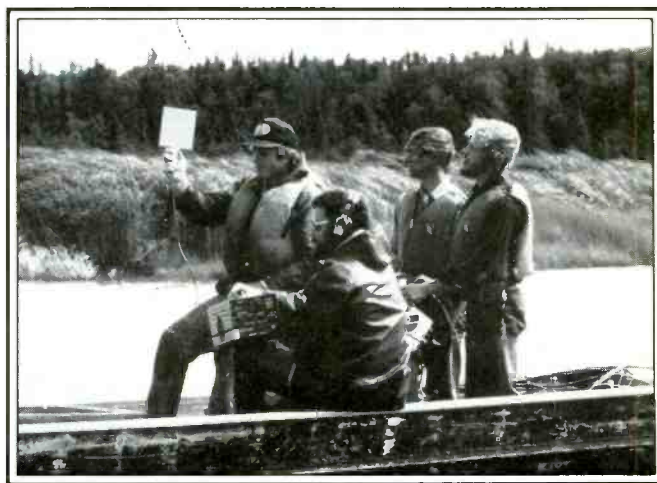
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Even fish are tracked by means of miniature radio transmitters. (Photo by Jo Keller. All photos courtesy of U.S. Fish and Wildlife Service)



Monitoring Report:

The U.S. Fish And Wildlife Service

This Agency's Low Band Communications System Offers Coast-To-Coast Scanning

BY RICK MASLAU, KNY2GL

The mission of the United States Fish and Wildlife Service (a bureau of the Department of the Interior), which is responsible for wild birds, endangered species, certain marine mammals, inland sport fisheries, and specific fishery and wildlife research activities, is to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the public.

The activities of this agency include resource management, biological monitoring, ecological studies, environmental assessment, management of fish and wildlife resources, and other endeavors.

What with increasing public concern about the preservation and protection of endangered species of wildlife, the agency's more than 400 National Wildlife Refuges (covering about 90 million acres) have been subject to renewed interest by Americans.

These National Wildlife Refuges (NWR's), which contain migratory and non-migratory birds and big game, are open to the public. Therefore, in addition to protecting the wildlife from problems caused by weather, disease, starvation, water shortages, and other factors exerting negative factors on their breeding and the quality of their existence, the wildlife must also be protected from human presence. There is, of course, a danger

of fire caused by negligence, of inadvertent-ly caused disturbance of the habitat, and of deliberate poaching.

Although much of the Fish and Wildlife's enforcement activities take place 410.625 MHz, there are numerous surveillance activities either in use or proposed in connection with enforcement efforts. These include satellites, mini transmitters, telephone pen-registers, vehicle tracking devices, and about five other systems. Remember, the Fish and Wildlife Service is the law enforcement agency in charge of 90-million acres—an area equalling the combined size of several states!

While much of the enforcement communications activity takes place on UHF frequencies, the normal day-to-day activity is heaviest on the low band. Since these stations are spread out coast-to-coast, that leaves scanners users in line for reception of NWR activities whenever there's skip activity!

These communications are interesting to monitor, but very little attention has been given to this agency's communications, and almost nothing in the way of information on NWR communications systems has ever been available to the monitoring public.

The author hopes to draw attention to the vast array of stations to be monitored via NWR low band operations. Hopefully, the

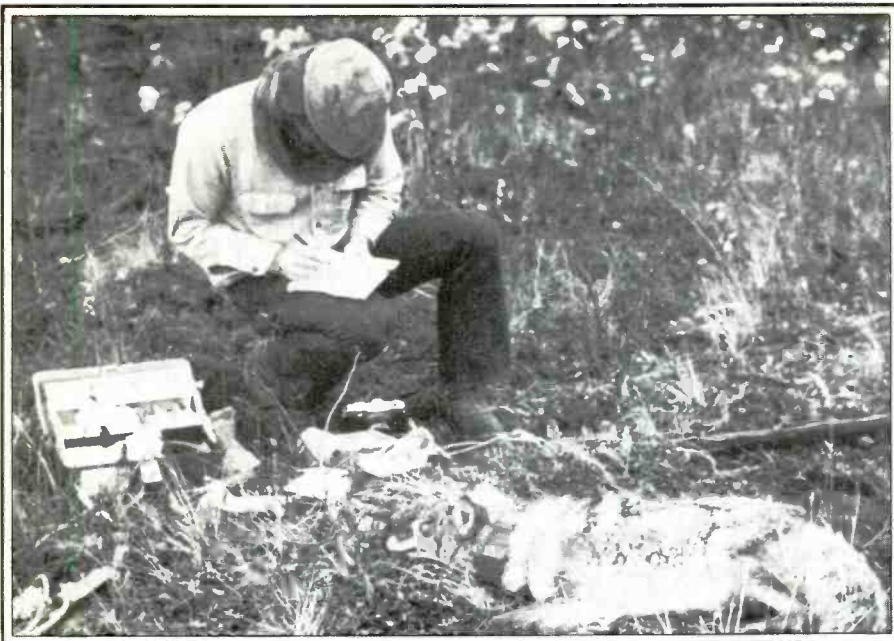


A black duck tagged with a radio transmitter for tracking purposes. (Photo by Jerry R. Langeore, U.S. Fish and Wildlife Service)

fragmentary information assembled here will be expanded by means of information feedback from our readers.

Low Band Activities

One of the first things that pops into mind when thinking about the Fish and Wildlife Service activities is the agency's use of radio in the tracking and monitoring of game and migratory birds. A small transmitter is connected to the bird or animal. The signals can then be monitored from a distance by agency employees. These signals can provide in-



Collaring a coyote with a radio transmitter. (Photo by Ed Bangs)



A portable shortwave receiver used for tracking purposes. (Photo by Matthew Perry)

formation as to the location of the transmitter and/or biological data on its wearer.

While these transmitters are low powered, and transmit either data or simply an unmodulated carrier, they have been noted on the following frequencies: 30.05, 30.06, 30.07, 30.17, 30.18, 30.19, 30.20, 30.21, 30.22, 30.23, 30.24, and 30.25 MHz.

The two-way communications used at the NWR's primarily take place around 34 MHz. Although 34.83 MHz is, by far, the most active of these channels, other frequencies are also used. All frequencies are, theoretically, available for use in all states, however, activity on specific frequencies is generally limited to certain states. These are as follows:

34.25 MHz: NV

34.41 MHz: MT WY
 34.43 MHz: FL GA MD PA SC VA
 34.81 MHz: CA CO HI MA ME MT NV
 OR RI UT WA WI
 34.85 MHz: AL AR DE FL GA IA IL IN KS
 LA MA MD ME MI MN MO MS MT NC NE
 ND NH NJ NY OH OK PA RI SC SD TN TX
 VA VT WI.

States not listed here are probably on 34.85 or 34.81 MHz.

The Stations

In compiling a list of callsigns allocated to the NWR's, several things should be pointed out. For one thing, and curiously, all of the base stations at NWR's have been given callsigns from within certain groupings, and the




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KAC612 Quivira NWR, Box G, Stafford KS 67578
KAC614 Kulm Wetland Mgt. District, Box E, Kulm ND 58456
KAC615 Flint Hills NWR, Box 128, Hartford KS 66854
KAC617 Rainwater Basin Wetland Mgt. District, Box 1786, Kearney NE 68847
KAC618 Hastings NE
KAC622 Litchfield Wetland Mgt. District, 305 N. Sibley, Litchfield MN 55355
KAC624 Odessa MN
KAC625 Larand CO
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KQC605 La Crosse District, Upper Miss. River Wild Life & Fish Refuge, P.O. Building Room 208, LaCrosse WI 54601
 KQC606 Brimley MI
 KSC620 Crab Orchard NWR, Box J, Carterville IL 62918
 KSC621 Muscatatuck NWR, Box 631, Seymour IN 47274
 KSC622 Edmunds ND
 KSC623 Crescent Lake NWR, Star Rt., Ellsworth NE 69340
 KSC624 Agassiz NWR, Middle River MN 56737
 KSC625 Necedah NWR, Star Rt. West, Necedah WI 54646
 KSC626 Horicon NWR, Rt. 2, Mayville WI 53050
 KSC627 De Soto NWR, Rt. 1 Box 114, Missouri Valley IA 51555
 KSC629 Sand Lake NWR, RR 1, Columbia SD 57433
 KSC630 Tamarac NWR, Rural Rt., Rochert MN 56578
 KSC631 Upper Souris NWR, RR 1, Foxholm ND 58738
 KSC632 Fort Niobrara NWR, Hidden Timber Route, Valentine NE 69201
 KSC633 Woodworth ND
 KSC637 Lostwood NWR, RR 2, Kenmare ND 58746
 KSC638 Mingo NWR, Rt. 1 Box 103, Puxico MO 63960
 KSC639 Union Slough NWR, Rt. 1 Box 32-B, Titonka IA 50480

Mobile & Portable

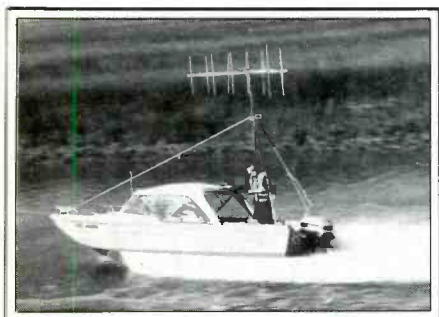
Authorized for all areas of USA: KA3385 KA3403 KA3433 KA3435
 KA8859 KA8861 KA8862 KA8864 KA8865 KA8866 KA9332 KA9338
 KG7702 KG7703 KG7708 KK3383 KK3386 KK3391 KK3415 KK3433
 KK3435

KA8863 Lostwood NWR, RR 2, Kenmare ND 58746

KA9331 Willapa NWR, 1309 N.E. 134th St., Vancouver WA 98665
 KA9369 Maryland
 KD8834 Great Dismal Swamp, 680-B Carolina Road, Suffolk VA 23434
 KE7407 Pennsylvania
 KG7709 North Carolina
 KG7710 Georgia
 KK3381 California
 KK3382 Alabama
 KK3384 Tinicum National Environmental Center, Scott Plaza 2, Suite 104, Philadelphia PA 19113
 KK3413 Colorado
 KK3437 Iowa

Small Boats

WXT5893	G.B. Heron	WZ2019	George M. Bowers
WZ2002	Speedboat #11	WZ2022	Oregon
WZ2003	Murree II	WZ2023	John N. Cobb
WZ2007	Patrol Boat	WZ2024	Alaska
WZ2008	Patrol Boat	WZ2027	FWS-905
WZ2010	Grizzly Bear	WZ2028	FWS-1451
WZ2011	Coot	WZ2029	FWS-19
WZ2013	Heron	WZ2030	FWS-1450
WZ2016	Speedboat #10	WZ2031	FWS-20
WZ2017	Rorqual	WZ2032	Canvasback
		WZ2035	Delaware II
		WZ2056	Ranger III



Wildlife tracking goes maritime mobile. (Photo by Curtis Carley, U.S. Fish and Wildlife Service)

first digit in the callsign (after the letters) is always a "6."

There are also mobiles, portables, handhelds, boats, and aircraft in use. These use callsigns formatted in the usual manners. One specific aircraft noted is a single engine observation craft headquartered in Minnesota that bears the FAA registration "N-701."

In addition to the low band frequencies, aircraft operate on 122.9 and 122.95 MHz, possibly also 123.5875 and/or 132.0125 MHz. Boats may also operate on 157.125 MHz in addition to the low band frequencies.

Our roster of NWR callsigns denotes the mailing address of the unit for most listings. Keep in mind that the mailing address may be many miles distant from the NWR named. Note also that some NWR's straddle state boundaries and are located in two states.

In the case of stations that have been monitored as being active on the 34 MHz frequencies, where the callsign could not be traced to a specific NWR, a location is indicated. A few of these locations were taken from government computer printouts containing artificially shortened names; therefore, they'll probably only make sense either to other computers or to residents of communities local to the places so indicated.

There has been no effort to include here

any Fish and Wildlife activities other than those at NWR's. A few VHF high band channels have been noted in use at several NWR's; they are not included because of their localized coverage.

What with more than 400 NWR's in existence, even taking into account that some have no base stations, and some may be covered by the facilities at a nearby NWR, there are obviously some NWR systems missing

from our roster. Our hope is that readers will fill in some of the blanks, provide additional information on the several obscure abbreviations, and otherwise shed new light on the communications of the U.S. Fish and Wildlife Service. Let's hear from you!

Listings for the vessels are reproduced (courtesy of the author) from *The Top Secret Registry of U.S. Government Radio Frequencies*, by Tom Kneitel.

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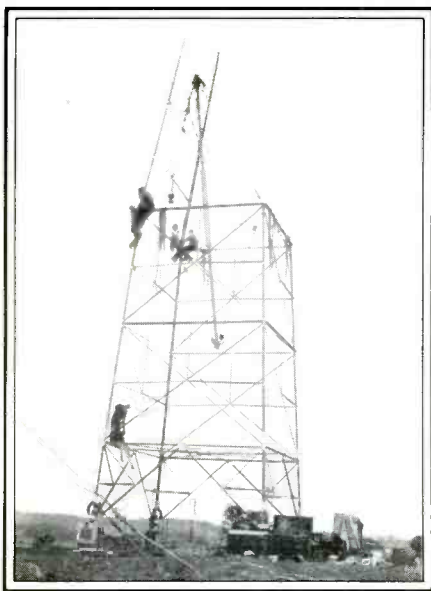
Name

Address

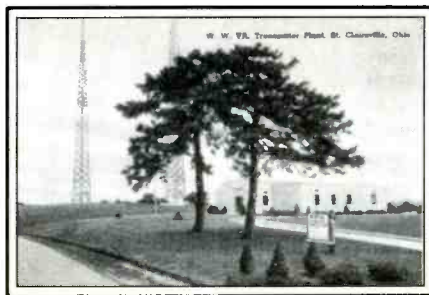
City

Zip

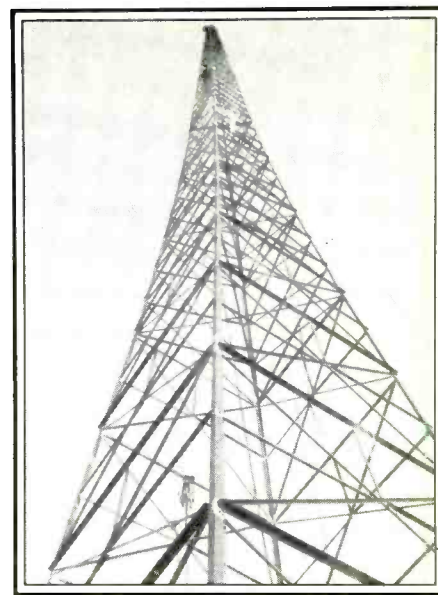
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One of the upwardly motivated WWVA towers in October, 1936.



A postcard showing the entire WWVA transmitter site in St. Clairsville, Ohio.



A tower at WWVA, completed in late 1936.

Remembering Radio

Broadcasting And Communications In Bygone Days

BY ALICE BRANNIGAN

If you have ever run your signal inverter past 1170 kHz during DX hours, you may have noticed WWVA of Wheeling, West Virginia. East of the Mississippi River, WWVA's potent 50 kW signal brings "Country and Western" music to its many loyal fans. In particular, WWVA is popular with long-haul 18-wheel truckers who listen to it throughout the night from Maine to Mobile.

We were reminded of WWVA recently when Gary Cumiskey (N8GJS) of Youngstown, Ohio sent us spectacular photos that his dad snapped back in the 1930's when he helped to put up an antenna system for the station. These unique photos represent a rare first-hand look at the process of assembling a large antenna 50 years ago!

WWVA inaugurated its broadcasting career in 1926 with a 100 watt transmitter on 860 kHz. By 1930, from its offices at 1299 Main Street in Wheeling, the station had moved over to 1160 kHz and was running 5 kW, a respectable power for that era. In 1936, WWVA slightly shifted its frequency to 1170 kHz, later increasing its power from 5 kW to 50 kW. By the end of WWII, still owned by the West Virginia Broadcasting Corp., the station had become a well established fixture on 1170 kHz with its powerful signal. Records of the mid-1940's indicated that the

WWVA offices were in the Hawley Building in Wheeling, with the transmitter across the river in St. Clairsville, Ohio.

An undated picture postcard shows the WWVA transmitter site at a point in time after the antenna system Gary Cumiskey's dad helped with had been installed. A small billboard notes that the station was using 50 kW at the time.

Ship To Ship

It's not too often that we get a chance to get a peek at a radiogram, but one going from one ship to another is especially unusual. Mike Schulsinger of Springfield, Ohio forwarded us just such a document.

Dated 1938, it's a copy of a radiogram sent from the S.S. EXOCHORDA (WBEF) to someone aboard the S.S. EXCALIBUR (KGWT). Both vessels belonged to the Export Steamship Corp., later to become American Export Lines.

Speaking of ships at sea, we had a complaint that we haven't given any coverage to these stations. That message was delivered in person while I was attending the Electronic Warfare Systems Conference at George Washington University in March. A faithful POP'COMM reader attending the gathering

recognized my photo from POP'COMM, introduced himself, and expressed surprise that I was ignoring ship stations.

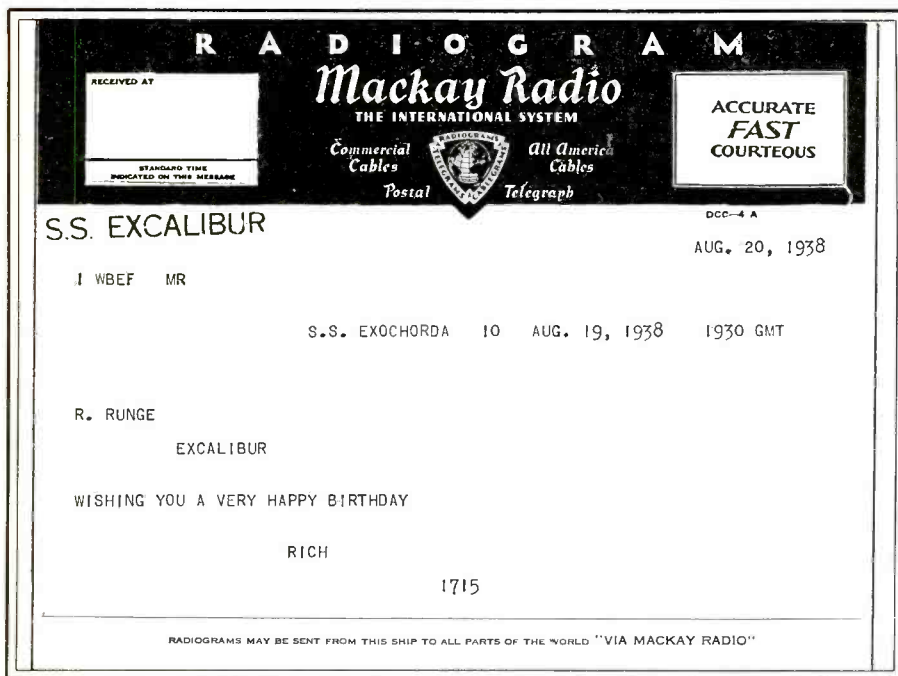
Well, you asked for it, you got it, Bill! I dug around and came up with a photo that describes itself as "the wireless cabin of the ELIZABETH AND BLANCHE," further noting that it was taken during the "Empire Cruise, 1925-1928."

Unfortunately, I'm not able to supply any of the specifics about either the vessel or the station itself. From the looks of the overhead construction, it appears to have had wooden decks. The lettering on the wireless apparatus cannot be made out, even under high magnification. A world cruise stretching out over a four year period raises the possibilities it was either a sailing vessel or else a cruise ship catering to a very well-heeled clientele; maybe a ship of British registry.

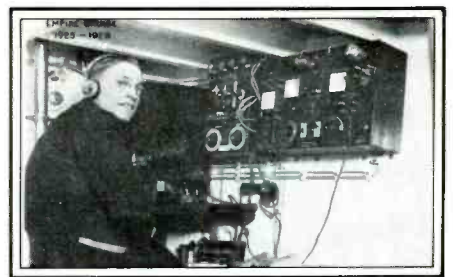
Any readers who can offer additional insights into this station, including its callsign, nationality, owners, type of vessel, propulsion system, length, tonnage, or years of service, are invited to speak up.

Update

Before I forget, I'd like to offer some additional information to previously covered



An example of a radiogram sent from one ship to another.



The radio shack aboard the good ship "Elizabeth and Blanche" during the 1927-1928 "Empire Cruise."



Dodge's Wireless Institute in Indiana is still there, but with a more modern approach (and name).



One of the 650-foot U.S.N. transmitting towers at Cavite in the Philippines. They were destroyed by the Japanese early in WWII.

items. This information was graciously furnished by our readers.

David C. Oliver, of Littleton, Colorado, comments on our photograph of the predecessor of the Valparaiso Technical Institute (December '85 issue). David graduated from VTI in 1983 with an Associate Degree in

Engineering Electronics. He notes that, when the school began in 1873, it was called the "Dodge School." The school is presently located several blocks away from the site shown in our photo, and there are about 200 students with approximately 10 faculty members. Daytime station WNWI (1080 kHz, 250 watts) is located on the VTI campus in Valparaiso, Indiana.

From Dick Ipsen, Napa, California, we get additional information on the large U.S. Navy transmission towers at Cavite in the Philippines (November '85 issue). Dick had originally sent in the photos of the towers and now adds that they are mentioned in the book *Silent Victory, The U.S. Submarine War Against Japan* (Volume 1), by Clay Blair, Jr. (J.P. Lippincott Co, New York, 1975). These books are considered to be the best source of information on WWII submarine action in the Pacific Theatre. Blair said (page 111) that the destruction of these towers by Japanese forces was hard felt because they were a vital link in our submarine communications network.

Also in the December '85 issue, we had a photo of the home of former station KGDA that was located in the Mitchell, South Dakota, Corn Palace. We wondered if the picturesque building still exists. Several readers wrote to say that, indeed, it does!

Jerry Van Vactor, K0JV, of Spearfish, South Dakota, mentions that the building is still in daily use for sporting events and conventions. Also, it is the home of radio station KORN (1490 kHz, 1 kW days and 250 watts at night).

From Winnipeg, Manitoba, we heard from Shawn Axelrod about the Corn Palace in Mitchell. Shawn's local newspaper, the *Winnipeg Free Press*, ran a story and photo about this structure. The story reports that it takes

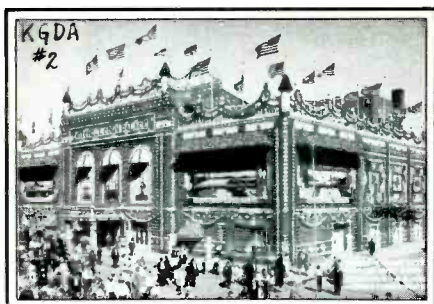
more than 3,000 bushels of corn (at a cost of \$35,000) to decorate the building every year for the yearly Corn Belt Exposition. A current photo of the building reveals that Moorish minarets and kiosks have been added to the roof and the marquee has been enlarged. Otherwise, the Mitchell Corn Palace looks the same as it appeared in our 1931 view.

Dennis E. Casey, Nebraska City, Nebraska, wants to exchange information. He reports that the murals on the exterior of the Mitchell Corn Palace are made from different colors of grain and are changed every year. "But," Dennis asks, "what kind of car are you pictured with?" Dennis refers to some of the photos run here where I'm accompanied by an unusual vehicle. Although it isn't mine, the car in the photo is a 1975 "Glassic" made by "Glassic Car Industries" in Daytona Beach, Florida. It's a bright red fiberglass repro of a Model A Ford built on an International Harvester chassis and a Ford 302 engine, automatic transmission. The car belongs to Tom Kneitel; the photos were taken a couple of years ago.

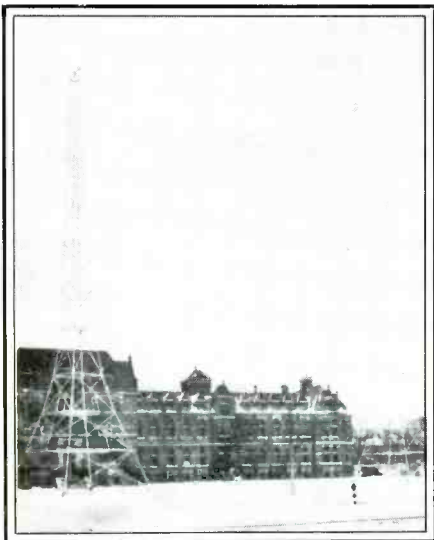
Questions, We Get Questions

Harvey Ehrenfeld of Las Vegas asks for more information about the early broadcasting practice of stations illegally shifting to frequencies they preferred rather than operating on frequencies assigned by the government.

The first station to try it was WJAZ in Chicago. The station decided that it didn't want to be on 1120 kHz anymore, so it simply found a frequency more suited to its preferences. The frequency they picked was one used by a Canadian broadcaster. Soon thereafter, inspired by WJAZ, many other



The Corn Palace in Mitchell, South Dakota was once the home of station KGDA. Now it houses station KORN.



Station CNRA had two masts, each 150 feet in height. This station was only a memory by the mid-1930's.

stations of the mid-1920's era decided to follow suit. This threw broadcasting into some amount of chaos with stations shifting overnight to any frequency they wanted. Eventually, the government tossed WJAZ (no relation whatsoever to the present WJAZ in Albany, Georgia) off the air.

Of course, some stations were fully authorized to change their frequencies and did so quite often. KTHS in Hot Springs, Arkansas operated on 780, 600, 1040, 970, and 800 kHz within the first couple of years it was on the air. WOAI in San Antonio (presently on 1200 kHz) came on the air in 1922. Between 1924 and WWII the station had tried and discarded 780, 940, 760, 990, 1070, 1190, and 600 kHz!

In Old New Brunswick

Those who listen to station CKCW (1220 kHz, 25 kW) in Moncton, New Brunswick are probably unaware that CKCW replaced an earlier station, now long forgotten. That would be station CNRA (630 kHz), operated by Canadian National Railways and located at the CNR's train station in that city. CNRA was one of ten mid-1920's broadcasters operated by the CNR across Canada.

CNRA ran a 500 watt transmitter (later increased to 700 watts) into an antenna strung between two 150-ft. high towers spaced

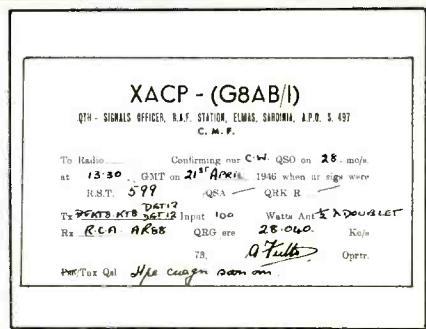
Historic Ham QSL's

In 1941 the Cia. Mex. Aviacion (of Mexico) commenced operation of a large number of 100 to 200 watt radiobeacons in the 1618 to 1708 kHz frequency range. Although the beacons all used three-letter beacon identifications, each was licensed with an official callsign commencing with the letters "XA", such as XACV, XACQ, XADG, etc. These stations were licensed and active at least into the 1960's

That's what was so odd in 1946, when the Ham bands first reactivated after WWII. Numbered among the very first DX Hams heard were stations using callsign from the Mexican "XA" radiobeacon series. QST magazine for 1946 specifically mentions XAAF, XABZ, XAAL, XABY, XACR, XACP, XAPQ, XAAP, XABU, XAAX, XAEY, and XAEG. No, they weren't Mexican radiobeacons that had wandered off frequency. These guys were in Italy, Greece, Rhodes, Sardinia, Trieste, and similar locations nowhere near Mexico.

It turned out that these Hams with odd 4-letter Mexican callsigns were all members of the allied armed forces on occupation duty in southern Europe! When the military communications people decided to authorize post-war Ham operation, they issued all of the stations callsigns from this series. Apparently there was no thought given to the fact that only Mexico was supposed to issue callsigns from the XAA to XIX callsign series, and that the Mexican government had done just that in copious amounts!

How and why did this happen? Most likely, the military brass who issued the

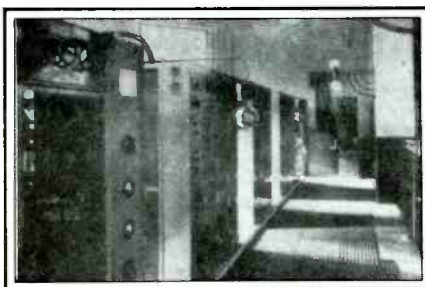


station authorizations knew virtually nothing about international callsign blocs, nor were they familiar with the alphanumeric formats normally used by Ham stations. Perhaps they arbitrarily selected the "XA" prefix in the same manner they had generated thousands of tactical identifiers during the years of the war immediately preceding.

The Hams were so happy to be authorized for operation they were hardly going to cause any problems by pointing this out to the military authorities. The reaction of the Mexican government to this blatant ripping off of their already-issued radiobeacon callsign wasn't recorded.

Our historic Ham QSL card is from XACP, a Ham station operated by the Royal Air Force on the island of Sardinia in 1946. This 100 watter rewarded those who contacted it with a truly unusual piece of wallpaper bearing a stolen and duplicated (yet fully authorized) callsign that was totally out of step with other Ham callsigns!

Mexico's "XA" beacon stations are long gone. Mexico now assigns four-letter "XA" callsigns to ships.



Poland's Radio Podebrady was a favorite with North American DX'ers in pre-WWII days. These are their transmitters.

200-ft. apart. This station vanished from station rosters in late 1933, about a year before the Moncton Broadcasting Company was able to get CKCW on the air with a 100 watt rig on 1370 kHz. By the end of WWII, CKCW had moved to its present 1220 kHz slot on the band, and had increased its power to 5 kW, and then later went to 25 kW.

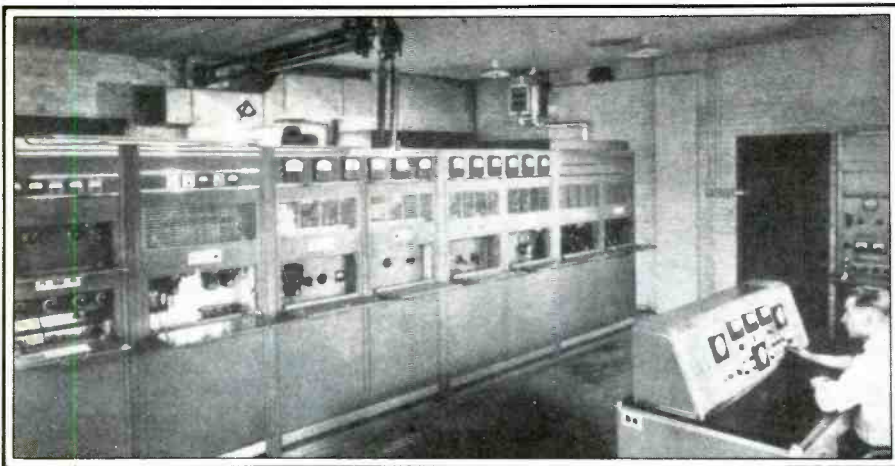
Czech This Out

The Republic of Czechoslovakia was pro-

claimed in 1918. That dream lasted for only about 20 years when, in a one-two blow the nation was, in effect, given to Hitler by means of the Munich agreement, followed by the dissolution of the Czech Republic by the Nazis in 1939. It had been thought (by some) that the Munich agreement to sacrifice Czechoslovakia might appease Hitler's appetite for European nations. The Czechs were "rescued" by the Russians in 1944 and within two years the nation had a Communist prime minister. By 1948 a harsh Stalinist period had commenced and, although a trend toward liberalization took place in 1968, an invasion of Czechoslovakia by several other Communist nations returned it to its earlier repressive policies. These policies continue.

During the early to late 1930's, however, the Czechs enjoyed a free government and the government's shortwave stations enjoyed much popularity around the world.

The Czech shortwave transmitters were located in Podebrady, a spa to the east of Prague, the capital city. Eight different 30 kW stations were in use: OK1MPT on 5145 kHz; OLR2A on 6010 kHz; OLR2B on 6030 kHz; OLR3A on 9550 kHz; OLR4A on 11840

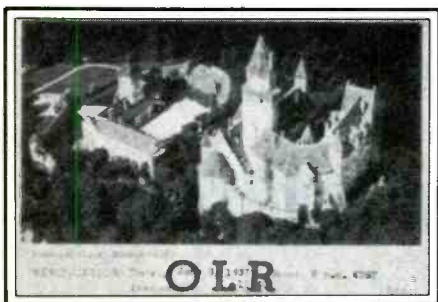


This early FM broadcaster bore the odd callsign of W85A. Later, the call was changed to a more traditional one, WGFM.

kHz; OLR4B on 11760 kHz; OLR5A on 15230 kHz; and OLR5B on 15320 kHz.

An array of seven antennas were in use. Three were directional, the others were omni-directional.

The North American transmission took place on 11840/11760 or 15230/15320 kHz, four days each week. These programs



Another 1937 Czech QSL was decorated with a local castle.



One of OLR's colorful 1937 QSL's showed a scene from a peasant festival.

consisted of news and entertainment in English and Czech.

A South American transmission on the same frequency pairs went out on Sundays from 2255 to 0255 GMT and was in Spanish and Czech.

The European service was sent daily on 11840/11760 kHz; 9550 kHz Monday/Tuesday; 6010/6030 kHz on Thursday; and 5145 kHz on Saturdays. These programs were in Czech, German, French, and English.

Although an International Reply Coupon (IRC) was required in order to obtain the Radio Podesbrady QSL card, listeners were rewarded with an assortment of beautiful photographic QSL's showing scenes from Czechoslovakia.

It's all history now. Only a few photos and QSL cards remain to mark the existence of Radio Podesbrady. Luckily, we have some to share with our readers.

Fee-Fi-Fo-FM

In the mid-1940's, FM broadcasting was just getting underway and, of the 45 stations operating in July of 1944, only seven were independent of any AM station affiliation.

One of the early FM broadcasters was affiliated with WGY in Schenectady, New York. WGY, of course, is General Electric's pioneer station. In 1945 their FM broadcast station bore the bizarre callsign of W85A and operated on 48.50 MHz, a frequency in what passed for the FM band back then. If you're observant, you'll notice that the callsign was made up to include the two middle digits of the station's frequency, an early FCC experiment in concocting callsigns for these new broadcasters.

This station also operated on 42.98 MHz under the experimental callsign of W2XI. After the present FM band was opened up (88 to 108 MHz) in 1946, this station was located on 100.7 MHz and was given the callsign WGFM. Guess the FCC dropped plans to use the exotic callsign format. Presently, WGFM in Schenectady operates on 99.5 MHz.

Parting is such sweet sorrow—until next month!

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Illustration by Terry Moehlman

An Inside View:

U.S. Army Communications In Central America

A Vital Tactical Link Forged From Scratch

BY COL. CHARLES L. GORDON, U.S. ARMY

In 1979 a well-organized revolutionary group known as Sandinistas overthrew the long-standing, almost universally hated, government of Anastasio Somoza in Nicaragua in the heart of Central America. At first it looked like a turn for the better, and the United States was quick to offer millions of dollars in aid to the new government, which had promised democratic elections and wide-ranging government reforms.

However, it soon became apparent that the Sandinista idea of "reform" had a Marxist-Leninist flavor. Pre-revolution promises were not kept, and Nicaraguans again found themselves governed by an oppressive regime. Refugee flow accelerated as over a million people left the country. Hundreds of Cuban Advisors poured in, and a rapid build-

up of the military machine began. Today, Nicaragua has an armed force second to none in the region, numbering over 100,000 soldiers (eight times its size in 1979). An endless chain of Soviet Bloc ships have delivered more tanks, artillery, anti-aircraft guns, attack helicopters, and other military equipment than that possessed by all the other Central American nations combined. In addition, the Sandinistas are building airfields to accommodate high-performance aircraft, which could be delivered at any time.

This buildup of military force, far larger than anything needed for defensive purposes, has understandably given Honduras and Costa Rica, Nicaragua's neighbors to the north and south, a case of the jitters. If there remained any doubt as to Sandinista inten-

tions, they needed only to look to their beleaguered neighbor, El Salvador, where insurgents waging a bloody civil war are being supported through Nicaragua from various sources.

Unwilling to accept a new Cuba on the American mainland exporting Marxist-Leninist revolution to its neighbors, the President, in April 1983, declared the region "vital to U.S. interests" and initiated a broad range of actions to deal with the crisis. The military portion of new U.S. initiatives in Central America has presented great challenges to communicators.

