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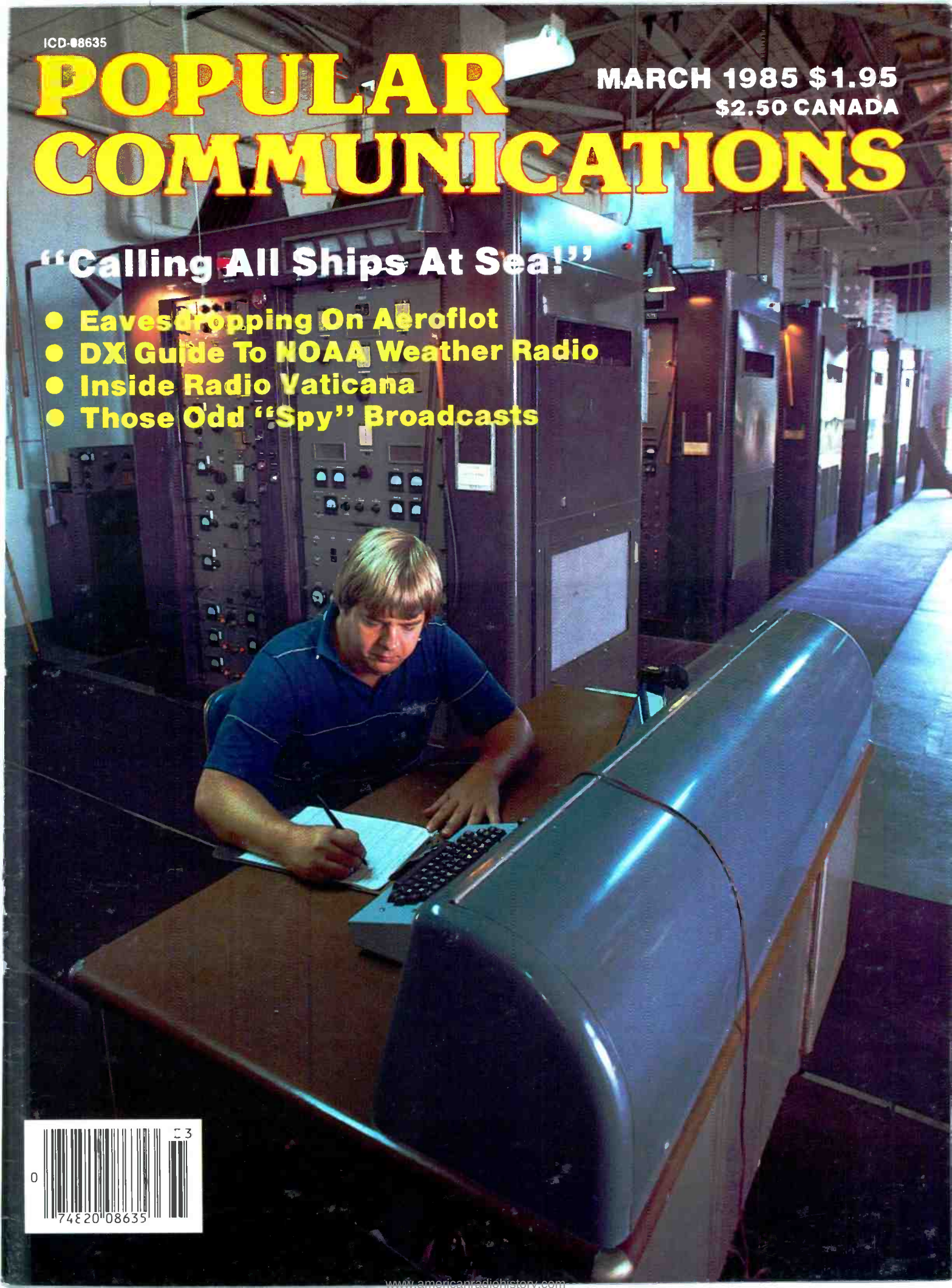
- DX Guide To NOAA Weather Radio
- Inside Radio Vaticana
- Those Odd "Spy" Broadcasts



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KENWOOD

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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).

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CP-1 Computer Patch™

SWL-TEXT is the software and CP-1 is the interface that when combined with your Commodore C64™ and communications receiver, will give you everything you could ask for in a CW/RTTY intercept station!

- Automatically determines RTTY speed and indicates if ASCII or Baudot
- Copies AMTOR, ARQ and FEC
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- 24 hour clock
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- Complete with all cables for Commodore C64
- Copies CW 5 to 99 WPM
- Copies Russian RTTY and Japanese RTTY & CW

Our Lab Has Checked Them All. This Is The Ultimate.

SWL-TEXT/CP-1 Special Introductory Package Price **$249.95**
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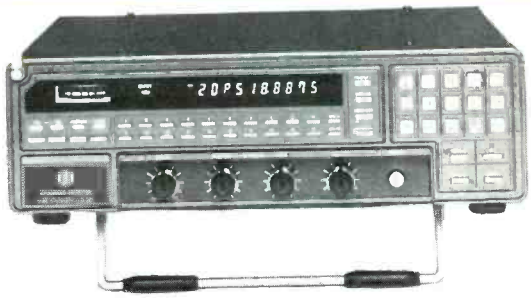

- A professionally created scanner for the serious listener
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- Continuous coverage. You'll hear everything.
- Birdie-Free, no internal 'signals' to interfere with scanning
- 20 Channel memory, AM-FM Mode memory, Priority memory
- Carrier Operated Relay (COR) permits automatic start/stop of a recorder
- Four low-noise front end converters for optimum performance
- 12 Volt DC operation (120 Volt AC power supply optional)
- Check JIL's ad in this issue for further details

Sale Price $549.95 List $739.90
P-1A Power Supply $34.95
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ICOM IC-R71A

WORLD CLASS RECEIVER

ICOM introduces the **IC-R71A** 100KHz-30MHz superior-grade general coverage receiver with innovative features including keyboard frequency entry and wireless remote control (optional).

This easy-to-use and versatile receiver is ideal for anyone wanting to listen in to world-wide communications. Demanding no previous shortwave receiver experience, the **IC-R71A** will accommodate an SWL (shortwave listener), Ham (amateur radio operator), maritime operator or commercial operator.

With 32 programmable memory channels, SSB/AM/RTTY/CW/FM (optional), dual VFO's, scanning, selectable AGC and noise blanker, the **IC-R71A's** versatility is unmatched by any other commercial grade unit in its price range.

Utilizing ICOM's DFM (Direct Feed Mixer), the **IC-R71A** is virtually immune to interference from strong adjacent signals, and has a 100dB dynamic range.

ICOM introduces a unique feature to shortwave receivers . . . direct keyboard entry for simplified operation. Precise frequencies can be selected by pushing the digit keys in sequence of frequency. The frequency will be automatically entered without changing the main tuning control. Memory channels may be called up by pressing the VFO/M (memory) switch, then keying in the memory channel number from 1 to 32.

Thirty-two tunable memories offer instant recall of your favorite frequency. Each memory stores frequency, operating mode, and a backup battery maintains the memories for up to five years.

Specifications.
• **Frequency Coverage:** 0.1 MHz-30.0 MHz • **Frequency Control:** CPU based 10 Hz step Digital PLL synthesizer with dual VFO system. Direct frequency entry through keyboard or RC-11 remote unit. • **Memories:** 32 tunable memories store frequency and mode. • **Scanning:** Memory and band scan with auto-stop. • **Frequency Readout:** 6 digit 100 Hz fluorescent readout. • **Frequency Stability:** Less than 250 Hz after switch on 1 min to 60 mins, and less than 50 Hz after 1 hour. With option CR-64 high stability crystal: Less than ± 50 Hz after switch on 1 m in to 60 mins, and less than ± 10 Hz after 1 hour at normal room temperature. Less than ± 100 Hz in the range of −10°C to +60°C. • **Receiving Mode:** A^1, A^3J (USB, LSB), F^1 (Output FSK audio signal), A^3, F^{3*}. • **IF Frequencies:** 1st: 70.4515 MHz, 2nd: 9.0115 MHz, 3rd: 455KHz, 4th: 9.0115MHz (except F^{3*}); with continuous Passband Tuning (except F^{3*}). • **2nd IF Center Frequency:** SSB (A^3J) $FM^*(F^3)$—9.0115 MHz, CW (A^1) RTTY (F^1)—9.0106 MHz, AM (A^3)—9.0100 MHz. • **Sensitivity (when preamplifier is ON):** SSB, CW, RTTY: Less than 0.15 microvolts (0.1—1.6 MHz: 1 microvolt) for 10 dBS + N/N; AM: Less than 0.5 microvolts (0.1—1.6 MHz: 3 microvolts); FM^*: Less than 0.3 microvolts for 12dB SINAD (1.6—30MHz). • **Selectivity:** SSB, CW, RTTY: 2.3 KHz at -6dB (Adjustable to 500 Hz min), 4.2KHz at -60dB; CW-N, RTTY-N: 500 Hz at -6dB, 1.5KHz at -60dB; AM: 6KHz at -6dB (Adjustable to 2.7KHz min), 15KHz at -50dB; FM^*: 15KHz at -6dB, 25KHz at -60dB. • **Antenna Impedance:** 50 ohms Unbalanced (Single wire can be used on 0.1—1.6MHz). • **Weight:** 7.5kg (16.5 lbs.) • **Dimensions:** 111mm(H)x286mm(W)x276mm(D)(4⅜ in. x 11¼ in x 10⅞ in.) • **Power Supply Requirements:** 117V or 235V ± 10% 50-60Hz 30V A, (100V/200V/220V use requires internal modification).

ICOM R71A OPTIONS

CK-70	12 Volt DC Kit	**$9.95**
CR-64	High Stability Osc.	**$56.00**
EX-310	Voice Synthesizer	**$39.95**
EX-257	FM unit (10M Ham)	**$38.00**
FL-32	CW filter, 500Hz 9MHz	**$59.50**
FL-44	2.4KHz 455KHz SSB Crystal Filter	**$159.00**
FL63	CW filter 250Hz 9MHz	**$48.50**
RC-11	Remote Control	**$59.95**

INSTALLATION . . . options can be installed by a skilled user/owner. ***EEB*** will do it for you!
• 1-3 options . . . . . **$35** • 4 and up **$45**

ICOM ICR71A with full factory warranty but without ***EEB***'s extra service/no installed options
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EEB—EXCLUSIVE OPTIONS

EEB OPTIONS INSTALLED

- **Mechanical 2.4KHz filter**—replaces stock ceramic filter—improves SSB, ECSS, AM narrow selectivity **$95**
- **Front end upgrade**—improves dynamic range (plus), pre-amp enable below 1600KHz **$35**
- **4KHz filter** replaces stock 6KHz wide filter. Improves AM selectivity **$50**

ICOM ICR71A with full ***EEB*** service . . . Factory and extended warranty, tested and aligned
. . . . . **SALE $699**

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CIRCLE 81 ON READER SERVICE CARD

NEW!

uniden®

Bearcat®

Rebates!

Communications Electronics,™ the world's largest distributor of radio scanners, celebrates 1985 with big savings on *Bearcat* scanners. Uniden Corporation of America, the manufacturers of *Bearcat* scanners is offering huge consumer rebates on their great line of scanners, when purchased from CE between February 1 and March 31, 1985.

Bearcat® 300-G

List price $549.95/**CE price $344.00/$10.00 rebate**
Your final cost is a low $334.00
7-Band, 50 Channel • Service Search • Nocrystal 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-G

List price $449.95/**CE price $274.00/$5.00 rebate**
Your final cost is a low $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-G

List price $349.95/**CE price $209.00/$35.00 rebate**
Your final cost is a low $174.00
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-G

List price $399.95/**CE price $274.00/$5.00 rebate**
Your final cost is a low $269.00
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.

FREE Bearcat® Rebate Offer

Get a coupon good for a $35.00 rebate when you purchase a *Bearcat* 210XL; $30 rebate on model 201; $20 rebate on models 180 and 100; $10 rebate on models DX1000 or 300; $5 rebate on models 20/20 or 260. To get your rebate, mail rebate coupon with your original dated sales receipt from Communications Electronics and the *Bearcat* model number from the carton to Uniden. You'll receive your rebate in six to eight weeks. Offer valid only on purchases made between Februafy 1, 1985 and March 31, 1985. All requests must be postmarked by April 15, 1985. Limit of one rebate per household. Special rebate coupon must accompany all rebate requests and may not be reproduced. Offer good only in the U.S.A. Void where taxed or prohibited by law. Resellers, companies and employees of Uniden, their advertising agencies, distributors and retailers are not eligible for this rebate. Please be sure to send in the correct amount for your scanner. Pay the listed CE price in this ad. *Do not* deduct the rebate amount since your rebate will be sent directly to you from Uniden. Orders received with insufficient payments will not be processed and will be returned. Offer subject to change without notice.

NEW! Bearcat® 201-G

List price $279.95/**CE price $189.00/$30.00 rebate**
Your final cost is a low $159.00
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-G

List price $249.95/**CE price $164.00/$20.00 rebate**
Your final cost is a low $144.00
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. 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-G

The first no-crystal programmable handheld scanner.
List price $449.95/**CE price $229.00/$20.00 rebate**
Your final cost is a low $209.00
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. 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. Order your scanner now.

Bearcat® DX1000-G

List price $649.95/**CE price $499.00/$10.00 rebate**
Your final cost is a low $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-G

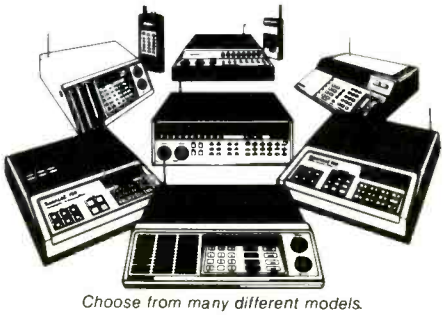
List price $159.95/**CE price $99.00**
The *Uniden* PC22 is a 40 channel AM remote mobile CB radio. It's the answer for today's smaller cars which don't always provide adequate space for mounting. Since all the controls are on the microphone, you can stash the "guts" in the trunk. The microphone has 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.

CIRCLE 28 ON READER SERVICE CARD

Uniden® PC55-G

List price $89.95/**CE price $59.00**
The *Uniden* PC55 40 Channel CB radio is a full featured transceiver that boasts a super-compact case and a front-panel mike. 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. The *Uniden* PC55...now at a special low price.



Choose from many different models.

OTHER RADIOS AND ACCESSORIES

RD55-G Uniden *visor mount* Radar Detector	$119.00
RD95-G Uniden *remote mount* Radar Detector	$139.00
FB-E-G Frequency Directory for Eastern U.S.A.	$12.00
FB-W-G Frequency Directory for Western U.S.A.	$12.00
BC-WA-G Bearcat Weather Alert™	$39.00
A60-G Magnet mount mobile antenna	$35.00
A70-G Base station antenna	$35.00

Add $3.00 shipping for all *accessories* ordered at the same time.
Add $3.00 shipping per scanner antenna.

BUY WITH CONFIDENCE

To ***get the fastest delivery from CE*** of any product in this ad, send or phone your order directly to our Scanner Distribution Center.™ Michigan residents please add 4% sales tax or supply your tax I.D. number. Written purchase orders are accepted from approved government agencies and most well rated firms at a 10% surcharge for net 10 billing. All sales are subject to availability, acceptance and verification. All sales on accessories are final. Prices, terms and specifications are subject to change without notice. All prices are in U.S. dollars. Out of stock items will be placed on backorder automatically unless CE is instructed differently. A $5.00 additional handling fee will be charged for all orders with a merchandise total under $50.00. Shipments are F.O.B. Ann Arbor, Michigan. No COD's. Most products that we sell have a manufacturer's warranty. Free copies of warranties on these products are available prior to purchase by writing to CE. International orders are invited with a $20.00 surcharge for special handling *in addition* to shipping charges. Non-certified checks require bank clearance.

Mail orders to: Communications Electronics,™ Box 1045, Ann Arbor, Michigan 48106 U.S.A. Add $7.00 per scanner, radar detector or CB or $12.00 per shortwave receiver for U.P.S. *ground* shipping and handling in the continental U.S.A. For Canada, Puerto Rico, Hawaii, Alaska, or APO/FPO delivery, shipping charges are three times continental U.S. rates. If you have a Visa or Master Card, you may call and place a credit card order. Order toll-free in the U.S. Dial 800-USA-SCAN. In Canada, order toll-free by calling 800-221-3475. WUI Telex CE anytime, dial 671-0155. If you are outside the U.S. or in Michigan dial 313-973-8888. Order today.

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POPULAR COMMUNICATIONS

MARCH 1985 **VOL. 3, NO.7**


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FEATURES

This month's cover: *Transmitter engineer Wallace Turzyn at WCC 20 kW transmitters located in South Chatham, Massachusetts. Photo by Larry Mulvehill, WB2ZPI.*

DEPARTMENTS

BEAMING IN

BY TOM KNEITEL, K2AES

AN EDITORIAL

The Big Ear

It's reassuring to think that Uncle Sam has his finger on the pulse of the nation, his eye to the far horizons, and his nose to the grindstone. Somehow it's less than reassuring to learn that he's so quick to also have his ear to the wall like his brother, "Big."

Not long ago, nationally syndicated newspaper columnist Jack Anderson noted that phone calls to and from many government agencies are being "monitored." You may assume that this relates to calls arriving at or departing from the Pentagon, State Department or various intelligence or investigative agencies. But no, this involves the Department of Agriculture, the Veterans Administration, Social Security, Department of Commerce, the Postal Service. Fourteen agencies, including Amtrak, have admitted doing it!

The White House has strongly opposed proposed legislation that seeks to yank the plug on this secret snooping except in instances of bona fide intelligence or criminal investigations as carefully enumerated in a set of strict guidelines. The Administration believes that such restrictions would limit "administrative flexibility" (whatever that means). They also point out that such snooping is "consensual," a word which means that the employess of the various agencies have had the opportunity to see notices on their bulletin boards advising them that their telephone calls are subject to monitoring and tape recording.

"But," you may ask, "what about the public?" Surely all persons who communicate with these agencies by telephone aren't aware that their calls are subject to secret monitoring. It seems that this situation is also covered by the magic word "consensual." The Administration believes that as long as one party to the conversation is aware of the monitoring and has consented to it, then there isn't any question of the other party's rights being violated.

Somehow, the thought of federal employees sitting at tape recorders evaluating Amtrak or Social Security telephone calls seems—to me, at least—a little far out. And what about the dozens upon dozens of other federal agencies that may be doing the same but haven't yet owned up to the practice? Basically, you'd have to assume that virtually every phone call to or from a federal agency may well be under such surveillance; and the employees of such an agency are not especially anxious to put you on notice that your call might be recorded and evaluated for security or other purposes. You'd think that, at the very least, the agencies in question would let you in on their little game which, by the way, seems to be operating outside of guidelines already established regulating such matters. Your last call to Amtrak asking when the train leaves for Chicago may already be in the National Security Agency computer!

Knock, knock.

"Who is it?"

"Federal agents. We want to talk to you about telephone communications you had three years ago with a federal agency."

"What are you talking about?"

"Did you ask the ticket agent what time the train left for Chicago?"

"Yeah, So what?"

"When you were told 3:15 p.m., did you say or allege that the train would probably leave more than an hour late?"

"Well—uh, yeah, maybe."

"When the agent told you that he could give you the scheduled time under the assumption that it was accurate, did you call him an idiot?"

"Gee—I—I don't know."

"Come clean, Mr. Hepplewhite! We have the tapes. You accused a federal agency of providing falsified information. Furthermore, you accused a federal agent of being incompetent. Didn't you?"

"Err—ah—ummm."

"Well, Mr. Hepplewhite, this is certainly no laughing matter, especially since we have a tape of your wife calling the Government Printing Office and saying that the government had no backbone. The Administration doesn't like that kind of talk, sir. At first we were willing to overlook your wife's subversive politics, but we now see it's falling into a pattern . . ."

"Wait—she only called to say that the book she ordered from them on rhubarb recipes had a defective spine and the pages were falling out."

"That's what you say now, sir. But tell us, Mr. Hepplewhite, were you taking the train to Chicago to visit one Horace H. Hepplewhite of Evanston—the same person we are now investigating for making threats to the Veterans Administration? Our tape reveals him shouting at them about his having a blackjack and a Pershing Missile."

"Wait—my Uncle Horace is 89 years old. He served in World War I with General Blackjack Pershing. He talks loud because he's hard of hearing. Maybe that's what he was trying to tell them. I don't think he was trying to . . ."

"Of course sir, it will all come out at the

(Continued on page 74)

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.

