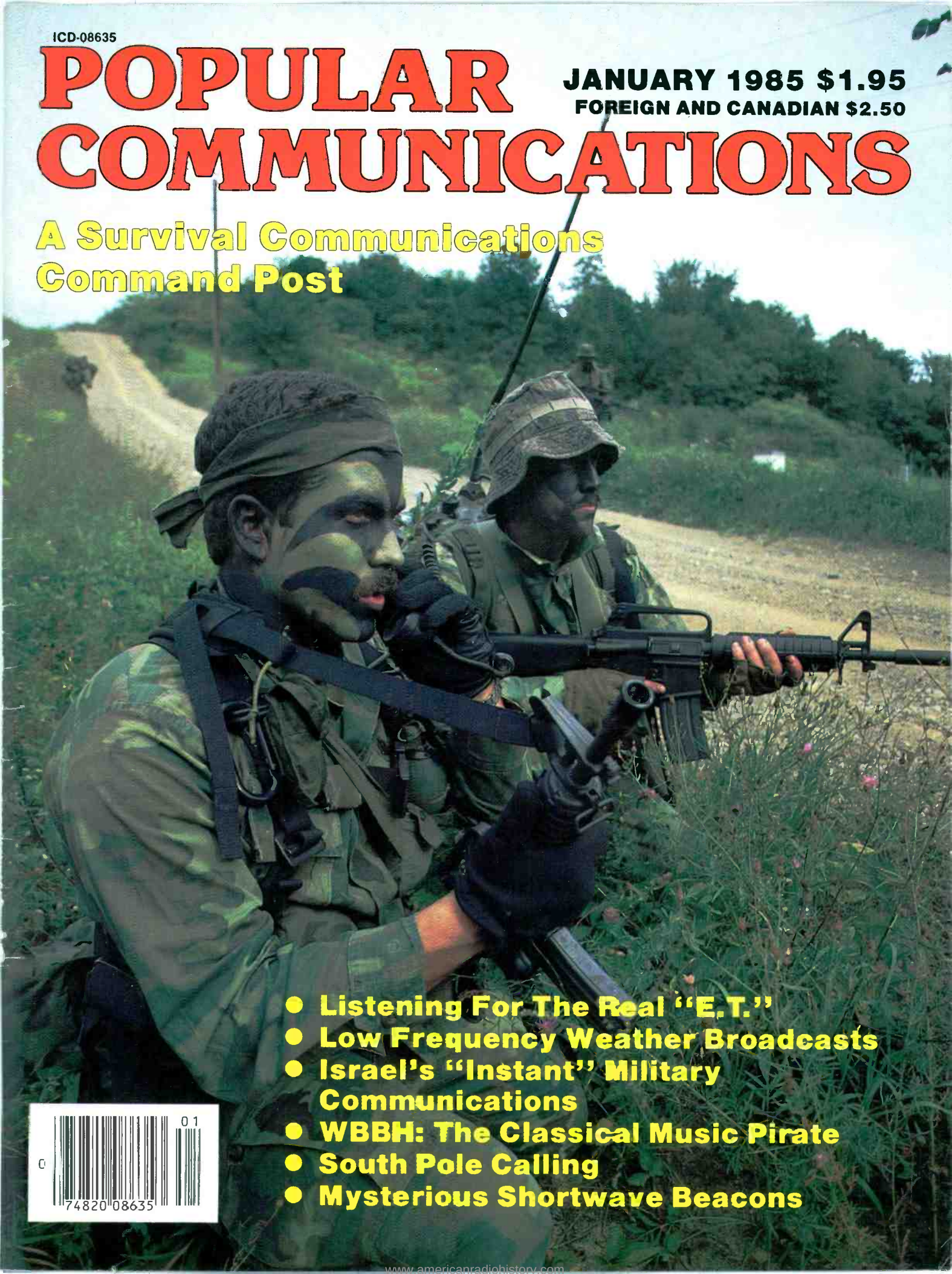
ICD-08635

POPULAR COMMUNICATIONS

JANUARY 1985 $1.95
FOREIGN AND CANADIAN $2.50

A Survival Communications Command Post



- Listening For The Real "E.T."
- Low Frequency Weather Broadcasts
- Israel's "Instant" Military Communications
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- South Pole Calling
- Mysterious Shortwave Beacons

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KENWOOD

...pacesetter in amateur radio

R-11 portable receiver

R-11

Kenwood's R-11 is the perfect "go anywhere" portable receiver. It covers the standard AM and FM Broadcast bands, plus nine additional short wave bands. The R-11's selectivity is greatly enhanced by the use of double-conversion on short wave frequencies above 5.95-MHz. High sensitivity coupled with a dual antenna system (telescopic and ferrite core) allow it to reach out and bring in those distant stations from all over the world.

Simplicity of operation is enhanced by a band-spread type tuning control. Electronic band switching, with LED band indicator, along with a tuning meter to indicate received signal strength, combine to provide you with superior listening capability. Safety Hold-Release switch prevents accidental station loss. Large front mounted speaker provides excellent sound quality. Tone switch adjusts for high, low and voice transmission.

Optional HS-7 micro-head phones allow for private listening pleasure.

All this along with a record output jack, external antenna terminal and a rugged and attractive carrying case make the R-11 portable receiver the perfect travel companion!

More information on the Kenwood receivers is available from authorized dealers of Trio-Kenwood Communications 1111 West Walnut Street, Compton, CA 90220.

CIRCLE 77 ON READER SERVICE CARD

R-2000 Top-of-the-line general coverage receiver • 150 kHz to 30 MHz • Ten memories • Dual 24-hr clock with timer • Scanning • 100-240 VAC (Opt.13.8 VDC) • Opt. VHF (118-174 MHz converter).

R-1000 High performance receiver • 200 kHz–30 MHz • digital display/clock/timer • 3 IF filters • PLL UP conversion • noise blanker • RF step attenuator • 120-240 VAC (Optional 13.8 VDC).

R-600 General coverage receiver • 150 kHz–30 MHz • digital display • 2 IF filters • PLL UP conversion • noise blanker • RF attenuator • front speaker • 100-240 VAC (Optional 13.8 VDC).

AEA Announces: SWL-TEXT™

MORSE, BAUDOT RTTY, ASCII RTTY and AMTOR RTTY MODES
Receive Only Software with Automated Features developed especially for the SWL Enthusiast.

MAIN MENU SCREEN

```
                    hh:mm:ss

SWL-TEXT™
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SELECT:
 M. MORSE
 A. ASCII
 R. RTTY
 L. AMTOR ARQ
 F. AMTOR FEC
 C. COMMANDS
 O. OPTIONS
 T. TIMING ANALYSIS
```

Just Look At Some Of These Features:

- * CW receive speeds from 5 to 99 wpm, auto speed track and lock.
- * 7 bit ASCII speeds from 45 to 300 bauds, preset and user set speeds.
- * 5 bit Baudot speeds from 60 to 132 wpm, preset and user set speeds.
- * TOR, ARQ MODE L. Allows reception of ARQ transmissions.
- * TOR, FEC MODE B. Allows reception of FEC Broadcasts.
- * Selects COMMAND MENU.
- * Selects OPTIONS MENU.
- * Selects TIMING ANALYSIS ROUTINE, AUTOMATICALLY DETERMINES RTTY SPEEDS.
- + Complete split-screen display with status information.
- + Allows RUSSIAN RTTY Reception.
- + Allows RUSSIAN and JAPANESE MORSE reception.

TIMING ANALYSIS SCREEN

```
                    hh:mm:ss
TIMING ANALYSIS
SAMPLING DATA
I:0000000   T:1234567
(NOISE)   (POSSIBLY)
147 WPM   110 BAUD
ASCII
INVERTED

T. TIMING AGAIN
A. ALT. TIMING
B. BIT TEST
U. USE DATA
```

- * AUTOMATICALLY DETERMINES RTTY SPEEDS.
- * Indicates reception of data for BIT TEST.
- * Indicates bit inversion and transposition patterns from BIT TEST.
- * Indicates signal problems or non-standard data.
- * Speed of RTTY data in words per minute and bauds.
- * Indicates type of RTTY data, either ASCII or BAUDOT.
- * Indicates that the signal is NORMAL or INVERTED.

- * Allows the Timing Routine to be repeated.
- * Allows the use of an Alternative Timing Routine.
- * Samples data to determine bit inversion and transposition pattern.
- * Allows usage of Timing Analysis data with a single keystroke.
- + Complete Printer Control.
- + Complete Buffer Control.
- + CW SPEED LOCK for enhanced copy in noisy conditions.

COMMAND MENU SCREEN

```
                    hh:mm:ss

L. LOAD BUFFER
B. BROWSE BUFFER
E. EDIT BUFFER
S. SAVE BUFFER
T. SET TIME
C. SET COLOR
```

- * 24 hour clock, displays time in hours, minutes and seconds.

- * Allows loading buffer from either DISK or CASSETTE storage.
- * Allows viewing of buffer in text format, no control characters.
- * Word processor type edit functions on buffer, normal file display.
- * Allows you to save buffer data to DISK or CASSETTE storage.
- * Allows setting the time of day clock.
- * Choose among any of 16 colors for each, Character, Screen & Border.

- + Now available for the COMMODORE 64 and VIC-20 Computers.
- + Complete with cables for the AEA CP-1 or MP-1 INTERFACES.
- + Keyboard overlays and manual.
- + For more information, contact your AEA Dealer or AEA.

Advanced Electronic Applications, Inc.
P.O. BOX C-2160 • LYNNWOOD, WA 98036 • (206) 775-7373 • TELEX: 152571 AEA INTL

NEW! uniden® Bearcat® Products

Communications Electronics,™ the world's largest distributor of radio scanners, is pleased to announce that *Bearcat* brand scanner radios have been acquired by Uniden Corporation of America. Because of this acquisition, Communications Electronics will now carry the complete line of Uniden *Bearcat* scanners, CB radios and Uniden *Bandit*™ radar detectors. To celebrate this acquisition, we have special pricing on the Uniden line of electronic products.

Bearcat® 300-E

List price $549.95/**CE price $339.00**

7-Band, 50 Channel • Service Search • No-crystal scanner • AM Aircraft and Public Service bands. • Priority Channel • AC/DC

Bands: 32-50, 118-136 AM, 144-174, 421-512 MHz.

The *Bearcat* 300 is the most advanced automatic scanning radio that has ever been offered to the public. The *Bearcat* 300 uses a bright green fluorescent digital display, so it's ideal for mobile applications. The *Bearcat* 300 now has these added features: Service Search, Display Intensity Control, Hold Search and Resume Search keys, Separate Band keys to permit lock-in/lock-out of any band for more efficient service search.

Bearcat® 20/20-E

List price $449.95/**CE price $269.00**

7-Band, 40 Channel • Crystalless • Searches AM Aircraft and Public Service bands • AC/DC Priority Channel • Direct Channel Access • Delay

Frequency range 32-50, 118-136 AM, 144-174, 420-512 MHz.

Find an easy chair. Turn on your *Bearcat* 20/20 and you're in an airplane cockpit. Listening to all the air-to-ground conversations. Maybe you'll pick up an exciting search and rescue mission on the Coast Guard channel. In a flash, you're back on the ground listening as news crews report a fast breaking story. Or hearing police and fire calls in your own neighborhood, in plenty of time so you can take precautions. You can even hear ham radio transmission, business phone calls and government intelligence agencies. Without leaving your easy chair. Because you've got a *Bearcat* 20/20 right beside it.

The *Bearcat* 20/20 monitors 40 frequencies from 7 bands, including aircraft. A two-position switch, located on the front panel, allows monitoring of 20 channels at a time.

Bearcat® 210XL-E

List price $349.95/**CE price $209.00**

6-Band, 18 Channel • Crystalless • AC/DC

Frequency range 32-50, 144-174, 421-512 MHz.

The *Bearcat* 210XL scanning radio is the second generation scanner that replaces the popular *Bearcat* 210 and 211. It has almost twice the scanning capacity of the *Bearcat* 210 with 18 channels plus dual scanning speeds and a bright green fluorescent display. Automatic search finds new frequencies. Features scan delay, single antenna, patented track tuning and more.

Bearcat® 260-E

List price $399.95/**CE price $249.00**

8-Band, 16 Channel • Priority • AC/DC

Frequency range 30-50, 138-174, 406-512 MHz.

Keep up with police and fire calls, ham radio operators and other transmission while you're on the road with a *Bearcat* 260 scanner. Designed with police and fire department cooperation, its unique, practical shape and special two-position mounting bracket makes hump mounted or under dash installation possible in any vehicle. The *Bearcat* 260 is so ruggedly built for mobile use that it meets military standard 810c, curve y for vibration rating. Incorporated in its rugged, all metal case is a specially positioned speaker delivering 3 watts of crisp, clear audio.

NEW! Bearcat® 201-E

List price $279.95/**CE price $179.00**

9-Band, 16 Channel • Crystalless • AC only Priority • Scan Delay • One Key Weather

Frequency range 30-50, 118-136 AM, 146-174, 420-512 MHz.

The *Bearcat* 201 performs any scanning function you could possibly want. With push button ease, you can program up to 16 channels for automatic monitoring. Push another button and search for new frequencies. There are no crystals to limit what you want to hear.

NEW! Bearcat® 180-E

List price $249.95/**CE price $149.00**

8-Band, 16 Channel • Priority • AC only

Frequency range: 30-50, 138-174, 406-512 MHz.

Police and fire calls. Ham radio transmissions. Business and government undercover operations. You can hear it all on a *Bearcat* 180 scanner radio. Imagine the thrill of hearing a major news event unfold even before the news organizations can report it. And the security of knowing what's happening in your neighborhood by hearing police and fire calls in time to take precautions. There's nothing like scanning to keep you in-the-know, and no better way to get scanner radio performance at a value price than with the *Bearcat* 180.

Bearcat® 100-E

The first no-crystal programmable handheld scanner.

List price $449.95/**CE price $234.00/*SPECIAL!***

8-Band, 16 Channel • Liquid Crystal Display Search • Limit • Hold • Lockout • AC/DC

Frequency range: 30-50, 138-174, 406-512 MHz.

The world's first no-crystal handheld scanner has compressed into a 3" x 7" x 1¼" case more scanning power than is found in many base or mobile scanners. The *Bearcat* 100 has a full 16 channels with frequency coverage that includes all public service bands (Low, High, UHF and "T" bands), the 2-Meter and 70 cm. Amateur bands, *plus* Military and Federal Government frequencies. It has chrome-plated keys for functions that are user controlled, such as lockout, manual and automatic scan. Even search is provided, both manual and automatic. Wow...what a scanner!

The *Bearcat* 100 produces audio power output of 300 milliwatts, is track-tuned and has selectivity of better than 50 dB down and sensitivity of 0.6 microvolts on VHF and 1.0 microvolts on UHF. Power consumption is kept extremely low by using a liquid crystal display and exclusive low power integrated circuits.

Included in our low CE price is a sturdy carrying case, earphone, battery charger/AC adapter, six AA ni-cad batteries and flexible antenna. The *Bearcat* 100 is in stock for quick shipment, so order your scanner today.

Bearcat® DX1000-E

List price $649.95/**CE price $489.00**

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.

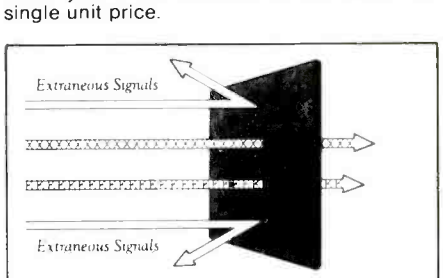
Uniden® PC22-E

List price $159.95/**CE price $99.00**

The *Uniden* PC22 is a 40 channel AM remote mobile CB radio. It's the answer for today's smaller cars which don't always provide adequate space for mounting. Since all the controls are on the microphone, you can stash the "guts" in the trunk. The microphone has up/down channel selector, digital display, TX/RX indicator and external speaker jack. Dimensions: 5¾" W x 7⅞" D x 1½" H. 13.8 VDC, positive or negative ground.

QUANTITY DISCOUNTS AVAILABLE

Order two scanners at the same time and deduct 1%, for three scanners deduct 2%, four scanners deduct 3%, five scanners deduct 4% and six or more scanners purchased at the same time earns you a 5% discount off our super low single unit price.



Both Bandit™ radar detectors feature E.D.I.T.™ the Electronic Data Interference Terminator that edits-out false alarm signals.

Uniden® PC33-E

List price $59.95/**CE price $44.00**

The *Uniden* PC33 boasts a super-compact case and front-panel mike connector to fit comfortably in today's smaller cars. *Controls:* Power & Volume, Squelch; *Switches:* ANL. Other features of the PC33 include Graduated LED "S"/RF Meter, Digital channel indicator. Dimensions: 6" W x 6" D x 1⅞" H. ±13.8 VDC.

Uniden® PC55-E

List price $89.95/**CE price $59.00**

The full featured *Uniden* PC55 front-panel mike connector makes installation easier when space is a factor. It has ANL, PA-CB, Channel 9 and RF Gain switches. LED "S"/RF meter, TX lite, PA & external speaker jacks. Dimensions: 6" W x 6" D x 1⅞" H. ±13.8 VDC.

Bandit™ Radar Detectors

Now that everyone else has taken their best shot at radar detection, the Uniden Bandit™ has done them one better...with E.D.I.T.,™ the Electronic Data Interference Terminator that actually edits-out false alarm signals.

The Bandit 55, features a convenient brightness/dimmer control for comfortable day or night driving, plus a handy highway/city control for maximum flexibility wherever you drive. The Bandit 95 Remote, is a two-piece modular unit that lets you mount the long-range radar antenna behind the grill, out of view. The ultra-compact control unit can then be inconspicuously tucked under the dash or clipped to the visor. Order **Bandit 55-E** for $119.00 each or the **Bandit 95-E Remote** for $139.00 each.

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CIRCLE 33 ON READER SERVICE CARD

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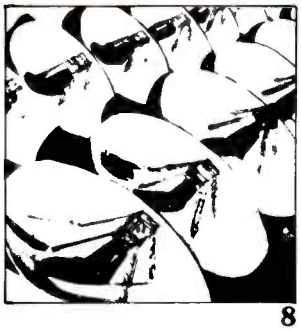
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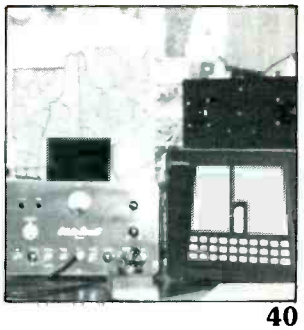
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FEATURES

This month's cover: *Communications between field units and a command post require some ingenuity. Maybe a mobile command post is the answer. Photo by Larry Mulvehill, WB2ZPI.*

DEPARTMENTS

BEAMING IN

BY TOM KNEITEL, K2AES

AN EDITORIAL

It's The Memory That Bugs Ya The Most

As time goes on we are learning more and more about the electronics of the body and mind, how it generates and receives all manner of signals. It's a study that has been ongoing for many years.

A while ago I attended a seminar of science writers wherein a psychology professor reported on some experiments with radio signals directed at laboratory rats, finding that the signals caused a brief initial period of overactivity followed by a long period of apathy. The signals pumped at the rats were in the UHF band, "home" of many TV channels, Cellular Mobile Radio, and many frequencies used for amateur, public safety, military, federal, and business/industrial communications.

As a matter of fact, the rats were subjected to low level signals running from 320 to 945 MHz. The intensity of the signals was no more than received by any persons who live within 10 to 20 miles of a radar or UHF TV transmitter. It had been previously thought that only UHF signals of high intensities could adversely affect the environment (and those who live within the environment). It does seem that there has been very little open public discussion on such matters of late. Inasmuch as exposure periods ranged from only 3 to 11 weeks, it would probably be reassuring to the public if the latest studies on such matters would be made more readily available to the public to say that these claims have been refuted by later or more extensive testing on humans. I'd hate to think that after a couple of weeks of offering investment advice to his customers by means of the Cellular Mobile Radio in his limo, the poor stockbroker has his brains scrambled.

On the flip side of that coin, Westinghouse's Human Science Laboratory has identified brain wave or component (designated P-300), which seems to indicate attention and perception. Researchers are developing a monitoring device consisting of an electrode that would pick up a person's P-300 signals and feed them into a computer for analysis.

Armed with a P-300 receiver and a properly programmed computer, the day may come when the boss can check on the attentiveness to the work of his or her employees by scanning their brainwaves. The computer might ring a warning bell on someone's desk or machine when the employee's mind begins to disconnect from the tasks at hand, or it could (also) be used to ring up a score on a tote board to keep a record of the attentiveness of all employees.

What with many companies now permitted to demand that employees (and applicants for positions) take polygraph ("lie detector") tests, it hardly seems such an outrageous concept once you think about it. This arrangement could turn up in schools as well as business and industry.

One area of thought on such a device points out that it might be used to test individuals to see if their span of attentiveness makes them suitable for being hired to perform a job that requires long term concentration to assure the safety of life and property. Or, it might be used to establish guidelines relating to how many hours a person might be expected to perform a high pressure job before getting a rest period (and also the length of time of the rest period).

It could also be used by lecturers, schools, ad agencies, producers of stage productions, TV programs, films, or newpaper, magazine or book publishers to see which portions of their offerings have the highest and lowest abilities to hold the attention and concentration of their audiences, readers, or students.

Such possible uses sound harmless (or even beneficial) enough, but others point out that there are probably as many potential abuses and chances for invasion of privacy in such a device than there may be benefits. To some, it smacks of being one step closer to a sinister "thought police" or efforts to achieve "mind control." At first, the polygraph was used only to check out persons accused of crimes, but within a few short years it has become a means of qualifying or even keeping a job, screening persons who would no more consider ripping off their employers than they would think of sticking up a gas station.

The question becomes—once a foot is slipped through the door with one of these devices, how far is it to the point where it can

(Continued on page 75)

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.

Alive & Kicking

Yes, the Association of DX Reporters is still around, in answer to your question on page 73 of the October '84 issue. I enjoyed your editorial "Getting Clubbed;" you hit the nail on the head more than a few times.

Reuben G. Dagold, Publisher
DX Reporter
Assoc. of DX Reporters
7008 Plymouth Road
Baltimore, MD 21208

The mystery is solved; the ADXR is alive and well! The group's publication, DX Reporter, *looks most healthy and worthwhile. Here's a growing club that our readers might like to consider joining. Tell them we sent you. —Editor*

Out To Launch

There is a considerable amount of missile activity in South Dakota. Is there a particular frequency that might be monitored in order to hear communications relating to tests and launches?

James Strongbow
Box Elder, SD

Try your luck on 148.095, 148.455, and 148.485 MHz; readers report these frequencies as being active in your area. And, by the way, many VIP's are usually on hand during tests and you might wish to monitor 372.2 MHz for communications from the VIP aircraft. —Editor

Yea Or Nay On The Gray?

I've heard the term "gray market" used in conjunction with electronics equipment but I haven't been able to obtain a clear definition of the meaning of the term. What is the gray market? Is it legal?

Barbara Incoronato
Denver, CO

As I understand the term, it relates to electronics (or other) equipment that is intended for sale in various areas outside of North America. This equipment may be generally equivalent to specific models produced for sale in North America, although there might be cosmetic or technical variations and also different model numbers assigned. It goes on the so-called gray-market when it somehow finds its way into the North American market and is offered for sale at startlingly low prices. The major problem with buying gray market equipment relates to the factory warranty; the problem being that it most likely isn't valid in areas other than those nations where the equipment was supposed to be sold. Although it circumvents the marketing structure established by equipment manufacturers, there doesn't seem to be anything illegal about offering it for sale or purchasing it. One way of determining if a particular piece of equipment is gray market merchandise is by looking at the warranty card; it may be quite specific about areas where it is (or isn't) in effect. If it's written in some language other than English, that's another pretty good clue. One electronics dealer who handles such equipment tells me that his company has a service department available to perform any necessary warranty work not covered by the manufacturer. Some have mentioned that design or model number differences make gray market equipment difficult to re-sell on the "used" market or use as a trade-in. —Editor

Having A Ball

The mobile antenna I use for my scanner is a metal whip. Don't tell me that I've lost my marbles but I recently discovered that the little red ball at the top of this whip is missing. Is this just a decoration or is it necessary?

Allen Manchester, Sr.
Rutland, VT

If you recall what happend to Capt. Ahab as he trailed Moby Dick, you'd better replace the little red ball. Remember how the mast of the ship glowed with St. Elmo's Fire? Poor old Ahab, with all of his other troubles, didn't realize that the good ship Pequod *had a bad case of electrostatic (or corona) discharge. It's the first cousin to the kind which affects a mobile whip. The condition occurs as the whip moves rapidly through the air. The resulting friction creates a build-up of electrical charges (like rubbing your shoes on a rug). Once the voltages reach sufficient levels, they leak back into the air. If the whip had a pointed tip, each electrical discharge would cause a sputter of noise in the scanner. However, the ball shape has plenty of surface area and the voltages spread out . . . and slurp off slightly. —Editor*

Facility Data Wanted

The 4-digit "numbers" stations seem to be in the general vicinity of the U.S. Army facility near Warrenton, Virginia. Can you give me any additional information on this facility other than what has already been run in *POP'COMM?*

Roger Burdine
Albuquerque, NM

We have already given a considerable amount of information on this garrison, which goes by the unusual name of Vint Hill Farms. The Army established the facility early in 1942 and used it for repairing communications equipment as well as for training technicians. There are about 1200 people working there, mostly connected with the U.S. Army Electronics Material Readiness Command and other components of the Intelligence and Security Command. Those who work there include civilians as well as military personnel. While Warrenton is the closest location with a post office, it's quite small (population 4200). The nearest community of any real size is Manassas (12,000 population). Washington DC is 43 miles away. The only thing we can add to that is the frequency of the base security people, which we understand is 38.53 MHz, and the base fire department—40.49 and 46.85 MHz. —Editor

How Low Can You Get?

I understand that AM broadcast stations that are limited by the FCC to daytime-only operation are also permitted to operate in the very early morning with very low power. You'd think that all daytime-only broadcasters would take advantage of this ability to remain on the air for additional hours, and yet many stations have opted to pass up on the chance. Sure would be a boon to DXers to get some QSLs from broadcasters running low power. What power is permitted during pre-sunrise hours?

A. Markowitz
Pittsburgh, PA

The pre-sunrise transmitter power permitted varies from station to station and is determined by several variable factors, however it can be as little as 3 watts (as in the case of WINE in Brookfield, Connecticut on 940 kHz, which normally runs 1 kW during its regular schedule). I asked the Manager of a daytime station why daytimers don't all take advantage of this opportunity to add extra hours to the schedule. He told me that his station, for instance, operates on a so-called "Canadian Clear Channel." They could operate with low power during pre-sunrise hours, but the station management feels that the station's signals would be below their normal daytime signal. Listeners would undoubtedly complain about the coverage and quality of the flea-powered signal and the interference from a high powered Canadian station which can still be received in their signal area during pre-sunrise hours. Other broadcasters express similar views and mention that broadcasting costs a certain amount of money per hour (electric and staff costs, for instance). The limited signal coverage produces a smaller audience and is also less attractive to many advertisers. This, combined with the fear of receiving listener complaints about co-channel interference from distant stations dominating the frequency in pre-sunrise hours, just doesn't make it worth the expense to bother with the idea. Still, many stations, nevertheless, do operate in this manner. —Editor PC

NEW!

Regency®

Scanners

Communications Electronics,™ the world's largest distributor of radio scanners, introduces new models with special savings on all radio scanners. Chances are the police, fire and weather emergencies you'll read about in tomorrow's paper are coming through on a scanner today.

We give you excellent service because CE distributes more scanners worldwide than *anyone* else. Our warehouse facilities are equipped to process thousands of scanner orders every week. We also export scanners to over 300 countries and military installations. Almost all items are **in stock** for **quick shipment**, so if you're a person who prefers fact to fantasy and who needs to know what's *really* happening around you, order your radio today from CE.

NEW! Regency® MX5000-E

List price $599.95/**CE price $359.00**

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6-Band, 10 Channel • Crystalless • AC only

Frequency range: 30-50, 144-174, 440-512 MHz.

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Bands: 30-50, 146-174, 450-512 MHz.

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The *Regency* Touch MX7000 provides the ease of computer controlled, touch-entry programming in a compact-sized scanner for use at home or on the road. Enter your favorite frequencies by simply touching the numbered pressure pads. You'll even hear a "beep" tone that lets you know you've made contact.

In addition to scanning the programmed channels, the MX7000 has the ability to search through as much as an entire band for an active frequency. When a call is received, the frequency will appear on the digital display.

Regency® Z10-E

List price $239.95/**CE price $138.00**

6-Band, 10 Channel • No-crystal scanner Priority control • Search/Scan • AC/DC

Bands: 30-50, 140-174, 440-512 MHz.

Cover your choice of over 15,000 frequencies on 10 channels at the touch of your finger.

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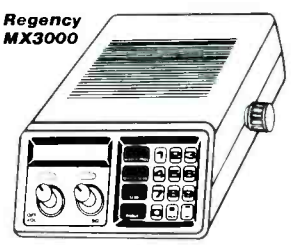
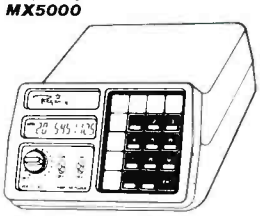


Regency MX5000



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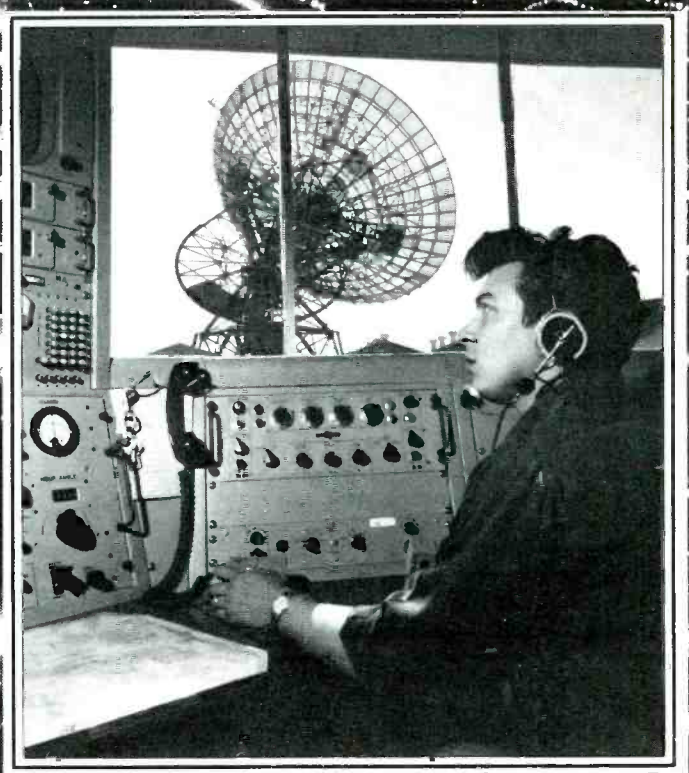
CIRCLE 37 ON READER SERVICE CARD

Listening For The Real E.T.

How Super DXers Are Monitoring Outer Space For Signals From Other Civilizations

BY GERRY L. DEXTER



This 85-foot antenna is part of the Deep Space Instrumentation Facility and has been used for SETI research. (NASA photo)

Might E.T. (extra terrestrial) *really* be out there somewhere?

Science fiction writers have, since the beginning, assumed intelligent life on other planets as a basic tenent for their writings. They've thought up everything from submarines to man on the moon to laser beams long before such events and inventions came to pass.

Are they right about "men from Mars" as well? Only a short while back most responsible scientists looked upon the possibility of life on other worlds with, at the least, raised eyebrows.

Today that attitude has changed. There are between 200 million and 100 billion stars in the Milky Way Galaxy alone. More and more scientists are beginning to see it as statistically likely that some of those stars must be like our own sun, with planets that are environmentally suitable for intelligent life to have developed—life intelligent enough to have built instruments for interstellar transmission and reception.

Add to this the belief that the basic building blocks of life seem to be universal. The sheer number of possibilities involved make it seem more reasonable to believe life exists elsewhere than to believe the Earth is unique in that respect.

The Search for Extraterrestrial Intelligence (SETI) is the overall term for monitoring efforts to try and make contact with any intelligent beings who might be sending signals in our direction.

SETI efforts, so far, have been negative. But the efforts have not been at all extensive and only a minute portion of the possible life targets have been explored.

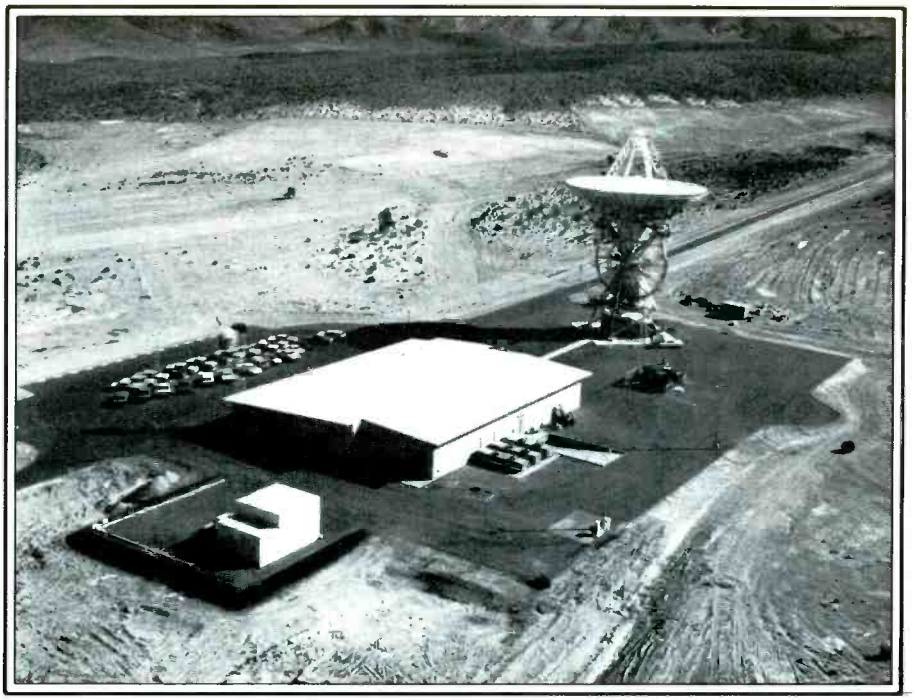
The National Aeronautics and Space Administrations's first SETI efforts began in 1960 at the National Radio Astronomy Laboratory in Virginia. Dubbed Project Ozma, the effort took up less than one-tenth of one percent of the astronomy laboratory's time and did not continue for very long.

Currently, NASA's Deep Space Network antennas are being used for SETI research. These are the same dishes that are used for communications with and tracking of space probes and exploration vehicles. These 85-foot antennas are located at Goldstone, California, Woomera, Australia and Krugeradorp, South Africa and can reach out for hundreds of millions of miles.

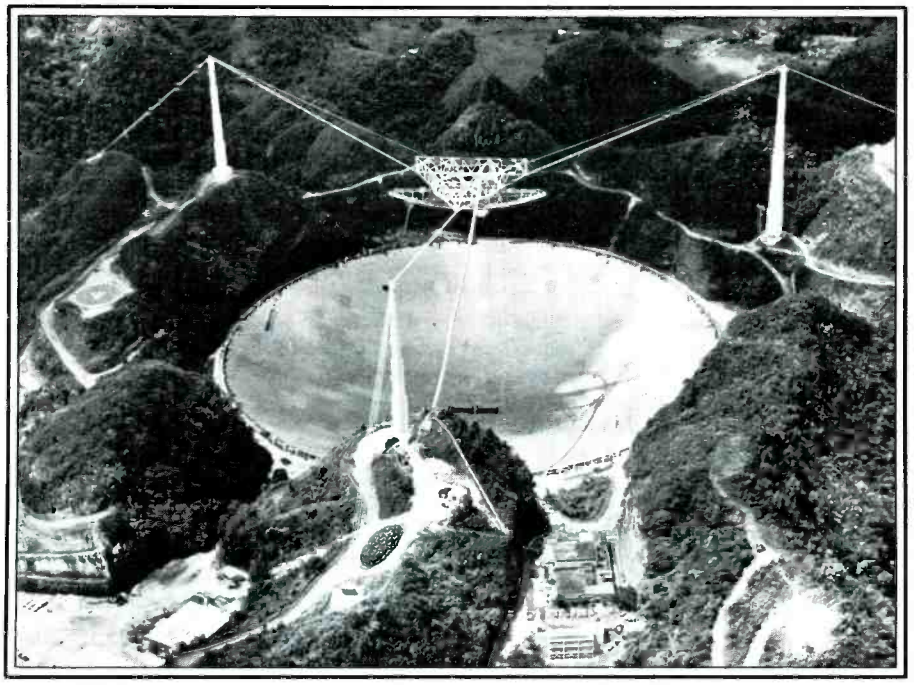
In 1979 NASA proposed a long-term SETI effort as a joint project for NASA's Ames Research Center, which would handle the science and program management and the Jet Propulsion Laboratory, responsible for the development of equipment and systems.

NASA plans an "all-sky" survey, concentrating on areas that look especially promising. At the same time the project will endeavor to map the sky and research man-made radio frequency interference.

The Jet Propulsion Laboratory is developing a super-cooled amplifier with an RF bandwidth some 10,000 times greater than that of an ordinary AM radio.



The Deep Space antenna at Goldstone, California. (NASA photo)



The 1,000-foot diameter antenna at the Arecibo, Puerto Rico National Astronomy and Ionosphere Center. (NASA photo)

NASA and Stanford University are also working on SETI investigations at the giant Arecibo radio telescope in Puerto Rico.

NASA's 1983 budget for SETI work was a modest $1.5 million. Later budgets have also been frugal.

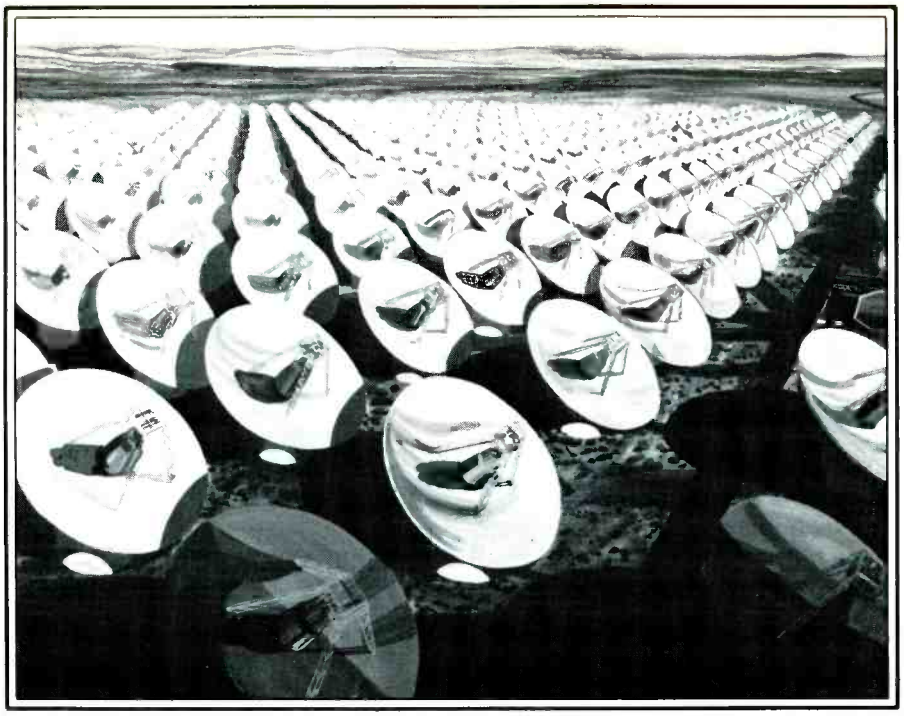
But NASA isn't the only group listening to the skies. Harvard University has also begun to do some SETI work.

Harvard physics professor Paul Horowitz, who is in charge of the project, says he "knows there is life out there and I'm pretty sure there are technological civilizations in communication with other technological civilizations, so I think it's a matter of when, not if, we establish contact."

An 84-foot radiotelescope at Harvard, which had been closed down for five years, has been reopened for this project, which is being funded by The Planetary Society.

The Harvard radiotelescope has a range of 1,000 light years, a distance that covers a million sun-like stars.

Horowitz is using what he terms a "Suitcase SETI," an advanced receiving system useable on existing radiotelescopes and easily portable. It can listen to 250,000 channels simultaneously.



Row after row of 100-meter dish antennas as seen by an artist's eye, would make up Project Cyclops. (NASA photo)

Receiver output is fed into a spectrometer which breaks the output into bandwidths from .01 to .03 Hertz.

This output, in turn, is tied into a computer system which analyzes, graphs, and highlights any suspicious signals and stores all the received data.

Most SETI efforts, including those at Harvard, concentrate monitoring in the 1.4 to 1.7 GigaHertz area. More accurately, it's 1.420 GHz, the frequency of the hydrogen atom, the most prevalent and abundant atom in the universe. This "magic frequency" is thought to be one of the most likely on which messages from other civilizations might be transmitted.

This 1.4 to 1.7 GigaHertz range (a GigaHertz is a million MegaHertz or a billion Hertz) is known as "the waterhole." The frequency range is fairly free of noise so artificial signals should easily stand out.

Horowitz operated his Suitcase SETI at the Arecibo facility in 1982 for about one month, checking some 250 stars. Results were, needless to say, negative.

The new effort will cover areas equal to 1,000 years' worth of effort of the 1960 vintage Project Ozma within sixty seconds time!

Horowitz says SETI monitoring is far less expensive than trying to go out and meet ETs face-to-face. He figures that, once communication is established, these intergalactic telegrams will cost about one dollar a word.

Karl Lind, who lives in the San Francisco area, is living proof that you don't have to have NASA or a university or a foundation behind you to DX the stars.

According to a January, 1983 *Newsweek* article, Lind is listening to signals from the area of Sigma Draconis, a star similar to our sun, some 18 light years distant. Lind uses a 6-foot dish antenna and an Atari home computer. It cost Lind approximately $15,000 to set up his galactic listening post.

All of these efforts are dwarfed by a SETI plan commissioned by NASA in the early 1970's, but so far, are not past the drawing boards.

Project Cyclops is a mind-boggling plan that envisions a microwave antenna system with a collecting area of from 7 to 20 square kilometers!

This would be achieved through the use of 1,000 to 2,500 antennas, each 100 meters in diameter and each separated from its neighbor by a distance of 300 meters.