Indigenous communications in Central America are austere at best. There are no roads or telephone lines into many towns. Where service does exist, systems are oper-



ating at full capacity, with little or no room for additional circuits. There is high reliance on telegraph and radio communications, and frequency management is almost non-existent. Until recently, the only secure U.S. communications lines in the area were to our embassies, and these were very limited. There were no significant lateral U.S. communications systems. If our ambassador in El Salvador were to talk secure to his counterpart in Honduras, the call had to be connected through Washington, DC.

In the summer of 1983, thousands of American servicemen and women arrived in Honduras to conduct Exercise Ahuas Tara II (Big Pine II), a follow-on to a smaller exercise held earlier in the year. This exercise was different from any which had been conducted

before. It involved up to 5,000 soldiers, airmen, and marines. Several thousand sailors participated in closely coordinated Atlantic Command (LANTCOM) exercises. Ahuas Tara II was the biggest exercise ever conducted in Central America. It lasted for five months—the longest continuous exercise in U.S. military history. The basic communications system which was established is still in existence, supporting the many follow-on exercises and real-world actions which have occurred over the last two years.

The backbone of this new regional system is Ground Mobile Force (GMF) multichannel satellite communications. The GMF links bring in AUTOVON and AUTODIN lines from CONUS, as well as command and control, Armed Forces Radio, weather, and

other special circuits. GMF also provides vital connectivity to United States Southern Command (USSOUTHCOM), the Unified Command responsible for U.S. military activities in the region, headquartered in Panama. The GMF system has employed virtually all of the Army's 235th Signal Detachment for the last two years, with occasional additions provided by the Joint Communications Support Element (JCSE) from MacDill AFB, Florida. The 235th, from Fort Monmouth, NJ, has done an outstanding job keeping these systems operational for a record period of time.

Continuous exercises in Honduras have provided a real-world training environment which has permitted the U.S. Army to exercise most of its Echelons Above Corps (EAC) Signal units. Besides the 235th Signal De-

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PACKET MANIA

The hottest trend in radio today is packet radio. Packet is error-free communications, and involves linking a special converter called a TNC (terminal node controller) with a transceiver or receiver and your computer. With a TNC you can copy RTTY, AMTOR, code, or packet communications. Madison offers both the AEA PK-80 or the Kantronics Communicator, both priced at \$229.00, as optimum ways to get started in packet. Call for further information.

CIRCLE 74 ON READER SERVICE CARD



tachment, Signal units have included elements of the 35th Signal Brigade from Fort Bragg and the 3rd Signal brigade from Fort Hood. But the brunt of communications support in Honduras has been borne by the 11th Signal Brigade from Fort Huachuca, Arizona. This capable outfit provides overall systems control and most of the automatic switching, technical control, telecommunications centers, cabling, and maintenance which enable our military forces in the field to support national policy in Central America.

In terms of equipment, one of the most useful communications items has been the single-channel, push-to-talk, tactical satellite (TACSAT) radio, AN/URC-101/110. With this radio, communicators have surmounted the mountainous terrain of Honduras without having to resort to isolated, personnel-intensive repeater stations. TACSAT has

thus made it possible for stations located many hundreds of miles apart to be in the same tactical radio net, allowing the cueing (prompting in near-real time) of one station from another. Without TACSAT, U.S. Military operations in the region would be significantly hampered and less beneficial to our training program.

TACSAT communications are absolutely vital in El Salvador. American trainers there are scattered throughout the country in small groups called Operational Planning and Training Teams (OPATTs). The OPATTs are located with brigade-size headquarters of the El Salvador Armed Forces (ESAF). U.S. trainers are not directly involved in ESAF military operations, but emergencies sometimes occur in the isolated areas where they work. When that happens, they cannot rely on limited ESAF communications networks,



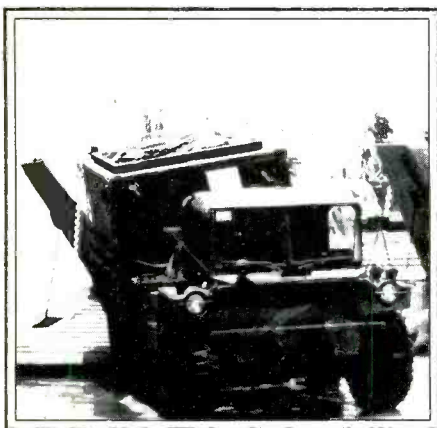


upgraded to include a new satellite earth terminal, new AUTOVON switch, additional microwave links, and tech control improvements. USSOUTHCOM Headquarters will soon be fully automated with the acquisition of a totally new ADP system which will be linked to scores of "smart" computer terminals.

In the meantime, U.S. military communications systems in Central and South America continue to provide reliable service through the dedication and skill of communicators from all the services, working together toward a common goal. There have been big changes south of the border. Things are humming now, but more is yet to come.

About the author: Col. Gordon has served in Signal command and staff assignments throughout the world during his 23 years of service. For the last two years, he has been stationed in Panama as Director, Communication-Electronics and Automated Systems, J6, United States Southern Command, with staff responsibility for all U.S. military communications in Central and South America. **PC**

POP'COMM wishes to thank the Army Communicator for their permission and cooperation in bringing you Col. Gordon's report.



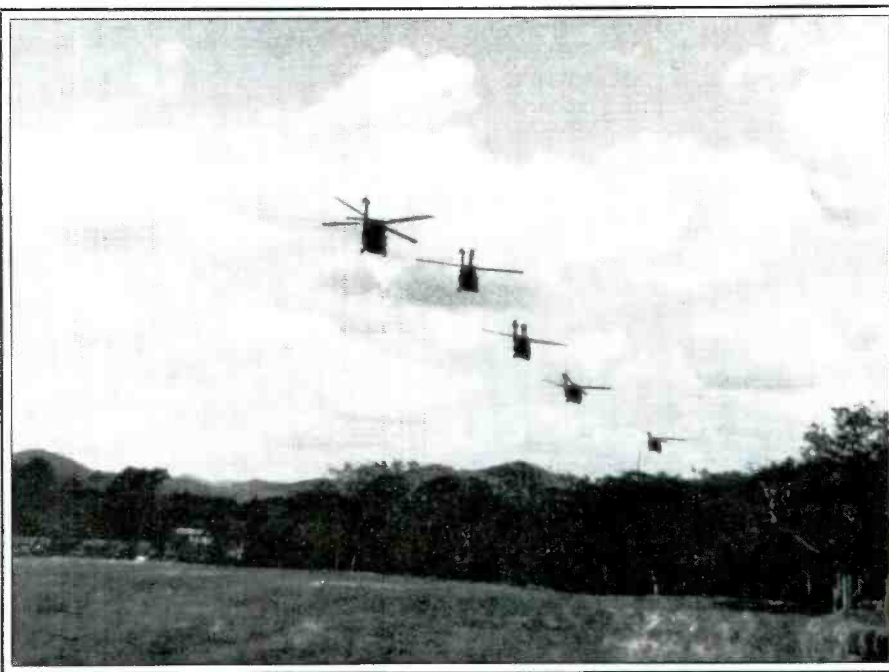
with repeaters throughout the country. Honduras has built a national military HF system with AN/URC-92 radios and, like El Salvador, is moving toward more use of COMSEC equipment. Even Costa Rica, which has no military establishment, has installed modest, securable HF and FM systems with security forces along her northern frontier.

Though much remains to be done to improve U.S. military communications in Latin America, many enhancements have now been set in motion. The tactical/transportable communications system in Honduras will be replaced with commercial equipment where feasible. The regional secure voice network of STU-II's and facsimiles is being expanded to embrace all U.S. military organizations throughout Latin America. Elements of the Defense Communications System (DCS) in Panama are being

most of which are non-secure in any case. The small TACSAT radios have proven to be lifesavers in the middle of a shooting war.

Another important communications innovation in Latin America has been the proliferation of secure facsimile. Tactical facsimile (TACFAX), specifically the AN/GXC-7, is used with the AN/URC-101/110 TACSAT radio. In addition, the AN/UXC-4 TACFAX and its off-the-shelf counterpart, Amecom's FASTFAX 2000, are widely used over commercial telephone lines. The path is currently secured with VINSON communications security (COMSEC) devices, but USSOUTHCOM is in the process of converting to new Secure Terminal Units (STU-II's). Some problems have been encountered due to the relative unreliability of telephone lines in Central America, but a workable, regional (lateral) secure voice capability now exists where there was none before.

Significant strides have also been made in host country communications. As security assistance has increased, poor nations of Central America have been able to purchase limited amounts of relatively modern equipment. El Salvador has acquired a great number of AN/PRC-77 and other tactical radios, and installed a securable FM radio system



Firefighter Rescues Man From Television Tower

Climbing television towers to rescue people threatening to jump in the middle of a cold, windy night is not part of a firefighter's training. But Seattle fireman Randy Fullerton's fast and correct action in such a situation helped avert a tragedy.

A 29-year-old man had climbed up the television transmitting tower of Seattle's KCTS-TV and threatened to jump. According to an account of the incident in the *Capitol Hill Times*, Tess Forte had been walking near the tower late one evening when she heard the man call to her from the tower.

"He said that he was going to jump and he wanted me to call the police," she told the *Times*.

SCAN PUBLIC SERVICE AWARD

Forte said that the man told her that he had planned to kill himself on Valentine's Day. She listened, and tried to communicate that she understood. She believes that her conversation with the man showed that she cared and kept his attention. "I tried to have a nurturing tone in my voice," she said.

Forte had another person walking by the tower call the police, and was still talking to the man when the police arrived a few min-

utes later. At this point, the man was about 125 feet above the ground on the television tower's narrow ladder.

The police were at first unable to communicate with the man because of traffic noises, but the man kept talking. Fire Station No. 10, only four blocks away, was called.

Ladder Company No. 10 arrived at the transmitter complex and entered a back door with the help of station personnel. The station compound contained two broadcasting towers and was surrounded by an eight foot-high fence topped with barbed wire. Police believe that the man climbed over the fence or found a space to crawl through in the parking area of the complex.

The firefighters attempted to raise the 100-foot ladder to rescue the man, but he began climbing higher when they did so, according to police reports and the account in the *Times*. The fire truck ladder was lowered and Fullerton volunteered to go up after the man.

Fullerton climbed up the tower, and reached a position just below the man. At this point, the tower was only a couple of feet wide, and a station technician on the scene had earlier mentioned the possibility of heat from the radio waves at the top of the tower, in addition to the possibility of electrical shock beyond a certain point on the transmitting tower.

The man, wearing a ski mask, jacket and leather boots, cautioned Fullerton not to come too close. Fullerton didn't, but he did

start what would turn out to be a 45-minute conversation in the cold, windy weather. While both men were hanging on the narrow ladder, Fullerton asked questions about the man and listened to his personal problems and what led him to climb the television tower. Both men were about the same age, and Fullerton's brother had been stationed at a military base in the man's home town. That made it easier for them to talk.

The man finally agreed to climb down, and both men reached the ground without injury. The man was taken to a nearby medical center for evaluation. He told the police that he had not been able to find help and that he decided to climb the tower to get someone to listen to him.

He was lucky that Randy Fullerton was one of those he talked to while on the tower. "It's our job to protect people . . . our basic purpose is to do the job," the Seattle firefighter told the *Capitol Hill Times*.

Fullerton was a three-year veteran of the Seattle Fire Department at the time of the incident. He also has taken psychology classes and is in pre-med.

For his actions above and beyond the call of duty, Randy Fullerton will receive this month's SCAN Public Service Award. This includes an engraved plaque and a cash award. SCAN member Kito Kaneta of Seattle will receive a special commendation plaque for making the nomination. Congratulations to both of you.

SCAN

Best Equipped

Lee Groce of Yadkinville, North Carolina, says that he is never without a pocket scanner. From the looks of things in this photo, he has not had to worry about not having a pocket scanner for some time.

His interests are shortwave broadcasting and utility transmissions, and he also holds a technician class amateur radio operator's license.

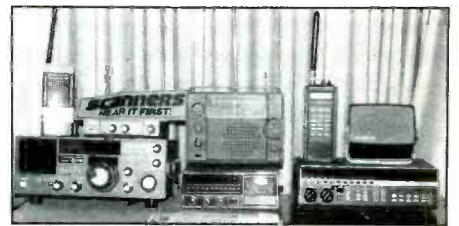
Equipment shown here includes (from left to right): Sony 2001 shortwave receiver; Kenwood R-11 shortwave receiver; Regency HX-650 six-channel pocket scanner;



SCAN PHOTO CONTEST WINNERS

Tennelec MS-2 binary base 16-channel scanner; Bearcat 100 16-channel pocket scanner; Regency HX-1000 pocket 30-channel scanner; ICOM 2AT two-meter handie talkie; and a Fanon Scanfare four-channel pocket VHF scanner.

Other equipment includes: Yaesu FT-101E 80-10 meter transceiver; MFJ antenna tuner; Autek QF-1A sideband/CW filter; Hy-Gain SWR/power meter; Welter 12-volt power supply; Gold Line SWR bridge meter; two-meter Lunar amplifier; Radio Shack 24-hour clock; Heathkit two kW dummy load antenna; Pace eight-channel Scan Monitor; Lafayette 25B 23-channel citizens band transceiver; and Commodore VIC-20 computer.



Best Appearing

Our winner in this category this month is Stuart Healy of Montreal, Quebec. Stuart's bumper sticker, arranged amid his equipment, says it all: "Scanners Hear it First!"

Stuart uses a Yaesu FRG-7700 shortwave receiver with active antenna, Bearcat 100 portable scanner, Bearcat 300 scanner, Realistic Pro-6 scanner, Craig 1254 scanner, and Realistic Patrolman-5 receiver.

Congratulations, Stuart!

Winners of the SCAN Photo Contest will receive a BMI NiteLogger.

If you'd like to enter the photo contest, send a black/white photo (which cannot be returned) to SCAN Photo Contest, P.O. Box 414, Western Springs, IL 60558.

SCAN

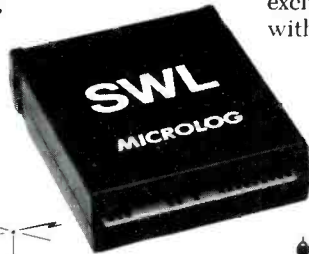
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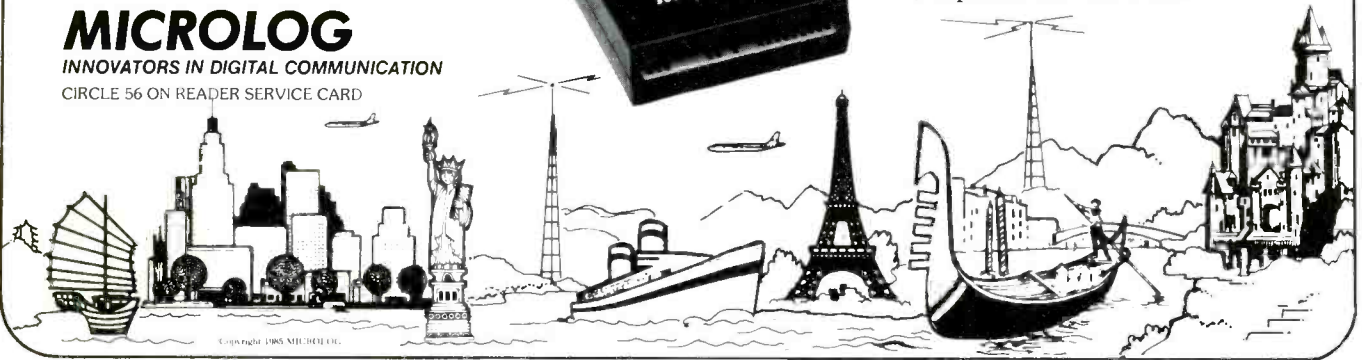
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Morse code and all speeds/shifts of radioteletype. It comes with a cable to connect to your radio's speaker/earphone jack, demo cassette, and an excellent manual that contains a wealth of information on how to get the most out of short-wave digital DXing, even if you're brand new at it.

For about the price of another "Pac-Zapper" game, you can tie your Commodore 64, 128 or VIC-20 into the exciting world of digital communications with the Microlog SWL. \$64. Postpaid, U.S. MICROLOG CORPORATION, 18713 Mooney Drive, Gaithersburg, Maryland 20879. Telephone: 301 258-8400.



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BOOKS YOU'LL LIKE!

BY R.L. SLATTERY

A Louin' Spoonful Of Radio History!

I confess to being an inveterate accumulator of information concerning broadcasting and communications. Two years ago I learned that there was a short-lived broadcaster in my community during the 1920's and that caused me to embark upon a search for additional information. That search was quite difficult due to almost 60 years of distance between the station's existence and my curiosity!

Maybe that's one of the reasons that I've spent so much time digging through Tom Kneitel's new book, *Radio Station Treasury (1900-1946)*. What Tom has done in this large size 176-page book is assemble data (callsigns, slogans, frequencies, addresses, licensee names, locations, powers, schedules—whatever he could find) on broadcasting and communications stations in virtually every category that operated between the days of the first spark transmissions and up to the beginning of the "TV era."



Covering stations throughout the entire world, and arranged generally by year, the book can be used to trace the operating specifics of AM broadcasters, shortwave broadcasters, federal and military stations, experimental, maritime and aeronautical stations, point-to-point and press stations, police and other two-way emergency units, even the many mysterious secret enemy propaganda stations that popped up all over the SW bands during WWII!

There are listings of the first American aircraft licensed for radio, 1931 TV stations, FM stations as far back as 1941, international callsign prefixes going back to 1919, the callsigns of ships such as the *Titanic*, *Lusitania*, *Leviathan* and *Morro Castle*. All of the first

American broadcasters are listed, along with the dates their licenses were issued and the experimental callsigns they had used prior to that. Any book that is so detailed that it gives the callsign of aircraft attached to the *USS Arizona* in 1931, listings for AM broadcasters in China during 1936, then goes on to specify that station KSPN, in 1938, was a snow plow operating on 2490 kHz in Washington state; well, that's my kind of directory! Want to know what wavelength broadcaster WJX was using in 1926? Want a listing of all of the broadcasters operating in Chicago in 1931; or Nampa, Idaho; or Tocola, Mexico; or Tinucu, Cuba; or Wolfville, Nova Scotia? They're listed! Maybe you want to also check out this information for 1942!

I don't know how many thousands of stations were on the air during the radio's first half-century, but there were many times more than I'd have guessed. Surprising, too, to see how many *really* low powered AM and shortwave broadcast stations were active in bygone years—like 10-watt WNBW in Pennsylvania during the early 1930's, or 5-watt CFCQ in Vancouver, or 7½-watt XGML in China, or 50-watt Portuguese broadcaster CT1CT (3750 kHz). Hey, if CT1CT had the grit to run a 50-watt SWBC station in the middle of a ham band (and really expected the world's DX'ers to hear it on their three-tube AC/DC receivers), it makes you wonder about those modern-day SWBC stations tossing out 100 kW killer signals to be picked up by state-of-the-art equipment!

Perhaps DX'ers from "way back when" had better antennas than we thought, or maybe they were willing to try hard to drag these flea-powered mighty-mites out from under the noise level. Today, unless a signal has enough moxie to bend the S-meter pin like a banana, many listeners pass it by!

Radio Station Treasury faithfully reproduces original rare directory archives listings dating back well into the dark ages of wireless—this in order to assure completeness and total accuracy, and to preserve the original flavor of the information sources.

There are fascinating features explaining the origins and evolution of callsigns and station directories. Scattered throughout are numerous ancient ads for SWL receivers, antennas, and accessories. There's a chapter listing hundreds of 1920's and 1930's broadcast station slogans, some of which are gems. How about the 1931 station that announced itself as, "Music for the sick"!

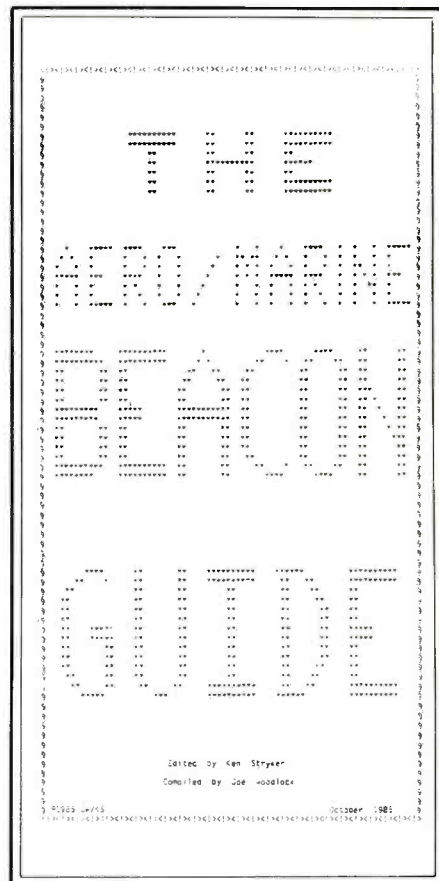
If it was on the air between 1900 and 1946, no matter what or where it was, it's probably contained in this unique directory. *Radio Station Treasury*, by Tom Kneitel, is \$12.95 per copy, plus \$1 postage (to USA/Canada/APO/FPO). If your favorite communications

dealer doesn't yet have it, it may be ordered by mail directly from its publisher, CRB Research, P.O. Box 56, Commack, NY 11725.

By the way, do you know the official U.S. Navy callsign assigned during WWII to one of Hitler's Heavy Cruisers? This 655 ft. dreadnaught, with a crew consisting of German and American sailors, boldly steamed into the harbors of Philadelphia and Boston, through the Panama Canal, and into the Pacific—where American forces tried (and failed) to sink it! Casey Stengel said it best, "You could look it up!"

Long May It Wave (Longwave)

We finally got our sweaty paws on a copy of the latest update of Ken Stryker's *Beacon Guide*. If you're a devotee listening to these stations, it's a reference source you'll find an invaluable aid.



Even after knocking out the 1,000 beacons that went off the air after the previous edition was put together, Ken still ended up with more than 6,100 radiobeacons in this directory. Coverage is for North/South America, Caribbean, Asia (including Asiatic USSR), and the Pacific.

Listings are according to frequency, cross-indexed by beacon ID's. Information in-

cludes coverage of maritime and aero beacons, airport/chart names, geographical coordinates, power in watts, voice weather characteristics, operating times, and operating authorities (including military). A separate sections lists over 100 "LOWFER" hobbyists operating QRP between 160 and 190 kHz.

The *Beacon Guide* is prepared in a format to be used in your three-ring looseleaf binder; that makes for easy updating.

Order this excellent publication at \$10.00, postpaid (\$15.00 overseas airmail) from Ken Stryker, 6350 North Hoyne Ave., Chicago, IL 60659. By the way, Stryker is one of the major honchos involved in the specialty of monitoring radiobeacons operating between 160 and 1745 kHz, and is therefore highly qualified to author this type of directory.

"I Yam Whats I Ham!" (Popeye the Sailor, c. 1936)

Ameco's Ham home-study books have been around, through various editions, for quite a number of years. These teach the way to a Ham "ticket" by the tried and proven method of giving the prospective licensee a peek at hundreds of official FCC test questions, along with the multiple choice answer selections, plus the correct answer for each question and an explanation of why that answer was the right one.

Currently available in Ameco's popular series are the study guide for *Novice*, *General*, *Advanced*, and *Extra Class* licenses. The *Novice* guide is \$2.95, while the others in this series are \$4.95 each.



If your thing is commercial radio, Ameco offers several guides for those FCC licenses. Newly revised are the *Commercial Radio Operator Q and A Guide for Elements 1 and 2* (one combined edition for \$3.95) and the edition for *Element 3* (\$5.95). A *Commercial Radio Operator Theory Course* (\$8.95) is also available.

Actually, Ameco offers a large number of study books, guides, and recordings. Those we have had a chance to examine have been

well thought-out and prepared with an eye toward taking you through the rough spots with as little pain as possible. Altogether, not as frightening or boring an experience as it might have been.

If you've been mulling over the idea of obtaining a Ham ticket, or "upgrading" an existing ticket, this series of books is worthy of your serious consideration.

Believe me when I tell you that all of the mystique about struggling to scrape up enough smarts to pass the FCC's exam is mostly a myth. It's perpetuated by folks who want to impress you with how bright they are.

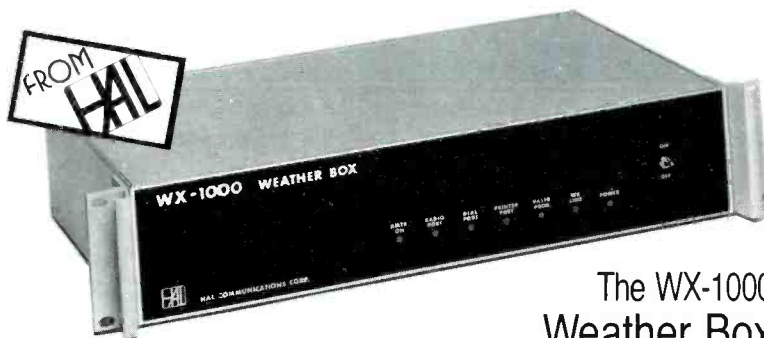
In fact, the FCC exams these days are designed to encourage entry into Ham radio. Alright, so maybe your brother-in-law, Elroy, wouldn't be able to pass one of these exams, but you shouldn't have any trouble at all after some minimal preparation. The reward is a terrific ticket to talk to Tahiti and Timbuktu (and if you can say that rapidly five times without biting your tongue, then you're a candidate for being a DX bigwig on the 20 meter band).

Ameco Publishing Corp. is located at 220 East Jericho Turnpike, Mineola, NY 11501. Tell 'em we sent you!

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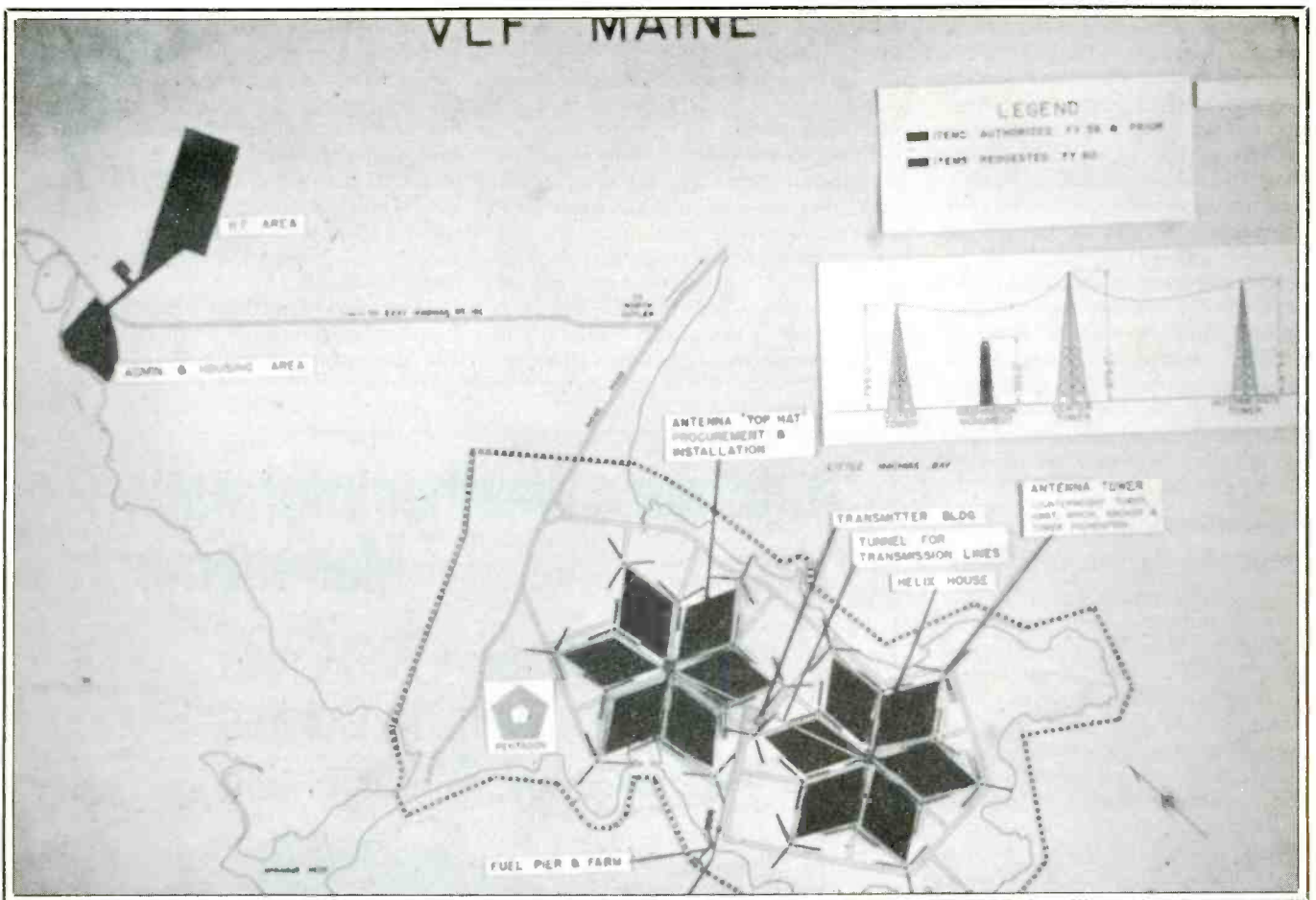


Diagram looking down upon NAA's dual array VLF antenna system. The system can be operated as two separate antennas or it may be combined into a single array. Each antenna is a base-fed monopole with a top hat for capacitance tuning.

POP'COMM Visits:

The World's Most Powerful Radio Transmitter

The U.S. Navy's Two-Million Watt Maine Monster Is Awesome!

BY TONY EARLL, KNY2AE

In a world filled with claims of "largest," "tallest," "longest," "strongest," "heaviest," and similar superlatives, it tends to become easy to begin taking adjectives with a blasé attitude. It isn't often that any of us ever come face-to-face with the persons or objects described as being "larger than life."

Within the world of communications, the U.S. Navy makes the claim that "the world's most powerful transmitter" is theirs. They say that it is used at their Naval Communication Unit, Cutler, Maine (near East Machias).

This station, which is known on the airwaves under the callsign NAA, certainly looks formidable enough to hold down at

least a dozen or so world class superlative titles.

Background

In the late 1940's, Naval planners realized the need for an extremely high-powered, low frequency transmitter located on the east coast for purposes of handling communications traffic to the North Atlantic and Arctic Oceans. Cutler, Maine (about the most north-easterly location in the United States) was selected, and in January of 1958, construction began. Three full years were required to erect this vital link in the Navy's worldwide chain of communica-

tions. NAA was formally commissioned as NAVCOMMU Cutler on 23 June 1961.

The mission of NAA is to provide a VLF communications link between high level command authority ashore and U.S. Navy ships, aircraft, and submarines operating in the northern latitudes. The station is staffed by both military and civilian personnel. High frequency transmission facilities also exist at this site.

Try This On For Size

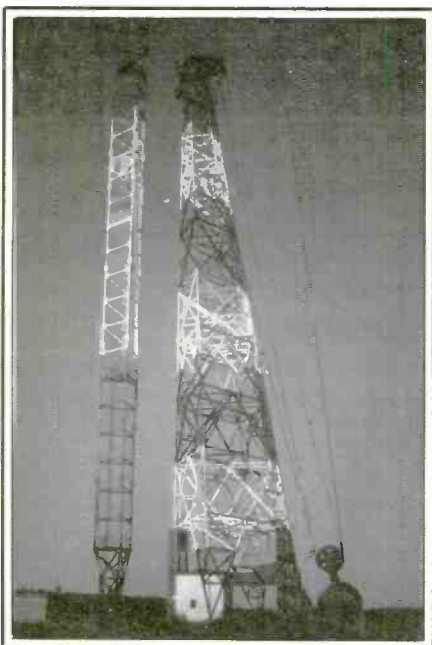
Several realities must be taken into account when visualizing the requirements of a station such as NAA. First, a truly massive



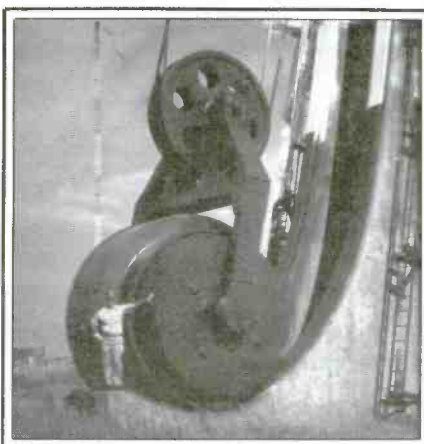
A bird's view of the VLF antenna farm. The towers range from 800 to 980 feet in height. To get an idea of the size of these arrays, realize that The Pentagon Building (in Washington) would easily fit between the center and outer towers of either of the two star-shaped antenna layouts.



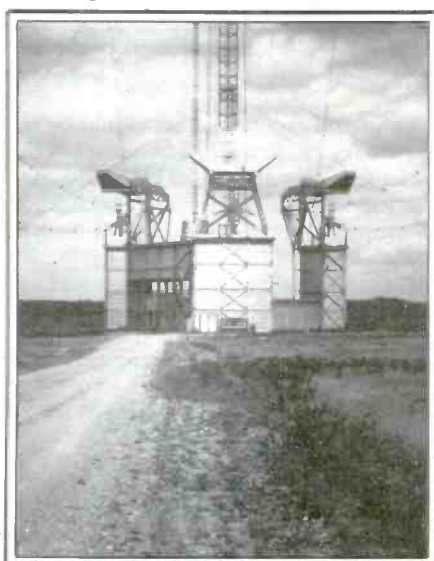
NAVCOMMU Cutler is also the site of HF transmitting facilities; here's the antenna system used for shortwave. The primary U.S. Navy HF transmitting site in the northeast provides fleet support for Naval Communication Area Master Station Atlantic (Norfolk), and to Commander, Patrol Wings Atlantic (Brunswick, Maine).



Two sets of towers (13 each) make up the antenna array. A center tower of 980 feet is ringed by six intermediate towers (875 ft. each) and six outer towers (800 ft. each). Smaller towers support the complex counterweight system. This is one of the counterweight towers.



The counterweight's enormous size can be grasped only when you compare it to the man standing next to the drum. The drums are filled with 220 tons of dense concrete. During icy conditions, they are automatically pulled up the track to balance the excess weight on the antennas. The heavy steel cables required for this job are as thick as a man's wrist.



Each of two buildings houses an enormous electric coil called a helix. Rearrangement of the helix coil permits different VLF frequencies to be set.



The only station in the world using an AN/FRT-31 transmitter is NAVCOMMU Cutler. Here's how the massive control panel looks.



Atop each helix house is a 980 ft. tower, the main support tower for one of the antenna systems. At the highest point of this tower is the "top hat" capacitance tuner.



Ice guards are required throughout the system. These protect the helix houses from being damaged by icing.

antenna and ground system would be required to be efficient on the frequencies proposed (between 10 and 20 kHz). This system would have to be sturdy enough to stand up against the wind and ice of a severe Maine winter.

The enormous power levels would require the entire antenna tuning and radiating system to employ wires and cables capa-

ble of operating with superpower.

One doesn't go out and purchase a 2-million watt transmitter "off the shelf." A special transmitter would have to be designed and constructed for NAA. A power source would also have to be constructed because it isn't possible to run a 2-million watt transmitter by simply plugging it into a wall outlet and expecting the local power company to come up with the juice!

Meeting The Challenge

The challenge was met! A site at Cutler was selected. Cutler is a small village on the rocky coast of northern Maine. The NAA site is on a peninsula jutting out into the churning Atlantic Ocean. The Navy took over 3,000 acres of land there, establishing some twelve miles of roads.

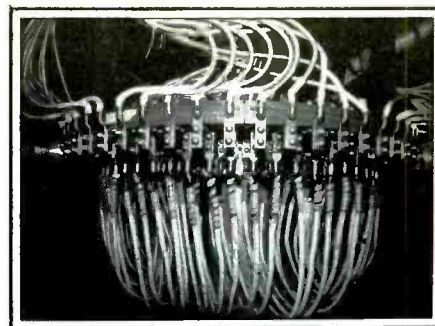
Twenty six antenna towers were built, each fully capable of withstanding winds of 150 knots. The towers are taller than Bunker Hill and the Washington Monument placed one atop the other. Building the towers required 15,000 tons of structural steel and 90,000 cubic yards of concrete.