NEW! Regency® MX7000-G

List price $699.95/**CE price $449.00**

10-Band, 20 Channel • Crystalless • AC/DC

Frequency range: 25-550 MHz. continuous coverage and 800 MHz. to 1.2 GHz. continuous coverage

In addition to normal scanner listening, the MX7000 offers CB, VHF, and UHF TV audio, FM Broadcast, all aircraft bands (civil and military), 800 MHz communications, cellular telephone, and when connected to a printer or CRT, satellite weather pictures.

NEW! Regency® MX5000-G

List price $599.95/**CE price $354.00**

Multi-Band, 20 Channel • No-crystal scanner Search • Lockout • Priority • AC/DC Selectable AM-FM modes • LCD display World's first continuous coverage scanner

Frequency range: 25-550 MHz. continuous coverage.

Never before have so many features come in such a small package. The *Regency* MX5000 mobile or home scanner has continuous coverage from 25 to 550 MHz. That means you can hear CB, Television audio, FM broadcast stations, all aircraft bands including military and the normal scanner bands, all on your choice of 20 programmable channels.

NEW! Regency® MX4000-G

List price $629.95/**CE price $394.00**

Multi-Band, 20 Channel • No-crystal scanner Search • Lockout • Priority • AC/DC Selectable AM-FM modes • LCD display

Bands: 30-50, 118-136, 144-174, 440-512, 800-950 MHz.

The *Regency* MX4000 is gives coverage in the standard VHF and UHF ranges with the important addition of the 800 MHz. and aircraft bands. It features keyboard entry, multifunction liquid crystal display and variable search increments.

Regency® MX3000-G

List price $319.95/**CE price $182.00**

6-Band, 30 Channel • No-crystal scanner Search • Lockout • Priority • AC/DC

Bands: 30-50, 144-174, 440-512 MHz.

The *Regency* Touch MX3000 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 public service frequencies by simply touching the numbered pressure pads. You'll even hear a "beep" tone that lets you know you've made contact.

Regency® Z30-G

List price $279.95/**CE price $166.00**

6-Band, 30 Channel • No-crystal scanner

Bands: 30-50, 144-174, 440-512 MHz.

Cover your choice of over 15,000 frequencies on 30 channels at the touch of your finger.

Regency® C403-G

List price $99.95/**CE price $62.00**

5-Band, 4 Channel • Crystal scanner Channel indicator LED • AC only • Low cost

Bands: 30-50, 148-174, 450-470 MHz.

Regency's basic scanner, the C403 gives you the excitement of police, fire and emergency calls at a budget price. It can tune in to any of five public service bands and brings the signal in loud and clear...on any of four possible channels. It comes with detachable telescope antenna and AC power cord. Order one crystal certificate for each channel you want to receive.

Regency® HX1000-G

List price $329.95/**CE price $209.00**

6-Band, 30 Channel • No Crystal scanner Search • Lockout • Priority • Scan delay Sidelit liquid crystal display • Digital Clock

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

The new handheld *Regency* HX1000 scanner is fully keyboard programmable for the ultimate in versatility. You can scan up to 30 channels at the same time. When you activate the priority control, you automatically override all other calls to listen to your favorite frequency. The LCD display is even sidelit for night use. A die-cast aluminum chasis makes this the most rugged and durable hand-held scanner available. There is even a backup lithium battery to maintain memory for two years. Includes wall charger, carrying case, belt clip, flexible antenna and nicad battery. Order your *Regency* HX1000 now.

Regency® R106-G

List price $159.95/**CE price $92.00**

5-Band, 10 Channel • Crystal scanner • AC/DC

Frequency range: 30-50, 146-174, 450-512 MHz.

A versatile scanner, The *Regency* R-106 is built to provide maximum reception at home or on the road. Rugged cabinet protects the advanced design circuitry allowing you years of dependable listening.

NEW! Regency® R1050-G

List price $179.95/**CE price $109.00**

6-Band, 10 Channel • Crystalless • AC only

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

Now you can enjoy computerized scanner versatility at a price that's less than some crystal units. The *Regency* R1050 lets you in on all the action of police, fire, weather, and emergency calls. You'll even hear mobile telephones.

Programming the R1050 is easy. Merely touch the keyboard and enter any of over 15,000 frequencies on your choice of 10 channels.

Regency® HX650-G

List price $129.95/**CE price $79.00**

5-Band, 6 Channel • Handheld crystal scanner

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

Now you can tune in any emergency around town, from wherever you are, the second it happens. Advanced circuitry gives you the world's smallest scanner. Our low CE price includes battery charger/A.C. adapter.

NEW! Regency® HX-650P-G

List Price $189.95/**CE price $104.00**

Now, Communications Electronics offers a special packaged price on the *Regency* HX-650 scanner and the following items for only $104.00. You get the *Regency* HX-650 scanner, a set of 4 AAA ni-cad batteries, the MA-506 carrying case, six crystal certificates, AC adapter/charger and flexible rubber antenna for only $104.00 per package plus $10.00 shipping/handling. To order this special package, use CE special order number HX-650P-E.

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.

NEW! Regency® HX2000-G

The World's First 800 MHz. Handheld Scanner

List price $569.95/**CE price $359.00**

7-Band, 20 Channel • No-crystal scanner Priority control • Search/Scan • AC/DC Sidelit liquid crystal display • Memory backup

Bands: 118-136, 144-174, 440-512, 800-950 MHz.

The new *Regency* HX2000, handheld scanner covers thousands of frequencies including the new 800 MHz. band. Although this scanner does *not* have low band, you can scan up to 20 channels at the same time. Selectable AM/FM reception modes on all frequencies. With the included AC/DC transformer, the HX2000 can be operated on either 120V AC or 6 VDC. Scans 15 channels per second. Size 3" x 7" x 1½." Includes wall charger, carrying case, belt clip, flexible antenna and nicad batteries.

NEW! Regency® RH250B-G

List price $699.95/**CE price $379.00**

10 Channel VHF synthesized transceiver Built-in scanner with programmable priority Fully programmable CTCSS on every channel

If you're a fireman, policeman or a person on the go and it's essential that you stay in touch with headquarters, you need the *Regency* RH250 transceiver. You can program simplex or semi-duplex frequencies including CTCSS tones.

OTHER RADIOS & ACCESSORIES

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Z45-G Scanner	$199.00
RPH410-G 10 ch. handheld no-crystal transciever	$399.00
B-4-G 1.2 V AAA Ni-Cad batteries (set of four)	$9.00
A-135C-G Crystal certificate	$3.00
A60-G Magnet mount mobile antenna	$35.00
A70-G Base station antenna	$35.00

Add $3.00 shipping for all accessories ordered at the same time. Add $3.00 shipping per scanner antenna.

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To ***get the fastest delivery from CE*** of any scanner, send or phone your order directly to our Scanner Distribution Center.™ Be sure to calculate your price using the CE prices in this ad. Michigan residents please add 4% sales tax or supply your tax I.D. number. Written purchase orders are accepted from approved government agencies and most well rated firms at a 10% surcharge for net 10 billing. All sales are subject to availability, acceptance and verification. All sales on accessories are final. Prices, terms and specifications are subject to change without notice. All prices are in U.S. dollars. Out of stock items will be placed on backorder automatically unless CE is instructed differently. A $5.00 additional handling fee will be charged for all orders with a merchandise total under $50.00. Shipments are F.O.B. Ann Arbor, Michigan. No COD's. Most products that we sell have a manufacturer's warranty. Free copies of warranties on these products are available prior to purchase by writing to CE. International orders are invited with a $20.00 surcharge for special handling *in addition* to shipping charges. Non-certified checks require bank clearance.

Mail orders to: Communications Electronics,™ Box 1045, Ann Arbor, Michigan 48106 U.S.A. Add $7.00 per scanner for U.P.S. *ground* shipping and handling in the continental U.S.A. For Canada, Puerto Rico, Hawaii, Alaska, or APO/FPO delivery, shipping charges are three times continental U.S. rates. If you have a Visa or Master Card, you may call and place a credit card order. Order toll-free in the U.S. Dial 800-USA-SCAN. In Canada, order toll-free by calling 800-221-3475. WUI Telex CE anytime, dial 671-0155. If you are outside the U.S. or in Michigan dial 313-973-8888. Order today.

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CIRCLE 37 ON READER SERVICE CARD

MAILBAG LETTERS TO THE EDITOR

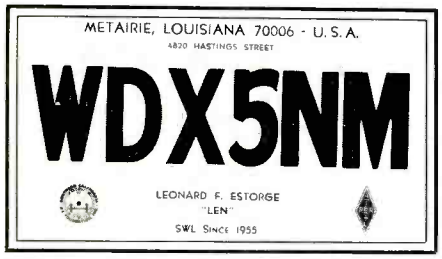
The most interesting questions we receive will be answered here in each issue. Address your questions to: Tom Kneitel, Editor, Popular Communications magazine, 76 North Broadway, Hicksville, NY 11801.

This Guy's A Real Card

From time to time in *POP'COMM* you run photos of QSL cards that are printed especially for use by hams and SWLs. Many of these are especially attractive, however you have never mentioned where a person can have these cards made up.

Henry Paul
Milwaukee, WI

There are dozens of companies specializing in printing SWL and ham QSLs. If you check out the Classified Ad section of a magazine such as CQ you can find plenty of these printers. My own QSLs are printed up by a custom QSL printer who has been in the business for years, although these days he's accepting orders only on a word-of-mouth basis. Nevertheless, I think he's got some of the sharpest looking cards I've ever seen and they bring great returns. Sample assortments of his QSLs are 50 cents and $1 (deductable). Contact him at: C. Fritz, Box 1684, Scottsdale, AZ 85252. Tell him we sent you!—Editor



Here's an SWL card made up by the famous "Fritz" printery.

Double Duty

I have a Realistic PRO-2002 programmable scanner. When I attempt to monitor frequencies in the VHF aeronautical band, especially between 129 and 132 MHz, there is a problem. While the scanner picks up plenty of signals, they are police and business band communications for the most part and I don't believe that they are supposed to be operating between 129 and 132 MHz.

Phillip Delonge
Ft. Riley, KS

Some programmable scanners are prone to picking up unwanted image signals and the PRO-2002 does seem to have a problem with its aero band. There isn't really anything that can be done to correct the problem, however rest assured that just because you're hearing phantom signals from stations operating on other frequencies, it doesn't mean that the scanner will not receive communications actually transmitted on the frequencies programmed in. You'll hear the wanted signals along with the spurious ones, even though it's annoying—Editor.

Outward Bound Radio

I found the *POP'COMM* story on the "Search for the Real E.T." (January issue) to be very informative. What about space probes? Aren't *Pioneer 11* and the first two *Voyagers* equipped with receivers for monitoring radio frequencies from outer space vantage points? You'd think they would be.

Willy Golicicwicz
New York, NY

These probes do have receiving equipment aboard. Voyager 1, for instance, is equipped with a 3.11 kHz receiver. Recently this equipment picked up signals that appear to be the first evidence of the heliopause—a gigantic boundary where our sun's magnetic field meets (and interacts with) interstellar matter. These are signals which are generated by electrons that are being accelerated through a plasma of highly charged particles. On the other hand, identification of the source and significance of the signals has not been deemed a 100% certainty at this point. Voyager 1 is about 3,300-million kilometers from the sun.—Editor

Make It Count

If I take my portable receiver with me on a vacation to Florida, and while in Florida, I log (and later verify) shortwave broadcasters in several nations not previously monitored, do such stations count as new countries? Or must I consider only those stations heard from my "fixed" location at home from where most of monitoring takes place?

H. F. Manoogian, II
St. Paul, MN

This question can be answered only in relation to the reason you are counting new countries heard. If it's just for your own records, or telling your friends, you can count countries any way you please. There are no hobby-wide standards by which you are obliged to abide. If you are reporting countries to a particular club (especially in conjunction with an award qualification) there are probably guidelines for getting an acceptable count for countries heard or verified, and this could affect those stations or countries heard while away from your primary location.—Editor

Long May It Wave

In the January issue you had a feature about low frequency weather transmissions. Thanks to this story I have logged a considerable number of new stations and have stepped into a new aspect of monitoring. While tuning for station TUK on 194 kHz (Nantucket, MA), I picked up a station on 191 kHz broadcasting classical music at 0345 PST, although I couldn't catch an identification. How can I find out what I heard?

George Golanos
Victoria, BC

Forget about TUK; you probably snagged a Soviet broadcaster, which is far better DX. Good chance this was the station listed as Blagoveschchensk, Siberia, which runs a cool million watts and has been picked up by several other listeners this side of the puddle of late. Actually, this has been an excellent season for DX on the low frequencies (below 535 kHz, that is) and there are dozens of broadcasters in Europe and Asia in that band, in addition to the beacons.—Editor

Permission Granted!

Your magazine does an excellent job of covering a wide range of communication issues. I would like your permission to use selected portions of *Popular Communications* in a briefing guide. Distribution will be limited to persons being trained or conducting training in communications security.

Robert B. Clardy, 1Lt. USAF
644 BMS/410 BMW
K. I. Sawyer AFB, MI

We receive a number of similar inquiries for our material to be used in various training programs. In general, we are pleased to grant such permission upon written request.—Editor

Your Bet's Not Locked Up Yet

Is it possible for a prison inmate to operate a ham or CB station, or even a communications receiver? It's the topic of a running debate I've been having with a friend. He says yes, I suspect no. A copy of the *World Radio TV Handbook* is riding on this bet.

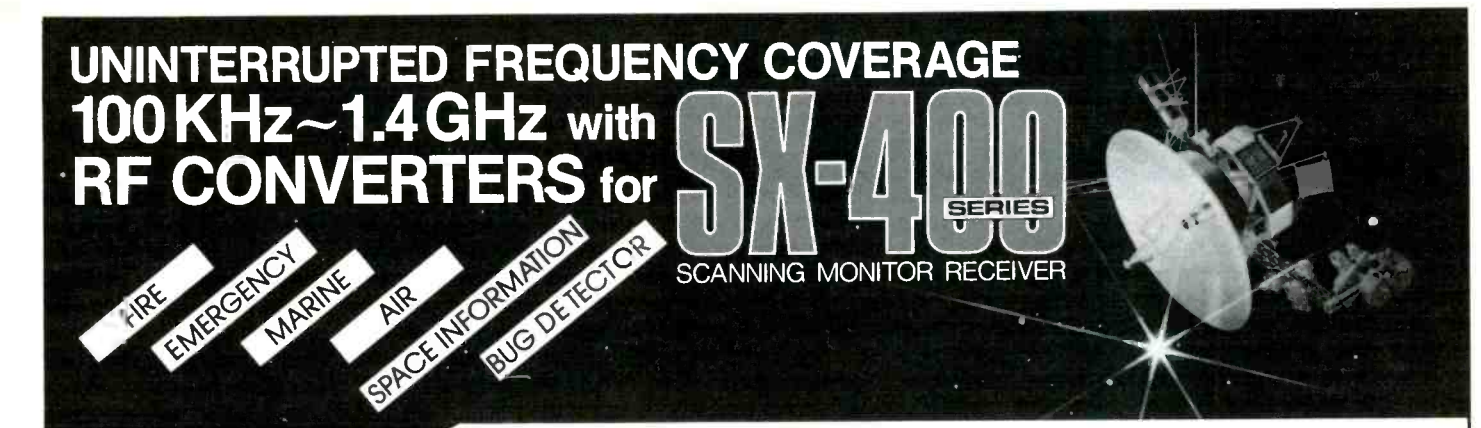
R. Klein
Media, PA

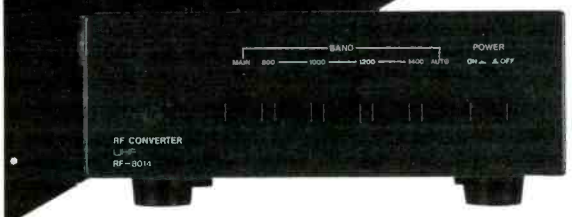
This would be a question that would have to be put to those who operate specific correctional institutions, since each institution undoubtedly has its own regulations. I checked with the warden of a county correctional facility in my own area and he advises that inmates are not permitted to bring in any type of radios (transmitting or receiving), however they can purchase (at nominal cost through the prison) a small transistor portable receiver which picks up only the standard broadcast band. They may take this receiver with them when they are released, but should they be sent back to that facility in the future they cannot bring the receiver back with them and would have to purchase a new one. My guess is that this may well be a common approach to the situation, but there is no universal rule and there may well be very liberal regulations at certain institutions.—Editor

UNINTERRUPTED FREQUENCY COVERAGE
100KHz~1.4GHz with RF CONVERTERS for SX-400 SERIES

SCANNING MONITOR RECEIVER

FIRE · EMERGENCY · MARINE · AIR · SPACE INFORMATION · BUG DETECTOR





RF-8014 DOWN CONVERTER

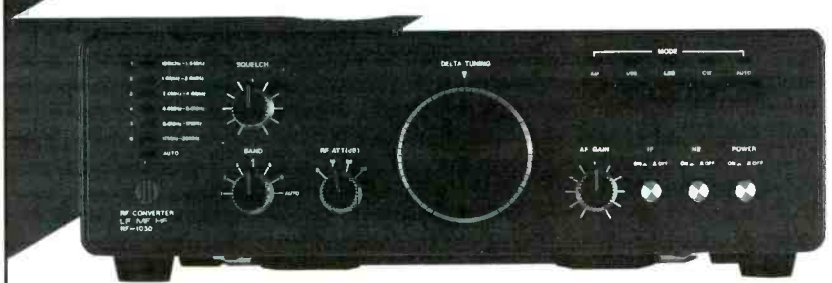
800MHz~1.4GHz RF converter for SX-400

● Bands: • MAIN (to cover 26~520MHz with SX-400) • 800MHz~1.0GHz • 1.0GHz~1.2GHz • 1.2GHz~1.4GHz • AUTO (Automatic control of RF-8014 with an external computer, etc.) ● Frequencies shown in SX-400 display: 500MHz lower between 800MHz~1.0GHz, 700MHz lower between 1~1.2GHz, 900MHz lower between 1.2~1.4GHz. ● Individual Band Switches and LED Indicaters. ● Current Drain: 250mA (approx.) ● Accessories: 1 BNC/M-adapter, 1 Cable with BNC terminals ● Dimensions: W. 148 × H. 51 × D. 225(mm)

RF-5080 DOWN CONVERTER

500~800MHz RF converter for SX-400

● Bands: • MAIN (to cover 26-520MHz with SX-400) • 500~600MHz • 600~700MHz • 700~800MHz • AUTO (Automatic control of RF-5080 with an external computer, etc.) ● Frequencies shown in SX-400 display: 300MHz lower between 500~600MHz, 400MHz lower between 600~700MHz, 500MHz lower between 700~800MHz. ● Individual Band Switches and LED Indicaters. ● Current Drain: 250mA (approx.) ● Accessories: 1 BNC/M-adapter, 1 Cable with BNC terminals, ● Dimensions: W. 148 × H. 51 × D. 225(mm)



RF-1030 UP CONVERTER

100KHz~30MHz RF converter for SX-400

● Bands: (1) 100KHz~1MHz, (2) 1~2MHz, (3) 2~4MHz, (4) 4~8MHz, (5) 8~17MHz, (6) 17~30MHz • AUTO (Automatic conrol of 6 bands of RF-1030 with an external computer, etc.) ● Frequencies shown in SX-400 display: 50MHz higher on all bands than the frequencies received. ● Individual Mode Switches and LED Indicaters: AM, USB, LSB, CW, AUTO • CW filter (optional) required for CW reception • AUTO—Automatic Control of modes of RF-1030 with an external computer, etc. ● Band Switch and LED Band Indicaters, Squelch Control, RF Att., AF Gain Control, Delta Tuning, IF ON/OFF Switch, NB (Noise Balnker) Switch. ● Current Drain: 1A (approx.) * Power Supply Unit P-1A (optional) required for RF-1030. ● Accessories: 1 BNC-M-adapter, 2 Cable with BNC terminals ● Dimensions: W. 300 × H. 90 × D. 233(mm)

ACB-300 ANTENNA CONTROL BOX

Manual and Automatic antenna control system for SX-400 series RF converters

● Individual Band Switches and LED Indicaters: 1030, 5080, 8014, 1.4GHz UP (for reception of 1.4GHz above) AUTO (Automatic control of antennas for RF-1030, RF-5080, RF-8014 and for MAIN scanner) ● Current Drain: 50mA (approx.) ● Accessories: 1 Cable with BNC terminals ● Dimensions: W. 148 × H. 51 × D. 225(mm)

SX-400

26~520MHz General Coverage Scanner

● Wider Coverage (100KHz~1.4GHz or above) with RF converters (optional). ● Computer controlled memory channel expansion (unlimited), High-Speed reprogramming, Record of Frequencies and Time, and all functions remote controllable with RC-4000 Interface (optional). ● 20 memory channels, Momentary recall of any memory channel. ● Continuous normal and limit search without interruptions by birdies. ● Stop Mode Switch for scan or search of modulated signals. ● Quick search of the most important frequency with Priority. ● Selective FM Narrow/Wide Switch for FM/TV listening. ● Variable Delay Control (0~4 Sec.) ● Current Drain: 1A (approx.) ● Dimensions: W. 300 × H. 90 × D. 233(mm)

RC-4000 DATA INTERFACE **Control of SX-400 series Scanner and RF Converters through Computer.**

● Direct system for NEC 8801A computer. ● High-Speed Reprogramming of 20 channels. ● Scan of unlimited channels stored in computer. ● Record of Frequencies and Time of signals received. ● Automatic Control of Bands and Modes of RF converters and ACB-300.