Individual antennas could be controlled to act as one giant collector with adjustments made in antenna direction, phasing, and signal delays so that the received signals would add together.

The arrays would also be divisible so that antenna subsystems could be created that could be individually tuned and directed.

Located in the center of this gargantuan antenna farm would be a control and data processing building.

Underground service tunnels would lead out from the control building to each antenna element allowing for connection of coaxial cables, power distribution, and data/signal distribution to and from each antenna.

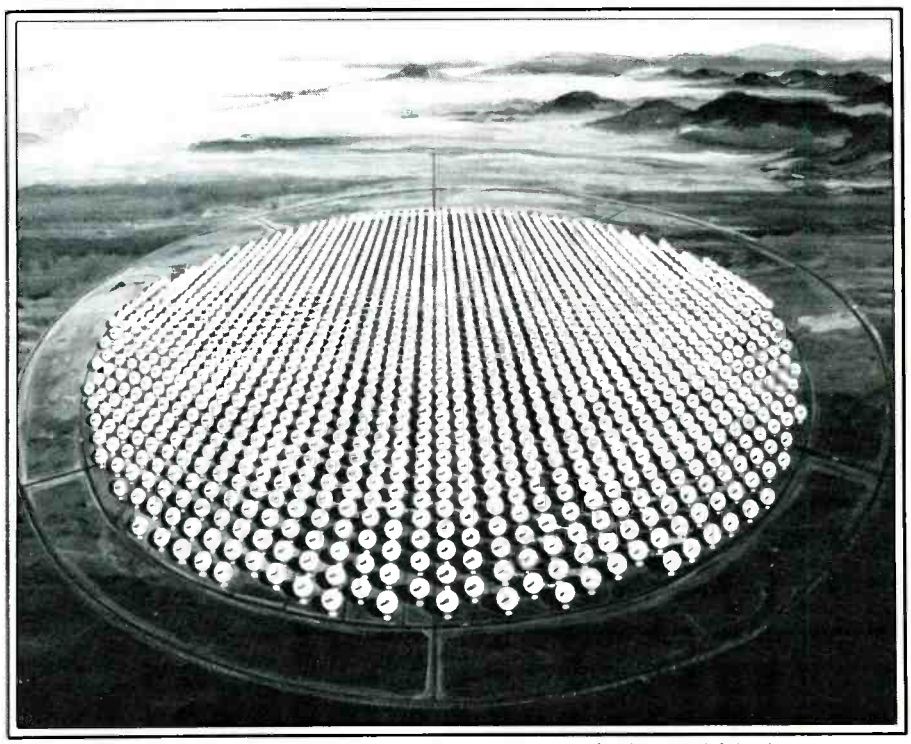
The installation would be placed at a low latitude, perhaps in the Southwestern United States. The site chosen has to be remote (as free as possible of interference), geologically stable, low in humidity, and have a calm climate with minimal wind.

Receivers used in the Cyclops project would cover the range of 500,000 MegaHertz to 3 GigaHertz.

Each heterodyne-type receiver would convert the received RF signal into an intermediate frequency for transmission to the control center. A synthesized, continuously checked local oscillator signal would be used for this purpose.

Special techniques would be used to reduce receiver noise to the minimum since receiver noise vs. coverage is inversely proportional—a halving of receiver noise doubles the effectiveness of the antennas.

Antennas would be remotely monitored from the control room to check parameters and provide automatic alarm systems in the event these parameters are exceeded.



Artist's conception of a complete Project Cyclops facility. (NASA photo)

Through a long series of stages and techniques, Cyclops operators would have a visual display of frequencies monitored.

Cyclops is also envisioned as a beacon, sending signals out to let any extra terrestrials know we are here. The designers suggest the installation of a 100 kilowatt transmitter at each of the antennas, giving a total power of 100 million watts, which could be monitored as far distant as 100 light years.

As an alternative beacon idea, Cyclops proposes the establishment of transmitters at the north and south poles, transmitting a continuous beacon into the depths of space.

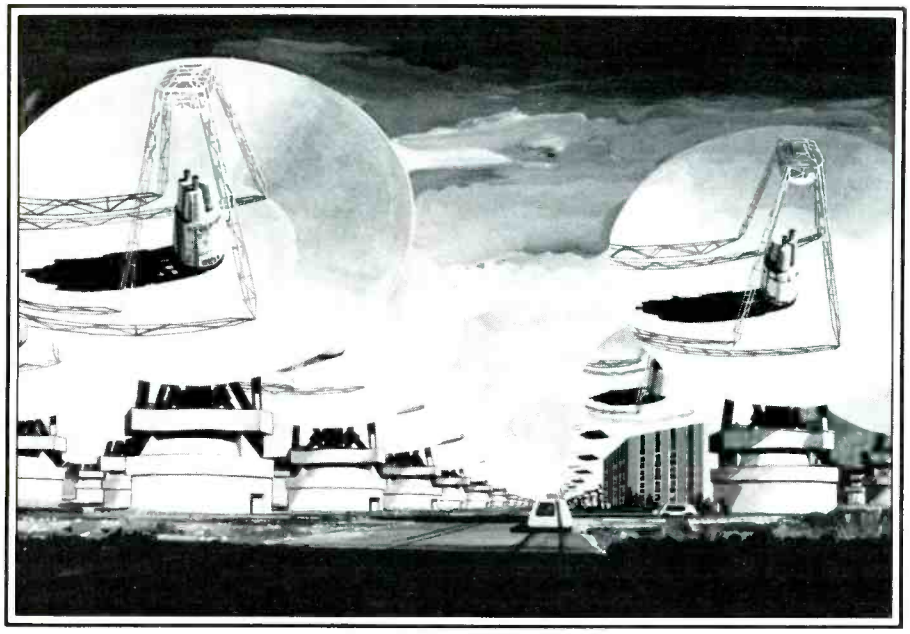
The Cyclops project calculated that, assuming television transmission on earth continues for another century, earth's electromagnetic radiation would be receivable at a distance of 100 light years. There are thought to be some 1,000 stellar systems within that range.

So what if contact is made someday? The Cyclops project paper warns there are potential hazards. Invasion from outer space perhaps; *War of the Worlds* come true. Or the strangers from space might try to exploit our planet or its population, or perhaps try subversion.

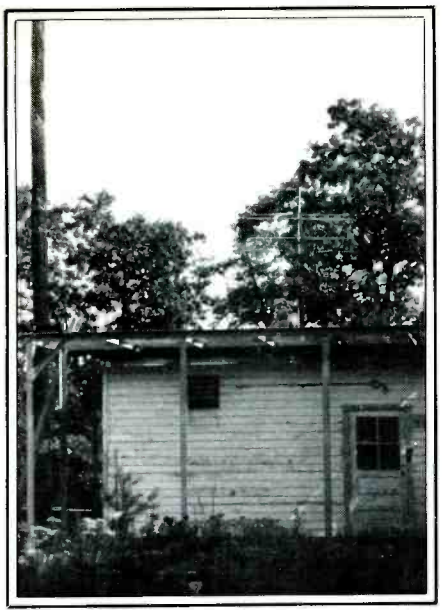
Perhaps the most likely prospect envisioned by the Cyclops creators is culture shock. A sort of global-wide inferiority complex as we discover we are pretty backward compared to civilizations existing in other star systems.

But, the good news is that, even if contact is made, it would initially be via a distance. And the long delays in sending and receiving messages would put off any physical contact for generations, if ever. That would give earthlings time to get used to the idea that we aren't alone and allow us to prepare for what would be the most significant moment in humankind's history—*Close Encounters of The Third Kind*—for real!

One day, perhaps in the not-too-distant future, some SETI monitor may well receive that electrifying signal that will indicate intelligent life does exist on a world out there and that earthlings may be part of a small corner of space advanced civilizations hadn't yet bothered about. **PC**

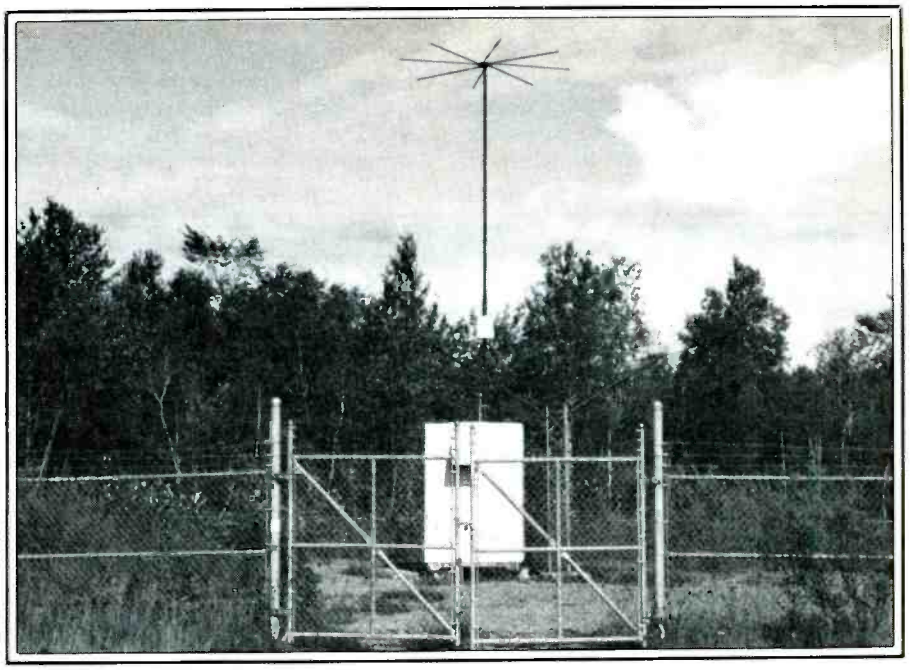


Artist's conception shows a ground level view of a part of the proposed Cyclops installation. Control building at lower right. (NASA photo)



A typical low frequency beacon station is located in a remote area along a back road. This is station "FO" on 400 kHz in Southport (district of Southhampton), New York.

Reader George Osier took this photo of a beacon station somewhere in New York.



Weather Watch

Low Frequency Weather Transmissions Are Little-Known But Offer 'Round The Clock Information For Emergency Use Or Just DXing!

BY LEWIS KESEBERG, KCA6PK

Many of us have found it a plus to keep a constant and watchful ear perked to the very latest weather reports and forecasts. As many of you know, when it comes to the rapidly changing whims of Mother Nature, few ladies can be quite as fickle, subject to sudden changes of mood, or as angry when the mood seems to fit.

Several years ago the National Weather Service began establishing localized weather transmission stations on several frequencies in the 162 MHz band. Today many areas are served by such stations, especially major metropolitan cities and coastal areas. There are, however, areas that are not covered by these stations or which receive them only marginally. Also, sometimes these stations are temporarily silent because of equipment malfunction; or your own VHF monitoring equipment may be out of service due to scanner or antenna problems.

There is, however, an alternate (but lesser known by the public) network of weather transmitting stations in operation which offers continuous 24-hour weather data over wide areas of the United States and Canada. These weather broadcasts are extremely thorough and are constantly revised. This is a service known as TWEB, or Transcribed Weather Broadcast Service, and is primarily sent out for aviation interests.

These stations transmit on low frequencies, generally within the 200 to 400 kHz range. Such frequencies (especially at night) provide long range reception on a far more reliable basis than shortwave, and they're far less temperamental than VHF over long distances. Most of these stations run between 50 and 2000 watts and are rated for an average service range of about 50 miles, with secondary reception out to about 75 to 100 miles. In actual fact, however, at night they have been received at distances of well over 1500 miles. Stations TUK, GLS, and GNI are high powered (more than 2 kW) and have been received throughout North America.

For reception within a station's normal service area, a short antenna (even indoors) may well suffice. For greater distances, an outdoor longwire (the longer the better) is suggested for best results and will undoubtedly be an absolute necessity for those attempting to DX these stations as a hobby.

Most modern communications receivers cover these frequencies, as do many multiband transistor portables designed for entertainment purposes. Foreign made broadcast receivers usually incorporate this band because it is used for standard broadcasting in many areas of the world (outside of the western hemisphere). Then, all you have to do is look up the station nearest to you, as shown in our chart, and you're in business. Our chart lists all of the stations thought to be active in North America.

The chart also lists the callsign (actually the identification letters) of the stations, as these letters are transmitted in slow CW along with the voice transmission of the weather. This makes it easy to sort out the station you want from other transmissions on the same frequency. Note that in addition to stations sending out continuous weather transmissions, there are other stations sending out weather information on these frequencies. In the United States, such transmissions normally go out at 15 and 45 minutes past the hour. In Canada, the broadcast schedule is at 20 and 40 minutes past the hour. These stations are shown in

our chart with an asterisk (*) next to their callsigns.

While you're setting up for making use of longwaves as an adjunct to gathering information of use to you, don't forget about station WGU20 on 179 kHz. This station, which is operated by the Federal Emergency Management Agency (FEMA) near Chevy Chase, Maryland, has been heard on and off for many years on an irregular basis. Most recently it has been noted sending time signals and announcing the exact time in Eastern Standard Time. WGU20 is quite powerful and has been reported with good signals as far away as Texas. Although not presently sending weather data (it has done so in the past), it is worth keeping WGU20 in mind for whatever potentials it may hold for the future.

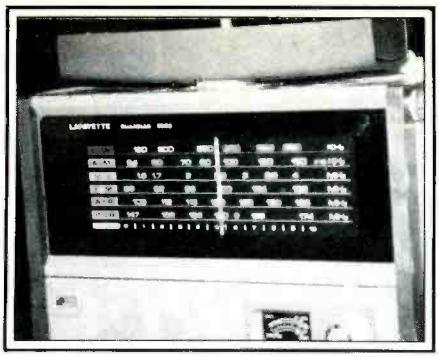
Modifications

Even after all is said and done, it is possible to modify a standard AM broadcast (covering 540 to 1600 kHz) transistor portable to receive the 200 to 400 kHz band. You might wish to pick up a cheapie radio and tinker with it to operate on these frequencies for local reception. It's an inexpensive and simple job, although once it's been done the receiver will no longer receive the standard broadcasting band.

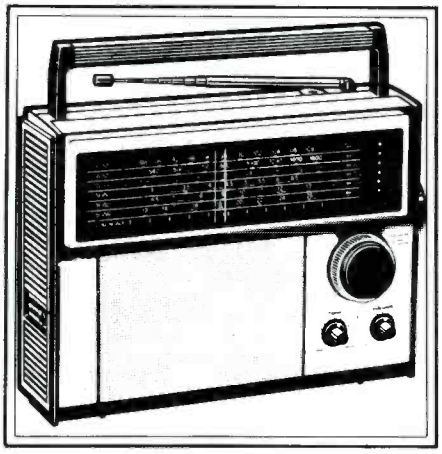
The main task is to add two capacitors across the tuner and repeak a few trimmers. Check our station listing and select the frequency of the station nearest to your location. The frequency of that station will determine the values of the capacitors you will use. Use mica type capacitors.

Now, look into the innards of the receiver and pick out the tuner. It is the component to which the front panel frequency selection knob is connected, and is usually a squarish affair with three terminals, two trimmers (small screwdriver adjustments), and a tuning shaft.

One of the terminals is the oscillator



Some portable receivers covering LF band are equipped with direction finding loops.



(OSC), one is the Ground (GND), one is the Radio Frequency (RF), and they may even be marked as such. If they are not marked, tune the receiver to a station near 1200 kHz and tap your finger on the terminals (try this only with a battery operated receiver, *never* with a receiver plugged into the household power lines). When you tap on a terminal which detunes the frequency, you know that you've discovered the OSC terminal. When the volume changes, you've hit upon the RF terminal. The GND terminal is unaffected when touched.

Now that you've figured this out, solder the OSC capacitor between the OSC terminal and the GND terminal. Next, the RF capacitor is soldered between the RF terminal and the GND terminal.

You should now be able to hear some of the beacon stations coming through at the low frequency end of the receiver tuning, possibly between 550 and 650 kHz on the dial. With a little plastic screwdriver made for such purposes, peak up the two trimmers on the tuning unit for maximum signal strength. Then locate the IF transformers (they look like a pair of aluminum dice with screwdriver slots), and also gently peak those for the best signal. That's all there is to it. You are tuned up for weather information any time you want it, and it is a great backup to weather data available on VHF.

Capacitor Chart

Freq. (kHz)	OSC pf	RF pf
390 to 400	30	150
370 to 390	39	200
360 to 370	39	220
330 to 350	47	270
310 to 330	51	300
290 to 310	56	360
270 to 290	62	430
250 to 270	68	510
230 to 250	82	620
210 to 230	82	820
200 to 210	100	1000
175 to 200	130*	1300*

Use this chart to determine the value of the two mica capacitors necessary to modify a transistor portable AM broadcast receiver to pull-in low frequency weather stations.

**These are not standard capacitor values but can be achieved by obtaining two capacitors having total values equal to those specified, then installing them in parallel.*

Low Frequency Weather Broadcasts

ID	Location	kHz	ID	Location	kHz
AA	FARGO ND*	365	BI	BISMARCK ND	230
ACE	HOMER AK*	277	BN	NASHVILLE TN	304
AES	NORTHWAY AK*	400	BO	BOISE ID	359
AK	KING SALMON AK*	400	BR	ATLANTA GA	266
AM	AMARILLO TX	251	BTV	BURLINGTON VT	323
AM	TAMPA FL	388	BY	BEECHY SASK*	266
AMD	BOZEMAN MT	329	BZP	GALENA AK*	371
ANI	ANIAK AK*	359	CB	CARTHAGE BAY NWT*	245
AOP	ROCK SPRINGS WY	290	CCZ	PITTSBURGH PA	254
AP	DENVER CO*	260	CD	COLD BAY AK*	341
AQD	HARTFORD CT*	329	CG	CASTLEGAR BC*	227
AWS	COLUMBUS GA*	335	CH	CHARLESTON SC	329
BBC	DAVENPORT IA	224	CI	SAULTE STE MARIE MI	400
BBN	BABYLON NY*	275	CL	CLEVELAND OH	344
BF	SEATTLE WA*	362	CM	COLUMBUS OH	391
BH	BIRMINGHAM AL	224	CMQ	ANCHORAGE AK	338

ID	Location	kHz
COV	CORDOVA AK*	375
CP	CASPER WY	375
CUN	FAIRBANKS AK*	257
CUT	HANCOCK MI	359
CYT	YAKATAGA AK*	209
DA	DAWSON YT	214
DB	BURWASH YT*	341
DC	PRINCETON BC*	326
DC	WASHINGTON DC*	332
DDP	SAN JUAN PR*	391
DF	DEER LAKE NFLD*	350
DJN	DELTA JCT AK*	347
DL	DULUTH MN	379
DN	DAUPHIN MAN*	224
DO	KANSAS CITY MO	359
DST	MISSOULA MT	308
DT	DETROIT MI	388
DTA	DELTA UT	212
DW	TULSA OK	375
EAV	EVANSVILLE AK*	391
EBY	NEAH BAY WA	391
EL	EL PASO TX	242
ELM	ELMIRA NY	375
ENZ	NOGALES AZ*	394
EO	LAKE EON QUE*	227
ESS	MIDDLETON I AK*	260
EV	INUVIK NWT*	254
EZB	OAKLAND CA*	362
FA	FLORA LK NFLD	218
FC	FREDERICTON NB*	326
FCH	FRESNO CA	344
FDV	NOME AK	239
FIS	KEY WEST FL*	332
FO	FLIN FLON MAN*	250
FR	FT RESOLUTION NWT*	274
FRT	SPARTANBURG SC	248
FRU	GR JUNCTION CO	396
FS	SIOUX FALLS SD	245
FS	FT SIMPSON NWT*	375
FT	FT WORTH TX	365
FTO	FT YUKON AK*	242
FWD	DENVER CO	379
FWL	FAREWELL AK*	206
GKQ	NEWARK NJ	379
GLA	GULKANA AK*	248
GLS	GALVESTON TX	206
GM	MILWAUKEE WI	242
GNI	GRAND ISLE LA	236
GT	GREAT FALLS MT	371
GW	PT DE LA BALEINE PQ*	371
GX	GILLAM MAN*	212
HAD	HARFORD NY	269
HBK	HINCHINBROOK AK*	362
HHM	KOTZEBUE AK*	356
HMB	GARDEN CITY KS	257
HNS	HAINES AK*	245
HQL	SYLVA NC	212
HTN	MILTS CITY MT	320
HY	HAY RIVER NWT*	311
HZ	HALIFAX NS*	248
IB	ATIKOKAN ONT*	209
IC	WICHITA KS	332
ICK	MATLAKATLA AK*	266
IGD	LOS ANGELES CA	332
ILI	ILIAMNA AK*	239
ILJ	SPRINGFIELD MO	254
ILT	ALBUQUERQUE NM	230
IN	INDIANAPOLIS IN	266
IN	INT'L FALLS MN*	353
IWW	KENAI AK	379
JA	JACKSONVILLE FL	344
JH	JACKSON MS	260
JNR	UNALAKLEET AK	382
JT	STEPHENVILLE NFLD*	390
L	TORONTO ONT	368
LB	N PLATTE NE	416
LE	RALEIGH NC	350
LG	LONG BEACH CA*	233
LI	LITTLE ROCK AR*	353
LKO	BILLINGS MT	400
LM	ST LOUIS MO	338
LN	ST LOUIS MO	338
LNT	MILLINOCKET ME*	344
LQ	BOSTON MA	382
LSZ	SYRACUSE NY*	350
LUK	CINCINNATI OH	335
LW	LEWISTON ID*	374
MA	MIDLAND TX	326
MA	MAYO YT*	365
ME	CHICAGO IL	350
MF	MIAMI FL	365
MFR	MEDFORD OR	263
MND	MENDENHALL AK	332
MO	MOBILE AL	248
MOG	MONTAGUE CA	382
MS	MINNEAPOLIS MN	266
MZS	SPOKANE WA	365
NI	NITCHEQUON QUE*	364
NMT	BROWERVILLE AK*	281
OCC	YUKATAT AK*	385
OGD	OGDEN UT	263
OJ	FOOTNER LK ALTA*	239
OM	OMAHA NE	320
ORB	ORR MN	341
ORT	REDMONT OR	368
OSE	BETHEL AK*	251
OW	OTTAWA ONT*	236
OW	OWENSBORO KY	341
PA	PR ALBERT SASK*	347
PBT	RED BLUFF CA	338
PDS	POLAND SPRINGS ME	240
PE	PEACE RIVER ALTA*	287
PEE	PETERS CREEK AK*	305
PKZ	PENSACOLA FL	326

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HX1000 HX2000 HX750 HX650

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CIRCLE 129 ON READER SERVICE CARD

ID	Location	kHz
PNC	PONCA CITY OK	368
PQO	PHOENIX AZ	326
PR	PRINCE RUPERT BC*	218
PSG	PETERSBURG AK	236
QB	QUEBEC QUE*	230
QG	WINDSOR ONT*	353
QI	YARMOUTH NS*	206
QK	KENORA ONT*	325
QN	MONCTON NB*	224
QQ	COMOX BC*	400
QR	REGINA SASK*	290
QT	THUNDER BAY ONT*	332
QU	GR PRAIRIE ALTA*	221
QV	YORKTON SASK*	385
QW	N BATTLEFORD SASK*	302
QX	GANDER NFLD*	280
QY	SYDNEY NS*	263
QZ	GUESNEL BC*	359
RAP	RAPID CITY SD	254
RD	REDMOND OR*	411
RF	ROCKFORD IL	275
RG	OKLAHOMA CITY OK	350
RJ	ROBERVAL QUE	378
RNB	MILLVILLE NJ*	363
RO	ROSWELL NM*	305
ROA	ROANOKE VA	371
RPY	BLYTHE CA	251
RR	RESOLUTE NWT*	350
RRY	HIBBING MN	356
RWO	KODIAK AK*	394
RYN	TUCSON AZ	338
SC	SHERBROOKE QUE*	362
SD	LOUISVILLE KY*	229
SGK	KNOXVILLE TN	281
SH	SHREVEPORT LA	230
SIR	RAWLINS WY*	368
SIT	SITKA AK*	344
SJ	ST JOHN NB*	212
SKI	SAC CITY IA*	356
SKW	SKWENTNA AK*	269
SM	FT SMITH NWT*	254
SPK	RENO NV	254
SVY	PORTLAND OR	332
SWU	IDAHO FALLS ID	350
TAD	TRINIDAD CO	329
TH	THOMPSON MAN*	244
TL	TALLAHASSEE FL	379
TS	MEMPHIS TN	371
TUK	NANTUCKET MA	194
TV	TRAVERSE CITY MI	365
UMM	SUMMIT AK	326
UQC	TRENTON ONT*	335
VG	VERMILLION ALTA*	230
VP	FT CHINO QUE*	390
VQ	NORMAN WELLS NWT*	326
VR	VANCOUVER BC	266
VTR	TAKOTNA RIVER AK*	350
WY	WRIGLEY NWT	222
XC	CRANBROOK BC	242
XD	EDMONTON ALTA*	266
XE	SASKATOON SASK	257
XJ	FT ST JOHN BC	326
XL	SIOUX LOOKOUT ONT*	242
XS	PR GEORGE BC*	272
XT	TERRACE BC*	332
XU	LONDON ONT	282
XX	ABBOTSFORD BC	344
XY	WHITEHORSE YT	302
YAZ	TOFINO BC*	359
YBE	URANIUM CITY SASK*	379
YC	CALGARY ALTA*	344
YCD	BANAIMO BC*	251
YCO	COPPERMINE NWT	372
YCS	CHESTERFIELD INLET NWT*	341
YEA	EMPRESS ALTA*	382
YFY	FROBISHER BAY NWT*	206
YG	CHARLOTTETOWN PEI*	347
YHD	DRYDEN ONT*	413
YKA	KAMLOOPS BC	223
YKL	SCHEFFERVILLE QUE*	203
YL	LYNN LAKE MAN*	395
YLB	LAC LA BICHE ALTA*	272
YMM	FT MC MURRAY ALTA*	388
YN	SWIFT CURRENT SASK*	314
YQ	CHURCHILL MAN*	305
YQA	MUSKOKA ONT*	272
YQD	THE PAS MAN*	284
YQH	WATSON LAKE YT*	248
YQL	LETHBRIDGE ALTA*	248
YRL	RED LAKE ONT*	218
YSB	SUDBURY ONT*	218
YSL	ST LEONARD NB*	404
YSY	SACHS HARBOUR NWT*	321
YTS	TIMMINS ONT*	212
YVC	LA RONGE SASK*	317
YVV	WIARTON ONT*	326
YWG	WINNIPEG MAN*	248
YXH	MEDICINE HAT ALTA*	332
YXR	EARLTON ONT*	257
YY	RIMOUSKI QUE*	340
YYB	NO BAY ONT*	394
YYD	SMITHERS BC*	230
YYE	FT NELSON BC*	382
YYF	PENTICTON BC*	290
YYU	KAPUSKASING ONT*	341
YZE	GORE BAY ONT*	341
YZU	WHITECOURT ALTA*	338
ZF	YELLOWKNIFE NWT*	356
ZL	LAIRD RIVER BC*	368
ZP	SANDSPIT BC*	368
ZS	CORAL HARBOUR NWT*	362
ZT	PT HARDY BC*	242
ZV	SEPTOILES QUE*	273
ZW	TESLIN YT*	269

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EEB EXCLUSIVES

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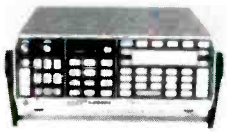
Add $6.75 UPS



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R1000 **Sale $499.95**
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- Digital readout • $400 range **Sale $399.95**

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TAKE IT WITH YOU PORTABLE SWL

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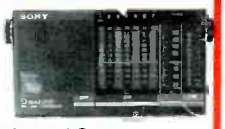

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SONY ICF 6500 W & ICF 6800 sold out & discontinued—sorry

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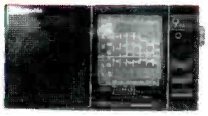

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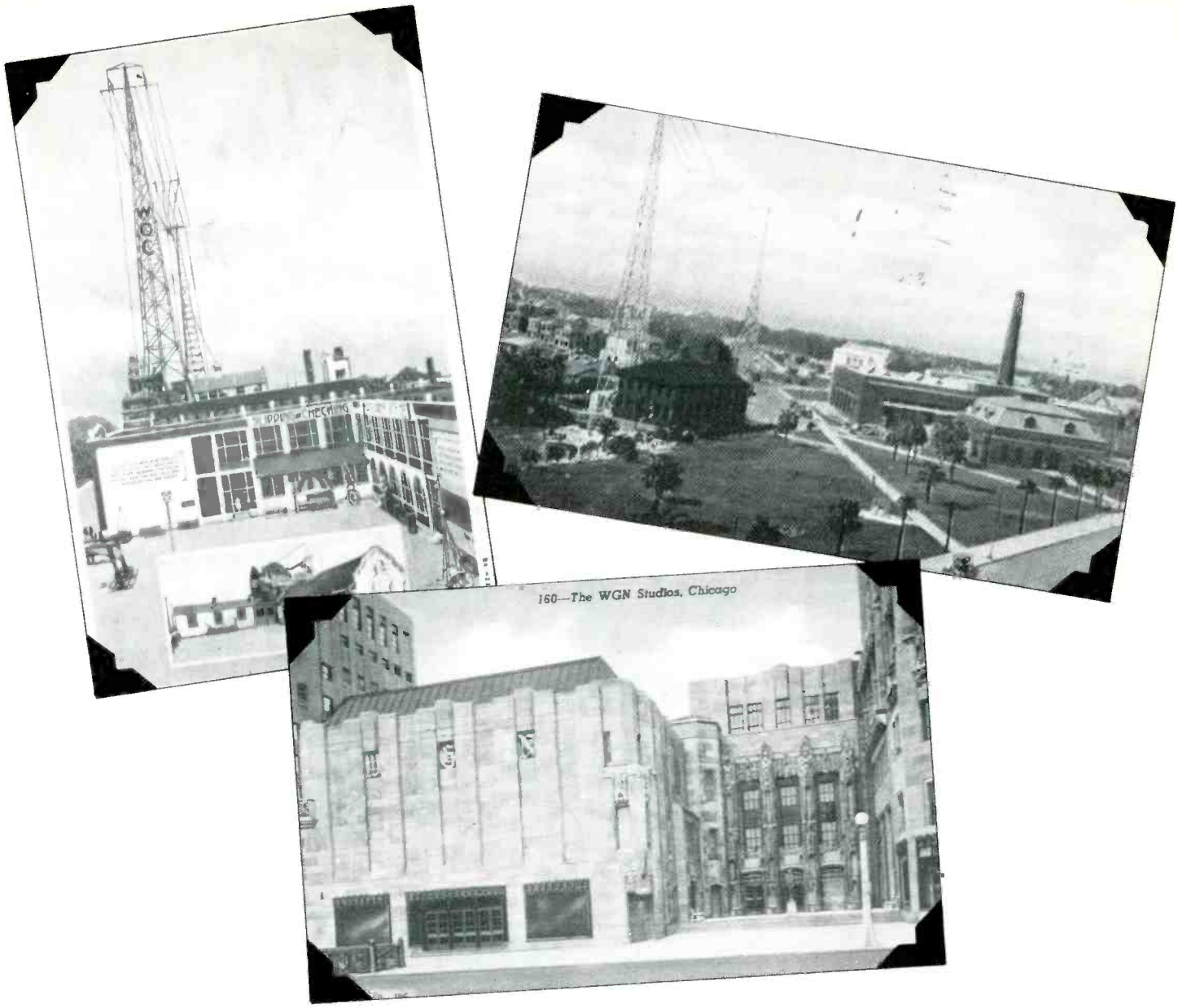


Look Back In Awe

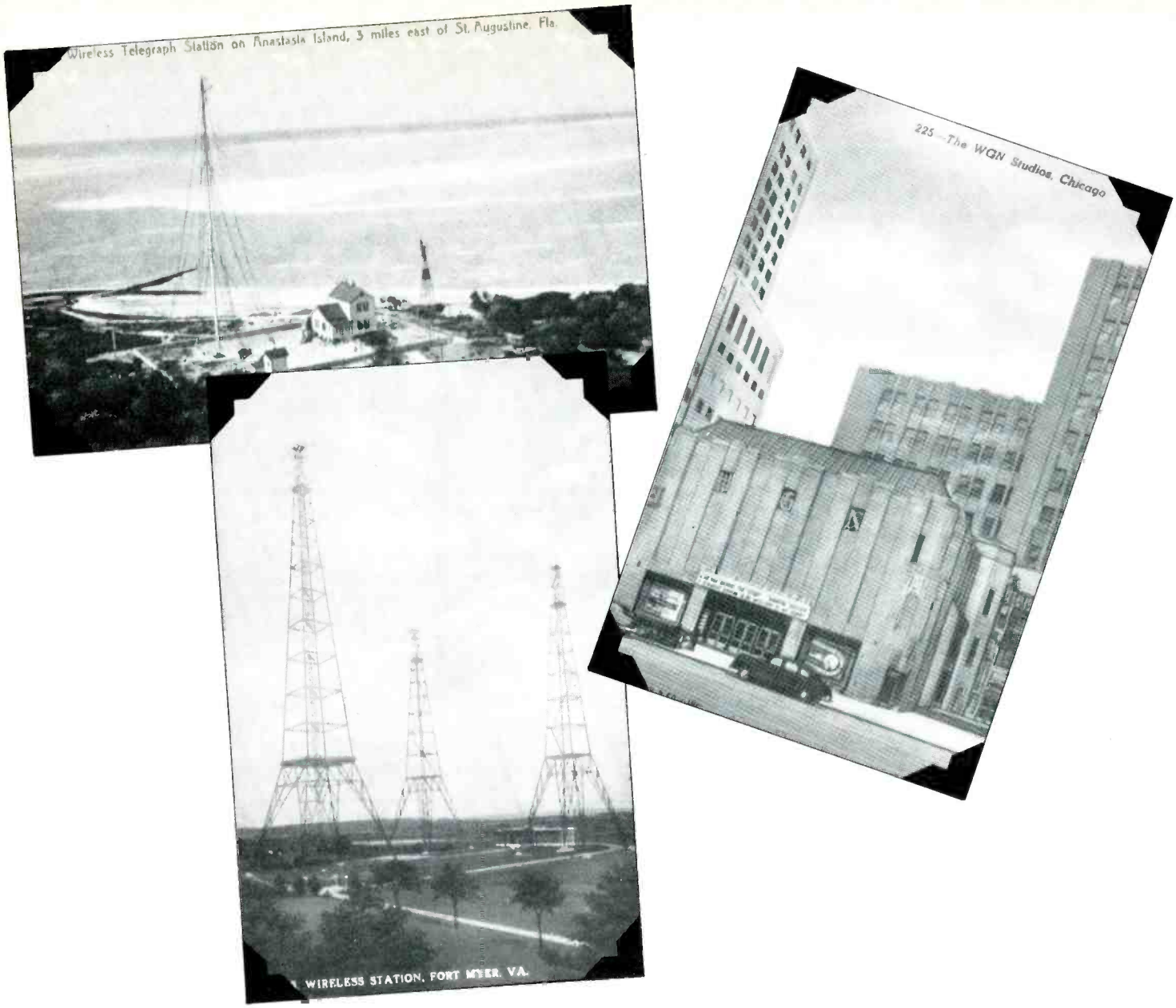
Another Glimpse Into The Golden Age Of Radio—Via Picture Postcards

BY ALICE BRANNIGAN

Response to the two previous excursions into ancient broadcasting and utility stations was excellent, so I've dug into my file for additional delights. These photos of old-time radio stations are by means of picture postcards, which is one of the best ways to get a look at the historic transmitting facilities that form the roots of our modern communications and broadcast industries.

One card I've always liked especially well shows broadcasting station WOC in Davenport, Iowa. WOC first went on the air in 1922 with 500 watts on 620 kHz. It was operated at that time by the Palmer School of Chiropractic. License records for 1930 indicate that the station was running 5 kW on 1000 kHz and was owned by the Central Broadcasting Company at 1002 Brady Street. As time went on, there were still further changes. By 1946 the station was on 1420 kHz with 5 kW and was owned by the Tri City Broadcasting Company of 1002 Brady Street, with the transmitter located on RFD #1. Current records show the station still on 1420 kHz with 5 kW, but owned by Palmer Communications Inc. of 805 Brady Street.

The postcard view is undated and shows the two large transmitting towers atop an L-shaped building. A smaller inset at the



bottom of the card shows another view of the station. In the larger scene, the words "Slipping and Checking" and "What's Wrong With Me" are written in large letters along the upper part of the structure. A longer message appears on the wall to the left of the card. It's very difficult to read, but under high magnification it seems to say, "Familiar as the voice of the land is to each, the highest here we ascribe to Moses, Plato and Milton is that they set at naught books and tradition and spoke not what they knew, but what they thought." The antenna arrangement shown gives the impression that we are looking at WOC as it appeared in the late 1920's or early 1930's, but that's just a guess.

Another early broadcaster is WJAX of Jacksonville, Florida. This station went on the air in 1925 and was assigned the callsign which had been previously used by an earlier station in Cleveland, Ohio (Union Trust Co., 500 watts, 770 kHz). Jacksonville's WJAX, licensed to the City of Jacksonville, came on the air on 900 kHz with 1 kW. Records of 1946 show that the station was at 1 Broadcast Plaza, with transmitter at Hyde Park Country Club, but it had changed frequency to 930 kHz with a power of 5 kW days, 1 kW nights. Present records list the station on 930 kHz, 5 kW, at 225 Coastline Drive West, and still operated by the City of Jacksonville.

Our view of the station shows it as it appeared in 1930 and described as being located at "Water Works Park." Indeed, the station is shown at the left of the photo and nearby there does seem to be a facility which looks to be a municipal water works. WJAX is shown with two large broadcast towers having antenna wires strung between them. Trolley car tracks are faintly visible in the street to the far right.

Utility enthusiasts will like the view described on an old (undated) postcard as "Wireless Telegraph Station on Anastasia Island, 3 miles east of St. Augustine, Fla." My research has determined this is a U.S. Navy radio station which, in 1919 records, had the callsign NAP. In early records the station was listed as operating on 142, 315, and 500 kHz, although records of 1930 indicate that it was operational on 128 and 500 kHz. The antenna shown in this photo view is a heavily-guyed vertical adjacent to the operating building. At one corner of the fenced-in compound, by a calm-looking sea, is a windmill and tower which was probably used for generating the electric power to operate the facility.

Next we have two views of the WGN studios in Chicago, obviously taken at different time periods. WGN came on the air in 1924, operating on 720 kHz with 25 kW and owned by The Tribune Co. The station, at that time, had its studios at 435 North Michigan Ave., with the transmitter in Elgin, Illinois. Records of 1946 list the station at 441 North Michigan Ave., with transmitter in Roselle, Illinois—still on 720 kHz but running a full 50 kW. The licensee was shown as WGN, Inc. Current records list this well-known station as operated by The WGN

Continental Broadcasting Co., 2501 West Bradley Place, but still on 720 kHz with 50 kW. WGN, of course, has a signal which is familiar to all who have ever attempted to DX on the AM broadcast band.

The horizontally oriented postcard shows a rather ornate structure with the letters "WGN" imbedded in the facade of the building. The studio entrance is below these letters and it appears that two large picture windows flank the triple set of brass doors. This card is undated.

In the other (vertically oriented) photo there have been some changes made to the WGN studios. The two picture windows are now revealed to be display cases for posters. Above the studio doors there appears a marquee topped off with the message, "WGN Mutual Broadcasting System WGNB." The marquee itself reads "6:45 PM Behind The Story - Marvin Miller, 7 Straight Arrow, 9:30 Mystery Is My Hobby." The call WGNB belonged to WGN's FM outlet (I presume).

This second photo must have been taken sometime between 1949 and 1951 since those were the years when *Straight Arrow* ran on the Mutual Network. *Straight Arrow* was a kiddie adventure western about a "paleface" who lived with the Comanches. The hero, Steve Adams (along with his ever-present sidekick, Packy) was prone to avenging all manner of evil deeds, according to information on this program. I was unable to locate any information on the other two programs in order to verify the dating, or narrow it down more closely. Those programs were possibly for local broadcast only and not on the network.

Also note that in the second photo, a large building has been constructed to the rear of the WGN studios, and seems to have replaced (or was built atop) a smaller building seen in the earlier view.

As a postscript to the photos we presented in December of Naval Radio NAA in Virginia, reader Paul Lecocq of Quebec wrote to say that he had come across an old card showing yet another view of the three large towers supporting the antenna array. This station cost $250,000 to build; today the one 600 foot tower alone would cost more than that. The transmitter was rated at 100 kW. Paul's card shows NAA in a close-up view, including the two-story brick transmitter building near the base of the tower at the far right. The card is undated and would seem to show the station at some period around the time of WWI. Thanks, Paul, for sharing this with *POP'COMM* readers! PC

PRODUCTS

REVIEW OF NEW AND INTERESTING PRODUCTS

New VHF Has Superior Noise Suppression And "Guest-Host" Color LCD

Raytheon Marine Company has introduced a new scanning VHF-FM marine radiotelephone with superior cross-channel interference rejection, providing clear signal reception, even in noisy, heavy traffic areas. Designed with advanced receiver circuitry that locks onto selected channels and suppresses disruptive signals, the new RAY-78 VHF-FM Marine Radiotelephone virtually ends annoying intermodulation cross-talk. In harbors close to big cities, the RAY-78 even provides valuable protection from the interference caused by large, powerful transmitters used on shore for private radio paging systems.

In addition to its superior noise suppression, Raytheon's RAY-78 is designed with new digital display technology, called "guest-host," which produces a color Liquid Crystal Display (LCD) with improved contrast for outstanding readability in all conditions—from bright sunlight to total darkness. Previously, digital displays were either conventional black/gray LCD, with optimum viewing in daylight, or LED (Light Emitting Diode) displays, with optimum viewing at night.

In guest-host technology, a dye (the guest) is dissolved in a liquid crystal (the host). When activated, this mixture allows colored light to be reflected out in digital form. These color LCDs have no need for the polarizing filters which absorb light and reduce viewing angle in standard LCDs. As a result, the RAY-78 color LCD has twice the contrast and 50 percent more viewing angle than other LCDs. In the RAY-78, channel numbers appear in bright-yellow guest-host LCD Digits on a black background, and function indicators appear in green and red.