The antenna's ground system required 2,000 miles of copper wire buried underground and in the ocean.

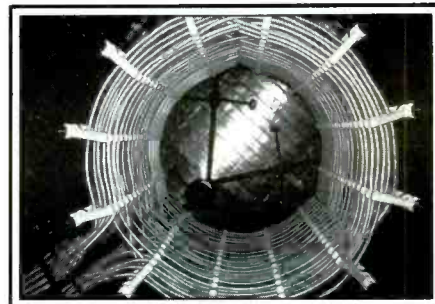
The antenna system itself needed 396,000 feet (75 miles) of 1" phosphorus bronze wire, kept under tension by 1,500,000 lbs. of counterweights.

In order to run NAA, a power system was built using a combination of four Cooper-Bessemer and other engines. This generates 15-million watts; that's sufficient to melt three inches of radial ice off the antenna!

The transmitter was built by Continental Electronics and dubbed the AN/FRT-31. It's the only one in the world. Some 2,200 miles of copper wire are required for transmitter grounding purposes. Power to operate the gigantic transmitter requires delivery of fuel oil via commercial tankers that pipe



This is the connector for tuning the vario-meter. It's located inside the helix house.



The transmitter tunes up by means of this huge helix coil. It's so large that a vehicle would fit through its core!

the fuel into a storage container holding 20,000 barrels of oil.

Getting Out

Needless to say, the signals from this rig can easily be heard throughout the station's primary service area. Indeed, NAA can be monitored throughout the world!

In addition to U.S. Navy units, NAA's signals have long been noted by the world's electronics enthusiasts. VLF signals also have other uses. For instance, POP'COMM reader Allen Linville (VE6BEQ) of Edmonton, Alberta, uses signals from NAA and other VLF stations in mineral exploration of the Canadian Arctic. These signals aid him in locating geophysical EM "conductors" that may (or may not) be mineralized.

Linville says that a small hand-held receiver is used to measure the in-phase and out-of-phase components of the EM field set up in the rocks by the primary field from the VLF transmitter. When the data are plotted of a map, (sometimes) a linear trend is noted. That is often the clue to the location of a future gold mine. The VLF frequencies are too high to penetrate the earth's crust to any depth, so the VLF receivers pick up shallow anomalies due to fractures, groundwater, changes in depth of non-conductive overburden, and also topography. Geologists will also be able to use the new ELF stations going on the air.

We present here a glimpse of NAA that few outsiders are given the chance to see, for which we are sincerely indebted to Lieut. J.S. Majka, Jr., USN, the Public Affairs Officer of NAVCOMM Cutler.

Here's a station that's hard to view without experiencing awe.

PC

MISSING



NAME: Antonella Mattina DOB: 6/18/72. AGE: 13. EYES: Brown HAIR: Brown HEIGHT 5' WEIGHT: 90 lbs. DATE MISSING: 7/16/84. LAST SEEN: Flushing, Queens, NY

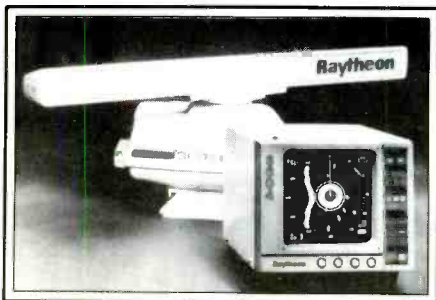
If you can assist in identifying a child or if you are one of these missing children, call Kid Watch, TOLL FREE HOTLINE (800)-KID-WATCH

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PRODUCTS

REVIEW OF NEW AND INTERESTING PRODUCTS



Raster Scan Radars With 36 And 64 nm Ranges

Raytheon Marine Company introduced its newest generation of Raster Scan Radars offering 36 and 64 nm ranges with built-in Electronic Bearing Line (EBL), Variable Range Marker (VRM), SeaGuard Zone Intrusion Alarm, and other features. Using the innovative digital technology of Raytheon's smaller 1200 and 2500 Raster Scan Radars, the new 3604 and 3610 Raster Scan Radars have additional built-in features once available only on large ship radars costing much more. The new radars are ideal for yachts, work and fish boats where long range is required.

While similar in many ways, the 3604 Raster Scan Radar has ranges from 1/4 to 36 nm with 4-kW transmit power and the 3610 Raster Scan Radar has ranges from 1/4 to 64 nm with 10 kW transmit power.

The new 3600 Series Raster Scan Radars are designed with a 12 inch diagonal, TV type picture, providing a 360-degree, continuous bright display. The 512 by 512 line, high resolution monochromatic display, with bright green image, provides fine detail and excellent contrast. The screen is easily viewed, even at a distance, in all but direct sunlight. The radars have open, 3 1/2 foot antennas with outstanding 2.4 degree horizontal beamwidth.

In addition to the EBL, VRM, and SeaGuard, several new features are particularly important. A selectable "Interference Rejection" allows the operator to prevent interference caused by surrounding vessel radars from appearing on the screen. Since it removes all nonsynchronous signals from the display, it also helps to remove background noise. A "Target Expander" feature allows the operator to enlarge weak signals for improved viewing. Touch controls are used to print alphanumerics on the screen, indicating range scale, VRM distance, bearing, tuning levels, and other modes. Raytheon's unique on-screen tuning bar enables rapid and simple radar tuning.

Operators who are using automatic EBL and VRM for the first time will appreciate the fast, accurate bearing and distance informa-

tion they provide. The EBL displays a target bearing, electronically printing the bearing line on the CRT, eliminating requirements for a mechanical cursor. Alphanumerics also display the EBL target bearing on screen. The VRM is a useful tool for marking distance measurements to targets. When combined with an EBL, the process of obtaining the range and bearing to a target requires only the touch of the keypad. Raytheon's SeaGuard monitors a prescribed electronic "protected" zone. When a target enters or contacts the zone, an audible alarm and a visible on-screen indicator alerts the operator.

Manufacturer's suggested list price for Raytheon's 3604 Raster Scan Radar is \$4,295; for the 3610 Raster Scan Radar, \$4,695.

Raytheon provides a two-year limited parts warranty with one-year free labor by any of its U.S. dealers and worldwide service networks. See your local Raytheon dealer for warranty details.

For information on the new 3604 and 3610 Raster Scan Radars, contact the nearest Raytheon dealer, or: Raytheon Marine Company, 676 Island Pond Road, Manchester, NM 03103, or circle number 105 on the reader service card.



Beeperless Remote Message Retrieval Feature Added To Telephone Answering System

Dictaphone Corporation introduced an enhanced version of its Ansafone® Model 757 telephone answering machine, incorporating beeperless remote message retrieval.

"The Ansafone Model 757 telephone answering machine is a high quality, dependable business system," said Elliott L. Smith, vice president, Marketing and International. "We've now added the convenience of retrieving recorded messages from any tone telephone, at no additional cost."

The Model 757 machine automatically answers the user's telephone, 24 hours a day, and records important messages. The messages may be reviewed at the touch of a button on the machine itself when the user is present. However, with the beeperless remote message retrieval feature, the user can listen to messages from any tone telephone. A number/tone code of the user's choice is

set in the machine by a Dictaphone representative at the time of purchase. To retrieve messages, the user simply calls the machine and pushes the corresponding number/tone on the telephone. The machine will rewind the message tape and play it back. In this way the user has access to messages from wherever, whenever he or she chooses.

For areas not served by tone dialing, a DictaCall® tone generator is available, at \$29.95, for remote message retrieval on the Model 757 machine.

The Ansafone Model 757 telephone answering machine with beeperless remote message retrieval is priced at \$395 and is available from Dictaphone sales representatives and authorized dealers nationwide. Dictaphone, a Pitney Bowes Company, is a leading manufacturer and marketer of voice processing systems, with headquarters at 120 Old Post Road, Rye, New York 10580. For more information, contact them directly or circle 101 on the reader service card **PC**

User Report:

The New Magnavox D-2999/17 "World Receiver"

***If You're A Person On The Move,
It's A Great "Take Along"***

BY CHRISTOPHER BLEECKER, KTX5GZ

Magnavox has recently come out with a world class portable receiver for the listener who wants to be certain not to miss anything while away from home base. It's called the D-2999/17 World Receiver.

This is actually a fully transportable receiving station that can be placed in service while being carried, when installed in a vehicle, or easily moved from one fixed location to another. It can even be used at a permanent location.

The Magnavox World Receiver tunes 150 kHz through 30 MHz and also the FM broadcasting band, and it does it with style. Considering that they've got it all in a case that's 9³/₄" high, 12¹/₂" wide, and 4¹/₄" deep, they've included a bountiful serving of listener-friendly features.

Let's take a look at what the World Receiver offers:

Power sources: Three "AA" cells are required for the memory systems regardless of the operational power source in use. Operational power may be selected from six D cell batteries, a 12 VDC battery (with optional adaptor cord), or from 120 VAC. A front panel battery meter permits you to check the status of the D cells. Another front panel prompt notice advises you when the memory batteries require replacement.

Antennas: Although provisions are made for connecting AM and FM external antennas, the receiver has built-in antennas covering its entire frequency range. For frequencies between 150 and 1600 kHz, a directional "ferroceptor" is used offering the user a DF potential. For FM and SW reception there's a sturdy telescoping whip antenna that extends from a fully articulated swivel mount. For FM reception, the antenna need be extended to 30", but for best SW reception the manufacturer suggests extending the antenna to its full 62" length.

Audio reproduction: There are two loudspeakers. One is a small 2³/₄" monitoring speaker on the front panel; this is in operation at all times when the set is turned



The new Magnavox D-2999/17 World Receiver.

on. For better broadcast reproduction, the user may switch on the built-in "main speaker," a 5³/₄" unit. An external speaker or headphones may also be connected. Separate bass and treble controls permit adjustment of the audio for maximum audio quality. A wide/narrow AM bandwidth switch cuts out interference from stations on adjacent frequencies while a local/distant switch eliminates front end overload from nearby FM stations. Overload from nearby AM stations can be reduced by means of an adjustable RF gain control.

Tuning: The receiver can be tuned by several different methods. There is, of course, a standard tuning knob. This can be rotated at different speeds and will cause the receiver to span the frequencies slowly (1 kHz on most bands, 10 kHz in the FM band), at a medium rate (20 kHz on FM bands, 2 kHz on others), or quickly (100 kHz on FM, or 10 kHz on other bands)—according to the number of *clicks* heard while using the tuning knob.

A particular wanted frequency may be entered in the programmable keyboard and used for tuning the receiver.

The receiver's memory system will store up to 16 different frequencies and will recall them by pressing two push-button switches. You can also set this receiver for

automatic ascending frequency search and it will stop on every active frequency it encounters. By depressing the set's search button, it will resume searching.

As an added tuning aid, there are push-buttons that can be activated to instantaneously shift you into any of various bands (LW, MW, FM, or 14 SW broadcast or Ham bands).

Metering: A tuning meter is provided and labelled "Field Strength." This is marked off from "0" (absence of signal) to "8" (strongest signals). These numbers don't correspond to the readout on an S-meter. Most strong local stations come in with a reading of about "6." The strongest SWBC station we could locate in the 25 meter band was running at 20 dB over S9 on another receiver's S-meter and rang up a "7" on the D-2999/17's meter.

This meter is well lit and easy to read. Frequency readout is via large LCD digits, which also serve as a 12/24-hour built-in alarm clock readout. The LCD readout is illuminated for in-the-dark use, although when operating on batteries you have to press a button to illuminate the frequency display and signal strength meter; this is to conserve battery power.

Accessory output: A jack is provided in order to supply audio output to an amplifier or tape recorder.

In Use

This is a very nifty hunk of hardware, offering the user a rather versatile assortment of features in portable form. The audio quality it offers is exceptionally good, and it seems sensitive enough to pull in those weak stations hiding out there in the distance, even with its (lengthy) built-in whip antenna.

Those who are deeply into Ham and "ute" station monitoring may miss the USB/LSB mode switch and find that tuning in SSB signals via the combination of BFO and RF gain controls is a little more work.

SSB monitors will possibly also miss the ability of the frequency readout LCD's to display frequency increments with a separation of less than 1 kHz.

We especially liked the FM broadcast reception. FM broadcast stations in North America operate on channels spaced at 200 kHz intervals. This receiver's ability to display frequencies every 10 kHz offers the opportunity to pick out distant stations by tuning them in slightly "off frequency" in order to avoid local station interference.

In all, the new Magnavox D-2999/17 World Receiver is a formidable companion to accompany you on any trip. It is well-built and extremely attractive in its nifty black case and he-man sized carrying handle.

Check it out at dealers handling the popular Magnavox line. **PC**

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Model LT



See Data Sheet for surge limitations.

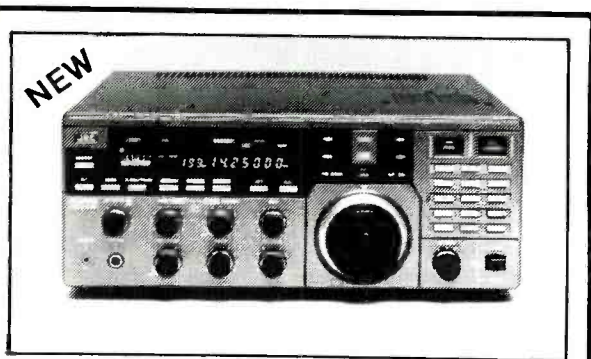
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PIRATES DEN

FOCUS ON FREE RADIO BROADCASTING

BY DARREN LENO, W0EJW

The escapades of a renegade radio station, Laser 558, have frequently been the subject of news and commentary in this column. However, this station, which operated from a ship anchored in the north Atlantic, recently had a streak of bad luck that could leave me with a lack of material to write about, and cost its owners a return on their \$2 million investment.

The *MV Communicator*, the bobber from which Laser 558 broadcasts, was in danger of sinking after its generators failed. The American-owned, Panamanian-registered ship issued a distress call via CB radio after its ship's radio failed. The only vessel willing and able to help was the *Guardline Tracker*, a ship leased by the British Department of Trade and Industry to isolate the *Communicator* and prevent it from receiving supplies from Britain. At first the *Communicator* refused the offer from the *Guardline Tracker*, but when the ship became in direct danger of sinking in strong winds, the skipper reluctantly accepted the offer.

The *Guardline Tracker* followed the *Communicator* into Harwich Harbor, where it was promptly placed under arrest and boarded by the Admiralty Marshal's office. The crew was released after questioning.

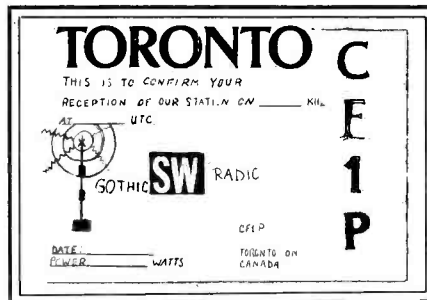
It is not known when or if the *Communicator* will be released. The British Government and radio industry have gone to great lengths to silence Laser 558, and have often been frustrated by their inability to do anything to silence the pirate. It seems to me highly unlikely that the *Communicator* will be released now that the government's prayers have been answered.

FCC Closes WDIA-FM

Every night from 7 until 10, David Laudenslager of Emmaus, Pennsylvania would turn on his stereo FM transmitter, play his favorite music, and take phone requests from listeners. FCC officials closed Laudenslager's unlicensed station, WDIA, because his carrier on 88.3 MHz interfered with TV Channel 6's audio signal. The FCC then set to work to find WDIA, which didn't take long because of the regular broadcast schedule this station kept, and fined the 29-year-old radio pirate \$750.

Scott Bieber of *The Morning Call* newspaper interviewed Gertrude Anderson, a spokeswoman for the FCC in Langhorne, Pennsylvania, about stations like WDIA. She said there are increasing numbers of radio pirates on the air today, and that the FCC is trying to discourage them by imposing significant fines. She also said that about six pirates are closed by her office each year.

Laudenslager plans to appeal the \$750



This Canadian pirate is threatening to take to the air regularly this spring.

fine, and is looking for financial backers to help him set up a legal station.

Radio Morania Mystery

For several years Pirates Den readers have been reporting a pirate known as Radio Morania. Most reports of this station are accompanied with comments praising the quality of the humor and studio production. Broadcasting from the mythical "Free State of Morania," this pirate has become a favorite of those who have managed to hear it. But no one has ever received a verification card from Radio Morania. Every time the announcer would read the station's address to eager listeners, a carefully staged surge of static would swell like a wave, drowning the address under a sea of RTTY and other QRM too terrible to mention.

Who are the people behind this creative station, and why do they shun their fans? Last month Gary Bourgois, WB8EOH, wrote to shed some light on Radio Morania.

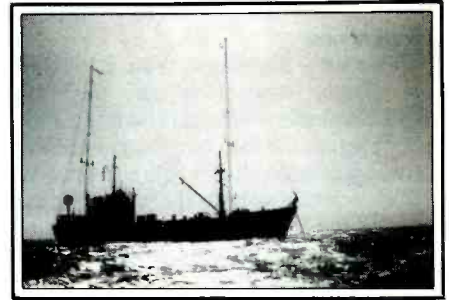
"Hi Darren,

"I was quite surprised by a logging in a recent edition of *The Pirates Den*. I refer to the External Service of Radio Morania. The reason I am surprised is that I am intimately familiar with Radio Morania, having created it in 1969! Radio Morania was never created to be heard on the airwaves. It was intended as a satire of the shortwave stations of the late 1960's, but things have not changed much since then, and the takeoff still holds true today.

"Originally I made the tape for a few friends of mine who, like myself, were DXers and Hams. Everyone thought the take was so funny that I decided to offer it for sale around 1972 with an ad in *Radio-TV Experimenter* magazine. While the sales of the Radio Morania tape were not stupendous, I did make enough money to pay for the ad, and even a few years later I was still receiving fan mail and requests to produce sequels.

"In the mid-seventies, I began to hear from people who said they had heard people playing Radio Morania over the air in places such as Toronto and New England. Since I no longer have any records of who I mailed the tape to, I cannot begin to say who is playing the hoax of broadcasting a tape that was originally meant only to entertain via tape player.

"Sincerely, Gary Bourgois"



Laser 558's ship, the MV Communicator, hobbled into a British port and was seized by the government. Its fate is undecided.

Anyone wishing to obtain a studio copy of the Radio Morania tape being used by this pirate can write Gary Bourgois, Manager, Studio B Media Services, 429 Spring St., Marquette, MI 49855. Enclose a self-addressed stamped envelope for ordering information.

Across The Dial

WGAT—Gator Radio After one-and-a-half years of searching the "pirate band," Charles Gust of California was rewarded with this new pirate, which he heard on 7423 kHz, from 0230 to 0315, as they played a mix of comedy, rock music, and parody commercials.

Dave Molinelli, Illinois; Paul Scolese, New York; Mark Carlsen, Massachusetts; and Leslie Coble of Pennsylvania, also heard WGAT, but on 7435 kHz at 2000 GMT. Dave says that Dr. Klystron claimed to be running a 31-year-old RCA transmitter.

KBFA "Broadcasters of Free America." Dennis Yost and Johnnie Harper, both in North Carolina, and Robert Schukai, Jr., in Indiana, heard this new pirate on 7425 kHz from after 0230 until 0308 GMT. Dennis commented on the professional sound this pirate has. Their programming included rock music and newscasts. The DJ, known as "The Archer," claimed to be using 200 watts of power, and asked listeners to send reports to this column. I can't forward your mail, but we'll use your loggings here.

Nancy van Kesteren in New York also heard KBFA, but on 8000 kHz from 2120 until 2155. Kathy Morin of Ontario also heard this broadcast.

KNRH Sends word that they will be relaying Radio Pamela, a British pirate. They also claim they have expanded their broadcasting schedule to 2200-0400 GMT daily on 11975 kHz. That's a big commitment, as well as a risky one. My bet is that by the time you read this, KNRH's schedule will include considerably less air time. But if you hear them, write for a QSL card to: KNRH, c/o PO Box 245, Moorhead, MN 56560.



Radio Caroline, alone on the North Sea.

Radio Happy Air This apparently new pirate station was logged by Paul Johnson of Arizona on 7435 kHz at 0200 GMT. A California address was announced for reception reports, but Paul says his report came back stamped "undeliverable."

Radio Clandestine Jerry Lainhart in North Carolina heard this popular pirate on 7376 kHz until 0500 GMT. DJ "R.F. Burns" was the host of this "very professional sounding station."

Radio Lymph Node Don Biancamano discovered this new pirate on 7390 kHz at 0400 GMT. The announcer was "Doctor Zeno" who presided over the new-wave rock music. No address was mentioned.

Secret Mountain Laboratory Excerpts from Radio Invicta, a British pirate, were featured on SML during a broadcast on 7435 kHz. Don Biancamano tuned in at 0314 GMT and listened to their good-quality signal until sign off at 0400 GMT.

UA Express Ben Feller, New York, found this foul-mouthed pirate on 7430 kHz at 2211 GMT. Reception reports go to UA Express, PO Box 14061, Evansville, IN 47714-0661.

Voice of Communism Steve Pellicciari of Connecticut, and Larry Larson of Minnesota stumbled across this hoax pirate on 7440 kHz at 1939 GMT. The announcer stated his intention to destroy capitalism, and assured his audience that after this broadcast, they would all be devout communists. A phone number was given for listeners to call.

Voice of Democracy Brenda Mahony of New York, and Mark Feller of Connecticut, heard the alter-ego of the Voice of Communism on 7370 kHz from 0515 GMT. VOD waved the National Anthem in listeners ears, and played the *Star Wars* theme as a commentary on Pres. Reagan's Strategic Defense Initiative, and engaged the Voice of Communism in a debate. A phone number was given and listeners were encouraged to call.

Voice of To-morrow Ken Cobb in Maine tuned in this controversial pirate from 0515 to 0549 GMT on 1616 kHz. A commentary discussed the Jewish Denomination and urged white listeners to join the "white American resistance." Says Ken, "I had heard of this station before, but didn't believe it until I heard it for myself."

WAYT (or WAYG), a/k/a/ Twilight Radio and The Music Machine. Non-stop rock and occasional ID's. Heard by Tom Kneitel (New York) around 0300 on 1620 kHz. Announced it was serving the Hauppauge/Smithtown areas of Long Island, but Tom says that their signal was in the mud in the Smithtown area. Announced an address of Twilight Radio, P.O. Box 641, Sag Harbor, NY 11963.

WHOT Dominic Benjamin, New Jersey, found WHOT on 1625 kHz from 0100 to 0600 GMT with hosts Jim Nasium and Pete Sake. The audience participated in the crime by calling the station and jesting with the jocks over the air. Listeners were promised that WHOT would pop up more frequently in 1986 than it did the previous year.

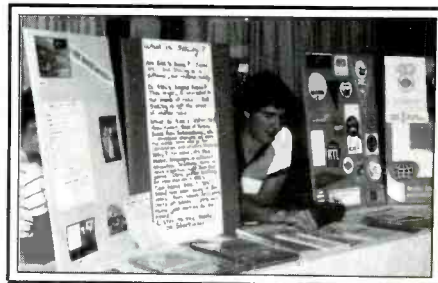
74-WKUE This pirate turned up on 7435 kHz at 2330, and played rock music until 0000 GMT. J.R. Polen in Virginia copied down the address as WKUE, c/o PO Box 5074, Hilo, HI 96720.

WMTV POP'COMM RTTY Editor Bob Margolis found "Capt. Megacycle" on 7450 kHz at 0530 as he played rock music and handled listeners phone calls from around the nation. Craig Clark of Michigan heard WMTV on 7427 kHz, from 0445 until sign off at 0545 GMT. Their address is WMTV, c/o PO Box 1945, Del Rey Beach, FL 33444.

WYMN "Pirate Jenny" was playing music by female artists on 7425 kHz at 0300 GMT when Shirley Lieb and Bradley Nicholson, both of Illinois, heard her. Shirley says reception reports can be sent to PO Box 5074, Hilo, HI 96720.



This controversial pirate will probably be with us for a long time.



Your editor, Darren Leno, manning a booth on SWLing at a hamfest.

Zeppelin Radio Worldwide Mark Smith of Kentucky discovered ZRW on 7422 kHz one Sunday afternoon at 2200 GMT. Captain Willie, a personality from Radio North Coast Int'l, made a special guest appearance. Mark said that everyone at the station seemed to be having a great time, which also made it fun for the listeners.

J.R. Polen heard ZRW on 7440 kHz at 2045 GMT, as they played heavy metal and marching music. Their address is ZRW, c/o PO Box 245, Moorhead, MN 56560.

Kevin Rickens, South Carolina, found this pirate on 7438 kHz at 0100 GMT.

Media Co-op

A new group called the Media Distribution Co-op is offering inexpensive do-it-yourself publicity resources for musicians, filmmakers, and writers.

This organization offers several publications, including Alternative Video Distribution, Cable TV Distribution, New Sources for Writers, Obtaining College Radio Airplay, among others. For more information, write them at 2912 Daubenbiss, Dept. PC, Soquel, CA 95073.

Questions, Questions . . .

Steve Spisak of Ohio is a newcomer to SWLing, and has a question about the difference between kHz and MHz. It seems Pirates Den lists frequencies in kHz, while his receiver wants to know them in MHz. Is 7425 kHz the same as 7.425 MHz, Steve asks? Yes. To convert from kHz to MHz, move the decimal point three places to the left, and vice versa. Then what about a listing like 7425.6 kHz, he asks? Do the same thing. In this case, the frequency would be 7.4256 MHz.

Shawn Snyder writes to ask where pirate radio stations get their transmitters. Most pirates buy used amateur radio equipment, like the Heath DX-60 and Johnson Viking

Ranger, through classified ads or at hamfests. Many of the operators have the technical skill to modify the transmitters to operate outside of the designated Ham bands.

Bob Nygaard of Oklahoma wonders what we mean when we say "pirate band," noting that there is no such designation on his SW receiver. The pirate band is a range of frequencies where most pirate activity can be found. Although there is no precise beginning and end of the pirate band, by looking at the frequencies in this column that pirates use, you might decide that the pirate band begins about 7350 and runs to 7450 kHz (that's 7.35 to 7.45 MHz, right Steve?). This is where you will find most pirates operating, and so we call it our "pirate band."

Chicago Pranksters

The Associated Press reported recently that three of Chicago's largest radio stations, WGN, WLS, and WMAQ became the "private plaything of a foulmouthed prankster." It seems someone decided to "pirate" the station's signals for a few minutes and air their own programming.

Officials declined to comment on how someone could seize control of a radio station's carrier, so I asked a friend of mine who works at a radio station and insists on anonymity, about this prank.

"It would really be an easy thing to do" he says. "Most radio stations in large cities beam programming from the studio to a transmit-



This North Sea pirate churns out many different collectables for its fans, including key chain, T-shirts, and this bumper sticker. (Courtesy David Kerr, Iowa)

ting site in the suburbs, which retransmits the studio's signal on the AM or FM band. If someone were enough to the transmitter site, they could overpower the studio's signal with their own signal," he stated. He also commented that to perpetrate such a stunt, the prankster would require enough technical knowledge to build a transmitter and locate the frequency of the microwave link. "It was probably some electrical engineering student," he said.

Probably.

C1FP

A new Canadian pirate sends word that they will, in their own words, "commence broadcasting in the early spring of 1986 un-

der the callsign of 'C1FP' from Toronto, in the 7350-7450 kHz range." C1FP is hoping to become a voice for musicians and underground bands in Toronto, like Change of Heart and Calling Rain. In addition, C1FP will program a wide variety of music, which includes everything "from Jimmy (sic) Hendrix and the Beatles to Alien Sex Fiend."

C1FP was logged by pirate DXers last winter, so there is a good possibility they may be on the air this spring. Finally, a pirate that the FCC doesn't have to worry about.

Special thanks this month to Staff Sgt. Ed Hutten, Terry O'Laughlin, Richard Krepps, WIACG, and Glen Schmidt for their assistance on the laser story, and Tom Balon for helping with the WDIA piece. **PC**

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CIRCLE 33 ON READER SERVICE CARD

THE MONITORING MAGAZINE

BROADCAST TOPIK

BY MARK MANUCY, W3GMG

DX, NEWS AND VIEWS OF AM AND FM BROADCASTING

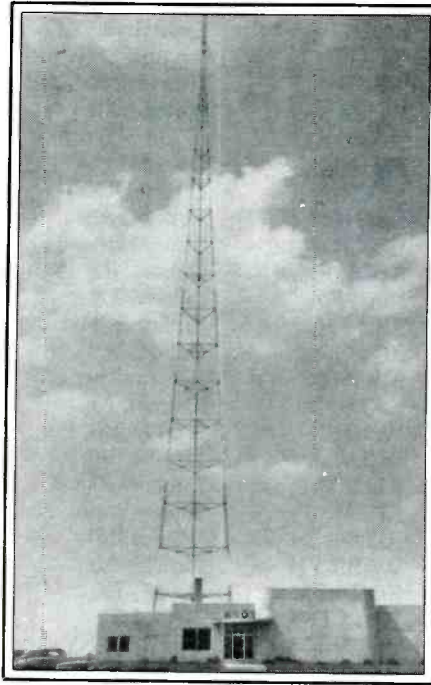
The planning of summer vacations is well under way. Let me give you some thoughts for carrying your hobby along with you.

When things get boring at the beach (all the bikinis look the same anyway!) or the feet get tired of climbing up a slope in the mountains (they all look the same!) and you need a break, dig out the AM/FM portable and see what you can hear. The mountains will give some excellent FM listening, while at the shore AM can be outstanding.

Whether you are driving or hiking the mountains, the FM band can be a trip with your mind—the only difference being the speed at which the changes take place. As one drives through the mountains, the FM signals will bounce off the different slopes, and though one is tuned to the same channel, several stations may be heard as the receiver passes from one hill to another. The FM signal travels in line of sight and will be blocked by any object in its way, such as a mountain or a large building. Depending on the strength of the signal, it may be blocked sufficiently by the mountain to allow another signal on the same channel to be heard. The other signal may be reflected off nearby mountains or may be a direct line of sight signal. Actually, by the time one has traversed all the way around a mountain, or across a range, there may have been several different stations heard on the same frequency. The higher the elevation, the more signals will be heard. Multiply this by the number of channels in the FM band and you can see what a bonanza mountaintop DX-ing can be. Actually, the top of the mountain will not be the best location; down from the top enough so that the receiving antenna can be completely shielded in different directions is the best location.

If the receiver has connections for an external antenna, then take one of the small flexible dipoles (300 Ω) and fasten it to a couple of sticks made into a "T." With this arrangement it is possible to turn the antenna and peak or null one station in order to hear another on the same side of the mountain. This type of antenna is very portable and can be easily stowed. Carry extra cord to tie a pair of sticks together wherever you may be.

Should the portable receiver not have an external antenna connection, then there are still two other possibilities for making a directional antenna. The rod antenna is directional by tilting and turning. It might be best to experiment with known stations before leaving home to determine just how to make this work. Don't pick stations that are local since it will be difficult to tell what is happening since they may never fade if they are too strong. The other trick is to fashion some sort of connection to use the portable



WSOY AM and FM, Decatur, Illinois. Merrill Lindsay has owned the station since 1937. This picture was taken about 1950. The tower is 462 feet. (Courtesy of Bob Grubbs)

dipole antenna. One connection would go to the rod (which would be in the closed position) and the other connection would go to a screw on the case, which makes contact with the chassis or ground inside the set. It might be possible to slip it under the headphone plug when it is inserted into the earphone jack. You are using headphones! Many stations will get right by the speaker. Take a small pair of earphones along or you'll miss a lot of DX. AM DX-ing in the mountains is generally pretty poor, except at night.

The beach is much more exciting for AM than it is for FM. The first beach to which I'm referring is a coastal beach, the salt water type—one of my favorite DX locations! There are many stories of great coastal DX-ing; let me tell one of my favorites. Coastal DX-ing is generally limited to the beach as the signals fade markedly just a few hundred yards inland. I put a 250 watt station on the air in New Smyrna Beach in 1960. The tower was on an island in the intracoastal waterway. As I would drive home to St. Augustine north of Daytona Beach, A1A would turn inland from the coast about a half mile or so. About five miles up the road the highway comes back out to the ocean and stays there the rest of the way to St. Augustine. During the passage inland the station would fade completely to return

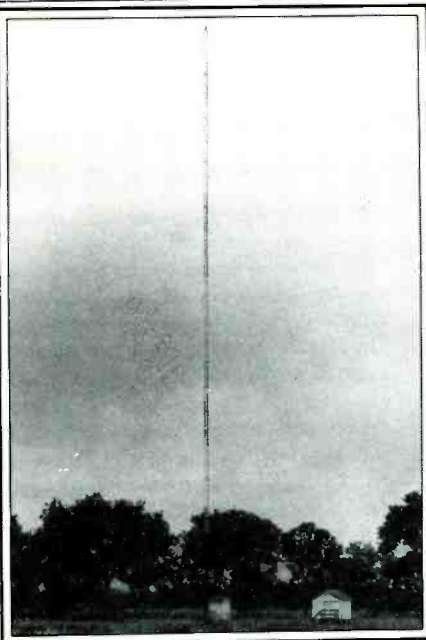
when the highway was near the ocean again. This little 250 watt station (in the 60's) could be heard on the beaches all the way to Cape Fear, North Carolina, near Wilmington, a distance of about 400 miles. The signal would fade as soon as one drove away from the beach (I mean when you went behind the dunes!). The frequency (1550) was a clear channel in those days, with very few stations operating. So, for the good DX, the way off stations, be sure to pick a location within sight of the water. DX-ing at the beach will require headphones due to the noise of the surf. This can be quite deafening even high on the beach. Also, there is usually a good breeze blowing which impairs hearing as well.

Most beach locations will be free of power lines, however, if there are any nearby, be forewarned that listening is probably going to be difficult. Power lines located near beaches stay coated with salt from the ocean breezes and, therefore, are most generally in a constant state of arcing to one degree or another. If there is any arcing or noise from power lines, I wouldn't even bother to set up for DX-ing. It will be a waste of time. Spend your time looking for a better location. This is one disadvantage to a salt water location. The other is corrosion, but I'll disregard the humidity factor for vacations.

I understand (from pictures I've seen) some of the beaches along the western coasts are not beaches at all, but cliffs overlooking the ocean. The same rules would apply except it would be fine to stay at the top of the cliff!

The best locations will be those that extend out into the water somewhat or off shore islands if they are accessible, such as the outer banks of North Carolina. Other spots that would be of interest are Cape Cod for New England coastal stations and those down the east coast toward North Carolina, as well as the delta roads near the Mississippi River in Louisiana. The islands along the southwest coast of Florida are good, as would be the beaches near Apalachicola. The beaches near Freeport, Texas look interesting, also. In California the spots that catch my eye would be near the coast above Santa Barbara toward Gaviota and on the other side of the point on the coast due west of Lopoc. The southeast coast of Nova Scotia between Yarmouth and Shag Harbor is a location I hope to visit some day.

There are also some interesting possibilities along the Great Lakes, especially on U.S. Route 2 along the northern coast of Lake Michigan and along the coast in Canada near Pukaskwa National Park. Again, be sure to locate near the water's edge. If one looks at these locations on a map, I think it will be obvious the type of location I'm trying



KLTT tower in Brighton, Colorado. (Photo courtesy Pat Griffith)



Pat Griffith of Denver keeps his eyes open and camera handy.