P-1A REGULATED POWER SUPPLY UNIT ● 1A ● AC 120V (220V, 240V, 100V available) to DC 13.8V ● Dimensions: W. 90 × H. 60 × D. 135(mm)

* Design and specifications subject to change without notice.

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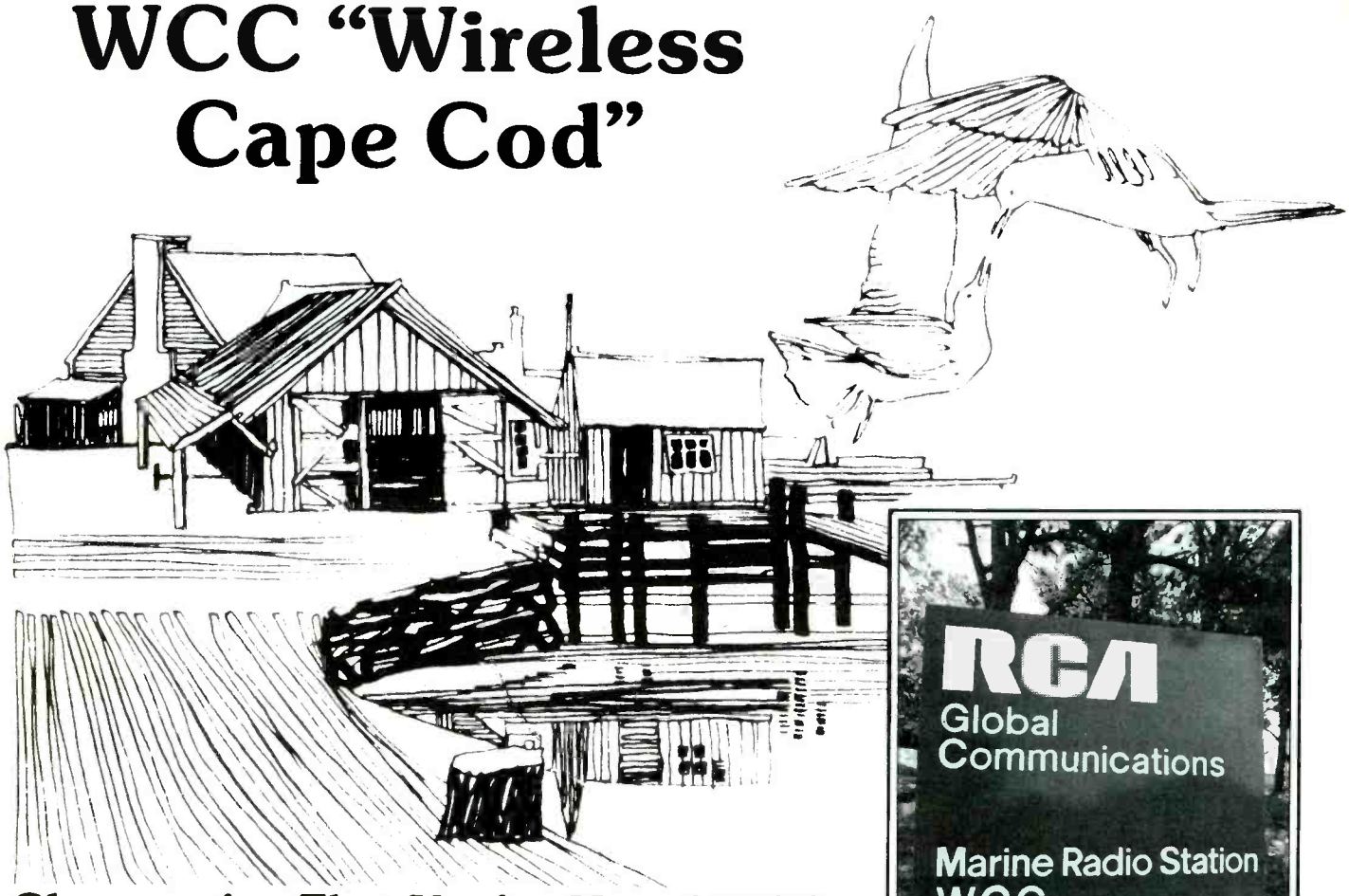
CIRCLE 13 ON READER SERVICE CARD

WCC "Wireless Cape Cod"



Chances Are That You've Heard WCC – That's Because It's Been A Resident Of The Airwaves Since The Earliest Days Of Wireless!

BY TOM KNEITEL, K2AES, EDITOR

Maybe you didn't realize that you were hearing WCC. If you can't read CW or copy SITOR (Simplex Telex Over Radio), you were probably unaware of what it was you were hearing. But it's virtually impossible to tune across the shortwave bands without crossing the path of the WCC signal. This is because WCC, also known as Chathamradio, is the largest coastal marine radio station in the United States. In one form or another, this station has been on the air since the early days from several picturesque locations on Cape Cod.

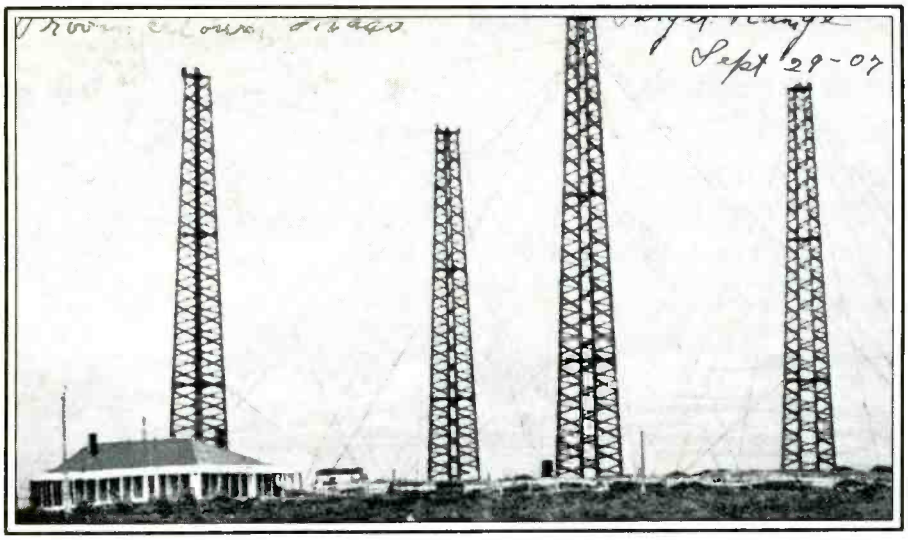
In the beginning, the station was located in South Wellfleet, Massachusetts and was known under the callsign "CC" (Cape Cod). This was later modified to "MCC" (Marconi Cape Cod), and eventually to "WCC" (Wireless Cape Cod"). This was in the days when it was Marconi's own wireless station.

When the South Wellfleet station was first built, it had an antenna system consisting of a circle of twenty 200-foot high masts. This supported a massive inverted cone of 200 wires that converged at the transmitter building. Unfortunately, this impressive system was carried away by a ferocious nor'easter storm before the station was placed in operation. Eventually a more modest antenna system was erected, which consisted of four wooden towers (painted red), each 210 feet in height. The transmitter was a non-synchronous rotary spark gap that was run by a large AC motor operating from a big kerosene engine. This was a 30 kW spark that not only produced blinding flashes of light, but also a sound that could be heard at least a mile from the transmitter. There were 50 amps going into the antenna. The signals from this station, sent out at about 16 wpm from an automatic paper tape machine, were directed at ships on the high seas. The message from WCC was famous through the world: "VVV TO ALL SHIPS EQUIPPED WITH MARCONI OR DEBEG APPARATUS AND SUBSCRIBING TO THE MARCONI PRESS SERVICE." This went out on 200 kHz, and the station could also operate on 500 kHz.

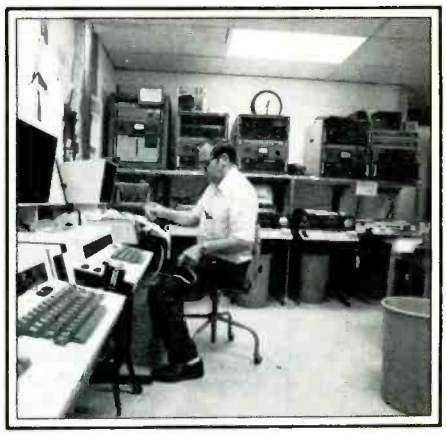
That station is long gone now. It served well but was razed decades ago. By WWII it had been gone so many years that only a few traces of it remained among the sand dunes of Cape Cod. But WCC lived on from a new transmitting site on Cape Cod. While a museum at South Wellfleet commemorates the site where Marconi sent out his first signals in 1903 and eventually built the first WCC (ex-CC, ex-MCC), a few towns to the south a new WCC arose.

WCC's receiving antennas are in North Chatham and stretch from a spit of land in Ryder's Cove over a hill to the shores of Stillwater Pond. The transmitting antennas are in a tidal marsh in South Chatham on the shores of the Atlantic. And, in 1922, under the ownership of RCA, the "new" WCC became the first RCA radio station to handle only marine traffic. Actually the station had originally been planned to carry international telegrams between the United States and other nations.

In earlier times, prior to modern concepts in antenna design being developed, the WCC transmitting site utilized 400-ft. high



Here's how the original Marconi station WCC looked during its existence at South Wellfleet. This 1907 postcard is courtesy Alice Brannigan.



Here's a view of WCC's receiving area.

The 436 kHz transmission tower (background) sports its own warning to trespassers.

antenna masts spaced at 1000 feet. There were also many exotic experimental antennas in use which were designed to improve transmission and reception.

In Service

Most messages handled by WCC are routine, but the station has played its part in many newsworthy events. WCC provided weather data for Lindbergh's transatlantic flight and recorded his departure and arrival times. It was in contact with the *Hindenburg*, with Richard E. Byrd at the South Pole, with Amelia Earhart, Wiley Post, and Howard Hughes during their globe-circling flights.

In the 1960's, WCC was in communication with the passenger liner *Santa Maria* when it was taken over by insurgents, and it was also in contact with the cruise ship *Raffael* when fire broke out in the engine room (on its maiden voyage). WCC's Manager, Edgar Hammons, recalls the incident vividly and notes that the ship's radio officer advised WCC that he had 250 telegrams from the passengers, but before the transmission had ended, quite a few more were sent.

Hammons hastens to point out that even though distress calls are handled by the Coast Guard, ships usually want to notify their home office. This is the type of traffic often handled during marine disasters. "We handle a lot of messages back and forth to their owners if there's a fire or if the ship needs help or a tug," notes Hammons. "It happens several times a year."

He recalls one American vessel that lost its engine power off the coast of Madagascar. It was drifting towards a reef. WCC remained in contact with the ship by CW and with its owners by telephone, relaying messages back and forth until the vessel could restart its engines and head away from the reef.

WCC offers emergency medico service. This is medical advice from hospitals to ships that don't carry doctors. It's a service for which there is never a charge. If the problem is so serious that the crew member has to be evacuated, WCC turns the matter over to the Coast Guard. Ships at sea sometimes report accidents caused by crew members working with the machinery aboard the vessel; however medical problems such as appendicitis or acute dental pain could require evacuation.

A technician tunes up the transmitters.

SITOR

WCC, in addition to handling CW traffic, also operates in SITOR mode, an error protected radio telex service. This was first instituted in 1978 and has resulted in an enormous increase in the amount of traffic the station handles. SITOR offers ships at sea a more reliable, less expensive, more efficient, and quicker service than CW (Morse code). It offers telex conversations between a ship's radio room and its agent's office.

WCC offers SITOR service on frequencies in the 6, 8, 12, 16, and 22 MHz bands. SITOR is basically a 50 wpm service. It is 75 baud but it has two check pulses for error detection. Inasmuch as charges are based upon the number of minutes used to transmit messages, you can see that the 3-minute minimum charge can be used more effectively when, via SITOR, between 140 and 160 words can be sent (after time is allowed for answerback, etc.) than by regular CW.

One of the WCC operators exchanges messages with a ship at sea.

CW

Despite the many advantages of SITOR, the old brasspounders' standby, CW, is still in use by a great many ships. Even though WCC provides the standard brass telegraph key at each of its eight operating positions, the telegraphers usually prefer to bring their own key with them. Because they are familiar with their own personal key, they are able to transmit more rapidly and accurately. These are sideswipe models, commonly called "bugs."

Table 1

WCC Operating Frequencies (CW & SITOR)

Low Frequency

130.35 kHz	147.5	442
143	436	460
		500

High Frequency

2036 kHz	8630	16973.45
4238	8711.5	17203.5
4268	8715	17204
4331	12925.5	17207.5
4356.5	12961.5	17216
6333.6	13033.5	22348.5
6337	13077.5	22366.5
6376	13078	22518
6500.5	13081.5	22521
6501	13090	22567.5
6504.5	16904.9	22568
8511	16933.2	22571.5
8586	16972	22580

WCC has come a long way over the years and now operates on a multitude of frequencies.

Just as with SITOR, a traffic list is sent out every two hours. Callsigns of the numerous vessels for which the station is holding traffic are transmitted on frequencies monitored by hundreds of ocean going vessels from tankers and freighters to luxury liners. Ships also call into the station on its monitoring frequencies in order to send their own telegrams. These messages are typed out on forms and a printer clerk sends the messages to RCA's Message Telegram Computer in New Jersey, which delivers them to the addressee's teleprinter.

WCC operates 24-hours per day, every day of the week. With the exception of weekends, the station permits visitors and even conducts tours. It would probably be wise to check ahead with WCC before showing up in person and asking for a tour. The station's address is WCC, RCA Global Communications Inc., P.O. Box 397, North Chatham, MA 02650. The telephone number is (617) 945-9602.

While WCC does not encourage reception reports from listeners, Edgar Hammons, the Station Manager, advised *POP'COMM* that they do respond to reception reports with a letter that does verify reception. Considering that WCC keeps alive the legacy of Marconi's first radio station and is the heir apparent to the historic "Wireless Cape Cod" facility, such a verification should be a most valued and welcome addition to the QSL collection of any communications enthusiast. A complete listing of WCC's frequencies is shown in the accompanying Table 1.

Additional Reading

RCA Relay, Fall/Winter 1981 issue. "RCA Globecom's Cape Cod Radio Station."

QST, February 1942 issue, "Wireless Cape Cod," by Irving Vermilya, W1ZE.

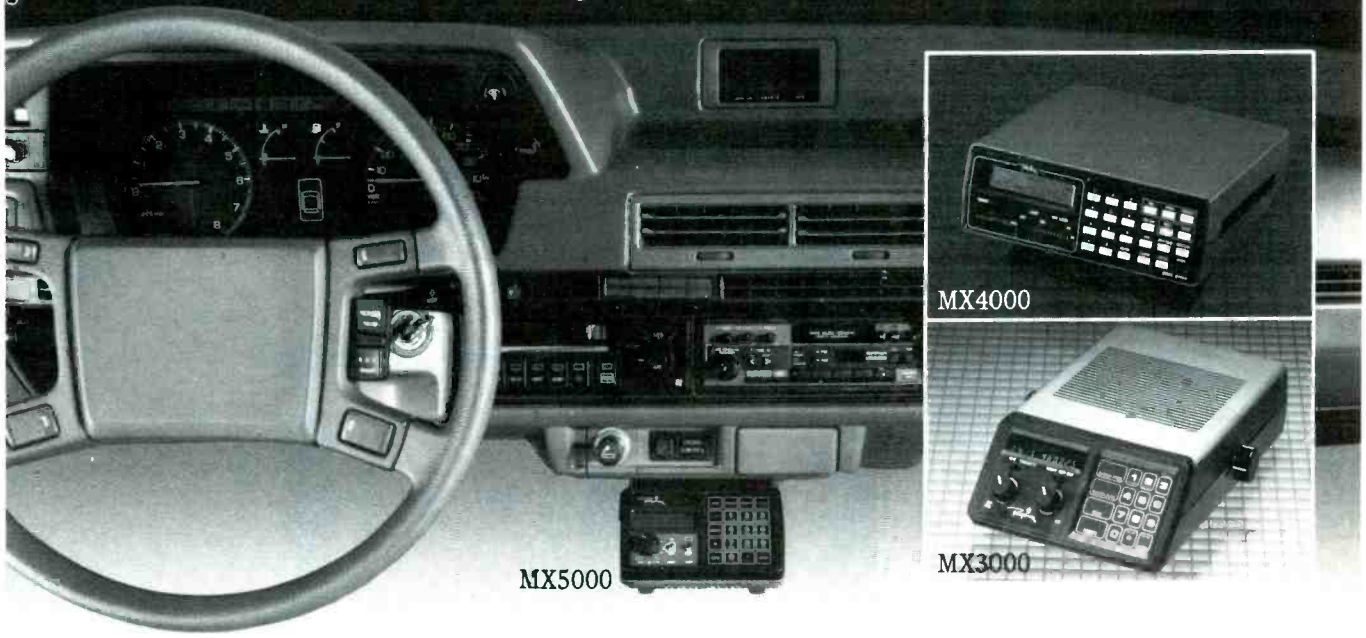
QST, April 1942 issue, "Correspondence From Members."

PC

New 800 MHz models

Regency Scanners

Bring you the Excitement of Police, Fire, Emergency Radio, and more.



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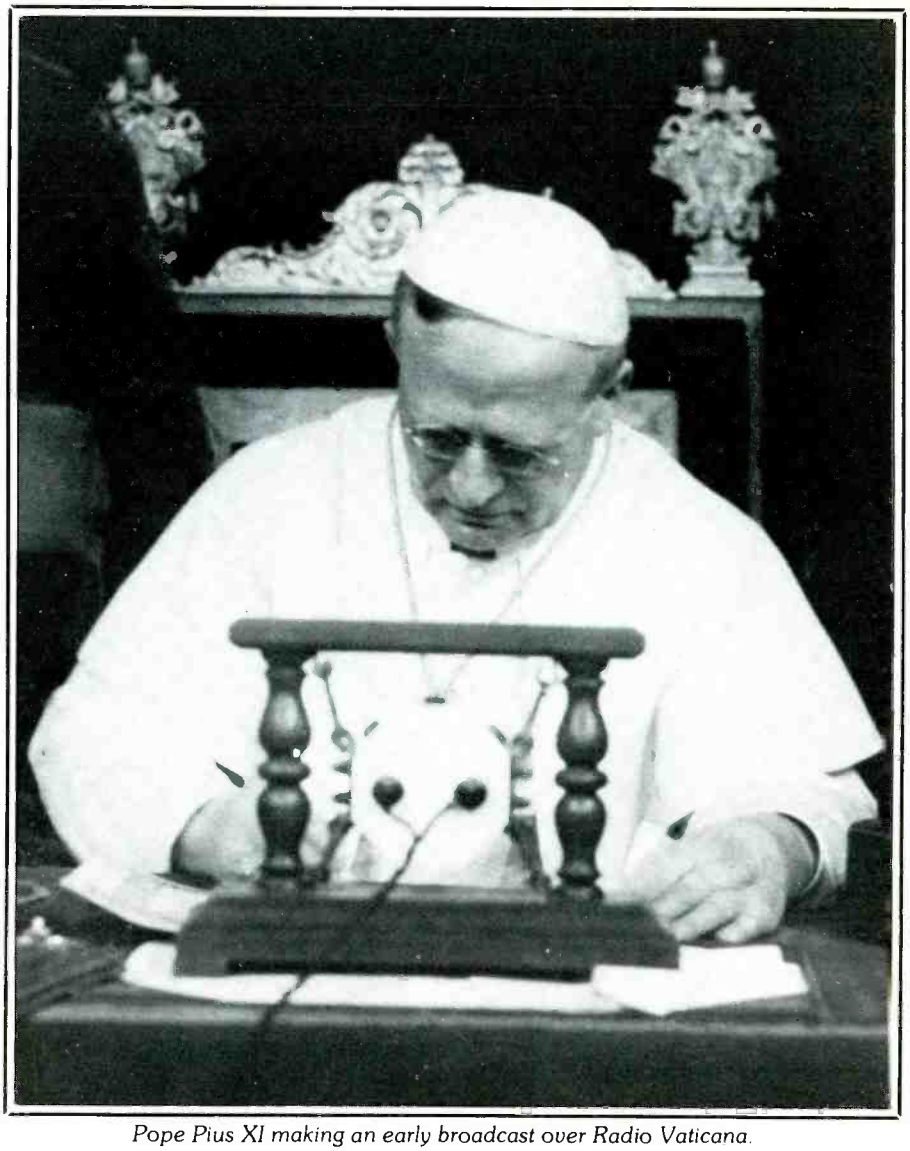
*Mobile use subject to restriction in certain localities.