The RAY-78 provides full-scan and select-scan for all U.S. and International (ITU) channels. It has 55 transmit and 91 receive channels, including eight U.S. and Canadian weather channels, and four special Canadian channels. At the touch of a button, the operator can scan all channels or a group of channels, whichever is selected. Among several important new user features, the RAY-78 SeaWatch alternately monitors Channel 16 and any other channel selected. Quick select for Channel 16 is also provided. In the select-scan mode, the RAY-78 can monitor an operators-designated "priority" channel, alternately, with each channel entered into select-scan memory. Entry into select-scan is unusually fast—the operator simply pushes the "add" button after selecting the channel with a rotary channel selector, and the channel is entered into program memory.

The RAY-78 is exceptionally rugged. Surface-mount components eliminate wire leads, holes, and "stand-up" circuit boards to protect the system from vibration fatigue. A metal case provides extra RF shielding for better receiver performance. The RAY-78 measures 3.1 in. (80 mm) High, by 9.4 in. (240 mm) Wide, by 10 in. (255 mm) Deep. Weight is 5 lbs., 11 oz. (2.6 kg). Maximum power output for the RAY-78 is 25 watts, switchable to one watt.

The compact RAY-78 VHF-FM Marine Radiotelephone meets or exceeds all FCC and DOC requirements and has passed Raytheon's tough environmental tests for shock, vibration, temperature extremes, and resistance to corrosion, fungus, and moisture penetration. Raytheon offers a two-year limited-parts warranty with one-year free service from any of its U.S. dealers and worldwide service network.

For more information about Raytheon's RAY-78 VHF-FM Marine Radiotelephone, contact the nearest Raytheon dealer, or Raytheon Marine Company, 676 Island Pond Road, Manchester, NH 03103, or circle number 102 on the reader service card.

Heath Adds New Receiver To Product Lineup

Heath Company of Benton Harbor, Michigan has expanded their radio line to include a new General Coverage Receiver which offers portability and low power consumption. The SW-7800 Receiver covers 150 kHz through 30 MHz continuously in 30 overlapping 1 MHz bands. Broadband front-end circuits eliminate the need to tune circuits within a band and wide-band front-end stages eliminate the need for the customary RF amplifier. The result is that the Receiver can handle incoming signals within a wide dynamic range. An up-converting, double-conversion mixing design provides excellent image rejection.

The SW-7800 features a 5-digit LED display with 1 kHz accuracy; LSB, USB, CW, and AM (wide and narrow) modes of operation; AGC time-constant switch; synthesized high-frequency oscillator; and a muting provision to permit operation with a transmitter. Other features include a switch to protect against overload from very strong local stations; front panel jack for taping receptions (unaffected by volume setting); and a telescoping whip antenna for local reception and portable operation. Only a VTVM is required for Receiver alignment.

This is just one of over 400 products featured in the latest Heathkit Catalog. To receive this colorful catalog free of charge, write Heath Company, Dept. 150-435, Benton Harbor, MI 49022. In Canada, write Heath Company, 1020 Islington Avenue, Dept. 3100, Toronto, Ontario, M8Z 5Z3. Catalogs are also available at over 70 Heathkit Electronic Centers in the U.S. and Canada. For more information, circle number 103 on the reader service card.

Electronic Voice Changer

The new model ECV voice changer is a portable device that interfaces with standard domestic and foreign telephones. It uses proprietary LSI circuitry to render the user's voice totally unrecognizable. A variable voice control changes the voice characteristics over a wide range.

Unlike older, more expensive voice changers, there is no annoying background whistle and the changed voice remains highly intelligible.

The device is powered by a standard 9 volt battery and is supplied with a special patchcord to connect it to a tape recorder for making recordings.

For further information, contact Viking International, P.O. Box 632, Newhall, CA 91322, or circle number 101 on the reader service card.

Those Mysterious High Frequency Single-Letter Beacons (SLBs)

Part 2: The "Cluster Beacons"— A Soviet Riddle!

BY WILLIAM ORR, W6SAI

My previous article (December, 1984) discussed the curious high frequency K- and U-radio beacons that have been logged by alert listeners over a period of many months. These signals, although weak, are easily identified by the letter "K" or "U" sent in frequency-shift Morse telegraphy, using a 1000 Hz shift. Two families of beacons, spread between 2 and 30 MHz, transmit these unusual signals. Extensive listening by a number of investigators has placed the location of the K-beacon as near Petropavlovsk on the Kamchatka Peninsula, on the Pacific Coast of the USSR. The U-beacon is thought to be in the general area of Murmansk-Amderma on the North Coast of the Arctic Sea. It is surmised that these beacons are used for marine service by the Soviet fleets, but the ultimate purpose of the signals is open to question. Further monitoring of the subtle frequency shifts and data bursts of these beacons is required.

The "Cluster Beacons"

A third family of unusual high frequency radio beacons exists: the cluster beacons. These interesting signals have been on the air for over a decade. They are not the frequency-shift mode as are the K- and U-beacons, but are keyed on-off (CW) at various rates and with various letter identifiers. They cluster together in narrow frequency spans about 4 kHz wide, spaced across the HF spectrum (Table 1). A large number of beacons exist in a cluster, although only a few of them are normally heard at one time in the Continental U.S., unless shortwave propagation conditions are extremely good.

All indicators point to the fact that the cluster beacons are Soviet in origin, but their purpose and the message they transmit remain a mystery.

In general, the cluster beacons are weaker in signal strength in the U.S. than either the K- or the U-families of beacons, suggesting that they are a greater distance away, lower in power, or that some of the beacon stations are located inland in the USSR instead of along the coast and the propagation path is more "lossy" than a direct overwater path.

Table 1

The Cluster Beacon Frequency Spans

3564 kHz to 3568 kHz
5305 kHz to 5309 kHz
6801 kHz to 6805 kHz
8645 kHz to 8649 kHz
10643 kHz to 10647 kHz
13635 kHz to 13639 kHz
17015 kHz to 17019 kHz
20991 kHz to 20995 kHz

A few of the cluster beacons are quite strong in Hawaii and others are loud in Europe. An observer on the Continent stated that "some of the beacons are a confounded nuisance, as they have strong spuriae inside the amateur bands." This suggests that the beacons causing the interference are within 1500 miles of the observer, possibly in the Crime area.

Some, but not all, of the cluster beacons transmit intermittent bursts of digital data over long periods of time. Others are merely keyed with an identifying Morse code letter. The letter changes from time to time on a single beacon frequency, indicating that either the beacon code changes, or the beacon has left the air and another one has taken its place.

The Beacon Cluster

The beacon cluster seems a jumble of random signals, but this is not the case. A receiver with a frequency readout to at least 100 Hz and with good selectivity is required to make sense of the order of the cluster. To start my observations, I examined each cluster, one at a time, and logged the signals in each cluster on a small frequency chart. A typical chart for the 13635 kHz to 13639 kHz is shown in Figure 1. As far as I can tell, all cluster beacons fall within a 4 kHz frequency span. The beacon frequencies are estimated to the nearest 100 Hz, and if two or more beacon signals show up on the same frequency (at different times), all are logged.

This monitoring process was repeated for the other beacon clusters and, when all was completed, the cluster plots were examined. It seemed a good idea to compare one against another, so the plots were aligned, vertically as illustrated in Figure 2. Once this was accomplished, a very interesting characteristic of the cluster beacons appeared. *Most signals in the cluster repeated themselves from cluster to cluster!*

To simplify matters, I broke the typical cluster into eight "channels," 500 Hz apart. The low frequency edge of the cluster is designated as "Channel 0" and the high frequency edge is "Channel 8." This was an arbitrary decision, but it helped to keep track of the signals, regardless of which cluster they were in. Finally, the space between each channel can be further subdivided into 100 Hz "markers," if desired. This provides a convenient grid to plot a representative cluster configuration.

Inside The Cluster

Armed with an extensive log book compiled in California and Hawaii (plus some inputs from an East Coast observer), I plotted a representative cluster, as shown in Figure 3. The plot reads from left to right, frequency-wise, with the lowest cluster frequency designated as Channel 0. Tuning into the cluster, the first beacon signal (heard only in Hawaii) is a V-beacon. About 500 Hz higher in frequency (Channel 1) are found several beacons, or one beacon with several identifiers. On the lower frequency clusters, the identifier is "F," but on the higher frequencies it may be "F," or "F plus a data burst," or "S plus a data burst." A "G" beacon was also noted on or near this channel.

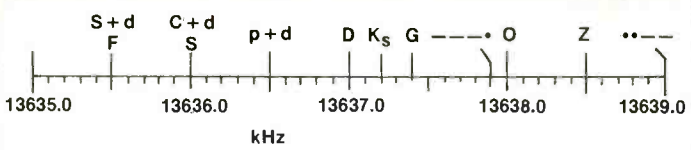


Figure 1: *A representation of the 13.6 MHz beacon "cluster." The span of the cluster is 4 kHz. The frequency axis is marked off in kiloHertz, with 0.5 kHz markers and 0.1 kHz submarkers. At 13,635.5 kHz, for example, is an S-beacon with digital data (the "d" indicates digital transmission). Also on this frequency at another time is an F-beacon. This beacon has no digital data. At 13,636.0 kHz is another beacon pair, the C-beacon having digital data. Farther into the cluster, at 13,637.2 kHz, is a K-beacon having a slow repetition rate of once every 8 seconds (the "s" indicates slow). At 13,637.9 kHz is a beacon sending a Cyrillic code letter. And 500 Hz above the O-beacon at 13,638.0 kHz is a second beacon sending a Cyrillic letter. Sometimes unidentified data burst transmissions are heard outside the high frequency edge of the cluster.*

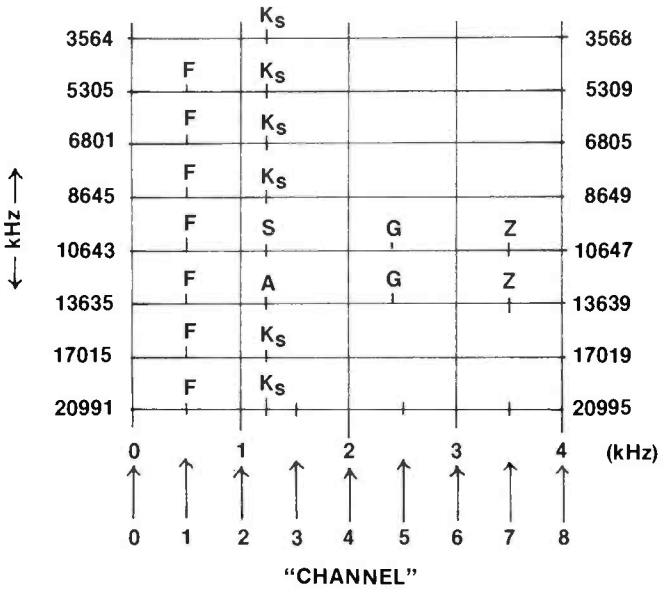


Figure 2: *Each cluster was plotted as shown in Figure 1. When this task was completed, a graph like this drawing was made, with the cluster plots aligned one above the other with respect to frequency. Every 500 Hz was arbitrarily called a "channel," providing 8 channels in a cluster. Once this was done, it was noticed that certain beacons occupied the same position in a cluster, regardless of which cluster was being observed! This discovery led to location of other beacons, for as soon as a new one was found in one cluster, it could then be quickly located in another cluster. (The F, Ks, G, and Z-beacons are shown for examples).*

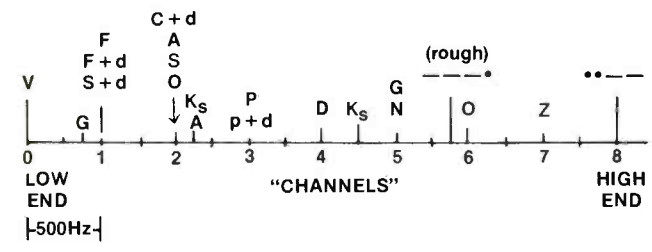


Figure 3: *This plot represents a typical beacon cluster, with the low frequency end of the cluster being at the left of the chart. Signals are plotted in kHz from the low frequency edge of the cluster. Each "channel" is 500 Hz wide. Thus the O-beacon is on Channel 6 (or 3 kHz higher in frequency than the V-beacon, which is on the low frequency edge of the cluster). Total cluster is 4 kHz wide.*

The next flurry of beacon activity is on Channel 2. No signals were heard on the two lower frequency clusters on this channel, but a combination of beacons has been logged on the higher-frequency clusters. Most notable are a "C plus data burst," and "A" and a "C" beacon. Occasionally on the 8.6 MHz cluster range is the marine utility station LPD4 (Argentina).

Two hundred Hz above Channel 2 is a K-beacon that repeats the identifier every eight seconds. It is easily missed if the cluster is tuned rapidly. On occasion, an A-beacon has been noted on this channel in the 10.6 MHz cluster.

The only beacon noted on Channel 3 is a P-beacon with data burst on the 13.6 MHz cluster. This frequency is occupied by coastal marine station KPH (San Francisco), making monitoring difficult in the United States.

Channel 4 is occupied with a D-beacon most of the time, although a slow K-beacon has been noted here in the 6.8 MHz cluster. The D-beacon in the 20.9 MHz cluster provides much interference to European amateurs working in the adjacent 21 MHz band.

A few hundred Hz above Channel 4 is a second K-beacon. It is not known if this is a spurious signal of the K-beacon about 1 kHz lower in frequency, or a legitimate signal. These two beacons have never been noted on the air at the same time, so the inference that they are separate signals is strong.

The only activity noted near Channel 5 is a G-beacon slightly lower in frequency and an N-beacon slightly higher. On the west coast, Japanese coastal station JDC is heard on this channel.

On or near Channel 6 is an interesting beacon that sends either the letter "O" or a Cyrillic character: — — — •. This beacon tone sounds very rough as though there may be an equipment malfunction. The O-beacon, on the other hand, is quite clear in tone.

Channel 7 is occupied by a Z-beacon and, finally, Channel 8 is the home of a beacon sending the Cyrillic letter • • — —.

European listeners have reported other single-letter beacons in the cluster spans, but the frequencies were not logged accurately enough to place them on the channel plot. One of the reported beacons sends the identifier "N," as noted above.

Careful listening to the clusters in many areas of the world should reveal many other beacons. It will take time and effort to complete the cluster span, but it *can* be done.

Where Are The Cluster Beacons Located?

Cluster beacons vary widely in signal strength in the Continental U.S. and the length of audibility time varies from beacon to beacon. There seems to be definite fade-in, fade-out times for the cluster. Each beacon has a propagation identity of its own, strongly suggesting that the cluster is made up of individual beacon sources at widely separated transmitting locations. They are not transmitting from a single spot and, unlike the K- and U-beacon families, some of the cluster beacons seem to be located inland in the USSR, in addition to being at coastal locations.

Direction finding techniques for the shortwave listener are not understood, nor are they reliable on long distance, multi-hop signals. Trying to locate the site of a specific beacon is a difficult task. Various indications indicate that many cluster beacons are spread around the northern regions of the USSR in an east-west pattern. This area is partially in the auroral zone around the North Polar regions and signals passing from the USSR to the USA through this zone are badly distorted. A pure carrier can pick up a "buzz-saw" tone due to the irregularities of the ionosphere and the unsettling effect of the Aurora Borealis. Large fluctuations in azimuthal angle of arrival have been noticed on signals passing through this zone. As a result, a lot of guesswork and intuition has to go into the answer as to the location of the cluster beacons.

Preliminary observations indicate the F-beacons are in the Vladivostok area, and the slow sending K-beacon is in the Petropavlovsk area of Siberia. The S-beacon signal arrives on the West Coast of the U.S. directly over the North Pole, placing it in the area of Murmansk. The C- and D- beacons seem to come from the Black Sea area of the USSR. Other beacons give indication of being scattered in the northern portion of the USSR, perhaps at important military bases.

Solving The Cluster Beacon Mystery

In order to learn more about these interesting beacon signals, more listeners are required, particularly in Europe and the Middle East. Beacon identifiers, along with time-on/time-off information, are required. Signal strength reports are very helpful, as well as a frequency check on each beacon heard. Observation outside the limits of the beacon bands is also suggested, for at least on one occasion a beacon was heard outside the band limitations arbitrarily set by the author.

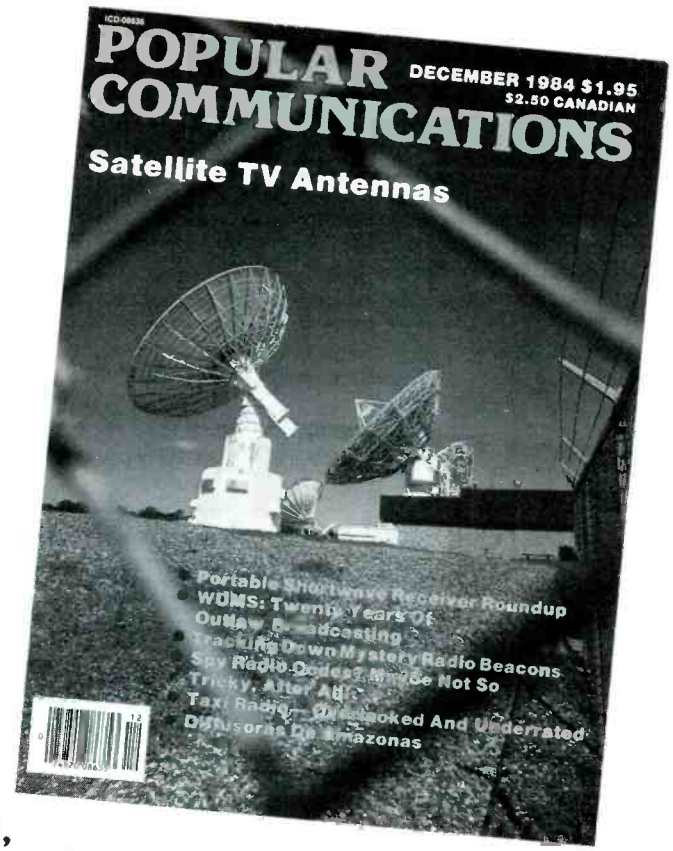
Cluster beacon reports may be sent to the author, in care of *Popular Communications*. With a little help, perhaps we can solve this "riddle within a mystery, wrapped inside an enigma," as Winston Churchill once said with respect to another Russian problem.

Summary

High Frequency Single-letter beacons are not random transmissions scattered haphazardly across the spectrum. They inhabit specific bands and transmit in a highly-structured manner. There are three families of beacons: the K-beacons, the U-beacons, and the "cluster" beacons. The K- and U-beacons are frequency-shift keyed, the cluster beacons are on-off (CW) keyed. The cluster beacons repeat themselves, cluster to cluster, as discussed in this article. PC

. . . . from the publishers of CQ

You be the judge...



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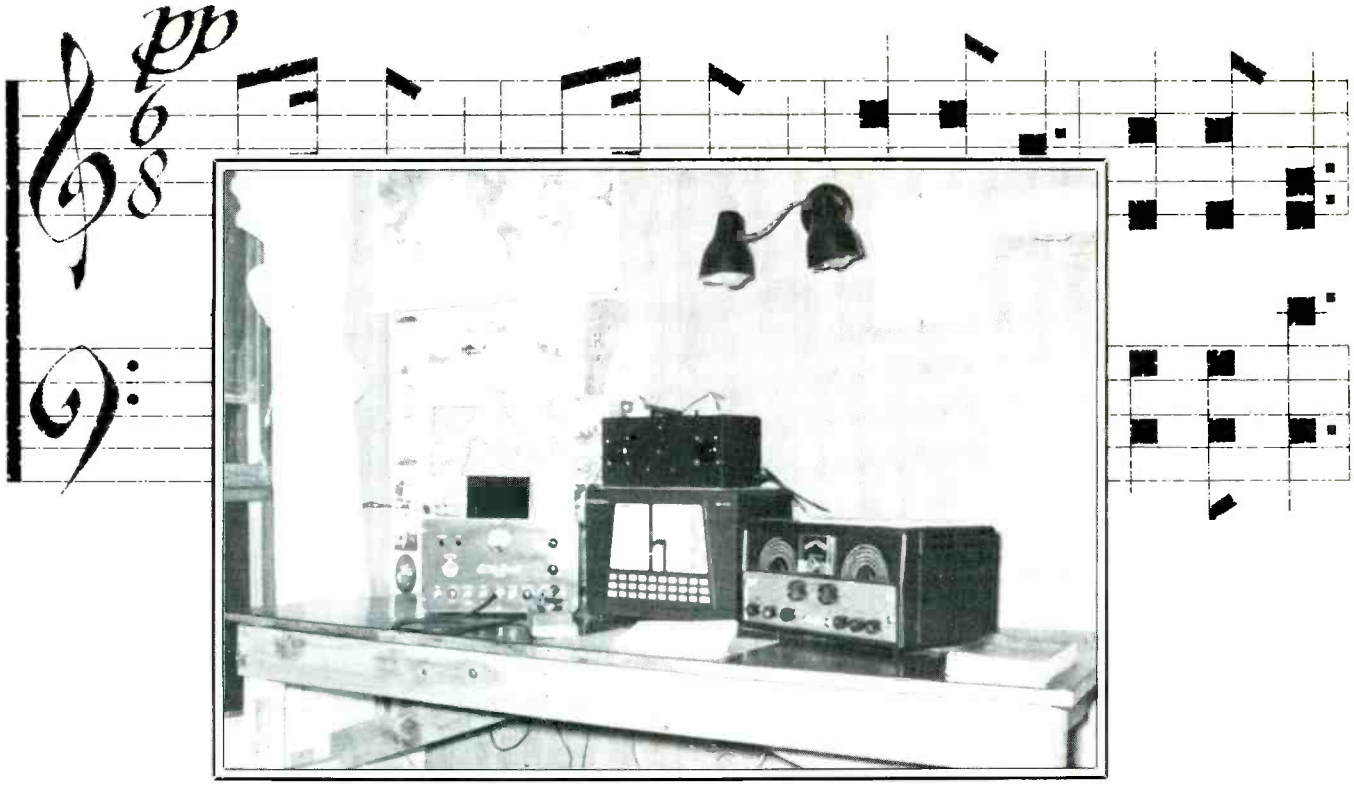

WBBH was nothing fancy, just some radio gear in the corner of someone's room. To hear this station describe itself on the air, one would have thought it to be a professional installation.

WBBH: The Classical Music Pirate

How It Broadcast For Months Without The FCC Even Knowing It Was There!

BY TOM KNEITEL, K2AES, EDITOR

"This is a test transmission of WBBH. WBBH transmits on a frequency of 4860 kHz in the 60 meter band and is owned and operated by the Courtland School of Music in Rutgers NJ," crackled the receiver of Arthur Pym of Washington, DC at 8:15 p.m. one evening during the Summer of 1984. Either he was witnessing the operation of a new pirate with a good sense of humor (and a great memory), or else he was tuned in on one of the most amazing cases of "radio echo" ever recorded. If it wasn't a pirate with a good memory then it meant that the original WBBH signals had bounced off some celestial object and returned to earth after a 19 year journey, for the one and only, original, WBBH hasn't been heard for lo these many years—since 1966, to be exact! Not only that, the station also shifted downward in frequency by 110 kHz during its trip through the twilight zone!

Well, to be exact, the mysterious echo was heard to give a blast from the past one other time prior to the summer of 1984. In January of 1970, *Popular Electronics* magazine reported a "WBBH Crystal Ship" operating with a faulty turntable on 7345 kHz. This was obviously a cheap hoax, for the real WBBH never condescended to operate in the 40-meter band "pirate row," would never have been caught dead with an out-of-sync turntable, and never used a tacky slogan the likes of "Crystal Ship." That's because WBBH was a class act all the way.

Back To Basics

The real WBBH first turned up in March of 1966. Nobody could accuse it of being obscure, for it arrived on the shortwave scene right on the frequency of YVLK, Radio Rumbos (in Venezuela), doing severe damage to the YVLK signal areas of North America. Radio Rumbos' operating frequency of 4970 kHz, it should be noted, is only a squeak away from WWV on 5000 kHz. In all, WBBH selected a high profile frequency to assign itself.

Going about its business, WBBH did not give off pirate station vibes. It was pouring out classical music with an occasional pop song or show tune mixed in. There were also news bulletins and even some humor spots. The signals were extremely high quality and went on the air each night at 7 p.m. On weekends the programming began at 3 p.m.

The station's often-repeated announcement stated, "This is station WBBH, New Brunswick, New Jersey, 4970 kilocycles, for the discriminating shortwave listener. WBBH is operated by the students of the Courtland School of Music."

Listeners from Massachusetts to Maryland heard the station and were pleased to note that there was a new broadcaster populating the 60-meter band. They were even more pleased when they were told by the WBBH announcer that if they sent a reception report to WBBH at "RPO Box 914, New Brunswick NJ" they would be rewarded with a QSL card. Those who sent the reception reports did receive an attrac-

The Globe Scout 65A was a nice little rig, but a far cry from a Gates broadcast transmitter.

tive blue and white QSL signed by the operator, a person named "Fisk," containing a message explaining the educational status of WBBH and describing the equipment.

Classy Stuff

Those who understood the finer things of broadcast equipment were impressed to learn that WBBH was using a Gates BFE-50C transmitter, a costly and sophisticated professional broadcast rig that put out 50 watts. The fact that a music school had the ability to purchase such a dandy piece of equipment, seek to offer classical music, and also get such a fancy operating frequency assigned went a long way towards presenting a very legit appearance. Another reason that there was little cause to suspect WBBH of being a pirate was that while the FCC was catching about 60 bootleggers per year on the ham bands, there hadn't been any shortwave broadcast pirates in this country since WWII.

On the other hand, perhaps the operators of WBBH had been just a wee bit too clever for their own good. Noting that American broadcasters had never before received an authorization to operate in the 60-meter band, and with the curiosity common to most SWL's, in May one enthusiastic WBBH listener called a field office of the FCC to get further information about his favorite new shortwave station.

The inquiry puzzled the FCC at first and they probably thought that the listener was joking or perhaps had become confused about both the callsign and the operating frequency of the new station. A quick check of the field office's records turned up nothing, nor did any of the field engineers have any knowledge of such a station. A more extensive check with FCC headquarters in Washington revealed that WBBH didn't—no, *couldn't possibly*—exist.

But a healthy signal, modulated by news broadcasts and the sounds of Beethoven and Vivaldi, didn't lie and certainly couldn't be denied, FCC license records notwithstanding. Frankly, the FCC monitors who tuned up their receivers on 4970 kHz after being alerted as a result of the casual inquiry, were somewhat startled to learn that there was, indeed, a station WBBH!

The New Brunswick telephone directory was checked so that a phone call could be put through to the Courtland School of Music in order to find out why they were operating an international broadcasting station without the proper license. Surprise, surprise! There was no such school listed, nor anything which remotely looked to be a Courtland School of Music. Next, the FCC checked the mailing address and learned that it belonged to Rutgers University and was actually a box assigned to one of the students—a student named Steve who, FCC records indicated, happened to have a ham license.

On The Trail? Well, Maybe!

The FCC engineers rushed to the Summit, New Jersey address of the student in order to confront him while he was operating the station. Another surprise; the fellow denied any knowledge of WBBH, and the station was on the air while the FCC was at his house. Obviously the station was not at that location.

Out came the direction finding antennas and within a few minutes the engineers arrived at another address in nearby Fairlawn. When the FCC came knocking, they were met by Dennis B., who readily welcomed them and admitted that WBBH was located in his home. He did, however, insist that the Rutgers student was his partner and had even donated his school postal box to the operation to make it difficult for the FCC to pinpoint the location of the station.

The studio was neat but not lavish. The FCC engineers saw large stacks of reception reports and correspondence from the station's enthusiastic audience. Some letters were from listeners who figured out that the station was a pirate, but wished "Fisk" (alias Dennis) luck in not getting caught by the FCC "since the excellent programming would be an unforgettable loss to SWL's."

The WBBH station equipment was not quite as sophisticated as had been announced. There was no Gates BFE-50C transmitter. The station was using a Globe Scout 65A ham rig, a transmitter that ran 50 watts and cost less than $100 when it was new (about eight years earlier). A record turntable and other studio gear were part of the station's equipment.

The FCC collected some of the reception reports and QSL cards as evidence. While they were doing this they instructed Fisk to pull the master switch at WBBH and bring to a close the station's three month broadcasting career.

The SWL world was aghast at such pirate operation, so blatant and out in the open. The August and September (1966) issues of the *Newark News Radio Club* bulletin made much of it, as did the November (1966) issue of NASWA's *FRENDX*. In all, the two operators got off with no more than a couple of warning letters; no charges were ever filed against them. Interestingly, Steve did not lose his ham license and now, at 37 years of age (and still residing in New Jersey) still retains his ham license (Amateur Extra Class). Although I was able to obtain the names of WBBH's operators through my own sources, the FCC steadfastly refused to release this information to the public. Modern pirates would be most appreciative of such a gentle treatment and consideration after getting caught by the FCC.

Out of curiosity, I recently attempted to get Steve to offer some current observations and recollections of the old days of the Courtland School of Music and WBBH, feeling that his words might offer some background information on this curious little operation. Perhaps not wishing to open old wounds with the FCC, or for other reasons, he declined to respond to my invitation.

Today, only some WBBH QSL cards remain to mark the original WBBH—and surely they are highly prized collectors' items at this point. Of course, the station does have that strangely echoing signal that recently appeared on 4860 kHz, or else somebody out there is seeking to ride to fame and glory on the nostalgia of Fisk's little monster station. **PC**

Radio Rumbos (WVLK) in Caracas, Venezuela, had their frequency ripped off by WBBH.

Radio Rumbos

En el tope de la popularidad

Y. V. L. L. 1030 Kcs. - Y. V. L. K. 4970. Kcs.

Caracas - Venezuela

Acusamos recibo de su reportaje verificado el Mayo-17-1955

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en 4.970 Klc. el que hemos encontrado conforme.

Con las gracias más expresivas quedamos de Ud. attos. S, S, S, S,.

RADIO RUMBOS

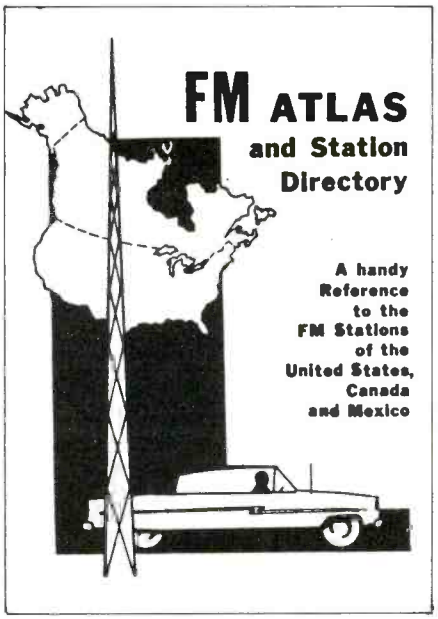
BOOKS YOU'LL LIKE!

The Radio Beacon Handbook, by Dr. Jurgen Trochimczyk, is a new specialty communications directory. Published in West Germany, the 252-page paperback is a comprehensive listing of the world's radiobeacons operating between 200 and 535 kHz and also those beacons operating on frequencies in the 1600 to 1700 kHz range.

The book's listings are divided into regions of the world (Europe, USSR, Africa, Near/Middle East, Asia, Pacific, Antarctica, North America, Central America, and Caribbean). Within those sections, the beacons (marine/aviation) are arranged according to identification letters, with information given as to operating frequency, location, latitude/longitude, power, and the type of service it performs.

Radio beacons have long been pursued by an inner circle of listeners who have managed to get hooked on these unique stations. Indeed, they have their own special mystique and fascination, but the art and science of pursuing radiobeacons has generally remained somewhat esoteric, even though the Long Wave Club of America (LWCA) and also the excellent and popular Clements/Stryker book (*The Beacon Guide*) have brought in a number of new "converts" to the fold. This new book will surely become one of the standard reference guides used by the low frequency and radiobeacon crowd, and it will undoubtedly be the inspiration for many new entrants into the field. We therefore highly recommend it for experienced old timers as well as those looking for new DX worlds to conquer. Some really great DX can be tuned up on these radiobeacon frequencies and most of the current crop of communications receivers will tune them in.

The Radio Beacon Handbook is available from Gilfer Associates Inc., P.O. Box 239, Park Ridge, NJ 07656. The book is $12.95 plus $1 for shipping.



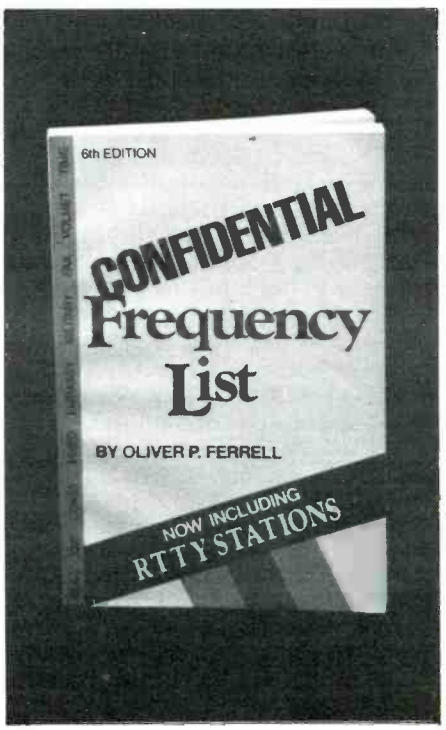
The FM Atlas & Station Directory, by Bruce F. Elving Ph.D., has just come out in its all new and revised 9th Edition. This is far more than a station listing book; it's got 65 pages of maps showing cities having FM broadcast facilities. The station listings are by location and frequency and you get information on music formats, networks, stereo, technical parameters, primary/secondary signal coverage, power, antenna height, on-air slogans and IDs, stations IDing with more than one city, and more. The directory covers commercial/non-commercial FM broadcasters in the US/Canada, including low-power school stations and short-range translator stations.

In addition to the maps and station data, all-new editorial coverage discusses the FM industry, FM vs AM considerations, FM subcarriers, Dolby, a salute to Edwin Armstrong, and other relevant topics.

Elving is a world-recognized authority on the FM DX scene and the previous eight editions each earned a highly respected spot in the hearts of those interested in FM broadcasting, including the broadcasters themselves and other members of the industry. Anyone interested in FM DXing will find the book an invaluable aid in rooting out and identifying those rare catches. We might add that many monitors who got into the hobby via the scanner route have been getting into the excitement of FM broadcast DX, since the 88 to 108 MHz band these stations use is right in the portion of the VHF spectrum they know so well.

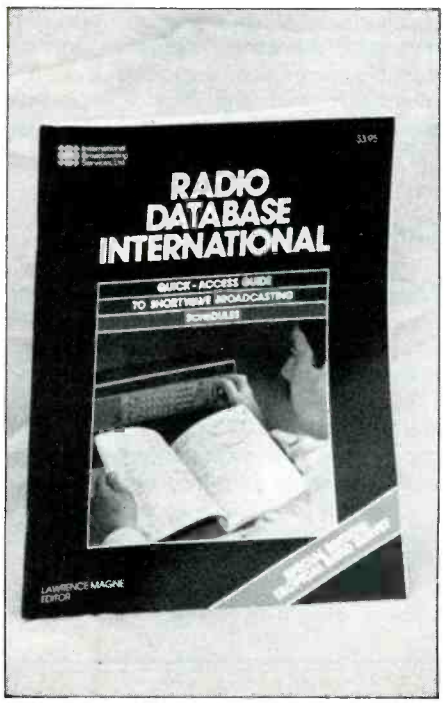
Elving's new 9th Edition of the *FM Atlas & Station Directory* gives you a lot of data (144 pages of hard information) for only $7.50 plus $1 shipping to US/Canada/APO/FPO addresses. Order it from CRB Research, P.O. Box 56, Commack, NY 11725.

The long awaited 6th Edition of *The Confidential Frequency List*, by the late Perry Ferrell, has just come out. The listings cover the HF frequencies (4 to 30 MHz) and include military, aero, embassy, Volmet, INTERPOL, weather, and RTTY stations. The extensive updated station listings section was completed by Perry just prior to his untimely passing. A considerable amount of very useful original text concerning the techniques for successfully monitoring "utility" stations was also included from well-known authorities such as Bob French, Tom Kneitel, and Webb Linzmayer. This is a fat (336-page) softcover book which has become to the "ute" monitor what the *World Radio TV Handbook* is to the shortwave broadcast lis-



tener, and the new 6th Edition is larger and more comprehensive than any of the prior editions.

The 6th Edition of the *Confidential Frequency List* is $13.95, plus $1 shipping. It's available from Gilfer Associates, P.O. Box 239, Park Ridge, NJ 07656. We can't imagine anyone attempting to listen to HF voice/CW/RTTY communications without a handy copy of the good ol' CFL at the operating desk, no matter how many other reference publications are in use.

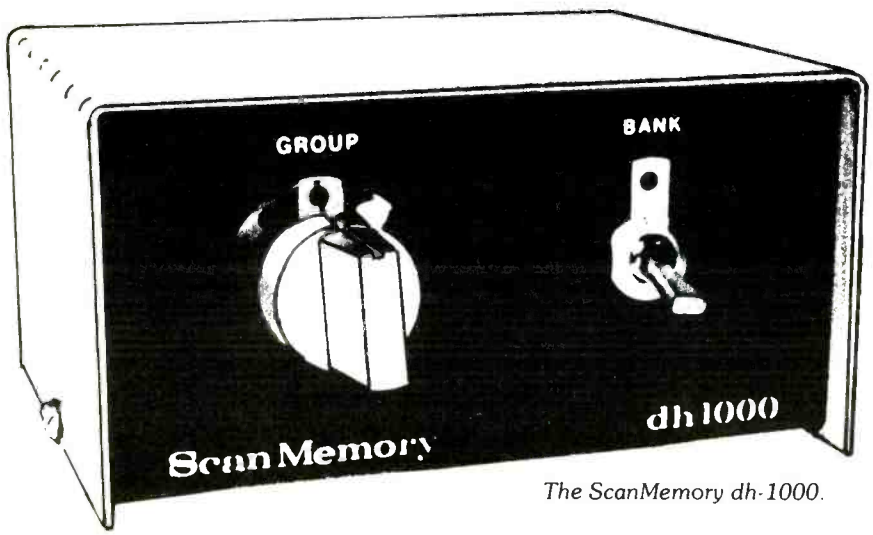


Radio Database International, Edited by Larry Magne, is a series of publications that provide quick-reference information on shortwave broadcast schedules and frequencies. These publications, which appear periodically, are constantly updated and offer the listener a frequency-by-frequency chart showing the various times each day that a particular frequency is in use—who it's used by, the languages spoken, whether or not it is jammed, and other vital data that make listening more enjoyable and rewarding. This series of publications is put together by leading DXers throughout the world and looks to be a very fine job. We feel it will add to your efforts to get the most out of international shortwave broadcast monitoring.

Radio Database International is published by International Broadcasting Services, Ltd., P.O. Box 300, Penn's Park, PA 18943.

PRODUCT SPOTLIGHT

Expanding Your Scanner Memory To 1000 Channels!



The ScanMemory dh-1000.

Scanner listeners who find that their on-line channel frequency memory capacity is a bit too small—take note—a new product may solve your problem.

Several of the more popular, frequency synthesized, VHF-UHF scanning radio receivers are, by the very nature of their unusual circuitry, excellent candidates for memory expansion.

Typical of these receivers are the Bearcat 250, 300, and 350 scanners. These are top-of-the-line, "crystalless" receivers having 50 user programmable frequency channels available.

The internal feature which allows these "higher" memory capacity scanners to be expanded to even more channels is that the integrated circuit memory component is a chip which peculiarly stands alone in the electronic configuration. Some of the other, smaller memory, synthesized scanners have their memory registers embedded in the central processing unit (the CPU chip), thus preventing access for memory modification.

How Many Channels?

Theoretically, the channel expansion capacity of these scanners is virtually unlimited, depending on the size of the external memory unit one wishes to employ. The new product, ScanMemory, provides 1,000 programmable frequency channels!

Perhaps 50 or 60 channels are memory enough for most scanner enthusiasts. On the other hand, some aficionados may find a real need for more readily available, on-line frequencies without having to re-program the receiver. Among such scanner hot dogs might be those living in or near large metropolitan areas having literally hundreds of VHF and UHF channels active. Some areas may have as many as 50 channels for police activity alone; and, as many more may be occupied each by fire departments, emergency medical, taxi, public service, mobile telephone, amateur radio, government, and military frequencies.

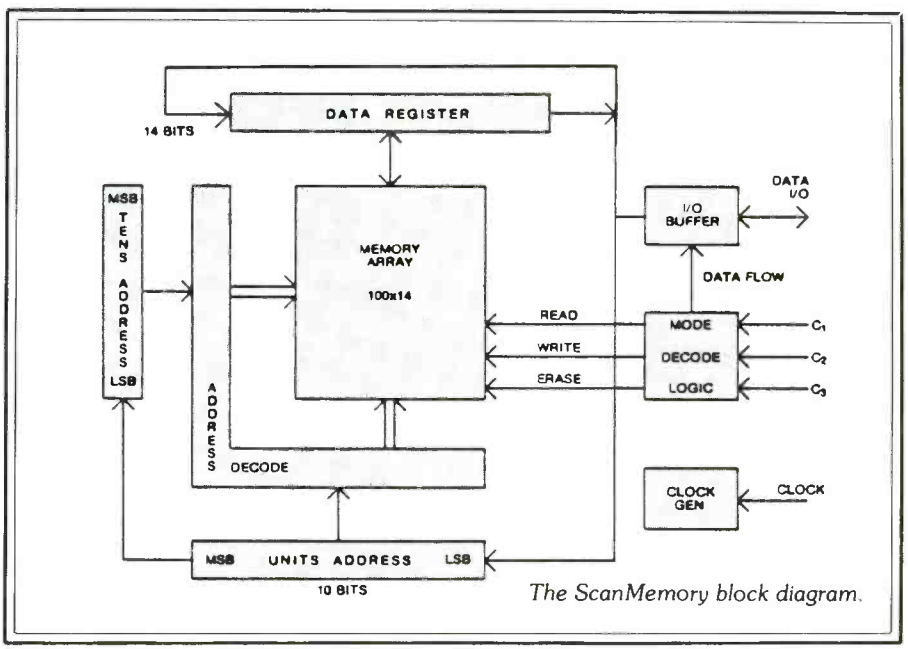
Alternatively, some mobile operators may wish, for instance, to program into their memory expander all the public service frequencies for each state through which they shall be passing. Thus, by the flip of a single switch, the traveler can move to a new set of 50 channels as he crosses state lines.

Can I Install It?

In the case of the 50 channel Bearcats, no soldering is necessary. Simply remove the cover, unplug a circuit chip, and replace the removed IC with a "dip" connector terminating a ribbon cable from the ScanMemory.