Station Updates

Call	Location	Freq	Pwr	Ant
AM				
WYRV	Cedar Bluff, VA	770	5/0	O
WEAB	Greer, SC	800	1/0	O
KCFA	Eagle River, AK	1020	10/10	O
WGOC	Kingsport, TN	1090	10/0	DA-D
WSFT	Thomaston, GA	1220	1/0	O
WHEZ	Portage, MI	1560	5/0	O
FM				
KXCR	El Paso, TX	89.5	.175	1092'
KLLN	Newark, AR	90.9	4	456'
WXCR	Safety Harbor, FL	92.1	1.95	400'
KDDR-FM	Oakes, ND	92.3	4	151'
KIXS-FM	Killeen, TX	93.3	100	1968'
KSD-FM	St. Louis, MO	93.7	100	985'
KOVO	Gallup, NM	94.5	100	1381'
KIXY-FM	San Angelo, TX	94.7	100	357'
KJUS	Lincoln, NE	95.3	3	90'
WFID	Rio Piedras, PR	95.7	50	940'
WJLW	Depere, WI	95.9	3	328'
KLLL-FM	Lubbock, TX	96.3	100	817'
KHFM	Albuquerque, NM	96.3	20.2	4110'
KZLS	Billings, MT	97.1	85	386'
WABB-FM	Mobile, AL	97.5	100	1644'
KORA-FM	Bryan, TX	98.3	.9	528'
WVIN-FM	Bath, NY	98.3	2.75	342'
WELV-FM	Ellenville, NY	99.3	.1	- 1630'
WGFB	Plattsburgh, NY	99.9	100	984'
WJLQ	Pensacola, FL	100.7	100	1555'
KFJB-FM	Marshalltown, IA	101.1	75	300'
WSGS	Hazard, KY	101.1	100	1483'
WGOX	Ravenel, SC	101.7	1.32	483'
KKIC-FM	Emmett, ID	101.9	1.26	507'
WISS-FM	Berlin, WI	102.3	3	176'
KFYO-FM	Lubbock, TX	102.5	100	841'
WAZU	Springfield, OH	102.9	50	492'
KJJO	St. Louis Park, MN	104.1	100	190'
KTIL-FM	Tillamook, OR	104.1	6.5	- 196'
KKLV	Anchorage, AK	104.1	55	71'
WKTC	Tarboro, NC	104.3	100	984'
WXLO	Fitchburg, MA	104.5	25.5	677'
WCSJ-FM	Morris, IL	104.7	40	184'
WTIB	Iuka, MS	104.9	1.79	410'
WBIF	Bedford, IN	105.5	2	399'
WNMB	N. Myrtle Bch, SC	105.5	3	328'
KAWA	Kingman, AZ	105.9	12.6	3678'
WMFM	Petal, MS	106.3	1.8	400'
WPYX	Albany, NY	106.5	15.3	900'
WSFL-FM	New Bern, NC	106.5	100	915'
KROQ-FM	Pasadena, CA	106.7	5.2	1378'
KGOL	Lake Jackson, TX	107.5	100	1965'

Key: D = Daytime, N = Nighttime, DA = Directional Antenna, DA1 = Same Pattern Day & Night, DA2 = Different Pattern/Power Day/Night, O = Omni Antenna Day And/Or Night, * = Special Operation Or Critical Hours, N/C = No Change

to show. One that has good line of sight to as much of the coastline as possible with a minimum of land intercepting the radio signals is what you are after.

The reasoning for the water location is simple. The salt water has the highest conductivity of any surface for carrying radio waves. It is for this reason the signals will travel greater distances. The least amount of land between the station's tower and your receiver, the better the reception will be. Write me some of the places that you have found to be good and tell me why. Good DXing to you this vacation.

AM And TV Stereo

As of January there were 190 TV stations broadcasting some stereo programming, although I understand some of the stereo is synthesized. At least 80 TV markets in the U.S. are receiving stereo broadcasts. It costs the TV station a good deal of money to convert to stereo, especially if the local studios are also converted to stereo. This will slow the smaller markets in broadcasting stereo, however, there does seem to be more competition among TV broadcasters and other media than the AM broadcaster. This is one reason AM stereo is not moving ahead at a faster pace—not enough competition for a quality AM sound. The broadcasters and receiver manufacturers keep waiting for the other to do something about the way AM sounds.

Anyhow, NBC is carrying very close to 20 hours of stereo per week, with PBS carrying about 25 hours on about two dozen stations. NBC has about two dozen stations carrying stereo, however, they are only broadcasting about one show per week and some specials. CBS plans no stereo operations until 1988.

In spite of problems AM stereo has been on the advance as well. Less than a year ago it looked like Motorola would run away with a one system standard. The Kahn people have been hard at work and they have also added a few stations to their roster in the past few months. Some manufacturers are now producing multi-mode sets. Reading the trade magazines, it is easy to tell the AM stereo dual system battle is far from over, and at this point it appears that if there is to

ceiver manufacturers keep waiting for the other to do something about the way AM sounds.

be only one system in the end we will have a long wait to see the outcome. As far as the DXer is concerned, the Kahn system is the better for listening to long distance stereo. As a matter of fact, the new SW station in Alabama is installing a Kahn stereo system. The station, NDXE, should be on the air by the time you read this. To receive stereo from NDXE, all you need is two SW radios. Tune one slightly off the station to the high side and the other slightly off the station to the low side. Set the radios a few feet apart and you may be the first on your block to hear AM stereo on shortwave. Check Gerry Dexter's Listening Post column for more information about NDXE and the frequencies they will be using. The owner, Mr. H. Dickson Norman, spent over \$10 million just for equipment. The logo for the station will be "Global Radio" and, as you might gather from the callsign, they will be broadcasting "in Dixie."

Here are the latest C-Quam AM stereo stations:

Call	Freq	Location
KHAR	590	Anchorage, AK
KCLS	600	Flagstaff, AZ
KNRY	1240	Monterey, CA
KCMJ	1010	Palm Springs, CA
KGNR	1320	Sacramento, CA
WDRC	1360	Hartford, CT
WEBY	1330	Milton, FL
WHOO	990	Orlando, FL
WBSR	1450	Pensacola, FL
WJAZ	960	Albany, GA
WGAU	1340	Athens, GA
WWSA	1290	Savannah, GA
KWIK	1240	Pocatello, ID
KSO	1460	Des Moines, IA
WVMI	570	Biloxi, MS
WQIS	1260	Laurel, MS
WJKX	1460	Moss Point, MS
KSST	1400	Springfield, MO
KVEG	1410	Las Vegas, NV
WJLK	1310	Asbury Park, NJ
WAYS	610	Charlotte, NC
WGDR	1150	Goldsboro, NC
WCIT	940	Lima, OH
WKDJ	1190	Muncie, PA
WZYK	1440	Cowan, TN
KQTY	1040	Amarillo, TX
KUTR	860	Salt Lake City, UT
WOKY	920	Milwaukee, WI
KOJO	1210	Laramie, WY

If you want a complete and up to date list of all the U.S. stations broadcasting in AM stereo, I have it available for \$2.50 post paid. This listing tells which system (of the four) each station is using. There are only six (to my knowledge) stations still using the PMX system, just to give an example. I don't guarantee they are on the air with the system, however!

Mail Call

Stanley Mayo is putting his Drake DSR-1 to good use. In January, he heard Radio Bermuda on 535 kHz, Radio Paradise on 825 kHz and The Caribbean Beacon on 1610 kHz. Stan mentions he's returning the DSR-1 to Drake for a checkup! This is not a bad idea for any receiver that you have had around for a number of years. Components

Call Letter Changes

Location	Old	New	Freq
AM Stations			
Anchorage, AK	KTNX	KASH	1080
Coalinga, CA	KOLI	KKFO	1470
Largo, FL	WSST	WRFA	800
Hailey, ID	KSKI	KNRC	1340
Salina, KS	KFRM	KNNN	550
Auburn, ME	WRXV	WTME	1530
Laurel, MD	WLMD	WILC	900
Brockton, MA	WAMK	WATD	N/A
Gulfport, MS	WAIZ	WQFX	N/A
Berlin, NH	WNHX	WAXC	N/A
Southern Pines, NC	WCEL	WEEB	990
Portland, TN	WQSI	WHRP	1270
White Bluff, TN	WBDX	WHRD	1030
San Antonio, TX	KXET	KUKA	1250
Sumner, WA	KPTJ	KARP	1560
Tumwater, WA	KCIG	KCIF	1500
Beckley, WV	WJKK	WCIR	1070
Viroqua, WI	WISV	WVRQ	1360
San Juan, PR	WXTO	WBMJ	1190
FM Stations			
Anchorage, AK	KASH	KASH-FM	N/A
Oceanside, CA	KEZL	KEZL-FM	102.1
Sacramento, CA	KSKK	KRAK-FM	105.1
Crystal River, FL	WRYO	WKTK	98.5
Thomasville, GA	WTUF	WHMJ	102.1
Atlanta, GA	WXGA-FM	WXVS	N/A
Boise, ID	KBOI-FM	KQFC	97.9
Nampa, ID	KBNY	KFML	96.9
Joliet, IL	WAJP	WJTW	93.5
Hartford City, IN	WWHC	WWWO	93.5
Spencer, IA	KRGS	KJJG	104.9
Cattlesburg, KY	WCAK	WKQI	92.7
Marshfield, MA	WATD	WATD-FM	95.9
Springfield, MA	WHYN-FM	WHFM	93.1
Gulfport, MS	WQFX	WQFX-FM	N/A
New Albany, MS	WIMJ	WTMX	N/A
Lincoln, NE	KHAT	KLGT	106.3
Las Vegas, NV	KITT	KKLZ	96.3
Berlen, NM	KMLW	KARS-FM	97.7
New Bern, NC	WSFL	WWMG	106.5
Dunn, NC	WIDO	WDKC	103.1
Ravenel, SC	WGOX	WFXR	N/A
Jackson, TN	WJHR-FM	WRJX	103.1
Pulaski, TN	WMGL	WINJ	98.3
Tye, TX	KTYE	KTLC	99.3
Corpus Christi, TX	KEXX-FM	KSTE	93.9
Grand Coulee, WA	KEYF	KEYG-FM	98.5
Cheney, WA	KEYJ	KEYF	N/A
Viroqua, WI	WGMB	WVRQ-FM	102.3
Clintonville, WI	WFCL-FM	WJMQ	92.1

do age and their aging may not be harmonious. This would cause the unit to become less sensitive and the features, such as a notch filter, may not work as well as it once did. Enjoyed your letter very much, Stan.

Patrick Griffith always sends a lot of info when he writes, which makes for interesting reading as well. In his latest communique he has a clipping from the *Rocky Mountain News* of January 2, 1986, which tells of Radio Catolica in Managua, Nicaragua, being shut down for not carrying the President's year-end speech. President Ortega doesn't care for stations that do not carry his speeches; never mind the station was in the

middle of broadcasting a rosary prayer. So the lights are out on HTA720, 720 kHz with 10 kw!

That's about all the space for this month. Thanks for the support via the mail. The loop antenna plans continue to be popular and they are as follows: Box loops (2) for \$5.50; Ferrite loops, which includes the preamp \$7.50; The preamp was in this column a few months back and plans are \$2.50; Modification plans for the ICOM R-70/71 broadcast band preamp and R-70 selectivity are \$2.50. The address to use for all correspondence is P.O. Box 5624, Baltimore, MD 21210. **PC**

NEW AND EXCITING TELEPHONE TECHNOLOGY

Teleconferencing

The telephone is designed to connect two callers together, and it does a wonderful job at this. Sometimes you may wish to "broadcast" to many people or have a full-blown conference with many participants. Teleconferencing is the technique used for this.

The simplest teleconference is when up to three people use different extensions on the same line. This is the system most used for family calls. Another way to get many people on one line is to gather around a speaker phone. If you have two lines coming in to a premises, you can bridge them together for a conference call. Several manufacturers make these devices. Any tinkerer can build his own two-line conference bridge (see Figure 1).

Most modern PBXs have the ability to set up conference calls. The usual number of lines that can be conferenced is three—one line for the originator and two for the other participants. PBX manufacturers limit the number of "bridged" lines to three to cut down the amount of noise that is accumulated by all those lines. Rolm, the PBX company that is now part of IBM, offers up to eight conferenced lines. They claim this is possible because their PBX is digital so ignores the analogue noise.

For up to six lines, AT&T will put together a conference call. To do this, you dial the operator and tell her you want to make a conference call. Give her the date and time you wish to make the call, plus the telephone numbers of the participants. At the assigned time the operator will call the participants. When everyone has been contacted and bridged together, the operator drops out. The originator of the conference call is billed. The participants get off free.

The AT&T service has the same problem with noise as the other conferencing methods mentioned previous. Another bug with the AT&T system is that the participants have to be standing by their phones waiting for the call to come through. This can be difficult to do for people who are traveling.

Many groups and companies have a need for wide area teleconferencing with many participants: Brokers spreading the word on a hot stock, gold dealers negotiating the daily price fix, sales departments having weekly meetings, airlines with last minute schedule changes due to bad weather, national clubs having director's meetings, engineers brainstorming, company training and new product information.

Teleconferencing is not only cheaper and faster than flying people in from all over the world for a meeting, it is also "instant." A

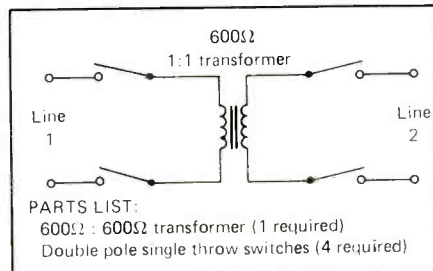


Figure 1: Using a 600 ohm 1:1 transformer for teleconferencing.

large teleconference can be pulled together in about ten minutes. Daily briefings can now become a reality.

There is a company that provides a teleconferencing service that will allow up to 300 participants. The company is called Darome Connection. They provide teleconference bridges in the U.S., Canada, and the U.K. Callers can be connected into these bridges from anywhere in the world.

The Darome bridge enables conferees to be called from the bridge by an operator, or call in. Being able to call in is very handy. People stuck in airports can still participate in a conference call. The bridge is run by an operator who checks the quality of the connections and can adjust the gain and signal

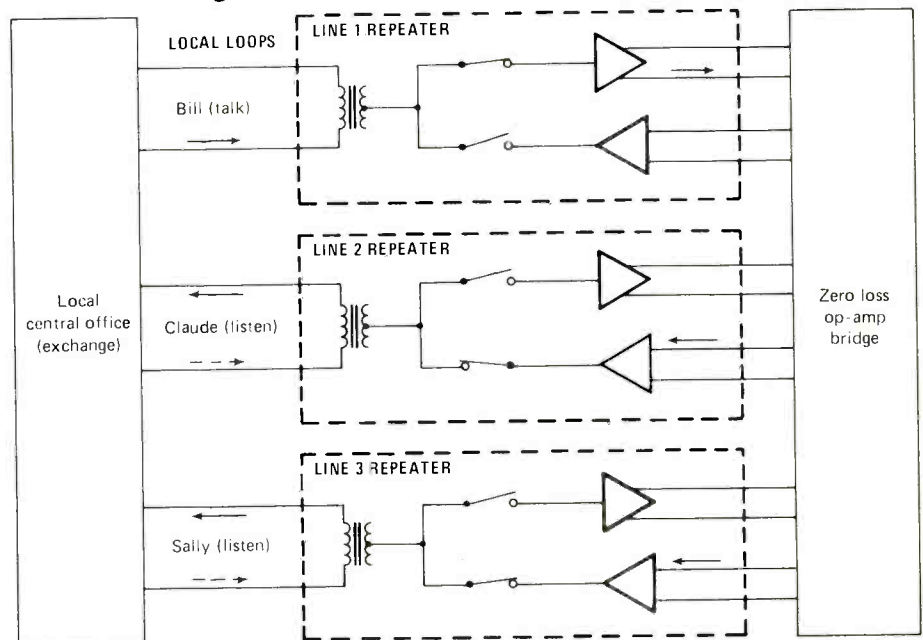
processing of each connection to make sure all the attendees can hear and be heard. The operator can also give a line priority, useful if the boss is speaking.

The Darome Connections uses a VOX system on its bridge so that the noise and echo from all the connected lines is excluded. Even with hundreds of lines connected, a Darome conference call can sound like a simple call between two parties. Besides speech, the Darome Connection can also handle Slow Scan TV and FAX if any charts and diagrams need to be sent to all parties.

What does all of this cost? According to Lou Appel, Regional Manager for Darome: "We charge \$10.00 per half hour per connection. Plus of course toll charges if any. We can connect the whole world together and make sure they all hear each other." You can contact Lou to find out more about his system and whether it can be used by your company or club. You may even want to consider it for large family reunions. Lou's telephone number is: (612) 894-7780.

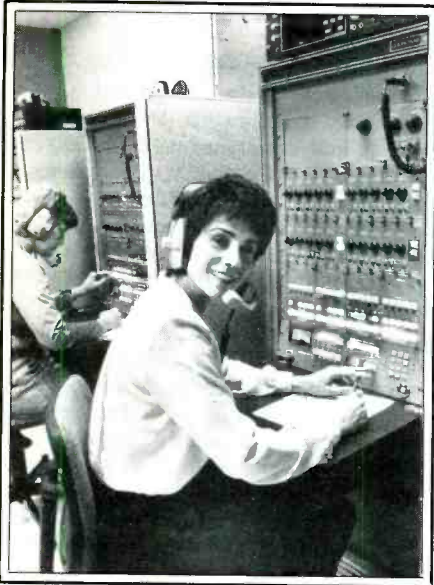
Many teleconferences consist of several groups of people who are gathered around a table. They can use a standard speakerphone or rent special speakerphones from Darome. The Darome equipment is high-quality custom-built equipment that will broadcast into the room at high volume and has jacks for

Figure 2: How the Darome Connection works.





Telephone conferencing connects an unlimited number of distant people with a meeting.



In a conference call, the operator serves as an administrative assistant.

tape recorders and multiple microphones. The purpose of the multiple microphones is to beat the "head in the trash-can" effect. If you use a single microphone in a large room, the echoes off the walls and ceiling will get in to the mike and give that distinctive speakerphone sound.

The Darome speakerphone equipment can also be used for standard phone calls between two parties or groups. If you love the convenience of speakerphones but are tired of rude comments such as, "Get yer head outta da barrel!", consider some of the equipment from Darome. They call their speakerphones "Conveners." Several models are available for both sale and rent.

One form of teleconferencing that is really a one-way public address system is used to announce "hot tips" to stockbrokers offices. Most brokers have a PA system on each broker's desk for announcing. In the brokerage business this is called "Hoot 'n' Holler." As a general rule, each office has its own system. With the Darome Connection, the head office can make announcements in every one of its offices at the same time. At last, if you live in Jackson Hole your local broker gets the tips at the same time as the New York office. **PC**

Hand-Held Scanner Reception

Today's hand-held programmable scanners are highly sensitive and sophisticated receivers (the Bearcat BC-100XL and the Regency HX-1000/1200 are among a growing number of quality units), but their range is often severely limited by the short "rubber ducky" antennas with which they are supplied.

TIP: To increase the range of your hand-held scanner, install an extendable full-length antenna with a standard BNC base. This simple operation will noticeably increase your receiving distance.

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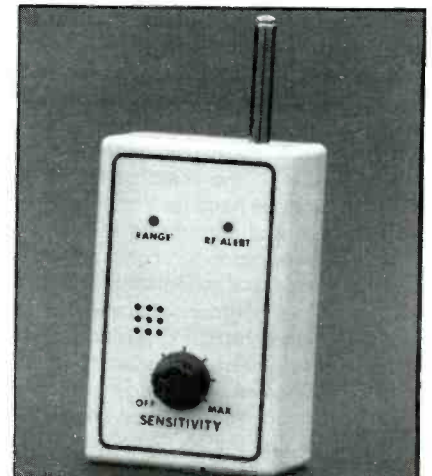
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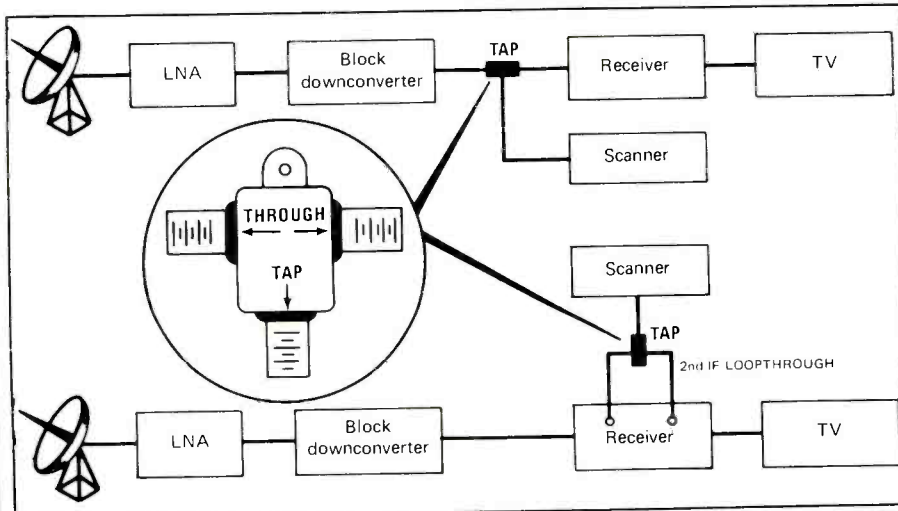
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Scanning The Satellite Bands: How To Connect a VHF/UHF Frequency Scanner To Your Satellite TV System



Here's how a three-way IF tap is used to join a scanner to a satellite system. It may also be connected to a receiver's second IF loopthrough to deliver IF SCPC signals into your scanner.

gram possibilities ranging from a cornucopia of music formats to dozens of collegiate and professional sports events. Many national, regional, and state news networks deliver their programming to affiliate stations around North America by means of satellite-delivered SCPC circuits. Educational audio programs also abound, with organizations such as the Corporation for Public Broadcasting simultaneously uplinking numerous unique educational programs, classical music performances, and a wide variety of cultural events. Several satellite SCPC circuits are also devoted to relaying a variety of foreign-language programs, including Latin American news in Spanish and the foreign radio broadcasts of the Voice of America.

While satellite TV transmission systems commonly use subcarriers (information-carrying waves that modulate the main video carrier in order to transmit the accompanying sound signal along with the video), the transmission of data- and audio-only services by satellite is more often achieved through the use of more spectrum-efficient modulation techniques. One of these techniques is known as SCPC for single channel per carrier.

Unlike audio subcarriers, which are inextricably linked to the main video carrier, SCPC signals can have their own independent carriers and frequency assignments within a given transponder. Either analog FM modulation or digital modulation techniques can be used to superimpose the audio or data information onto the SCPC carrier. Because of the relatively narrow bandwidth of each SCPC transmission, a single satellite transponder can conceivably contain hundreds of individual audio signals. The amount of bandwidth actually occupied by any SCPC signal depends on how much the SCPC carrier is deviated by the modulating audio signal. FM-modulated voice signals typically have a bandwidth of 25 to 45 kHz, while broadcast quality audio program distribution requires a bandwidth of 100 to 250 kHz.

Digitally-modulated SCPC signals for "thin-route" (low density traffic) voice applications or data transmissions commonly utilize 30 to 60 kHz of bandwidth per signal.

The wider bandwidth of high-fidelity SCPC channels is due to their use of a higher FM deviation level in order to faithfully reproduce the entire spectrum of audio frequencies (50 Hz to 15,000 Hz) that comprise most musical compositions. SCPC telephone traffic only need reproduce the human voice (50 Hz to 3,000 Hz), so a lower level of deviation can be effectively used. To permit the maximum number of audio and data signals to inhabit the same transponder, nonlinear gain networks called compander circuits are often employed to compress the extreme peak deviation levels of the audio or data signal prior to modulation. Earth stations that receive these companded SCPC signals employ an inverse gain expander circuit that returns the compressed signals to their original state.

Scanning The Satellite Spectrum

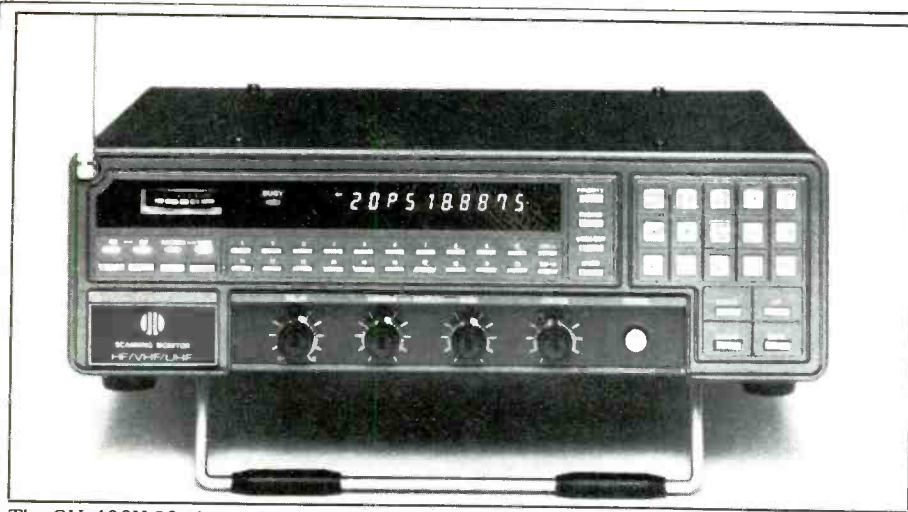
Single Channel Per Carrier (SCPC) services transmitted by North American domestic satellites offer a wide selection of pro-

gram possibilities ranging from a cornucopia of music formats to dozens of collegiate and professional sports events. Many national, regional, and state news networks deliver their programming to affiliate stations around North America by means of satellite-delivered SCPC circuits. Educational audio programs also abound, with organizations such as the Corporation for Public Broadcasting simultaneously uplinking numerous unique educational programs, classical music performances, and a wide variety of cultural events. Several satellite SCPC circuits are also devoted to relaying a variety of foreign-language programs, including Latin American news in Spanish and the foreign radio broadcasts of the Voice of America.

Outside of the North American region, SCPC transmission techniques are commonly employed by international satellites to relay radio programming, the sound portion of TV broadcasts, and a multiplicity of two-way telephone conversations. Intelsat uses two methods to combine SCPC transmission techniques with video programming relays. In many cases, the transponder is divided into two separate half transponders, with the video programming occupying one half, and as many as 1200 SCPC signals occupying the other half. These half-transponder SCPC transmissions include the audio portion of the TV program, separate radio station broadcasts, numerous telephone conversations, and special marker signals called pilot tones. Many developing countries such as Algeria and Sudan use this scheme as a way to squeeze the most use out of a single transponder. The second method of combining video and SCPC signals is to transmit the SCPC sound circuit for the satellite TV service on a different transponder from the one carrying the video signal, a method currently employed by the Intelsat TV leases of Colombia and Saudi Arabia.

Receiving SCPC Signals

By gaining access to the full gamut of SCPC services, those of us who are involved in the broadcasting and satellite communications industries can keep abreast of the amazing diversity of news, sports, and musical entertainment services that are available. For experimental purposes, SCPC signals can be received by satellite earth sta-



The SX-400K 20-channel programmable scanner from JIL can include continuous coverage of the 800 to 1400 MHz frequency spectrums with the addition of converters.

tions which have been equipped with a VHF/UHF scanner.

Connecting A Scanner To Your Satellite Receiving System

The most effective way to employ a scanner for the reception of satellite-delivered SCPC signals is to connect the IF output of the satellite receiver's block downconverter to the antenna input of a VHF/UHF scanner that covers the appropriate IF frequency range. Today's block downconversion satellite TV receivers commonly translate the 3.7 to 4.2 GHz satellite band to an intermediate block of IF frequencies which lie within the 950 to 1450 MHz frequency bands. (The block IF frequency ranges of 270 to 770 MHz, 400 to 900 MHz, and 900 to 1400 MHz are also used by a few block downconverter manufacturers). Whenever the pass-band of the scanner corresponds to the IF output frequency range of the satellite receiver's downconverter, then the scanner can instantaneously access all SCPC services of a given polarity transmitted by a given satellite.

At the present time, there are at least two scanners that can receive signals within the 950 to 1450 MHz frequency range. The JIL

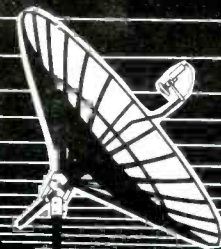
SX-400K scanner features a 20-channel programmable memory and provides continuous coverage of all frequencies between 35 and 535 MHz. Optional RF converters (RF5080K & RF 8014K) expand the continuous coverage of the SX-400 to include the 500 to 800 and 800 to 1400 MHz frequency spectrums as well. While not covering the 1400 to 1450 MHz segment of the 950 to 1450 MHz block downconversion band, the JIL scanner will provide access to the majority of the available SCPC audio services presently being transmitted by the North American domsats. ICOM America recently released its new 99-channel IC-R7000 scanner that has the ability to continuously tune from 25 MHz to more than 2000 MHz. The IC-R7000 also features a sophisticated scanning system that can provide instant access to all active SCPC frequencies. By depressing the auto-M switch, the IC-R7000 automatically memorizes the first 99 active SCPC frequencies encountered while the unit was operating in the scan mode. These active channels can then be recalled by pressing the unit's memory switch and then rotating the memory channel selector knob.

For those readers that already own VHF/UHF scanners that cannot tune to the 950 to 1450 MHz IF frequency band (or to



The ICOM R7000 scanner has the ability to continuously tune from 25 MHz to more than 2000 MHz.

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one of the other alternate block downconversion bands), there is an alternative method of connection that in many cases will also permit less capable scanners to access satellite-delivered SCPC signals. This alternative method involves tapping into the 2nd IF loop through connection that can be found on the rear panel of most block downconversion satellite TV receivers. The input and output connections are provided so that satellite TV owners can easily add filtering accessories to their receivers. The second IF output signal usually employs a center frequency of either 70, 134, or 380 MHz. If the VHF/UHF scanner is capable of tuning up to 18 MHz to either side of the 2nd IF center frequency, then it can be interfaced with the satellite TV system to facilitate SCPC reception. There are several scanners that are manufactured by Regency, Yaesu, JIL and others that can be used in this manner. The main disadvantage with tapping into the 2nd IF circuit is that only those SCPC services that fall within the bandwidth of the selected transponder can be received at any one time. The channel selector on the satellite receiver must be activated before additional SCPC services located on other transponders can be received.

A scanner should be connected to your system by means of an isolated three-way tap

Uplink/Downlink	Capacity	70 MHz	IF	134 MHz	IF	950-1450 MHz*
5947.2/3722.2	20 kHz			72.2	136.2	1427.8
* (Due to the high-side injection mixing method used by most block downconverters, the IF frequency order is reversed so that transponder 1 would have a center frequency of 1430 MHz and transponder 24 would have a center frequency of 970 MHz).						

Table 1: The SCPC service listing format in the World Satellite Almanac.

module. For those scanners which can tune the frequency range of the block downconverter's IF output, the tap is connected in line between the downconverter and the indoor receiver unit. A "thru connection" supplied by two of the tap's three "F" connectors acts as a two-way valve, passing a DC voltage from the indoor receiver to the downconverter and feeding the IF output signal from the downconverter to the indoor receiver. The third F connector on the tap delivers the IF signal to the antenna input of the scanner by means of a short coaxial jumper cable. Supplying -10 to -20 dB of attenuation, the isolated output on the tap reduces the signal level and blocks unwanted DC voltages from entering the scanner. For those scanners that cannot tune into the frequency range supplied at the output of the block downconverter, the three-way tap supplies a means of connecting to the 2nd IF loop through ports

found on the rear panel of many of today's block downconversion receivers.

Determining The Correct Scanner Frequencies For SCPC Reception

Most scanners have digital frequency readouts that provide a reliable indication of the relative frequency for each SCPC carrier. SCPC audio services of particular interest to the system operator can even be programmed into the scanner's memory for easy access. The SCPC service listings contained in the 1986 *World Satellite Almanac* appear in the format outlined in Table 1. By finding the entry that pertains to the IF frequency scheme that you are using to gain access to SCPC services, you can look up the appropriate scanner frequency for the desired service.

Many of the block downconverters used today for satellite TV reception exhibit a stability of +/- 100 kHz. The dielectric resonant oscillators (DRO) commonly used in block downconverters have a higher level of stability than most of the conventional single or double conversion receivers used in past years. However, even the DRO is susceptible to drifting problems caused by variations in outside temperature changes over the course of any 24 hour period. To minimize the amount of drift, the downconverter should be installed indoors so that it will have a fairly constant operating temperature.

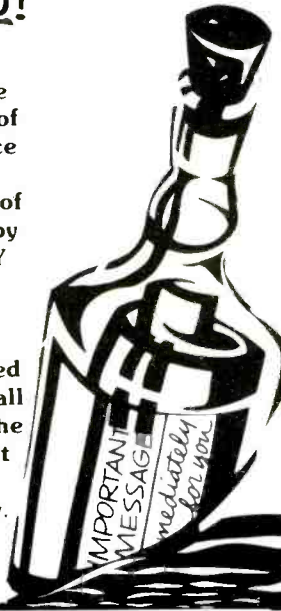
To calculate the amount of downconverter drift, select one of the full-time SCPC services listed in the *Almanac* and then adjust the scanner's fine-tune control for best reception of the service. The amount of variance between the listed frequency and the actual frequency required for best reception can be added to or subtracted from the frequencies listed for other SCPC channels in order to compensate for the DRO frequency shift caused by outside temperature changes.