CIRCLE 62 ON READER SERVICE CARD

Guglielmo Marconi, builder of the first Vatican Radio, with Father Gianfranceschi, SJ, the station's first director.



Pope Pius XI making an early broadcast over Radio Vaticana.

Inside Radio Vaticana

The Pope's Radio

BY GERRY L. DEXTER

Normally, Vatican Radio does not air much in the way of dramatic programming, but it did one day in May, 1981. It was a sunny day, but a day filled with dark events. It was the day gunfire was heard in St. Peter's Square—the day the Pope was shot.

A Vatican Radio announcer stood on a balcony overlooking the square, describing the scene as John Paul II was about to begin his weekly audience. As the shots rang out and the screaming and the pandemonium began, news producers in the main studios wasted no time getting additional personnel out on the balcony to broadcast reports in other languages. The dramatic reporting continued from the balcony for nearly an hour and a half. Then the story was picked up with continuous reporting from the studios until the Pope was out of the operating room several hours later.

There is some irony in all of this, because Radio Vaticana owes much of its recent audience increase to the popularity of this Pope—the sixth under which Vatican Radio has operated.

The decision to begin a radio service from the Vatican came in 1929 under Pope Pius XI, only four days after the agreement making the Vatican a sovereign state took effect. Pius XI assigned the job of building the new Vatican Radio to "the man" himself—Guglielmo Marconi!

It was Marconi, rather than Pius XI, who spoke the first words ever heard on Radio Vaticana when it signed on for the first time back in 1931.

By 1934, advances were already underway in the form of a more powerful transmitter. But it was to be an additional five years before Vatican Radio began an international service. That was in 1939 when the coronation of Pope Pius XII was carried in nine lan-

The Radio Vaticana transmission center where broadcasts are routed to various transmitter/antenna combinations.

Announcers record a program for the Ethiopian service.

guages to an overseas audience. That same year saw the station move its studios and offices to the Palazinna Leo XIII, the former site of the Vatican observatory.

Program content was watched very carefully in the beginning years since the Vatican wanted nothing said that might irritate the Italian dictatorship and possibly call into question the still young agreement on the Vatican's independent status.

During World War II, Vatican Radio created an Information Office to process missing persons data. The station handled nearly 1,250,000 personal messages between 1940 and 1946, devoting over 12,000 hours of program time to helping families locate missing relatives. Language output increased to 19 by the end of the war.

In 1952 a site at Santa Maria di Galeria was given extraterritorial status by the Italian government, prepatory to the installation of a new Vatican Radio transmission center in 1957. That year saw the rather late-in-the-game creation of a separate news department and increase in language use to 29.

Studios and offices made another move in 1961—to the Petriano Museum, and moved yet again in 1970 to their current location in the Palazzo Pio on the west bank of the Tiber River.

During the Vatican II Conclave, the first transmissions went out from a new 500 kilowatt transmitter hooked to the largest rotating antenna of its kind in the world.

From the beginning, the Jesuits have had the responsibility for running Vatican Radio and the top positions are all held by Jesuits. The station's full time staff numbers around 350 from 40 different nations. One hundred of these people serve in a technical capacity, some 20 to 30 occupy administrative posts, and the remainder are involved in programming. Language output today is at 35, with another six languages used on special occasions. Some 600 programs are produced every week. The Vatican Governatorato provides ordinary maintenance, legal and other services, allowing the station to get by with a somewhat smaller staff than it would otherwise.

Staff member are not all priests, but those who are not must still have a strong religious background or be well versed in theology. Many expatriots are employed to broadcast back to their home countries. Finding people qualified to fill such positions is difficult. Most either lack the necessary religious foundations, are unprepared for the techniques of broadcasting, or are too emotionally involved with their native land to handle the job. Those who do show promise are sent to one of the broadcast training centers operated by such big international broadcasters as the Voice of Germany.

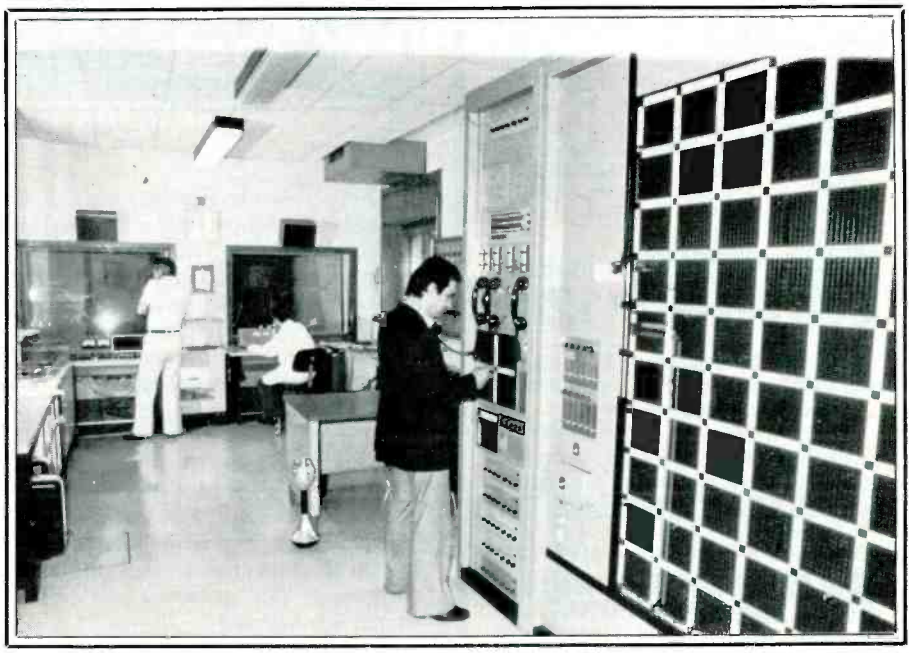
Staff members are paid salaries lower than that of their brothers at RAI in Rome. But they pay no Italian income tax and have a few other perks, like cut-rate gasoline from the Vatican's pumps.

The station is organized into six divisions: General Executive, Program Management, Daily News Management, Journalistic, Information, and Technical Management.

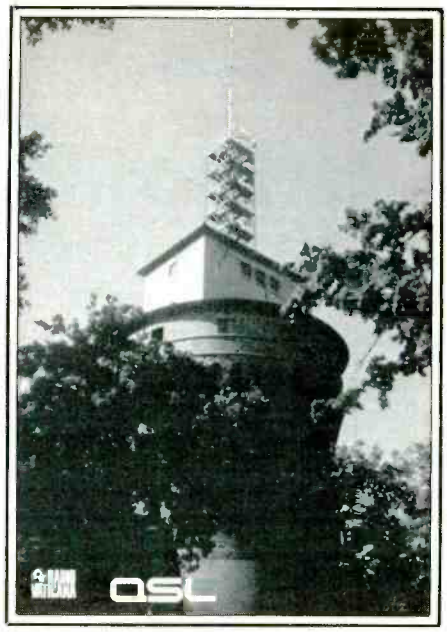
The programming on Radio Vaticana runs from Mass in several languages to messages from the Pope to news, live and recorded music and programming addressing the needs and problems of specific target areas. It is a difficult job, trying to provide what often amounts to a community radio service on an international scale, trying to be all things for all people.

The popularity of Pope John Paul II has created a unique problem for the station.

The Palazzo Pio, Vatican Radio's home since 1970.



Winged Gabriel statue at the main antenna/transmitter site.



This antenna installation on the Tower of Leo XIII provides the radio link between studios and the Santa Maria di Galeria site.

Pope John Paul II on one of his frequent trips abroad with a Vatican Radio staffer.

The Pope's own broadcasts have led to an increased audience. But Vatican Radio management, while it welcomes the new listeners, isn't so comfortable about the side effects. As one director notes, "We are not the voice of the Vatican, but are always taken as such. Anything said by anyone on any problem is always taken as official policy." Some people at the station would even like programming opened up to other voices, other opinions, even other churches.

No area of life is considered outside the province of Vatican Radio coverage. Many broadcasts give considerable play to the promotion of human rights, religious freedom, and current "hot" questions with which the church is concerned.

Church news does occupy a large segment of news time, as do items of specific interest in the countries to which broadcasts are beamed. A Central Co-ordinating Office provides material to the programming department, leaving the programmers free to concentrate on production.

Catholics in Eastern Europe in particular rely on the station for broadcasts of Mass, but there's a large non-Catholic listenership in Eastern Europe too, which uses Vatican Radio as an outside source of news.

Some degree of caution does pervade the Vatican Radio news department. One eye is kept on political developments and diplomatic necessities and sensibilities. "Prudence" is the word the station uses to describe this approach. Prudence means that no statement made by Polish Cardinal

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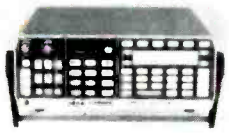

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ETA Feb. 85

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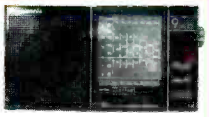
SONY ICF 6500 W & ICF 6800 sold out & discontinued—sorry

PANASONIC RF-9



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CIRCLE 164 ON READER SERVICE CARD

Jozef Glemp is ever used straight off the wire service. It's checked out with the Cardinal directly before it goes on the air. Prudence allows the reporting of the arrest of Serghei Antonov, the Bulgarian Airlines Rome office manager suspected of being connected with the attempt on the Pope's life. Prudence does not allow an on-the-air connection to be made between Antonov and the possibility he may have acted under the direction of Bulgarian government elements.

Vatican Radio newscasts are also carried weekly over some 120 medium wave and shortwave stations in Latin America.

Both Vatican Radio personnel and independent observers agree that the station's programming has improved a great deal over the past decade. Currently Radio Vaticana receives about 75,000 letters a year from listeners and mails 100,000 copies of its program schedule every month.

Recently the Italian government announced that aid parcels could be sent to Poland at no cost. Vatican Radio's Polish service asked for names and addresses of Poles needing assistance and received about 8,000 names in reply, all of which were turned over to relief agencies in Rome.

John Paul II likes to travel and the radio station sends a team along. The first Papal trips were nightmares filled with logistical and technical problems for the broadcasters. But as the trips have increased, so has Vatican Radio's ability to cover the Pope's activities abroad. Currently, a team of twenty engineers and announcers now go along on the Pope's global travels.

Out of an annual budget of $8 million, $1 million goes to pay the electrical bill for running the transmitters.

The Santa Maria di Galeria site where most of the transmitters are located is ten times the area of the Vatican itself. The huge, 175-ton rotating antenna is comprised of two towers with a 275-foot curtain antenna strung between. The site has 29 towers in all, watched over by a winged statue of Gabriel, patron saint of telecommunications. Powers on shortwave range from 20 to 500 kilowatts. There are also three medium wave and two FM channels in use.

At one time Vatican Radio had more power and transmission facilities than it had studios and personnel, an imbalance that left transmitters idle. Today the situation is reversed. There is more programming capability than the station can squeeze into its existing transmitting facilities. That is the explanation for the most often heard listener complaint at Vatican Radio: "Your programs aren't long enough!" Indeed, there is only 20 minutes of English directed to North America each day!

An increase in the number and power of transmitters available is planned, although no specific plans or timetable is known. Television is another item on Radio Vaticana's "wish list."

Currently, English from Vatican Radio is scheduled to Europe at 0500 to 0520 on 6.185 and 9.645, 1950 to 2010 on 6.190, 7.250, and 9.645. To North America at 0050-0110 on 6.015, 9.605, and 11.845. To Africa at 0500 to 0600 on 11.725 and 15.190; 0615-0630 on 15.190 and 17.730; 1115-1130 on 17.840 and 21.485; also 1200 to 1300 on those same two frequencies, 1545 to 1600 on 11.810, 15.120, and 17.730; 2045 to 2145 on 9.625, 11.700, 11.760, and 15.120. Broadcasts in English to Asia, Australia, and New Zealand run from 0200 to 0300 on 7.125, 9.550, and 11.865; 1200 to 1300 on 17.865 and 21.725; 1430 to 1445 on 11.865, 15.115, and 17.845; and 2205 to 2230 on 9.615, 11.830, and 15.120.

Vatican Radio replies to correct reception reports with a variety of colorful QSL cards, many of them featuring Pope John Paul II. Reports or requests for program schedules can be sent to Vatican Radio, 00120 Vatican City, The Vatican.

After over half a century of service, The Pope's Radio is continuing its growth, still striving to maintain the delicate programming balance it seeks in serving both Catholics and Non-Catholics in places as diverse as Mozambique and China. PC

АЭРОФЛОТ

Eavesdropping On Aeroflot

It's Moscow's Official Airline And It's Elusive

BY HARRY CAUL, KIL9XL

The giant Soviet airline doesn't come to the United States anymore, but even when it did you had to look for its aircraft a little harder on the shortwave bands than those from other airlines. An aircraft, however, can be rooted out if you know how to listen.

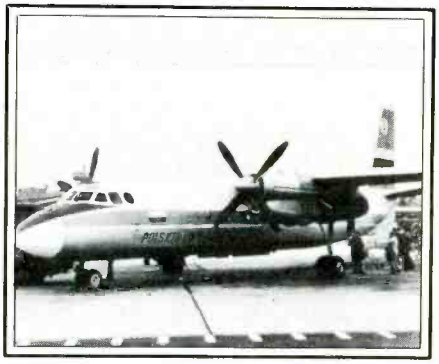
The official Soviet airline, Aeroflot, was begun in 1932 when all of the air services in the USSR were placed under the Chief Administration of the Civil Air Fleet. By 1940 the airline had 91,000 miles of route and was carrying 359,000 passengers as well as 45,000 tons of mail and cargo. Currently, Aeroflot flies to 3,500 airports within the USSR, more than 60 nations outside the USSR, and accommodates well over 100-million passengers per year.

Some of the aircraft currently being flown by Aeroflot includes the following types:

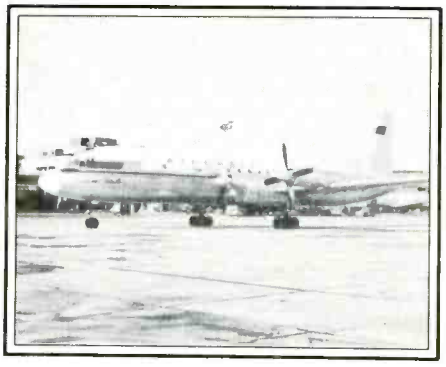
Antonov An-12. Aircraft numbered in the series CCCP-11000 to CCCP-11999. This

A 3-engine Yak-40.

Here is the An-24, although in this photo it is in service by Polish National Airline.



The Il-18 has four turbo props.



The Tu-134 has seen wide service.

AEROFLOT ROSTER

AIRCRAFT NUMBER	CALLSIGN	AIRCRAFT NUMBER	CALLSIGN	AIRCRAFT NUMBER	CALLSIGN	AIRCRAFT NUMBER	CALLSIGN
11038	RGAMB	86477	RPECV	86523	ROWJO	86677	RPEZY
11104	RPLWW	86478	RPVGR	86531	ROWSR	86679	RCZIO
42303	RILNG	86483	ROWEA	86532	RKAAO	86680	RQBTH
61021	RPSDS	86484	ROWEB	86534	ROWRH	86681	RCZIF
74257	RFOCO	86485	ROWEC	86535	ROWRW	86682	RQBTW
74258	RFOCO	86486	ROWED	86605	RPNUY	86683	RQVGZ
74260	RFOCX	86487	ROWEE	86606	RPENS	86684	RQVGJ
74261	RHAFS	86488	ROWEF	86607	RPGWU	86685	RPATJ
74262	RHAFU	86489	ROWEJ	86608	RPSBB	86686	RPATV
74264	RHAFH	86497	RBUAR	86609	RPSBI	86687	RPNCR
75440	RWZAE	86500	RWUGA	86610	RPSBQ	86689	RPNCY
75459	RIOCM	86501	RWUGI	86613	RPSEM	86690	RPNMC
75516	RPETW	86502	ROWCE	86614	RPSEN	86691	RPNMG
86451	RPTUZ	86503	RWQRB	86621	RPGPW	86692	RPNMN
86456	RINME	86504	RWQRR	86649	RWHKU	86693	RPNMX
86457	RINMF	86506	RGGKK	86650	RWRNQ	86697	RGUOW
86458	RINMJ	86507	RGEHL	86651	RWRNC	86698	RGUOE
86462	RINMM	86510	ROWCK	86652	RWRNY	86699	RGUOF
86463	RINMN	86511	ROWCL	86653	RWUGY	86700	RGUON
86464	RINMO	86512	ROWCM	86654	RWHKC	86701	RGUOH
86465	RINMP	86513	ROWCN	86655	RWHKQ	86702	RPLWG
86469	RPEUS	86514	ROWCO	86661	RPSWK	86704	RPLWT
86473	RPECB	86517	ROWCS	86675	RPGEQ	86705	RPLWX
86474	RPECE	86518	ROWCT	86676	RPEZZ		

Table 1

is the cargo version of the An-10 (and An-10A). Still in use even though the An-10 and An-10A versions were withdrawn from service after a bad accident in 1972. This is a high wing monoplane intended for use at airports having bad runways. It has four 4,000 hp Ivchenko AI-20 engines.

Antonov An-24. A high wing monoplane with two Ivchenko AI-24 turbo prop engines (2,100 hp each). Many have been built, including An-24-TV and An-26 cargo versions, plus a survey version known as the An-30. The An-24 carries 50 passengers.

Ilyushin Il-18. Aircraft numbered in the series CCCP-74000 to CCCP-74999. About 600 have been built. This is a low wing monoplane running four Ivchenko AI-20 turbo prop engines having 4,000 hp each. Each aircraft carries 80 passengers. It has been in service since 1957.

Ilyushin Il-62. Aircraft numbered in the series CCCP-86000 to CCCP-86999. Used for international and intercontinental flights, this jetliner is replacing the Tu-114 aircraft. Looks very much like the British BAC-VC10, having a total of four turbofan engines in a rear-mounted configuration.

Tupolev Tu-104. A rather outdated twin-turbojet aircraft which has been in service for 30 years. It carries 50 passengers. A larger version, the Tu-104A, carries 70 passengers, while the Tu-104B handles 100 passengers. Many have been retired but there are still a substantial number in use.

Tupolev Tu-134. Serial numbers CCCP-65000 to CCCP-65999. The Tu-134 and Tu-134A aircraft are used for short hauls. Carrying 64 and 80 passengers, respectively, these are rear-engined turbofan aircraft that are in wide use.

Tupolev Tu-154. This is a tri-jet liner that has been in service since 1971. It is replacing the Il-18.

Yakolev Yak-40. Carrying 32 passengers, this is a local service aircraft with three jet engines. It can land at small fields, including those with runways in poor condition. Some 2,000 are in service. The serial numbers are CCCP-87000 to CCCP-87999.

Yakolev Yak-42. These include the aircraft numbered in the series CCCP-42000 to CCCP-42999. A recently designed 120-passenger aircraft.

In The Air And On The Air

While communications within the USSR have been monitored in North America, the best bet for hearing Aeroflot is the popular Moscow to Havana route. This offers both SSB and CW communications between the airliners and ground stations in both Moscow and Havana.

The Long Distance Operational Communications (LDOC) voice frequencies, which are in use at Havana and have been monitored exchanging company communications with Aeroflot, are: 3007, 5544, 8927, 13339, 17934, and 21985

GROUND STATION AEROFLOT CALLSIGNS

COL	HAVANA, CUBA
RFNV	MOSCOW (SHEREMETIEVO), USSR
UAFE	
UCTD	AIRFIELD #735, USSR
UGAB	MOSCOW (TUSHINO), USSR
UXDB	
UXDF	AIRFIELD #707, USSR
UXUC	AIRFIELD #877, USSR

Table 2

АЭРОФЛОТ
Soviet airlines

kHz. The LDOC frequencies in the USSR are 5529, 8924, 10030, 13345, 17940, and 21958 kHz.