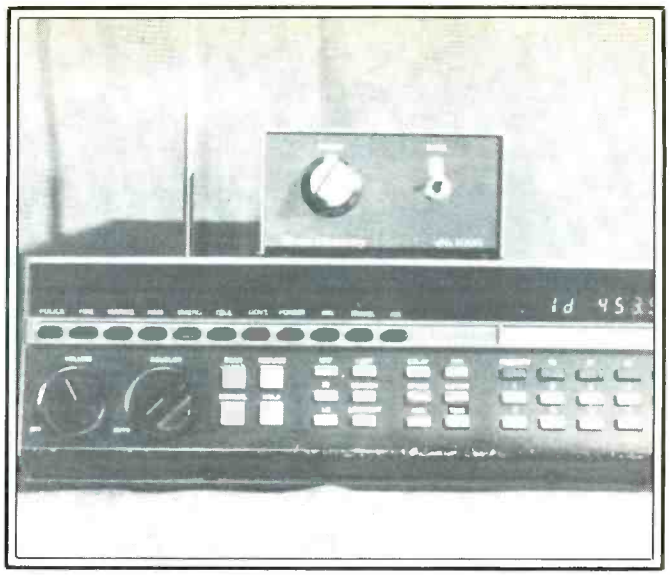
In the case of the 50 channel Regency scanners, the D-810 for example, it will be necessary to unsolder the memory chip and replace it with a 14 pin socket in order to plug in the ScanMemory cable. (Check equipment warranty literature to determine if warranty may be affected.)

Operating voltages as well as control signals are brought through the single plug for



The ScanMemory block diagram.

The ScanMemory shown connected to a Bearcat 250.



A Bearcat 300 shows a good size comparison to the dh-1000.

operation of the memory expander circuitry and pilot lamps.

How Does It Work?

The current ScanMemory, dh-1000, available from the manufacturer, Dog House Enterprises, P.O. Box 511, Fairfax, Virginia 22030, utilizes the recently developed, non-volatile memory integrated circuit chip, the EAROM.

Arranged in a symmetrical matrix within the ScanMemory unit, the respective EAROM memory circuits are switched into action in banks of 50 channels by front panel controls. All other programming features are done through the scanner buttons as before modification.

The Electrically Alterable Read Only Memory (EAROM) requires no "keeper" voltage as in the case of conventional full static read-write Random Access Memory (RAM) devices. It is a modified MNOS integrated circuit in which the silicon dioxide layer has been replaced by a silicon nitride/silicon dioxide sandwich. The storage function occurs as a threshold voltage is modified within the chip by tunneling a charge through its thin oxide layers to become trap sites in the nitride.

In essence, all this technical jargon means that the ScanMemory will retain channel frequency registration while the power is off, and even when disconected from the scanner receiver.

Curiously enough, the dh-1000 also will operate with certain scanning VHF-UHF transceivers available through the ScanMemory manufacturer. These are user programmable, two-way radios operating generally in the 134 to 174 and 421 to 512 MHz bands.

Presently on the drawing board is a companion version of the ScanMemory for those scanners having CMOS static memory chips. The Radio Shack, Realistic PRO-2003 thus ultimately will be adaptable for channel expansion.

What About Home Computers?

There are currently on the market several VHF-UHF scanner radios that will operate with expanded channel capacity when interconnected with PC micro-processors. Notable are the Bearcat CompuScan 2100 and the J.I.L. SX-400. The J.I.L. unit is a standalone scanner that will operate with or without the home computer, whereas the Bearcat must interface its companion PC microprocessor to operate.

For those who do not wish to tie up their present computer with scanner functions, or don't have room under the dashboard of the old Studebaker for the CRT, the ScanMemory may be your cup of tea.

(This information supplied by the manufacturer at the request of Popular Communications.*)*

PC

Best Bets!

Selected English Language Broadcasts Winter 1984-85

BY GERRY L. DEXTER

Note: Hundreds of English language broadcasts are to be found on shortwave every day. This is a representative sampling and not intended as a complete reference. Some stations air only part of their broadcasts in English during a given hour. Others run their English broadcasts into the next hour or for several hours continuously and these are not necessarily carried over in this listing. Numbers in parenthesis indicate the starting time for English, within the listed hour. Some major broadcasters such as the BBC, Radio Moscow and Voice of America maintain virtual 24-hour per day English services. The list was accurate at the time of compilation. All times are in GMT.

Time	Station/Country	Frequencies
0000	Radio Beijing, China	11.650, 15.385, 15.520
	Radio Tirana, Albania	7.065, 9.760
	BRT, Belgium	9.925, 11.620
	Radio Sofia, Bulgaria	9.700, 11.870
	Radio Canada Intl., Canada	5.960, 9.755
	HCJB, Ecuador (0030)	9.745, 15.155, 15.250
	Radio Berlin, E. Germany	9.730, 11.975
	All India Radio, India	9.912, 11.765, 11.875, 15.110, 15.415
	Kol Israel, Israel	9.440, 9.815, 11.655
	Radio Japan, Japan	15.300, 17.825
	Radio Exterior Espana, Spain	9.630, 11.880
	Vatican Radio, Vatican (0050)	6.015, 9.605, 11.845
	BBC, England	5.975, 6.085, 6.175, 7.325, 9.590
0100	Voice of Greece, Greece (0130)	9.420, 9.865, 11.645
	Swiss Radio, Switzerland (0145)	6.135, 9.755, 9.895, 12.035
	Radio Beijing, China	11.650, 15.385, 15.520
	Radio Budapest, Hungary	6.025, 6.110, 9.520, 9.835, 11.910, 12.000
	Radio Tirana, Albania	7.120, 9.760
	Austrian Radio, Austria (0130)	5.945, 9.770
	Radio Canada Intl., Canada	5.960, 9.755
	Radio Prague, Czechoslovakia	5.930, 7.345, 9.540, 9.740, 11.990
	HCJB, Ecuador	9.745, 15.155
	Deutsche Welle, W. Germany	6.040, 6.085, 6.145, 9.545, 9.565, 9.590, 11.785
	Radio Berlin Intl., E. Germany (0130)	9.730, 11.975
	Kol Israel, Israel	9.440, 9.815, 11.655
	RAI, Italy	5.970, 9.575
	Radio Japan, Japan (0145)	15.195, 17.825
	Voice of Nicaragua, Nicaragua	6.015
	Radio Exterior de Espana, Spain	9.630, 11.880
	Voice of Free China, Taiwan	11.825, 17.890
0200	Radiobras, Brazil	15.290
	Voice of Free China, Taiwan	5.985, 11.740
	Swiss Radio Intl., Switzerland (0245)	6.135, 9.755, 9.885, 12.035
0200	RAE, Argentina	11.710, 11.755, 15.345
	Radio Beijing, China	11.650, 15.385
	Radio Budapest, Hungary	6.025, 6.110, 9.520, 9.835, 11.910, 12.000
	Radio Netherlands, Netherlands (0230)	6.165, 9.590, 9.895
	Radio Polonia, Poland	6.095, 6.135, 7.145, 7.270, 9.525, 11.815, 15.120
	Radio Sweden Intl., Sweden (0230)	9.695, 11.705, 17.840
	Radio Tirana, Albania	7.120, 9.760
	Radio Belize, Belize	3.285
	Radio Cairo, Egypt	9.475, 15.370
	Radio Berlin Intl., E. Germany	9.560, 11.840, 11.975
	Radio Korea, S. Korea	11.810, 15.575
	Radio Lebanon, Lebanon	9.545
	Radio Bucharest, Romania	5.990, 6.155, 9.510, 11.810, 11.830, 11.940
	Radio RSA, South Africa	5.980, 6.020, 9.615
0300	Radio France Intl., France (0315)	7.135, 9.545, 9.550, 9.790, 11.670, 15.180, 15.435, 15.440
	Voice of Greece, Greece (0340)	9.420, 9.865, 11.645
	Radio Dublin Intl., Ireland	6.910
	Radio Beijing, China	15.520, 17.795
	Radio Polonia, Poland	6.095, 6.135, 7.145, 7.270, 9.525, 11.815, 15.120
	Trans World Radio, Swaziland	3.240
	Radio Sweden Intl., Sweden (0330)	11.705
	Austrian Radio, Austria (0330)	5.945, 9.770
	Radio Prague, Czechoslovakia	5.930, 7.345, 9.540, 9.740, 11.990
	Radio Japan, Japan	15.300
	Voice of Kenya, Kenya	4.915
	Radio Kuwait, Kuwait	15.345
	Radio Portugal, Portugal	6.060, 11.925
	Radio Tanzania, Tanzania	5.050
	BBC, England	5.975, 6.175
0400	Radio Botswana, Botswana	4.848, 7.295
	Radio Lesotho, Lesotho	4.800
	Radio France Intl., France (0415)	7.135, 9.550, 9.790, 11.705, 11.875, 11.995, 15.155
	Swiss Radio Intl., Switzerland (0430)	9.725, 12.035
	Voice of Turkey, Turkey	11.755
	Radio Beijing, China	15.385, 17.795
	Radio Sofia, Bulgaria	11.750
	Radio Havana, Cuba	11.960
	Voice of Nicaragua, Nicaragua	6.015
	Radio Bucharest, Romania	5.990, 6.155, 9.570, 11.810, 11.830, 11.940
	Kol Israel, Israel	9.009, 9.815, 11.655, 12.025
	RAE, Argentina	6.060, 11.710, 15.345

Time	Station/Country	Frequencies
0400	Radio Korea, S. Korea	9.570
	Radio Uganda, Uganda	15.325
	Trans World Radio, Netherlands Antilles	9.535
	Radio Japan, Japan	9.675, 15.300
	HRVC, Honduras	4.820
	BBC, England	5.975, 6.175, 9.510
0500	Radio New Zealand, New Zealand (0515)	9.585
	Radio Netherlands, Netherlands (0530)	6.165, 9.715, 9.895
	Radio Havana, Cuba	11.960
	HCJB, Ecuador	6.095, 9.745, 11.910
	Deutsche Welle, W. Germany	5.960, 6.120, 9.545, 9.690, 11.705
	Radio Berlin Int., E. Germany (0530)	9.560, 11.975
	Radio Korea, S. Korea (0530)	11.810, 11.820, 15.575
	Voice of Nigeria, Nigeria	7.255, 11.770, 15.120
	Radio Portugal, Portugal	6.075, 9.575
	Radio Exterior Espana, Spain	9.630, 11.880
	Trans World Radio, Monaco	9.610
0600	Trans World Radio, Swaziland	7.295, 9.725
	Radio Havana, Cuba (0630)	11.725
	HCJB, Ecuador	6.095, 9.745, 11.910
	Ghana Broadcasting Corp., Ghana	4.915
	SLBC, Sierra Leone	5.980
	ELWA, Liberia	4.760
	Radio Berlin Intl., E. Germany	9.560, 11.975
	Radio Netherlands, Netherlands	6.165, 9.715, 9.895
	Radio Cook Islands, Cook Islands	11.760
	BBC, England	6.175, 9.510
0700	BRT, Belgium (0715)	9.880
	Radio Japan, Japan	9.505
	Voice of Free China, Taiwan	5.985
	Radio RSA, South Africa	7.270, 11.900
	BBC, England	9.510
0800	Radio New Zealand, New Zealand	9.620
	SIBC, Solomon Islands	5.020, 9.545
	Radio Australia, Australia	6.045, 9.580, 11.720, 15.165, 15.395, 17.715
	HCJB, Ecuador	9.655, 11.835
0900	Radio Kabul, Afghanistan	4.450, 6.230, 15.225, 17.900
	NBC, Papau New Guinea	4.890
	FEBC, Philippines	11.890
	Radio Japan, Japan	9.505
	Radio Oman, Oman	9.735, 11.890
	Radio Australia, Australia	9.580, 11.720
	KTWR, Guam	11.840
	BBC, England	6.195, 9.510
1000	Kol Israel, Israel	11.655, 15.485, 15.585, 15.650
	Radio Japan, Japan	9.505
	Radio Korea, S. Korea	9.570
	Radio Oman, Oman	11.890
	Radio Singapore, Singapore	5.052, 11.940
	Voice of Vietnam, Vietnam	9.840, 12.035
	KYOI, Saipan	11.900
	Radio Australia, Australia	6.045, 9.580
1100	Radio Beijing, China	15.520
	Radio Japan, Japan	9.505
	Radio Pyongyang, N. Korea	9.745, 9.977
	Radio Pakistan, Pakistan	17.660, 21.800
	BSKSA, Saudi Arabia	11.855
	Radio Finland Intl., Finland	15.400, 17.800
	Radio Australia, Australia	9.580
	Radio Singapore, Singapore	5.052, 11.940
	Trans World Radio, Netherlands Antilles	11.815, 11.875
	Radio Angola, Angola	11.955

Time	Station/Country	Frequencies
1100	BBC, England	5.965, 6.195, 11.775, 15.215
1200	VOPK, Kampuchea	9.695, 11.938
	Voice of Greece, Greece (1235)	9.815, 11.645, 15.630
	Radio Beijing, China	11.650, 15.520
	Radio Bangladesh, Bangladesh	17.800, 21.670
	HCJB, Ecuador	11.740, 15.115, 17.890
	Radio Finland Intl., Finland	15.400, 17.800
	Radio Japan, Japan	9.505, 11.815, 11.840
	Radio Ulan Bator, Mongolia	12.015, 12.045
	Voice of Nigeria, Nigeria	15.120
1300	FEBC, Philippines	6.030, 15.450, 21.475
	Swiss Radio Intl., Switzerland (1315)	9.535, 12.030, 15.570, 17.765, 17.785, 17.830
	Radio Finland Intl., Finland	15.400, 17.800
	All India Radio, India	11.810, 15.335
	KTWR, Guam	9.510
	T.W.R., Netherlands Antilles	11.815
	Radio Japan, Japan	9.505, 11.815, 11.840
	HCJB, Ecuador	11.740, 15.115
1400	Swiss Radio Intl., Switzerland (1445)	9.535, 12.030, 15.570, 17.765, 17.785, 17.830, 21.520
	Radio Belgrad, Yugoslavia	9.620, 15.240, 15.300
	Radio Sofia, Bulgaria	17.610, 21.815
	Radio Finland Intl., Finland	15.400, 17.800
	Voice of Indonesia, Indonesia	11.790, 15.155
	KTWR, Guam	9.510
	HCJB, Ecuador	11.740, 15.115, 17.890
	Radio Sweden Intl., Sweden	15.190
1500	Voice of Greece, Greece	9.420, 11.645, 15.630
	Radio Australia, Australia	9.545, 9.710, 9.770, 11.800
1500	VORE, Ethiopia	9.560
	Radio Japan, Japan	9.505, 11.815
	Radio Norway, Norway (Sun)	15.175, 15.225, 25.615
	FEBC, Seychelles	11.895
	Radio Nepal, Nepal	9.590
1600	Radio France Intl., France	6.175, 11.705, 15.315, 17.620, 17.795, 21.685
	UAE Radio, United Arab Emirates	11.955, 15.200, 15.320
	Radio Norway, Norway (Suns)	15.205, 17.800, 21.615
	Radio Pakistan, Pakistan	9.860, 11.670, 15.445, 15.565, 17.680
	HKBS, Jordan	9.560
	BBC, England	11.775, 15.070, 15.260
1700	RAE, Argentina	9.690, 15.345
	Radio Japan, Japan	11.815
	Radio Norway, Norway (Suns)	15.175, 15.205, 21.730
	BSKSA, Saudi Arabia	11.855
	Kol Israel, Israel	9.920, 15.550, 13.720
	All India Radio, India	11.620
	Voice of Nigeria, Nigeria	15.120
1800	Radiobras, Brazil	15.270
	Radio Kuwait, Kuwait	11.675
	Voice of Nigeria, Nigeria	15.120
	BRT, Belgium	15.550, 15.590
1900	VOIRI, Iran (1930)	9.027, 11.930
	Kol Israel, Israel	11.655, 12.025, 13.745, 15.485, 15.585, 17.685
	Radio Kuwait, Kuwait	11.675
	Voice of Nigeria, Nigeria	15.120
	Radio Tanzania, Tanzania	9.750
	Radio Kabul, Afghanistan	9.665, 11.960, 15.077
	SPLAJBC, Libya	15.450
2000	Radio Algiers, Algeria	9.510, 9.640, 9.685, 15.215, 17.745
	Radio Kuwait, Kuwait	11.675
	Voice of Nigeria, Nigeria	15.120
	ELWA, Liberia	11.830
	CBCNS, Canada	9.625, 11.720
	R. Mediterranean, Malta	9.510
	BBC, England	11.750, 15.070
2100	Kol Israel, Israel	9.815, 11.655, 12.025, 13.745, 15.585, 17.685
	Voice of Nigeria, Nigeria	11.770, 15.120
	Radio Japan, Japan	9.675, 11.815, 15.310
	Radio Havana, Cuba	17.705, 17.750
	Radio RSA, S. Africa	9.585, 11.900
	Radio Jamahiriya, Libya	11.815
	Radio Baghdad, Iraq (2130)	9.610
2200	Voice of Turkey, Turkey	9.765, 11.755, 11.965, 17.815
	Radio Sofia, Bulgaria (2230)	9.700, 11.870
	Radio Canada Intl., Canada	5.960, 9.755
	Kol Israel, Israel	9.440, 9.815, 11.655
	Radio Havana, Cuba	11.705
	Radio Jamahiriya, Libya	11.815
	Radio Japan, Japan (2215)	9.580, 9.645, 15.210, 15.235, 17.755
	Radio Belgrad, Yugoslavia	9.620
2300	Voice of Turkey, Turkey	9.515, 11.755, 17.815
	Radio Sweden Intl., Sweden	9.695, 11.960
	Radio Canada Intl., Canada	5.960, 9.755
	Radio Berlin, E. Germany (2315)	9.730, 11.975
	Radio Japan, Japan	9.645, 15.175, 15.325, 17.755
	Radio Pyongyang, N. Korea	9.745, 15.230
	Voice of Vietnam, Vietnam (2330)	9.840, 12.035
	Kol Israel, Israel	9.440, 9.815, 11.655
	R. Vilnius, Lithuania	9.685, 9.750, 15.100
	Radio Kiev, Ukraine	15.180, 15.405, 17.860

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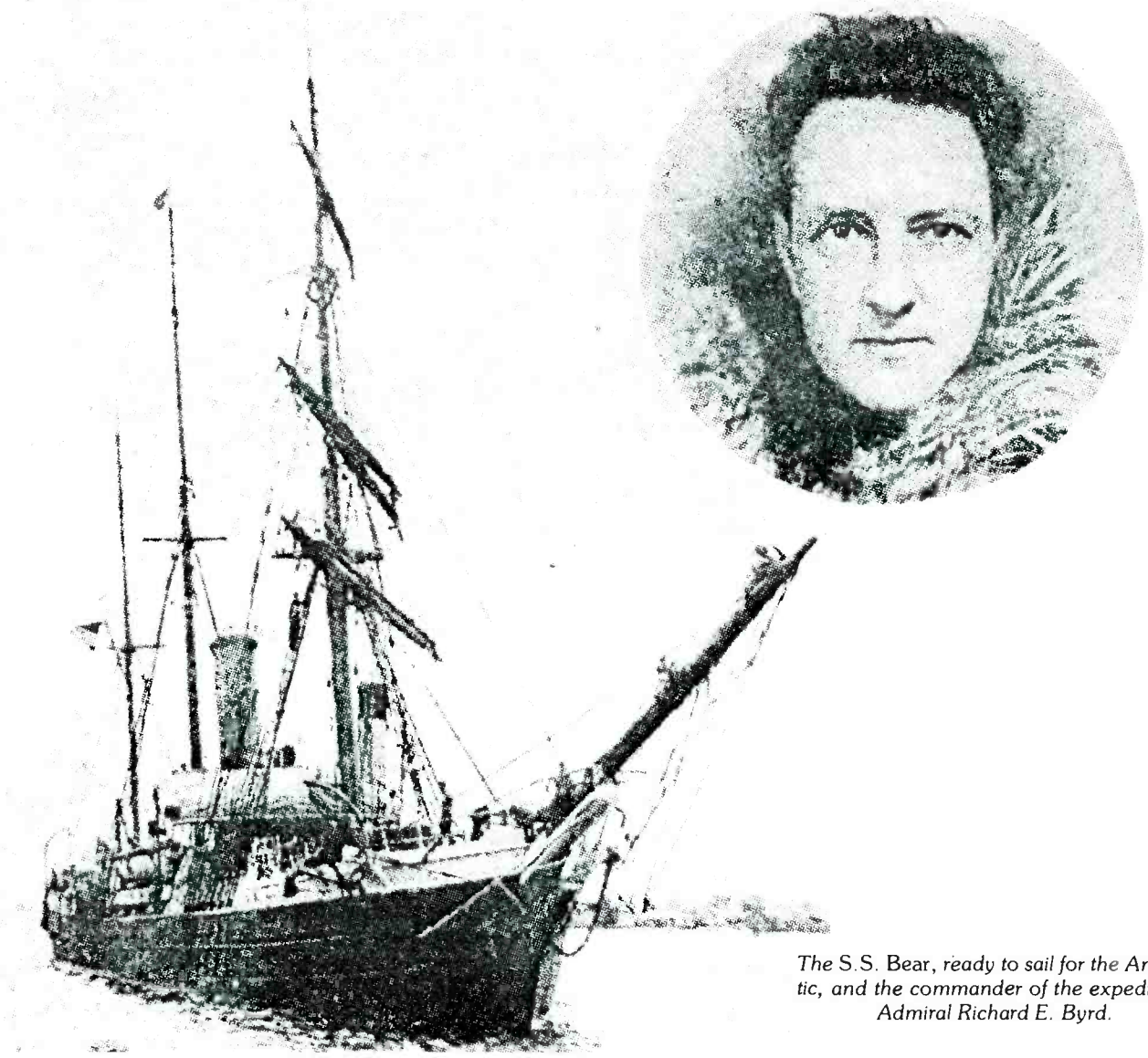


The S.S. Bear, ready to sail for the Antarctic, and the commander of the expedition, Admiral Richard E. Byrd.

South Pole Calling!

POP'COMM *Sails To The Antarctic With Admiral Byrd*

BY DON JENSEN

The postman didn't have to ring twice. Fifteen-year-old Elaine Groves, convalescing at home after an appendectomy, had been waiting for him.

The letter he delivered—actually a copy of a radiogram—was a get-well wish from a family friend, Stevenson Corey, a native of nearby Winchester, Massachusetts. The post office had carried it only the last 160 miles from Schenectady, New York to the pretty teenager's Cambridge, Massachusetts home. The message had originated, by radio, 10,000 miles away in Little America, Admiral Richard E. Byrd's expedition headquarters in Antarctica.

The greetings from Corey, supply officer with the Byrd expedition, had been a response to the fortnightly mailbag program of General Electric's station, W2XAF.

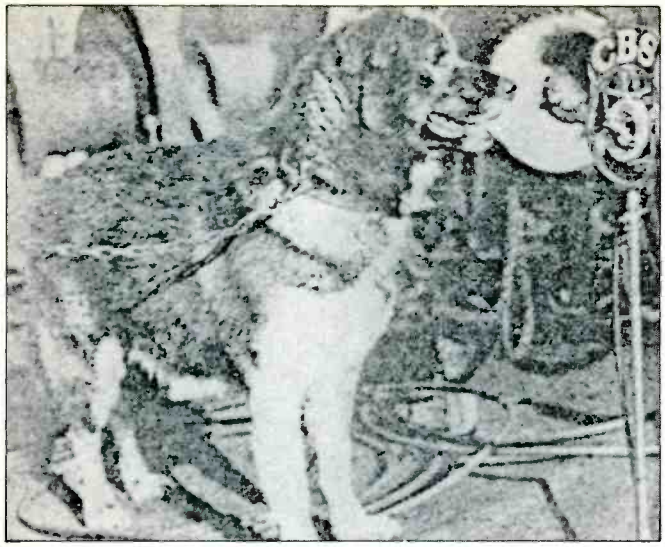
At about the same time, half a world away in Thames, New Zealand, a local physician, Dr. G. Campbell MacDiamond, was having a great time listening to the transmissions from KJTY, the expedition's shortwave station. Being considerably closer to Antarctica, he was getting good reception, but he also had little trouble hearing the GE station at Schenectady on 31.4 meters.

Dr. MacDiamond called it the "outstanding event" of the year for radio fans.

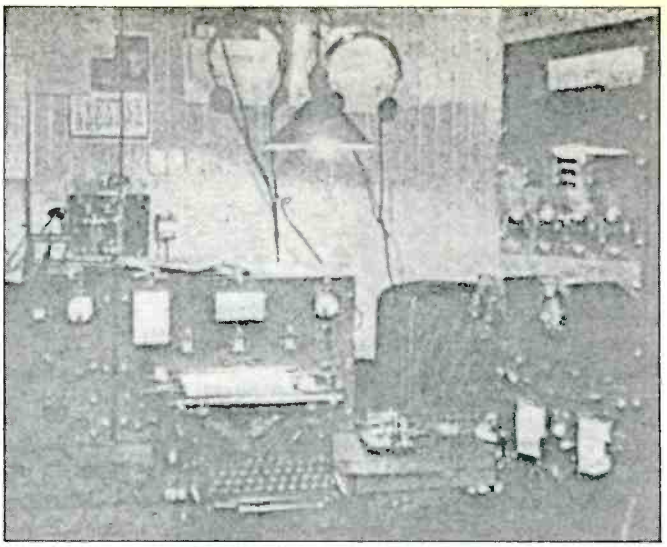
Americans, in general, agreed, and were glued to their sets that summer of 1934.

The South Pole was calling and, thanks to the fledgling CBS and NBC radio networks, which picked up and rebroadcast the shortwave signals, the nation was receiving some fascinating listening.

The southernmost continent was still terra incognita, an unknown frozen wasteland, an explorer's last frontier. Ice-bound bays, peninsulas and plateaus, even entire mountain ranges never before seen by man, were discovered during Byrd's first expedition. On his return trip five years later, he would discover still more. But the difference was



Mike, the canine mascot of Admiral Byrd's flagship, the S.S. Jacob Ruppert, *whose voice was heard from the Antarctic at the beginning of each radio broadcast.*



The radio control room of station KJTY aboard the flagship S.S. Jacob Ruppert, *from which all commercial messages on shortwave emanated.*

that this time, thanks to radio, America was along for the ride.

Admiral Byrd's second expedition below the Antarctic Circle carried more radio equipment than any other exploration party in previous history. So much radio gear was on board Byrd's two vessels that even the radio engineers weren't able to determine in advance just how many transmitters would be placed in operation at the bottom of the world.

Radio was used for two-way communication between the civilized world and the icy wastes of Little America. But there also were regularly scheduled programs, entertainment as well as information, beamed back for rebroadcast into the homes of American listeners via the stations of the CBS radio network.

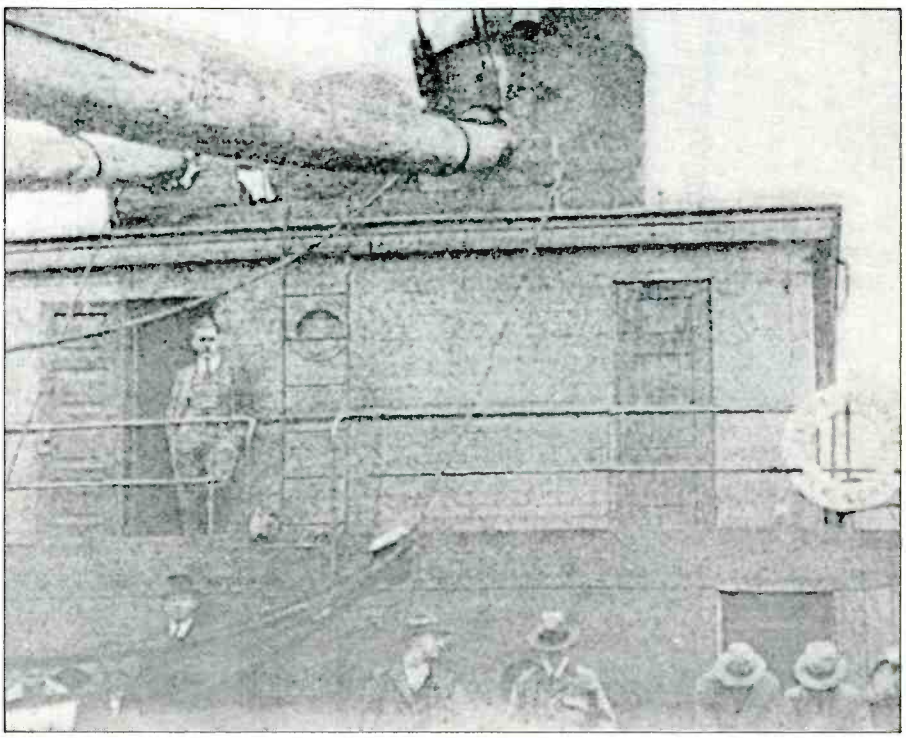
Additionally, there was an amateur radio station aboard Byrd's flagship, the *S.S. Jacob Ruppert*, which communicated with thousands of American hams.

A total of 5,000 pounds of radio equipment was taken to the Antarctic. The heaviest single piece of gear was the 1,000 pound gasoline-powered generator used on the Ross Ice Shelf base, where it was the only reliable power source.

A 50-watt transmitter was installed in the Curtiss-Condor aircraft in which Byrd flew over the South Pole. The historic moment was radioed back to Little America, where a 200-watt station relayed it to the flagship, at sea beyond the pack ice. Then the shipboard KJTY passed it along for further relay back to the States.

Two other planes on the expedition, a Fokker and a Fairchild, also had 50-watt transmitters aboard. Virtually every conveyance on the Antarctic ice had its own radio communications gear. Even the dogsleds carried 1 watt VHF transmitters and receivers which operated on 5 meters for short range communication.

With the exception of a commercial communications system handled by Mackay Radio Co., the Columbia Broadcasting System was in charge of all radio installations, equipment, and operations for the expedition. CBS estimated it represented a cost of $1 million. The expedition was financed by private funds and commercial firms, such as CBS and its sponsors.



This cabin, on the afterdeck of Byrd's flagship S.S. Jacob Ruppert, *housed the radio apparatus and control room of KJTY.*

The Federal Radio Commission, predecessor of the Federal Communications Commission, assigned 15 frequencies to the Byrd expedition: 6,650, 6,660, 6,670, 8,820, 8,840, 13,185, 13,200, 13,230, 13,245, 13,260, 17,600, 17,620, 21,515, 21,600, and 21,625 kHz.

Before the ships left the U.S. in October 1933, CBS technical advisor Edwin K. Cohan said that only experimentation would show which frequencies provided the most reliable communication. In fact, while shortwave listeners received transmissions from Little America on many frequencies, only two—8,820 and 13,200 kHz—were from the FRC approved list.

Cohan had plenty of high powered advice during the planning stages. The science of long distance radio communications, particularly through geomagnetically active polar regions, was brand new in 1934. Technical advisors included Harvard University's Dr. T. S. McCaleb; A. Y. Tuel, vice

president of International Telephone and Telegraph; Harry Young, an executive with Western Electric Co.; William Thompson of American Telephone and Telegraph; S. H. Simpson of RCA and, "the father of radio" himself, the Marchese Guglielmo Marconi.

No one really knew how well signals would propagate from the Antarctic to the U.S. Preliminary plans called for the transmissions to be relayed by a Buenos Aires station, LSK.

Learning that the expedition planned to try a series of frequencies from 6 kHz to 21 kHz, Marconi predicted that it might actually be possible to communicate directly between Antarctica and New York at the high end of that frequency range. The eminent radio inventor offered to set up a listening post on his floating laboratory aboard the yacht *Elettra*, off the Italian coast, to try to pick up Little America's signals.

Actually, once the transmissions began, it became clear that direct, 10,000-mile communication was perfectly possible, not only by professional monitoring stations, but by ordinary shortwave listeners in the U.S., on frequencies at least as low as 6 MegaHertz.

For reliable reception of relay-quality signals, however, intermediate stations, including the Argentine LSK, and KKW, Kokohead, Hawaii, were often used, as well as an RCA station at Bolinas, California.

The key station of the Byrd expedition was KJTY, with a 1,000 watt transmitter, first located aboard the *S.S. Jacob Ruppert*, named for one of the explorer's primary financial backers.

CBS sent along its own engineer, John Newton Dyer, as on-the-scene technical supervisor of the program series to be broadcast from Little America over the national radio network.

CBS also sent Charles J. V. Murphy, newspaperman, author, and radio announcer. He served as producer, director, writer, and announcer for the weekly programs.

The broadcasting station on the *Jacob Ruppert* was installed in a studio adjoining the ship's regular radio room. With space aboard at a premium, the studio doubled as living quarters for four radiomen, with four foldaway bunks.

A plate glass window between studio and adjoining control room was set in the wall between upper and lower bunks. Microphones were placed on a table at the end of the bunkhouse-studio. For larger groups of performers, the mike was moved outdoors on an upper deck.

During the three-month cruise south, a series of programs originated from the *Jacob Ruppert*. Once the vessels reached the icepack, the broadcasting gear was transferred to the steamer (which carried sail on its three masts) *S.S. Bear*, built as an icebreaker to penetrate to near the Little America base.

Weekly programs were sent, via Buenos Aires, to the RCA transoceanic receiving station at Riverhead, Long Island, a New York suburb. From there, phone lines took the signal to WABC, the CBS key station of its nationwide radio network.

The programs, often little more than amateur talent night featuring engine room baritones and scientist-ukelele players, were aired every Saturday night in late 1933 and the first half of 1934, from 10 to 10:30 p.m., EST. They were sponsored by General Foods Corp., with commercials usually done live and on-the-spot from the remote and frigid land. They began with a unique and distinctive trademark, the bark of Mike, a sandy-haired sled dog, who soon learned to enjoy his radio performances.

With CBS having a lock on these programs from Antarctica, rival network NBC moved fast to compete. It joined forces with the nation's major radio manufacturer, General Electric, to broadcast to the isolated and lonely explorers.

GE had a 20 kilowatt shortwave station, W2XAF at its Schenectady plant, and a directional antenna left over from experimental transmissions during Byrd's first South Polar trip in 1928-29. Plans were made to broadcast messages from home and entertainment to Byrd's men from the Schenectady studios, with remote pickups of entertainment features from New York City, Washington, Boston, Albany, Rochester, and Byrd's hometown, Richmond, Virginia.

NBC fed the same program via its network links to affiliates around the U.S. It had started late in the Antarctic derby and had to run fast to catch up to CBS.

Orginally, W2XAF programs were to be aired late Saturday night, but it turned out that the timing, just after the CBS show from Little America, was wrong. It was too tough an act to follow. So GE rescheduled its program for alternate Sunday nights, from 11 p.m. until after midnight, EST. After the regular show, GE continued with a mailbag segment, which turned out to be the most popular of all. Relatives and friends could send brief messages—a maximum of 50 words, later expanded to a 100-word limit—to members of the expedition. The men of Little America later could radio back their replies, which GE mailed out to recipients, such as young Elaine Groves. Relatives actually were invited to the GE studio to broadcast greetings in person. For those who couldn't get to the upstate New York station, C. D. Wagoner, GE's publicity man, advised, messages could be mailed to the company at 1 River Road, Schenectady, to arrive no later than the Friday before the broadcasts.

The GE broadcasts were aired in 1934 on March 11, 25; April 8, 22; May 6, 20; June 3, 17; July 1, 15, 29; Aug. 12, 26; and September 9, 23.

Shortwave fans, however, didn't have to rely on the NBC network broadcasts via their local medium wave AM outlets. They tuned in W2XAF on 9,530 kHz, shortwave.

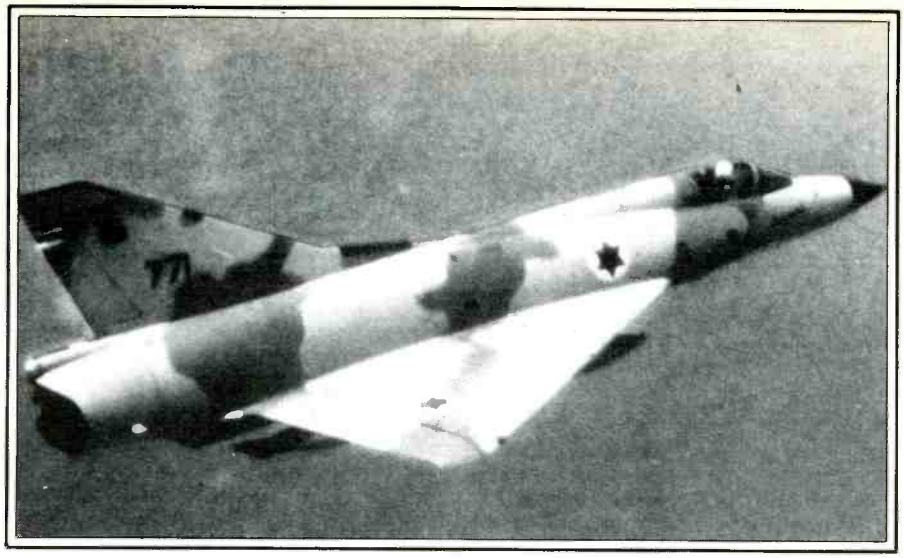
As 1934 drew toward a close, "summer" came to Antarctica again. The long and lonely winter night ended for the men of Little America. It was time to set about their scientific chores. Four major exploratory parties set out from the main base by tractor and dogteam.

An extensive scientific program began, including meteorology, cosmic radiation and magnetic studies, vertebrate and invertebrate zoology, bacteriology, auroral and meteor studies, glaciology and oceanography.

Time was short and the broadcasts back home took a backseat to the real purpose of the expedition. By the time the second long night came, in 1935, interest in the States had dimmed a bit. Broadcasts continued, but somehow it wasn't as exciting to the home listeners.

Still, it had been an interesting time, that previous year. A leading radio magazine put it this way:

"Never before has an expedition offered so many radio opportunities to broadcast listeners, shortwave experimenters and amateurs . . . a rare opportunity to share in the reception of actual broadcasts from the 'bottom of the world!' " PC



"Instant airfields" permit Israeli fighters to remain at strategic points for use on a moment's notice. This saves time and fuel. Also, the airport itself can be quickly relocated for maximum security.

Israel's "Instant" Military Communications

A Look Inside The Amazing Mobile Communications Units That Israel Uses To Establish "Instant" Military Airfields During Combat

BY ANTON KUCHACEVICH ze SCHLUDERPACHERU

We are somewhere in the southern part of Lebanon. The government of Israel is in the process of moving in military forces. The year is 1982. A large military cargo aircraft makes its final approach turn just before landing on a desolate airstrip just recently captured.

The cargo door lowers and within a few minutes, out roll several small khaki vehicles, including one that looks strangely different from the others. It quickly maneuvers to a point near one side of the landing strip where it rolls to a stop. The driver wastes no time in hopping to the ground and opening up various panels on the vehicle. As he works, with a seeming lack of effort, the vehicle begins to change shape.

Within minutes, antenna masts are erected and operating positions are discernable. It has been less than fifteen minutes since the vehicle made its first appearance on the ground; it is being staffed by five crew members, now taking their places at the controls, plugging in microphones and headsets, adjusting their chairs. And, presto —the once limited-capability airstrip has been instantly transformed into a full-fledged combat airfield, complete with two air traffic controllers, one telephone operator, one tactical communications operator, and a tower commander! Here is the ATC/4950/AM in action, one of Israel's tools for establishing ground/air communications during the type of unique and highly mobile warfare encountered in the Middle East.

The highly mobile and portable control tower can now communicate with fighter aircraft, transports, and cargo aircraft requiring the use of the field. At any time, when the need for the airfield is over, the whole station can be closed down, packed up, and flown to another site, or it can drive itself over almost any terrain.

There is, in fact, a whole series of these little mobile military control towers being produced for desert warfare by a company called Electronics Corporation of Israel, Ltd. (of Tel Aviv, Israel).

The ATC/4950/AM happens to be the smallest of the stations. Others are far more sophisticated and approach the utility and creature comforts of any full-fledged control tower at a medium-sized airport.

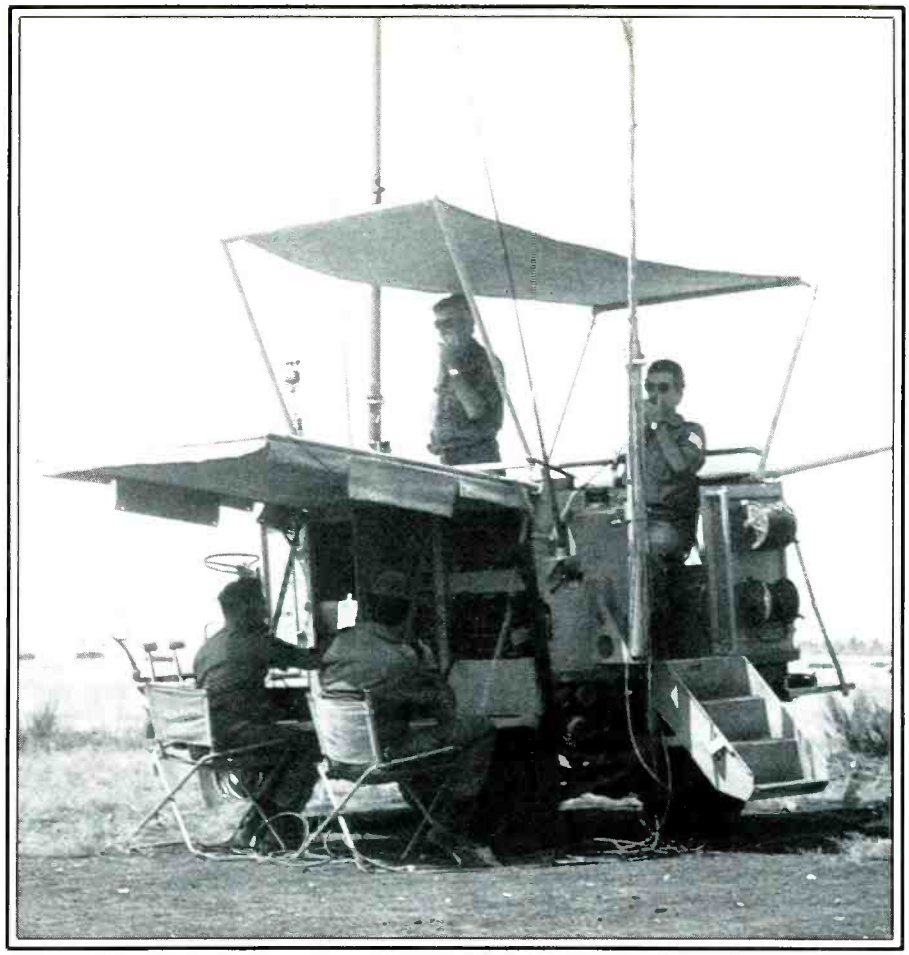
Of completely modular construction, the ATC/4950/AM is comprised of four main units. The controllers' desk, or "SU-1" module, contains all communications gear, meteorological instruments, lighting functions (including a runway lighting system control and light gun, telescoping antenna masts, antenna distribution, panel power distribution board, PA system, siren, and a complete field telephone exchange). Each of two controllers operates independently and uses the equipment located at his/her post, which also includes a desk. A set of cockpit minilights enables operation during blackout periods. The solar protection shade above the SU-1 can (if desired) be folded out of the way in seconds.