Scanners: An Access Tool For Broadcasters And Satellite Equipment Vendors

As of this writing, the legality of the private reception of SCPC services by home satellite TV enthusiasts was questionable. The combination of satellite TV and VHF/UHF scanning receivers should be of legitimate interest to satellite equipment vendors as well as to station managers and technicians who wish to keep track of new services or check the operation of commercial SCPC hardware. Since the scanner-equipped satellite earth station can instantaneously access all SCPC program services, the satellite vendor can

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Uplink/Downlink (in MHz)	Capacity	70 MHz IP	134 MHz IP	950 - 1450 IP	Service/Description
5967.600/3742.6	20 KHz	52.6 MHz	116.6 MHz	1407.4 MHz	Transtar:Tour Station For the Hits/Rock
5968.000/3743.0	20 KHz	53.0 MHz	117.0 MHz	1407.0 MHz	Transtar:Tour Station for the Hits/Rock
5968.800/3743.4	7.5 KHz	53.4 MHz	117.4 MHz	1406.6 MHz	Occasional audio feeds including "Solid Gold" from ILUB Radio/Dallas-Port Worth/Solid Gold
5968.600/3743.6	7.5 KHz	53.6 MHz	117.6 MHz	1406.4 MHz	Occasional audio sports feeds
5968.800/3743.8	7.5 KHz	53.8 MHz	117.8 MHz	1406.2 MHz	Occasional audio feeds including "Solid Gold" music from ILUB
5969.000/3744.0	7.5 KHz	54.0 MHz	118.0 MHz	1406.0 MHz	----
5969.200/3744.2	7.5 KHz	54.2 MHz	118.2 MHz	1405.8 MHz	Occasional audio entertainment and sports feeds
5969.400/3744.4	7.5 KHz	54.4 MHz	118.4 MHz	1405.6 MHz	Occasional audio sports feeds
5969.600/3744.6	7.5 KHz	54.6 MHz	118.6 MHz	1405.4 MHz	----
5969.800/3744.8	7.5 KHz	54.8 MHz	118.8 MHz	1405.2 MHz	----
5970.000/3745.0	7.5 KHz	55.0 MHz	119.0 MHz	1405.0 MHz	----
5970.200/3745.2	7.5 KHz	55.2 MHz	119.2 MHz	1404.8 MHz	Occasional audio sports feeds
5970.400/3745.4	7.5 KHz	55.4 MHz	119.4 MHz	1404.6 MHz	Occasional audio sports feeds
5970.600/3745.6	7.5 KHz	55.6 MHz	119.6 MHz	1404.4 MHz	Occasional audio sports feeds
5970.800/3745.8	7.5 KHz	55.8 MHz	119.8 MHz	1404.2 MHz	Occasional audio sports feeds
5971.000/3746.0	7.5 KHz	56.0 MHz	120.0 MHz	1404.0 MHz	VJR Detroit/ABC News/Occasional audio sports feeds
5971.300/3746.3	7.5 KHz	56.3 MHz	120.3 MHz	1403.7 MHz	Michigan Sports Services Network/WFAG PM 107, Ann Arbor Michigan/University of Michigan Football
5971.500/3746.5	7.5 KHz	56.5 MHz	120.5 MHz	1403.5 MHz	The Florida Network
5971.800/3746.8	7.5 KHz	56.8 MHz	120.8 MHz	1403.2 MHz	IIGG PM 105 Los Angeles
5972.000/3747.0	7.5 KHz	57.0 MHz	121.0 MHz	1403.0 MHz	Occasional audio entertainment and sports feeds
5972.200/3747.2	7.5 KHz	57.2 MHz	121.2 MHz	1402.8 MHz	----
5972.400/3747.4	7.5 KHz	57.4 MHz	121.4 MHz	1402.6 MHz	West Virginia Network/WVAQ Morgantown/Mountaineer Sports Network
5972.600/3747.6	7.5 KHz	57.6 MHz	121.6 MHz	1402.4 MHz	----
5972.800/3747.8	7.5 KHz	57.8 MHz	121.8 MHz	1402.2 MHz	Occasional audio entertainment feeds
5973.000/3748.0	7.5 KHz	58.0 MHz	122.0 MHz	1402.0 MHz	Colorado News Network/IOA Deaver/Colorado Football Network
5973.200/3748.2	7.5 KHz	58.2 MHz	122.2 MHz	1401.8 MHz	----
5973.400/3748.4	7.5 KHz	58.4 MHz	122.4 MHz	1401.6 MHz	----/rock music service
5976.200/3751.2	7.5 KHz	61.2 MHz	125.2 MHz	1398.8 MHz	Oklahoma News Network/Satellite Channel 2
5976.500/3751.5	7.5 KHz	61.5 MHz	125.5 MHz	1398.5 MHz	----/(LPBI AM 1530 Sacramento, California)
5977.000/3752.0	7.5 KHz	62.0 MHz	126.0 MHz	1398.0 MHz	Oklahoma News Network/Satellite Channel 1/IGGP-Radio 69/ABC News Information Radio affiliate
5977.200/3752.2	7.5 KHz	62.2 MHz	126.2 MHz	1397.8 MHz	The Florida Network/News and sports
5977.400/3752.4	7.5 KHz	62.4 MHz	126.4 MHz	1397.6 MHz	Agricultural Broadcast Network, Columbus Ohio/Ohio Broadcast Network/occasional sports feeds
5977.800/3752.8	7.5 KHz	62.8 MHz	126.8 MHz	1397.2 MHz	ABC News & ABC Direction Sports
5978.400/3753.4	7.5 KHz	63.4 MHz	127.4 MHz	1396.6 MHz	Texas Agricultural Network/Texas Information Network
5978.800/3753.8	7.5 KHz	63.8 MHz	127.8 MHz	1396.2 MHz	Occasional audio sports feeds/Missouri Net Sports/ABC News
5979.300/3754.3	7.5 KHz	64.3 MHz	128.3 MHz	1395.7 MHz	Occasional audio sports feeds/Missouri Net Sports
5980.100/3755.1	7.5 KHz	65.1 MHz	129.1 MHz	1394.9 MHz	Interface Communications, Ocala Florida
5980.300/3755.3	7.5 KHz	65.3 MHz	129.3 MHz	1394.7 MHz	----
5980.600/3755.6	7.5 KHz	65.6 MHz	129.6 MHz	1394.4 MHz	Southern States Network/News and sports
5981.000/3756.0	7.5 KHz	66.0 MHz	130.0 MHz	1394.0 MHz	Mutual Radio Network/WJBO-1150 AM/CBS Radio News
5983.000/3758.0	20 KHz	68.0 MHz	132.0 MHz	1392.0 MHz	Texas State Network
5986.500/3761.5	20 KHz	71.5 MHz	135.5 MHz	1388.5 MHz	Learfield/ABC News, ABC Direction Sports
5987.500/3762.5	7.5 KHz	72.5 MHz	136.5 MHz	1387.5 MHz	ABC Information Network
5987.700/3762.7	7.5 KHz	72.7 MHz	136.7 MHz	1387.3 MHz	Total Radio/North Carolina Radio/UPI Radio sports
5987.900/3762.9	7.5 KHz	72.9 MHz	136.9 MHz	1387.1 MHz	ABC News, ABC Direction Sports/occasional audio sports feed
5988.100/3763.1	7.5 KHz	73.1 MHz	137.1 MHz	1386.9 MHz	IMBZ Kansas City/Occasional audio sports feeds/Texas Jayhawk Network/Iowa Information Network/Iowa State Cyclone Football and basketball network
5988.800/3763.8	7.5 KHz	73.8 MHz	137.8 MHz	1386.2 MHz	United Stations Radio network/occasional audio news, sports feeds/RIO News
5989.400/3764.4	7.5 KHz	74.4 MHz	138.4 MHz	1385.6 MHz	Mississippi Network/The Old Miss Football Network
5989.700/3764.7	7.5 KHz	74.7 MHz	138.7 MHz	1385.3 MHz	West Virginia Network/Occasional audio news, sports feeds/RIO News
5989.900/3764.9	7.5 KHz	74.9 MHz	138.9 MHz	1385.1 MHz	Mississippi Network/Mississippi State Football Network/RIO News
5990.200/3765.2	7.5 KHz	75.2 MHz	139.2 MHz	1384.8 MHz	Capitol Sports/North Carolina Radio Network
5990.800/3765.8	7.5 KHz	75.8 MHz	139.8 MHz	1384.2 MHz	North Carolina Network/Duke University Football and Basketball/WVAR music
5992.700/3767.7	7.5 KHz	77.7 MHz	141.7 MHz	1382.3 MHz	Virginia News Network/University of Virginia football and basketball network
5993.800/3768.8	112 Kb/s	78.8 MHz	142.8 MHz	1381.8 MHz	----
5996.400/3771.4	7.5 KHz	81.4 MHz	145.4 MHz	1378.6 MHz	Arkansas Radio Network/RIO News/EARN music
5996.900/3771.9	7.5 KHz	81.9 MHz	145.9 MHz	1378.1 MHz	Arkansas Radio Network/secondary circuit and paging system
5997.100/3772.1	7.5 KHz	82.1 MHz	146.1 MHz	1377.9 MHz	----
5997.700/3772.7	7.5 KHz	82.7 MHz	146.7 MHz	1377.3 MHz	Occasional audio sports feeds
5998.000/3773.0	7.5 KHz	83.0 MHz	147.0 MHz	1377.0 MHz	Texas Voice Network
5998.800/3773.8	7.5 KHz	83.8 MHz	147.8 MHz	1376.2 MHz	----/Occasional audio sports feeds
5999.000/3774.0	7.5 KHz	84.0 MHz	148.0 MHz	1376.0 MHz	----
5999.400/3774.4	7.5 KHz	84.4 MHz	148.4 MHz	1375.6 MHz	----/Occasional audio sports and entertainment feeds
5999.600/3774.6	7.5 KHz	84.6 MHz	148.6 MHz	1375.4 MHz	----
5999.800/3774.8	7.5 KHz	84.8 MHz	148.8 MHz	1375.2 MHz	----/Occasional audio sports feeds
6000.400/3775.4	7.5 KHz	85.4 MHz	149.4 MHz	1374.6 MHz	Oklahoma State Network/Oklahoma State Cowboys football network
6000.900/3775.9	7.5 KHz	85.9 MHz	149.9 MHz	1374.1 MHz	Occasional audio entertainment and sports feeds/Oregon State Beavers Sports Network
6001.100/3776.1	7.5 KHz	86.1 MHz	150.1 MHz	1373.9 MHz	WTMJ Milwaukee, Wisconsin AM 620/Milwaukee Brewers baseball/Bucs basketball network
6001.300/3776.3	7.5 KHz	86.3 MHz	150.3 MHz	1373.7 MHz	Occasional audio sports feeds
6001.500/3776.5	7.5 KHz	86.5 MHz	150.5 MHz	1373.5 MHz	----
6002.000/3777.0	7.5 KHz	87.0 MHz	151.0 MHz	1373.0 MHz	KRPC Los Angeles, California AM 710/Rock
6002.300/3777.3	7.5 KHz	87.3 MHz	151.3 MHz	1372.7 MHz	----
6002.500/3777.5	7.5 KHz	87.5 MHz	151.5 MHz	1372.5 MHz	Occasional audio sports feeds/New Jersey Nets Basketball
6002.700/3777.7	7.5 KHz	87.7 MHz	151.7 MHz	1372.3 MHz	----

Table 2: The chart represents the SCPC services carried by a single Westar satellite transponder. For a complete list of SCPC services carried by North American satellites, please refer to the entries in the World Satellite Almanac.

demonstrate reception to potential commercial customers without using more expensive and less versatile commercial SCPC systems. Radio and TV stations are always looking for a competitive edge within their marketing area. Equipment providers who increase their knowledge of what is available and offer potential local commercial customers a demonstration of the reception possibilities can gain access to new marketing opportunities. However, commercial customers will have to purchase more sophisticated SCPC receiving equipment for professional broadcast-quality performance; a scanner alone could not possibly deal with the various companding and preemphasis requirements with which radio stations would need to cope in order to add a new radio service to their repertoire. But as an access tool, the scanner can provide an acceptable level of audio performance for demonstration purposes.

The 1985-1986 World Satellite Almanac is available through Mark Long Enterprises Inc., P.O. Box 159, Winter Beach, Florida 32971 (telephone: 1-305-571-1021). The price is \$39.95 plus \$1.50 shipping & handling.

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BY JANICE LEE

Wisconsin Legislature Again Tries To Outlaw Radar Detectors

If the Wisconsin Legislature isn't careful, it may force traffic officers to strip-search motorists. No, police won't be looking for drugs or concealed weapons . . . they'll be frisking for radar detectors small enough to be concealed in a pocket or purse. For the seventh time in six years, Wisconsin's governing body is considering banning radar detectors. Sponsors of this ban claim it will decrease speeding. They imply that traffic officers are now hard-pressed to enforce the 55 mph speed limit. Should this ban be enacted, traffic officers will assume yet another duty: Citing otherwise law-abiding citizens who own radar detectors.

Janice Lee, President of the Radio Association Defending Airwave Rights, Inc., believes Wisconsin's Legislature is spinning its wheels. Six bills to ban radar detectors have already died in committee: Assembly Bill 573 and Senate Bills 500 and 528 were introduced in 1979; they died in 1980. Assembly Bill 927 and Senate Bill 371 were presented in 1981; both died in 1982. Senate Bill 204 was introduced in 1983 and died in 1984. The current bill—Senate 28—banning the sale and use of radar detectors, was introduced in 1985.

Lee believes that, like the previous six bills, Senate Bill 28 will be defeated for at least three good reasons: First, such a ban infringes on our constitutional rights. The First Amendment guarantees motorists' freedom of speech; this includes the right to hear radar detectors. Banning the sale or use of radar detectors would clearly violate drivers' civil liberties.

Second, the two state agencies primarily concerned with traffic safety do not favor a radar detector ban. During committee hearings, a Department of Transportation (DOT) representative testified that enforcing such a ban on out-of-state drivers would be extremely difficult. Therefore, DOT cannot support the bill. In addition, a State Patrol rep stated that the patrol opposes banning radar detectors. Testifying that "People have the right to know if they are being observed," the patrol also cited enforcement problems and violation of civil liberties.

The patrol recognizes that enforcing a radar detector ban would be almost impossible. Radar detectors are no longer easy-to-spot black boxes perched on dashboards or clipped to visors. Technological improvements have shrunk them to roughly the size of a cigarette pack. Short of erecting roadblocks, patrol officers could only ferret out detectors if motorists slowed down in the presence of radar. Afterwards, both vehi-

cles and drivers would have to be searched for concealed detectors.

Third, current testimony indicates that supporters of the ban believe these devices are purchased solely by reckless speeders. According to marketing surveys, drivers purchase radar detectors as a defense against malfunctioning and incorrectly operated police radar. They are not attempting to flaunt the law. They know approximately one out of every five radar-based speeding tickets is erroneously issued. Any motorist who travels the interstates frequently could testify to the truth of the matter: Radar detectors actually slow down traffic as effectively as patrol cars.

Indiana Gets Tough On Speeders

The Indiana State Police superintendent says cracking down on speeding motorists has become a priority for his office.

John T. Shettle says more people are traveling in excess of the 55 mph speed limit, a trend that could lead to a loss in federal road construction money for the state.

Federal highway officials are allowed, through a 1981 congressional action, to withhold up to 10 percent of non-interstate construction money from states where more than 50 percent of vehicles regularly exceed the federally mandated speed limit.

The percentage is determined through regular monitoring required by U.S. Department of Transportation officials, who compile the statistics annually.

During fiscal year 1983, 35 monitors in Indiana showed that 38.7 percent of all motorists passing the checkpoints were speeding. In 1984, the percentage was 46.6.

For state highway officials, the 1984 speeding percentage is uncomfortably close to the 50 percent level.

To hold back the tide, Shettle ordered stepped-up enforcement of speeding laws.

"It's become a priority in the last six months," said State Police Lt. John H. Hill.

Since 1974, each state has been required to monitor speeds on randomly selected stretches of urban and rural interstates, expressways, major arterial highways, and even on rural secondary roads.

State Police Ticket Quotas Argued In Arbitration Case

It happens all the time. A driver gets a speeding ticket and complains the police officer was trying to meet a quota.

Connecticut state police officials have long denied the department has such quotas. But the head of the state police union is citing a recent arbitration ruling as proof that the quotas exist.

In September, a state labor arbiter ruled that superior officers at the Litchfield barracks were justified in giving a state trooper a bad evaluation because he refused to issue at least one ticket a day, as the barrack's so-called "productivity standard" required.

The arbiter, Herbert Haber, found that such standards were a reasonable way to cut down on traffic violations and accidents.

Jerry Herskowitz, president of the Connecticut State Police Union, charged that the arbitration ruling proves that the department is placing too much emphasis on quantity at the expense of quality police work.

The debate over ticket quotas is an old one. Herskowitz charged last year that contract negotiations broke down because of an "implied ticket quota" that he said was unfair to troopers and to the public.

The debate flared soon after state police began a crackdown last fall on speeders.

"We do not have quotas," Sgt. Edward Daily, a state police spokesman, said during a recent interview. "Management has the right to set certain parameters. There's a big difference between a parameter and a quota."

Charged Herskowitz: "If you're worrying strictly about numbers, you're going to be too concerned about the little stuff. What are we going to put our priorities on?"

Pennsylvania Supreme Court Bars ESP Use By Local Police

A device owned by more than 500 Pennsylvania police departments to catch speeding drivers can only be legally used by the state police, according to a recent Supreme Court ruling.

The court, in a 4-2 decision, said the state Department of Transportation was wrong to classify the "Excessive Speed Preventer" as a kind of device that can be used by local police departments.

The devices, commonly called ESP machines, calculate speed by measuring the time it takes a vehicle to travel between sensors on a road.

The ruling reversed the speeding conviction of a man cited by East Pennsboro Township police near Harrisburg in 1981. It was not immediately clear how the ruling would affect other speeding citations issued by local police using the machines.

It also was unclear what impact, if any, the ruling would have on other devices used by local police.

In a dissenting opinion, justices James T. McDermott and Robert N. C. Nix Jr. said the court cannot ignore that a violation of the speeding laws took place.

Corporal John Campbell of the East

Pennsboro police said he's sure the decision is "going to have a big impact" on the way local police catch speeders.

Robert Gentzel, the attorney general's spokesman, said the ESP "has been in wide use by police departments across the state." A PennDOT spokeswoman said at least 500 local departments have the machines in Pennsylvania.

Under state law, local police may use only mechanical or electrical devices to catch speeders. State police may also use electronic devices, which includes radar.

PennDOT had classified the ESP machines as electrical. The court, citing technical testimony provided by an electrical engineer disagreed and said the devices were electronic.

The court also said PennDOT has no authority to classify any speed detection devices at all.

The court said the Legislature denied local police departments the right to use electronic devices for a variety of reasons, including a belief that departments would take advantage of drivers and use the devices to raise revenue.

Campbell said his department already had stopped using ESP in favor of a device that requires an officer to time travel between white lines on the road. The switch was made because the ESP's use can tie up several officers at once, he said. **PC**

Janice Lee is the Editor of Monday, A.M., the newsletter of Electrolert, Inc.

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BETTER SIGNALS

ANTENNAS AND SIGNAL IMPROVING ACCESSORIES

This article introduces two new concepts for building and testing antennas for shortwave broadcast reception. The very same idea can be carried over to the other shortwave frequencies as well. The first is a result of continued experiments with loaded verticals using PVC piping both as a mast and a coil form for the loading coil. The first one was put together in 1984 for operation as a good-performing 40-meter ham antenna with an overall length of only 18 feet. The arrangement worked out well for base-loaded and helical arrangements. If you are cramped for space and 31 meters is your band, give this low-cost 20-foot vertical a try. The second item introduces the use of an antenna bridge with its own battery-power signal source as a means of measuring antenna resistance and resonant frequency. Designed mainly for radio amateur application, it is a jewel for checking out shortwave receiving antennas as well. It opens a new world for the receiving antenna experimenter.

There is much hand-me-down to-do about the noise pick-up of verticals. As a matter of fact, with its often unshielded single-wire lead-in, is worse than any matched vertical or dipole with their shielded lead-in. A single-wire lead in its path to your receiver can pick up a lot of noise if it passes any noise source. In the HF spectrum, I have found little noise difference between a matched vertical and a matched horizontal dipole antenna. The one you place nearer the power line picks up the most noise. An advantage of the vertical is its more uniform omnidirectional pattern and its good low-angle pick-up.

A center loaded vertical for the 31-meter band as mounted on a 20-foot length of 2 inch ID diameter PVC pipe is shown in Figures 1 and 2. Overall length of the vertical antenna wire (#16 vinyl covered) is about 28 feet. It is subdivided into two 8-foot, 3 inch lengths, plus the piece used to wind the 14-turn coil around the pipe over a centered length of 1 foot, 6 inches. Eye-ring solder lugs are attached to both ends of all three pieces. Three 24-foot, 9 inch radials complete the antenna.

Such a vertical is ideal for mounting in a limited space and where antenna must be mounted among trees. Performance compares favorably with conventional dipole or inverted dipole mounted at the same height. Ground characteristics at my own antenna site are such that the performance of a vertical such as this is usually a bit better than the other two types.

Drop the radials down to ground level as shown in Figure 3. They can be laid on the ground or, for cosmetic and safety reasons, buried about an inch beneath the surface. Radio separation is 120°. If space is a limitation, one or all of the radials can be laid in

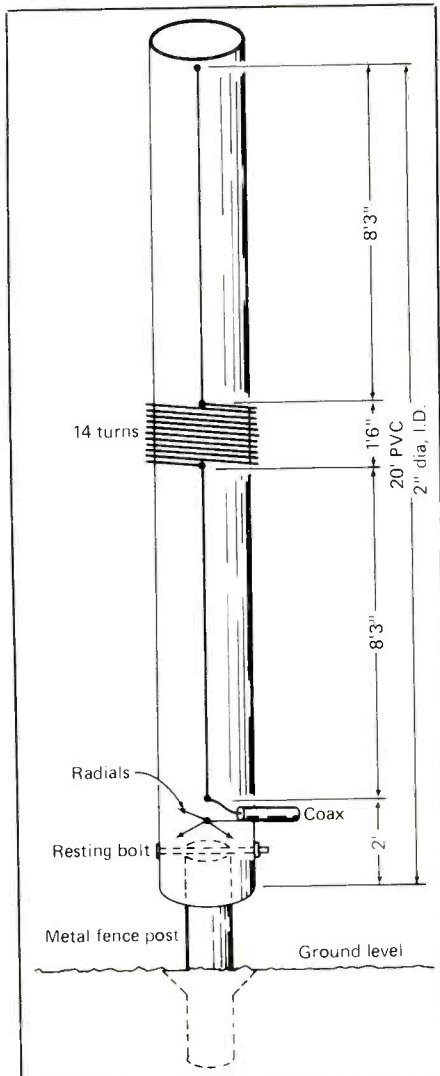


Figure 1: 31-Meter center loaded vertical.

serpentine manner as shown by the dash curve in Figure 3 with little or no difference in performance.

Figure 4 shows the three radials soldered to a single eye-ring solder lug which is held down by the ground bolt/nut terminal. The vertical antenna wire is connected to the bolt/nut terminal just above. Beneath the ground terminal can be seen the resting bolt which sits on the top of the metal fence post. The bottom of the mast is somewhat less than two feet below the resting bolt/nut combination.

The coaxial transmission line is connected at the opposite ends of the terminal bolts. Spade lugs are first soldered to the wire ends of the transmission line and are held in position by a second pair of nuts and appropriate lock washers. The nut ends of the terminal bolts with transmission line attached are shown in Figure 5.

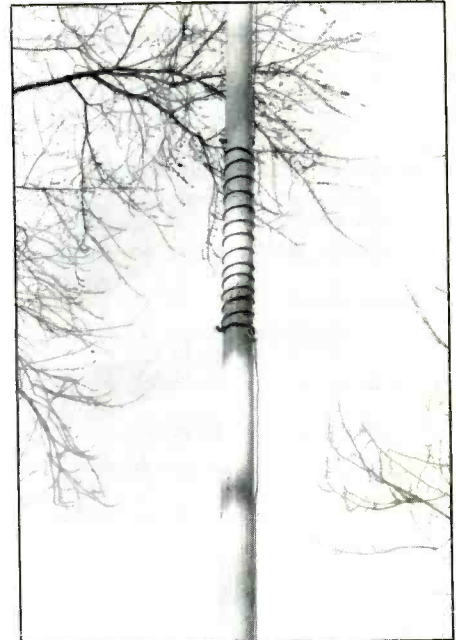


Figure 2: Center loading coil wrapped around PVC pipe.

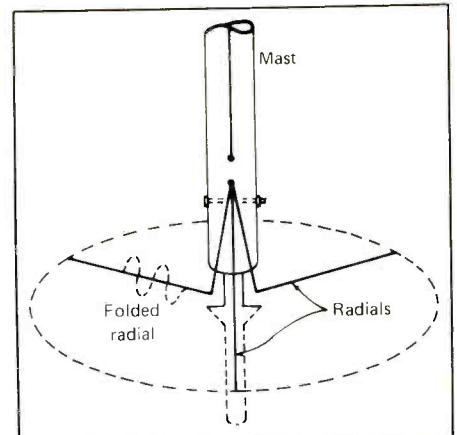


Figure 3: Arrangement of 120° separated radials.

If you follow the design dimensions of Figure 1 you will obtain good performance over the entire 31 meter band. The antenna performs well on the 25 meter band and provides acceptable results on some of the other shortwave broadcast bands.

An Antenna Bridge

The usual antenna for shortwave listening is not too critical as to length and the standard equations for dipoles and verticals are completely adequate despite some variables that can influence the actual resistance and resonant frequency. Such variables are height above ground, ground characteristics, proximity of other antennas and metallic surfaces. An antenna bridge is of help if you are critical

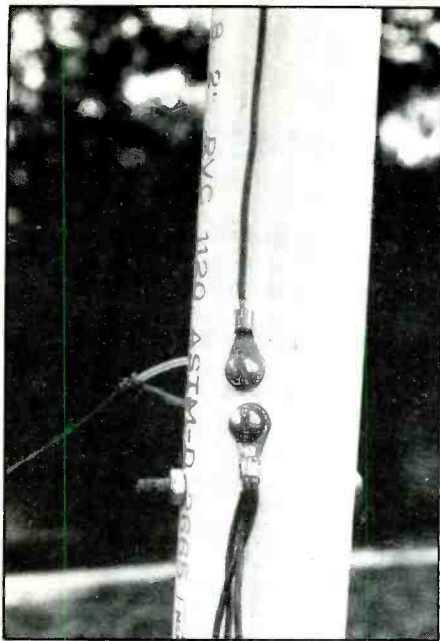


Figure 4: Attachment of vertical antenna to terminal as well as three wire radials to ground terminal. Resting bolt also seen.

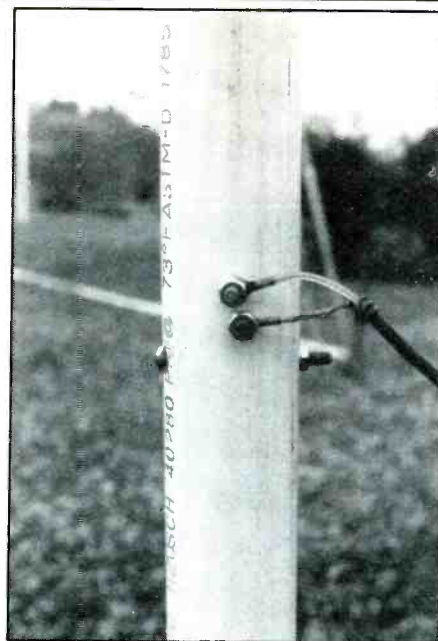


Figure 5: Transmission line attached to opposite ends of terminal bolts.

and really want to know what happens when you make minor changes. An antenna bridge is of more significance and importance when you are building and experimenting with high gain and directional antennas as well as special antenna configurations, such as those employing coil loading, traps, and matching networks. Such a bridge was really not required for the center-loaded vertical of this article, largely because of past experience. However, it was encouraging to verify and double-check antenna resistance and resonant frequency. I have some other ideas about loaded antennas and I expect I will be using it frequently.

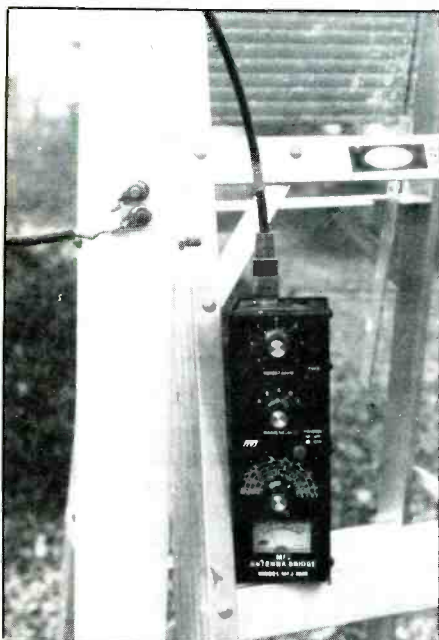


Figure 6: Using antenna bridge to check antenna resistance and resonance.

The antenna bridge shown is an MFJ-204B. It's a gem for testing receiving and transmitting antennas. The model is powered by a 9-volt battery and it has its own signal source built into a convenient-to-use package. A short length of coaxial cable attaches the bridge to the antenna terminals of the vertical as shown in Figure 6.

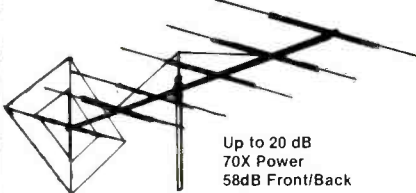
A bridge of this type is easy to use. Allow a suitable warm-up period and set the bridge to the desired frequency range. You can set the bridge to some precise frequency if required by using a digital frequency meter or picking up its signal on a receiver with an accurate frequency dial or digital display. To measure the antenna resistance at this frequency, vary the resistance control of the bridge for maximum meter dip. Resistance in ohms can be obtained by referring to an accompanying calibration chart.

The resonant frequency of an antenna can be determined in much the same way. This time, set the antenna resistance control to the approximate resistance of the particular antenna type under test. Now vary the frequency control carefully for maximum dip. The resultant frequency-dial setting indicates the resonant frequency of the antenna. A more precise frequency value can be gotten by picking up the bridge signal on your receiver. As you trim or otherwise adjust the antenna for a precise resonant frequency, this procedure is repeated until the antenna length is such that the desired resonant frequency is obtained.

Usually the antennas used for shortwave reception need not be set to a precise frequency because of their significant bandwidth. Therefore, it is not necessary to be overly precise about resonant frequency so long as it falls somewhere within the band as indicated by the dial calibration of the bridge frequency control.

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LISTENING POST

BY GERRY L. DEXTER

WHAT'S HAPPENING: INTERNATIONAL SHORTWAVE BROADCASTING BANDS

Some months ago, Brazil reshuffled the frequencies for its stations on the 49 meter band. Now a similar samba is taking place on 31 meters. Once the dance is done, the new line up of Brazilians on this band will look like this:

- 9.505 Radio Record, Sao Paulo
- 9.520 Radio Itatiaia, Belo Horizonte
- 9.530 Radio Cultura, Foz de Iguacu
(ex-9.630)
- 9.540 Radio Sociedad da Bahia, Salvador
(ex-9.515)
- 9.550 Radio Pampa, Porto Alegre
(ex-9.520)
- 9.565 Radio Universo, Curitiba
(ex-9.545)
- 9.585 Radio Excelsior, Sao Paulo
- 9.600 Radio MEC, Rio de Janeiro
(ex-9.770)
- 9.615 Radio Cultura, Sao Paulo
(ex-9.745)
- 9.630 Radio Aparecida, Aparecida
(ex-9.635)
- 9.645 Radio Bandeirantes, Sao Paulo
- 9.665 Radio Marumby, Florinapolis
- 9.685 Radio Gazeta, Sao Paulo
- 9.695 Radio Rio Mar, Manaus
- 9.705 Radio Nacional, Rio de Janeiro
- 9.715 Radio Journal do Commercio,
Recife (ex-9.565)
- 9.725 Radio Clube Paranaense, Curitiba
- 9.735 Radio Cultura da Bahia, Salvador
(ex-9.595)
- 9.745 Radio Nacional Brasilia
- 9.775 Radio Nacional Brasilia

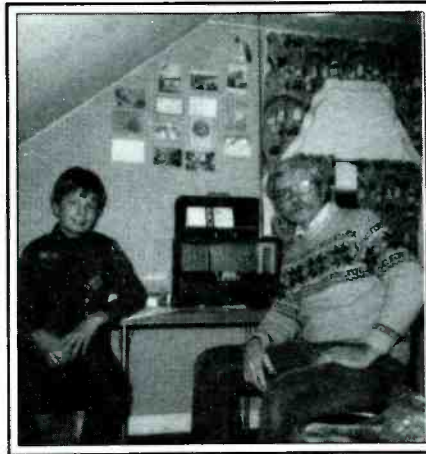
These changes may or may not be completely in place yet. Radio Journal do Comercio has reportedly had its license revoked and is off the air.

Adventist World Radio expects to be on the air from Facpi Point, Agat, Guam by summertime. Ground breaking ceremonies were held in November for this new station, which will operate initially with a 100 kilowatt transmitter serving Asia from the Soviet Union to the Philippines. Two more 100-kilowatt transmitters are planned later on.

The Voice of America expects to begin construction on its \$150 million dollar relay in Israel during the first half of this year.

Radio Rwanda has been heard by a number of listeners over the past winter season on its 3.330 frequency from 0300 sign on. The station's 5 kilowatt transmitter was to be replaced by a 20 kilowatt unit, and the better reception of late may be an indication that this has already occurred. The other listed frequency of 6.055 is reported to be back in service.

Listening Post reporter Alex Batman, who edits the "Easy Listening" column in *Frendx*, the bulletin of the North American Shortwave Association, notes the many



Ten-year-old Kevin Kiley and his father Dick are a listening team in Manchester, New Hampshire operating a Zenith Transoceanic.

changes that have been taking place on Radio Havana Cuba's airwaves in recent months. Some of the old features have been dropped or shortened and there's a greater emphasis on music now. We can't help but wonder if this might not be a response to suggestions ye editor sent them some time ago. Either way, the changes are an improvement, although it's our opinion that they haven't taken things far enough yet.

The Dutch-based World Music Radio, which has been relayed by a number of pirate and quasi-pirate stations in Europe for the past few years, now reports it will have its own transmitter—probably 1,000 watts—operating on 6.230. In a news release dated last November, the station announced that tests would "start soon." So far we've seen no reports of this one being heard in the U.S. under its own power and, even if it does get on the air, reception will be tough beyond the east coast. Reports go to P.O. Box 4078, 1009 AB Amsterdam, The Netherlands. WMR is an independent, non-political, non-profit foundation attempting to promote international understanding through worldwide music broadcasting. Thanks to Jim Coyle of Johnson City, New York for forwarding the info to us.

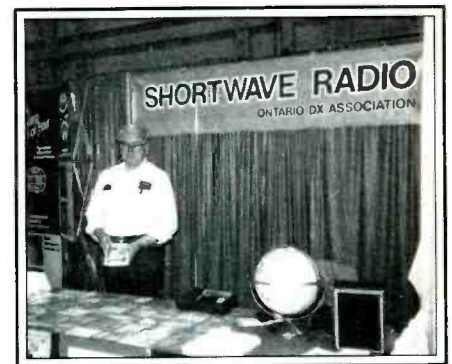
In a similar vein, Radio Netherlands' Media Network reports the European pirate Radio Caroline hopes to begin broadcasts on shortwave using a 5 kilowatt shipboard transmitter. The station tested last November on 6.273, but we don't know if that's the frequency that will be used when regular programming begins.

It would take several paragraphs to list all of the recent activities and future plans of the Ontario DX Association. There's now a 24 hour hotline (1-416-757-2325), they've

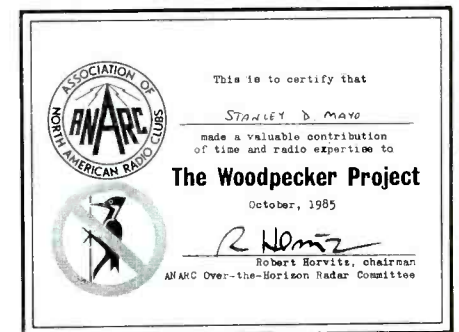
added over 200 new members in 1985 alone, the club promoted itself and the hobby at about eight hobby shows and flea markets last year, also held its first annual convention, and actually plans to present a course in shortwave listening at a local college! The monthly bulletin, *DX Ontario*, continues to be one of the most professionally done club efforts you'll find anywhere. For info and a sample bulletin, send \$1.50 to Cedric Marshall, P.O. Box 232, Postal Station Z, Toronto, M5N 2Z4, Canada.

Another club we've meant to mention for some time is the Association of DX Reporters, which is an outgrowth of the old Newark News Radio Club. ADXR publishes a monthly bulletin covering the entire listening spectrum from broadcast band up through FM and TV DX'ing. We can recommend it especially for its fine ham band and utility columns. Info and a sample copy of the monthly bulletin *DX Reporter* are available for \$1 from ADXR, 7008 Plymouth Road, Baltimore, MD 21208.

Let's also take a line or two to extend congratulations to Editor-in-Chief Jens Frost and Editor Andy Sennitt on the 40th anniversary edition of the *World Radio TV*



Ralph Shepherd of the Ontario DX Association mans the booth at the 1985 Hobby Show in Toronto.



Participants in the Woodpecker Monitoring project, described a few issues ago, received this QSL card-size certificate.

Handbook. You can't get very serious about shortwave broadcast listening without a current edition of the WRTVH.

In The Mail

We received a letter from Ron Seymour (3639 Meramec Avenue, St. Louis, Missouri 63116) who wanted his address listed in the hope for correspondence. Ron asks about an Australian station he hears announcing itself as part of the ABC network. The station plays a lot of country-western stuff and seems to ID as "6WF." You didn't mention a frequency Ron, but we'd guess you mean VLW9 at Perth on 9.610, relaying 6WF medium wave, also from Perth.

Ron also forwards a DX'ing tip he's found to be of help. Every month he writes down all the frequencies reported in Listening Post, by country, and then when he hears something he can't ID right off, just checks his frequency index, looks for a match, and checks the magazine.

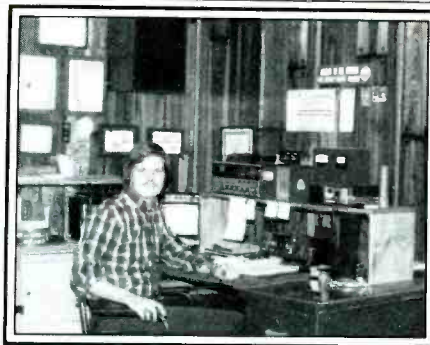
Last month someone asked about a St. Louis area club. Those readers in the St. Louis area might want to contact the Gateway DX Club at 836 Lamplight Lane, Hazelwood, MO 63042. Send an SASE for details. While we're talking clubs, let's appeal again for information about local and area clubs around the country. If you know of one and haven't informed us about it, please do. It helps us put area listeners in touch with each other.

Here's the Listening Post equivalent to the "search for Herb," only we're searching for "Gene." Alex Batman (4618 Alvan Dark, Apt. 34, Baton Rouge, LA 70820) made contact with Gene through these pages. Alex wants to get back to him but has forgotten Gene's last name and misplaced his address and phone number. So Gene, if you're out there, call Alex.