A considerable amount of Aeroflot CW communications has been noted on: 5600, 8842, 10025, 11193, 11312, 11390, 11394.5, 13248, 15024, and 17936 kHz. The most active of these frequencies is 8842 kHz, which also features CW weather forecasts from Moscow at 10 and 40 minutes past the hour (also noted simultaneously transmitted on 11193 and 11312 kHz).

Some SSB communications have been noted on 6748, 8975.5, and 13221 kHz.

Communications via SSB between Aeroflot aircraft and the ground stations used for civil aircraft flying international routes have also been noted. Best bet for North American monitors are for communications with Havana, which take place on: 2887, 3455, 5520, 6577, 6586, 8846, 8918, 11387, 11396, 13297, and 17907 kHz.

The following voice frequencies used for similar purposes in Europe and Central Asia might also be checked out:

Europe: 3479, 5661, 6598, 10084, 13288, 17961 kHz.

Central Asia: 2851, 3004, 3019, 4678, 5646, 5664, 6592, 10039, 10096, 13303, 13315, 17958 kHz.

Who?

On voice, the Aeroflot aircraft usually identify by their flight numbers, such as "Aeroflot 334." On CW, usually the aircraft's serial number is given, such as "86473." Such numbers relate to the tail number of the aircraft, such as "CCCP-86473," which means "USSR-86473." Each of the Aeroflot aircraft is also assigned a 5-letter callsign commencing with the letter "R," and a listing of those callsigns which are known is found in Table 1. There are, of course, several thousand aircraft in the Aeroflot fleet and our listing does not even approach being complete. It incorporates only those aircraft where a callsign has been matched to an aircraft serial number by North American monitors.

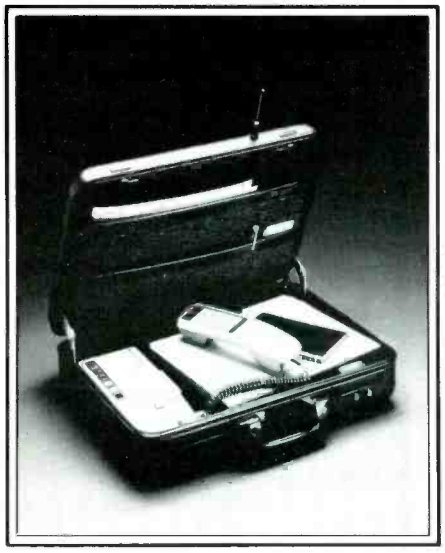
It should also be noted that many aircraft now flying under the banner of the Cuban national airline, Cubana, are Soviet aircraft registered in the USSR with "CCCP" serial numbers and Soviet callsigns.

The most popularly noted ground stations are COL in Havana and RFNV in Moscow. A listing of various ground station callsigns monitored is shown in Table 2.

Armed with this data, you should be able to tune in on one of the world's largest and yet most elusive airlines. PC

PRODUCTS

REVIEW OF NEW AND INTERESTING PRODUCTS



First Cellular Phone In A Briefcase

World-Caller™ is one of the most advanced concepts in the field of mobile communications to come along in years. It combines AT&T's System 1000 Cellular telephone with a briefcase of brushed aluminum made by Halliburton.

The World-Caller offers all the ease of an office telephone, including instant dial-tone, freedom from static and signal-fade, worldwide dialing, and complete privacy.

Advanced Cellular Systems chose the System 1000 because of AT&T's pioneer work in Cellular technology. It features dial-in-handset operation, last number redial, 10-number memory, access to long-distance services like MCI and Sprint, and access via modem to mainframe and portable computers. The Halliburton briefcase, which is available in silver, gold, or flat-black brushed aluminum, was chosen for its ruggedness and elegant looks.

The World-Caller does double duty as a business-papercarrier and as the most convenient mobile telephone ever made. It is an ideal communications tool for traveling businessmen who must use rental cars and trains. It can be used in any of the 90 major cities that now have or will shortly be getting Cellular Mobile Telephone Systems.

World-Caller comes complete with battery, antenna, transceiver, control head, wall charger, and cigarette lighter adapter for automobile use. World-Caller is covered by AT&T and Advanced Cellular Systems 12-month, full-replacement warranty against defects.

For more information contact Advanced Cellular Systems at P.O. Box 122, Southampton, PA 18966.

Metz Communications Marine Antennas

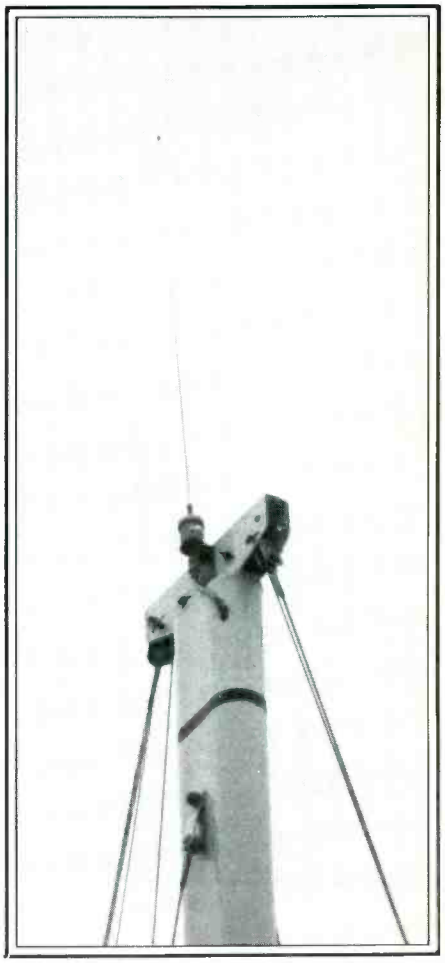
The Metz line of commercial and maritime antennas has been serving the communications industry for over 15 years. The Metz antenna is a distinctive type of vehicular and/or maritime antenna that has no look-alikes. Each Metz antenna features a patented stainless steel base loading coil with a stainless steel whip. Various whip lengths match over ten discrete frequency antennas. All whips screw onto the rugged SO-239 connector (similar to a coaxial cable barrel connector). Several varieties of mounts with and without coax are available to complement any Metz installation.

Metz Corporation is proud to announce three new members of the Metz family called "dual banders." Quite simply, one antenna operates on two different frequencies.

The AM/FM dual bander is ideal for marine and automotive stereo entertainment receivers. The gleaming stainless steel loading coil and yard-long stainless steel whip will complement any installation. The AM/FM dual bander offers outstanding reception capabilities on the AM broadcast band from 500 kHz to 1700 kHz. Built into the same coil is a matching network to tune in FM entertainment frequencies between 88 MHz to 108 MHz. The extra long whip antenna helps reduce multi-path signal fading as well as picket-posting. The AM/FM dual bander allows for noise-free reception of all broadcast signals, even when you are over a hundred miles away from the transmitting station. The coil also features shunt-fed feeding to eliminate the build up of wind static on the antenna system. For maximum entertainment radio range, the Metz AM/FM antenna cannot be surpassed.

For shortwave reception, the new Metz shortwave/FAX antenna is ideal for casual shortwave listening or for commercial weather facsimile recorder reception. This specifically wide-tuned antenna pulls in shortwave signals between 3 MHz and 30 MHz. A unique tuning system within the stainless steel coil also offers peaked reception of U.S. and foreign weather facsimile broadcast stations. This antenna is ideal for marine applications when tied into a shortwave receiver or tied directly into a weather facsimile receiver. For the shortwave enthusiast, the antenna may be mounted directly on the shortwave receiver or remotely in an attic. For mobile homes, the antenna is mounted on any aluminum surface for maximum reception of shortwave, military, amateur radio, marine, and weather facsimile transmissions.

The Metz combination citizens band/scanner antenna allows for long distance

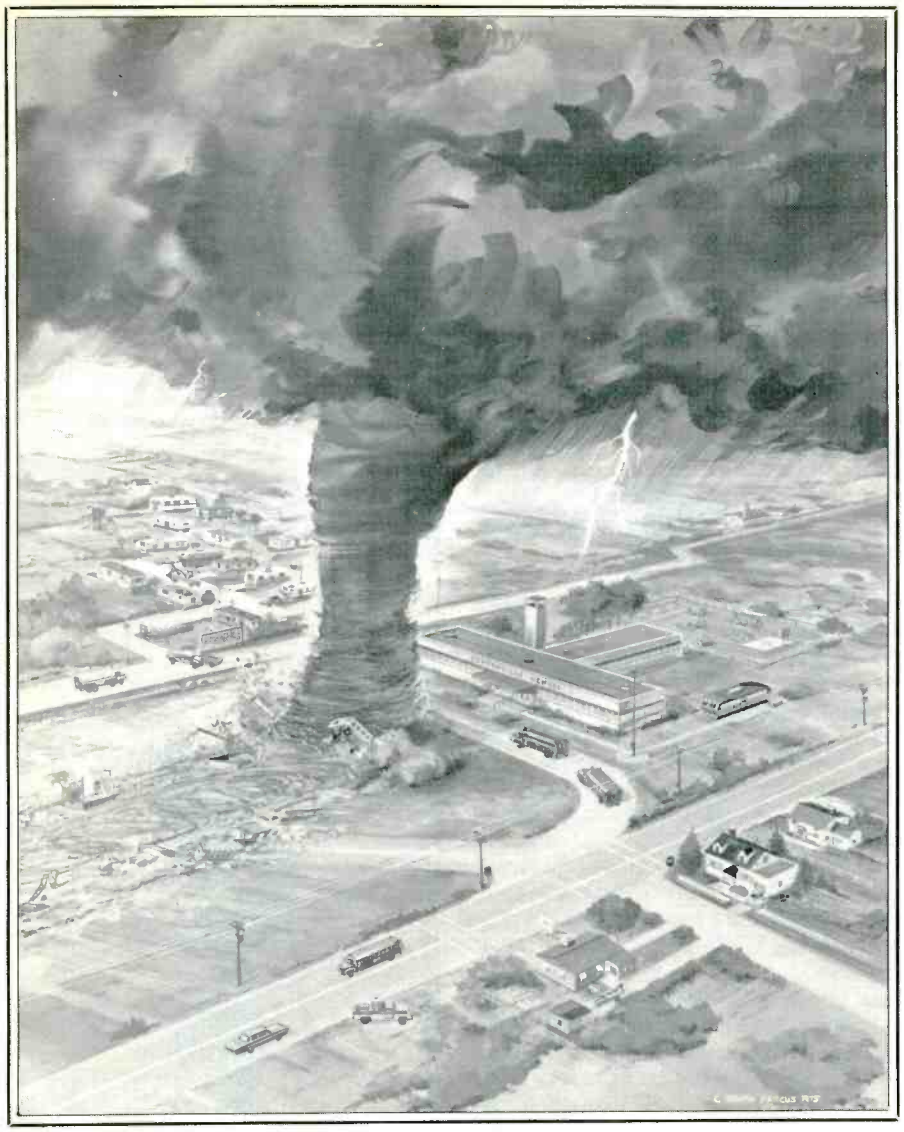


transmission and reception range on 27 MHz CB, plus long distance scanner reception on low band, high band, and at UHF frequencies, too. All that is necessary is a two-position coaxial cable switch that will either select your CB set or your scanner to be fed into the CB/scanner antenna.

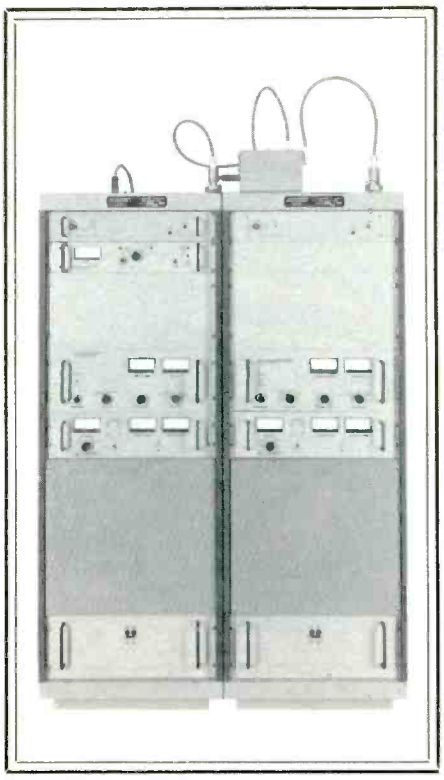
A unique tuning section allows for an extremely good match to all 40 channels on citizens band. In the scanner receive mode, the antenna looks like an in-fed halfwave receive system on most scanner bands. It actually offers gain over quarterwave whips at ultra high frequencies. The sleek stainless steel appearance of the CB/scanner antenna makes this a distinctive addition to any vehicular or home installation.

All Metz antennas are covered with a lifetime replacement warranty. The practically indestructible stainless steel antenna will provide years of trouble-free service in single antenna applications, or in situations where two antennas are required, with one Metz antenna covering both frequencies.

See the stainless steel Metz antennas at your local communications specialist dealer.



NOAA photo



The SR-416 VHF transmitter is popularly used for NOAA broadcasts.

A DX Guide To NOAA Weather Radio

Yes, It's Useful, But Don't Overlook The Hobby Angle!

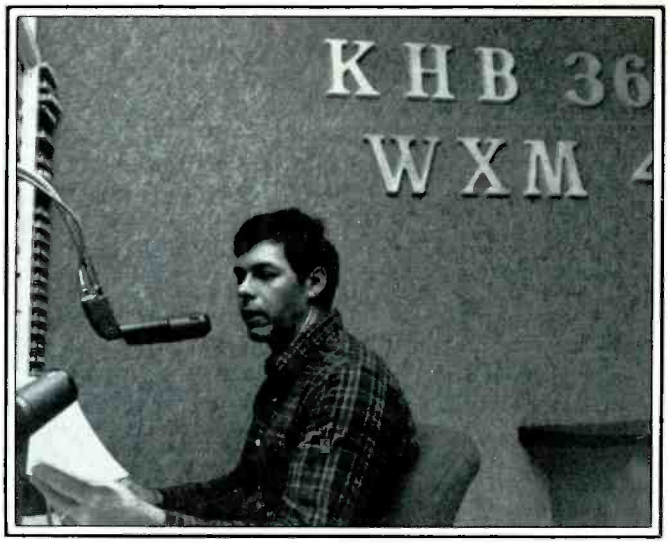
BY LEWIS KESEBERG, KCA6PK

Scarcely a person in the United States remains unaware of the fact that somewhere in a remote portion of the radio spectrum one can—by means of a special receiver—pick up weather broadcasts directly from the National Weather Service. Radio Shack, Bearcat, and several other companies produce these special receivers, and better VHF marine radiotelephones can also tune them in. For the most part, the general public is little concerned with the nuts and bolts of all of this; it's there to be used, and there's little to be said about it. Well, if you're satisfied with that approach, then good luck to you. The fact is the network of NOAA Weather Radio (NWR) stations really shouldn't be taken for granted by persons interested in communications. There's much to be said for and about NWR, not the least of which is that they offer a chance to hear (and even QSL) some genuine VHF DX. Read on, Macduff!

Background

The concept of continuous VHF-FM weather broadcasts by the NWS was first tested in the early 1950's. During that period, transmitters at Chicago (1953) and

Severe weather alerts are sent out over NOAA stations. Some of these stations can trigger receivers by means of tone signal. (NOAA photo)



An NOAA forecaster readies a program for transmission. (NOAA photo)

New York (1956) began broadcasts to primarily serve aviation interests. In the early 1960's, NWS ran a "Continuous Weather Communications Project" at Providence, Rhode Island in order to determine the feasibility of using VHF-FM radio as a means of disseminating weather on a nationwide basis. The project resulted in a proposal by Senator Theodore F. Green (RI) that the Weather Bureau "initiate and maintain a 24-hour continuous broadcast schedule over a national network of FM stations." Green asked the Weather Bureau "to explore all possibilities for establishing such a network . . . and to initiate whatever action that may be required to establish several FM weather broadcasting programs."

Frankly, the program was not an immediate success, probably because of the limited distribution and high cost of the specialized receivers required to pick up the broadcasts. However, the NWS was able to expand the program to several more cities during the mid and late 1960's, principally along coastal areas to serve marine interests. Weather for aviation interests during this period was discontinued inasmuch as the FAA assumed responsibility for that service. These actions occurred concurrently with the increasing availability of popularly priced commercial receivers which could tune in the broadcasts. Simultaneously, the marine-oriented network was expanded to include some of the larger inland metropolitan areas to offer continuous weather information to the general public. By the early 1970's the national network plan of 330 to 340 VHF-FM stations had been developed.

In addition to the direct efforts of the NWS, other federal, state, and local governments, as well as civic groups, have participated in expanding the network through gifts of 13 of the more than 370 systems presently in operation.

Their Function

Most of the NWR stations operate 24-hours daily. Taped weather messages are repeated every four to six minutes and are routinely revised every one to three hours (more frequently if needed). During periods of severe weather (or impending severe weather), NWS forecasters are able to interrupt the routine weather broadcasts to flash special warning messages. An alerting tone can also be transmitted which will tune in on those receivers equipped with an automatic turn-on capability. Under normal conditions, the receiver operates in a stand-by (muted, or quiet) mode, but will become fully operational when the tone signal is transmitted. This tone-alerting feature is in heavy use at schools, hospitals, police and highway departments, and broadcast stations.

In 1975, the White House designated NOAA Weather Radio as being the sole government-operated radio system for providing direct warnings into private homes for natural disasters as well as nuclear attack. This supplements other warning systems used by Civil Defense and the commercial broadcast industry.

While routine weather messages are of interest and use to farmers, boaters, private flyers, and the general public, it is the news media and numerous public safety agencies that are especially interested in emergency alerts provided over the NWR network. Many broadcasters (including cable TV systems) receive their weather information directly from NOAA Weather Radio. For example, KDKA in Pittsburgh uses NWR to rebroadcast hourly weather conditions—just one of many broadcasters who find this an efficient way of providing weather information to their listeners. New forecast information takes only minutes to reach the public via direct reception of NWR or through the many broadcast facilities rebroadcasting the information. There are times, during periods of severe weather, when the NWR transmissions have been rebroadcast over 2-meter FM ham band repeaters and also over CB stations on Channels 9 and 19 or channels used by boaters. There are times when a tornado or severe thunderstorm warning has been flashed to the public virtually simultaneously with the completion of the forecast by NWS personnel, a factor that has been of obvious benefit to the safety of life and property.

NOAA Weather Radio

All NOAA Weather Radio broadcasts take place in the 162 MHz band by FM (16 kHz bandwidth). The three standard frequencies used are:

Channel 1 162.55 MHz

SURVIVAL

BY R.L. SLATTERY

ESTABLISHING SURVIVALIST COMMUNICATIONS SYSTEMS

Antenna Commentary

From time to time we kick around a few general thoughts on antennas based upon the incoming reader mail to the column. It seems to be that time again.

I'd like to address a portion of this column to signal polarization since it's seldom given its due importance when considering a communications system.

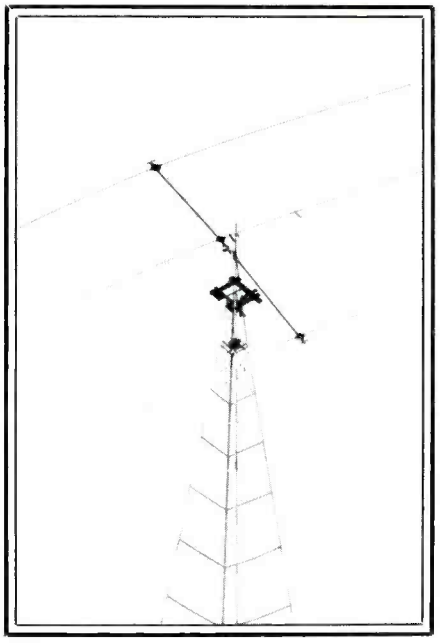
The polarization of a radiated signal is determined by the direction of the lines of force making up the electric field. If the lines of force are at right angles to the surface of the earth, the waves are said to be vertically polarized. If the lines of electric force are parallel to the surface of the earth, the wave is said to be horizontally polarized--given the slang name of "flat side" polarization.

When a single wire or element antenna is used to receive signals, best reception occurs when that antenna is oriented to the same polarity as the incoming signals. So a vertical antenna (such as a whip antenna) is used for efficient reception of vertically polarized waves. A horizontal antenna is used for best reception of horizontally polarized waves. Sometimes, the polarization of a transmitted signal rotates as it travels over a long distance, especially in the case of signals propagated by skywave (or "skip"). Under such conditions, the received signal will have both vertical and horizontal components and have elliptical polarization.

At medium and low frequencies (3 kHz to 3 MHz), ground wave transmission is heavily relied upon and the preferred signal polarization is vertical. Since the vertical lines of force are perpendicular to the ground, the radio wave can travel a considerable distance along the ground surface with a minimal amount of loss. Because the earth acts as a good conductor at low frequencies, horizontal lines of force are shorted out and the useful range of a horizontal antenna's signal is limited.