The communications equipment features operation in the VHF aero band (118 to 136 MHz), the UHF aero band (225 to 400 MHz), and SSB below 30 MHz, tactical communications and landline telephones.

The "SU-2" module is a storage unit for masts, cables, chairs, digging tools, and whip antennas. The "SU-3" module is a storage cabinet for the meteorological equipment, first aid kit, and five 20-liter jerry cans for fuel and drinking water. The "SU-4" module is a short flight of stairs.

The electrical system is supplied from 24 VDC (180 AH) batteries or from a 24 VDC (3 KVA) gasoline generator.

The vehicle which transports the station is a flatbed version of the Jeep CJ5 with mod-



It's hard to believe that only a few moments before this picture was taken this was little more than a jeep. Now it's a complete mobile communications center and air traffic control tower. This unit is called the ATC/4950/AM.

The ATC/4952/M is cleverly designed so that it can be a fully-functioning combat zone control tower within moments after arriving on the scene.

ified fuel and electrical systems. The 4-wheel drive vehicle has a 300-mile driving range from a single tank of fuel. In addition to its capabilities as a control tower, the unit can also be used for rescue missions, delivery of food and medical supplies, evacuation of injured in cases of natural disaster. It can also be used as a mobile communications center or forward observation post.

A bigger brother to this unit is the ATC/4954/AM, which is mounted on a command truck. The control tower can be in full operation within five minutes after the vehicle arrives at a landing area. The unit accommodates two control tower operators plus a commander and, in addition to having fully air conditioned operating facilities, it has double-paned and tinted observation windows for use under all weather conditions.

When on-scene, the operating position, which also houses the antennas and masts, elevates to a height about 20 feet above ground level in order to provide enlarged viewing range and increased communications coverage. This can be fully operational, even on 100 mph winds.

A bed is even provided for night duty!

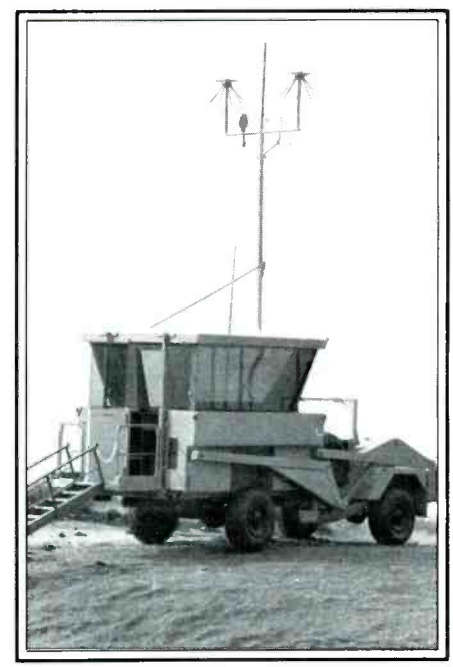
The largest version of the tactical control tower is known as the ATC/4952/M and comes closest to being a replica of a standard permanent airport control tower. Yet it is mounted on a heavy-duty truck frame and can be moved from place to place and put on the air in minutes.

The "4952," which is air conditioned, accommodates a crew of four at a 3-position controllers' console. It has two UHF transceivers, two VHF transceivers, a VHF direction finder, an SSB transceiver for HF operations, two "hot line" telephones, as well as full meteorological instrumentation.

Like the AM/4954/AM, this station can also become elevated to almost 20 feet in height when on-station. Inside the "4952" there are comfortable work stations with cushioned swivel chairs and desk surfaces. Indeed, this unit is probably better appointed than the control towers at some airports; you'd hardly know that it is a rough 'n' ready command post that can be pressed into service under just about any weather or combat conditions.

These three units offer the Israeli military an enormous tactical advantage, vastly increasing the safety and utilization of any landing area where they might be assigned. Without them, hours or days might have to be devoted to the establishment of comparable ground communications facilities, and in the fast-moving type of combat which is common to the Middle East, mobile air traffic control towers have become one of Israel's most versatile and novel communications tools—custom tailored to meet that nation's unique military requirements. They have been in constant and heavy use throughout all combat zones into which Israeli forces have been thrust. PC

Here's the ATC/4952/M packed up and ready to move on to a new location.



The ATC/4954/AM is made with a "pop-top" concept that elevates it 5.2 meters (almost 20 feet) into the air for better visibility and communications range.

RADAR REFLECTIONS

RADAR DETECTORS AND THEIR USE

BY JANICE LEE

Radar Not Effective On Bridge Speeders

If the California Highway Patrol wants to catch speeders on the Golden Gate Bridge, it's going to have to do it the old-fashioned way, because modern radar isn't working.

CHP officers using radar to enforce the 45 mph limit on the span say problems unique to the bridge made the electronic speed checkers useless, according to Mike O'Brien, spokesman for the local CHP office.

The main problem is that the bridge is made almost entirely of steel.

"This entire roadway is bordered by metal," throwing off the radar, he said.

The situation is complicated because cars are going north and south separated only by cone markers.

Pennsylvania Police Nab Speeders Out Of Jurisdiction

Speeding charges by the Hopewell Borough Police Department against several drivers will be dropped while an undetermined number of motorists have already paid fines over a 15 month period for charges which may not have held up in court.

Following completion of a survey requested by the Bedford County courts, borough officials learned recently that the police department, in apprehending speeders using an electronic speed device along Route 915 as they crossed what was believed to be the borough line, was actually out of its jurisdiction. The survey revealed that the borough line which leads into Broad Top Township falls about 75 feet short of that shown on maps which have been used by the borough since the turn of the century.

Approximately 10 motorists who have fought the speeding charges will be the big winners. But a marked discrepancy exists between some officials and a Broad Top Township resident regarding the number of people who have already pleaded guilty to the charges and paid the fines.

Lawrence Miller of Hopewell RD, who has contended for several months that the borough line was wrong, recently said that based on conversations he has had with people apprehended at the spot, as many as a thousand drivers may have been caught in what has now been determined to be an illegal trap.

But Hopewell District Justice Charles O. Guyer, who has processed the traffic violations, said that his estimate of drivers apprehended at the trouble spot and awaiting prosecution in his office will be dropped. Court cases pending for four drivers who have appealed the charges are also expected to be dismissed.

In view of the findings, Guyer said, the question remains whether or not there are any options open to those people who have already paid fines. He noted that he does not know if the drivers could contact the Bureau of Motor Vehicles and request the convictions be overturned.

David Chisholm, mayor of the small town with a population of 255, said the police department, because it is "unable to prove jurisdiction," will inform the District Attorney's office that it has been unable to establish jurisdiction in the cases and those in the Hopewell District Justice's office will be dismissed.

As for the others who have been apprehended before the boundary line problem came to light, Chisholm contends they unfortunately have no options. "It is my understanding they can't benefit from this. We're not dealing with people who didn't do something wrong. We're prepared to prove them guilty (of speeding) but we didn't have jurisdiction."

Just how the "wrong" boundary line came to be shown on all available maps, no one is certain. But Chisholm speculated that the problem probably began at the Courthouse prior to 1909.

County Police Heeds Public On Radar Use

St. Louis, Missouri County police will stop using radar to catch speeders at the times and places most motorists complained about—at the bottom of hills, in areas where the speed limit drops, and during rush hours.

The department has adopted, for the first time, a policy on the use of traffic radar as a result of a citizens survery conducted last April. The new policy emphasized the use of radar to prevent traffic accidents.

The radar survey is the latest of three recently completed by county police to determine what the public thinks of their service.

Three hundred residents of unincorporated parts of the county, half of whom got speeding tickets recently, were questioned by telephone on the department's use of radar. All of the non-violators and 95 percent of the violators agreed that the police should use radar.

"That was a little surprising," a police official said.

But many disputed why, where, when, or how radar should be used. Of those who had already gotten tickets, 41 percent said they believed police used radar to catch speeders and 27 percent said they used it to reduce accidents. Of respondents who had not gotten ticketed, 51 percent said radar was used to cut down on accidents and 31 percent said to catch speeders. Only 15 percent of both groups said police used it to deter speeding.

When asked why police should use it, 32 percent of the non-violators and 32 percent of the violators said it was used as a deterrent. Thirty-six percent of the non-violators and 28 percent of the violators said it should be used for accident reduction. About 20 percent of both groups said it should be employed to catch speeders.

More than 90 percent of both groups said radar should be used at high-accident locations, in school areas, and on major highways and roads. About 79 percent objected to the bottom of a hill and areas where speed limits changed.

More violators than non-violators objected to radar in unmarked cars and in aircraft, the report noted. About two-thirds of both groups objected to the use of radar in peak traffic hours.

Asked how much above the posted speed limit one should be going before getting a ticket, 61 percent of the non-violators said one to five mph and 65 percent of the recent offenders said six to ten mph.

"The responses indicate most people think we used radar to catch or deter speeders but would like us to use it primarily to reduce accidents with injuries," the report concluded.

Chisholm, Minnesota Officer Gives Speeders A Break

If you're speeding on a Minnesota highway, State Trooper Ron Erickson's the guy you want behind the radar. As a public education officer, he issues warnings—not tickets—and he likes his work. "It's much easier to tell someone they should use their turn signal than to tell them they didn't use it," he says. A radar-operated electronic sign on top of his parked squad car tells motorists how fast they're going. One driver stopped when she read her speed. "Is that accurate?" the woman asked Erickson. "I was going 60 and it only said 54."

Washington Radar War Doing Little To Halt Speed Problem

The Colfax radar war has increased city revenues but has done little to reduce the number of motorists speeding through town, city officials say.

The Colfax Police Department continues to issue 40 to 50 speeding tickets a week, "but, in all honesty, I can't say it has done that much good," Chief Roland Watts said.

Colfax's Main Street is U.S. Highway 195. It carries traffic going from Pullman and Moscow, headed to the cities of Spokane and Seattle.

Tougher enforcement of the 25 mph speed limit resulted in collection, in the first four months of 1984, of $22,500, up from $2,600 during the same period a year earlier.

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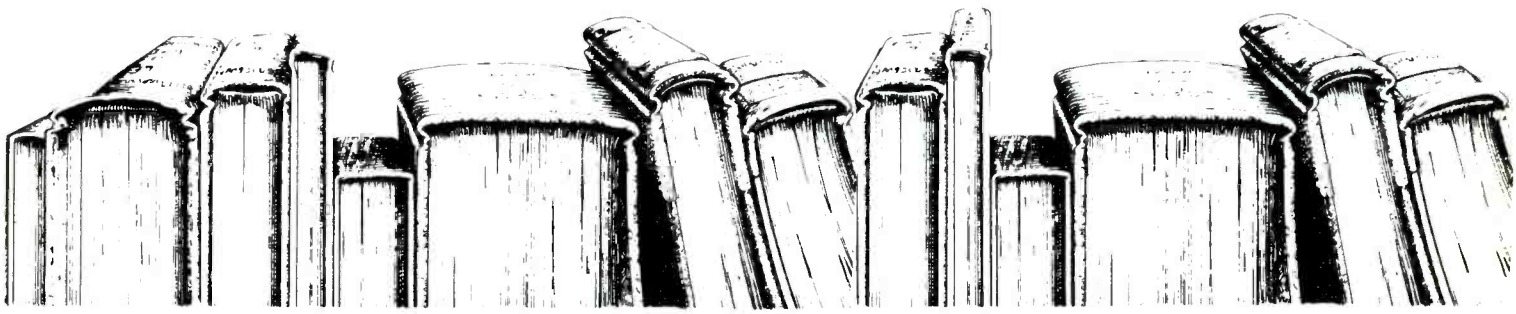

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SURVIVAL

BY R.L. SLATTERY

ESTABLISHING SURVIVALIST COMMUNICATIONS SYSTEMS

Mobile Command Center—Cheap!

Some individuals and groups working with survival, emergency, and disaster communications have assembled rather formidable mobile command posts or communications vans. This means that somebody has gone to the trouble to acquire an old bus or truck and equip it with half-a-ton of antennas and electronics.

In the event of a power blackout, natural disaster, or whatever, the station can immediately be rushed to an area where it can be put into action as a temporary base station—the central dispatching point for mobile units participating in relief operations.

Okay, okay, it's a great idea—but every individual or group doesn't have the finances or time to gather together the ingredients for such a fancy portable base station or command post. This is not to say that there is any less need for such a van. There is a quick 'n dirty way "out."

Some communications groups are fortunate enough to have a bus that they can use as a communications van.

John (SSB-329B) went whole-hog with a 15-foot foldaway tower 45 feet in the air. This is topped with a V-Quad antenna.

Actually, I got this idea during a visit I made a while back to a survival training group for which I did some consulting work. They had a number of patrol vehicles and manpack units in the field; these units were spread out over many square miles of wilderness. They needed something more extensive than a portable rig as a command post in order to exercise control over their spread-out network. They started with a car, and were lucky enough to have a van at their disposal. Although any vehicle might have been pressed into service, they took up a collection from within the membership and found that they could purchase a 10-year-old van or wagon for relatively little money. They painted their vehicle in camouflage colors, although for other purposes it might have been done up in international (florescent) orange.

The rear wheels were fitted with oversized snow tires to give it a better chance to travel down muddy roads, gravel surface roads, snow covered roads, or other difficult areas. Obviously, a 4-wheel drive vehicle would be the most suitable vehicle for rough terrain, but in this instance they took what they could get at a particular price.

The vehicle was equipped with appropriate electronics, including a communications receiver, a scanner, a CB transceiver, and a VHF rig. I should point out that, even though the van was a bit of a relic, the electronics gear was anything but beat-up old junk. Since it had to be relied upon for vital communications, it was found advantageous to use the best equipment possible.

The vehicle's electrical system should, of course, be kept in top condition, with the battery fluid level maintained. The vehicle's engine will have to be used from time to time so that the alternator can recharge the battery (or batteries) used to run the electronics; that will mean an ample gasoline top-off prior to going off into a wilderness area. It was decided not to carry extra gasoline in jerry cans because of the possible safety hazards. However, extra engine oil, anti-freeze, and water was always on hand "just in case." A gasoline generator or solar cells could have been used in place of the vehicle's engine for charging the batteries, but this was a real budget job and it was felt that the engine could handle such tasks without the additional costs of a generator or solar cells. Solid state equipment draws relatively little juice when receiving, and providing that the station isn't doing continuous transmitting, there should not be excessive electrical drain. Actually, lights and other auxiliary equipment will account for more power drain than the radios.

A good mobile antenna might well have sufficed for adequate coverage, but in this particular case mobile antennas were not sufficient to meet the demands of the system for communications over long distances. It was felt that the best bet would be to use a regular base station antenna mounted considerably higher than the vehicle. Not possible you say? Nothing is impossible!

Here's the clever way this group had a complete base station antenna right in the mobile unit, ready for use at any temporary location.

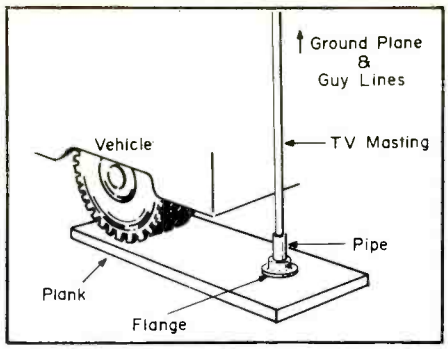
First, get a plank of wood at least ½"-thick (plywood should be fine), measuring about 6" × 24". At one end of the plank, attach a pipe flange. Into the flange, screw a 6" to 2' length of threaded pipe. This is to the base for the antenna, so make sure the base is wide enough to accept the mounting pole or mast it is to accommodate.

In the installation I saw, the mounting pole consisted of several sections of TV masting. Atop these sections, which can probably be raised to about 10' high without the need for guy wire, a ground plane or other lightweight antenna may be mounted.

The strength to support the antenna system is acquired when the vehicle's wheel is driven over one end of the plank and stopped when the wheel is securely holding down the plank in a level or flat position. Once held in this position, the antenna mast can be fitted into the pipe/flange base. It can be guyed if necessary (in fact, if the location selected for the portable command post is windy, it *should* be guyed).

The location selected for the command

Jim from Rosedale, New York, fit a base station into his passenger car to make a mobile command post.



Basic design of the antenna mounting described in the text.

Here is how the communications van looks in its camouflage paint.

post will depend upon the nature of the use to which it is put. Atop a hill or mountain will offer the best signal coverage, but may not be advisable if there is severe weather or if the position is to remain concealed (of course, if the position is to remain concealed, be sure to put camouflage paint on the masting and antenna, but tape over the antenna connectors before doing so).

For general emergency use of such a command post, here are some other items it should carry:

1. Water
2. Dried or canned food
3. Cooking/eating utensils
4. Maps
5. Flashlights and extra batteries/bulbs
6. Road flares
7. First aid and snake bit kits
8. Blanket(s)
9. Pad, pencils
10. Clock
11. Compass
12. Personal items (soap, towels, toothbrushes, clothing, etc.)
13. Tool kit
14. Binoculars
15. Insect spray/repellent
16. Hunting knife
17. High-intensity vehicle spotlight

Your station, thus equipped, is a self-contained and completely portable emergency or survival communications center; a miniversion of a huge communication van costing tens of thousands of dollars. Nevertheless, it can be pressed into service for any number of purposes for the good of the community, or your own group, or your family. PC

SCANNER SCENE

BY CHUCK GYSI, N2DUP

MONITORING THE 30 TO 900 MHz "ACTION" BANDS

When I bought my first pocket scanner about a decade ago, I installed crystals for the local police and fire departments and the rescue squad I belonged to. After a while, I decided I wanted a little more variety than working fires and cops and robbers. I went to the scanner store and looked over the bank of available crystals and drove home with four mobile telephone crystals.

Apparently I wasn't the first to discover this listening phenomenon. At about the same time, a columnist for a major metropolitan newspaper wrote about how she also had a pocket scanner loaded up with police crystals for her neighborhood when she caught wind that she also could eavesdrop on mobile phones.

There are a lot of listening conversations to be heard on the mobile phone channels if you listen in enough. Outside of hearing businessmen calling their wives to tell them they'll be late and then hearing them call their girlfriends for a date, or hearing a big business transaction taking place, you'll hear some calls out of the ordinary. For instance, a TV station may use mobile phones to send news crews on a breaking story, the rationale being that the competition is monitoring the station's private channels and they don't want to tip them off. Police detectives may use mobile phones during an investigation when they need to make calls from the field. In addition, mobile command posts in many large cities usually have a mobile telephone on board to relay important landline calls from the scene of a major fire or other disaster. Quite frankly, you never know who you may hear on the mobile telephone channels. If you were to take a look at the individuals licensed for mobile telephones in the Federal Communications Commission's files, you'd see movie actors, entertainers, governors, politicians, district attorneys, philanthropists, you name it.

Until recently, mobile telephone service in metropolitan areas was limited to a small number of individuals and waiting lists for service were a mile long. But now with all the ballyhoo you've been hearing, a new mobile telephone service called cellular phones is available. The new cellular service operates in the 800 MHz band; the older mobile phone services operate in the VHF low band, VHF high band, and UHF band. Like repeater operation, mobile phones operate on one frequency, the input, and hear the conversation on the output frequency. So that the mobile operator doesn't have to play around with a push-to-talk switch, the operation is duplex—in other words, both parties can hear and talk to each other at the same time without waiting for the mobile operator to let up on a microphone switch. The operation is the same as the normal phone service you have at home. To prevent the mobile's transmitter from desensitizing the mobile's receiver, since both are in operation at the same time, a mobile duplexer is used in the transceiver.

Here's the monitoring post of William F. Stepp, Jr. in Ashland, Ohio. Not only is William into scanners and shortwave listening, it also seems video is another hobby of his.

There are two ways to obtain mobile telephone service (that is if you like paying, or can afford, steep monthly charges). One way is through the local telephone company. The other way is through a radio common carrier, a company in the business of providing mobile telephone and/or paging service. Because of the distinct difference between telephone companies and radio common carriers (RCCs), the FCC has set aside frequencies for each group to use.

Although most mobile phone users switched off the low-band channels long ago, there is still some use of the frequencies in some metropolitan areas. The following is a list of telephone company mobile telephone channels:

Channel Designator	Base (Output) MHz	Mobile (Input) MHz
ZO	35.26	43.26
ZF	35.30	43.30
ZH	35.34	43.34
ZM	35.38	43.38
ZA	35.42	43.42
ZY	35.46	43.46
ZR	35.50	43.50
ZB	35.54	43.54
ZW	35.62	43.62
ZL	35.66	43.66
JL	152.510	157.770
YL	152.540	157.800
JP	152.570	157.830
YP	152.600	157.860
YJ	152.630	157.890
YK	152.660	157.920
JS	152.690	157.950
YS	152.720	157.980
YR	152.750	158.010
JK	152.780	158.040
JR	152.810	158.070
QC	454.375	459.375
QJ	454.400	459.400
QD	454.425	459.425
QA	454.450	459.450
QE	454.475	459.475
QP	454.500	459.500
QK	454.525	459.525
QB	454.550	459.550
QO	454.575	459.575
QR	454.600	459.600
QY	454.625	459.625
QF	454.650	459.650

Cellular mobile telephone service provided by telephone companies operates with the cells transmitting on frequencies in the 880-890 MHz band, and the mobiles operating in the 835-845 MHz band. The combinations of usable frequencies are almost endless in a system because the cells are low power and the frequencies can be reused in the same system if necessary.

The following is a list of frequencies used by radio common carriers to provide mobile phone service. Because many RCCs also provide paging service, you'll also hear tones on some of these frequencies.

Channel Designator	Base (Output)	Mobile (Input)
1	152.030	158.490
3	152.060	158.520
5	152.090	158.550
7	152.120	158.580
9	152.150	158.610
11	152.180	158.640

13	152.210	158.670
21	454.025	459.025
22	454.050	459.050
23	454.075	459.075
24	454.100	459.100
25	454.125	459.125
26	454.150	459.150
27	454.175	459.175
28	454.200	459.200
29	454.225	459.225
30	454.250	459.250
31	454.275	459.275
32	454.300	459.300
33	454.325	459.325
34	454.350	459.350

Radio common carriers providing cellular mobile telephone service operate with the cells on the 870-880 MHz band, and the mobiles in the 825-835 MHz band.

As you listen to the mobile phone channels, you'll hear a tone on unused channels. Some scanners, such as the former Regency ACT-T16K programmable model, included a filter in the receiver so you didn't have to listen to the channels with the tone as it was scanning.

Here's a listing of mobile telephone channels used by telephone companies in major cities:

Albuquerque: 152.510, 152.570, 152.630, 152.750, 152.810.

Atlanta: 152.510, 152.540, 152.600, 152.630, 152.660, 152.690, 152.750, 152.810.

Baltimore: 152.510, 152.630, 152.750, 152.810, 454.400, 454.500.

Boston: 152.510, 152.540, 152.600, 152.660, 152.780, 454.425, 454.475, 454.500, 454.525, 454.550, 454.600.

Chicago: 152.510, 152.570, 152.630, 152.690, 152.720, 152.750, 152.780, 152.810, 454.375, 454.400, 454.425, 454.450, 454.475, 454.500, 454.525, 454.550, 454.575, 454.600, 454.625, 454.650.

Cincinnati: 35.42, 152.510, 152.630, 152.750.

Cleveland: 152.510, 152.630, 152.690, 152.750, 454.400.

Dallas: 152.510, 152.630, 152.690, 152.750, 152.810, 454.400, 454.475, 454.550, 454.600, 454.625, 454.650.

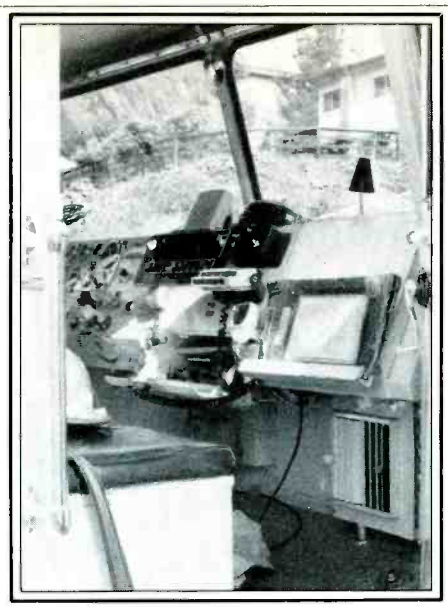
Denver: 152.510, 152.540, 152.600, 152.630, 152.690, 152.750, 152.780, 152.810, 454.375, 454.400, 454.425, 454.450, 454.475, 454.500, 454.525, 454.550, 454.575, 454.600, 454.625, 454.650.

Detroit: 152.570, 152.600, 152.630, 152.690, 152.720, 454.375, 454.475, 454.525, 454.575, 454.625.

Houston: 152.510, 152.630, 152.720, 152.750, 454.400, 454.425, 454.450, 454.475, 454.500, 454.550, 454.600, 454.650.

Indianapolis: 152.510, 152.540, 152.630, 152.690, 152.750, 152.810, 454.375, 454.400, 454.425, 454.475, 454.500, 454.525, 454.550, 454.600.

Kansas City: 152.510, 152.540, 152.630, 152.690, 152.750, 152.780, 454.375, 454.425, 454.450, 454.475, 454.550, 454.650.



This is the radio installation of Station 19 of the San Jose Fire Department in California. F1 is Channel 14, 154.280; F2 is Channel 15, 154.010; F3 is Channel 16, 154.115; and F4 is Channel 17, 153.980. Robert Brown, who snapped this picture, presently uses a Regency HX-1000 and a Bearcat 200 with a Hamtronics CVR-806 converter for 800 MHz.

Las Vegas: 152.510, 152.540, 152.570, 152.600, 152.630, 152.660, 152.690, 152.720, 152.750, 152.780, 454.375, 454.425, 454.450, 454.475, 454.525, 454.550, 454.575, 454.600, 454.625, 454.650.

Los Angeles: 35.38, 35.46, 152.510, 152.570, 152.630, 152.690, 152.720, 152.780, 152.810, 454.400, 454.450, 454.500, 454.550, 454.575, 454.625.

Miami: 152.510, 152.570, 152.600, 152.630, 152.660, 152.720, 152.750, 152.780, 454.375, 454.400, 454.425, 454.450, 454.500, 454.550, 454.600.

Milwaukee: 152.510, 152.570, 152.600, 152.630, 152.720, 152.780, 454.400, 454.475, 454.600.

Minneapolis/St. Paul: 152.570, 152.600, 152.630, 152.690, 152.750, 152.780, 152.810.

Nashville: 152.510, 152.570, 152.630, 152.690, 152.780, 152.810, 454.375, 454.450, 454.475, 454.525, 454.600, 454.625.

Newark, NJ: 152.540, 152.750, 152.810, 454.425, 454.475, 454.575.

New Orleans: 152.510, 152.630, 152.690, 152.810.

New York City: 35.50, 35.66, 152.510, 152.570, 152.630, 152.690, 152.720, 152.780, 454.375, 454.450, 454.525, 454.550, 454.625, 454.650.

Oklahoma City: 152.510, 152.540, 152.630, 152.660, 152.720, 152.750, 152.780, 152.810, 454.375, 454.400, 454.425, 454.475, 454.500, 454.600, 454.650.

Philadelphia: 35.50, 152.510, 152.540, 152.630, 152.690, 152.750, 152.810, 454.400, 454.425, 454.475, 454.500, 454.550, 454.575, 454.600, 454.650.

Phoenix: 152.510, 152.540, 152.570, 152.600, 152.630, 152.660, 152.720, 152.750, 152.780, 152.810.

Pittsburgh: 35.42, 35.66, 152.510, 152.630, 152.690, 152.750, 454.375, 454.400, 454.425, 454.475.

St. Louis: 152.510, 152.570, 152.630, 152.660, 152.690, 152.750, 152.780, 152.810, 454.375, 454.425, 454.450, 454.550.

Salt Lake City: 152.510, 152.570, 152.630, 152.690, 152.750, 152.810.

San Diego: 35.38, 35.46, 152.510, 152.570, 152.630, 152.690, 152.810, 454.550.

San Francisco: 152.510, 152.540, 154.630, 454.550.

Seattle: 152.510, 152.540, 152.630, 152.660, 152.690, 454.375, 454.450, 454.500.

Washington: 152.510, 152.600, 152.630, 152.690, 152.720, 152.750, 152.780, 152.810, 454.375, 454.425, 454.475, 454.525, 454.550, 454.575, 454.625, 454.650.

Now, we'd like to hear from you here at *POP'COMM*. Send us lists of frequencies that you listen to, and while you're at it, send us a photograph of your monitoring shack. Write to: Chuck Gysi, N2DUP, Scanner Scene, Popular Communications, 76 North Broadway, Hicksville, NY 11801. PC

ON THE LINE

BY GORDON WEST, WB6NOA

NEW AND EXCITING TELEPHONE TECHNOLOGY

Car Phones Under $1,000!

Our November issue cellular telephone feature article generated a landslide of mail! Probably the most often asked question was when the sets would be available for less than $1,000. Believe it or not, mobile phones are available right now in that price category—and cellular telephones may soon follow.

Let's face it, everyone would like a car telephone. Only the rich and famous have been able to afford them in the past. There's a much brighter outlook for the future, and prices continue to drop.

"We have learned that at least two manufacturers plan to bring out a cellular phone with a list price of about $1,000 within a year or so," comments one industry insider. I have heard the same report, too, from mobile telephone dealers; the present $2,500 price tag will probably drop into the $1,000 category by the end of this year.

Good mobile phone service is available in smaller cities that may not have the sophisticated cellular telephone systems. Almost every city in the country is served by radio common carrier mobile telephones, AT&T VHF and UHF telephone systems, as well as trunked radio telephone systems.

While not as sophisticated as cellular telephone systems, the radio common carrier (RCC) and the telephone company systems use individual VHF or UHF channels for placing and receiving phone calls, retrieving messages, and basically staying in touch with modern, full-duplex telephone sets. Instead of a gaggle of cellular telephone repeaters constantly tracking your movements, the present VHF and UHF telephone systems use mountain top sites that give you several hundred miles of roaming. In smaller cities where usage is not high, there is usually a vacant channel to place a phone call on. In larger cities, your equipment will find an open channel and alert you that a dial tone is available. While during rush-hour time this might take up to 3 minutes, you will ultimately get through.

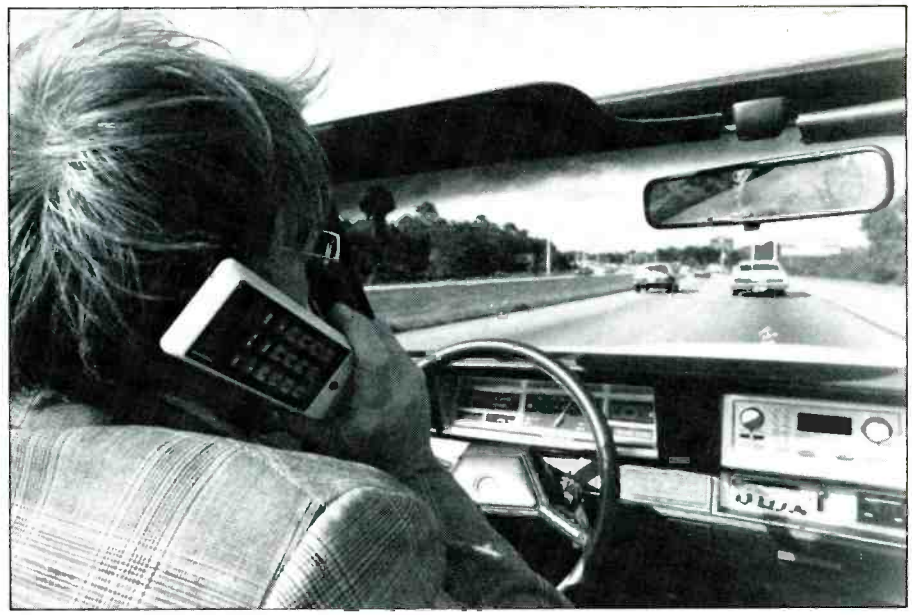
The common VHF and UHF traditional mobile telephone is also a good performer. The equipment and the associated base stations have been around for many years, and there will be few surprises.

Except when you go into long tunnels, you should find VHF or UHF mobile phone clarity just about as good as proposed cellular telephone clarity. You just don't get as many chances of a vacant channel every time you pick up the handset.

The rates are also lower for traditional VHF or UHF mobile telephones. Typical monthly rates are around $30, with channel usage around 20 to 30 cents per minute. This is substantially lower than the $100 monthly fee for cellular telephones with a 50 to 75 per minute channel usage fee.

You will also find that the equipment for VHF and UHF mobile phones is readily available—especially used equipment replaced by the more expensive cellular telephone equipment. It's quite possible to find a 25-watt VHF or UHF, full-duplex telephone system for as low as $800 slightly used. A UHF mobile telephone antenna is only slightly taller than a cellular telephone antenna—it doesn't have the telltale curly coil in the center.

In many rural areas of the country, operator-assisted mobile phone systems are alive and doing just fine. Instead of scrolling through your cellular telephone keypad and looking at alphanumeric numbers on people who have tried to call you, out on the plains of Kansas a friendly operator will let you know that Mr. Smith called and give you an elaborate message. Where else but on a rural mobile phone circuit can you find a friendly operator that will wish you a pleas-



Conventional VHF RCC (radio common carrier) telephone equipment is a great deal!

IMTS (Improved Mobile Telephone Service) UHF equipment is a good buy.

Staying in touch with RCC or IMTS gear can be much less expensive than using cellular systems.

ant trip and to stay warm as you head out of town on a cold, snowy night!

It's also possible to choose VHF or UHF mobile telephone equipment that may later be modified for cellular telephone use. Let's say your city won't go cellular until 1988, but you want to get on the air today with some sort of mobile phone system. Choose a full-duplex mobile phone system that may later be adapted to cellular service. While the head looks exactly the same, you will find that a cellular transceiver can be added in the trunk at a later date. This will allow you the transition into cellular without having to tear everything out of your automobile.

While cellular telephone will ultimately become the most popular and low-cost mobile phone communications system available, regular VHF and UHF service is still a bargain, and used equipment is even more cost effective than ever.

Most VHF and UHF telephone systems are available through land mobile radio dealers or business radio dealers listed in the Yellow Pages.

Yet another low-cost mobile phone system is still trying to get started, called the Personal Radio Communications Service (PRCS). The idea was developed several years ago by General Electric, and the system is similar to a very long-range cordless telephone. You would install your own base transponder on your present telephone set at the house or at the office. You would then install a CB-looking transceiver that goes in the vehicle—an installation just as easy as installing a CB set.

Both the base and remote unit would only cost around $400, and would operate at 900 MHz with 5 watts output.

In actual testing that I did with a GE PRCS system in Chicago, I found that our direct home-to-mobile-base range was about 5 miles—plenty for a "long distance cordless phone" setup. I also could switch to a mountain top repeater that would give me 60 miles range. The repeater would merely extend the range of the home telephone and car telephone setup. While it would cost a monthly fee of $10 to go through a repeater, my local range would require no monthly fee because the equipment is all at my house and I already own it.

Right now, General Electric is operating an experimental station in Syracuse, New York. They are only waiting for FCC approval before they launch an extensive marketing program for the PRCS system.

Although the PRCS system sounds electronically simple, it's really not. Microprocessor chips will keep both the mobile and base stations scanning for open simplex or repeater channels for incoming or outgoing calls. It is proposed that there will be 30 LTC's (low talk channels) and 96 RTC's (repeater talk channels). This would allow you to stay in touch with your wife while she is in her car as you drive around town, direct or through a $10-per-month repeater. Your equipment would automatically limit your conversation to about 5 minutes during heavy telephone use time. If you operate simplex, you can talk to your heart's content—similar to GMRS radio or (heaven forbid) citizens band radio.

Your set will also do such exotic things as automatic identification, automatic listening to incoming calls, and automatic power reduction when you are close to the station with which you are communicating.

As you can see, there are alternatives to cellular telephone coverage. Local radio common carriers and your local phone company already offer excellent VHF and UHF coverage with conventional, full-duplex setups. PRCS phones are still a year off, but very well may be your next choice. Trying to modify your present cordless telephone for car telephone coverage beyond two houses away is a futile exercise.

With so many options for telephone coverage in your car, there's no reason to stay out of touch next time you get behind the wheel! PC

Note: The "Cellular Phone Manufacturers" list in the November 1984 issue of Popular Communications *was reprinted from* Personal Communications Magazine, *4005 Williamsburg Ct., Fairfax, VA 22032, 703/352-1200.*

LISTENING POST

BY GERRY L. DEXTER

WHAT'S HAPPENING: INTERNATIONAL SHORTWAVE BROADCASTING BANDS

By the time you read this there should be two more shortwave stations on the air from the United States. The Assemblies of Yahweh station WMLK (see *POP'COMM*, August, 1984) based in Bethel, Pennsylvania, and KCBI, operated by the Criswell Bible Institute of Dallas, Texas were to have started broadcasting sometime during the November/December period. At this point, frequencies and times were not fully settled so we can't give them to you. But keep an ear peeled in the area of 15.100 to 15.300 and 17.700 to 17.900, probably from around 1700 to 0000 GMT. WMLK can be reached at P.O. Box C, Bethel, PA 19507. KCBI's address is P.O. Box 1809, Dallas, Texas 75221. There's still more new U.S. shortwave broadcasting activity ahead and we'll keep you advised on the developments.

The Voice of America has joined the many worldwide stations carrying programs for DXers and shortwave listeners! The new VOA DX show is aired as part of the VOA "Magazine Show" on Thursdays at 1330 and 1730 and Friday at 0230 (Thursday night U.S. time) on the many VOA English service frequencies. Try this one at 0230 on 5.995 or 6.130 during the broadcast to Latin America.

The popular Radio Earth program continues to have more than its fair share of headaches. Disagreements with the management of WRNO have resulted in a cancellation of the WRNO/Radio Earth arrangement. Radio Earth was to have returned to its original host station, Radio Clarin, in the Dominican Republic. For the time being, the show will be done live from Clarin by Radio Earth host Jeff White, presumably at the same 0300-0400 time as before. Radio Clarin has apparently carried out planned improvements in its antenna system because the station is now putting out a much stronger signal. Clarin's frequency remains 11.700.

Computer snags have been holding up further publication of the innovative Radio Database International publications. A book covering the tropical bands was published earlier this year and the intention was (and still is) to publish semi-annual surveys of the international bands, in addition to the yearly tropical bands book. For more information, you can write Radio Database International at Box 300, Penns Park, PA 18943.

Another new publication is entitled *Home Service Stations Outside the Tropical Bands* just issued by the Danish Shortwave Clubs International (who publish the *Tropical Bands Survey* each year). The new 32-page booklet lists all active domestic broadcasting stations on shortwave above 5.900. Gilfer Shortwave carries this publication.

We had the pleasure of meeting Mike Witkowski a few weeks ago. Mike operates the SWL department of the ARRL QSL Bureau. Ham QSL cards intended for listeners which the ARRL Bureau receives are forwarded to Mike for distribution.

Billy Hunt uses an NRD515 in his Durham, North Carolina shack.

Mike says he has several hundred cards on file for listeners he cannot locate. Cards usually come in without the intended's address, just whatever call the listener uses. If you've done some ham band listening, have sent reports to hams and aren't known to Mike, it's possible he may have cards for you. Mike is currently holding cards for the following: WCT1DX, NR-100, WDX1BVM, WPE1CK, WDX1E, W1-SWL, WDX1IEC, W1-777, KA1GLG, SWL1-RR, WDX1USN, WA1-2214, SWL-W2, W2-298, W2-6088, WE2EXQ, WPE2IQM, WDX2CA, WDX2MM, WDX3IGS, WDX3PN, WDX3M, WDX3HRX, WPE3HQW, WDX4JWA, WDX4ENX, W4-16759, WDX5FOX, "SWL-Jim," SH-W5-109, SWL5HFX, WDXO5, WDX5AA, WPE5ABF, W5-10353/TA, WDX6HXN, WPE6BZB, WDX6AIP, WPE8CAY, WPE8DCC, SWL8-1251, WDX8KHV, KDX8A, WPE8ZCF, WDX9KHY, W9-16476, WAØ-138-82. If one of these ID's belongs to you, send a #10 self addressed stamped envelope to: Mike Witowski, 4206 Nebel Street, Stevens Point, Wisconsin 54481.

A Collins 75A1 graces the operating position of Ronald Jansen of North Hudson, Wisconsin.

Regular *POP'COMM* reporter Gary Hickerson of Ft. Smith, Arkansas supplies some recent African information. Guinea-Bissau is now using 5.475 and signing on around 0612 (variable) and can also be heard around 0001 when sign off occurs. The Canadian time station CHU has to be caught in one of its weaker moments in order to bag the Comoro Islands on 3.330.9 at 0300. The same holds true for Rwanda on 3.330. If you are looking for the Cape Verde Islands, try 3.930 up to sign off at 0002.

Mailbag

Alan Nacht of New York City says he uses a Kenwood R-2000 with a "New York City longwire." Could that mean you've found a successful way around the antenna-in-an-apartment problem, Alan? If so, how about describing it for us. Lots of readers are in the same boat and would be interested in how you solved it. Alan also wants the address of Radio Beijing. Just add "Beijing, People's Republic of China" on to the station name and you've got it!

What is "Radio Rainbow?" John Friberg of Concord, New Hampshire heard a station in Spanish with identifications for "Radio Rainbow" on approximately 6.837. We'd have to guess it to be a pirate or perhaps a clandestine. Anyone know for sure? John just got a Uniden CR-2021 receiver and says he is hooked on shortwave listening. We hope you'll check in often, John!

Stephen W. Phelps is a journalist in Colorado Springs and was an active listener back in the 1960's. Now, like so many others, he has returned to the fold. Steve notes that he finds the way news is played (or not played) on various broadcasts from other countries especially interesting; as is making comparisons to coverage (or non-coverage) of the same story in U.S. media. He uses a Hammarlund HQ-100 and an 80-foot longwire.