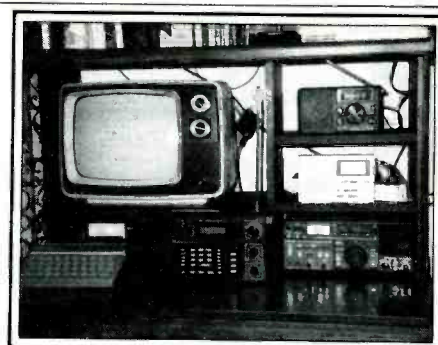
Chris Chase of Stillwater, Oklahoma forwards some information on the status of the upcoming High Adventures Ministries station, KVOH in California. Chris says Media Network interviewed the station's director who reported that, although the antennas were up, the transmitter hadn't yet arrived. They were hoping for an on-air date by mid-February or early March. If that was met, KVOH should be on the air.

A returnee to SWL'ing is Ira Wilsker of Beaumont, Texas who's using a Sony 2002 and a Panasonic portable. He's heard the BBC announce the addition of broadcasts to the South Pacific, Australia, and New Zealand, via Singapore, at 0600-0915 on 11.955 and 15.360. Thanks, Ira, and we're sorry but we can't use your reports in the format you have them. With the increasing number we're getting each month, we have to insist that reports be in the required format—by country, with your last name and state abbreviation after each logging and spaced so we can cut them up.

Mark Carlsen of Brookline, Maine says he's getting the Voice of Greece on approximately 7.425 in the afternoons and evenings. Actually, it's 7.430 Mark. He says Al-



Here's Harold Woering of Easthampton, Massachusetts, whose listening career dates back to 1967.



An ICOM R70 receiver is the main work-horse in this shack, which belongs to Mike Magick of Glendale, Arizona.

geria's 17.745 frequency has been "jammed" the past few months and wonders about alternatives. Try 9.685 or 9.640 or 9.509. Algeria has a history of both inconsistent operation and variable frequency usage. Mark would like to meet other listeners in his area and perhaps start a local club. You can contact him at 55 Harvard Avenue #16, Brookline, MA 02146.

The Latins are favorites of Dave Magnuson, 414 35th Avenue Court, Greely, CO 80631, who'd like to hear from listeners who like Latins and tropical band DX'ing. Dave asks about our deadline and it's hard to give a surefire answer to that one. Generally, if you mail your report by the end of one month it'll reach us in time to make the next column.

"Neverboard" is the name of a new computer bulletin board service in the Pittsburgh area which features a shortwave listening section. For more information, call Larry Di-Gioia at (412) 733-4842.

Jeff Leach in Omaha, Nebraska wants the address of Radio Luxembourg. It's Parc Municipal, Villa Louvigny, Luxembourg. If your report is for the English program, it's 38 Hertford Street, London W1Y 8BA, England.

Next month it's your turn. We appreciate your logging reports (using the format described earlier), clippings, schedules, good quality copies of QSLs, general news, comments and questions, so let's hear from you.

Listening Reports

Here's what's on. All times are GMT.

ALASKA- KNLS, Anchor Point on 6145 at 1335-1400 w/oldies music (Lizzi, CA).

ALBANIA- R. Tirana, 7065 at 0000 w/news in English (McDonough, PA; Pellicciari, CT); 9500 w/IS at 2029, opening on believed Farsi at 2030 & in French at 2004 w/ID (Palmer, WA); 9750 at 0000 in English w/news, music (Lizzi, CA); 11990 at 1438 w/Asian service in English (Seymour, MO).

ANTIGUA- Deutsche Welle relay, 6040 at 0135 in English (McDonough, PA); 0115 w/"Germany Today" (Hunt, NC); 6120 at 0500 in English (Magnuson, CO; Seymour, MO); 15355 in German at 2108 (Palmer, WA).

ARGENTINA- RAE on 5980 at 0130 w/"DX Special." Poor (Seymour, MO); 9690 in English at 0145 to N. America (Seymour, MO); 0100 in English w/news, tangos, DX program (Pellicciari, CT); 0100 w/ID (Neff, OH); 0127 w/mailbag in English (Paszkiwicz, WI); 11710 at 0100 in English (Neff, OH); 0143 w/ID, interview (Mayo, ME); 15345 at 2100 in English (Rass, ON).

ARMENIAN SSR- R. Yerevan, 7165 at 0330-0400 altho didn't hear reported English BC at 0355 (Batman, LA).

ASCENSION ISLAND- BBC Atlantic Relay 11860 w/"This Week In Africa" at 0512 (Fravel, WV); 15260 at 2011 w/English to S. America (Pastrick, PA); 2100 w/news (Mayo, ME); 15400 at 1600 w/news in English (McDonough, PA); 21660 at 1455 w/drama, ID (Mayo, ME).

AUSTRALIA- R. Australia, 6060 w/world news in English at 1500 (Magnuson, CO); 1445 w/music. Weaker on 5995 & 9580 (Seymour, MO); 1425 w/news, "Anything Goes" (Lizzi, CA); 9580 at 1400 w/world news (Hunt, NC); 1320 "Australia Tonight" (Neff, OH).

ABC- Perth, 9610 at 1400 w/news, opera program (Hunt, NC).

VNG, time station, 12000 at 2144 w/voice ID at 2159 (Mayo, ME).

AUSTRIA- R. Austria International, 11840 at 0836 in English, "Profile of Austria." Weak (Shute, FL); 5945 at 0600 in German w/ID, news (Seymour, MO).

AZAD KASHMIR- Azad Kashmir R., 4790 at 1218, man & woman talking, sub-continental music (Sgrulletta, NY).

BANGLADESH- R. Bangladesh, 17670 at 1450 ion Asian language, male & female announcers (Hunt, NC).

BELGIUM- BRT on 15590 at 1313 in English w/commentary, ID (Neff, OH); 1324, weak; also 5910 at 0635 fair on same day (Seymour, MO).

BELIZE- R. Belize, 3285 at 0600 w/end of request show & ID (Sgrulletta, NY); 0525 in English w/country-western, heavy CW QRM (Magnuson, CO).

BENIN- La V. de Revolution, 2045 on 4870 in French, tentative w/mention of Benin, African music (Carlsen, MA); 0550 weak, in French (Batman, LA).

BOLIVIA- R. Illimani, La Paz, 4945//6025 in Spanish at 2322; ID 2330 (Leach, NE).

BOTSWANA- R. Botswana, 4820 at 0300 w/IS, group singing after 0300 (Brossell, WI); 7255 at 0349 w.usual cowbells IS, anthem, ID in English 0400 (McDonough, PA); 0355 w/ID, 0400 anthem, woman w/ID, into music (Alpert, NY).

BRAZIL- Radiobras/R. Nacional, 11745 in English at 0205 (Fravel, WV); 0232 in English (Seymour, MO); 0220 (Lizzi, CO); 0200 w/news (Mayo, ME); 15200 in Portuguese at 1950 (Pastrick, PA).

R. Nacional Amazonas, 11780 at 1932 in Portuguese, ID on the half-hour, jingles, talk (Ross, ON); Portuguese talk & music at 2047 (Pastrick, PA).

R. Liberal, Belem, 3325 at 0430 w/Brazilian music mentions of Belem (Sgrulletta, NY).

R. Nacional Tabatinga, 4815 at 0205 in Portuguese. ID as R. Nacional (Sgrulletta, NY).

R. Nacional do Manaus, 4845 at 0216 w/Radiobras program. Off 0236 (Sgrulletta, NY).

R. Relogio Federal, 4905 at 0212 in Portuguese w/announcements, time checks by woman (Paszkiwicz, WI).

R. Poti, 4965 at 0100 in Portuguese, pop instrumentals, ID's of "Aqui Radio Poti do Natal" about every 10 minutes (Sgrulletta, NY).

R. Universo, Curitiba, 9545 at 0930 w/frequencies, ID, announced as "for Brazil & the world" (Shute, FL).

R. Bandeitantes, 9645 at 0700 w/music & Portuguese (Fravel, WV); 11925 at 0153 w/time checks, music, news to 0205 s/off (Paszkiwicz, WI).

BULGARIA- R. Sofia, 7100 w/English to N. Americaat powerhouse level, 2130 to 2200 s/off, //7115 (Alpert, NY); 7115 at 0411 in English (Seymour, MO).

CAMEROON- Radiodiffusion National, Yaounde, 9745 in French at 2020 (Batman, LA).

R. Cameroon, Garoua, 5010 in English w/newscast at 2105 (Carlsen, MA).

CANADA- R. Canada International, 5960 at 0230 w/"as It Happens" (Herzog, NY); 0100-0200 w/news, music, talks (Lizzi, CA); 0115 w/discussion (Mayo, ME); 0311 in English (Neff, OH); here & 9755 at 0100 in N. American service (Seymour, MO); 11975 in English to W. Europe (Magnuson, CO); 15140 at 2000 to W. Europe (Palmer, WA); 15325 at 1652 w/news (Seymour, MO).

CBC N. Quebec Service, 9625 in an Indian language & ID's in French at 1524 (Batman, LA); 11720 in English at 1749 (Seymour, MO); 6195 at 0340 (Linville, Alberta).

CFRX, Toronto, 6070 at 1013 w/news (Shute, FL); 1527 call-in program (Seymour, MO).

CHU, time station on 14670 at 1511; 7335 at 0403 (Seymour, MO).

CHAD- Radiodiffusion National, N'djamena, 4904.5 at 0509 in French w/native music (Mayo, ME); at 0521 (Fravel, WV).

CHILE- R. Nacional de Chile, 15140 at 1953 in Spanish w/music (Pastrick, PA).

CHINA- R. Beijing, 9550 at 1420 in English w/news, talks, 9730 at 1335 in English (Lizzi, CA); 9820 at 0014 w/English news (Seymour, MO); s/on in English at 0000 (Alpert, NY); 0044 w/Chinese lesson (Mayo, ME); 0000 w/IS, ID, news (Neff, OH); 2332 all Spanish (Palmer, WA); 9880 at 0101 w/news in Spanish, ID (Magnuson, CO); 15100 at 0100 in French (Mayo, ME).

CLANDESTINE- La V. del CID (anti-Cuba), 6305 in Spanish at 0300, battle sounds, news (Seymour, MO); 9590 at 1520 w/pop music, ID to 1530 s/aff (Magnuson, CO) Sure of frequency?--Ed; 9940 at 2210 in Spanish w/commentary or news (Pastrick, PA); 0102 w/anti-Castro talk, ID as "Radio Camillo Cienfuegos" (Leach, NE).

R. Venceremos (anti-El Salvador), 6553 in Spanish at 0316 man/woman talking over marching song, announced sked as 11 AM to 8 PM (Magnuson, CO); 6555 at 1745, frequent Venceremos ID's (Batman, LA).

R. Halgan (anti-Somalia), 9595 via Ethiopia, 1743 w/frequent mentions of Addis Ababa & ID's by child accompanied by band music (Batman, LA).

R. Magdallanes (anti-Chile program of R. Moscow), 9490 at 0234 in Spanish (Leach, NE); Yes, a report in Spanish to this one is advisable--Ed.

COLOMBIA- Ondas Ortega, 4975 from Florencia, 2351, 2351 w/variety of music, Spanish talks (Palmer, WA); 2251-2300 w/echo announcements (Fravel, WV).

R. Super, 6115 at 0600 in Spanish w/frequent ID's (Seymour, MO); Suspect La V. del Llano carrying R. Super network--Ed.

La V. de los Centauros, Villavicencio, 5955 at 1020 in Spanish w/program "Buenos Dias, Colombia" (Shute, FL).

R. Macarena, Villavicencio, 5975 at 1017 w/music, ID, time check in Spanish (Shute, FL).

COOK ISLANDS- R. Cook Islands, in English w/request line music program at 0820 on 11760 (Batman, LA).

COSTA RICA- TIFC, Faro del Caribe, 50555 at 0334 w/English religious program (Mayo, NE).

R. Columbia, 4850 at 0615 in Spanish w/pop music, fast-talking commercials (Magnuson, CO); 0546 w/frequent "Columbia!" mentions during songs (Seymour, MO).

R. Reloj, 4832 at 0713 w/music & dedications (Magnuson, CO); 0619 on 4832/6006; music & tick-tock behind DJ (Seymour, MO).

R. Impacto, 6160 at 0551, Spanish w/music, ID's (Seymour, MO).

R. Casino, Puerto Limon, 5950 at 0520 w/top 40 songs in reggae style, ID's (Seymour, MO).

CUBA- R. Havana, English s/on at 0000 on 6100 & "30 minute information package" (Alpert, NY); 0614 w/English on 9525; s/on in English at 0631 on 9730 (Seymour, MO); 11725 in English at 2043 (Pastrick, PA); 15230 at 1800 in Spanish (McDonough, PA); 2000 s/on in Spanish (Alpert, NY); 2009 w/French to Africa (Pastrick, PA); 15300 at 0242 in English (Mayo, ME).

R. Moscow via Havana relay, 11840 at 2105 (Pastrick, PA).

CYPRUS- BBC Relay on 9580 w/world service at 0630 (Batman, LA).

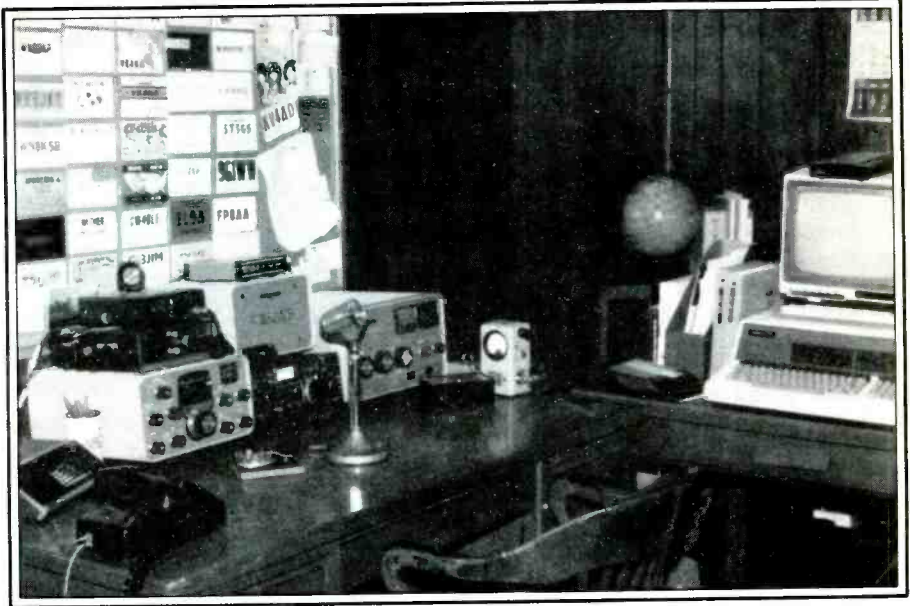
CZECHOSLOVAKIA- R. Prague, 5930 at 0150 in English w/news (Neff, OH); in Spanish at 2331 to N. America (Seymour, MO).

DOMINICAN REPUBLIC- R. Clarin, 11700 at 2040 w/Latin music & Spanish (Pastrick, PA).

R. Santiago, 9780 w/commercials & Latin pops at 0335 (Batman, LA).

EAST GERMANY- R. Berlin International, 15240 at 1520 in English w/world news, commentary (Hunt, NC); 6125 at 2130 in English w/European service (Seymour, MO).

ECUADOR- HCJB European service in English at 0710 on 6205 w/DX Party Line (Griffith, CO); new 6230 w/"Passport" at 0547 tune in



Mike Suhar of Dayton, Ohio combines listening with hamming. He's WB8GXB.

//11910 (Alpert, NY); 0645 w/DX Party Line, also 9870//11910 at 0610 (Seymour, MO); 0644 in English (Neff, OH); 9985 at 0535 in English w/"Passport" (Magnuson, CO); 11740 at 1350 w/religious program (Herzog, NY); 11910 at 0056 in English (Neff, OH); 15270 at 2130 in English (Pellicciari, CT); 17790 at 1929 w/English to Europe (Pastrick, PA); 17890 at 1940, Spanish to S. America (Pastrick, PA).

R. Quito, 4920 at 2339 in Spanish w/music (Fravel, WV).

La V. del Upuno, 5039 at 0156 talk by man, music, ID, all Spanish (Leach, NE); 0120 on 5040 long talks, occasional short guitar segments, many ID's around 0215 (Sgrulletta, NY).

R. Federacion, tentative on 4960 at 0115 to 0200 s/aff. Andean instrumentals, ballads, mentions of Quito, lively vocals, bells before announcements, theme music, anthem (Paszkievicz, WI).

R. Centinela del Sur, 4890 at 0118 w/Spanish & music (Fravel, WV).

EGYPT- R. Cairo, 9475 at 0230 w/Egyptian music, woman announcer in English (Hunt, NC).

ENGLAND- BBC World Service, 0430 & 0603 on 9515 (Lizzi, CA); 6005 at 0533 w/"Network Africa" (Seymour, MO); 0330-0400 on 6020//6175//9670 w/"Anything Goes" (Seymour, MO); 9670 new freq for E. Africa 0300-0430 (Alpert, NY). Note some of these are via various BBC relays--Ed.

EQUATORIAL GUINEA- R. Nacional, Bata, 5005 at 2100-2205 s/aff in Spanish w/ID & chanting (Carlsen, ME).

ETHIOPIA- VORE Addis Ababa, 9560 at 1500 w/ID & music, news, all English (Leach, NE).

FALKLAND ISLANDS- FIBS on 3958 at 0600. Hardrock to 0630 s/aff (Batman, LA).

FINLAND- R. Finland International w/English at 1400 on 11945 & "Northern Report." Fair, but //15400 inaudible (Batman, LA); 1400 w/news in English (Seymour, MO); at 1402 (Neff, OH); 15400 at 1330 w/"Airmail" program (Hunt, NC).

FRENCH GUIANA- R. France International relay, good at 0324. News 0350-0400 on 9800 (Seymour, MO); at 0415 w/news in English on 6055//7135//9800 (Griffith, CO); 0315 w/news in English, ID, into French 0330 (Sgrulletta, NY).

GABON- Africa #1, 4810 at 0510 in French w/music (McDonough, PA); 0506 in French (Fravel, WV); 15200 w/request line program in French at 1600 (Batman, LA); 1005 in French (Shute, FL); 15475 at 2030 in French w/rock (Herzog, NY); 2020 w/pop music (Pastrick, PA).

GHANA- GBC on 4915 at 0520 in English w/boxing match (Mayo, ME); 2245 w/English news (Brossell, WI).

GREECE- V. of Greece at 0448 on 7430 w/ID in Greek but RTTY QRM (Shute, FL); 11645 at 1540 woman w/world news in English, Greek music (Hunt, NC); 15630//17565 at 1500 w/Greek music/news (Batman, LA).

GREENLAND- Granlands R., Godthab heard 3999 2320 to 0000 fade out w/pops & announcements in Danish or Greenlandic. Heavy RTTY & ham QRM (Brossell, WI).

GUATEMALA- R. Chortis, 3380 at 0220 w/marimba music, ID at 0258 s/aff (Sgrulletta, NY).

GUYANA- Guyana BC Corp., 5950 in English

at 0830 w/ID "You are tuned to the Guyana Broadcasting Corporation" (Shute, FL).

HAITI- 4VEH in English on 4930 at 0020 (Shute, FL); Creole at 2326, ID 2330 (Fravel, WV).

HONDURAS- R. Luz y Vida, 3250 at 0400 w/easy listening music to 0401, ID, anthem, off at 0403 (Sgrulletta, NY).

HUNGARY- R. Budapest, 6025 w/news in English at 0215, mailbag 0216 (Seymour, MO); 12000 at 1708 w/European service in English (Griffith, CO).

INDIA- All India R., 9445 at 1320 in English. ID, woman w/news (Neff, OH); 9910//11620 at 2212 w/news in English & ID (Leach, NE).

INDONESIA- R. Republik Indonesia, Ujang Pandang 4719 in Indonesian at 1148, male announcer, "Song of the Coconut Islands," presumed news at 1200 (Sgrulletta, NY).

IRELAND- R. Dublin International, 6910 at 0015 w/pop music, male announcer. Slow fades (Hunt, NC).

IRAQ- R. Baghdad on 9610 at 2156 w/English news, music (Neff, OH).

ISRAEL- V. of Israel, 5885 at 0200 w/world news (Hunt, NC); 0220 w/talk by woman in English (Mayo, ME); 7410 w/news in English at 0500, into French 0515 (Seymour, MO; Pellicciari, CT); 0100 in English w/news, features (Neff, OH); 9385 at 2120 tentative Hebrew to Europe (Pastrick, PA); 11605 at 2230 music & news briefs in English (McDonough, PA).

ITALY- RAI on 5990 at 0115 w/news in English, fair (Seymour, MO).

JAPAN- R. Japan on 5990 at 1320, news in English, music (Lizzi, CA); S. Asian service in Vietnamese at 2258 on 15350 w/news (Caplan, MI).

JORDAN- Hashemite Kingdom BC Service, 9530 at 1953-2001 in Arabic w/male announcer (Fravel, WV) ID?--Ed.

LEBANON- V. of Hope, 6280 in Arabic w/slow vocals, some talk. Poor (Paszkievicz, WI) Time?--Ed.

LIBERIA- VOA Relay, 17705 at 1913 w/French to Africa, at 1935 on 17870 w/English to Africa (Pastrick, PA).

ELWA on 4760 at 2224-2232 s/aff w/religious program in English (Fravel, WV).

LITHUANIAN SSR- R. Vilnius, 5905 in English at 2300, was //7165 (Batman, LA; Herzog, NY); ending English at 2329 on 11790 (Seymour, MO).

LUXEMBOURG- R. Luxembourg, 6090 at 0000 in English w/"don't drink/drive" message & pop tunes (Hunt, NC).

MALAYSIA- RTV Malaysia in either Tamil or Hindi & subcontinental music at 2148 on 4845 (Batman, LA).

MALI- Radiodiffusion du Mali, 4783 in French w/music & announcements at 2230 (Brossell, WI).

MEXICO- R. Mexico International on 17765 at 2027 w/mariachi music (Shute, FL).

MONACO- Trans World R. on 7160 w/music box IS at 0721, English s/on at 0725 & into religious program (Alpert, NY).

MONTSERAT- Deutsche Welle relay on 11810 at 0156 w/interval signal, English ID for Carib relay on Montserrat, then Spanish to S. & Central America (Mayo, ME).

MOROCCO- RTM at 1545 to 1700 s/off on 17595 in Arabic. Lots of music & man announcer on the hour (Carlsen, MA); 1440 in Arabic w/talks & music (Hunt, NC).

NAMIBIA- R. Southwest Africa, 3295 at 0337 w/pop music, no breaks in all-night service to 0401 when English ID (Mayo, ME).

NETHERLANDS ANTILLES- R. Netherlands relay, 6145 at 0250 w/"Shortwave Feedback" (Hunt, NC); 9715 at 0537 in English w/"Newline" (Magnuson, CO); 15560 at 2127 w/IS, ID in English w/freq & location, time pips & into Dutch at 2130 (Mayo, ME); 17605 at 1905 w/English to Africa (Pellicciari, CT); 1830 w/news & "Newline" (Pastrick, PA).

Trans World R., Bonaire, 9535 at 0355 in English w/religious program (Skrabutenas, IL); 11815 at 1234 in English w/booklet offer (Neff, OH); 1115 w/news, WX, religious program (McDonough, PA).

NICARAGUA- La V. de Nicaragua, 6015 at 2248. Fair (Seymour, MO); 0552 in English, ID "...from the land of lakes & volcanos..." (Magnuson, CO); 0445 news, ID, talk on anniversary of R. Sandino (Sgrulletta, NY).

NIGER- ORTN (on 5020?-- Ed.) 2105-2202 s/off in French. Soap opera, ID by mon, flute IS, music. Off w/anthem (Carlsen, MA).

NIGERIA- V. of Nigeria/R. Nigeria, 7255 at 0545 w/W. Africa service in English (Seymour, MO) w/ID, program in English w/DJ & music to news at 0530 (Seymour, MO); English at 0500 strang sigs (Brassell, WI).

NORTH KOREA- R. Pyongyang at 2345 on 9735 w/talks in English (Brassell, WI).

NORWAY- R. Norway International, 9675 w/ID in English & Norwegian, BC starts 1455 (Seymour, MO); 15310 at 1320 in English w/"Newsletter From Norway" (Hunt, NC).

PAKISTAN- R. Pakistan, 17640 at 2158 w/music. News 2200 (Lizzi, CA).

PERU- R. San Juan de Chota, 5274 at 2320 music & echo announcements (Fravel, WV).

R. La Merced, 4960 at 0033-0055 music & frequent announcements in Spanish (Fravel, WV).

R. Atlantida, 4805 at 0330 in Spanish, fanfare & "Radio Atlantida...Republics del Peru" (Sgrulletta, NY) Believe now back on nominal 4790-- Ed.

PORTUGAL- R. Partugal, 9740 w/anthem at 0800 (Shute, FL); 15105 at 1600 in English to Middle East, s/off 1633 (Carlsen, MA); 1600 in English w/talks, DX program (Hunt, NC); 15285 at 1700 in Portuguese (McDonough, PA).

SENEGAL- ORTS, Dakar at 2220 on 4890. Seemedito alternate between French & Arabic. Tentativebut hearn Senegal mentioned several times (Brassell, WI).

SOLOMON ISLANDS- SIBC on 9545 at 0727 w/news, American pops, ID's, woman announcer (Leach, NE).

SPAIN- REE Madrid, 9630 at 0045 in English w/talks, ID, Spanish lesson (Neff, OH); 11880 at 2107 in Spanish to S. America (Pastrick, PA).

SOUTH AFRICA (REP. OF)- Radio RSA, 5980 at 0159 s/on in English (Fravel, WV); 7270 at 0306 in English to E. Africa (Fravel, WV); 0304 in English w/African news, commentary (Magnuson, CO); 0415 music, news headlines, into French 0428 (McDonough, PA); to W. Africa & W. Europeat 2054, all French; English from 2100 (Palmer, WA); 7270/9585 s/on in French at 0530 (Alpert, NY); 2100 w/UK, Ireland & W. Africa on 7270/9585 (Shute, FL); 0300-0430 in English on 7270. English on 9615 0200-0300 (Skrabutenas, IL); 0009 w/call-in show on 9615 (Seymour, MO); 0220 in English (Hunt, NC); at 0243 (Neff, OH); 9585/11900 at 2110, English to Europe, W. Africa (Pastrick, PA).

SOUTH KOREA- R. Korea, 7550 at 2200-2300 in English. Into Portuguese at 2300 (Carlsen, MA); 9570/9750 1500-1600 w/ID, "Echos of Korean Music" (Leach, NE); 9750 at 1400-1500 in English, Korean lesson, "Pulse of Korea" (Seymour, MO); 1444 w/sports highlights (Lizzi, CA); 1413 in English w/talks (Shute, FL); 1430 older pops (Hunt, NC).

SWEDEN- R. Sweden International, 11945 in English at 1401 (Neff, OH); 15345 at 1405 w/news in English (Seymour, MO); 1400 in English w/various features (Hunt, NC).

SWITZERLAND- Swiss R. International, 6135 at 0221. Spanish at 0230, English 0400, German 0430 (Seymour, MO); 0300 English (Linville, Alberta); 9885 at 1526-1600 in English (Lizzi, CA); 0220 English (Hunt, NC); 15570 at 1330 in English (Mayo, ME).

SYRIA- R. Damascus, 7455 at 2124 in English w/"Press Review" (Pellicciari, CT); 12085 at 2030 w/"Welcome to Syria" program (Griffith, CO); 2045 in English (McDonough, PA).

TAIWAN- V. of Free China, 5985 (via WYFR) at 0245 w/Chinese lessons (McDonough, PA); 6065 (via WYFR) in English at 0223 (Magnuson, CO); 7355 (via WYFR) at 2232 in English w/cooking show (Seymour, CO).

TANZANIA- R. Tanzania, English on 9684 at 0423 w/talks, ID, frequency info (Shute, FL).

TOGO- RTT, Lome, 5047 at 0530 in French. S/onw/hymns (anthem?-- Ed.). Paar (Brassell, WI).

TURKEY- V. of Turkey, 7215 at 2107 in English. Review of Turkish Press. QRM'd (Paszkiwicz, WI); 2300 w/IS, several ID's, news (Sgrulletta, NY); 9560 at 2325 in English (Hunt, NC); 0408 in English w/news (Seymour, MO).

UGANDA- R. Uganda, 5025 at 1945-2102 s/off. music & drama in French, commentary in English (Carlsen, MA).

UKRAINIAN SSR- R. Kiev, 5905 at 0030 w/news in English (Pellicciari, CT).

UNITED ARAB EMIRATES- R. Dubai, 17775 at 1330 w/mailbag show in English (Hunt, NC).

UNITED STATES- WHRI, World Harvest R., Nablesville IN w/regular programs as of last Christmas, 5995 at 1100-1300 (Batman, LA); testing at 1228 gave address as P.O. Box 50250, Indianapolis IN 46250 (Neff, OH); 6100 at 0612 on 1st day of tests (7 Dec.) w/tones, requests for reports (Alpert, NY); 6155 w/tests at 0404; also 2200 on 9770 (Paszkiwicz, WI); tests at 0628 on 6155 (Shirer, WI) Nat 6155?-- Ed.; 9615 at 0139 w/tests (Leach, NE); 9770 w/religious music, frequency change info 2257 (Palmer, WA); 11780 at 0000 in English (Herzog, NY); 11865 at 1910 w/religious music (Ross, ON); 15355 at 1700 testing & promising "special QSL's" (Griffith, CO); 11865 at 1934, 9770 at 2100, 9615 at 0230, 6155 at 0330 (Stuard, OK).

V. of America, 6020 s/on in Arabic at 0730 (Alpert, NY); 6030 w/"Daybreak Africa" at 0300 (Seymour, MO); 15650 w/jazz hour at 2044 in USB feeder (Mayo, ME); 17640 in French to Africa at 1850 (Pastrick, PA); 17790 at 2213 w/jazz hour & Stan Kenton music (Lizzi, CA) Ahhhh!-- Ed.

KCBI at 1800-2100 in English on 11790/11905 w/religious, news, country/western (Skrabutenas, IL); 11905 at 1808 in English (Seymour, MO); 1830 w/"Rodia Connection" (Alpert, NY); 2049 w/country music (Pastrick, PA); 1900 in English (Neff, OH); 1930 w/"Skylight" program (Pellicciari, CT); 1845 "Today in Dallas" (Ross, ON); R. Earth via KCBI at 2035 on 11790 (Seymour, MO).

R. Marti, via VOA facilities, 9525 at 0230 w/English soft-rock oldies (Griffith, OH); 11930 at 1745 in Spanish; romantic music, anti-Castro commentary (Magnuson, CO).

WYFR-- 6065 at 0145 in English w/ID, address & s/off (Herzog, NY); 9510 w/religion to Europe & China (Seymour, MO); 11830 at 1800 w/English to Canada (Seymour, MO); 2103 in English (Pastrick, PA).

AFRTS on 12030 at 0040 in English w/announcements (Neff, OH).

WRNO on 11705 at 2145 w/rock, ID, ads (Neff, OH).

United Nations R., 15410 at 1900 w/ID, announcement of upcoming BC in French, then Portuguese (Magnuson, CO).

KGEL in Spanish on 9615 at 0630 in Spanish (Seymour, MO).

USSR-- R. Moscow in English w/news at 0505

on 5900/6150/7260 (Griffith, CO); 5915 in N. Americanservice at 2300 s/on (Alpert, NY); 6000 at 1125 in English (Neff, OH); 6130 from 0300 w/news, "Soviet Way of Life" (Neff, OH).

VATICAN- Varican R., 6015 at 0105 w/news in English (McDonough, PA); 0100 strong w/news (Seymour, MO); 6250 at 0729 ending English news, into Spanish (Alpert, NY).

VENEZUELA- R. Rumbos, 9660 in Spanish w/conversation at 2146 (Pastrick, PA); 2344 Latin big band music, shouted "Rumbos" ID's (Palmer, WA).

R. Yaracuy, San Felipe, 4940 at 2309 in Spanish w/music (Fravel, WV); 2330 Latin Songs, ID (Hunt, NC); at 0958 s/on "Desde San Felipe..." (Shute, FL).

R. Mara, 3275 at 0230 in Spanish w/easy listening music (Magnuson, CO).

Ecos del Torbes, 4980 San Cristobal w/discussion program in Spanish at 2240 (Fravel, WV).

WEST GERMANY- R. Free Europe, 9555 at 2135 in Bulgarian, commentary on world events (Pastrick, PA).

Deutsche Welle, 3995 at 2341 in German, pop & German music (Neff, OH).

YUGOSLAVIA- R. Yugoslavia in English at 2215 on 7240, 2230 into French (Batman, LA).

ZIMBABWE- Zimbabwe BC Corp., 3396 from 0500-0600 s/off in English. Very weak (Batman, LA).

That's the lot. Hats off to: Robert Palmer, Spokane, WA; Michele Shute, Pensacola, FL; Bob Caplan, Ann Arbor, MI; Bruno A. Lizzi, Redondo Beach, CA; Billy Hunt, Durham, NC; Stan Mayo, Yarmouth, ME; George Neff, Niles, OH; Sheryl Paszkiewicz, Manitowoc, WI; Robert Pastrick, Conway, PA; Allen R. Linville, Edmonton, ALB; Patrick M. Griffith, Denver, CO; David R. Alpert, New York, NY; Mike Shirer, Green Bay, WI; Jeff Leach, Omaha, NE; Steve Pellicciari, Norwalk, CT; Patrick McDonough II, Pittsburgh, PA; Jerry Stuart, Lawton, OK; Dave Magnuson, Greely, CO; John Sgrulletta, Mahopac, NY; Mark Carlsen, Brookline, MA; Ronald T. Seymour, St. Louis, MO; Brian Skrabutenas, Homewood, IL; Robert Brassell, Pewaukee, WI; Robert S. Ross, London, ONT; Paul Herzog, Syracuse, NY; Alex Batman, Baton Rouge, LA; and Larry R. Fravel, Clarksburg, WV.

Til next month, good listening!

PC

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SCANNER SCENE

BY CHUCK GYSI, N2DUP

MONITORING THE 30 TO 900 MHz "ACTION" BANDS

The readers of Scanner Scene are the greatest! The mailbox is constantly stuffed with your letters and we appreciate it. You may have what you consider a silly little question, but if you send it in and we check it out and answer it in this column, many other readers will also probably benefit from the subject. We'll even keep you anonymous if you prefer.

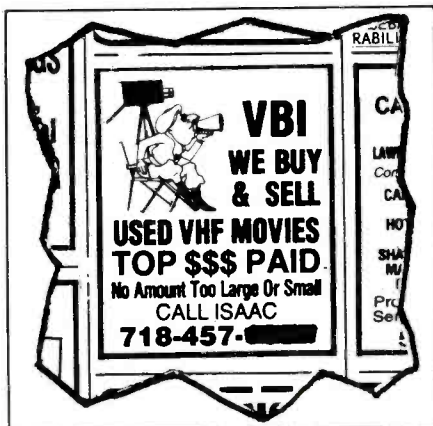
In any event, we'll attempt to clean out some of the backlog of letters this month. Here we go:

Ricardo Garcia, KIL9FP, of Chicago, Illinois, advises us of some changes in the Windy City. U.S. Postal Inspectors have changed their "red" channel from 169.850 to 414.750 and their "blue" channel is switched from 169.650 to 415.050 MHz. Some of their conversations are scrambled, Ricardo advises.

In addition, Illinois State Police have taken over from Chicago Police all patrol duties of interstate highways within the city limits. To handle the new patrols, Illinois State Police have added some new channels. District 3 in Chicago covers the Eisenhower, Kennedy, and Edens Expressways on 42.88 MHz. District 4 at Crestwood covers the Ryan, Stevenson, and Calumet Expressways on 42.66 MHz. It certainly would pay to tune in those channels at rush hour.

An anonymous reader in the midwest reported hearing interesting communications on 148.525 MHz while mobile near Earth City, Missouri (northwestern St. Louis County). She says that high-ranking military officers were heard discussing their personnel response to a hijacking late one night. She adds that the conversation sounded like an autopatch on a hotline channel to an officer at Scott Air Force Base in Illinois, which provides transportation for anti-terrorist forces. The reader adds that communication on this channel is rare and usually just radio checks. Sounds like a good frequency to us!