Between 3 and 30 MHz we can rely upon skywave transmission and it makes little difference whether vertical or horizontal transmission is selected. After the signals bounce off the ionosphere, they become elliptically polarized, so the transmitting and receiving antennas can be mounted either vertically or horizontally. Nevertheless, horizontal antennas seem to be used on these frequencies more often than vertical antennas because they can be made to radiate effectively at high angles and have inherent directional properties.

Between 30 MHz and into the UHF range, either polarization is satisfactory. However, the polarization of the transmitting and receiving antennas must be the same for best reception.



HF antennas for long range communication can be either vertically or horizontally polarized. The beam shown here is for horizontal polarizations.

Keeping the electronics just described in mind, there are other factors to consider when planning your systems. This is because there are advantages and disadvantages to vertical and horizontal polarization.

A simple vertical half-wave antenna can be used to provide omnidirectional (in all directions) communication. This is an advantage when communicating with moving vehicles or personnel or with several other base stations at different locations. Also, when antenna heights are limited to 10 feet or less over land (such as in a vehicle installation), vertical polarization offers a stronger received signal at frequencies up to about 50 MHz. Between 50 and about 100 MHz there is only slight improvement over horizontal polarization with antennas of the same height. There is virtually no difference at frequencies above 100 MHz.

Radiation using vertical polarization is somewhat less affected by reflections from aircraft flying over the transmission path. Using horizontal polarization, such reflections cause variations in received signal strength. In areas where there is heavy aircraft activity, this is an important consideration. Also, when using vertical polarization, less interference is produced or picked up because of strong VHF and UHF broadcast transmission and reception (TV and FM) since all TV and some FM broadcasters use horizontal antennas exclusively. This is an important factor when a communications antenna must be located in a heavily populated area and is one of the reasons why CB operations (which have a potential for severe TV Channel 2 interference) are almost always conducted with vertical polarization.

On the other hand, a simple horizontal half-wave antenna is bidirectional. This characteristic is useful if you want to minimize interference from certain directions. Also, horizontal antennas are less prone to picking up ignition noise and other man-made interference (since this is usually polarized vertically).

When antennas are located near dense forests, horizontally polarized waves suffer less losses than vertically polarized waves, most especially above 100 MHz.

Small changes in antenna locations don't cause large variations in the field intensity of horizontally polarized waves when antennas are located among trees or buildings. When vertical polarization is employed, a change of only a few feet in the antenna location may have a considerable effect on the received signal strength.

When simple half-wave antennas are used, the coaxial transmission line (usually vertical) is less affected by a horizontally mounted antenna. By keeping the antenna at right angles (90°) to the transmission line and using horizontal polarization, the coaxial cable is kept out of the direct field of the antenna. As a result, the radiation pattern and electrical characteristics of the antenna are virtually unaffected by the presence of the vertical transmission line.

Receiving Antennas

Vertical receiving antennas accept signals from all directions with equal efficience, just as vertical antennas used for transmitting radiate equally in all directions. Because of this characteristic, other stations operating on the same or adjacent frequencies may interfere with the desired signal and could make reception difficult or impossible. However, reception of a desired signal can be improved by using a directional antenna.

Horizontal half-wave antennas accept radio signals from all directionals with the exception of the two directions in direct line with the ends of the antenna. Thus, when only one signal is causing interference (or when several interfering signals are coming from the same direction), interference can be reduced or eliminated by changing the

antenna installation so that either end of the antenna points in the direction of the interfering station.

Other Considerations

Communication over a radio circuit is satisfactory when the received signal is strong enough to override undesired signals and noise. In other words, the receiver must be within range of the transmitter. Communication effectiveness can be increased between two stations by several methods. Above 25 MHz, you will find that increasing the height of the antenna will also increase the range of the station. In general, communication effectiveness can also be increased by boosting the transmitter power, changing the type of emission (for example, changing from AM to SSB or CW), moving to a different frequency or frequency band, or using a more directional antenna. In point-to-point communication, it is usually more economical to increase the directivity of an antenna system than to attempt to use higher transmitter power. Directional transmitting antennas concentrate radiation in a given direction and minimize radiation in others. A directional antenna may also be used to lessen interception by unwanted monitors and interference with friendly stations.

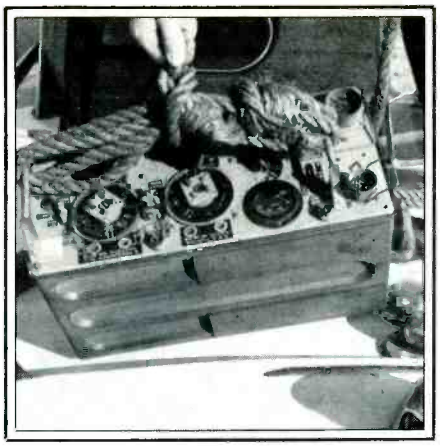
The Mark II

I'm constantly surprised at the number of requests I receive for advice on the old WWII Mark II transceiver. There are obviously thousands of these things still in existence and making the rounds through garage sales and tag sales. This is certainly a testament to the fact that the Mark II is physically indestructable. These sets were designed for export to the USSR for use in tanks. For those who own tanks, this is probably a great piece of equipment, but the effort involved to convert a Mark II to any other conceivable communications use is enormous.

If you're into collecting curious looking antiques, it is an impressive conversation piece for your radio room. In fact, in the assortment of "outbander" QSL cards that ran in this column last month, there's a Mark II shown sitting atop someone's desk! Other than that, the only reasonable conversion for this hairy old cossack was discovered almost 30 years ago by military surplus fans. It was simple: take some heavy line and securely fasten it to the handles of the Mark II. It makes a fine anchor for a small boat!

POP'COMM reader Joe Harrington (P.O. Box 1691, Kankakee, IL 60901) writes to ask if we can give him any information on two pieces of mil surplus he recently acquired, the BC-474-A and the BC-1335. Joe says he wrote to the manufacturers of the sets plus at least 12 other potential information sources (including surplus dealers) and drew a total blank on these. Search no more. We can give you some basic information on these two interesting transceivers.

The BC-474-A is a vintage portable AM and CW transmitter and receiver used during WWII. It covers 2300 to 6500 kHz, fully tunable. The transmitter puts out 4 watts



This is the famous Mark II transceiver conversion to boat anchor.

and requires a 35-foot antenna and 35-foot counterpoise. The receiver is a superhet with a 455 kHz IF. The input is to an RF stage and the output to a high impedance headset. The transmitter uses three type 6V6 tubes. A separate power amplifier is used for the output stage and is keyed for CW operation. Power is supplied by a 90 VDC dry cell and a 1.5 VDC dry cell, or a GN-44-A hand-crank generator.

All in all this is a nice little rig, given its age and low power. The transmitter and the receiver are on two separate chassis attached to a common front panel. Years ago a friend of mine and I purchased a BC-474-A and we sawed the front panel in half. He got the receiver and I got the transmitter. The receiver tube lineup is a 1N5GT RF amplifier, 1A7GT converter, 3A8GT IF CW oscillator and AVC, and 1D8GT detector and 1st/2nd audio.

The BC-1335 is an FM transceiver that some folks used to call the "horsey talkie" since it was intended for horseback use. This is another WWII gem and actually quite a nifty rig that was popular with early-era CB'ers since it operated on two crystal controlled channels between 27 and 38.90 MHz and was fully portable.

In the design of the BC-1335, one crystal is used per channel. This controls the receiver. The transmitter is monitored by the receiver during transmissions and this causes the transmitter oscillator to be held on frequency by means of a reactance tube across the transmitter oscillator. A carbon mike is required with the BC-1335, such as a T-17. The PTT button on the mike energizes the transmitter heaters. The receiver IF is 4300 kHz. The receiver local oscillator is below the signal frequency and uses the 4th harmonic of the crystal.

This 5-inch, 3-color patch is a dandy for sideband operators.

The 1335 runs on 6 or 12 VDC (negative ground). Transmitter output is 2 to 4 watts into a whip antenna (a coaxial output is also available). This is a complex little gizmo containing close to 20 vacuum tubes and rather a novel design, all in all.

Joe is also looking for a U.S. Army manual TM-11-879. If any readers can help him, or offer additional information on either or both of his surplus rigs, contact him directly.

Many of this column's readers are devotees of 27 MHz SSB operations. I therefore thought I'd pass along information on a really great looking and colorful (red/white/blue) embroidered patch designed for operators of this breed. This beautifully designed patch is quite large (5 inches) and the photo tells it all regarding its looks. An attractive addition to yer cammies or jacket, and a good way to tell the world you like 27 MHz SSB! Best of all, it's inexpensive, considering its large size and number of colors. It's only $5.95, postpaid, from The SSB Network, P.O. Box 908, Smithtown, NY 11787. PC

About The "Spy Numbers" Transmissions

Something Is Very Odd . . .

BY ROBERT M. DYQUETTA

During 1984, *Popular Communications* presented a trio of number transmission articles reflecting the opinions, extrapolations, and hypothetical conclusions as expounded from the ranks of several current or formerly active number investigators. As there are a multitude of theories and opinions, the primary purpose was to give you a much broader understanding of this unique and convoluted radio mystery by presenting a mixture of what is known, along with what certain aspects of the data could indicate. Some conclusions were contradictory, but they were not presented in order to confuse you. We have a mystery, and only if it is examined from all angles can we begin to grasp what is possible and what is not.

The November '84 *POP'COMM* article "Spy Transmissions—Operational Perspectives," layed out a hypothetical scenario for the most prevalently held opinion; namely that the number transmissions are "spy/cloak-and-dagger" operations. Although the majority of number buffs ascribe to this spy theory, there remains a small minority who do not. Their observations were scattered throughout the previous articles, and in this essay, we will more closely examine the premise echoed by one of this minority. "Something is very odd about the number transmissions" . . . . To accomplish this, we will explore this avenue of investigative probing by counterpointing it against the popular "spy" theory.

Our modern variety of number transmissions has been in existence for roughly the past 25 years. During this interval, all of the now regular number types made their appearance. It is now possible to link several of the major types to specific transmitter site locations.

The regular SS/YL 4-digit and the CW 5-element, plus the SS/YL 4-digit and CW 4-element (which do not have any s/on preamble nor s/off) originate from the Remington, Virginia site of the National Communication System complex, headquartered at Warrenton, Virginia.

The very familiar SS/YL 5-digit, with her "Atencion" s/on and the "Final, Final" s/off, are from Bautu, Cuba.

The GG/YL and EE/YL 5-digits, along with the repeated phonetic type, were RDFed to Nauen, East Germany. (It must be noted that certain German AM mode transmissions heard in North America can only be originating from within the western hemisphere and not Nauen.)

From this QTH data we can arrive at a broad assumption: The USA and the USSR are the originators for most, if not all, of the regular number types we can now monitor. I would point out that even though the Soviet Union itself has not been located as a transmitter source, the centralized nature of communism dictates that overall control would be exercised by the USSR through its surrogates (in this instance, Cuba and East Germany). This would be especially true for espionage activities. So from the spy theorist viewpoint, we have radio operations being carried out by the CIA and the KGB.

Most number buffs concentrate on locating the frequencies in use, along with day and times utilized. As we all know, *every* regular number type has a predictable transmission schedule. With only a minimal effort, anyone can assemble a day by day, hour by hour schedule for any of the regular types. (We have previously denoted this scheduling as the DTF pattern.) As such, you could randomly pick a day and time, then tune to the indicated frequency and hear the number type, which you worked up a schedule on.

When one number type follows a predictable pattern, we can chalk this up to their specific operational routine. But as we are aware, *all* of the regular types follow this pattern. Something, therefore, is very odd, and this oddity centers on the fact that these transmissions originate from locations that represent two diametrically opposite political/social ideologies—democracy and communism.

A major reason for the belief that number transmissions are "spy" in nature revolves around the use of simple transmission modes. AM, A3H, or CW can be monitored with a very simple shortwave receiver. In many countries outside of the USA, HF shortwave frequencies are utilized for regional broadcasts since the AM broadcast band simply cannot cover the entire nation. Therefore, any citizen can openly own a

shortwave receiver and not be suspected of being a spy.

The utilization of encrypted message texts, which cannot be deciphered by the crypto buff, lends to the spy theory. The lack of any government to acknowledge or truthfully comment on these number transmissions (in other words, the iron clad security surrounding them) completes the aura of the spy mystique.

Lending support to this are the factual exposes, novels, TV and movie depictions of intelligence operations. Intelligence operations, via radio means, is most certainly carried out today, and our number transmissions seem to fit into that mold quite nicely. What could be more exciting than to believe that we are actually listening to cloak-and-dagger activity from our own home?

It all fits together quite nicely until we try to qualify the assumption by explaining their DTF similarities. The fact that certain number types have been tracked down to locations that represent the two major opposing ideological concepts is not surprising. What is surprising is that they are utilizing the same baseline system.

To mimic each other serves no sane purpose. Each intelligence service has developed its own specific operational parameters, and it is self-defeating to modify it, to conform with the opposition. To do so merely to fool or confuse the average shortwave monitor is an absurd conclusion. These intelligence services would not jeopardize their own operation by striving to appear to be just like their counterparts simply to deceive any unauthorized listener.

But as we have come to realize, all of the regular number types have the same baseline operational parameters. These include:

1. a predictable and adhered to Day/Time/Frequency pattern
2. simple transmission modes with an out in the open transmission
3. on hour time starts for initial transmission
4. standard s/on preamble and s/off ident
5. pre-recorded format
6. female voice (via electronic insertion methods or computer synthesization)
7. message repeated within the same hour time frame (immediate repeat, groups repeated twice in a row, or repeated on a different freq.)
8. 4 or 5 numerical element grouped enciphered text

Granted, each has transmission characteristics unique to that specific number type, but overall, considering their points of origin, they have too many similarities. To justify this, in the context of the spy theory, you would have to conclude that all intelligence services have mutually agreed to adopt and adhere to a baseline radio transmission procedure.

At this point it must be noted that there are several regularly heard types that are the exception. They include the SS/YL 4-digit and CW 4-element that have no s/on or s/off routine, merely repeat for 10 minutes (3 time slots per 24 hours) 2 to 6, 4-digit group, starting at plus 30 minutes. Another is the phonetics which repeat a 4 element group that consists of 3 phonetic alphabet letters and one number. The above have been directly linked to a regular number type and are assumed to be a variation within their respective systems.

The Remington 4/5 CW uses a "cut" Morse presentation adopting the AUV4E6BDNT layout. There are other CW numbers that use a somewhat different cut layout. No extensive probing has been done on these, but it is intriguing to speculate that the non-Remington CW types could be a Morse code counterpart for the Cuban SS/YL 5-digit. The SS/YL 5-digit has a variation that uses a triple "Atencion" in the s/on, and a triple "Final" in the s/off.

There are other number transmissions that use languages other than Spanish, English, or German, but as these are not regularly heard in North America, they are presumed to be for European and Asian areas.

A Spanish language male vocalization number type has been monitored, but not with predictable regularity. Its babbling type delivery suggests a live transmission.

Also to be noted is that the regular 5-digit types (Spanish, German, and English) have a version that presents the groups in a 3 and 2 element delivery.

Although the above transmissions are to be noted for the purposes of this article, we will regard them either as variations of the regular types or transmissions not intended for North American reception.

One broad based observation can be drawn. Considering the variety of languages in use, and that some number types are primarily heard in only one geographical area, it can be stated that number transmissions are a worldwide phenomenon.

From what we've learned from apprehended agents, the hallmark of espionage type radio transmission was randomness. If a simple voice or CW mode was employed, then the frequency, day, and time aspects were not predictable. The whole idea was to make it as difficult as possible for counterintelligence. Even if the agency uses (for example) a roster of 70 frequencies, if they were utilized in what appeared to be a random fashion, it would force counterintelligence to monitor all 70 frequencies, 24 hours a day, 7 days a week. But even this is not a practical reality, for there is no reason to be tied to any frequency roster. As such, *any* HF frequency can be used, and over a considerable period of time, not one specific frequency would be utilized a second time. To illustrate: between 4 to 17 MHz there are 13,000 whole frequencies, one kHz apart. With this vast number, even taking into account frequency versus propagation requirements, there are still several thousand usable frequencies for any given day or night period. Ergo it is somewhat illogical to conduct spy type operations, using a predictable handful of frequencies, linked to a regular day/time schedule, when you have at your disposal a simple yet effective method to hide your transmissions.

By utilizing the above, along with non-predictable day/time aspects, you'll require counterintelligence to scan a very wide frequency spectrum, 24 hours a day, 7 days a week, to intercept any transmission.

The regular number types do not apply this rationale, so why is it that number buffs believe they are spy transmissions? Is there a subtle psychological phantom intertwined in this? Except for these number transmissions, where else have any CIA/KGB type transmissions been so identified? Virtually nowhere. These intel agencies obviously do carry out radio mode communications, and there is plenty of clandestine type radio traffic that could be intel generated, but not verifiable as such. Hence there is a subconscious need on the part of the number buff fraternity to find these radio operations. And among the large flock of oddball radio activity, there is one class of sheep that are obviously howling at the moon. Ergo, not only do the number transmissions suggest a cloak-and-dagger mystique, they also fulfill a desire within the monitoring community to identify and tune into such transmissions. Therefore, a question to ponder is, are we (subconsciously) deceiving ourselves?

As stated, it is a major goal in intel related radio operations to make it as difficult as possible a task for your opposition to first find your transmission, let alone decipher the encoded message. But the hallmark of all the regular number types is an adherence to a predictable day/time versus frequency schedule.

Why start a transmission at a predictable and routine time? Most number transmissions (the initial broadcast) start on the hour, making it very easy for counterintel, and you and me, to find and monitor them. The time required to transmit the message portion itself averages, depending on text length, between 2 and 20 minutes, no matter which type was involved. As such, an on the hour start is not required from the aspect that the majority of number transmissions require a full 60 minutes of time to transmit the message and its repeat. Visualize this from the SS/YL 5-digit type. It has a 4 minute average s/on preamble, and if for example, the text takes only 6 minutes to vocalize, you have a total of 10 minutes time utilization. As she does an entire repeat on a different frequency, the grand total time line utilization is 20 minutes, out of an entire 60 minute period. If this specific transmission must occur during a specified hourly period, it can still start anytime from 00 to plus 40 minutes, and still adhere to the hourly context.

The whole predictable DTF pattern is upheld by some for only one reason—the message is along the lines of a one-time code pad setup, therefore virtually undecipherable; hence, no need to hide the transmission. So by applying this logic, there is no reason to use apparently random frequencies, nor odd s/on times. Granted this is logical until we add in another component—you. You can easily monitor number transmissions. So what? If you accept that these transmissions are intelligence operations using the DTF routine, then you have to agree that their originators are blatantly advertising their clandestine operation.

In communist dominated nations, its citi-

zens don't dare to question or probe into activities carried out by their government. Here in the USA, our constitutional freedoms allow us to cut up our own government like Jack the Ripper. Therefore, a U.S. based radio intel operation would strive to be as discrete as possible, lest it draw the unwanted attention of its inquisitive citizens. We have all seen the results of the recent revelations of CIA directed mining of Nicaraguan harbors, and its authoring of an anti-Sandinista (terrorist) manual, which led to very unfavorable exposure in the media and probing by Congress. It is logical to transmit a secure coded message out in the open from a clandestine station, but most illogical if the government has to answer to the citizenry and Congress concerning such activities. This is especially true if one can be placed on their doorstep.

But isn't it a curious fact that the number transmissions, which are so blatantly cloak-and-daggerish, have never been (openly) probed by the news media or Congress? You would think that the likes of *60 Minutes* would jump at the opportunity to run an expose on the Remington number transmissions. But as of late 1984, there has never been an investigative "white paper" by any of the major television networks, nor any open-to-the-public Congressional probe. This lack of interest is incredible. The news media isn't at all timid, for it has gone for the government's throat anytime it detected shenanigans by a government agency, especially the intelligence services. If the spy theory is correct, then from Remington, Virginia we have coded messages being transmitted to espionage agents operating in foreign countries . . . and this is being conducted right out in the open for anyone to monitor. Yet the news media seems oblivious to this. Why? Could it be that the media has determined that the Remington transmissions are not an intelligence operation, and therefore an indepth report on them wouldn't generate enough rating points to justify the venture? Or is it that the government can exert so much persuasion it can quell any media/congressional probing of the Remington numbers?

If the initial time starts are odd, so is a lengthy s/on preamble. The logical reason for this is to insure the receptor will be able to determine if the transmission is for him. Of course, if he tuned in late, then the lengthy preamble will guarantee this.