A 500-foot antenna aimed at Africa is aiding Keith Hill's listening in New York State. Keith is a member of "DX Newsline," which he notes is a computerized system one can call for the latest DX tips. If you are interested, the phone number is (301) 953-0777.

The antenna of Frank Stewart of Statesville, North Carolina does double duty, serving as a support for Frank's tomato plants as well! Frank says it must work because he hears stations from all over the world and his tomatoes are so large "it takes

only eight of them to make a dozen!" The "tomato antenna" is attached to a Radio Shack DX-160. Good grief! Next we'll be hearing about "pumpkin patch antennas" or lead-ins hooked to screen doors which filter out interference! Incidentally, Frank used to work for the Voice of Germany.

Steven Johnson of Omaha, Nebraska wonders about the address for Trans World Radio. They have several, Steve, and reports are best sent to the individual outlet you received; in your case B.P. 349, Monte Carlo 98007, Monaco. Steve also needs a manual or schematic as well as a source for spare parts for his Hallicrafters SX-110. You can write Steve at 4910 North 60th Street, Omaha, NE 68104.

Ronald Johnson of North Hudson, Wisconsin sends a photo of his monitoring station. Ron's listening interests cover a wide range, from Coast Guard stations to 2 meter FM as well as the SWBC bands. His equipment line up includes a Collins 75A1, Hallicrafters WR600, Sears programmable monitor, HW116 transceiver, Regency MR-10, and a Patrolman CB unit.

Another photo comes from Billy Hunt of Durham, North Carolina. Billy's shack includes a new Japan Radio Company NRD 515 with memory unit. For portable listening, he uses a Sony 2002. Antennas include a 94-foot longwire with preamp and a Sony AN-1 vertical active antenna.

Steve Pellicciari lives in Norwalk, Connecticut but checks in from San Diego, California, where he did some listening on vacation. He uses a Zenith Transoceanic but hopes to upgrade to one of the new keyboard entry, digital readout receivers soon. Steve's been listening for two years now.

Scraps . . . Kenneth West at WEZY Radio is right across the river from the Kennedy Space Center . . . Pat McDonough has added 65 feet of length to his antenna and is expecting lots of QSLs . . . Sheryl Paszkiewicz reports tentative loggings of Mozambique—9.618 and Gjirokaster, Albania on 5.020 . . . Larry Fravel used his DX-400 with a whip antenna on vacation, in contrast to his four antennas at home.

That's the bottom of the bag. Next month, let's hear from *you*. We're always happy to have your comments, questions, photos of you in your shack, high contrast copies of interesting QSLs, press clippings relating to radio, program schedules—anything you think might be of interest to Listening Post readers. Hope you will check in regularly.

This past July saw the annual Association of North American Radio Clubs convention. Shown here is the display of Universal Shortwave Radio of Reynoldsburg, Ohio.

Listening Reports

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

Albania Radio Tirana heard on 7.120 at 0246 in English with revolutionary folk songs, CW, and Woodpecker QRM. (Paszkiewicz, WI) 0135 with interest rates by world banks. (Gray, MI) 7.065 after 0000 with news and commentary. (Stewart, NC)

Algeria Radio Algiers heard at 2000 on 17.745 in English with news, ID at 2010. (Gray, MI)

Antigua BBC Relay on 6.155 at 0146, English with "Woodstock" music, ID at 0200. (Gray, MI)

Argentina RAE in English from 0200 to 0255 on 15.345, announcing 9.690, 11.710, and 11.755 in addition, but no luck hearing these. (West, FL) 11.710 at 1130-1158; excellent with news, review of Argentine films, QRM from Voice of Germany from 1158. (Fleming, MD) 15.345 heard at 1700 with news and music. (Miller, GA)

Ascension Islands BBC Atlantic Relay on 15.400 noted at 1620 in English, African news items, ID at 1625. (Gray, MI)

Australia Radio Australia, 15.320 at 0500 with news, "Jazz Australia." (Cedel, FL) 0300 to 0400 with world news, sports, Australian inventors. (Pellicciari, CA) At 2219 with commentary about Nuclear Free Pacific Movement. (Pastrick, PA) 9.580 at 1200-1400 news, sports, etc. (Cedel, FL) At 1200 with world news, weather, music. (Hunt, NC) 15.395 with news at 0200. (Miller, GA) At 2335 with pop music, ID. (Gray, MI) 15.160 with news and music to Asia and Papua New Guinea at 0430. (McDonough, PA) 17.795 at 0325 pop music, ID. (Gray, MI)

VNG time station on 12.000 at 0600. (Jackson, IL)

Austria ORF Vienna at 0130-0200 on 5.945 in English. (West, FL) In German to 0330 when switched to English. (Stewart, NC) 0130 with news and review of sports. (Miller, GA) 15.320 at 1245-1255 with "Austrian Report." (Fravel, WV)

Belgium BRT on 9.880 at 0030 with news in English. (Phelps, CO) 11.620 at 0101-0113 sign off, history of a town in Belgium, Belgian TV. (Fravel, WV) 17.610 at 1400-1440 in English with news, features, music. (Cedel, FL)

Belize Radio Belize on 3.285 at 0255 in English with a BBC program. (Shute, FL)

Brazil Radiobras in English at 0213 on 15.290 with report on alcohol production in Brazil to be sold to Bulgaria. (Gray, MI) 0200 to 0300 in English with news, weather, pop music. (Pellicciari, CA) Music and talk about plants in Brazil. (Johnson, NE) At 0158 in Spanish. (Shute, FL) 0145 to 0200 with English features after 0200. (Cedel, FL)

Radio Brazil Central, Goiania, 4.985 at 0549 in Portuguese. (Shute, FL)

Radio Aparecida, 11.855 at 0137 in Portuguese with announcement of 31 and 49 meter bands also in use. (Shute, FL) 9.635 and 6.010. (Editor)

Bulgaria Radio Moscow relay on 9.720 at 0001, anti-missiles in NATO talk. (Gray, MI)

Burkina Faso (formerly Upper Volta) National Radio of Burkina, 4.815 in French at 0550, ID 0600. (Hill, NY)

Burundi Voix de la Revolution, 3.300 heard from 0442-0454 with music program in local language. Weak. (Fravel, WV)

Canada Radio Canada International on 17.820 at 1800-1830 with English to Africa, news, and "Spectrum." (Pellicciari, CA) 9.755 at 0133 with eyewitness to bomb explosion. (Garcia, FL)

Cameroon Radio Douala on 4.795 at 2245 in French with African music. (Hill, NY) 2300 with commentary, music, ID at 2308, in French. (Gray, MI)

Radio Yaounde, 4.850 at 2250 in French. Radioteletype interference. (Hill, NY)

Radio Garoua, 5.010 heard at 2215, fair in French. (Hill, NY)

Radio Bafoussam, 4.000 at 0435-0521, music, discussion, music, all French. (Fravel, WV)

Cape Verde Islands Voz do Sao Vicente, 3.930 at 2345 in Portuguese. (Hill, NY)

Central African Republic RTV Centrafricaine, Bangui, 5.035 at 0508-0520, man in French with some music. (Fravel, WV) 2251 with music, commentary, sign off with national anthem. (Gray, MI)

Chad Radiodiffusion Nationale Tchadienne, 4.905 with interval signal, national anthem at 0450, then only carrier to 0510. Recheck at 0523 and still open carrier. Interval signal again at 0527 and ID in French 0528. (Shute, FL) 4.904 at 0455 sign on with interval signal, anthem, into French with music at 0500. (Fravel, WV) Good at 0530 in French. (Hill, NY) Frequency is actually 4.904.5 (Editor)

Chile Radio Nacional, 15.150 at 2302 in Spanish with news and lots of commercials. (Phelps, CO) 15.140 at 2052 news in Spanish. (Nacht, NY) From 2338 to 0009, easy listening music, IDs about every 15 minutes. (Fravel, WV)

China Radio Beijing, 15.520 in English with "Music From China" at 0150, commentary. (Gray, MI) 0000 with world and home news. (McDonough, PA) 0340 with "Listener's Letterbox." (Phelps, CO) News at 0002. (Nacht, NY)

Clandestine La Voz del C.I.D. on 7.400 at 0337 in Spanish with ID, martial music. (Paszkiewicz, WI) CID's Radio Frank Pais. (Editor)

La Voz del Sandino, 6.230 at 0443 in Spanish. (Shute, FL)

Colombia Radio Sutatenza, Bogota, 5.095 heard from 0140- 0150 in Spanish. Sounded like a sports event. (Fravel, WV)

Radio Cultura Surcolombiana, Bogota, 5.010 in Spanish at 0212. (Nacht, NY)

Congo La Voix de la Revolution, 15.190 at 2155 to 2205 in French. Talks by man. (Hill, NY)

Costa Rica Radio Reloj, 4.832 with Olympic coverage at 0500. (Jackson, IL) 6.006 at 0633-0700 news, music, time checks. (Fleming, MD)

Radio Impacto, 6.150 at 0404 in Spanish with rock and Latin music, jingles. Off suddenly at 0420. (Paszkiewicz, WI)

TIFC on 5.055 in Spanish at 0245. Into English at 0255. (Hill, NY)

Cuba Radio Havana Cuba, 6.025 at 0310 with Spanish discussion, vocal music. (Paszkiewicz, WI) 17.750 at 2100-2140 in English. News, sports, "P.O. Box 7026." (Pellicciari, CA)

Cyprus BBC Relay on 15.420 at 2345, radio play, news. (Gray, MI)

Czechoslovakia Radio Prague, 5.930 in English at 0100 with commentary. (Gray, MI)

East Germany Radio Berlin International, 9.620 at 2235 in English. (Nacht, NY) 0210 in English, ID, methods of improving economy. (Gray, MI) 11.975 at 0015-0045 news in English, features on East Germany. (Cedel, FL) 0015 world and local news. (Hunt, NC) 9.560 at 0230-0300, parallel 11.975. (Cedel, FL)

Ecuador HCJB on 15.155 at 0030 with news and religious program. (McDonough, PA) At 0115 with international call-in program. Transmission problems. (Shute, FL) 3.220 at 0353-0402 with classical music, ID in Spanish. (Fravel, WV)

Radio Zaracay, Santo Domingo de los Colorados, 3.395 at 0412 in Spanish with Andean music, CW interference. Sign off at 0430, carrier remaining on. (Paszkiewicz, WI)

Emisoras Gran Colombia, Quito, 4.910 at 0402 in Spanish. (Shute, FL)

Radio Nacional Progresso, Loja on 5.063 at 0416 in Spanish. Good level. (Shute, FL)

Egypt Radio Cairo, 9.475 in English at 0200 with news and discussion. (Hunt, NC) 0220 with ID and mailing address, frequencies given at 0232. (Gray, MI)

England BBC on 9.590 at 2300-0000 in English with news, comment, Steven Spielberg interview. (Pellicciari, CA) 3.955 at 0440-0444, end of "English by Radio." (Fravel, WV) 9.590 at 0012 with "News About Britian," "Radio Newsreel." (Pastrick, PA) 15.070 heard at 1820 items on water shortages, tall ships in Liverpool harbor. (Gray, MI)

Equatorial Guinea Radio Nacionale, Bata, 4.926 heard from 0526-0536 with music program in Spanish. (Fravel, WV)

Ethiopia Voice of Revolutionary Ethiopia, 7.110 at 0402-0417. Woman announcer, music, local language. (Fravel, WV)

Finland Radio Finland International on 15.400 in English at 1300, world news. (Hunt, NC)

France Radio France International, 9.790 at 0320 with news in English. (Gray, MI) 0315 to 0330 with English news and contest information. Address announced as P.O. Box 9516, Paris. (Garcia, FL) 11.670 with news at 0315. (Shute, FL) 17.620 in English at 1645. (Nacht, NY) 7.135 with news at 0420. (Gray, MI)

Gabon Africa Number One on 4.810 with English, rock, news on the quarter hour from 0505 tune in to past 0600. (Young, CA) At 2240 in French with music. (Nacht, NY) On 11.940 in French with reggae and hi-life music, call-in show. (Phelps, CO) 2010 pop music, western-style DJ program. (Gray, MI)

Ghana GBC-1 on 4.915 at 0600-0615 with news read by a woman, into local language at 0615. (Hill, NY)

Greece Voice of Greece on 11.645 at 0112. Greek music, commentary by woman. (Gray, MI) 9.865 at 0330 with news in English. Into Italian at 0350. (Jackson, IL) 0330 with news in English, into Greek at 0350. (McDonough, PA) 9.420 at 0130 in English, world news. (Hunt, NC)

Guyana Guyana Broadcasting Corporation, GBC-2, 5.950 at 0730 in English with strong signal. (Hill, NY)

Honduras Radio Luz y Vida, San Marin, 3.251 at 0230 in Spanish. (Shute, FL)

Hungary Radio Budapest, at 0215 on 9.835 with commentary on tax evasion problems in Hungary. (Gray, MI) 6.025 at 0039 in Spanish, some classical music. (Paszkiewicz, WI) 0124 in English announcing times and frequencies. Interference from 6.020 and 6.030. (Shute, FL) 0217-0226 sign off in English with talk about religion in Hungary. (Fravel, WV)

India All India Radio on 11.620 at 2002 in English. (Nacht, NY) At 2010 with English talks, Indian music, woman announcer. (Hill, NY) 2057 to 2115 music and news in English. (Fravel, WV)

Iran Voice of the Islamic Republic of Iran on 15.084 in language at 2132. (Nacht, NY) At 1541 with possible Koran recitation. (Fravel, WV) 2103 with Mideast music, heavy QRM from possible Iraqi jammer. (Phelps, CO)

Israel Kol Israel on 9.009 at 0405 with news in English. (Gray, MI) 9.440 at 0000 in English with news and talk on history of Jerusalem. (Hunt, NC) 0000 with commentary. Parallel 9.815. (Gray, MI) 11.655 at 2315 with commentary, ID at 2330. (Gray, MI)

Italy Radiotelevision Italiana, 9.575 at 0100 in English. (Shute, FL) At 0030 in parallel with 11.800. Classical music and commentary by woman. (Gray, MI)

Ivory Coast Radiodiffusion Television Ivoirienne, 7.210 at 0706 with man and woman announcers in French, hi-life music, commercials. (Phelps, CO)

Japan Radio Japan on 9.505 at 1500-1600 in English with news, current affairs, "Tokyo Pop-in." (Pellicciari, CA) 17.825 in English at 0005 with ID, news items. Weak. (Gray, MI) 21.695 at 1535-1600 with music, Japanese lesson, news in English. (Cedel, FL)

Kuwait Radio Kuwait, 11.675 at 1902 in English. (Nacht, NY) At 1815 in English with pop music, time pips, news. (Paszkiewicz, WI) 1900 with English and pop music. (Cedel, FL) 1945 with "How To Understand Islam." (Gray, MI)

The International Broadcaster's Forum at the ANARC Convention. From left to right at the front table: Andrew Piper, BBC; Adrian Peterson, AWR-India; Gene Reich, VOA; David Pearce, HCJB; Ian MacFarland, Radio Canada International; and Jeff White, Radio Earth.

Liberia ELWA, 4.765 at 2240-2300 sign off. Religious program, anthem at 2259, English. (Hill, NY) Now moved to 4.760. (Editor) 11.755 with interval signal at 2013, into unidentified language. Heavy QRM and poor signal. (Shute, FL)

VOA Relay 15.600 with news items and "Nightline Africa." (Gray, MI) 6.035 at 0340 with "Daybreak Africa." (Gray, MI)

Libya Radio Jamahiriya, 11.815 at 2148-2210, Arabic music, denouncements of the U.S. (Johnson, NE) 2145 in English with "Green Book" readings. (Phelps, CO) 15.450 at 2216 in English with mailbag, music, Green Book. Announced 11.816. (Paszkiewicz, WI) 2245 with talks, Western pop music. (Gray, MI)

Lithuanian SSR Radio Vilnius, 15.170 (via Radio Moscow transmitters, Editor) at 2200 with Soviet and Lithuanian news broadcast in English, beamed to Europe. (Phelps, CO)

Luxembourg Radio Luxembourg, 6.090 at 2349 with current Top 40. (Nacht, NY)

Mali Radiodiffusion Nationale du Mali, 7.110 at 0542 in French. (Hill, NY) 4.783 at 0600 sign on in French with anthem, schedule, African music, talk in language. CW QRM. (Paszkiewicz, WI)

Malta Deutsche Welle Relay on 9.565 at 0124 in English. Unemployment said to be caused by new technology. (Gray, MI)

Mariana Islands KYOI Saipan, 11.900 at 1030 rock and ID at 1045. (Gray, MI)

Mauritania Radiodiffusion National de la Republique Islamique de Mauritanie. 4.845 at 0630 in Arabic with talk, sitar music, French news at 0700 and back into Arabic. (Paszkiewicz, WI) 0600 good with Arabic talks and music. (Hill, NY)

Mexico Radio Mexico International, XRMX, 17.765 at 2005 with presumed national anthem, news, music from the Vera Cruz area. (Phelps, CO)

Namibia Southwest Africa Broadcasting Corporation, 3.295 in Afrikaans at 0352 with U.S. pop, ID at 0359. (Gray, MI)

Netherlands Radio Netherlands, 9.590 at 0230 with "Happy Station" program. (Garcia, FL) 9.715 at 0600 with "Shortwave Feedback." (McDonough, PA) This station was heard at 0530-0625 with news, "Media Network." (Pellicciari, CA)

Netherlands Antilles Radio Netherlands 9.590, via Bonaire, 0234 with problems involving the third world debt. (Gray, MI)

Trans World Radio, Bonaire, 9.535 at 0400 in English with "Caribbean Night Call." (Phelps, CO)

New Zealand Radio New Zealand on 15.485 at 0300 with pop music. Unreadable by 0350. (Gray, MI)

Nicaragua Voice of Nicaragua, 6014.7 at 0145 in English to 0205 when into Spanish. QRM from Radio RSA on 6.010 at 0200. (Young, CA) 6.015 heard from

0407-0455 with music, commentary on American policy toward Nicaragua. QRM from "high pitched noise." (Johnson, NE)

Radio Sandino, Managua on 6.200 at 0545-0630 with American and Top Ten Latin hits. (Fleming, MD)

Radio Zinica, Bluefields, 6.120 at 0450 in Spanish with heavy interference. (Shute, FL)

Nigeria Voice of Nigeria on 7.255 with English news and editorials at 0545. "West African Scene" ended at 0600 and into French. (Jackson, IL) 0530 with news, music, commentary. Into French at 0600, back to English at 0800. (McDonough, PA) 15.120 at 1015 in English. ID and commentary, heavily QRM'd. (Gray, MI) At 1139 with news. QRM. (Nacht, NY)

FRCN-Kaduna on 4.770 at 0508 with Western pop/rock, ID at 0530, African chants. (Gray, MI)

North Korea Radio Pyongyang, 11.880 at 0850 with music, news, propaganda in English. (Phelps, CO) 9.745 at 1225 with commentary, music, ID at 1229. (Gray, MI)

Norway Radio Norway International, 9.610 at 0200 with ID in English, into Norwegian. (Phelps, CO) 9.605 at 1557, ID, interval signal, into Norwegian. (Gray, MI)

Papua New Guinea National Broadcasting Commission, Port Morseby, 4.890 at 1200 with news in English, rock. (Phelps, CO)

Pirate WMTV at 0456 on 7.417 with rock, fake ads. (Paszkiewicz, WI)

Poland Radio Polonia at 2330 on 7.270 in English with music by Chopin. Parallel 7.125 which was unreadable. (Gray, MI)

Portugal Radio Portugal at 0200 on 11.925 with news, program about tourism. (Miller, GA) At 0300 with news read by woman. (Gray, MI)

Qatar Qatar Broadcasting Service on 17.910 at 1650 with Arabic music. (Nacht, NY) 1650 Arabic music, commentary in Arabic. (Gray, MI)

Rwanda Deutsche Welle Relay on 7.225 at 0438 in English. World Conference on Religion and Peace. (Gray, MI)

Saudi Arabia Broadcasting Service of the Kingdom of Saudi Arabia, 11.855 at 1535-1540, Arabic program. (Fravel, WV)

Senegal ORTS Dakar, 4.890 at 2310 in vernaculars, native music, commentary, more local music and chanting. (Gray, MI)

Seychelles Far East Broadcasting Association, 15.200 in English at 0429. (Shute, FL)

Solomon Islands Solomon Islands Broadcasting Corporation, 9.545 at 0730 with news in English. Buried by VOA on 9.550 at 0741. (Phelps, CO)

South Africa Radio RSA on 5.980 in English at 0200 with world and local news, music. (Hunt, NC) 6.010 at 0202 with news on elections, relations between Portugal and Angola. (Shute, FL) 9.615 at 0200 with news and ID. (Garcia, FL) 9.585 at 2100 with ID, "Our World Heritage," QRM from 9.590. (Gray, MI) 4.990 at 0420 with bio-technology discussion, news, ID. (Gray, MI)

SABC on 3.230 in English at 0400, treaty with Morocco and Libya, ID at 0405. (Gray, MI)

Capital Radio, Transkei, 3.930 at 0455 in English, woman with news at 0500. (Hill, NY) 0417 to 0432 with music program and heavy amateur QRM. (Fravel, WV)

South Korea Radio Korea, in English on 15.575 at approximately 0145 with world news, music. (Hunt, NC) 0145 in English with ID and schedules, news/commentary. (Gray, MI)

Spain Radio Exterior de Espana, Madrid, 11.880 in English at 0100 with news, sports, listener's corner and Spanish classical music. (Hunt, NC) Spanish lesson 0049-0100 and announcement that previous hour would be repeated twice more. (Stewart, NC) 9.630 at 0030 with English to North America and Caribbean. News, commentary, Spain's relations with Morocco. (Pastrick, PA) 0154 near close of English with DX report and address given as Box 156202, Madrid 24. (Garcia, FL) 0005 with sports report, ID. Parallel to 11.880. (Gray, MI)

Swaziland Trans World Radio on 7.295 at 0505 in English with ID. (Young, CA) 5.055 at 0342 in English. (Nacht, NY)

Sweden Radio Sweden International, English at 0227 on 9.695, ID and visits to Swedish art galleries. (Gray, MI)

Switzerland Swiss Radio International, 17.830 at 1520-1531 with sign on and "Sunday Supplement." (Fravel, WV) 15.570 at 2210 with "Dateline" and English to South America. (Pastrick, PA) 17.765 at 1300 in English and with talks on housing, energy, old airplanes. (Hunt, NC) 9.725 in English at 0200 commentary on UN study on slavery. (Gray, MI)

Syria Syrian Broadcasting Service, 12.085 at 2100-2200 in Arabic. (Hill, NY) 1950 in Arabic, music, and commentary. (Gray, MI)

Tahiti Radio Tahiti on 15.170 at 1617. First time heard during this time period. Tahitian music, French announcements. Not heard in further checks at this hour. (Shute, FL) At 0305-0345 with ID at 0330. Unheard on 11.825. (Cedel, FL) 0350 with island music, commentary. (Gray, MI) 11.825 in French at 0300 with ID, Polynesian music. (Paszkiewicz, WI)

Taiwan Voice of Free China, 5.985 (via WYFR—Editor) with item about first emporer of Ming Dynasty and difficulty of programming computers in Chinese. Overpowered by unidentified station signing on at 0200. (Stewart, NC)

Togo Radio TV Togolaise, 5.047 at 2230, fair in French. (Hill, NY) 0532 in French, commentary, music, interval signal, ID. (Gray, MI)

Turkey Voice of Turkey on 11.755 at 0306 in English. (Shute, FL) At 0300 in English to "Northeast America," news, press review, Turkish history. (Phelps, CO)

Uganda Radio Uganda on 5.027 at 0405 in English, discussion of Uganda's economic recovery. (Gray, MI)

Ukraine SSR Radio Kiev (via Radio Moscow transmitters—Editor) talks about events in Russia, gives answers to listeners questions at 0200 on 15.180. (Hunt, NC) 11.725 at 0500 in English with "Ukraine Today." (Phelps, CO)

United Arab Emirates UAE Radio, Dubai, 15.320 at 1600 with talk on 18th Century travel in the Middle East, ID, music, news, weather. (Miller, GA) 15.300 at 1645 in English with news. QRM from Radio France International. (Shute, FL) At 1630 with news. (Pellicciari, CA) 11.730 at 0330 in English with world news, mailbag, reading reception reports. (Hunt, NC)

United States WRNO, New Orleans, 15.420 at 1800-1930 with World's Fair Report. (Pellicciari, CA) 11.965 at 2238 in English with rock, World's Fair Report. (Pastrick, PA)

Voice of America on 15.580 at 2214 in English to Europe with commentary about U.S. elections. (Pastrick, PA)

WWVH time station, Hawaii, 10.000 at 0346-0401 under WWV. Pacific weather at 0351. (Fravel, WV)

KGEI San Francisco, 11.725 with sign on in Russian at 0230. (Phelps, CO)

WINB Red Lion, PA, 15.145 at 0202 into program called "In Defense of Truth," right-wing commentary. (Phelps, CO)

UN Radio in English on 15.120 with news at 1830. (Pellicciari, CA)

USSR Radio Moscow, 9.765 via Lvov transmitter, 0200 in English to North America. (Gray, MI) 15.150 via Simferopol at 1800 in English. (Gray, MI) 9.760 at 0020 in North American Service. (Phelps, CO)

Radiostansiya Rodina on 15.455 at 1900, interval signal played three times with IDs in Russian in between. (Hill, NY)

Venezuela Radio Rumbos, Caracas, 4.970 at 0406 in Spanish with top Latin Hits, a few American pop tunes. (Fleming, MD)

Radio Lara, Barquisimeto, 4.800 at 0001-0100 with pop music. (Cedel, FL)

West Germany Voice of Germany at 0100-0135 on 6.040, 6.085, 6.145, 11.785 with news and features. Uses a mixture of German nationals and Americans as announcers. (Stewart, NC) 9.545 at 0500-0550 in English with new, "Microphone on Europe," "Spotlight on Modern Life." (Pellicciari, CA) 6.085 at 0130 with science program. (Phelps, CO) 0108 with "Microphone on Europe." (Gray, MI)

Radio Liberty on 17.725 at 1511-1520 in Russian. (Fravel, WV)

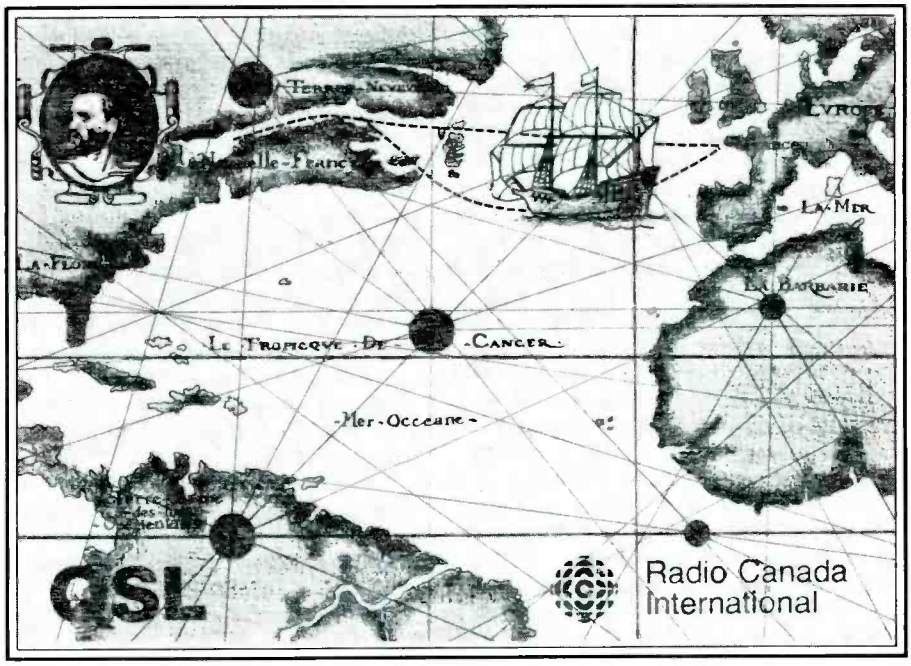
Yemen Arab Republic Radio San'a 9.780 heard at 0405 with Arabic music, man announcer, good signal. (Hill, NY)

Yemen (PDR) Aden, 6.005 at 0323-0334 with Arabic music, total fade by 0334. (Fravel, WV) 0242 with QRM from CFCX. (Hill, NY)

Yugoslavia Radio Yugoslavia on 15.240 at 1534-1551 in English. Weak level. (Fravel, WV)

Our thanks to: J. Speed Gray III, Grand Rapids, MI; Keith Hill, Pine City, NY; Larry Fravel, Clarksburg, WV; Pete Cedel, Jacksonville, FL; Steve Pellicciari, San Diego, CA; Robert Pastrick, Baden, PA; Stephen W. Phelps, Colorado Springs, CO; Michelle Shute, Pensacola, FL; Billy Hunt, Durham, NC; Sheryl Paszkiewicz, Manitowoc, WI; Alan J. Nacht, New York, NY; John Miller, Thomasville, GA; Frank A. Stewart, Statesville, NC; Ulises R. Fleming, Odenton, MD; Allan Young, Los Olivos, CA; Pat McDonough, Pittsburgh, PA; Joey Garcia, Key West, FL; Kenneth W. West, Cocoa, FL; Steven Johnson, Omaha, NE; and David E. Jackson, Lombard, IL.

'Til next month, good listening! **PC**



Radio Canada International's attractive 1984 QSL. (Courtesy of Pat McDonough, PA)

BROADCAST TOPIX

BY MARK J. MANUCY, W3GMG

DX, NEWS AND VIEWS OF AM AND FM BROADCASTING

Happy New Year! We're in the middle of the BC Band DX season when the static is the lowest and the hours of darkness the longest, so I hope you're finding some good DX to write me about.

Those Who Were First

The verbal battle has raged now for decades. Who was on the air first? Throughout the years a number of stations have said they were first on the air. Over the next paragraphs I will try to unravel the different stories of those who were first.

Definition: broad'cast (-kast), adj. 2. Radio and TV. Transmitted by broadcasting. -n. 1. A casting in all directions, as in sowing seed by hand. From Webster's *New Collegiate Dictionary*, Copyright 1958.

Reginald Fessenden, a Canadian, discovered how to use radio waves to carry music and voice. His first successful broadcast was aired in Massachusetts, December 24, 1906, a program of Christmas carols. He had another broadcast a week later heard by ships as far away as the West Indies. These were, as far as I can find out, the "first" broadcasts. Fessenden had earlier developed the heterodyne circuit which is what we use today in all receivers and many transmitters. Fessenden did not have sufficient funds to keep his broadcasts going to develop them into a "broadcast station."

WOSU: This station dates from 1910 in the laboratories of Ohio State University. This was for course work under the direction of Professor W.L. Upson. During the first World War, radio activities continued at Ohio State under the Army. The first license issued to the school was 8XL on March 23, 1920. During 1920 the school paid Mr. P.D. Breese 75 cents a night, not to exceed $50 a year, to operate the radio station. The next year that was increased to $30 per month to send out two daily market and weather reports along with other important news. Regular broadcasting began on April 24, 1922. The 100 watt transmitter power was increased to 500 watts in November.

The first call letters were WEAO and the station operated on 1020 kHz. In 1927 the frequency was changed to 1060. The following year, WEAO was moved to 550 and in 1929 to 570 kHz. The power was increased to 1000 watts in 1933, with 750 watts after sundown. The call was changed to WOSU in 1933 and the final frequency change to 820 kHz was made in 1941 with a power increase to 5,000 watts.

The number of stations by the end of 1921 was about 30; by the spring of '22 there were about 200. Within another year there were almost 600 on the air. Of course, the numbers changed constantly because many stations failed due to insufficient financial backing. Those wanting to start stations did not realize what they were getting into. It takes more to run a radio station than a transmitter and a microphone! Funny thing is, 60 years later, this is still the case. Stations continue to fail each year, despite the fact that the FCC does screen the applicants more closely.

Program guide from WAYR in Jacksonville, Florida.

WEAF: We have just been through deregulation with the AT&T companies. Did you know that in 1926, AT&T (which owned WEAF in New York), agreed to sell the station and not get involved in broadcasting again except to rent telephone and telegraph lines to radio stations that might need them. WEAF was purchased by a new company called NBC.

NBC was the result of an idea by the executive brains of RCA, GE, and Westinghouse. As NBC grew, they split into two networks. By 1943 one of NBC's networks became ABC. CBS dates from 1927.

WEAF is credited with being the first commercial station by selling a New York real estate developer 10 minutes of airtime for $50. By 1925, WEAF was earning $150,000. This was the beginning of radio as we know it today. WEAF went on the air August 16, 1922 replacing another AT&T station, WBAY, which was put to rest because of its poor location (no one could hear it). WEAF also developed the idea of network broadcasting, since they were owned by the telephone company! WEAF became WNBC.

Mail Call

A letter came from Bill Lauterbach, a long time BCB DXer and now a vice president of WJCO in Jackson, Michigan. Bill loves *POP'COMM* and would like B/C Topix readers to listen for his station! He is specifically looking for interference problems around sunrise and sunset (the best DX times). Those living in the Wisconsin area are especially encouraged to listen and respond. WJCO is 5,000 watts at 1510 kHz and their address is 1293 Floyd Avenue, zip 49203. The format is oldies and the QSL reward is a QSL card, letter, and bumper stickers (while they last)! This would be a good "catch" since they were silent from 1981 until May, 1983.

WBAL heard in Salem, Ohio, by Scott Corkhill, Jr. at 1:30 a.m.—a real trouper! Scott has a DX-160 with a 60 foot wire.

Robert Johnson is interested in the TIS stations. Normally they are used for travel information or tourist guiding. They are not small broadcast stations for churches, schools, or banks to use for programs or advertising. Most run 10 watts or less—coverage usually less than a couple of miles. They may use short loaded antennas or a cable buried in the ground.

Bernie Wimmers has apartmentidize; that means no room for decent antennas. This problem does not dampen his BCB interest. Limited to a 25 foot wire, his R-1000 works overtime bringing in the sigs along the east coast. He has a long list from when he was stationed in Puerto Rico.

Allen Myers from Ohio hasn't heard WBAL but has heard WFBR. WFBR, also in Baltimore (1300, 5,000 watts), must have more signal to the NW than WBAL. The towers of the two stations are within sight of one another! WFBR uses four towers in a parallelgram. His favorite DX is the low power daytimers which he catches on weekends. His ears are a GE model 2880.

Brian Rogers enjoyed the political convention coverage on WBZ—thought it was the best of any station he could hear. He also enjoys Larry Glick.

But Alex Vrenios, like me, is not much into talk shows, but says BZ has a good signal into Illinois. He enjoys DXing while stuck in traffic. His receiver is also the R-1000 and he loves to listen on 800 kHz. Can hear several stations each night!

Patrick Cloonan enjoys DXing while

A great radio station souvenir from station KYA (now KIOT, 5000 watts) in San Francisco, a rare reserved seat ticket for a KYA-sponsored Beatles concert in 1966. This is not quite a QSL card from "Radio 1260," but is nevertheless an interesting piece of broadcasting memorabilia. Collecting broadcast station tickets, flyers, pennants, flags, decals, bumper stickers, etc. forms an interesting sideline to DXing. (Courtesy Alice Brannigan)

hitchhiking! The hills of Pennsylvania provide good listening! Thanks for the log.

Pete Kemp remembers an ol' DJ from WINS, Jack Lacey. Jack left New York when WINS went all news and came to WBAL in Baltimore. Well, Jack retired several years ago and moved to LA, where just for fun he keeps his gorgeous tones in tune on KQQW, I believe. I saw Jack this past spring on a visit to B-town and he seems happy and looks good. Pete, we will have to get together on the air.

Stephen Jones sent in a correction on WXSS in Memphis. Thanks, Steve. Everyone should have fun trying to log this new 50 kw station.

A question from Greg Glynn about airliner interference on the FM band. The airline band is adjacent to the FM band (108 to 135 MHz). The intermediate frequency used in an FM receiver is 10.7 MHz. If a receiver is not selective enough, the amplifier next to the antenna terminals will not know any difference between a signal at 104.1 MHz and 125.5 MHz (+ and − 10.7 MHz from the mixer oscillator). Therefore, both signals are sent to the intermediate amplifier (IF amp). This amplifier has both the 104.1 and the 125.5 frequencies sent to it by a conversion mixer, whose job it is to convert the dial frequency to the intermediate frequency (IF). So if the antenna amplifier hears from 104.1 to 125.5, the mixer will send both signals to the IF amp.

At this point the detector is supposed to stop the AM signals (static, noise, and AM signals) from being heard. However, if the detector is out of alignment, has something wrong, or is of inexpensive design, it will detect the AM as well as the FM signals. The aircraft use AM while the FM station is of course FM. Normally FM detectors will not hear an AM signal at all (except as a dead carrier signal).

Generally the best solution is to buy a more expensive receiver.

A couple of notes about the pictures in some past issues. I have some sharp eyed readers out there! One letter from Michigan

Call Letter Changes

Old	New	Location
AM		
new	WXWY	Robertsdale, AL
new	KTGG	Spring Arbor, MI
new	KNPE	Bellevue, NE
new	WGCR	Brevard, NC
new	KQLX	Lisbon, ND
new	KKQA	Nephi, UT
KARM	KFIG	Fresno, CA
KLAK	KRXY	Lakewood, CO
KLRR	KRMH	Leadville, CO
WFNN	WVTY	Dunedin, FL
WMIB	WWWO	Marco, FL
KWAI	KZHI	Honolulu, HI
KSAC	KEXT	Manhattan, KS
WSAC	WBUL	Ft. Knox, KY
WLLH	WSSH	Lowell, MA
WTGE	WKLT	Kalkaska, MI
KHDN	KYTY	Hardin, MT
WBNX	WKDM	New York, NY
WCDO	WSID	Sidney, NY
WGIC	WBZI	Xenia, OH
KQAQ	KGHR	Austin, MN
WZRA	WMOC	Chattanooga, TN
KTXC	KALO	Port Arthur, TX
KIKN	KDAE	Sinton, TX
FM		
new	KDEJ	Anchorage, AK
new	KFLR-FM	Phoenix, AZ
new	KKSY	Bald Knob, AR
new	KCLT	West Helena, AR
new	WEGS	Milton, FL
new	WLPE	Augusta, GA
new	WZDM	Vincennes, IN

Old	New	Location
new	KUOO	Spirit Lake, IA
new	WMDJ-FM	Allen, KY
new	WBBN	Taylorsville,MS
new	WJPZ-FM	Syracuse, NY
new	WNYW	Watertown, NY
new	WGSI	Russell, PA
new	KRRS	Hamlin, TX
new	WPUF	Mechanicsville, VA
new	KTCW	Pasco, WA
KRSH-FM	KCRR	Bullhead City, AZ
KLOK	KFIG-FM	Fresno, CA
KLPC-FM	KXCC-FM	Lompoc, CA
KROI	KSJQ	Manteca, CA
KROY	KSAC	Sacramento, CA
KRTM	KRRR	Temecula, CA
KPPL	KRXY-FM	Lakewood, CO
KLMC	KRMH-FM	Leadville, CO
WVTY	WVTY-FM	Holiday, FL
WRNZ	WMJB	Wrens, GA
KUID	KFRA-FM	Moscow, ID
WPIG	WHYR	Saco,ME
WKLT	WKLT-FM	Kalkaska, MI
KHDN-FM	KATM	Hardin, MT
KEER	KYRK-FM	Las Vegas, NV
KALG-FM	KPSA-FM	La Luz, NM
WSLU	WJGT	Canton, NY
WBZI	WBZI-FM	Xenia, OH
WPTG	WJTL	Lancaster, PA
KBCB	KRYS-FM	Corpus Christi, TX
KOAX	KQZY	Dallas, TX
KALK	KLAK	Denison, TX
WHWB-FM	WJJR	Rutland, VT
KENE-FM	KZHR	Toppenish, WA
WIBZ	WMGP	Parkersburg, WV

Station Updates

Call	Location	Freq	Pwr	Ant
AM				
WZOB	Ft. Payne, AL	1250	5	D
KBJT	Fordyce, AR	1570	1	D
KMTL	Sherwood, AZ	760	10	D
WLUX	Port Allen, LA	1550	5/5	DA-N
KWOK	Wagoner, OK	1530	1	D
KYJC	Medford, OR	610	5	D
WRID	Homer City, PA	1520	1	D
WESC	Greenville, SC	660	50/5	£
WVSL	Loris, SC	1240	1/.25	O
KDRY	Alamo Hgts, TX	1100	5	D
WZZX	Lineville, AL	780	5	D
WSRO	Marlborough, MA	1470	5	D
new	Scottsmoor, FL	840	.25/0	O
WHCU	Ithaca, NY	870	5/1	DA-N
WKSN	Jamestown, NY	1340	.5/.25	O
KHND	Harvey, ND	1470	1/0	O
WFGN	Gaffney, SC	1180	2.5/0	O
WWRT	Algood, TN	1590	1/0	O
WAAS	Thompsons Station, TN	1100	5/0	O
WXSS	Memphis, TN	1030	50/0	O
new	Spring Arbor, MI	1540	.25/0	O
new	Bellevue, NE	1180	5/1	O
new	Nephi, UT	1300	5/0	O
FM				
WDCL	Somerset, KY	89.7	100	570′
WWDM	Sumter, SC	101.3	N/C	1323′
KRZA	Alamo, CA	88.7	7	2393′
WWLV	Daytona Beach, FL	94.5	100	472′
WQCS	Ft. Pierce, FL	89.1	100	449′
WWEV	Cumming, GA	91.5	8.91	965′
WAEV	Savannah, GA	97.3	100	992′
WJBM-FM	Jerseyville, IL	104.1	45.7	524′
new	Indianapolis, IN	107.9	21.9	762′
KSEZ	Sioux City, IA	97.9	100	1000′
KSKU	Hutchinson, KA	102.1	N/C	1031′
WRBS	Baltimore, MD	95.1	N/C	500′
WRDO-FM	Augusta, ME	92.3	50	500′
WFMK	E. Lansing, MI	99.1	28	183′
KMBR	Kansas City, MO	99.7	N/C	1000′
WMAA-FM	Jackson, MS	91.3	100	761′
WTYX	Jackson, MS	94.7	N/C	1135′
WMAB-FM	Mississippi State, MS	89.9	63	1084′
WMAV-FM	Oxford, MS	90.3	100	1244′
KKCI-FM	Liberty,MO	106.5	100	1200′
KEZK	St. Louis, MO	102.5	100	750′
KEER	Las Vegas, NV	97.1	15	1811′
WDAO	Dayton, OH	89.5	N/C	N/C
WDAO	Dayton, OH	107.7	N/C	500′
WDPS	Dayton, OH	89.5	N/C	N/C
KJSN	Klamath Falls, OR	92.5	60	1013′
WPRO-FM	Providence, RI	92.3	43	533′
KBCB	Corpus Christi, TX	99.1	97	N/C
KTXN-FM	Victoria, TX	98.7	100	246′
KUSU-FM	Logan, UT	91.5	65	1140′
KVFM	Logan, UT	94.5	15.6	1148′
KUOW	Seattle, WA	94.9	100	N/C
WVSR	Charleston, WV	102.7	N/C	403′
KIIM	Tucson, AZ	99.5	95	2000′
WAGQ	Athens, GA	104.7	100	1025′
KVKI-FM	Shreveport, LA	96.5	N/C	797′
KDLB	Henryetta, OK	99.5	100	N/C
KRBD	Ketchikan, AK	105.9	5	−372′
KRTH	Los Angeles, CA	101.1	54	N/C
WCTO	Smithtown, NY	94.3	1.5	430
WCTO	Smithtown, NY	94.3	1.5	430
WPLJ	New York, NY	95.5	6.3	1331′
KTYE	Tye, TX	99.3	71	625′

Station Updates

Call	Location	Freq	Pwr	Ant
WZEE	Madison, WI	104.1	9.4	N/C
WELR-FM	Roanoke, AL	102.3	2.9	N/C
WQCS	Ft. Pierce, FL	88.9	100	449′
KEI-FM	Pocatello, ID	104.9	N/C	1120′
KGLI	Sioux City, IA	95.5	100	1004′
WFCA	Ackerman, MS	107.9	100	614′
WBAG	Burlington, NC	93.9	100	1880′
KITT	Las Vegas, NV	96.3	100	1175′
WCBS-FM	New York, NY	101.1	6.8	1353′
KZEU	Victoria, TX	107.9	100	N/C
WHWB-FM	Rutland, VT	98.1	1.175	2561′
KISW	Seattle, WA	99.9	N/C	1149′
new	Lewiston, ID	101.5	100	985′
new	Littleton, NH	106.3	.115	1256′
new	Williston, ND	101.1	100	1000′
KQZE	St. Johns, AZ	95.7	100	1763′
KIIM	Tucson, AZ	99.5	N/C	2000′
KOJY	Dinuba, CA	98.9	19	815′
KNTI	Lakeport, CA	99.5	2.6	1880′
KUSC-FM	Los Angeles, CA	91.5	25	667′
WQHL	Live Oak, FL	98.1	58	368′
WAGQ	Athens, GA	104.7	100	1025′
WLBS	Mt. Clements, MI	102.7	50	500′
WLLT	Fairfield, OH	94.9	16.2	790′
KDLB	Henryetta, OK	99.5	100	N/C
WCKA	Sutton, WV	97.1	18	750′
WJZQ	Kenosha, WI	95.1	28.4	N/C

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

Here is a fully equipped remote studio for radio station WLNG of Sag Harbor, New York. (Photo by Tony Earll)

enclosed clippings form the *Baltimore Sun* noting one of the persons in a picture was no longer employed at the Baltimore station. Thanks Mack. The radio business changes rapidly! What can I say. The same thing happened in the next issue as well. Oh well, I try . . . now if I had one of your BCB DXer's shack pictures, things would not be so confusing . . . how about it? Yes, I mean *you*!