George J. Hulseberg of South River, New Jersey, is in search of frequencies that might be used by medical examiners in New York City and Middlesex County, New Jersey. We also couldn't come up with specific frequencies for those two areas. In New York City, you might want to try listening on 47.66 MHz, which is used by city morgue units. You may not hear medical examiners, but it would be worth giving it a shot. Although medical examiners may not be using two-way radios, don't rule out their possible use of mobile or cellular phones. Typically, a medical examiner might be a regular doctor who gets paid by the county for the number of cases he or she has to handle. If a medical examiner is needed, his or her of-



This ad appeared in Newsday, a newspaper on Long Island. We wondered if they also purchased UHF movies.

fice might be called and the answering service might page the doctor. The doctor then would get his or her message and drive to the scene.

Outside of a big city, most medical examiners probably would not make much use of a radio. They might have unit numbers reserved for their use, however, in case they ever do use a radio. For instance, Montgomery County, Pennsylvania (just outside Philadelphia), reserves 14-series unit numbers for the county coroner's office, even though radios are not used. If a particular medical examiner or coroner has a mobile phone, you could give a listen there, but you'll have to listen to all the other conversations as well in trying to hunt the proper call.

Eric Miller of Island, Kentucky, asks about certain radio codes he hears police dispatchers using and wants us to list the ones he hears and what they mean. That's one of the interesting aspects of monitoring—figuring out what you hear. A "Signal 2" in one police department might mean "emergency—officer needs help" while in another town it might mean "pick up a coffee with cream, no sugar." Outside of the standard APCO 10 codes used by most police departments, a lot of smaller departments set up their own radio codes. The best bet to get a list of these codes is to check with a local scanner shop, the police dispatcher himself or herself, or a police officer. If you listen enough, you might be able to figure out certain codes on your own, too. For instance, if you hear police constantly responding to a department store for a "Code 19" with two subjects being detained or whatever, it's probably the code for shoplifting. Keep your ears open, Eric. You'll figure out those codes.

Don Benn of Victoria, British Columbia, says he receives Russian broadcasts on



This tidy monitoring post belongs to Howard Abercrombie (KA3KKL) of Belle Vernon, Pennsylvania.

119.05 MHz in the aircraft band. He uses a shortwave receiver that also has the aircraft band and wonders if the Soviet Union has taken to the aircraft band for broadcasting. Without being technical, the receiver probably is being overloaded by a 250 or 500 kilowatt Russian transmitter on the shortwave band and it pops up like junk in the aircraft band. I once had one of those multi-band receivers when I started out shortwave listening and all kinds of garbage would pop up on the aircraft band: Hams, FM broadcasts, paging transmitters. In fact, come to think of it, I never really did hear that much air traffic. Don, if you want to listen to the aero band without all the other junk, you should start saving your pennies for the day you decide to upgrade to a better receiver. In the meantime, don't forget you can hear aircraft using the shortwave bands. Check out the other columns here in POP'COMM for details.

Howard Abercrombie, KA3KKL, of Belle Vernon, Pennsylvania, sends along a photo of his shack. Howard has all types of monitor, amateur, test and computer equipment, including a Kenwood 530, Kenwood TR2500, Cushcraft AV5 vertical, Bearcat DX1000, Bearcat 300, Bearcat III, Bearcat 100, Bearcat Five-Six, Bearcat Aircraft Thin-Scan, Heathkit 1680-1681, Heathkit HW2036, Vic-20 and a Kantronics terminal. Check out the photo in this column. (And if you have a photo of your shack, send it in!)

Mike Stewart of Kansas City, Missouri, says he's planning on attending the Indianapolis 500 later this month for the first time and wants to know what frequencies race car drivers use to talk to their pit crews. We did a full feature on race communications in the February issue of POP'COMM and hope you caught the article, Mike. Most

race crews use UHF business band radio channels for race communications. Set your scanner to search 461-465 and 466-470 MHz. You also might hear some race-related communications on high-band VHF business channels from 151.625 to 151.985 and 154.515 to 154.600. Some drivers use the same channels; others change their frequencies not only each race, but even several times during a race. If you search enough, you'll figure out who is using which channel. And don't forget to send us a list of the channels you do log. We're planning on updating that February article on race car communications.

Ed Jones Jr., WB2DVL, of Somerset, New Jersey, questions whether or not it is legal for amateur radio operators to use scanners in their cars in New Jersey in view of the state's law prohibiting the mobile use of scanners. There was a provision introduced in the New Jersey Legislature a few years ago that would have allowed amateurs to use scanners, but the measure was killed in committee when the state police chiefs association got wind of the bill. In any event, the current New Jersey mobile scanner law reads as follows:

"Any person who installs or has in any automobile a shortwave radio receiver operative on frequencies assigned by the Federal Communications Commission for fire, police, municipal or other governmental uses, is guilty of a misdemeanor, unless a permit therefore has been obtained from the chief of the county police, or from the chief of police of the municipality wherein such person resides.

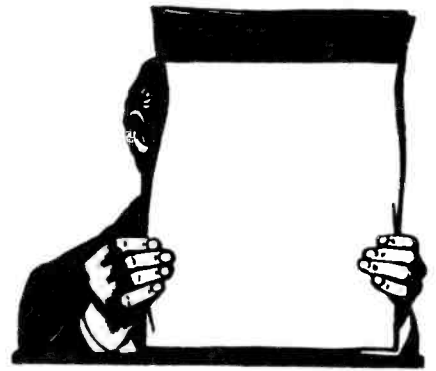
"This section shall not apply to any fire, police, or other governmental official of the state or of any county or municipality thereof.

"The term fire official, as used in this act, shall include all active members and officers of any municipal fire department or force or any first aid

squad and emergency or volunteer ambulance or rescue squad whether said department, force or squad be paid, part-paid or volunteer."

Thus, unless you possess a permit from your police chief (some New Jersey chiefs do issue these permits, others you shouldn't even consider asking) or serve with the fire company or rescue squad in your spare time, don't mount that scanner in the car unless you're a good talker and can convince them you're listening to the cable TV company and the railroad. Ed also asks whether it would be legal to use a scanner in a car if the car was not moving or on private property. That's a question for the courts to decide if the matter ever would come up, however, if you read the law again, you'll see it states: "Any person who installs or has in any automobile . . ." The law doesn't say anything about someone operating an automobile with a scanner in it. A recent drunken driving conviction was obtained in the state's courts of a man who was behind the wheel of his car, but he wasn't driving and he was on private property. Take it for yourself, but I think the same instance could apply here with the scanner law. Your best bet is to carry a hand-held scanner and step out from behind the wheel and do your listening. But then, who obeys every law on the books, right?

This was a column with excellent reader input. We look forward to all your letters and thoughts, frequency lists, and photographs. While we can't personally answer every single letter that comes across the desk, we do handle as many as we can of general interest in this column. We'd like to hear from you this month. Write to: Chuck Gysi, N2DUP, Scanner Scene, Popular Communications, 76 North Broadway, Hicksville, NY 11801-2909. **PC**



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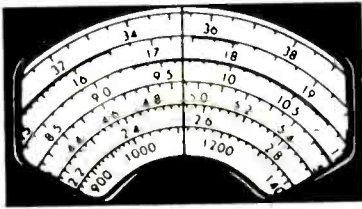
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COMMUNICATIONS CONFIDENTIAL

BY MIKE CHABAK

YOUR GUIDE TO SHORTWAVE "UTILITY" STATIONS

As this is springtime, we're on the downside of the good long-range monitoring conditions of winter. Now is an ideal time not only to reflect on the previous seasons monitoring/QSLing triumphs, but also to assess the failures.

Some of you utility monitors that have not been at it all that long may not be aware of the outside variables influencing and affecting your monitoring. These factors combine to either insure your success or make sure that you don't succeed. As such, even a very elementary exploration into this area would be of benefit—for with this baseline knowledge, you can apply it to your utility monitoring to maximize the time and effort you spend before the rig.

Monitoring Variables

Very simply, here are those factors that influence your monitoring. The variables are basically (discounting antenna/rig):

- A) Solar sunspot activity level
- B) Season of the year
- C) Day or night conditions
- D) Frequency, output power, and transmission mode
- E) Thunderstorm activity

Solar Sunspot Activity

This is an average 11 year cycle, encompassing the minimum to maximum appearance of sunspots on the face of the sun. Sunspots are sources of intense electromagnetic energy, and the more sunspots, the heavier will be the overall solar radiation bombardment onto the earth. Ultra-violet, X, and Gamma rays rain down on our upper atmosphere, colliding with atoms of oxygen and nitrogen. These high-speed encounters knock electrons off of the atoms, and the result is called ionization. As it is those freed electrons that refract radio waves, no long range HF communications would be possible without this upper atmosphere ionization process (at least not until the advent of communication relay satellites). On the other hand, too much radiation bombardment, as found during the years of maximum sunspot activity, serves to degrade normal long range HF communications. An unpredictable solar component is solar flares, which release extreme amounts of electromagnetic energy that can altogether prevent HF communications.

Season

Only two seasons are really important—summer and winter—as they represent the extremes. In winter our northern hemi-



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V6Z 2J8

4 November 1985

Your file: Votre référence

Our file: Notre référence

6802-29 (PNFM)


Mr. Robert C. Homuth

Dear Robert:

This will confirm your reception of our Penticton, British Columbia non-directional beacon on 290 kHz. This navigational aid is a 500 W Nautel Electronic Laboratories NDB model NEL7301. It radiates continuously from a 120 ft. vertical tower.

Your reception confirmation is appreciated.

Sincerely,


L.E. Fisher
Regional Superintendent
Electronic Maintenance

Bob Homuth received this QSL letter from a Canadian DOT aeronautical radio beacon.

sphere is angled away from the sun, so the solar energy bombardment is less intense due to the slant angle of radiation impacting our atmosphere. In summer we're angled towards the sun, hence more direct solar bombardment, therefore more deliverable electromagnetic energy.

Day/Night

This refers not only to your monitoring location versus the utility station, but also the utility station's location in regard to with whom it communicates. Regardless, all are under the control of the upper atmosphere ion layers. There are three basic layers—D, E, F. The E and F layers have sub-divisions, but we're only interested in the major players—the D and F2 layers.

Both layers are energized into an ionized state by the solar radiation. The D layer comes alive at local sunrise. It is the closest layer to the earth, therefore its atom/

molecule density is quite dense. This dense pack versus radiation bombardment turns the D layer into a very energetic ion zone, so much so that it is basically an absorption layer rather than a radio wave refraction layer.

Much higher up is the F2 layer. Its atomic particle density is very thin, therefore the ionization level is considerably less than the D layer. But be it D or F2 layer, continued ionization ceases once the sun no longer shines on them.

Shortly after sunset, the D layer's free electrons rapidly recombine with electron shy atoms, and become stable once again. Once stable, the D layer becomes transparent to all radio wavelengths.

The F2 layer atoms and free electrons are very widely separated, so recombining goes on all night and never fully finishes before the next sunrise. In other words, the F2 layer never completely becomes stable (actually electrically neutral) and because of this,

long range lower HF communication is possible at night.

Radio Frequency

This is our last major player in this triad of variables. To illustrate, let us assume that two utility stations are 2,000 miles apart, and you are located near ute station B. For simplification purposes, stations A&B only have two comm frequencies—one in the 4 MHz area and one in the 25 MHz area. Except for the sunrise and sunset periods, stations A&B share the same day or night period. During daytime they communicate over the 25 MHz frequency and at night over the 4 MHz frequency. Why? The reason is the D layer.

During the daytime, the D layer is so energetically ionized that the longer wavelength frequencies below 5 MHz are all but completely absorbed by it. What little remains is refracted back to earth, but on the average, 4 MHz in daylight can reach out just a few hundred miles at best, regardless of the output power or transmission mode employed.

On the other hand, the higher wavelength 25 MHz signal bores right through the D layer (but does lose a percentage of its energy potential in the process) and is then refracted off of the F2 layer. Hence, long range daytime communication is possible with the 25 MHz frequency, but not the 4 MHz frequency.

At night, the situation reverses itself, but not for the obvious reason one might expect. The D layer disappears shortly after sunset, so both the 4 and 25 MHz signals would be unimpeded to reach the F2 layer. Now it's the F2 layer's turn to play with the signal. Its ionized electrons are slowly finding electron shy atoms, but at the same time there aren't that many free electrons to start with. Two factors must be understood. It is these free electrons which actually refract radio waves. As more of them recombine with atoms, there are fewer to act as refractive sources. Hence, the F2 layer begins to lose its ability to refract the higher wavelength frequencies, so at night the 25 MHz signal would go straight out into space, and only the lower HF radio signals would be refracted back to earth.

The other factor is the angle at which the radio wave intersects the F2 layer. Even in broad daylight, 25 MHz radio signals can easily penetrate right through the F2 layer. In order to propagate them over long distances, the radio waves must intersect the F2 layer at a very shallow angle (much like when you "skip" a rock across a pond). So, you can see that if stations A&B utilized an omni-directional type transmitting antenna, then only a fraction of the overall signal actually reaches the other station. On the other hand, if they beam (aim) their signals at each other and use an appropriate shallow angle in the process, the overall signal strength is vastly improved and maintained.

Now let us move you 6,000 miles from ute station A. You now have opposite conditions. When station A is in night, you are

in daytime. Stations A&B are using 4 MHz, but you can't hear them. Why? Again the D layer. Granted, the D layer above stations A&B is gone, but as you are in daylight, there is a D layer over your location. The D layer acts the same way, whether the signal is coming up from the earth or down from the F2 layer. As such, the 4 MHz is absorbed over your location and prevented from reaching you on the ground.

During heavy sunspot activity the F2 layer can be so massively bombarded that portions of the layer are actually ripped open. Under these conditions the 25 MHz signals will slip right through the holes and not be propagated during daylight. To counter this, stations A&B would use a third frequency, say in the 11 MHz area. During really high level solar bombardment, as produced by solar flares, the F2 layer on the daylight side of the earth can literally be temporarily blown away, preventing any long range communications at all on any HF frequency.

Thunderstorms

With thunderstorms, their factor is from a noise generating aspect. Even when frequencies do propagate into your location, it might be difficult or impossible to read them through the unending volume of ear-splitting noise produced by countless lightning discharges.

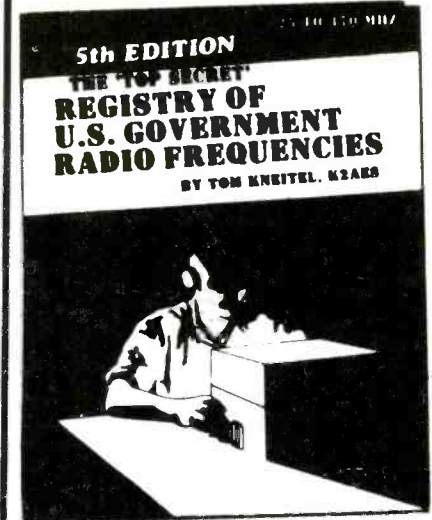
Summertime monitoring, too, has an F2 layer limiting factor. More direct angle solar radiation really stirs up the F2 layer. As such, even well after sunset, activity in the layer is more energetic than normal. For reliable long range HF communications, the F2 layer must be within a certain ion energy status level, otherwise consistent angle refraction will not be possible. In other words, the signals are scattered more than normal. It is for this reason that long range summertime DX'ing conditions are well below that encountered during the winter months.

The most extreme example of these variables in action is to be found with U.S. Antarctic air/ground comms on 8997 kHz. Here in North America, 8997 kHz from Antarctica is heard only for about five years out of the 11 year solar sunspot cycle, and even at that, really reliable and readable signals occur only during a 12 to 24 month period out of those five years. This is all centered on the year of the solar sunspot minimal cycle period.

Antarctica has an additional factor, that being the south geomagnetic pole. All forms of radiated energy are drawn to the pole, and therefore ionization of D and F2 layers is unbelievable. There are years when even frequencies well above 5 MHz can't even penetrate the D layer, and during the years when they can, find a very disrupted F2 layer.

Because of this, years can go by without anyone in North America being able to monitor comms on 8997 kHz. Antarctica can and does communicate over long distances, but in order to do so, utilizes highly

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directional beamed transmissions with frequencies capable of making the two hemisphere, two season crossing between it and North America.

The Reality

If you want to monitor a specific station or a network of stations using the same frequencies, you must take into account the variables. If you do, you will not only be able to more properly plan your monitoring activities, but you will also get the most out of the time you spend in front of the receiver.

The Best Is Yet To Come

The ideal monitoring condition is winter-time combined with the minimal sunspot cycle. The next minimal is predicted to be 1987-88. Sunspot activity has an average 11 year cycle, yet it has been as short as eight years and as long as 15 years. Energy levels likewise vary as to the max-minimum levels for each cycle. As such, it is not entirely predictable as to how low this level will be at the minimal cycle period. But if very low, ute stations you never thought possible to hear will become a reality. Coast to coast and across the ocean 2 MHz marine band stations will regularly appear. Stations or networks now weak will be 5 by 5. The entire 2 through 13 MHz frequency realm will literally come alive, to the point where you may have to beat off the stations with a stick. It is a once in 11 year gift from Mother Nature. You'll still have to take into account the variables, but when you do ... WOW!

Phone Patch QSLing?

This is a big no-no. In case you are new to QSLing utility stations, I want to stress this point. You cannot QSL any facility that you monitored if you heard it via a phone patch. Let me use an example to illustrate this. Aircraft GULL 15 contacts MacDill and requests a phone patch to Miami Monitor. All you can QSL is GULL 15 and or MacDill, but NOT Miami Monitor.

This holds true for any communication that involves a phone patch. Experienced utes are quite familiar with this type of comm procedure, but it is not always the case with enthusiastic but novice utes. What is to be remembered is that one of the stations on the phone patch is not transmitting, but having its communications relayed. As such, any facility not directly transmitting CANNOT be QSLed.

Taking the above example, here is how some might be misled. Joe Ute is dial twisting up to 8993 kHz. MacDill has just advised GULL 15 to initiate the patch. But Joe Ute tunes in just after this, in time to hear: "Miami Monitor this is GULL 15 with weather observation 7." From this communication it appears that Gull 15 and Miami Monitor are communicating on 8993 kHz, since Joe Ute missed the beginning of comms between GULL 15 and MacDill. But if Joe Ute continues to monitor he will hear, once GULL 15/Miami are finished, Gull 15 contacting MacDill and advising them that the patch

RECEPTION REPORT

LW/SW 333
Brian & Nikki Britt
"The Listening Post"

Monitor: 25kHz-500kHz
AM/FM/SSB/CW

TX: 1,750±11 meters
AM,SSB/CW

LW/SW 333
CWR 289
theBRITTS
2173B Dogwood Dr.
Grand Forks AFB ND USA 58205

STATION:-----
DATE & TIME (UTC):-----
(LOCAL):-----
FREQUENCY:-----
MODE:-----
TRANSMITTER:-----
TRANSMISSION ANTENNA:-----
EFFECTIVE RADIATED POWER (WATTS):-----
RECEIVER:-----
RECEIVING ANTENNA:-----
S:-----
I:-----
N:-----
P:-----
O:-----
READABILITY:-----
DISTANCE (STATION TO STATION):-----
PROGRAM COMMENTS:-----

SEE ATTACHED PAGE FOR PROGRAM DETAILS

S STRENGTH	I INTERFERENCE	N NOISE	P PROPAGATION	O OVERALL
5 excellent	5 none	5 none	5 none	5 excellent
4 good	4 slight	4 slight	4 slight	4 good
3 fair	3 moderate	3 moderate	3 moderate	3 fair
2 poor	2 severe	2 severe	2 severe	2 poor
1 inaudible	1 extreme	1 extreme	1 extreme	1 unusable

Brian and Nikki Britt have had good results with this reception report form designed for ute stations.

was terminated. That will tell you which of the three facilities was transmitting (GULL/MacDill) and which one was having its comms relayed by one of them (Miami Monitor VIA MacDill).

So, don't jump the gun with a reception report or logging. Any comms which appear to have three different parties may be a phone patch. If so, ascertain if it is a phone patch, and if so, which two stations out of the three are actually transmitting, and which one is relaying the third party comms.

This will save you a lot of disappointment when you send out a reception report only to have it not verified because you tried to QSL the station not directly transmitting.

Random Replies

As I receive questions/inquiries pertaining to previous columns, I'll present a recap of the most often asked.

Antennas — Just about any type of wire can be used for a shortwave antenna. Whether bare or insulated, it is better to use the multi-strand variety, and the wire should be in the 14 to 22 gauge range. Bare wire must not come in contact with any metal object. Although an RG-58U coax cable lead in is preferred, it is not mandatory for an indoor wire, only outdoor. Outdoor, try to get your antenna as high as possible above the ground or roof of the house. But don't have a nervous breakdown if that distance isn't that great. Indoor, go for the max spread out area for your antenna wire. That usually means running it the perimeter of the room along the ceiling. Any wire length above 30 feet will work. The most used lengths range from 50 to 150 feet. If you want to concentrate on frequencies below 2 MHz, 100 plus feet is the norm.

If you can erect either an outdoor or in-

door antenna, forget about an active antenna. The cost versus performance gains isn't worth it. But if you can't set up any antenna, the active antenna is your only chance. It does work and work well if this is your only antenna option.

Generally speaking, the long wire antenna has omni-directional pick-up characteristics when used for a 2 to 30 MHz spread of frequencies. Compass alignment is, therefore, unimportant. Pick a layout configuration to suit your available space. Make sure, in a permanent set up, that your receiver is grounded.

When it comes to lightning/electrical surge protection, use your common sense. The chances of such occurring are remote, and if you want to take the one-in-a-million chance, go right ahead. But considering the cost of protection versus the cost of equipment, you're making a sucker bet if you don't take some precautions.

NOAA Vessel Addresses

From POP'COMM reader Mike Hardester comes the following data. If you want to QSL any of the NOAA research vessels, send along a stamped prepared card/letter and address as such: NOAA Vessel (add in ship name), c/o (The following vessels can be reached via these addresses):

- JOHN N. COBB, DAVIDSON, DISCOVERER, FAIRWEATHER, MILLER FREEMAN, SURVEYOR—all care of: FPO Seattle WA 98799
- ALBATROSS IV, DELAWARE II—both care of: NOAA Northeast Marine Support Facility, Woods Hole, MA 02543
- McARTHUR, RAINIER—both care of: NOAA Pacific Marine Center, 1801 Fairview Avenue East, Seattle, WA 98102
- FERREL, HECK, MOUNT MITCHELL, PIERCE, RUDE, WHITING—all care of: NOAA Atlantic Marine Center, 439 West York Street, Norfolk, VA 23510
- CHAPMAN, OREGON II—both care of: NOAA National Ocean Survey, PO Box 1207, Pascagoula, MS 39567.

The following all have individual addresses:

- DAVID STARR JORDAN—NOAA National Marine Fisheries Service, PO Box 271, La Jolla, CA 92038
- MURRE II—NOAA National Marine Fisheries Service, PO Box 255, Auke Bay, AK 99821
- RESEARCHER—NOAA National Ocean Survey, 1600 Port Boulevard-Dodge Island, Miami, FL 33132
- TOWNSEND CROMWELL—University of Hawaii, Marine Center #1, Sand Island Road, Honolulu, HI 96819.

Winter Monitoring Results

As of this writing, here's how monitoring of specific stations panned out. See if my observations tallied with yours.

US ANTARCTIC on 8997 kHz: On the average, all stations were weak to unreadable. Mid-November and December provided occasions when comm levels were

fairly decent. The frequency 13251 kHz proved to be much better than 8 MHz when heard here in North America, but stations primarily used 8997 kHz, which was probably better for them. Readable comms were heard as early as 0345 GMT and as late as local sunrise. The best QSA levels appeared to be from 0600 through 1000 GMT. Overall, the lower sunspot activity level did not offer that great a reception improvement over the 1984-85 season. Disappointing yes, but this should improve several fold during the 1986-87 season.

Raoul Island Raoul regularly made a daily appearance, but at an odd start-up time of between 0515 and 0520 GMT. In early win-

ter, Raoul used 7890 kHz, but by mid-December was mostly voicing over 9950 kHz. Of the two, 9 MHz offered much better readability levels here. When no phone patches were requested by Raoul, the comms between it and Wellington often lasted less than 15 minutes. With phone patches, Raoul could be up for 30 to 90 minutes.

USCG NW Pacific Net Very disappointing. Overall voice comms were few and far between. Although Yokota Monitor was fairly well heard, the other stations were very weak to unreadable, no matter which frequency was being used.

Pacific Trust Territory Here was the

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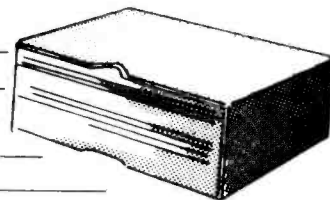
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bright spot. Frequency 5205 kHz after 0500 GMT often turned out to be a monitoring bonanza. KUP-66 Ponape, as usual, came in loud and clear. Many others ranged from unreadable to easily readable. The only hang up was the fact that most comms were in the native Micronesian language. Although many stations in the Caroline Island group were heard, virtually no Mariana nor Marshall Island station was monitored on 5205 kHz.

Whether you heard these stations or not, and at what readability levels, you and I have to contend with one of Murphy's laws — "the moment you switch frequencies or turn off the rig, then activity appears on frequency, or the comms abruptly rise from unreadable to easily readable . . ." When it comes to utility monitoring, doing all your homework and being a very patient monitor can often end up being rewarded or foiled simply by the capricious nature of lady luck.

So, if certain utility stations have so far eluded your monitoring efforts, hang in there baby, your turn will come.

Intercepts Section BY DON SCHIMMEL

The mailbag this month was loaded with great intercepts and included some QSL cards, QSL addresses, and a nice reception report form. In addition, there were some very interesting comments received from various readers relating to items they had contributed.

A mystery station was picked up by E. Provencher, Maine who reported hearing musical selections with no station identification on 21000 kHz. The selections were always the same and in the same order, and scratching was noted at the end of one of the pieces each time this transmission was observed. It would, therefore, appear that the material was taped. The selections consisted of Strauss waltzes and a polka. The first waltz was "The Blue Danube," followed by the "Thunder and Lightning" polka and then concluding with the "Emperor" waltz. This strange AM mode transmission was heard by reader Provencher almost every day for a month between the hours of 1500-1700Z. At the end of the month, however, the signal disappeared and has not been heard since. Is it possible we have an other type of "spy" station?

Reader R. Homuth, Arizona has furnished a copy of the QSL letter he received confirming his intercept of a British Columbia beacon. He stated he believed the address on the letter was valid for any British Columbia aerobeacon. Here it is: Air Administration, 800 Burrard Street, PO Box 220, Vancouver, BC, Canada V6Z 2J8.

Homuth also supplied another QSL address for Canadian aerobeacon stations and it is: Department of Communications, Treble Building, Room 100B, 473 Albert Street, Ottawa, Ontario, K1R 5B4, Canada. In his comments, he mentioned you should always include a prepared form card or letter and always include return postage.

Brian Treadwell, Virginia sent in a copy of an article which appeared in the *Washington Post* newspaper and described the growing pains at Dulles International Airport. This airport, located about 17 miles from Washington, DC, is experiencing a steady increase in daily flights and, as a result, there are traffic jams at the airport as travelers seek to leave the parking lots. According to the article, the flights are to be spread out more evenly during the day and, to aid passengers in making a decision where to park, the FAA will have a Traveler Information Service (TIS) Station in operation. The frequency has not yet been announced.

While listening to the USCG station, NMN, Portsmouth, Virginia, reader F. Krizanek on the *USS Coral Sea* heard Ted Koppel of ABC with a phone patch on 4402 kHz, USB Voice at 0402 communicating with the USCGC Harriet Lane. "The transmissions were about the hurricane that was threatening the East Coast. The material was being carried live over the ABC News 'Nightline' program."

Interesting exchanges between SAM 26000 (*Air Force 2*) and the State Department, *Air Force One* and *Air Force 2*, plus various phone patches to CROWN (The White House) were contained in loggings forwarded by Robert Edler, Connecticut. The subject matter of the conversations was in relation to the just concluded summit meeting in Geneva, Switzerland and were heard on the frequencies of 11035 and 11249 kHz. The communications were coordinated through Andrews Air Force Base.

A reader in Harrisburg, Pennsylvania sent in some US Coast Guard items he copied on 2670 kHz, but he forgot to include his name. At 0020 on USB the fishing vessel *Shamrock* worked the USCG Port Paul. The fishing vessel was dead in the water and was carrying a load of fish. The discussion related to WX, equipment, type of vessel-hull (wood), and request for commercial tug from Massachusetts. Then at 0217 the USCG Station in San Francisco was heard with an Advisory to Mariners regarding the Humphrey the Whale operation, San Francisco Bay. At 0220 the USCG Cape Hat, worked the M/V Texaco Tampa who reported engine problems.

Mike Chabak shared some fine intercepts he made of USB voice comms on 5205 kHz from the Caroline Islands, Federated States of Micronesia. The time frame was 0550-0657Z and included the following: KUP-66 Ponape worked KWQ-24 Nukuoro Island with 5F metro. OM/English and Micronesian languages. KUS-91 Mokil Island worked KUP-66. OM/primarily in Micronesian language. KUP-96 Namoluk Island worked KUP66. OM/mostly English. KUP-76 Kosrae Island working KWQ-77 Oroluk Island. OM/Micronesian language. KUP-89 Kapingamarangi Island working KUP-66. OM/Micronesian language.

We are getting very few utility contributions from the female SWLers. Come on gals, lets see some more intercepts.

198: DJW beacon, Dixon NC at 0620 (Dennis Bannister, NJ).

214: CHX beacon, Chaix, Mexico at 0535 (R. Homuth, AZ).

216: CLB beacon, Carolina Beach NC (Homuth, AZ). Noted at 1108 (Tom Kneitel, NY).

233: YJ beacon, Sydney, BC, 500 watt ILS outer marker. Heard regularly w/moderate sigs around 1245-1330 is noise level isn't too high (Homuth, AZ).

236: GNI beacon, Grand Isle, Louisiana seaplane base. No WX BC since last hurricane but heard at 0300 w/long test count and alphabet (Homuth, AZ).

245: TLR beacon, Tulare-Medford CA, new station heard at 0446 (Homuth, AZ).

274: CQI beacon, Council, Idaho, w/odd negative keying. Sounds like IAEINT; at 1330 (Homuth, AZ).

290: YF beacon, 500 watts, Pentictan, BC (Homuth, AZ).

295: XFK beacon, La Paz, Mexico, two dashes after two CW ID's. Keying is chirpy & irregular; at 1310 (Homuth, AZ).

296: G beacon, Galveston TX, strang at 0400 (Homuth, AZ).

300: C beacon, Mobile Point Rear Light Station, AL, at 0531 (Homuth, AZ).

302: L beacon, Point Lama Light Station, San Diego CA at 1300 (Homuth, AZ). Also beacon "A" at Los Angeles Light Station at 1301; followed by "O" beacon at Pt. Arguella Light Station CA at 1302 (Homuth, AZ).

309: XFL beacon, Mazatlan, Mexico, at 1303. Chirpy keying (Homuth, AZ).

311: BFE beacon, Brownfield TX, at 1230 (Homuth, AZ).

313: PIL beacon, Brazos Santiago Light Station, TX at 0532 (Homuth, AZ).

316: MAJ beacon, Majuro, Marshall Islands, heard once at 1302 (Homuth, AZ).

332: XH beacon, Medicine Hat, Alta. (Homuth, AZ).

341: YYU beacon, Kapuskasing, ON, at 0400 (Homuth, AZ).

350: NY beacon, Enderby BC, at 1330. Extremely strong sigs due to N/S grayline effect (Homuth, AZ).

360: KIN beacon, Kingston, Jamaica, at 0530 (Homuth, AZ).

387: SPP beacon, San Andres Island, Colombia, at 0500 (Homuth, AZ).

390: DDP beacon, San Juan PR, at 0355 (Kneitel, NY).

392: ML beacon, Charlevoix PQ, at 0355 (Kneitel, NY).

400: QQ beacon, Camox BC at 1300 (Homuth, AZ).

414: BC beacon, Baie Comeau PQ, at 0411 (Kneitel, NY).

442: WKM, West Haven CT, traffic list in CW at 2230 (Kneitel, NY).

500: SVZV, Greek vessel SOVERIGN RUBY calling WSC in CW at 0351 (Kneitel, NY).

2182: CG-2959, Canadian CG Cutter LEONARD J. CALLEY working St. Johns CG Station in USB at 0514 (Daryll Symington, OH).

2583.4: APT in CW with 5L groups at 0105 (Kneitel, NY).

2696.7: GLD3, Lands End, England, noted with combined CW/ARQ marker at 2345 (Kneitel).

3081: CUW, Lajes, Azores, in USB with aero WX at 0000 (Ross, ON).

3166.7: P beacon in CW at 0003 (Kneitel, NY).

4109: 4XIB, M/V ZIM TOKYO in USB working WOO in NJ w/phone patch at 1520 (Symington, OH).

4242.8: UVD, Magadan, USSR in CW at 1246 (G. Bledsoe, AK).

4278: CTP, Oeiras, Portugal w/CW marker at 0213 (Ross, ON).

4305: CTU4, Monsanto, Portugal, w/CW marker at 0057 (Ross, ON).

4309: MTI, Plymouth, England w/CW marker at 2143 (George Osier, NY).

4408.8: NODS, USCGC SALVIA in USB to COMMSTA New Orleans w/phone patch to Dept. of State re Soviet defector; at 0125 (Symington, OH).

4507: Rollcall of CAP's WIGWAM stations followed by discussion of hurricane traffic (Shirley Lieb, IL).

4746: McDill & Lajes AFB relaying coded traffic in SSB; time not stated (Bannister, NJ).

5015: WUB4, U.S. Army Corps of Engineers, Baltimore MD in SSB at 1222 (Hank Lucas, NY).

5270: YDF in CW with VVV at 0130. Anybody know who or what this is? (Kneitel, NY).

5306.3: P beacon in CW at 2338 (Kneitel, NY).

5535: Aircraft SPEEDBIRD 292 in USB working Speedbird London (British Airways) with passenger info, ETA & selcall check of 0448 (Symington, OH).

5598: Aircraft "German Air Force 471" in USB at 0144 to Gander w/position report (Symington, OH).