To accept this premise means that all of the agents must monitor the transmission in order to ascertain that fact. From the known activities of apprehended agents comes a curious fact. Many agents had *no* radio reception responsibilities whatsoever. Many of the apprehended KGB agents received instructions and passed on data by non-radio methods. In these instances, a centralized radio receiving unit (often a Soviet or communist bloc embassy) monitored, then contacted the agent via a prearranged meeting or blind drop. So it may be reasonable to assume that only a small percentage of field agents are actually monitoring the transmitted number broadcasts. If this is true, then there would be very few actual receiving sites. Since these sites would be a critical link, they must be secure. An embassy in a foreign country fits this. The point is, if the site(s) are secure, they would be routinely monitoring all number transmissions from headquarters. Ergo, a brief preamble is all that would be required.

In instances when agents did do their own monitoring, they had a prearranged schedule. But with this precept, there is no need for any preamble at all, since a transmission on that frequency, at a specified day and time, would be intended for that particular agent and no other.

As explored in my November 84 article, there are methods which require the use of a preamble, and not knowing which is the real situation, leaves it up to you to weigh the merits.

It must also be pointed out that radio transmission methods are not always utilized. Instead, the sacrosanct diplomatic pouch was the delivery system.

The whole idea of number transmissions to field agents, in its simple, out in the open method, has a derogatory ethnic bias to it. It follows this line of reasoning: most of the field agents would be local inhabitants who do not possess the skills and sophistication of a James Bond role model. So make the transmissions as simple as possible for these local yokels to monitor. We've seen this slur carried out in countless spy melodramas. The American CIA agent is the hero, whose mission sends him into one of the "banana republics." The local agents assist along the lines of a Doctor Watson to our Sherlock Holmes. Other than that, their primary function is to be a love interest for our hero, a token presence, or to end up being terminated by the bad guys. Whether it is a novel, TV or movie, the situation is usually the same. The locals are inept, and it takes our hero to go down there to pull off a successful mission.

As such, many number buffs accept these spy melodramas as fictionalized reality, and therefore subconsciously view the DTF pattern and straightforward transmission modes as being a logical method to contact local field agents.

Of course nothing could be further from the truth. An intelligence agency would not waste its time to work with bumbling locals. The "enciphered" messages indicate that the receptor must have deciphering skills. Lastly, since these transmissions have been going on for many years, it means that the system works and that those involved in it are very good at what they do. Think about it.

Previously it was mentioned that several of the regular number types can be lumped into one ideological camp or another. The CIA and the KGB are both playing the same game, but from diametrically opposite positions. So it strains credibility that opposing intel operations would adopt very similar radio mode parameters. The conformity or number transmission formats are not a conspiracy by the CIA and KGB to fool or otherwise confuse the average radio monitor. But what other conclusion can you draw? It's almost as if the KGB said to the CIA, "Let us be practical. We're both playing the same game, even if it's from opposite camps. But since we are, why not adopt a common radio format, if for no other reason than to allow others to identify our transmissions as intelligence operations . . ." Absurd isn't it? Yet this type of reasoning is the only possible way to explain why opposing intelligence organizations would follow a very similar code of radio operations.

In effect, when we examine each number type by itself, it has the characteristics of a cloak-and-dagger radio operation. But when we compare them together (foregoing where they originate from), they appear to be only aspects of one single operation.

Why do the major number types all use a female voice? It is merely due to the fact that female vocalizations are primarily of a higher pitch than a male, therefore more readily understandable. Is the psychological aspect that men tend to pay more attention to a female rather than a male voice a consideration—or the subtle ploy, that a male voicing coded traffic would be viewed as sinister in nature, whereas a female voice, innocent?

Why do the major number types all use a simple, straightforward transmission method? Would it not be in keeping with intelligence operations to avail oneself of the several varieties of esoteric transmission means; burst transmissions, voice scrambling, tone masking, frequency hopping, all of which can be demodulated by state of the art equipment. If you are locked into the assumption that number transmissions must be kept straightforward because the receptors only have simple receivers, or that the receptors themselves are too simpleminded to master and utilize sophisticated equipment, then your logic itself is somewhat simple minded.

We must not forget these other oddities. Specific transmissions are not only repeated once, but can and are repeated over and over again. The SS/YL 5-digit is famous for repeating the same message in consecutive daily or weekly time slots. It has always been a difficult task for the spy theorist to justify why some messages appear over a consecutive 3 to 26 week period.

Grouping may not be what it appears. The SS/YL 4-digit utilizes a 4 element group, whereas the SS/YL 5-digit, a 5 element group. At first glance it appears that both are using different code systems. This is not necessarily true. It is far more convenient to copy blocks of numbers rather than one continuous stream of numbers. Then, too, both of these types give a group count in its s/on preamble, therefore grouping acts as a double check. If there was a 24 group count, you must end up with 24 (4- or 5-digit) blocks of numbers. Grouping is a matter of convenience and does not denote anything about the cipher system being employed. Without stretching the imagination, the same message can be grouped in a 4 or 5 block alignment and appear, at first glance, to be two different messages. Example:

81603295 71688630 0284	81603 29571 68863 00284
39370442 18903526 3121	39370 44218 90352 63121

It is not a suggestion that the SS/YL 4-and 5-digit types are transmitting the same messages. The point is that they could be using the same cipher system, only grouping it differently. Of course this doesn't seem possible, due to the fact that the SS/YL 4-digits come from Virginia, and the SS/YL 5-digits come from Cuba.

There is another less than obvious aspect to examine. Broadcasts made by the Voice of America, Radio Free Europe, and others are regularly jammed by the communists. You would think that "spy" transmissions in particular would be targeted for the QRM treatment, not only by one side, but by both. Yet there is no audio proof that *any* of the regular number types were or are being deliberately jammed.

The regular types predictably adhere to their respective DTF patterns, and as such, are the guilty parties who usually jam RTTY, CW, radiotelephone (etc.) traffic, that are already up on frequency.

Since they all follow a very predictable DTF schedule, you cannot say that the numbers are not jammed because the transmissions cannot be found. It is almost as if there is an unwritten law among the intelligence services not to jam each other's cloak-and-dagger radio operations.

The whole concept of counterintelligence is to uncover, foil, or interfere with "enemy" intelligence operations. In other words, if you can disrupt the operations by your opponent, you do it. So why aren't the regular number types being jammed?

By examining the frequencies being employed, we can detect something that suggests a single operation theory. To the novice number buff, number transmissions seem to occur very randomly throughout the HF spectrum. They, in fact, do not. Number transmissions congregate within somewhat limited frequency bandwidths, and the majority of number types are so aligned.

List A depicts the major frequency areas where number transmissions occur. The abbreviations are:

SS5—SS/YL 5-digit (Cuba)
SS4—SS/YL 4-digit (USA)
GG5—GG/YL 5-digit (GDR and an unidentified western hemisphere QTH)
EE5—EE/YL 5-digit (same as GDR)
PHO—Phonetics (3 letters & 1 number—same as GDR)
CW4/5—CW 4 or 5 digit (USA)

Following them, in parentheses, are the ITU allocated service designations occupied by these number frequency areas.

As you can observe, most number transmissions are within bands allocated for "fixed service." It is also to be noted that many of the aero (aeronautical) and maritime band areas are used by both commercial and military stations. It can be broadly stated that the majority of regular number types operate in the bands allocated for such type traffic and in areas of known governmental/military usage. This in itself is no startling revelation. Except for minor intrusions into the international shortwave broadcast bands, number transmissions occur in what is know as the utility bands. A diehard SWBCer would have little or no knowledge of these transmissions. Likewise, those unfamiliar with normal military tactical communication practices or the 5-figure weather format broadcast could easily confuse these non-number types with the regular number transmissions.

List B denotes either specific frequencies or frequency areas of 60 kHz or less in which at least two of the regular number types, or all 3 types, are or have been active. This "sharing" of specific frequencies clustered within very close proximity by the two or three aforementioned nations must be considered very odd.

If the spy premise is genuine, then it is a logical conclusion that each intel service would stay clear of frequencies used by their opposite counterpart. Any aspect of clandestine activity, especially if its purpose is directed against the oppostion's camp, would be as well hidden from detection as possible. This is not a logical conclusion—it is a definite reality. You don't succeed in the cloak-and-dagger realm by brashness, but instead primarily by stealth. But as you can readily observe, almost the reverse is being employed with the number transmissions.

Let us think about what has been touched on in this article. Now follow me through this assumption . . . The CIA/KGB have entered into an agreement to utilize the same basic radio transmission format, and likewise share frequencies or occupy the same narrow bandwidths for their respective clandestine radio operations.

Now before you call this author a fool, examine the premise. To accept the spy theory means that you have to acknowledge the DTF scheduling, shared frequencies/areas, and all the other oddities and similarities that the regular number transmissions have; as the radio operational characteristics of their respective intelligence agencies.

List A

Major Frequency Areas	Number Type	ITU Band Allocation
3060-3150	SS5 PH0	(Aero)
3218-3265	GG5 SS5	(Fixed/Broadcast)
3370-3385	GG5	(Fixed/Broadcast)
3416-3445	SS5 PH0	(Aero)
3805-3855	GG5	(Fixed/Aero)
4010-4055	GG5 SS5 CW5	(Fixed/Maritime)
4100-4110	SS5 CW5	(Maritime)
4305-4395	SS4 SS5 GG5	(Maritime)
4455-4475	GG5 SS5	(Fixed)
4500-4835	CW5 GG5 PH0 EE5 SS4 SS5	(Fixed)
5015-5095	SS5 GG5 SS4	(Fixed/Broadcast)
5135-5185	CW5 SS5 GG5	(Fixed)
5225-5230	PH0 GG5 EE5	(Fixed)
5410-5440	GG5 PH0 EE5	(Fixed)
5540-5550	GG5 SS5	(Aero)
5620-5695	GG5 PH0 EE5	(Aero)
5735-5785	CW5 GG5 SS5 PH0	(Fixed)
5810-5850	SS5 SS4 GG5 CW5	(Fixed)
5900-5940	GG5 PH0 SS5	(Fixed)
6200-6275	GG5 PH0 SS5 EE5	(Maritime)
6315-6385	GG5 SS5	(Maritime)
6410-6495	GG5 SS5	(Maritime)
6500-6555	GG5 CW5 SS4 SS5	(Maritime/Aero)
6735-6999	SS5 SS4 CW4 CW5 GG5 EE5	(Aero/Fixed)
7320-7385	CW5 SS5 EE4 GG5	(Fixed)
7400-7450	CW4 CW5 GG5 SS5 PH0	(Fixed)
7500-7540	SS4 SS5 CW5 GG5	(Fixed)
7585-7665	SS5 EE4 EE5 CW5 PH0 GG5	(Fixed)
7715-7785	EE5 SS4 GG5 CW5	(Fixed)
7800-7915	SS5 GG5 CW4 CW5	(Fixed)
8055-8185	SS5 EE5 CW5 GG5 EE4	(Fixed/Maritime)
8405-8425	SS4 SS5 PH0	(Maritime)
8870-8890	SS5 CW5 PH0	(Aero)
8900-8925	CW5 SS5 EE5	(Aero)
9000-9085	CW5 SS4 SS5 GG5 EE5	(Aero/Fixed)
9220-9270	EE5 GG5 CW5 SS4	(Fixed)
9400-9465	CW4 CW5 EE4 SS5 GG5	(Fixed)
9830-9845	CW4 SS5	(Broadcast)
9955-9975	CW4 CW5 GG5 EE5 PH0	(Fixed)
10015-10020	CW5 SS5	(Aero)
10135-10185	GG5 SS5	(Fixed/Ham)
10420-10460	PH0 GG5 SS5	(Fixed)
10500-10615	GG5 EE4	(Fixed)
10820-10825	PH0 SS5	(Fixed)
11030-11055	EE4 SS5	(Fixed)
11215-11240	GG5 EE4 CW4	(Aero)
11415-11450	SS5 GG5	(Fixed)
11510-11570	SS4 SS5 GG5	(Fixed)
11605-11640	SS5 CW4 GG5 EE5	(Fixed/Broadcast)
12135-12165	SS5 CW4 CW5	(Fixed)
12310-12325	SS5 GG5 EE5	(Maritime)
13420-13485	SS5 EE5 GG5	(Fixed)
14410-14450	SS4 SS5 CW4	(Fixed)
15610-15650	SS4 SS5 GG5	(Fixed)
17390-17430	SS5 CW5 GG5 EE5 PH0	(Maritime/Fixed)

List B

Frequency or frequency areas less than 60 kHz

Major Frequency Areas	Number Type		
*4010-4055	GG5 SS5 CW5	*7905-7910	GG5 SS5 CW5
4305	SS5 SS4	8418	SS4 SS5
4670	SS4 PH0	*8870-8875	PH0 SS5 CW5
*4780-4790	SS5 GG5 CW5 PH0	*9038-9050	SS5 GG5 CW5
*5080-5090	SS5 SS4 GG5	9074	SS4 SS5
5750	GG5 SS5	9267	GG5 CW5
*5810-5820	SS4 SS5 CW5 GG5	9325	GG5 SS5
*6495-6555	SS5 CW5 GG5	*9450	SS5 CW5 GG5
*6840	SS4 SS5 CW4 CW5 GG5 EE5	11532-11534	SS4 SS5
*6850-6900	CW5 GG5 SS5 EE5	11545	SS5 GG5
*7375-7380	CW5 GG5 SS5	12312-12315	SS5 EE5 GG5
*7400-7445	GG5 CW5 SS5 PH0	*13440-13485	SS4 SS5 EE5
*7525-7535	SS4 SS5 CW5 GG5	14414-14441	SS4 SS5 CW4
7600	CW5 SS5		
*7830-7855	GG5 SS5 CW5	(* - indicates all three number QTH transmissions)	

Anyone who has studied literature concerning intelligence activities knows full well that the cloak-and-dagger clan are anything but bumbling fools. The only time we learn of their more recent activities is usually when they botched it up and got caught red-handed. Otherwise, the covert operations themselves, plus the ways and means they have or are now being carried out, has been kept, quite effectively, from becoming public knowledge. Intelligence services do not advertise what they are doing, but the number transmissions are about as discreet and circumspect as a lighthouse beacon on a clear night.

Now let us apply a bit of reverse logic. Knowing the sophistication of the CIA/KGB, the last thing any knowledgeable intelligence buff would accept is that these number transmissions are their operations. The agency makes these transmissions so obvious that no one would really believe that they had anything to do with them. In other words, hide what you are doing in plain sight.

This is a very intriguing possibility, but not very rational. Intelligence operations are a very deadly cat-and-mouse game. The stakes they are playing for are very high, and any slip ups could have disastrous consequences. Therefore, everything would be done to hide what they are doing from the opposition, much less the monitoring public.

We, the shortwave monitors, are being spoon fed a conglomeration of number transmissions. Governments and their respective agencies, when queried, either remain silent or practice deception. In doing so, they leave us to dredge up every sane and insane idea to explain the numbers away. In effect, we are being given what appears to be an audio James Bond thriller. But, as in these novels, the circumstances might be likewise, totally fictitious. These transmissions are so obviously "spy" flavored that because of that influence, we fail to follow up and examine them from the not so obvious aspects. We accept the obvious, and that is in all probability exactly what some entity wants us to do.

Something very odd is going on, and apparently with the knowledge and complicity of our own government, along with some other foreign governments. We can therefore examine the number transmission picture by asking these disturbing questions:

A. Are the transmission formats so basically similar that they are, in fact, compatible?

B. Are the seemingly random use of same frequencies, or clustered in the same narrow frequency bandwidths accidental or of a designed purpose?

C. Are these transmissions of a one-way only mode, or are they actually *one network*, exchanging information? This could be along the lines of information that does not require an immediate response, or information that does not postulate a question requiring a definitive answer.

If the above are a reality, then we have an operation other than conventional cloak-and-dagger intelligence activity. Although this would burst the spy theorists bubble, it would not make these transmissions any less intriguing. What this option could entail is currently anyone's guess. But it can be stated that this minority viewpoint must be given equal consideration, along with the spy contention.

As a synopsis to this article, here are the basic evaluations of the non-spy theory group:

1. The number transmissions are sanctioned by the government, and operated/controlled by an agency with considerable clout.
2. This is reinforced by the iron-clad security

that surrounds, envelops, and protects the number transmissions.

3. Several decades of continuous operation breaks down into a large expenditure of time, financing, and manpower utilization. Combined with the seemingly secure encrypted texts all indicates that these transmissions serve a vital and needed purpose.

4. The fact that these transmissions are not hidden (by an application of random frequencies and similar random day and time usage, or the more esoteric transmission methods) strongly suggest that the number transmissions are not essential to each government's covert security ethics (in other words, not espionage activities).

5. The very similar DTF formats, the utilization of clustered frequency area transmissions, leans toward the possibility that the bulk of the regular number type transmissions are engaged in a common purpose.

6. The fact that the transmitter locations involve the USA, Cuba, and East Germany (the latter acting as surrogates for the USSR), plus the common format/frequency applications, tempts one to speculate that the two major world powers are intimately involved in some type of activity of a mutual interest, concern, and benefit to both.

Out of all of this, you now have a basic question to fathom. Are the regular number transmissions cloak-and-dagger operations? If you cannot justify this rationale, then explore what type of government sanctioned operation, other than espionage, could be active; one that is secret as to its content and purpose, but one that is being openly carried out, with the strong possibility that it involves the interaction and cooperation between several nations.

If you have read all four of the *Popular Communications* number articles I've authored, you will come to realize that the number transmission mystery is not a simple puzzle to solve. Opinions vary, and I have attempted to educate you as to the wide variety of possibilities that are at our disposal.

We are all seeking the answers, answers that are the reflections of the truth. Deciphering the truth has been a very frustrating adventure, but tackling the number mystery head on is only one approach. When confronted by an enigma, *if you cannot define what it is, then at least attempt to ascertain what it is not* . . . .

Everything we know about the number transmissions has come about through the probing of individuals like yourself. Each has added another piece to the puzzle and, all things considered, this is probably the tedious methodology that will eventually lead to the elusive truth.

But keep in mind the iron clad security that is compounded by the fact that no agency wants to comment on the numbers, and when they do, it is a mixture of gobbledygook, half truths, or outright misinformation, attests that the government places a high value on these number transmissions.