A note to TV DXers: if you would like more coverage of TV, please make it known to us here at *POP'COMM*. We don't want to cut into the AM/FM coverage for TV, but if there is enough interest, some expansion might be considered.

My alloted space has been overrun this month, but let's hear from you. Glad to have radio station pix, too. Address is P.O. Box 5624, Baltimore, MD 21210. PC

SCANNER WORLD, USA

10 New Scotland Ave., Albany, NY 12208 518/436-9606

Special

The Regency D310

30 Channel Automatic/Programmable Scanner

FEATURES

- ***30 Channels*** *For full coverage and easy selection.*
- ***No Crystals Required*** *Your choice of over 15,000 frequencies just by pushing a button.*
- ***6 Bands*** *Covers high and low VHF, UHF and UHF "T" plus two FM Ham Bands.*
- ***Search or Scan*** *Scan frequencies you have entered or search for exciting new frequencies.*
- ***Priority Control*** *Automatically overrides all other calls to listen to your favorite frequency.*
- ***Permanent Backup System*** *Memory requires no batteries. Capacitor saves frequencies entered up to one week during power outage or storage.*
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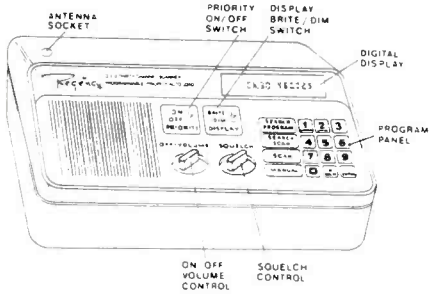
- ***Display Messages*** *Display flashes verbal messages to aid in programming.*
- ***External Speaker Jack*** *Standard connection allows use of external speaker.*
- ***AC or DC*** *Use at home or on the go. Both power cords included.*

Scanner World Price

$129.99

(plus 4.50 Shipping)



Suggested Factory List Price $259.95

The Regency D310 is a compact, programmable 30 channel, multi band, FM monitor receiver for use at home or on the road. It is double conversion, superheterodyne used to receive the narrow band FM communications in the amateur, public safety and business bands: 30-50, 144-174, and 440-512 MHz.

Sophisticated mircoprocess-controlled circuitry eliminates the need for crystals. Instead, the frequency for each channel is programmed through the numbered keyboard similar to the one used on a telephone. A "beep" acknowledges contact each time a key is touched. The D310 scans approximately 15 channels per second.

Any combination of two to thirty channels can be scanned automatically, or the unit can be set on manual for continuous monitoring of any one channel. In addition, the search function locates unknown frequencies within a band.

Other features include scan delay, priority and a bright/dim switch to control the brightness of the 9-digit Vacuum-Fluorescent display. The D310 can be operated on either 120VAC or 12VDC. One year warranty from Regency Electronics.

- ***Telescoping Antenna*** *Electronically optimized for all frequencies, included.*
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Optional Mobile Cigarette Lighter Plug (RGMPC . . . . 4.95)

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REGENCY POLARIS MT-5500XL Marine	229.99 (5.50)
REGENCY R1050 AC 10 Chan. Programmable	114.99(4.00)
REGENCY C403 AC 4 Channel Crystal HLU	66.99 (4.00)
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REGENCY MX5000 All Band Scanner	369.99 (5.50)
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REGENCY MX3000 30 Channel Digital	186.99 (4.00)
RCD Listen-In	38.99 (3.00)
REGENCY R106 AC/DC 10 Chan. HLU Crystal	96.99 (4.00)
FOX BMP 10/60 10 Channel Scanner	149.99(4.00)
JIL SX-100 16 Channel Scanner	159.99 (4.00)
JIL SX-200 16 Channel Scanner	269.99 (4.00)
JIL SX-400 All Band DC Scanner	549.99(12.00)
FANON M8HLU 8 Chan. Mini Mobile Crystal	99.99 (4.00)
FANON PSK-1 AC adapter for M8HLU	12.99 (*)
FANON SlimLine 6 HLU Handheld Crystal Scanner	103.99 (4.00)
FANON CHB-6 Charter/AC Adpater for Slim 6	12.99 (*)
FANON CAT-6 Carrying Case with Belt Clip	11.99 (*)
FANON AUC-3 Autolighter Adapter/Charger	12.99 (*)
FANON SCMA-6 Mobile Adapter/Charger/Amplifier for Slim Line 6 HLU	38.99 (3.00)
FANON PSK-6 Base Power Supply for SCMA-6	14.99 (*)
BEARCAT® 350 AC/DC 50 Channel	298.99(7.00)
BEARCAT® 5 HLU AC Crystal Scanner	94.99 (4.00)
BEARCAT® FIVE-SIX Pocket Scanner	126.99 (4.00)
BEARCAT® SP-55 Carry Case for BC5/6	12.99 (*)
BEARCAT® BC-260 AC/DC Scanner	278.99 (4.00)
BEARCAT® DX-1000 Shortwave Radio	499.99 (12.00)
BEARCAT® 20/20 Digital Scanner	279.99 (4.00)
BEARCAT 220 Digital Scanner	249.99 (4.00)
BEARCAT 250 Digital Scanner	265.99 (4.00)
BEARCAT 100 Digital Hand-Held	234.99 (6.50)
BEARCAT 300 Digital Scanner	346.99 (5.50)
BEARCAT 201 Digital Scanner	194.99 (4.00)
BEARCAT 180 Digital Scanner	168.99 (4.00)
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6 CHANNELS — 4 BANDS

VHF-Lo	30 to 50 MHz
VHF-High	146 to 174 MHz
UHF	450 to 470 MHz
UHF-T	470 to 512 MHz
Small Size	3¾"W x 5½" H x 1" D

Quality features included in the Regency HX-650 are 6 channels - 4 band coverage, lockout switches, manual step switch, scanning speed of 15 channels per second, long lasting LED's, volume & squelch controls, AC adapter/charger jacks.

Scanner World's Special Package Deal Includes the following:

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- Set of 4 AAA Nickel Cadmium Batteries
- 6 Monitor Crystals (specify frequencies needed or wil will include certificates for unknown frequencies)
- Flexible Rubber Duckey Antenna
- AC Adapter & Charger

Scanner World Package Price

$109.99

(Plus $5.50 Shipping)

VISA MasterCard

Ordering Information

Call (518) 436-9606 to place orders by phone or mail orders to ***Scanner World,*** 10 New Scotland Ave, Albany, NY 12208. Orders will be shipped same day received by United Parcel Service. ***Scanner World*** accepts VISA, MasterCard. C.O.D. shipments by United Parcel will be for cash or certified checks only. Mail orders with personal or business checks will be held 4 weeks for bank clearance. Orders with cashiers checks or money orders shipped same day received. Prices, specifications and terms subject to change without prior notice. If items are out of stock we will backorder and notify you of delivery date. All shipments are F.O.B. ***Scanner World*** warehouse in Albany, NY. We are not responsible for typographical errors. All merchandise carries full manufacturers warranty. Bid Proposals and Purchase Orders accepted from Government agencies. Free full line catalogue available upon request. No minimum order. New York State Residents add 7% sales tax. Dealers send business letterhead for dealer wholesale information.

Shipping Charges

Add ($) per scanner, and $3.00* for all accessories ordered at same time. C.O.D. shipments will be charged an additional $3.00 per package. Full insurance is included in shipping charges. All orders are shipped by United Parcel Service. Shipping charges are for continental USA only. Outside of continental USA, add $15.00 per scanner.

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CIRCLE 52 ON READER SERVICE CARD

PIRATES DEN

BY DARREN LENO, WDØEWJ

FOCUS ON FREE RADIO BROADCASTING

Hundreds of pirate radio stations are taking away audiences from England's 43 legal independent broadcasting stations, and creating financial hardship for some. There are more than 50 pirates operating in London alone, catering their programming to listeners from all walks of life.

"The pirates have an impact because they do everything on a shoestring. They don't pay staff union rates, they don't pay copyright for music" says Peter Baldwin of Great Britain's Independent Broadcasting Authority (IBA).

The London Times reported that independent stations are having trouble competing because of their high overhead operating costs. A group of independent stations recently approached the government to ask that certain operating requirements set by the IBA be relaxed.

They point out that one popular and good sounding FM pirate operation in London uses equipment costing £ 10,000, whereas an independent station is required to spend over £ 200,000 on technical and studio equipment. These extra costs imposed by the IBA reduce the profitability of independent radio stations, and have made some uncompetitive.

Mr. John Whitney, director-general of the IBA, said "A little less dotting of the Is and crossing of the Ts by the IBA may help to streamline overheads while maintaining the high standards of the service."

Independent broadcasters are particularly worried about the American backed Laser 558, a station broadcasting from a ship (*MV Communicator*) located off the Essex coast. Laser 558 is registered in Panama and run from New York. It is backed by over $2 million of investment. The station was expected to begin selling advertising last fall.

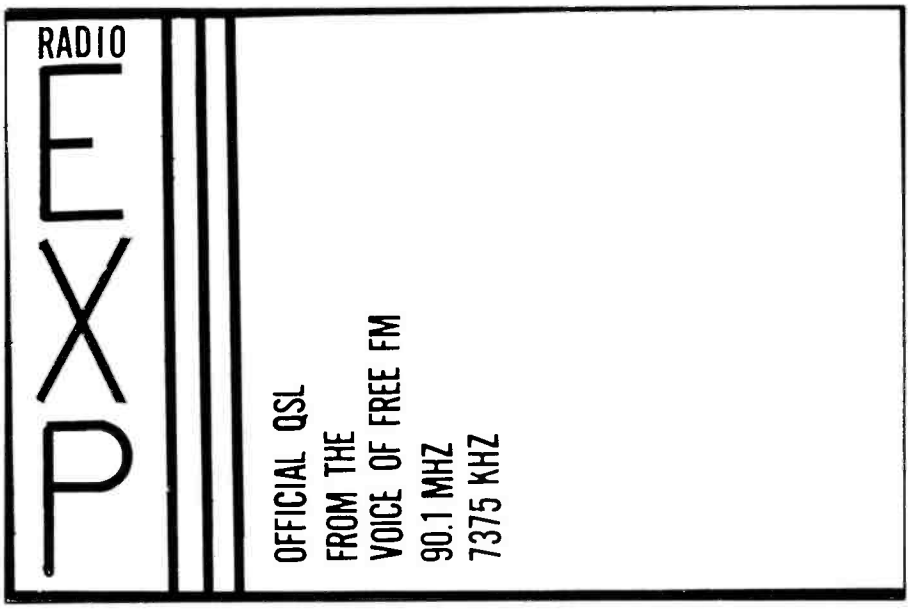
Pirate Hunting Season Opens

New Year's has traditionally been celebrated by pirate broadcasters without fail for several years. Keep an eye on the following frequency ranges in the evening during the Holidays, because your chances of hearing a pirate are as good now as they'll ever be until July 4, 1985.

7350-7450 kHz
6900-7000 kHz
6200-6300 kHz
3400-3495 kHz
1600-1630 kHz

Pirate Bandscan

CFCQ: "You are tuned to alternative rock, CFCQ shortwave, Northern Ontario." Arthur Pym of New York noted this new pirate on 3240 kHz from 0740 until 0935 GMT.



Radio EXP hopes to be operational soon on 7375 kHz with 100 watts.

KLS: This station was apparently having audio problems when Joe Wosik of Illinois heard them on 7405 kHz after 0415 GMT. Joe was able to discern some Beatles music.

KPRC: New York's notorious KPRC can be heard on 6275 kHz SW, 1616 kHz AM, and 91.5 MHz FM, sometimes all at once. Check weekend evenings after 0300 GMT.

KQRP: From the number of loggings of this station I receive each month, it seems like KQRP is a hard pirate NOT to hear. According to William Dang of Alberta, Canada, KQRP is still going strong. He recently heard them on 6280 kHz after 0400 GMT. Programming included bluegrass music and a mailbag show. Allan Young from California would have enjoyed a KQRP re-broadcast of "The Shadow," a popular old radio program, but the static and interference on 7435 kHz after 0220 GMT was quite severe. Barry Martz of Michigan also heard KQRP re-broadcast "The Shadow," but on 7415 kHz after 0230 GMT.

Modern Radio: "Serving the west coast on 41 meters, this is Modern Radio." William Dang heard this interesting pirate on 7440 kHz from 0830 GMT. He says they sounded quite professional. The DJs had Australian sounding accents. Not much else is known about Modern radio at this time.

Radio Clandestine: Craig Clark of Michigan listened to RC from 0440 GMT on 7360 kHz until WYFR, a religious shortwave broadcaster, began transmissions on that frequency at 0500 GMT. RC was the first pirate John Carver of Indiana ever heard. He logged them on 7355 kHz after 0300 GMT. John heard a "science" show featuring Mr. Wizard and Timmy as the pair attempted to build a nuclear reactor out of macaroni. Music was largely from the 1960's era.

Radio Blotto: "The station of topographic maps . . ." was heard on 7439 kHz after 0250 GMT by Dave Houde of Virginia. Dan Miller of Wisconsin heard Radio Blotto on 6255 kHz after 0400 GMT. The station also claimed to be using 1610 kHz AM.

Samurai Radio: This pirate was logged on 7413 kHz after 0230 GMT by Barry Martz of Michigan. Rock music was played, and jokes about the FCC arriving at the station were also heard. William Dang heard Samurai Radio on 6275 kHz at 0430 as they signed-on to the airwaves with a piano interval signal.

Tangerine Radio: Nek Nomis heard Tangerine Radio on 7432 kHz after 0530 GMT. The programming consisted primarily of rock music.

Voice Of Laryngitis: Dr. J was complaining about his twin brother, Atilla, when Ken Evans of South Carolina heard him at 0200 on 7430 kHz. Beach Boys music was heard mixed in with an Al Jolson and a Devo song. Talk about a musical variety !

Voice Of To-morrow: This controversial station was claiming to be a "beacon of truth for white Americans who will take the time to think" as Joe Wosik tuned them in after 0325 GMT on 6240 kHz. VOT has also been heard on 7410 kHz.

Voice Of Venus: Paul Walkendorf of Michigan heard banjo music and a pro-military skit amidst the problems this old pirate was having with an FMing carrier on 7340 kHz after 0300 GMT.

WBST: "WBST brings out the beast in me." Rick Freeman of Florida heard WBST on

7425 kHz after 0400 GMT as they played rock music.

WIMP: Walt Sepaniac of Texas tuned into WIMP during a transmission on 7410 kHz after 0500 GMT. He heard the operators claim to be using 500 watts. A mention was made that hinted at some kind of affiliation with pirate station KMA.

WMTV: I had the chance to hear this new pirate after 0400 GMT on 7415 kHz. They played a wide variety of rock music, and claimed to be located in south Florida. Their signal was extremely strong, and had no problem breaking through the static.

QSLing Pirates

Getting a QSL or verification card from a pirate station can at times be a challenge, and a frustrating one at that. Although most responsible pirates will swiftly verify correct reception reports, others prefer to hold us in limbo as we hope, wait, and wonder if that QSL card will ever arrive.

The best tip that I can give anyone who wants to try his or her hand at convincing a pirate to QSL is to follow directions. If, during the course of a broadcast, a station asks for three First Class stamps, don't send him two. If they want a self addressed stamped envelope, make sure you stamp it (and make sure it's a long envelope.)

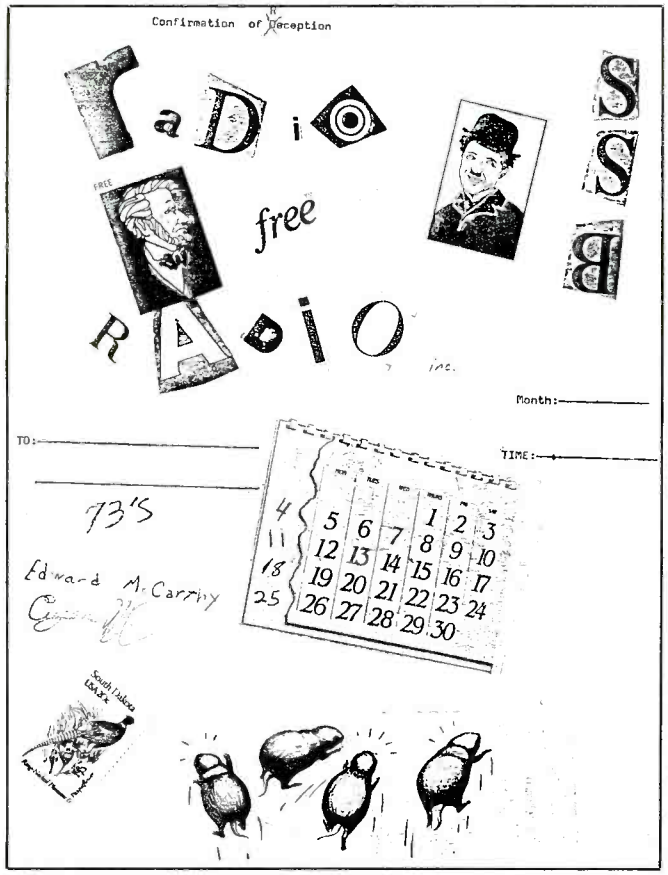
Make your reception report as detailed and accurate as possible.

Send your reports quickly. Some pirates won't verify reception reports that are sever-

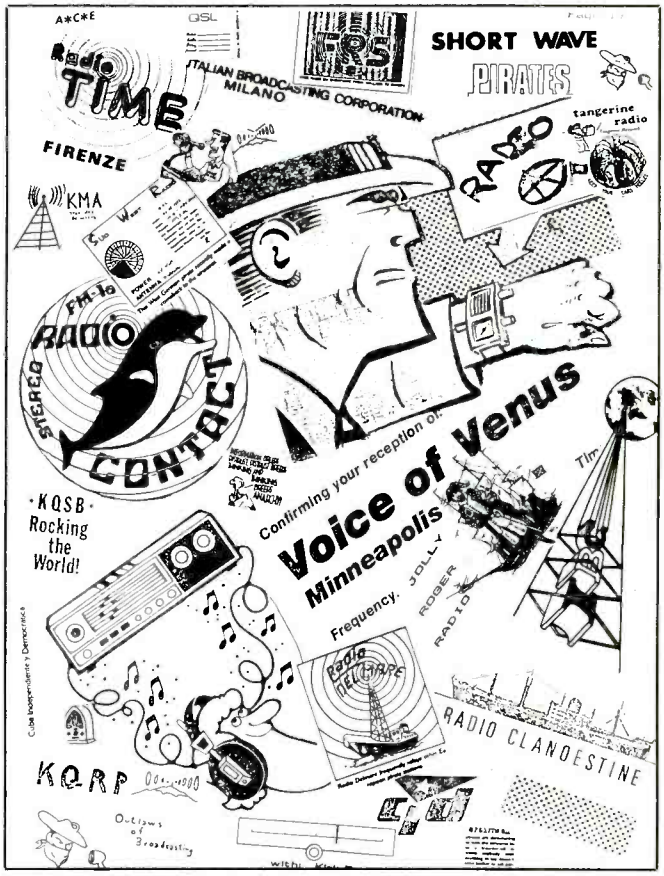
Table 1

Crystal Ship	PO Box 245, Moorhead, MN 56560
GAN Intl.	PO Box 222064, Dallas, TX 75222
KEXJ	PO Box 5074, Hilo, HI 96720
KFAT	PO Box 5074, Hilo, HI 96720
KLS	PO Box 982, Battle Creek, MI 49016
KMA	PO Box 3192, Joliet, IL 60434
KPRC	PO Box 542, Exeter, NH 03433
KQRP	PO Box 982, Battle Creek, MI 49016
KQSB	PO Box 982, Battle Creek, MI 49016
Minority Assn.	PO Box 42678, Philadelphia, PA 19101
Munchkin Radio	PO Box 982, Battle Creek, MI 49016
Pirate R. New England	PO Box 40554, Washington, DC 20016
R. Clandestine	PO Box 982, Battle Creek, MI 49016
Radio Ganymede	PO Box 42678, Philadelphia, PA 19101
R. North Coast	PO Box 245, Moorhead, MN 56560
Radio USA	PO Box 5074, Hilo, HI 96720
Samurai Radio	PO Box 982, Battle Creek, MI 49016
Secret Mountain Laboratory	PO Box 5074, Hilo, HI 96720
Tangerine R.	PO Box 5074, Hilo, HI 96720
WBST	PO Box 40554, Washington, DC 20016
WCFR	2226 S. Gunderson, Berwyn, IL 60402
WDX	PO Box 245, Moorhead, MN 56560
WIMP	PO Box 982, Battle Creek, MI 49016
WMTV	PO Box 1331, W. Palm Beach, FL 33403
WOIS	PO Box 982, Battle Creek, MI 49016
WTNT - FM 91.9	PO Box 710, Yonkers, NY 10704
Voice of Bob	PO Box 5074, Hilo, HI 96720
Voice of Communism/Democracy	PO Box 982, Battle Creek, MI 49016
V.O. Laryngitis	PO Box 982, Battle Creek, MI 49016
V.O. Redemption	PO Box 1411, Calumet City, IL 60409
V.O. To-morrow	PO Box 20039, Ferndale, MI 48220
V.O. Venus	PO Box 245, Moorhead, MN 56560

Radio Free Radio was a pioneer SSB pirate who left the air in January, 1982, vowing not to return to the air until more pirates began using SSB.



*Here's a QSL montage from A*C*E.*



40 METRES — SCOTTISH PIRATE RADIO - 7375 KHZ

RADIO STELLA

FIRST SUNDAY OF EVERY MONTH; 10 a.m. TILL NOON

al months old. By then, they are often too old to be of any value to the pirate.

Be sure to include a little personal data on yourself; what kind of receiver and antenna you own, why you listen to pirates, etc. Pirates I've talked to say they enjoy learning about the people who listen to their shows. No doubt an informative reception report that reads like a letter will be more interesting and amusing to the operator than a bilingual Xeroxed report form.

Many readers have been writing in to ask about the addresses of certain pirates. An alphabetical list of some of the pirates active today and the addresses they use is shown in Table 1, compliments of the members of the Assoc. of Clandestine Radio Enthusiasts.

The list of pirate addresses is by no means complete, nor can I even guarantee it to be accurate, since pirates have a tendency to come and go, and a few may have even changed addresses by now.

In Conclusion . . .

The Association of Clandestine radio Enthusiasts is an organization dedicated to monitoring pirate, spy, and clandestine broadcasters. It comes recommended as a source of current and specific information. To learn more about this group, write A*C*E, PO Box 452, Moorhead, MN 56560. Enclose an SASE for information.

The Ontario DX Association has added a monthly column on pirate radio to their sharp looking bulletin. If you would like to see a copy of *DX Ontario*, send $1.50 to ODXA, PO Box 232, Postal Stn. Z, Toronto, Ontario M5N 2Z4.

Special thanks to Merville Thorne-Booth, a transplanted Englishman now living in California, for sending the information on British pirates.

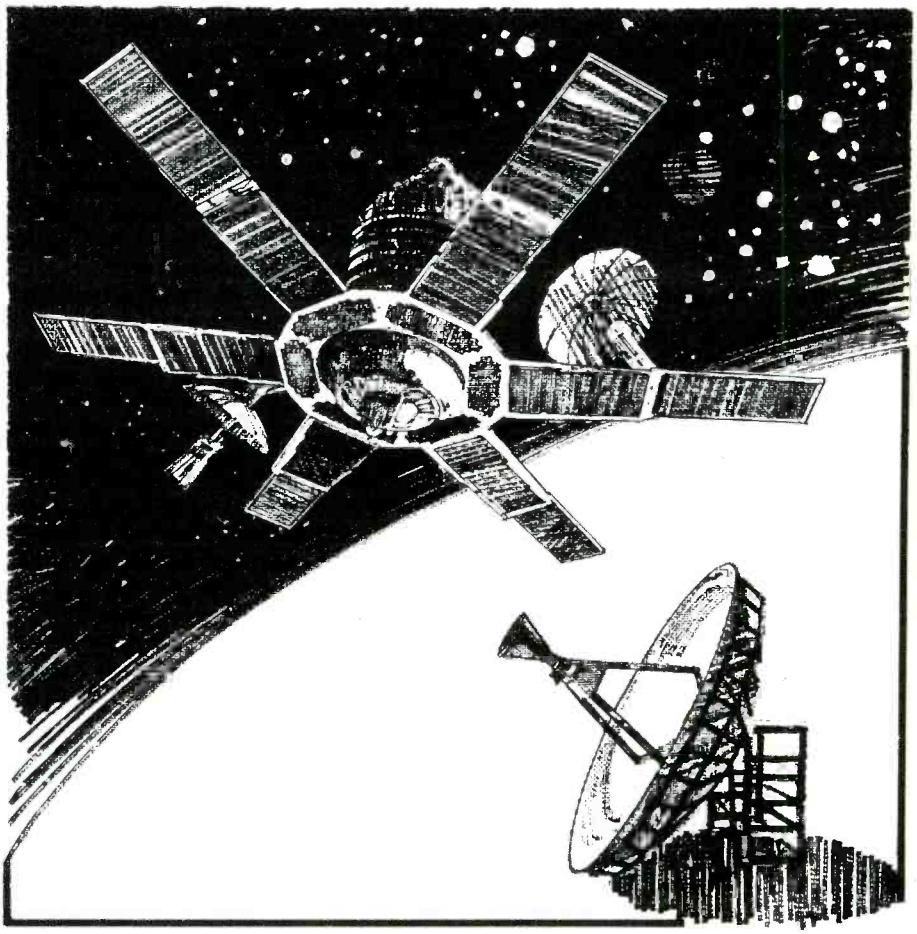
Thanks to all those mentioned who took the time out to send me a letter and report what they've been hearing. I hope by next month we will see your name listed here, too. Photo-copies of pirate QSL cards, pennants, etc. are welcome. Send them to: The Pirates Den, c/o Popular Communications, 76 N. Broadway, Hicksville, NY 11801 PC

SATELLITE VIEW

INSIDE THE WORLD OF TVRO EARTH STATIONS

BY FRANK BAYLIN

Beyond Satellite Television Digital Termination Systems



Satellite television is a joy and a wonder. But satellite technology has also spawned many powerful and cost effective methods for relaying data and voice communications to the furthest reaches of our globe. In the next three columns I will explore how some of the more innovative systems are radically altering the way businesses of all sizes communicate. Within a few years, variations of such satellite technologies will certainly find their way into our homes.

Since the 1969 FCC Carterphone decision, which allowed a Texas businessman named Carter to tap into telephone lines using an acoustic coupler, the telephone industry has been increasingly competitive. This culminated on January 1, 1984 when AT&T was instructed to divest itself of its seven operating companies. Competition in all communication markets (including broadcast television) has become stiff.

In past years, no one was able to predict their unit costs of communications over Bell lines. These customer fees are not subject to negotiation. Communications managers have often complained that it is easier to send data 3,000 miles over long lines, be they via conventional line-of-sight microwave, satellite circuit, or alternate routes, than it is to relay from their offices to the long-haul facilities. Alternatives to the hard-wired, "local loop" of the phone company offer solutions to connection and tariff problems. These local loop bypass technologies are most often made possible by satellite communication backbones.

Presently, three of the most notable bypass techniques are digital termination services (DTS), satellite rural voice and data networks, and spread-spectrum systems. Satellite rural networks will allow any mobile vehicle or any fixed site anywhere under a satellite footprint to relay voice and data directly to this satellite from a small helical antenna. This is then directed to any other user on the same network, to operators of new mobile cellular telephones or to any conventional telephone. Spread-spectrum technologies allow point-to-multipoint "thin-route" data transmissions to and from an earth station costing less than $8,000 and having antenna dimensions less than 4-foot in diameter. But more about these technologies in later columns.

DTS evolved from private microwave services, probably the oldest of the bypass technologies. Microwave line-of-sight relays are a common sight in most metropolitan areas used in phone company networks (which operate in the 4 to 6 GigaHertz C-band, a common source of interference for satellite television broadcasts). In the late 1970's, Litton Industries applied to the FCC for use of the spectrum from 10.55 to 10.68 GigaHertz for microwave cooking, a range best suited for browning meats. Xerox had a better idea. The concept was to use small line-of-sight antennas on offices for relaying directly to the long-distance carrier facilities. The FCC followed suit by requesting proposals from other private concerns. With approval of this frequency band for communications, DTS was born.

Each DTS central node communicates directly to satellite and thus to other central nodes. From the 130 MegaHertz wide band, only about 10 MegaHertz is allocated to each central node. This is equivalent to a capacity of from 5 to 9 Megabits (Mb) per second of data transfer. So if rates of 19.2 to 56 Kilobit (Kb) per second are used, dozens or even hundreds of users can be simultaneously managed. But if all users require the large T-1 capacity traffic (1.544 Mb per T-1 line), no more than about half a dozen can be accommodated. However, DTS are switched systems. Any user can connect to any other user but, on the average, any particular user requires service for short periods of time. So the potential number of subscribers is much higher than if all used the network full time.

Unconditioned or regular phone lines with sophisticated ports or modems can handle at most 2400 bauds today. And the error rate on phone lines is much higher than the 1 in 100,000,000 bit error rate typically seen on commercial DTS systems.

Today, all that is required to join a DTS network is a 2-foot antenna mounted on a roof or on a window sill in line-of-sight with a central node antenna and the necessary electronics for both modulation of a digital stream onto a carrier microwave (or demodulation) and communication control. Subscribers can then communicate directly with any other so equipped user via the central

metropolitan uplink. Although some problems and uncertainties with interference between the signals from various DTS operators and within those from the DTS central node bands exist, the technology is destined to be a resounding success for certain segments of the business communication market.

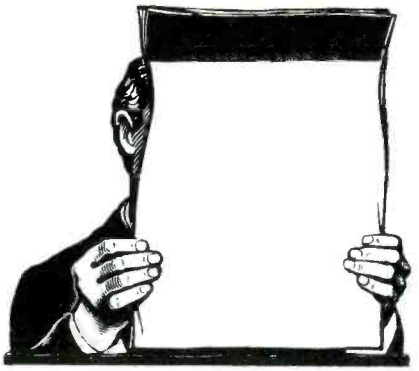
The original experiment to test DTS was performed with systems linking San Francisco and Manhattan. Tymnet DTS, Inc. and a subsidiary of M/A COM, Inc., LDD, handled the local communications while long-haul transmission was accomplished via a Ku-band (12 to 14 GigaHertz) Satellite Business Systems (SBS) satellite.

As a result, three systems are now being turned on in the Bay area. These offer a range of the services expected to be available in other cities. The SBS system is viewed primarily as an easy access to their long-haul satellite links. A premium of from $400 to $500 per month per subscriber will probably be charged for connection to a network other than that of SBS. Tymnet DTS, while catering to the higher capacity T-1 needs, will offer bandwidth in multiples of 56 Kb. This company is reported to be especially interested in relaying digital video conferencing. A move towards "slower-speed," switched services is also expected. The Pacific Bell system, of particular interest because a Bell operating company is contributing to the growth of technologies which specifically bypass their phone system, expects to offer voice grade data circuits in multiples of only 56 Kb.

The concept of the national area network as contrasted to the more familiar local area network is thus born. For example, Dama Telecommunications Corporation is establishing DamaNet. The company lists the following network highlights: seventeen geographically diverse, fully redundant earth stations serve over 30 major metropolitan areas via the WESTSTAR system for full-mesh satellite-based distribution; satellite facilities provide T-1 organization for optimum compatibility . . . high quality continuous service . . . and 64 Kb granularity to access low density cities; advanced baseband technology with DTS for local wideband microwave distribution. Alternate terrestrial facilities include institutional cable and dedicated T-1 channels; services allow call-by-call circuit creation for high-quality digital voice and data on a switched basis. Available data rates range from 2.4 to 512 Kb, all on a demand-assigned basis; and a 2-foot diameter radio antenna.

Certainly fully integrated voice, video, and data networks connecting any two points nearby the large earth stations are now a feasibility. Next month I'll explore a more rural solution to telecommunications.

If you would like to learn more about satellite television, *Satellites Today, The Complete Guide to Satellite Television* is available for $9.95 (plus $1.00 postage and handling) from ConSol Network, 1905 Mariposa, Suite B, Boulder, Colorado 80302.



The Clandestine Confidential Newsletter

A new publication devoted to clandestine stations and programs, *The Clandestine Confidential Newsletter* is designed to keep you up to date on this intriguing aspect of shortwave listening and DXing.

C-C-N will be published six times a year, beginning with the February, 1984 issue. It will contain the latest frequency and schedule information, monitoring data, background information, addresses, and features on new and old stations.

C-C-N will serve as a continuing updater to the new book *Clandestine Confidential,* being published by Universal Electronics.

Subscriptions to *C-C-N* are $10.00 per year in North America, $13.00 overseas, payable in cash, check or money order.

Also available: *List of Clandestines By Time* and *List of Clandestines By Frequency* for $3.95 each.

To subscribe, send your remittance to:

C-C-N,
Gerry L. Dexter,
RR4 Box 110,
Lake Geneva, WI 53147, U.S.A.

WASHINGTON PULSE

FCC ACTIONS AFFECTING COMMUNICATIONS

FCC Inquiry Into Rules Governing Telephone Maintenance Radio Service

The Commission initiated an inquiry into what amendments, if any, should be proposed to Section 90.81 of the rules governing eligibility and operations in the Telephone Maintenance Radio Service (TMRS).

The FCC is undertaking this inquiry to re-evaluate the rules in light of the massive changes that have recently occurred in the telecommunications industry in the wake of the divestiture of the Bell Operating Companies (BOCs) by the American Telephone and Telegraph Company (AT&T).

TMRS was established in 1958 to provide wireline common carriers with private radio facilities to handle internal business communications relating to the construction, repair, maintenance, and operations of telephone lines, plant, and equipment. At the time, the majority of common carrier facilities, both interexchange (long distance) and local exchange, were owned by AT&T directly or its wholly-owned BOCs. However, there was no distinction made in the rules between the use of TMRS frequencies for construction and repair of the local loop, the construction and repair of long distance lines, and the installation and repair of customer premises equipment (CPE).

Currently, the wireline carriers have exclusive use of two low-band VHF frequencies (30-50 MHz), two high-band VHF frequencies (in the 150 MHz band), and six frequencies pairs at 450-470 MHz in the UHF band used for mobile relay operations. While the microwave carriers have available 12 frequency pairs in the UHF band which they share with eligibles in the Power, Petroleum, Forest Products, and Manufacturers Radio Services, currently there are no frequencies allocated for their exclusive use.

Additionally, wireline common carriers can apply for authorizations on the 12 microwave carrier frequencies when all the base and mobile frequencies on the six wireline frequency pairs are assigned within 35 miles of the proposed base stations. However, microwave carriers do not have the option to apply for wireline frequencies when all their microwave frequency pairs are assigned in their area.

In light of the divestiture of its BOCs, AT&T is no longer in the business of providing local exchange telephone service. It is now an interexchange carrier operating in competition with the microwave carriers.

Therefore, the Commission is seeking comments on the following:

- Whether AT&T should continue to be eligible in the TMRS under the classification of wireline carrier, and whether all the VHF and UHF frequencies now allocated to the TMRS should be made available to both wireline and microwave carriers on an equal basis;
- Whether wireline carriers should continue to be able to use frequencies in the microwave carriers' frequency pool or should microwave carriers also have access to frequencies in the wireline pool;
- Whether interservice frequency coordination should continue to be required on the 12 UHF frequency pairs in the 450-470 MHz band shared with the Power, Petroleum, Forest Products, and Manufacturers Radio Services;
- Whether additional spectrum should be allocated to the TMRS in order to meet the need of both wireline and microwave carriers; and
- Whether there are any current problems existing between and among wireline and microwave carriers in the 470-512 MHz band and the 800 MHz band, where there is no division of frequencies.

Additionally, the Commission is seeking comments on whether the TMRS, a service established primarily to provide for the construction and maintenance of basic transmission facilities, should be reoriented to give preference to the maintenance of local exchange service facilities rather than the maintenance of long distance facilities, CPE, and enhanced services.

Two Petitions To Change Requirements For RF Lighting Devices Marketed Under Limited Waiver

On February 7, 1984, the Commission received two petitions for waiver from the Lighting Equipment Division of the National Electrical Manufacturers Association (LED/NEMA), requesting relaxation of the requirements for RF lighting devices operating under the terms of a waiver of Part 18, Subpart H granted to North American Philips Lighting Corporation and other manufacturers (*Order Granting Limited Waiver*, FCC 83-361, released August 5, 1983).

The purpose of these petitions consists of the following:

1. Change the wording of the required labels adopted in the Order because the language used conveys a negative statement to the lay public;

2. Eliminate certain administrative provisions of the Order Granting Limited Waiver, in particular the requirement to file for certification.

LED/NEMA also states that the alternative provisions it proposes for the marketing of RF lighting devices will not only benefit the manufacturers and the consumers but possibly the Commission.

Experimental Actions

The Commission, by its Office of Science and Technology, Frequency Liaison Branch, took the following actions:

KO2XFT, Astronet Corporation, Lake Mary, Florida. Station to operate on 870-890 and 825-845 MHz bands to conduct system tests and demonstrate equipment to prospective customers.

KO2XFV, Astronet Corp., Lake Buena Vista, Florida and 25 mile radius. Station to operate on 870-890, 825-845 MHz bands to conduct system tests and demonstrate equipment to prospective customers.

KO2XFW, Astronet Corp., Orlando, Florida and 25 mile radius. Station to operate on 870-890 and 825-845 MHz bands to conduct system tests and demonstrate equipment to prospective customers.

KO2XGC, M/A-COM Linkabit, Inc., San Diego, California; KO2XGE, M/A-COM Linkabit, Inc., San Diego, California and 25 mile radius; KO2XGF, M/A-COM Linkabit, Inc., San Diego, California; KO2XGG, M/A-COM Linkabit, Inc., San Diego, California. Licenses were granted for the above, at locations as shown to operate on 459.375, 459.400, 459.425, 459.450, 459.475, 459.500, and 459.525 MHz to develop transmitters for use in Domestic Public Land Mobile Radio Service.

KO2XGD, M/A-COM, Linkabit, Inc., San Diego, California. Station to operate every 25 kHz between 454.375 ending 454.525 MHz to develop transmitters for use in Domestic Public Land Mobile Radio Service.

KO2XGH, Robert Walter Stankus, Richmond, Virginia. Station to operate on 18.068-18.168 and 24.890-24.990 MHz bands for research and development of new antenna designs for use in Amateur Radio Service.

KO2XGI, Ford Communications, Inc., Mobile in California, New Mexico, and Virginia. Station to operate on 10.9-11.1 GHz band to research an advanced surface-to-air missile concept, and to development software for use in the mid J-Band frequencies.

KO2XGJ, Orion Industries, Inc., East Cleveland, Ohio. Station to operate on 806-896 MHz band for design, development, and testing 800 MHz antenna products and accessories.

KO2XGK, METS, Easton, Maryland. Station to operate on 9375 MHz for training of shipboard radar operations.

KO2XGL, Westinghouse Communication Services, Inc., Anne Arundel County,

Maryland. Station to operate on 9695-9905 MHz band for development of radar for export to the Republic of China.