5599: International air traffic frequency, NY working Allitalia aircraft in SSB at 0715 (Bannister).
 5696: USCGC Corpus Christi TX working 'capter 2129 during a hurricane; search/rescue for tanker & oil rig crew. "Sea conditions very rough." Heard at 0301 (Alan Nacht, NY). Alan, I've always found 5696 kHz to be filled with a variety of traffic-- Ed.
 5809: SS/YL in AM w/"529 1-10" repeated announcement at 0710; new group at 0710 (Mike Chinakos, WA).
 6272: WA3NAS Amateur Radio Club, Gaddard Space Flight Center rebroadcasting a Space Shuttle flight here in SSB at 1800. Said they would be doing the same with additional flights (Bannister, NJ).
 6365: KFS, Half Moon Bay CA, w/news from the ARA (radio officers' union) in CW at 0555 (J. Bedient, MN).
 6374.5: TBO-2, Izmir, Turkey in CW w/marker at 0345 (Bledsoe, AK).
 6395: TBA2/3 Izmir, Turkey in CW w/calltape at 0345 (Bledsoe, AK).
 6445.3: UFK/UJK, Vladivostok, USSR, in CW w/traffic list at 0510 (Bledsoe, AK).
 6448.1: UFH, Petropavsk, USSR, in CW w/calltape at 0501 (Bledsoe, AK).
 6462: FUM, Popeete Naval Radio, Tahiti, w/CW calltape at 0943 (W. Batten, LA).
 6502.6: TBB6, Izmir, Turkey, in CW w/marker at 0331 (Bledsoe, AK).
 6520: USCGC PAW PAW calling various East Coast stations at 0820 (Kevin Rickens, SC).
 6649: Panama Radio relaying clearance for USAF aircraft PAYOLA 13 at 0623 (Bedient, MN).
 6679: Aukland, New Zealand, VOLMET in SSB at 0935. "It took me hours to pick this up, very prone to fading (Rickens, SC).
 6730: Aircraft SAM 24130 in LSB to Andrews AFB. Returning to base w/broken windshield. Heard at 1523 (Symington, OH).
 6761: SKYBIRD to ELECTRIC in USB. DESK 21 to DESK CONTROL in USB at 0450 about meeting an airborne tanker (Lieb, IL).
 7890: ZME-20, Raoul Island, Kermadec Islands, in USB during 0521-0538 w/callup, WX report & p/p via ZLZ-51 (Wellington, NZ). Duplex on 5225 (Mike Chabok, AZ). Ed note: this location also known as "Sunday Island."
 8210: Radiotelephone operator in Cortegena, Colombia, in USB at 0550 w/call to California (Britt, ND).
 8000.7: JJY, Tokyo, Japan, in MCW at 0510 w/time pips & CW ID (Bledsoe, AK).
 8445.3: A4M, Muscat, Oman, in CW w/calltape (Bledsoe, AK).
 8480.1: HZY, Ra's Tannurah, Saudi Arabia, in CW at 1352 w/calltape (Bledsoe, AK).
 8478.4: CBV, Valparaiso, Chile, in CW at 0359 w/calltape (Bledsoe, AK).
 8504: ZLBZ/3/4/5/6/7, Awarua, Invercargill, New Zealand in CW at 0505 w/calltape (Bedient, MN).
 8649.5: 4A4 (un-ID) in CW with repeating calltape. Very strong so could be Soviet mil (Bledsoe, AK).
 8665.5: HMZ, Pyongyang, N. Korea, in CW at 2003 w/calltape (Bledsoe, AK).
 8686: JCT, Chosi, Japan, in CW at 0452 w/calltape (Bedient, MN).
 8844: Un-ID air traffic control in U.S. in USB at 2046 working to U.S. airliners (Batten, WA).
 8993: Ascension Island (USAF) providing p/p to Miami Monitor for aircraft TEAL 06 in USB during 0747-0749. TEAL 06 was in a hurricane (Chabok).
 8997: NGD, Antarctica MAC Center working un-ID aircraft w/WX in USB at 0011 (Symington).
 9348: VOA feeder in LSB at 1315 (Kneitel).
 10000: JJY, Tokyo, Japan w/time signals at 0859. "Actually heard best on 9997 kHz, less WWV QRM." (Rickens, SC).
 10217: U beacon in MCW at 0035; also 5F traffic from another station, the traffic was followed by the 2nd station also sending a U beacon (Kneitel, NY).
 10255.5: Rapid bagpipe type contral tones at 2350 (Kneitel, NY).
 10523.6: NRT, Yokota Monitor (USCG Loran-C Master Station), Japan, in USB at 0553-0556 to NRT-3, Iwo Jima Loran (M. Chabok, AZ).
 10871: CW transmission at 2005 repeating EPRUE HHQOF XTCWE NCEFK QEEFD JBZXQ SK; noted again a few days later at 0015 to 0022 s/off repeating: WILUS OILUS TBVHM RXOXJ BZXOK OHBRE SK (Kneitel, NY).
 11055: Ait Force 1 in LSB at 1809 to CROWN and CARTWHEEL (Symington, OH).
 11246: SAC Airborne Command Post in USB at 2130 w/encrypted traffic (Britt, ND).
 11249: SAM 26000 to Andrews AFB in LSB with p/p traffic (Symington, OH).
 11617: BJ numbers station, both EE & GG in SSB at 2100 (Lukas, NY).
 12000: VNG, Lindhurst, Australia, w/time sigs & ID at 0744 (Rickens, SC).
 12022.5: KKN50, Dept. of State, Washington DC w/CW QRA marker at 1135 (Kneitel).

12125: CKN, Vancouver BC, Forces Radio, in CW at 2015 w/calltape (Jerry Brumm, IL).
 12141: FF telephone call in LSB; only 1 side of the conversation on this freq.; heard at 0035 (Kneitel, NY).
 12173: RCD34, Moscow, USSR, Radio Moscow feeder in LSB at 0045. Strong echo on signal. Listed 12175 kHz (Kneitel, NY).
 12185.5: U beacon in CW at 1328 (Kneitel).
 12220: 5L groups in CW at 1523 (Kneitel, NY).
 12300: Italian 2-way simplex traffic, USB at 2115 (Kneitel, NY).
 12354.8: LECK, M/V ROYAL VIKING SEA, luxury cruise ship near Nicaragua; in USB placing 'phone calls through WOM at 1332 (Kneitel).
 12662.1: 7T8, Algiers, Algeria in CW w/calltape at 1407 (Bledsoe, AK).
 12709: A9M, Bahrain, in CW at 1736 (Lukas, NY).
 12750: CWA, Cerrita, Uruguay, w/CW calltape at 2150 (J. Brumm, IL).
 12801: TAH, Istanbul, Turkey, in CW w/marker at 0730 (Bledsoe, AK).
 12977: VK30 (Australian allocation) in CW at 1505 w/calltape (Bedient, MN).
 13002: KPH, RCA Global Communications, San Francisco CA in CW at 1745 contacting ship station GMSU (Bedient, MN).
 13113: KILO 8 LIMA to OSCAR 4 ZULU in

USB at 2055 asking for registration & other info on a specific ship. Info passed back encrypted. Later XBV and ASC called K8L for more info. (Britt, ND).
 13215: IMPROPER in LSB at 1655 working SAM 2600 (Symington, OH).
 13375: DKW5, Radiografico, Nauen, E. Germany in EE SSB at 1320 (Lukas, NY).
 13382: GFT, Blacknell, England, meteo & call tape in CW at 1358 (Kneitel, NY).
 13582: EC3Y, unknown station, in CW at 0006 w/VVV & call marker (Kneitel, NY).
 14453.6: Twa EE/OM in USB at 1505 w/coded traffic & cryptic chatter (Symington, OH).
 14818: Y7A60/Y7A78, Ministry of Foreign Affairs, Berlin, E. Germany. In CW at 0105 w/call marker (Kneitel, NY).
 14945: GG/YL 5F in USB at 1445 to 1448 s/off (Kneitel, NY).
 16458: KRH50, U.S. Dept. of State, London, England, in CE at 0143 w/QRA tape (Kneitel, NY).
 17082: DFR28, Frankfurt, W. Germany, in CW at 1613 w/call tape (Osier, NY).
 17083: IQX, Trieste P.T. Radio, Italy, in CW at 1613 w/call tape (Osier, NY).
 17344.5: EHY, Pozuelo del Rey, Spain, in USB at 1825 w/SS traffic (Ross, ON).
 22149: LPD91, General Pacheco, Argentina, in CW at 1653 w/call tape (Osier, NY). **PC**

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How Synthesized Scanners Work

Before the synthesized scanner, receivers were either tunable or crystal-controlled. VHF and UHF tunable receivers required precise manipulation to get them on frequency, and commonly the frequency of the scanner would vary. In other words, you never really knew when you were on frequency until the station started transmitting. You also could only pick up one station at a time, depending on where you left your dial.

The advent of the crystal-controlled scanning receiver made it a lot easier to lock on to VHF or UHF scanner frequencies. The only problem with crystals was that they were expensive—sometimes unavailable off the shelf on a certain frequency—and usually drifted after a few years of use. Crystal scanners would also not allow you the luxury of tuning around and seeing who was on what frequencies, unless you just happened to have purchased a \$6 crystal on that channel.

Slide rule type tuning scanners and crystal-controlled scanners are still found around swap meets, but the latest technology of frequency synthesis now makes these two other types of scanning techniques obsolete.

The first synthesized scanner appeared on the market only about ten years ago. I am proud to be a helper in the development of the SBE "Opti-Scan," a programmable scanner that utilized no crystals. A complex photosensitive digital reader would look at a user programmed card to "read" the desired channel. The card contained ten programs, and to change any one channel, all you needed to do was to change the little stickers on the card.

About that same time, Electra, Bearcat, and Tenelec developed programmable scanners that used switches to program the channels that you wanted to scan. Through digital logic (1's and 0's), you could select any frequency on low band, high band, or UHF. Like the SBE Opti-Scan, all three scanners required a frequency conversion book that would tell you which switches were zero (0) and which switches were one (1).

It took almost two years of development before the first direct keyboard entry frequency system was unveiled, and this is the type of synthesized scanning we use today—simply look up the frequency, punch a few keys on the keypad, and you're on the air! More about this in a moment.

How do you get thousands of frequencies without having to use any crystals? It's not magic; it's called phase-locked loop synthesis. We'll simply abbreviate it to PLL.

PLL frequency synthesis has been around a lot longer than scanners and CB radios. Bristol Electronics had been supplying the



The Regency DX-3000 programmable scanner.

government with PLL synthesized military radios since 1963 (under the RCA label). That radio was affectionately called the PRC-77, an Army field pack radio.

The Bristol Electronics system put the entire PLL section on a single integrated circuit chip, and they were granted patent No. 3,174,589 issued 1973 for this PLL chip process.

Your scanner receiver has many electronic stages similar to your every day kitchen radio. It has a speaker, audio stage, radio frequency stage, power supply, and an oscillator stage. On your kitchen radio, you manually tune the oscillator stage to the frequency you wish to hear. On an older scanner crystal radio, you select the crystal that programs the oscillator stage to a specific channel. On today's new PLL scanner receivers, you keyboard enter the frequency you wish to receive or scan, and chips then convey this information to the phase-locked loop system that then tells the oscillator what to do, and when.

Taking a closer look at a PLL system, there are four basic components within this system: the phase comparator, the low pass filter, the DC amplifiers, and the voltage controlled oscillator (VCO).

When you keyboard enter a frequency on your scanner's keypad, the information is then sent to an integrated circuit that turns your command into binary logic. The binary logic is sent to the oscillator section that tells

the receiver HF section where to tune. Any signal on this frequency is first introduced to the phase comparator stage of your phase-locked loop section.

At the same time, the phase comparator is also being fed a voltage from the VCO output, and these two signals are mixed and will produce a phase difference that will result in an error voltage. The phase comparator output is filtered, amplified by the DC amplifier, and applied as a control voltage to the VCO.

The control voltage, or "error" voltage, is used to slightly shift the VCO frequency in the direction that reduces the phase difference between the input signal and the VCO output. This "corrective feedback" circuit will automatically lock onto the input signal and will track it over a predetermined variation. This means your very sophisticated keyboard entry scanner set will actually hold onto signals that may slightly vary off frequency.

This entire process of locking onto a signal takes just fractions of a second, allowing a scanner to sample many different frequencies for signal activity. Just as soon as a signal is received, the squelch circuit opens, the scanner locks on, and the PLL circuitry will bring through the signal loud and clear.

Probably the biggest advantage of PLL scanner synthesis is that you never need to buy a crystal for a particular frequency. Yes, your scanner does have one or two "reference crystals," but these are soldered into

place and never need to be changed. If you want a new frequency, you simply keyboard enter the channel you want, and there it is, loud and clear. Of course, you must be sure that your scanner is indeed capable of receiving the frequency band that you may wish to tune in.

For instance, if you plan to enter the distress channel for aircraft, 121.5 MHz, then you must have a scanner that has a receiver section listed to cover the aeronautical frequency band.

Another nice thing about PLL circuitry is that it requires little or no maintenance. The reference crystals are of such high tolerance that seldom will they ever drift. Any small amount of drift will be compensated for by the PLL VCO. Even temperature won't affect the frequency locking capability of a PLL-type scanner.

If you're just getting started in scanning, the best advice is to avoid buying an inexpensive crystal-type scanner, unless you wish to only hear one or two channels for the lifetime of your scanner. If you are a general scanner user, chances are you may wish to program a bunch of frequencies, or scan between two predetermined frequencies. Crystal sets won't let you do this, so this is why you should only look to a completely synthesized scanner receiver using PLL circuitry.

If you're looking at a scanner you don't recognize, simply ask the question, "Does it require crystals, or is it synthesized?" If you still have doubts, open up the set and see whether or not there are rows and rows of

crystals or sockets for crystals. All modern scanner sets that are synthesized will somewhere have a keyboard for direct frequency input, and this is most likely what you'll want.

Almost everything has gone to frequency synthesis today. CB radios are all frequency-synthesized. Marine radios and ham radio hand-held transceivers are all frequency-synthesized. Business radios are now switch-

ing over to PLL synthesis. Aeronautical radios have gone from crystals to PLL.

So you see, phase-locked loop frequency synthesis is one of the best ways for any type of radio receiver to become "frequency agile." Simply dial in the frequency within the receiver tuning range, and in microseconds you are smack dab on channel without ever having to buy a crystal. It's the only way to go!

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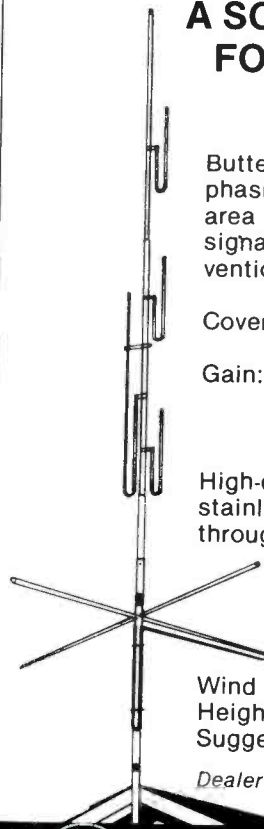
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THE EXCITING WORLD OF RADIOTELETYPE MONITORING

"RTTY OR NOT HERE WE COME," is the title of this month's article, which consists of a potpourri of items dealing with RTTY and non-RTTY subjects. The non-RTTY items, however, are connected in some way with your RTTY monitoring.

The Soviet Union has a new nuclear-powered icebreaker, which you might be able to monitor on HF radio marine bands sending telegrams back to a home port. Named "Rossia," the 25,000-ton vessel is the fourth nuclear-powered icebreaker in the Soviet fleet. The others (and the years they were commissioned) are Lenin (1959), Artika (1974), and Sibir (1977).

Speaking of Soviet ships, many of them can be monitored as they load grain and other foodstuff at U.S. ports. Did any of you monitor the Russian cargo ship Novotroitsk last December? For a while it was docked at the Port of Los Angeles, California, helping to alleviate California of some of the state's 1985 record crop of 587 million pounds of almonds.

The vessel, on a run from Nicaragua to Los Angeles, and then to Veracruz, Mexico and Leningrad, USSR, its home port, set sail from L.A. with 100 gray containers carrying 1,500 tons of almonds, worth \$4.2 million, according to the *Los Angeles Times*. All the almonds were to be taken to confectionaries for processing into chocolate bars.

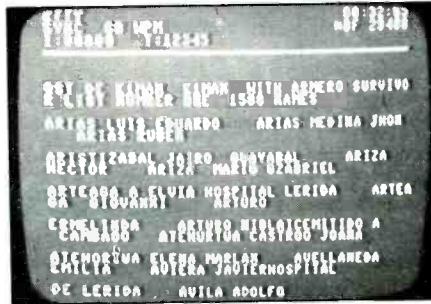
Guess who's going to ruin our reception of HF radio signals from RTTY, CW, and voice utility stations? NASA!

And the space agency's going to do it the hard way—by using the Space Shuttle to punch holes in the ionosphere, according to an article in *The Economist*, a British weekly newsmagazine.

You see, we're able to monitor RTTY stations because their signals bounce back to earth from the ionosphere, that layer of the upper atmosphere that's about 37 to 622 miles above ground. By knocking a hole in the layer, some RTTY signals that hit that hole will continue journeying to outer space and not return to our receivers.

NASA is doing this to assist radio astronomers. Picture it this way: We're able to monitor RTTY stations from signals bouncing back to our sets. But low-frequency signals from space, which the astronomers want to receive on their radio-telescopes, bounce off the other side of the ionosphere back into space. It's only at certain times and places when the ionosphere becomes weak with having few electrons that low-frequency signals from space are able to sneak through the layer. When this occurs, radio astronomers are able to gather information about our galaxy, but we shortwave monitors hear nothing at all.

Last January, we ran a column reporting



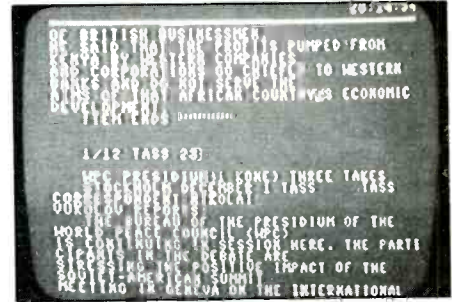
Orman Darby of Bellingham, Washington prefers watching the news as it happens rather than watching reruns of Johnny Carson's *Tonight Show*. Here, a ham operator sends a list of survivors from last November's volcano eruption in Colombia.

what was believed to be the reception of RTTY traffic in North Korea from an embassy somewhere around Central America. Reader opinion was asked about that article's analysis. Well, word comes from Ernest Hartley of Boone, North Carolina, who says he has knowledge of Korean, albeit "quite limited." His observations confirmed the analysis as he took the RTTY text appearing in the article, and showed it in the McCune system of Romanization (which was used during this writer's research of the article) and then Hangul, which is Korean script.

A ribbon of RTTY tape goes to him for his exceptional analysis. It appears that these messages, which are diplomatic, are not of the earth-shaking variety. These cables are, more or less, of the "Hi. Howya doin'?" type, offering greetings and congratulations that one would expect to be heard between neighbors over a backyard fence.

Answer to a question from Frankie Gittens, Secretary of the Caribbean Shortwave Listeners Club, St. Michael, Barbados: The station you monitored on 16194.7 kHz at 1740, 850/100N, is NBA, the U.S. Navy radio station at Balboa, Panama. The traffic you copied came during war games last year, which were hosted by Brazil and involved the U.S. Navy and U.S. allies in South America.

You ask what I see in the future for RTTY DXing of news services after seeing UPI, AP, and Reuters flee HF radio for satellite transmissions. DPA, Hamburg, W. Germany and Agence-France Presse, I predict, will be the next ones to completely divest themselves of their HF radio facilities and have their news via satellite. Leasing transponder space on satellites is costly, and therefore is beyond the budgets of many smaller news agencies throughout the world. They'll be around for many, many years. Most likely TASS (from the Soviet Union) will stay on HF radio for the benefit of third-world nations. The Soviets will bear the brunt of the financial burden.



Orman Darby's snapshot of a TASS news transmission as viewed on his video monitor. Trouble is, the TASS news doesn't run a crossword puzzle and a couple of pages of color comics. But the recipes for 1001 ways to make borscht are mouth-watering!

Walter Schivo, KB6BKN, of Novato, California, says he hears a weak-powered RTTY station that is east of his QTH. It appears from his letter that he does not have a RTTY demodulator. He asks readers of this column to monitor the station's frequency and reveal what's being sent. One problem with that request, Walt. It's rather doubtful that it was a RTTY station because of the frequency you said it was using—27,275 kHz, in the CB-radio band. But if it were so, it would be very difficult for monitors in the eastern half of the country to try and monitor it for you. Conditions are *vershtoonkeneh* right now for receiving anything far away on frequencies above 20 MHz. But, if any reader living close to Walter is able to determine what he's hearing, please let us know.

Two of this month's photos were submitted by Orman Darby of Bellingham, Washington. He says he was recently bitten by the RTTY bug (see how contagious it gets?) and bought a demodulator. "I was immediately successful in acquiring many, many CW and RTTY signals," he writes.

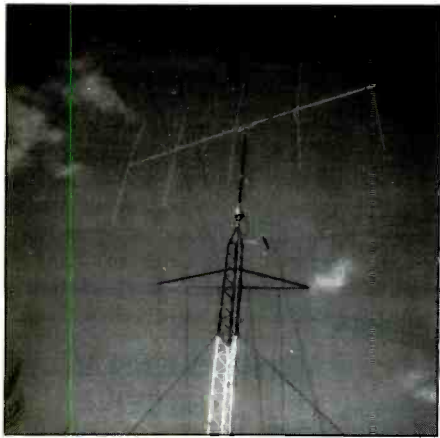
Photo No. 1 was taken as amateur radio station WIMAN of East Greenwich, Rhode Island, was sending a list of 1,500 survivors of the volcanic eruption last November in Colombia. Was 170/60 at 0835 on 14088 kHz. Darby says seeing that traffic "was a big thrill for me."

(Note: As a rule, this column does not handle RTTY involving amateur radio stations. But just this once we'll make an exception, knowing how Orman must have felt viewing this while the news was still hot [no pun intended].)

Photo No. 2 shows a TASS news transmission at 0200 on 14902 kHz, 850/66R. The location of this transmission, Orman, is Cuba. Notice the "KONE)" in the copy? Cuban operators have a nasty habit of not hitting the figures button on the Teletype keyboards so that it would read correctly as



Ed Viadock of Avoca, Pennsylvania has been monitoring for about 30 years and is an RTTY enthusiast. His monitoring station has three Zenith monitors, a Drake Theta 550, Info-Tech M-600, M-610, and M-6000 units, HAL RS-2100 'scope, two Kenwood receivers, and three JRC receivers, amongst other gear.



The antenna system atop Ed Viadock's monitoring station requires 40-ft. and 250-ft. of RG-8 cable. This is one of the towers and some of the antennas used for Ed's three VHF scanners. Nifty!

"(ONE)." They do the same thing too with Prensa Latina news copy. They always type the agency's logo as "KPL" instead of "(PL)." Oh well, their fingers still are good at rolling cigars.

To Douglas Vincent of Honolulu, Hawaii: You do need a stable receiver with SSB capability to monitor RTTY. Without SSB, you won't be able to tune in RTTY copy. There should be a ham shop in Oahu that could set you up with the right equipment.

To Jerry Brumm of Chicago, Illinois: "Normal" polarity means that "mark" is set on the lower audio frequency of the two RTTY tones and "space" is set on the higher frequency. "Reverse" polarity puts "mark" at the higher frequency and "space" at the lower.

The RTTY settings listed with the loggings in this column use the words-per-minute rate rather than the baud rate because I believe that newcomers to RTTY would better understand wpm than they would baud. Re-

member the first time you heard about computer data being sent in baud over modems? Confusing, wasn't it? This way, I won't have to keep explaining what "baud" means every time a new RTTY monitor sees the word.

Here's a conversion chart you requested: 45 baud = 60 wpm; 50 baud = 66 wpm; 57 baud = 75 wpm; 75 baud = 100 wpm; and 100 baud = 133 wpm. The number you see listed first in RTTY setting—usually 170, 425, and 850—is the shift in Hertz between the two tones of the RTTY signal. So, a setting of 425/66N means "a 425 Hz shift between the higher and lower audio frequency, with mark set at the lower frequency (normal polarity), and a speed of 66 wpm."

By the way, meteorological stations send data in groups of five digits, not five letters. If your RTTY unit has an "unshift on space" button, turn it off during a weather broadcast and you'll see the copy correctly. With UOS turned on, the data shifts to "letters" after receiving a space character.

Now let's clear the "in" basket of your loggings:

2612: NBTM, USCG POLAR STAR working NMC (San Francisco), 170/100R at 0430 (Daryll Symington, Holland OH).

2713.2: CCS, Santiago Naval R., Chile, w/coded traffic to fleet, 850/66R at 0215 (Fred Hetherington, Ormond Beach, FL).

2750: DyN news in Spanish, 850/100R at 2340. Argentina? (Tom Kneitel, NY).

2788: 72JKL, Madrid Naval R., Spain, w/Spanish traffic, 850/100R at 2340 (Kneitel, NY).

3175: LPAZ, Santa Maria, Azores, w/RYYR tape, 850/66R at 0007 (Kneitel, NY).

3322: U.S. Navy MARS net, 170/100R at 2350 (Kneitel, NY).

3257.5: 77BGQ, probably Spanish Navy, w/RYYR & foxes, 850/100R at 0112 (Kneitel, NY).

3392: U.S. Navy MARS net, 170/100R at 2357 (Kneitel, NY).

4004.5: LRO2, Buenos Aires, Argentina, TELAM news in Spanish, 850/66R at 0025 (Kneitel)

4172: WA5307, M/V GEORGE A. SLOAN, a steamer that's part of the U.S. Steel Great Lakes fleet on Lake Michigan; w/WX to WLC & WQZ9670, the M/V EDGAR B. SPEER. Both in ARQ on different days between 2100-2200 (Editor's logging).

4173: GOXX, M/V CAVENTISH, w/position rpt at 0225, ARQ(Guy Atkins, Seattle, WA). Welcome to the column, Guy; the Cavendish transports liquefied gas-- Ed.

4174.2: ESGJ, possible name of vessel is KOSMONAUT GAGARIN, flying under flag of Estonian SSR; 170/66N to URB-2 at 0608 (Kneitel, NY).

4177: Y5CC, M/V ARKONA, E. German flag vessel w/telexes to Y5M, ARQ at 0438 (Editor).

4275: A lively network of bootleggers conducting ham-type network, 170/60R at 2048. ID's used included KS-30, KS-42, KS-90, KS-161 & KS-210. Discussed computers, printers & RTTY interface gear (Editor).

4351.3: WLC, Rogers City, MI, w/WX for Great Lakes (plaintext), FEC at 1636 (Editor).

4632.5: "IPUK" marker being run in ARQ by INTERPOL station GMP in England at 0401 (Kneitel).

4813: LZM7/LZA8, Sofia Meteo, Bulgaria, 425/66N at 0013 w/CQ & RYYR (Kneitel, NY).

5097.5: JAB35, Jiji, Tokyo, Japan w/English news at 1400, 425/66R (Atkins, WA).

5117: STK, Khartoum Aero, Sudan, w/RYYR, 425/66R at 2348 (Kneitel, NY).

5240.2: 40C2, TANJUG, Belgrade, Yugoslavia, w/English news, 425/66R at 2300 (Frankie Gittens, St. Michael, Barbados).

5393.5: ELRB, Roberts International Airport, Monrovia, Liberia, 525/66N at 2325 w/RYYR & QJH1 tape (Kneitel, NY); at 0427 (Tom Brailey, Kentwood, MI).

5495.5: ROMEO SEIS VICTOR calling LIMA NUEVE BRAVO, 850/66N at 0620. Also sending RYYR & SGSG along with message tape reading "0125 4CFC INT MSA MSC MFI MTI" (Kneitel).

5740: Possibly HZN, Jeddah Meteo, Saudi Arabia, w/coded WX at 0100, 850/66N (Brailey, MI). You're correct, the WX data was from villages throughout that nation--Ed.

6248.3/.6: H3LV, HUASTECCO; and 3ERY, MIXTECO, both Mexican vessels possibly owned by Petroleas Mexicanos. Heard almost daily,

first on lower freq then on higher one, in ARQ & FEC w/telexes in English & Spanish to XBCC, Veracruz. Also send WX. Have also logged XCOO, OLMECA II, here. Listen 2100-0100 (Editor's loggings).

6263.5: Noted here working WLO at various times were WAKL, GULFKING, & WISO, BIG ORANGE 21, ARQ mode (Editor).

6249: ZYRARDOW, a Polish tanker w/telex in Polish to Gdansk via Wazawa R., ARQ at 0304 (Editor).

6477: AP/UPI news in English from AFRS, 170/100R at 0638, announced Los Angeles (Kneitel).

6661: ALFA CERO MIKE w/RYYR at 0415, 850/66N; also receiving 5L groups from GOLF SEIS MIKE. Messages were of "URGENTE" nature (Dallas Williams, Sedgwick, CO). Note similarity to listing for 5495.5 kHz. Based upon past monitoring on other freqs, I'd guess these to be either from Venezuela or Peru--Ed.

6880.2: Un-ID station w/RYYR & SGSG & NNOALS DE NNN02SZ (Brailey, MI). These are U.S. Navy MARS stations-- Ed.

6943: STX, ASECNA, Nouadhibou, Mauritania at 0527 w/RYYR, 425/66N (Brailey, MI).

7375: PTT, Havana, Cuba, w/RYYR & fax test to ITT Worldcom NY, 425/66R at 0157 (Ronald Bruckman, Homestead, MD).

7395: RPFN (CTW47), Monsanto Naval R., Portugal, 850/66R at 0300 w/RYYR & foxes (Kneitel, NY).

7436: RUZU, Soviet Antarctic Meteo Station, Maladzezhnoya, Antarctica, w/RYYR at 0146, 425/66N (Brailey, MI).

7474: TJK, ASECNA, Douala, Cameroon, w/RYYR test at 0035, 475/66N (Atkins, WA).

7954.5: LRN85, DyN, Buenos Aires, Argentina, 850/100R, Spanish news at 0042 (Kneitel).

8030: RRQ27/RCA25/RDZ71, TASS Agency in Alma Ata w/RYYR at 0055, 425/66R. Some garbling. (Kneitel, NY).

8060: RRQ27/RKA25/RJZ71/RAW71, TASS w/RYYR, 425/66R at 1259 (Kneitel, NY).

8075: LOL, Buenos Aires Naval R., Argentina, w/RYYR in 425/133N, at 0432 (Kneitel, NY).

8175: JAE58, Jiji, Tokyo, Japan w/news at 1400, 850/66N (Michael Walker, Spring, TX). Mike's a newcomer to RTTY & he's logging Japan!-- Ed.

8345.2: NMN, USCG, Portsmouth VA using this ship transmitting freq to send sports to NODP, USCGC MARIPOSA (home port: Detroit). Couldn't locate NODP's freq. (Editor)

8356: WHU, San Juan R., PR, w/telex to New Orleans via WLO, ARQ at 1923 (Editor).

9052: ISY90, ANSA, Rome, Italy, w/news in English at 1947, 425/66N (Symington, OH).

9154: D4B, Sol Airadio, Cape Verde Islands, 900/66N, w/RYYR at 0321 (Kneitel, NY).

9216.2: 5UA, ASECNA, Niamey, Niger, w/coded WX at 2005, 425/66N. Then came a msg that M/V GOLDEN MONARCH, which had requested assistance on 2182 kHz, no longer needed help. This followed by NOTAMS in English; one said that international air traffic near Miami was being rerouted due to launching of a Space Shuttle & that Senegal was an emergency landing site. (Editor).

9315.5: Un-ID station w/RYYR's "DE LGAT" test tape at 2047, 850/66R (Brailey, MI). That's Hellenik International Airport, Athens, Greece-- Ed.

9417.2: BZP59, XINHUA, Beijing, China, w/news in English at 0145, 425/66R (Gittens, Barbados).

10114: CLN281, Havana, Cuba, w/RYYR & foxes, 425/66N at 0013 (Kneitel, NY).

10118: 59Y, Sao Tome Airadio, Sao Tome e Principe, w/RYYR, 425/66R at 2058 (Kneitel).

10390: "IPZV" INTERPOL station marker, ARQ at 1944. At 2100 there was Spanish traffic concerning cocaine shipments (Kneitel, NY).

10429: Y7A44, Berlin, E. Germany, embassy w/German text messages, 425/66R, at 0012 (Kneitel, NY).

10536: Canadian station giving North Atlantic WX & navigation information, 850/100R, at 1847 (Kneitel, NY).

11500: 8BB35, Jakarta Meteo, Indonesia, calling CQ & w/RYYR at 1335, 425/66N (Hetherington, FL).

11230: HMF49, KCNA, Pyongyang, N. Korea, w/news in French, 425/66N at 1355 (Symington, OH).

11424.9: 5HD, Dar es Salaam, Tanzania, w/test slip at 1205, 170/66N (Hetherington, FL).

11476: HMF36/HMF51, KCNA, Pyongyang, N. Korea, //13580 w/RYYR, 525/66N at 2120 (Kneitel, NY).

11531.6: XBRH, Mexico's defense forces at Isla Mujeres, sending ARQ t/c at 0230 (Hetherington, FL).

11536: French text at 1805; odd shift >170/66N. INTERPOL? (Kneitel, NY).

12131.5: Mexican gov't telexes from Mexico City at 1602, 170/75N (Editor).

12208.5: Another frequency for viewing the

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N. Korean embassy traffic highlighted in the January issue. Noted here at 1533, 425/66R, prior to switching to CW at 1535 (Editor's logging).

12264: "RY DE TTL" here at 2140, 170/66N. Note other times w/coded WX (Williams, CO). TTL = ASECNA, N'djamena, Chad-- Ed.

12496: MARSHAL ZAKHAROV, a Soviet ore/bulk/oil carrier, w/telexes to Novorossisk R. at 1555, ARQ (Editor).

12503: NWEQ, USNS WYMAN, a surveying ship operated by Military Sealift Command for the USN Oceanographer. Carrying 41 civilians & 20 scientists, it has equipment to map depths to 4,000 meters. Noted w/telexes to NMF, ARQ at 2042 (Editor's logging).

12503.5: XCRA, M/V TARASCO, a cargo ship w/telex via WLO to Monterrey, ARQ at 2208 (Editor).

12522.5: VICTOR BUGAEV, a Soviet hydrographic/meteorology research ship w/instructions to cargo ships at 1652, 170/66N. Operates in the Black Sea; home port is Odessa (Editor).

13021: NMF, USCG Boston w/plaintext WX at 1701 in FEC. Message about Soviet fishing trawler having sent a distress call from the Ionian sea and assistance needed (Editor).

13093.5: OXZ, Lyngby R., Denmark, working 9VLR the ship AMERICAN REEFER at 1502 in ARQ (Symington, OH).

13440: YZJ5, TANJUG, Belgrade, Yugoslavia, w/news in English, 525/66R at 1220 (Kneitel).

13540.7: Plantation Canaveral w/telexes in Spanish about the sugar crop. Was 170/66R at 1135 (Hetherington, FL).

13566: MKD, RAF, Akrotiri, Cyprus, 850/66N at 0121 w/RYRYI, faxes & count (Kneitel).

13615: ZEN62, AFP, Victoria Island, Hong Kong, w/RYRY & into news in French at 1000, 425/66R (Hetherington, FL).

13785: SON278, PAP, Warsaw, Poland, w/English news, 425/66R at 1547 (Kneitel, NY).

14418: KUNA news in English at 0133, 325/50N, Kuwait (Kneitel, NY).

14500: XJJ250 w/RYRY at 1450, 425/66R (Williams, CO). I see you logged this one again, Dallas (see the February column). Now I know what this station is, it's SOO250, PAP in Warsaw, Poland. It begins its news BC in Russian around 1500. The test tape is sent with a standard Cyrillic machine (the one without the 3rd keyboard shift). So the letter S would appear as an X, the O would appear as J-- Ed.

14527: Same type Korean embassy as noted at 12208.5, monitored at 1900. RTTY setting not listed (Rich Knowles, Montgomery, IL). Welcome to the column. Rich is interested in diplo traffic from Warsaw Pact nations, the Soviet Navy, and clandestines-- Ed.

14817.6: INTERPOL, Buenos Aires, Argentina w/police bulletins in Spanish at 1600, ARQ (Symington, OH). Callsign here is AYA47. Also noted by Atkins of WA, who calls these messages "great stuff."

15481: Algiers, Algeria, APS news in English, 850/66N at 1437 (Kneitel, NY).

15772: Polish text, 525/66N at 1500 (Kneitel).

15940: ELE25, Firestone Rubber Co., Harbel, Liberia, in ARQ at 1335 w/telexes (Kneitel).

15996: DPA news in English, 425/66N at 1720 (Kneitel, NY).

16675: UJZK, a Soviet ship calling URB2 & w/RYRY, 170/66N at 1729 (Kneitel, NY).

16678: GBTT, RMS QUEEN ELIZABETH II, the luxury cruise ship w/telexes via GKP6, ARQ at 1518. QEII was on 2nd day of a 10-day Carib cruise set up for baseball fans. A new satellite telephone system had just been installed. (Editor's logging).

16700: "Station ID'd as USLI transmitting what appeared to be routine messages in Russian to Odessa R., 170/66N. Each message began with either I FRANCO ODS or IWAN FRANCO/ODS. (Walker, TX). What you monitored were telegrams being sent from USLI, the IVAN FRANCO, a Soviet ship that carries 700+ passengers. ODS is an abbreviation for Odessa, the ship's home port-- Ed.

18359.5: 7L1, Czech embassy, Havana, Cuba, w/RYRY to MFA in Prague, 150/100N at 1355 (Hetherington, FL).

18697.7: DFS70L3, DPA Hamburg, W. Germany, news in English, 425/66N at 1450 (Kneitel).

19640: At 1515, 425/60N, a hand-keyed message: "Mira dame con la maq OK si puedes cambiar la maq mira tu me tx una cta y metetra en ra bien pero luego cuando vas a tx la segunda vuelta la z z z entre el pbl y a la cta no me entra completamente bien OK" (Kneitel, NY).

20096: Same lfc noted on 12208.5 & 14527 was monitored at 1730. No RTTY settings given (Knowles, IL).

20140: CNM91, MAP Rabat, Morocco, w/news at 1515, 425/66R. Also noted on 20784.9 at 1330 in // transmission (Gittens, Barbados).

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