KE2XOC, Pavlof Bay, Alaska; KE2XOD, Akutan Bay, Alaska; KE2XOE, Chukchi Sea, Alaska; KE2XOF, Bering Sea, Alaska; KE2XOH, Morzhovio Bay, Alaska; KE2XOJ, Stepovak Bay, Alaska. These were granted to Exxon Communications Company on frequencies 401.7145 and 401.65 MHz to provide oceanographic and meteorologic data from buoys moored in remote locations via GOES Satellite and TIROS-N Satellite.

KE2XOK, Exxon Communications Company, Pavlof Bay, Alaska. Station to operate on 401.7145 MHz to provide weather data from a remote Alaska location via GOES Satellite.

KO2XBR, Rockwell International Corporation, Between San Francisco and Los Angeles, California. Station to operate on various discrete frequencies between 5760 and 88000 kHz for research with pseudo random pulsed wide band emissions.

KO2XBS, Rockwell International Corp., Between Washington, D.C. and Boston, Massachusetts. Station to operate on various discrete frequencies between 5760 and 88000 kHz for research with pseudo random pulsed wide band emissions.

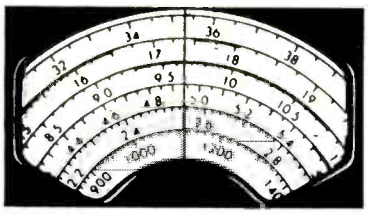
KO2XGA, Kavouras, Inc., Minneapolis, Minnesota. Station to operate on 5350-5460 MHz band for development of weather radar.

KO2XGO, Comp Comm, Inc., Within Continental U.S. and U.S. Possessions. Station to operate on 825-855 and 870-900 MHz bands to conduct field strength surveys.

KO2XGP, AT&T Technologies, Inc., Within Continental U.S. Station to operate on 825-845 and 870-890 MHz bands to test prototype equipment intended for use in Part 22 and for type acceptance and certification tests.

KO2XGQ, Stuart J. Kaplan, Portland, Oregon. Station to operate on 104.1 MHz to develop another alternative for FM B/C allowable in small controlled areas.

KO2XGR, Foster Airdata Systems, Inc., Airborne 500 nautical miles of Columbus, Ohio. Granted CP and License for new experimental station to operate on 118-135.95; 1025-1150 MHz bands and 1030 MHz to research and develop airborne and navigational devices to meet required FAA standards. PC



COMMUNICATIONS CONFIDENTIAL

BY RON RICKETTS, WA5VFA

YOUR GUIDE TO SHORTWAVE "UTILITY" STATIONS

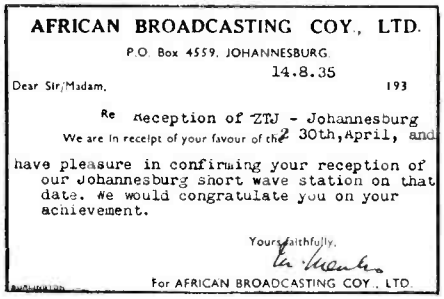
Our recent references to the mysterious activities of WGY912 has prompted an interesting letter from Jerry D. Ennis of Georgia. Jerry tells us that he, too, has monitored WGY912 sending slow CW in five-letter groups at a five word per minute rate on 16201. He also states that radio station WGY912 is FEMA's (Federal Emergency Management Administration) special facility located at Mt. Weather in West Virginia. This explains Harold Eisley's description of the signals as "loud and clear" at his home in Maryland. The other call mentioned in the column, WGY980, is also assigned to FEMA and is located in Denver, Colorado. A similar letter was received from Michael A. Schulsinger of Ohio, who indicates that Mt. Weather is located in Maryland. Now, I know that our government is capable of doing many things, but moving mountains, other than those of paper, does not seem to be in character even for Uncle Sam. So anyone who knows where Mt. Weather is located is invited to respond. We can only speculate on the purpose of the lengthy coded transmissions, though. Any of our readers working for FEMA are requested to enlighten the rest of us. Anonymity is assured, if requested.

And if the foregoing confusion isn't enough, additional information concerning the activities of WGY912 was supplied by Gary L. Bledsoe of Florida. He was listening on the 10-meter amateur band looking for some European DX when, lo and behold, he heard WGY912 sending its well-known slow CW on 28091 kHz at 1323. This is right in the CW portion of the 10-meter amateur band with good signals (SI0444). The following message was repeated over and over: OYAXO JGOHM UGUHB OXTRO XTRVW IEQSO SK. Now, I am not aware of any shared use of this portion of the band, so it is possible that WGY912 had a substantial amount of harmonic output on a lower frequency or (shudder) the station was operating on a non-assigned frequency. Judging from the quality of the signal, it probably was not a harmonic transmission. But I guess that if you are the government, you can transmit where you please. It is interesting to note that the charter of FEMA is so broad they can probably do anything they want to.

SAC Jammers Revealed

Recently, a number of our readers sent loggings of deliberate and malicious interference to SAC "foxtrot" transmissions. A reader serving in the Air Force in the XXX Tactical Fighter Wing informed me that the interference was indeed severe and also planned and executed by the Air Force itself. During the period in question, the writer's base was experiencing "war week," a planned exercise to test the readiness of the base. During the exercise, many tactical transmissions were purposely jammed by the "self inspection teams" assigned to the exercise. The testers used heavy metal rock music by Black Sabbath and AC/DC, not particularly for the quality of the music but for the fact that these groups' sound is quite heavy in random noise, which helps fully modulate transmitters and is excellent material for interfering with voice transmissions.

The base in question, incidentally, received excellent marks in communications as the controllers used several unspecified techniques to combat such interference. Our anonymous writer also states that, though the armed services may choose to test itself with jammers during readiness exercises, a person foolish enough to attempt this on his own would find considerable difficulty, as the armed forces have their own private methods for handling these problems. Our thanks to Airman "A. Nonymous" of XXX Tactical Fighter Wing for his informative letter.



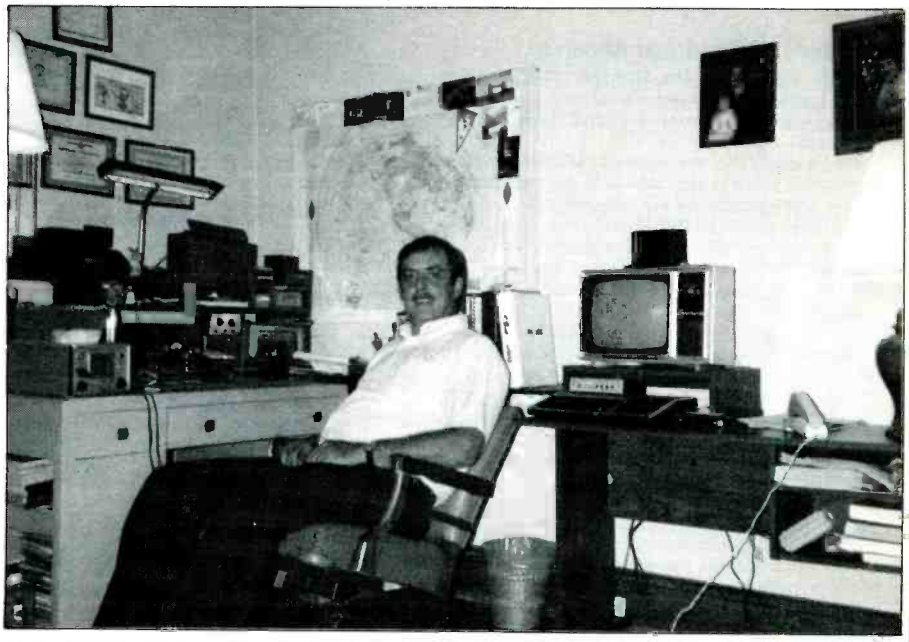
AFRICAN BROADCASTING COY., LTD.
P.O. Box 4559, JOHANNESBURG.
14.8.35
Dear Sir/Madam, 193
Re Reception of ZTJ - Johannesburg
We are in receipt of your favour of the 30th, April, and have pleasure in confirming your reception of our Johannesburg short wave station on that date. We would congratulate you on your achievement.
Yours faithfully,
For AFRICAN BROADCASTING COY., LTD.

Here's a highly prized rare QSL from station ZTJ on 6097 kHz in Johannesburg, South Africa. This card is dated August 14, 1935. Thanks to R.G. Hollingsworth of Illinois for sending it.

More On The VLF Stations

Last month the expanded VLF coverage in the column was greeted with considerable enthusiasm, so more loggings of these stations were included this time, and elsewhere in this issue is a VLF feature story. As you read this, the weather is just about perfect for VLF-DX; cold, crisp, and clear nights with the lowest atmospheric noise of the year makes the best time for listening for these stations. You will find that the DX or "skip" distance of these stations is not as great as that of higher frequencies, but this is made up for by the sheer quantity of stations on the air. Even in the heartland of the United States you will, on a good night, be able to

Henry Ponder of Lawndale, North Carolina, sent us a photo of his listening shack, which features an FRG7700 and Bearcat 220.



log a considerable number of the CW beacons. The voice beacons with time pips or weather advisories are heard most commonly in the coastal areas unless you are located near a fairly large airport. For those of you who wish to learn more about these stations, or would like to join a club oriented toward VLF monitoring, I suggest you contact the Longwave Club of America, 45 Wildflower Road, Levittown, PA 19057. This club is exclusively for those interested in the frequencies below 540 kHz. Their club publication, *THE LOWFER,* covers listings of stations operating from 10 to 540 kHz and the new, no-license, 1750 meter communications band. Membership in the LWCA is $10 a year and includes the publication via First Class mail. These are good folks, so tell them *POP'COMM* sent you.

Another Mystery Beacon

Richard J. Bobinski of New York sent us some fine reception reports this month, including one that is a bit bizarre. It appears to be a beacon of some sort, probably for navigation, but its mode of operation is a bit strange, to say the least. Richard was monitoring 307 kHz recently and logged the following pattern:

YYY
-9 second pause-
YYY
-10 second pause-
YYY
-9 second pause-
PP
-10 second pause-
PPP
-10 second pause-
PPP
-10 second pause-
A
"W" repeated 34 times
-10 second pause-
35 seconds of nothing at all!
"M" repeated 40 times
-10 second pause-
83 seconds of nothing . . . and then . . .
It does it all over again!

Richard monitored this station for a total of 3 hours and detected no change in the data or pattern. This was received on an ICOM R-71 using an Info-Tech M600A. Anybody know what it is?

More Voice Scramblers Being Used

There was a time when you could tune around to any of the commonly used military frequencies and hear all sorts of chit-chat "in the clear" with no attempts at encoding other than the usual military acronyms. But lately, especially on the SAC frequencies, the familiar "foxtrot" transmissions are being replaced by something much more ominous to the casual listener—encrypted RTTY and voice scramblers. Now I can understand the use of encrypted RTTY. It is a handy method of sending large groups of letters and numbers without repeating, and transcription errors are non-existent with the newest equipment. But voice scramblers . . . now that's something else. If you have spent any time listening to a scanner in a metropolitan area, you will be familiar with the sound of scrambled speech. In its simplest form, it consists of electronically removing certain voice frequencies, moving them up or down a bit, and replacing them in the transmitted signal. The end result sounds somewhat like SSB heard on an AM receiver. This type of scrambling certainly discourages the typical listener, but if you are a persistent cuss, you can build up a mixer circuit and a couple of tone generators and with a bit of experimenting, actually reinject the missing frequency components to yield strange-sounding but intelligent speech.

This was a fun game to play but governmental agencies, realizing what was going on, decided to play hardball; hence was developed the DVP—the digital voice processor. If you are an amateur cryptologist, you will certainly appreciate the deviousness of the minds of the individuals who came up with this. They realized that by just lifting and substituting voice frequencies, they could never disguise the voice patterns totally. Even with this old-style scrambling, the inflections of the voice were still present. You could tell if the phrase was a question or an order by its emphasis. Well, the designers even took that away from us. If you have ever heard DVP, you can certainly appreciate (or unappreciate) the results of the designers' efforts, because it's virtually uncrackable by us common folks.

It is called DVP, digital voice processing, because the voice is actually disassembled manipulated, and put together again in a completely different way so that the end result is something like the cross between a belch and a lion's roar. If you have wondered how it is done, I'll be glad to tell you. First, the human voice is not made up of a single tone, or even a small group of tones. The voice creates complex waveforms of many frequency components and harmonics, which gives it its richness and flexibility. When these harmonics are stripped away, the result is a flat and hollow pattern of speech not unlike that of the old hand-cranked Victrola, or SSB coming through too narrow a filter. It is the richness of the human voice that makes the DVP so confoundedly effective; we'll see why in a moment.

Digital voice processing for transmissions consists of four discrete processes; pre-filtering, analog to digital conversion, encryption, and digital to analog conversion. Let's examine each process in turn. The first step consists of filtering or stripping the voice of its frequency components above about 2200 Hz. This process is required so that the second step, the analog to digital conversion, will not have to handle an input signal that is faster than its optimum conversion rate. A second reason for this filtering is that the frequency components of the voice above 2500 Hz add to richness but not to in-

telligibility. The second step employed consists of reducing the varying instantaneous voltage of the voice signal to a digital value; a number. This process is usually done at least twice as fast as the highest frequency of the input signal, the voice. So for a maximum voice frequency of around 2500 Hz, the sample rate will be 5000 Hz. The sampling (or digitization) rate remains constant regardless of the input signal. So with no input at all, each sampling gives a zero, and when the voice is active, the output will be a digital number that is directly proportional to the intensity of the voice at that instant.

Now we have a rapid sequence of these digital numbers zipping along, 5000 or so a second. What do we do with them? If you have followed this so far, you will realize that we could take these numbers we have generated and immediately reverse the process. If we were to do this, we would end up with an exact replica of what we entered, so the output would sound exactly like the input. Well, if life were only so simple. This is where the third step occurs—the encryption.

There are several methods of DVP encryption, but we will deal with only the simplest to avoid confusion. Since the object is to render the speech unintelligible, it would appear that we could somehow manipulate these digital numbers we have generated and then, upon re-conversion, the speech would be altered. This is exactly what we are going to do. The simplest technique is that of "simplex translation." This method consists of taking each digital number and applying it to a look-up table in the DVP. This is like looking up a word in a dictionary. When the number's entry is found, a new number from the look-up table is substituted for the original. The end result is that every number is somehow changed to a different number in a random but categorized manner.

Once this has been accomplished, the new number goes to the fourth and final step, that of being converted back to a voltage. This is an ongoing process; voice waves come in, are converted to numbers, the numbers are substituted from a table, and the numbers are re-converted to voice waves. The end result is the gurgling, gagging noises on the air. In most DVP systems there is a time lag due to the amount of internal processing required. This usually amounts to anywhere from a few milliseconds to almost a second in the military systems.

All well and good, you might say, but how the devil do you ever get an intelligible voice back from this mess? In theory, it's quite simple, though in practice it's a fairly technical enterprise. Essentially, the entire process is reversed. The audio waves are received and noise spikes are filtered out. The filtered audio is reduced to digital numbers as before. The difference lies in the digital look-up table used. It will be the reverse of the table used to encrypt the data originally. Using this table, new numbers are supplied and are turned back into audio signals which are intelligible to the listener. In theory this is an excellent system. In practice, however, DVP is difficult to tune to get "signal lock," a condition whereby there is no phase distortion to confuse the decryptor circuits. Likewise, the transmitters and receivers must be stable in the extreme, signal levels must be strong, and band conditions must be quiet. For this reason, you will hear most DVP systems being using on VHF and UHF-FM. The units used by the military use a different scheme for encryption and decryption, so the foregoing problems, except for noise, do not apply.

So the next time you hear encrypted transmissions, tip your hat to the designers of the DVP system. They earned it.

Listening Reports

This month we have some good loggings. You'll notice that there are quite a few VLF beacons. Since this is the best time of the year to hear them, I thought we should give you some to listen for. Send your listening reports, questions, and comments to Ron Ricketts, Popular Communications, 76 N. Broadway, Hicksville, NY 11801. Now let's see what we have in the listening reports.

174: AM marker beacon continuously repeating "This is Station WGU20, Eastern Daylight Time . . . " read by a male announcer every ten seconds with time pulses between intervals. (Mike Gardner, OH)
179: WEU20, Chase, MD. Man's voice saying "Good morning. This is station WEU20. Eastern daylight time: 0 hours, 38 minutes, 10 seconds. (pip)" Very strong signal at time of reception. (Bill Carney, MI) This callsign usually reported as "WGU20."
194: TUK, Nantucket, MA, CW beacon at 0531. (Bill Carney, MI)
216: "YTR" repeated in CW at 1958. (Richard J. Bobinski, NY) CLB, Carolina Beach, NC, CW beacon at 0501. (Bill Carney, MI)
221: HM, Hamilton, Ontario, Canada, CW beacon at 0549. (Bill Carney, MI)
233: OWX, Ottawa, OH, CW beacon at 0510. (Bill Carney, MI)
245: YZE, Gore Bay, Ontario, Canada, CW beacon at 1717. (Bill Carney, MI)
246: DFI, Defiance, OH, CW beacon at 1936. (Bill Carney, MI)
260: BYN, Bryan, OH, CW beacon at 1957, very weak. (Bill Carney, MI)
261: "PYA" repeated in CW at 2010. (Richard J. Bobinski, NY)
263: GR, Grand Rapids, MI, CW beacon at 0505. (Bill Carney, MI)
266: YYU, Kapaskasing, Ontario, Canada, CW beacon at 0621. (Bill Carney, MI)
267: "IT" repeated in CW heard at 2020. (Richard J. Bobinski, NY)
272: BT, Battle Creek, MI, CW beacon at 1600. (Bill Carney, MI)
286: GD, Goderich, Ontario, Canada, CW beacon at 1320. (Bill Carney, MI)
289: YLQ, La Turque, Quebec, Canada, CW beacon at 420. Weak with much static. (Bill Carney, MI)
312: YMN, Maniwaki, Quebec, Canada, CW beacon at 0517. (Bill Carney, MI)
318: "C" repeated in CW heard at 1945. (Richard J. Bobinski, NY)
323: "B" repeated in CW heard at 2000. (Richard J. Bobinski, NY)
326: VV, Wiarton, Ontario, Canada, CW beacon at 0550. (Bill Carney, MI)
329: AMN, Alma, MI, CW beacon at 1702. Also, AAA, Lincoln, IL, CW beacon at 0101. (Bill Carney, MI)
332: QT, Thunder Bay, Ontario, Canada, CW beacon at 0615. (Bill Carney, MI)
335: "UQC" repeated in CW at 2015. (Richard J. Bobinski, NY)
340: YY, Mont Joli, Quebec, Canada, CW beacon at 0515. (Bill Carney, MI)
341: SB, South Bend, IN, CW beacon at 0627. (Bill Carney, MI)
344: CL, Cleveland, OH, CW beacon at 2235. (Bill Carney, MI)
345: "AVN" repeated in CW at 1933. (Richard J. Bobinski, NY)
353: QG, Windsor, Ontario, Canada, CW beacon at 1337. (Bill Carney, MI)
357: VES, Versailles, OH, CW beacon at 0521. (Bill Carney, MI)
359: UES, Waukesha, WI, CW beacon at 0430. (Bill Carney, MI)
362: LYL, Lima, OH, CW beacon heard at 0432. (Bill Carney, MI)
378: RJ, Roberval, Quebec, Canada, CW beacon at 0515. (Bill Carney, MI)
379: FZI, Fostoria, IL, CW beacon. very weak at 1300. (Bill Carney, MI)
382: XU, London, Ontario, Canada, CW beacon at 1340. (Bill Carney, MI)
388: DT, Detroit, MI, CW beacon at 2010, very weak. (Bill Carney, MI)
391: DDP, San Juan, PR, CW beacon at 0503. Signal very weak. (Bill Carney, MI)
394: YB, North Bay, Ontario, Canada, CW beacon at 0449. (Bill Carney, MI)
396: ZBB, Bimini, Bahamas, CW beacon at 0510. (Bill Carney, MI)
398: G, Windsor, Ontario, Canada, CW beacon at 0517. (Bill Carney, MI)
404: ZR, Sarnia, Ontario, Canada, CW beacon at 0537. (Bill Carney, MI)
409: YTA, Pembrooke, Ontario, Canada, CW beacon at 0633. (Bill Carney, MI)
412: UKG, Kleinburg, Ontario, Canada, CW beacon at 0634. Kleinberg is a suburb of Toronto. (Bill Carney, MI)
414: BC, Baie Comeau, Quebec, Canada, CW beacon at 0453. (Bill Carney, MI) CSS, Fayette County, OH, CW beacon at 0457. (Bill Carney, MI)
2806: CCS, Santiago Naval Radio, Santiago, Chile with CQ in CW at 0600. (Neil Wake, AZ)
3655: At 0128 Spanish male whistled and called what sounded like "Philadelphia" then ran a Spanish numbers tape at high speed in AM. (Elton Manzione, GA)
3780: CTP Oeiras Vaval Radio, Portugal, with QSX marker in CW at 0600. (Neil Wake, AZ)
3810: HD210A in Guayaquil, Ecuador with time pips and announcements in Spanish in AM. (George Primavera, NJ)
4030: 5-digit Spanish numbers station in AM with female announcer at 0400. (Joe Erwin, VA)
4055: Spanish 5-digit numbers transmission to "893" with female announcer in AM, closing with "final, final." (Elton Manzione, GA)
4444: 5-digit Spanish numbers station with female announcer at 0330. (Joe Erwin, VA)
4525: Nauen Radio, West Germany with time pips at 0045. (George Primavera, NJ)
4670: "Victor Lima Bravo 2" marker at 2348, SINPO 24333, by female announcer in AM. (George Osier, NY) 4-digit Spanish numbers station in AM with female announcer at 0200. (George Primavera, NJ)
4780: Unknown station sending slow CW 5-character groups at 0100. (George Primavera, NJ)
4935: German 5-digit groups in 3/2 format at 2209, SINPO 24333, with female announcer in AM. At 2209, three numbers and 1 zero, like Spanish 4-digit stations. At 2210, ten pulses and "gruppen" and on to more 3/2 groups. (George Osier, NY) Female announcer in German with "3 3 3, 1 0" at 2200. (Joe Erwin, VA)
5091: Spanish numbers station with female in AM. Began with tones, "grupo 188," then into 4-digits at 0601. (Bill Carney, MI)
5320: Radio New Orleans working CG Cutter Salvia—no RTTY available so sent message via voice. Lights and channel markers needing some necessary repairs. (Kenneth F. Newell, FL)
5696: USCG Rescue #145 in flight off the coast near Crescent City, CA, passing traffic in USB. (Stewart MacKenzie, CA)
6572: 5-digit Spanish numbers station with female announcer in AM at 0800. (Joe Erwin, VA)
6677: English speaking male reciting "Echo Charlie etc." in USB at 2355. (Joe Erwin, VA)
6683: SAM 27000 working Andrews AFB with comm checks before takeoff. Callsign changed to Air Force One at 2132, then gave lift-off message at 2136. AF1 was enroute to Andrews AFB from Decatur, IL. SAM 26000 (Bush's Aircraft) also came on this frequency at 2246 for comm checks. (Daryll Symington, OH) Welcome to

POP'COMM, Daryll. Keep up the good loggings! (Editor)

6749: Male announcer reading "India Whiskey Tango Charlie Sierra etc." at 0600. (Joe Erwin, VA)

6761: "Fruit 14" doing phone patch to Wilmington Control in USB at 0058. (Gary P. Vendetti, NJ)

6790: 4-digit Spanish numbers transmission with female announcer from 0605 to 0635. Signal was very clear. (Paul Scalzo, Quebec)

6807: Spanish 5-digit numbers station in AM with female announcer at 2038. (Bill Carney, MI)

6852: 5-digit German numbers station in USB with a female announcer at 2235. (Joe Erwin, VA)

6890: 5-digit Spanish numbers station with female announcer from 0500 to 0530. (Dan Smith, NY) 5-digit Spanish numbers at 1020 in AM at SINPO 55555! Announcer was female as usual. (George Osier, NY)

6892: 5-digit Spanish numbers station with female announcer at 0500 to 0508. Began with "attencion 330 70" repeated several times. Extremely strong signal. (John Mairs, VA) This is probably the same station logged at 6890. Note the strength of the station relative to the listeners. (Editor)

6908: 5-digit Spanish numbers station in AM with female announcer at 0633. (Bill Carney, MI)

6923: "V" marker in modulated CW (SSB) from 0100 to 0200. (Paul Scalzo, Quebec)

6946: CKN, Vancouver, BC, with V marker in CW at 0158. (John Friberg, NH)

7140: 5-digit Spanish numbers station with female announcer at 0400. One hour later, at 0500, the frequency was active again with pirate activity by WIMP, with mailing address in Michigan. (Joe Erwin, VA) Female announcer reading 5 character groups in French in AM at 0400. Transmission ended without ID at 0417. The Quebec underground? (Howard Glazer, CT) Without a doubt. Or maybe the Bureau Deuxime got some funding. Actually, I don't know. Perhaps more loggings of these transmissions will shed light. Can anyone help? (Editor)

7444: "Kilo Papa Alpha 2" repeated from 0315 to 0324 by female with unidentifiable foreign accent. (Phil Amend, NJ)

7445: Woman repeating "Zulu Echo Oscar Zulu" in SSB at 0220. (John Friberg, NH)

7643: Young lady announcer in Spanish with "Attencion 5 0 3, 2 4" over and over at 0600. (Joe Erwin, VA)

7652: KKN44, US Embassy in Monrovia, Liberia with CW marker at 0130. (George Primavera, NJ)

7887: 5-digit Spanish numbers station with female announcer at 0500. "Finale, Finale" at 0507, left air at 0508. (Dan Smith, NY)

7904: "K" repeated continuously in CW at 0140. (George Primavera, NJ)

8245: Swordfish 02 working landshark concerning position of boat suspected of smuggling Haitian refugees. (Kenneth F. Newell, FL) Good logging, Kenneth. The Coast Guard frequencies are always interesting to monitor. 5692 and 5696 are also very active in the Gulf of Mexico. (Editor)

8566: D3E41, Luanda Radio, Angola with CW marker at 0100. (George Primavera, NJ)

8567: ZSJ3, Silvermine Cape Naval Communications Center, RSA Navy CW marker at 0115. (George Primavera, NJ)

8608: HPN60, Puerto Armuelles Radio, Panama with CW marker at 0130. (George Primavera, NJ)

8620: EA3D, Aranuez Radio, Spain with CW marker at 0137. (George Primavera, NJ)

8771: *Spartan (USS Lexington)* working Raspberry Pensacola in preparation for visit by Florida governor, Graham. (Kenneth F. Newell, FL)

8800: WOM High Seas with weather broadcast, live ID, and schedule of next broadcast and frequencies. (Elton Manzione, GA)

8972: "S4U" calling "6DZ" in USB at 2058. USN "Overwork" transmission. (Gary P. Vendetti, NJ)

8993: "MacDill" doing a "Skyking" transmission in USB at 2100. (Gary P. Vendetti, NJ) Also, "Halifax Military" calling "Canadian Military 8357" for radio check in USB at 2304. (Gary P. Vendetti, NJ) Scarab 00 working MacDill, p/p to Bodyguard at Key West NAS, enroute from Guantanamo Bay, Cuba. (Daryll Symington, OH)

9050: Spanish numbers station jammed right off the frequency by a strong clicking signal from 0216 to 0230. (Paul Scalzo, Quebec)

9326: "3/2" German numbers station with female announcer at 2350. Off at 2353 with "Ende." Transmission was in USB. (Dan Smith, NY)

9373: 5-digit Spanish numbers station with female announcer at 0305. (Edward H. Hammond III, MD)

9450: 5-digit German numbers station with female announcer at 1910. Long tone at 1917 then off the air. (Dan Smith, NY)

9453: 5-digit Spanish numbers station with female announcer in AM beginning at 0500, off at 0519. (Dan Smith, NY)

9465: Woman repeating one through zero and "359" three times in English at 0500. Then at 0510, ten beeps and into a 4-digit female number transmission in English. (Dan Smith, NY)

9973: 5-digit German numbers station with female announcer at 0200, ending at 0215. (Dan Smith, NY) This is the frequency that has the woman that sounds like an ex (?) Nazi. Give a listen sometime. (Editor)

10000: Number and letter codes with "Missile Silo" thrown in for good measure. (Edward H. Hammond III, MD) Is this for real? This is the second report I have had of something unidentified coming in over WWV. Anybody know what's going on here? (Editor)

10174: 5-digit German numbers station in SSB with female announcer at 0100. This was live transmission—announcer could be heard catching her breath between transmissions. (George Primavera, NJ)

10649: Phonetics read at 1838 by female announcer in SSB, SINPO 34333. (George Osier, NY)

11182: "Teall 6" weather beacon doing phone patch Scott AFB in USB at 2157. (Gary P. Vendetti, NJ)

11228: "ELECTRIC" working MacDill AFB in LSB at 1446 to 1511. Electric is the callsign of the National Emergency Airborne Command Post, also known as the "Doomsday Plane." They were setting up an RTTY circuit and hopped frequencies to lose anyone who might be listening in. Other frequencies used were 13210, 9020, 11246, and back to 11228. (Daryll Symington, OH) This is a *superb* catch! This aircraft is seldom heard, since it is our last bastion of leadership in the event of nuclear war. I doubt anyone will get a QSL from them. Good work, Daryll. (Editor)

11246: "MAC 2069" on ground at Guantanamo NAS, Guantanamo Bay, Cuba, working "FORMAT" in USB at 2054. (Gary P. Vendetti, NJ)

11267: "4SX" doing a "Skyking" broadcast in USB at 2059. Note that a USN station is doing a USAF broadcast. (Gary P. Vendetti, NJ)

11618: Woman repeating "Bravo Juliet" 4 times, then a strange musical tone. Transmission was in USB at 2100. At 2105, transmission of 5-digit numbers began, with female announcer, once again in USB. (Dan Smith, NY)

12250: Spanish female announcer with 5-digit groups to "299." A total of 46 groups were transmitted in AM. (Elton Manzione, GA)

13201: "ROVEPACK" working Patrick AFB in USB at 2046. (Gary P. Vendetti, NJ)

13244: "NALO 552" working Patrick AFB if USB at 2011. (Gary P. Vendetti, NJ)

13473: Spanish 5-digit numbers station with female announcer in AM with SINPO 34333. (George Osier, NY)

14014: CLS, Havana, Cuba with QSX marker in CW at 0500. (Neil Wake, AZ)

14695: Continuous beacon in SSB with female announcer repeating "This is transmission for Baltic (?) adjustment purposes from the Moscow Radio Telephone Station," heard until 1500. (Mike Gardner, OH)

18576: English 5-digit numbers station in AM with female announcer and SINPO 23333. (George Osier, NY)

19070: Slow speed CW at 1743 sending three messages, each repeated for 5 minutes. "UD TDANEA, 4E 4DAEAA, and EU NAUVUA." Sign off without callsign at 1758. (Howard Glazer, CT)

29670: Three high and low pitch tones, followed by a female repeating "259" twice in French at 2148. This did not appear to be an amateur transmission. (Paul Scalzo, Quebec)

Keep those monitoring intercepts coming!

PC

RTTY

BY JOSEPH JESSON

THE EXCITING WORLD OF RADIOTELETYPE MONITORING

We have touched briefly on various software packages available to copy RTTY using a personal computer. Several requests have been made asking for a compilation of the popular "stand-alone" software.

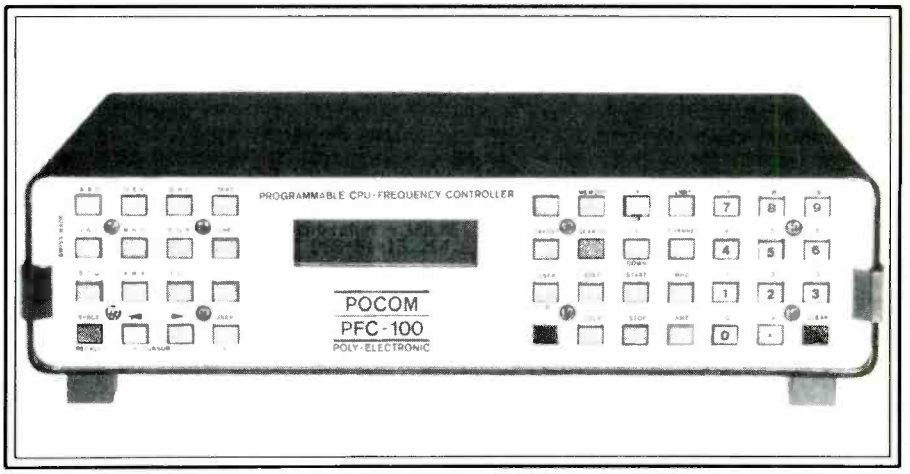
The advantages of this approach resides in the choice of several programs that will run on a low-cost standard machine. The most popular software is the Kantronics Hamsoft™ series. It will copy Baudot at 60, 67, 75, and 200 WPM and ASCII at 110 or 300 baud. Morse can also be read in the area of 5 to 99 WPM. Features include split screen, 1K type-ahead buffer and RTTY message ports. Various computers are compatible with Hamsoft, including Apple II+, IIe, Atari, TRS80 Color Computer, VIC 20, and the TI-99/4A. Prices range from a high of $99.95 for the TI-99/4A to a low of $29.95 for the Apple II+. Hamtext™ series includes all of the features of the Hamsoft series but offers additional capability, including text editing, received message storage, and variable buffer size—clearly a good choice for ham applications.

The ideal software for the RTTY listener in the Kantronics line is the "Supertap" series. It receives Baudot at 50, 67, 75, 100, and 132 WPM and ASCII at 110 and 300 baud. Advanced features include selectable upshift on space, text editing, word-wrap, status indicator, and an RTTY speed estimate mode. "Supertap™ will function on the Commodore 64 and VIC 20 only.

For an RTTY program I've had luck with the SWLTEXT™ by Advanced Electronics Applications. All of the standard Baudot and ASCII speeds, as well as Morse code, are included. SWLTEXT™ also features advanced editing, disk storage of received text, color select, timing analysis, and exclusive features (in the $90-100 price range) such as bit inversion, bit transposition, third register Cyrillic RTTY, Cyrillic Morse, and Katakana Morse.

Unfortunately, the SWLTEXT™ is only available on the Commodore 64. If you are like me and use other computers, SWLTEXT™ would be very desirable on the Apple II+ and the IBM PC. AEA's rationale is to introduce software on the machine with the largest users base (any other reasonable software company would do the same). I only hope that AEA is working on functionally equivalent RTTY software for other computers.

Last time we mentioned lap-sized portable computers, such as the Radio Shack TRS-100, Olivetti M10, and the NEC portable. A source of RTTY software for these computers has been located. This RTTY Baudot program works with any user-supplied FSK demodulator to form a complete lap-sized RTTY monitoring post. All popular baud rates with 1 or 1½ stop bits are covered. Received signals may be optionally echoed to a parallel printer.



The POCOM PFC-100 frequency controller.

Contact Swindell Judy Inc., Suite 349, Dept. JJ, 4316 Dressler Rd. N.W., Canton, Ohio 44718 for more information. A phone number of (216) 456-5321 is listed. A price of $19.95 (includes postage) is noted.

A recent announcement indicated plans to upgrade the U.S./Soviet hot line indicates the direction of future communication—*no* dedicated voice link, only RTTY text and facsimile. The logic behind this decision revolves around the need to accurately translate information and text as more precise. The new hot line will actually consist of three separate data channels:

1) Four nongeostationary (polar) Russian Molyna-11 satellites that move in a lower elliptical orbit around the earth. Four satellites are required due to the limited time each satellite is overhead (approximately six hours a day for each).

2) An Intelsat satellite in geostationary orbit over the mid-Atlantic.

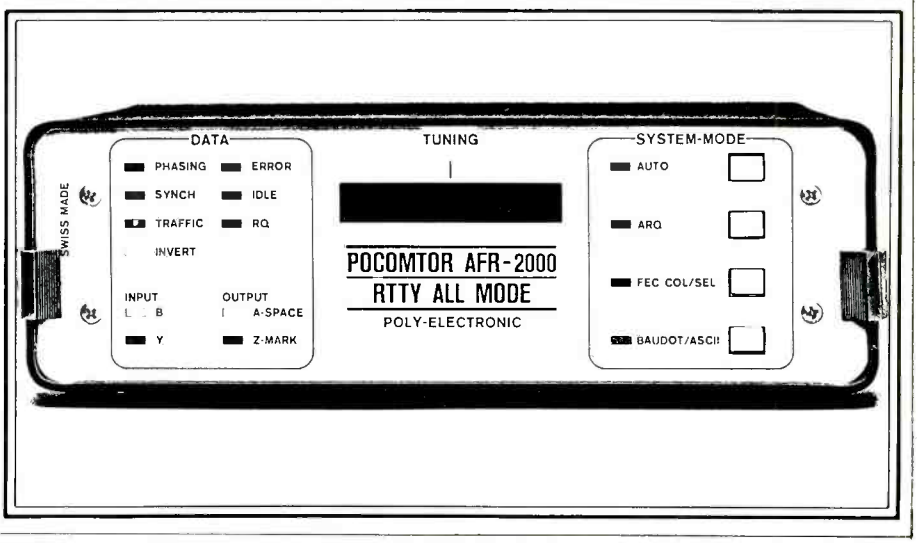
3) A backup circuit carried by undersea cable.

Any communications between the Pentagon and the Kremlin will be carried over several (at least two) of the above links. This diversity scheme will insure reduced error communications.

Parallel sets of earth stations will also be required. One antenna is in Fort Dietrick, Maryland and an Intelsat earth station is in Edam, West Virginia, and this technique is known as space diversity reception.

The Soviet earth stations will be situated in Moscow and Lvov. Data is encrypted at

POCOMTOR AFR-2000 features simple and quick tuning with 16 line LED bar indication.



both ends—but the language is not translated before transmission. Soviet messages are printed in Cyrillic at the U.S. end. Who will be the first RTTY buff to monitor "hot line" testing?

A recent communications conference, The Second World Conference on Transborder Data Flow Policies, was convened by the Intergovernmental Bureau for Informatics (IBI) in Rome. Dominated by Third World countries, on-line sources of digital information became the hot topic. The conference took an anti-American and anti-Western tone. Foreign governments are concerned that RTTY links might undermine their own national policies. As U.S. telecommunications companies grow, it is good business to listen to the grievances of developing countries. The term "informatics" was coined by the French and refers to all data and voice communications.

There are occasional outbursts, such as a Cuban delegate's vocal denunciation of "information imperialism" or the Chilean brigadier general who represented his country's military junta in denouncing "information aggression" fostered by the U.S.

Roy Brown, Jr. points out that the RTTY program in the August '84 issue does not work due to the lack of a figures and letters shift function. This program, as mentioned in the article, was included for a template and not a complete program. The RTTY program mentioned earlier in this column (Swindell Judy) includes a complete source listing—ideal for the interested hobbyist to determine the details of a complete Baudot to ASCII conversion.

The other programs mentioned do not include the complete source listing and the $19.95 price is certainly worth the listing (8085 based) even if one does not use a TRS100 portable computer. Roy also mentions that Basic will easily handle 300 baud. This is true, but assembly language RTTY programs allow greater flexibility in designing advanced RTTY programs.

For example, a nice addition to an RTTY program would be a baud rate estimator for unknown RTTY signals. This is accomplished by assembly language and it is not possible to code in Basic. Ever want your ICOM R-70/JRC NRD 515 to display the actual transmitter and RTTY mode on an alpha-numeric liquid crystal display?

The POCOM PFC-100 is a very sophisticated intelligent frequency controller offered by Poly-Electronic in Switzerland. I am not aware of any U.S. distributors of the PFC-100 and all inquiries should be sent to Poly-Electronic, CH-8303 Basserdorf/Switzerland, Spranglestr. 30. This is a relatively expensive unit, costing over $800 (pricing is subject to change).

Poly-Electronic also introduced a new RTTY decoder for Baudot, ASCII, ARQ-FEC, and TOR. It includes automatic searching and synchronizing according to baud rate and phase. A special narrow band quadrature discriminator is used to demodulate shift from 50 to 1000 Hz. Tuning is accomplished by the use of a 16-line LED bar graph indicator. PC

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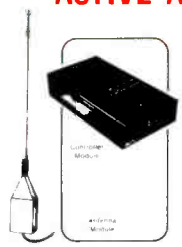

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Beaming In *(from page 4)*

be inched into becoming a tool for the invasion of personal privacy? And, if you can get someone to work or study one type of electrode or probe inserted into their cranium, then how much more is it to ask or demand that they function with two, or three, or ten of them to measure indifference, hostility, boredom, or personal habits or activities? One can only wonder where it may end, especially since, moving by inches, we have suddenly found ourselves at a point where personal privacy is at an all-time low.

Every possible aspect of our lives is presently spread out in a multitude of data banks from coast to coast. Notwithstanding hackers and other unauthorized intruders, it doesn't take a lot of effort for one computer to survey others on duty at employers, insurance companies, military services, credit bureaus, clubs, professional organizations, political groups, public utilities, courts, schools, hospitals, banks, credit card companies, and countless local, county, state, and federal offices and agencies to assemble a portrait of any of us that could fill a 1,000-page book.

Virtually every U.S. law enforcement agency has some access to the FBI's computer system. Now an advisory group for the Bureau is considering recommending a major expansion of a national computerized file to distribute information about some individuals who are considered "suspicious" but who aren't actually wanted for any crimes. The FBI is aware that there are questions of civil rights that may be involved in such a system and therefore a decision on whether to go ahead with this may not be finalized for some time to come.

I can recall the 1950's when a primitive Univac computer filled up the inside of a six story building that had to be hollowed out to accommodate the huge device that required thousands of vacuum tubes. At that time the justification for putting up with the 70-foot high, 10 ton trinket was that it was going to be used to solve certain complex equations in higher mathematics and quantum physics —very noble causes, to say the very least. Along with other college student volunteers, I spent long hours fixing solder connections and replacing burned out vacuum tubes in this beast because I thought I would be playing some small part in the advancement of knowledge or figuring out the riddles of the universe. It was such a mind-boggling concept (and machine) at the time that none of us in the "solder brigade" ever considered that this infernal idiot savant, which we nursed through many mysterious illnesses and temperamental tantrums, would ever be shrunk to the size of a roll of Lifesavers (or smaller) and would have the very nasty ability to peer into our privacy, and then analyze the information, retain it in its memory, and then be so damned eager to spill out its guts to anyone who pressed some buttons on a Touchtone pad.

Sometimes I almost feel like Dr. Frankenstein's assistant, Igor! **PC**

AD INDEX

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