So be aware that you will be pushing on a door, behind which you really do not know what awaits . . . . PC

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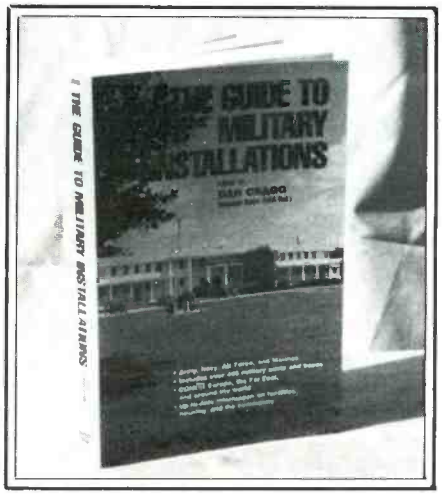

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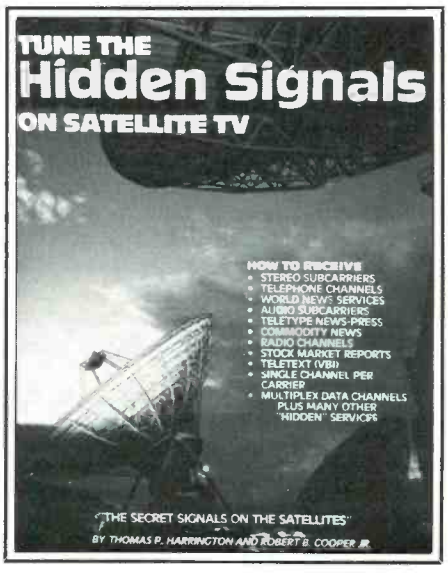
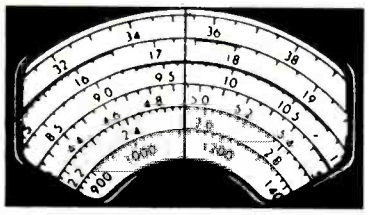


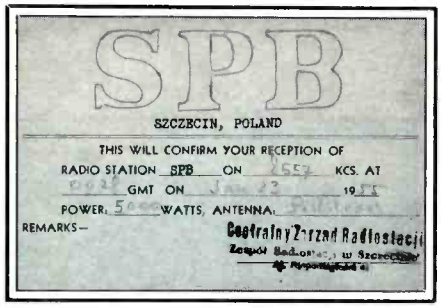


COMMUNICATIONS CONFIDENTIAL

BY RON RICKETTS, WA5VFA

YOUR GUIDE TO SHORTWAVE "UTILITY" STATIONS

262: "JSO" repeated in CW at 0649. (P. N. Davis, IL) This is an RDF Aero marker from Jackson, MS. (Editor)
364: Aviation weather broadcasts from Dallas-Fort Worth Airport at 0658. (P. N. Davis, IL)
414: CW beacon heard at 1430 repeating O-G-Y. (Tom Lewandowski, NY)
3090: 5-digit Spanish numbers with female announcer at 0240. (Harold Ort, NY)
3400: 3/2 digit German numbers in AM with female announcer heard at 0615. (Bruce Saville, NY)
4025: 5-digit Spanish numbers in AM spoken by female announcer at 0301. (Thad Adamaszek, OH)
4094: "VVV DE TBO/2" in CW at 0305 by Izmir Naval Radio, Turkey. (Don Schimmel, VA)
4125: At 0230 in AM, 5-digit Spanish numbers spoken by female announcer. "Attencion 044 45" repeated before message. Message ended with "final" at 0237. (Harold S. Eisley, MD)
4184: YUR DE YTIF, YUR DE YTAS in CW at 0057. YUR is Rijeka, Yugoslavia. (Don Schimmel, VA)
4221: "DE GYU QSX 4 6" marker in CW at 0053. GYU is located in Gibraltar. (Don Schimmel, VA)
4251: CW marker, "DE GKC" at 157 from Portishead Radio, England. (Don Schimmel, VA)
4282: English 4-digit numbers station with female announcer heard at 0027. (George Osier, NY)
4380: Unidentified station sending five-letter groups in CW at 0510. (Robert Margolis, IL)
4525: Time signals from Y3S, Berlin (Nauen), GDR at 2326. (George Osier, NY)
4614: CW marker "VVV VVV VVV DE IDR2." Strong signal. (Marc A. Mugmon, MD) This is Rome Naval Radio. (Editor)
4640: Male reciting numbers in Spanish with overmodulated and distorted AM signal at 0551. Announcer speaks very rapidly. (Thad Adamaszek, OH)
4671: Female announcer repeating "Victor Lima Bravo 2" in USB at 0004. (George Osier, NY)
4781: WGY912, FEMA special facility at Mt. Weather, sending five-letter group, six-group messages in slow CW at 0531. Each message was repeated eight times. (Robert Margolis, IL)
5036: "Mike, Mike" running radio check with "Niner Mike" asking him to run test tones and then RTTY. Transmission began at 2225 and went to RTTY at 2229. (George Osier, NY)


SPB
SZCZECIN, POLAND
THIS WILL CONFIRM YOUR RECEPTION OF
RADIO STATION SPB ON KCS. AT
GMT ON 19
POWER. WATTS. ANTENNA.
REMARKS—
Centralny Zarząd Radiostacji

This QSL from SPB in Poland represents one of the few ute verifications to emerge from Eastern Europe. It dates from 1955. (Courtesy Tom Kneitel)

5223: 4-digit English numbers station with female announcer in SSB. Was heard transmitting from 0039 to 0042. (Dennis Kosakowski, MA)
5305: US Army N58, V1J31, and G8B stations heard at 0500 on USB having problem with RTTY portion of their transmissions. (Tom Lewandowski, NY)
5316: German 5-digit numbers station in 3/2 format in USB at 0011. The announcer was female, with an unfamiliar voice. (George Osier, NY)
5412: At 0300 in AM, 5-digit numbers spoken in English by female announcer. "1234567890 352 352 352" repeated until 0310 then tone pulses followed by several messages. 3/2 rhythm, except that occasionally changes to 2/3. RTTY QRM from 0318 to 0352.
5597: USAF aircraft "Whip-42" calling NY Aeradio; position report at 0450. (Tom Lewandowski, NY)
5642: Female announcer repeating "Sierra Yankee November 2" in USB at 2331. (George Osier, NY)
5770: 5-digit German numbers station in AM with female announcer at 0340. (Tom Lewandowski, NY)
5812: At 0216 in AM, 4-digit Spanish groups spoken by female announcer. Message ended at 0236, carrier off at 0258. Flapping sound at end of message like a tape running loose. Low 60 Hz modulation on carrier. (Harold S. Eisley, MD)
5985: 4-digit Spanish number station with female announcer at 1004. (Joseph Lemak Jr, NY) 5-digit Spanish numbers station with female announcer at 1000. The transmission was barely audible and was being clobbered with QRM. (Robert Margolis, IL)
6100: YVTO Time signal station, Caracas, Venezuela at 0649. (P. N. Davis, IL)
6230: 5-digit numbers in Spanish spoken by female announcer at 0504. (Rodney Grussling, KS)
6388: FUF, Fort de France, Martinique, V marker in CW heard at 0615. (Rodney Grussling, KS)
6515: Woman reading traffic list on SSB at 0200 for VAF, Canadian Coast Guard, Albert Bay, British Columbia. (Robert Margolis, IL)
6604: Gander, Newfoundland VOLMET VFG in USB at 0055. (Rodney Grussling, KS) Gander Radio with weather reports for Canadian locations in USB at 0321. (Marc A. Mugmon, MD)
6730: On USB Andrews AFB/USAF aircraft "Birdnest" went to RTTY 100 wpm encrypted at 0445. (Tom Lewandowski, NY)
6760: Five figure groups in CW sent by hand between two unidentified stations at 0329. (Don Schimmel, VA)
6770: 5-digit Spanish numbers station with female announcer at 0704. (Robert Margolis, IL)
6791: Female repeating "Charlie India Oscar 2" in USB heard at 0018. (George Osier, NY)
6797: USAF traffic; "Offset" working "Furcoat" in USB monitored at 0510. (Tom Lewandowski, NY)
6835: 5-digit Spanish numbers station with female announcer caught at 0908. (Robert Margolis, IL)
6860: Unidentified station with five-letter groups in CW at 0125. Used letters A B D E I N S T U V as substitutes for numbers and had NNNNN between each message. (Robert Margolis, IL) This is another version of "cut" CW numbers. (Editor)
6874: At 0106 in AM, English speaking female repeating "383" until 0110. (Harold S. Eisley, MD)
6890: 5-digit Spanish numbers in AM with young sounding female announcer at 0500. (Thad Adamaszek, OH)
6963: 5-digit English numbers station with female announcer in SSB at 0323. Was in a 3/2 format. At 0331, she said "repeat" and "count 248." "End" was at 0352. (Robert Margolis, IL)
6990: 5-digit AM numbers with female announcer at 0801. (Thad Adamaszek, OH)
7025: 5-digit Spanish numbers in AM with female speaker on various dates at 0300 GMT. (Thad Adamaszek, OH)
7370: "Roger" calling "Grandma" in SSB at 0502. (Julie Burke, AK)
7404: 5-digit German numbers in AM,

usual format at 0004 spoken by female announcer. (George Osier, NY)

7410: 5-digit CW groups with zero cut as T at 0318. (Robert Margolis, IL)

7420: 4-digit Spanish number station with female announcer at 0921. (Joseph Lemak Jr, NY)

7435: Female in AM reciting "attencion 7-2-7 1-1-0" over and over in Spanish, then in 5-digit groups at 0804. (Thad Adamaszek, OH)

7446: Female announcer repeating "Kilo Papa Alpha 2," over and over at 0010 in USB. (George Osier, NY) Female in AM at 0300 repeating "attencion 5-3-6 8-0" over and over in Spanish followed at 0303 by 5-digit groups. Heavy QRM during transmission. This transmission repeated at same time on two consecutive days. (Thad Adamaszek, OH)

7527: 5-digit Spanish numbers station with female announcer monitored at 0400. (Robert Margolis, IL)

7532: 5-digit German numbers station with female announcer in SSB. Began at 0330 with the woman saying "Bravo Juliet" four times, rolling the R's in "Bravo." This was followed by an Arabesque musical marker.

7654: At 2318 in CW, "QRA QRA QRA DE KKN44 KKN44 KKN44 QSX 4/7/11/17/23 K." (Harold S. Eisley, MD)

7675: *Challenger* Space Shuttle launch: Victor One Charlie gives "launch mark monitor" to Gull 13 of the USAF on SSB at 1152, 2 hours, 8 minutes before lift off. (Robert Margolis, IL)

7750: Random electronic tones in AM mode at 0340 running for 10 minutes followed by CW numbers in SSB for 3 minutes. Repeating from 0340 until after 0500. (Kevin D. Busse, NE)

7845: Spanish numbers station with female announcer at 0645. Repeated 2-2-3-5 in Spanish five times before transmission and carrier left the air. Reception conditions were very good, with a SINPO of all fives. (T. E. Jones, OH)

7846: Almost nightly activity, 5-digit Spanish language, female announcer. Always the same station, strong signal, poor audio. Generally heard on even quarter hour from 0630-0730. (J. Bedient, WI)

8185: 4-digit Spanish number station with female announcer at 0811. (Joseph Lemak Jr, NY)

8478: TIM Limon Radio, Costa Rica calling CQ in CW, 0253. (P. N. Davis, IL)

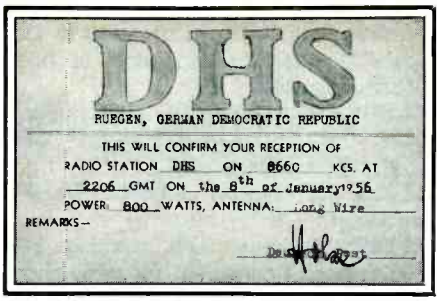
8510: CW marker, "QSX 8 MHZ K" from FFT4, St. Lys Radio, France at 1655. (J. E. Gregory, Australia)

8573: HKC Buenaventura Radio, Columbia VVV Marker in CW at 0654. (P. N. Davis, IL)

8598: ZLO, Irirangi Naval Radio, New Zealand, sending a DE/QSX marker in CW at 0717. (Robert Margolis, IL)

8634: "Aztec Calendar" and "Shallow Five" working "Open Door" in SSB at 1626. (Robert Margolis, IL)

8651: "Apple Barrel" working "Straggler," "Twin Bed," and "Apple Jack" in SSB at 1709. (Robert Margolis, IL)


DHS

RUEGEN, GERMAN DEMOCRATIC REPUBLIC

THIS WILL CONFIRM YOUR RECEPTION OF
RADIO STATION DHS ON 8660 KCS. AT
2206 GMT ON the 8th of January 1956
POWER 800 WATTS, ANTENNA: Long Wire
REMARKS—

DHS, in East Germany, was QSL'd in 1956 after being monitored using CW on 8660 kHz. (Courtesy Tom Kneitel)

8654: CW Marker, "DE PCH4 2 12 AS," 0504. Scheviningen Radio, Ijmuiden, Holland. (J. Bedient, WI)

8657: ROM, Tashkent Metro, USSR, sending an ID marker in CW at 0408. (Robert Margolis, IL)

8686: CNP, Casablanca Naval Radio, Morocco, sending a CW/QSX marker in CW at 0650. (Robert Margolis, IL) "CQ DE 4XO QSX 12C K" repeated in CW at 0311. (Marc A. Mugmon, MD) PJC Curacao (Willemstad) Radio, Curacao calling CQ in CW, 0211. Also 4XO, Haifa Radio, Israel calling CQ in CW, 0215. (P. N. Davis, IL)

8711: "DE WLO RTTY K" repeated over and over in CW, heard around 0307. (Marc A. Mugmon, MD)

8741: WOO "Ocean Gate Radio" female voice transmitting weather and wind reports for "South of 35 North," in SSB at 0200. (Thomas N. Cerf, IL)

8768: DAJ, Norddeich Marine Radio, West Germany, on SSB at 0545 handling ship to shore phone patches. (Robert Margolis, IL) US Navy—"Overwork" broadcasts, WOK/P5G/X4B/K0W/F5D at 0400. (Tom Lewandowski, NY)

8784: JEB18 Bern Maritime Radio, Switzerland. Male operator handling ship to shore phone calls in English SSB at 0133. (P. N. Davis, IL)

8855: Belem, Brazil Aero working aircraft at 0249. English in USB. (Harold Ort, NY)

8903: Aircraft calling Accra (Ghana) Radio, 0408, Brazzaville (Congo) Radio, working air traffic over Southwestern Africa in French language, 0433. (J. Bedient, WI)

8972: 5-digit Spanish numbers spoken by female at 0705, ending at 0708. (Julie Burke, AK)

9027: Foxtrot Broadcast ending with "Calloway out," SSB monitored at 0118. (Thomas N. Cerf, IL)

9042: German language numbers station with female announcer in USB at 2340. (Gregory Majewski, CT)

9050: German 5-digit groups spoken by female announcer at 0202. Female has noticeable Eastern European accent. Also similar transmissions at 0300. (Thad Adamaszek, OH) Female with heavy Eastern European accent speaking 5-digit English groups at 0106.

9074: 4-digit Spanish numbers station with female announcer at 0100. Was simulcast on 11532 and 6802. (Robert Margolis, IL)

9075: Female reciting "5-4-5" in Spanish under grinding noise in AM at 0100. (Thad Adamaszek, OH) Female in AM with 4-digit Spanish numbers at 0100—"grupo 196." (Thad Adamaszek, OH)

9109: 5-digit groups in CW sent fairly fast, at 1333. (J. E. Gregory, Australia)

9224: 0-digit Spanish numbers station with female announcer at 0100. All she did was repeat "cinco cuatro cinco" for 10 minutes. No counting from uno to cero, no beeps, no numbers, no nothing. (Robert Margolis, IL)

9231: Unidentified station sending 5-digit groups with zero cut as T, in CW at 0009. (Robert Margolis, IL)

9265: In AM at 0102, double beeps to 0105, female with "gruppen 2-4," then 5-digit groups in German. (Thad Adamaszek, OH)

9325: 5-digit German numbers station with female announcer in SSB at 0203. Transmission was preceded by "ALFA ROMEO" and an Arabesque musical marker before groups, which were in 3/2 format. (Robert Margolis, IL)

9380: Female in AM reciting 5-digit groups in Spanish at 0303. "Final" at 0305. (Thad Adamaszek, OH)

9445: Young sounding female announcer with "attencion—502-25" followed by 5-digit groups at 0300. Strange buzzsaw type QRM at 0306. (Thad Adamaszek, OH)

9560: Female reciting 5-digit Spanish groups in AM monitored at 0100. (Thad Adamaszek, OH)

10000: Military(?) traffic over WWV consisting of someone with the callsign RJH71 calling F3J61, A2D11, and A6T91 in SSB from 0120 to 0131. (Jamie Dowdy, IN)

10038: Scrambled SSB at 0223. (Daryl E. Duckworth, CO) Probably military aircraft. (Editor)

10110: Male in AM with flat, monotone voice with 5-digit Spanish numbers, each group being repeated at 0340. (Thad Adamaszek, OH)

10178: 5-digit English numbers in USB spoken by female announcer at 0606. (Rodney Grussling, KS)

10355: Unidentified station sending 5-digit groups with zero cut as "T" on CW at 0336. (Robert Margolis, IL)

10437: No calls. Five-letter groups in CW at 2236. It is probably Soviet because of use of IM AA OE OT characters. (Don Schimmel, VA)

10493: FEMA, WGY903, Olney, MD, working as "net control" while giving radio checks to WGY904, Thomasville, GA; WGY906, Denton, TX; WGY908, Denver, CO; WGY909, Santa Rosa, CA; WGY910, Bothell, WA; and WGY912, special facility at Mt. Weather. (Robert Margolis, IL)

10646: "O" beacon at 0205, believe this used to be "K." (Daryl E. Duckworth, CO)

10730: Male in SSB saying phonetics in groups of 3 at 0211. Then at 0213 two-way transmission with female. (Thad Adamaszek, OH)

10780: Bloodhound 36 of the USAF calling Victor One Charlie on SSB at 0507. (Robert Margolis, IL)

10822: 5-digit English numbers in USB spoken by female announcer at 0546. (Rodney Grussling, KS)
11108: 5-digit German numbers station in 3/2 format with female announcer in SSB at 0040. (Robert Margolis, IL)
11155: "K" beacon at 0506. (Daryl E. Duckworth, CO)
11180: Andrews AFB working SAM 24130 and "South Sea" for radio checks and phone patches in SSB at 0400. (Thomas N. Cerf, IL)
11182: Scott AFB/SAM-975 VIP flight with phone patches at 0100. (Tom Lewandowski, NY)
11201: RAF VOLMET broadcast in SSB at 0236 with weather and approach info. (R. Chambers, TX)
11226: Foxtrot broadcast with Andrews AFB radio check with SAM 31683 in SSB at 0230. (Thomas N. Cerf, IL)
11244: "Redeemer" with foxtrot message by male announcer in USB at 2358. (George Osier, NY)
11270: Male with American accent identifying himself as "4KN" calling "any station this net." He received no replies after several calls and signed off. In USB at 0319. (Marc A. Mugmon, MD)
11490: 4-digit Spanish numbers station with female announcer at 1830, with the sane groups being read on two consecutive days. (Robert Margolis, IL)
12135: NAM, USN, Norfolk, VA relaying CW information on torpedo firing exercises and submarine operations in Agean Sea at 1640. (Robert Margolis, IL)
12500: RTY Cyrillic telegrams, "Murmansk" and "Radio Murmansk" mentioned frequently. 170 shift, 67 wpm at 2356. (Dallas Williams, CO)
12705: WLO, Mobile Radio, AL, sending first-aid instructions for those injured fighting electrical fires. Was in CW at 1930. (Robert Margolis, IL)
12770: UAT, Moscow, with ID marker in CW at 0605, followed at 0613 with GKE, Portishead, England sending a DE marker. (Robert Margolis, IL)
12829: XFM Manzanilla Radio, Mexico calling CQ in CW at 0059. (P. N. Davis, IL)
12940: CW marker, "DE LZW," sending continuously at 1645, LZW is Varna Radio, Bulgaria. (J. E. Gregory, Australia)
12978: ICB Genoa P.T. Radio, Italy VVV Marker in CW, 0045. (P. N. Davis, IL)
13031: "VVV DE FUF" CW marker at 2103. FUF is Fort de France NAVRAD at Martinique. (Don Schimmel, VA)
13116: Coded traffic is SSB at 0430 passed between "Whiskey Oscar Mike," "Alpha Whiskey," and "Oscar November Delta Alpha." (Thomas N. Cerf, IL)
13185: Man reading weather conditions in SSB at 1505. National Weather Service, San Francisco. (P. N. Davis, IL)
13248: "RFNV DE COL" CW traffic, Moscow from Havana at 2032. Both ends of transmission audible. (Don Schimmel, VA)
13264: Shannon, Ireland VOLMET with weather info in English, USB at 1323. (Harold Ort, NY)

Photo of the monitoring station used by Karl A. Holt of Delhi, New York. The receiver is a Yaesu FRG-7700. One antenna is a long-wire and the other is a 50 ft. dipole. Hey Karl, let's meet at "The Gathering," the fancy eatery in Delhi!

13281: CW marker, "VVV DE FUF" in CW at 2346. Fort de France NAVRAD, Martinique. (Don Schimmel, VA)
13395: Unidentified CW transmission consisting of six figure groups, five groups per message with pauses between each transmission. Heard at 2152 and 2112 on different dates. (Don Schimmel, VA)
13430: Male announcer in English USB at 2240 calling himself ECHO GOLF. He called SIERRA CHARLIE, UNIFORM OSCAR, ROGER VICTOR, XRAY BRAVO AND XRAY LIMA. Appears to be US Military tactical traffic. (Don Schimmel, VA)
13350: Spanish Cuban official press items in CW at 2336. (Don Schimmel, VA)
13410: Dakar NAVRAD, Senegal "V" marker in CW at 2345. (Tom Lewandowski, NY)
13434: CW marker "CQ DE CLQ QSX 6300/12624 KHZ" at 2342 from Havana, Cuba. (Don Schimmel, VA)
13630: KDM50, FAA, Hampton, GA and November 19 working Rockwell Flight Test on SSB at 1946. (Robert Margolis, IL)
13773: 5-digit German numbers station with female announcer at 1747. (Robert Margolis, IL)
14314: Traffic net in Hawaii in English at 0600. Sounded like military phone patch. (David Keenan, CA)
14443: Repetitions of "KMT DE 70C 70C 70C" in RTTY, 170/67 at 0255. (Marc A. Mugmon, MD)
14448: KNY37, GDR Embassy, Washington, DC with VVV/QRA marker in CW at 1550 followed by RTTY, 170/66R with plans to boycott the Olympic Games. (Robert Margolis, IL)
14500: RTTY weather traffic marked "ESA" at 1704, 850 shift, 67 wpm. Possibly SUC60 (Cairo Aeradio) but Cairo is listed as being 425 shift. (Dallas Williams, CO)
14686: DEA—Ground station "Atlas"/aircraft "Swordfish-2" in USB at 2315. (Tom Lewandowski, NY)
14894: "QUAKER" giving radio check to

"CYCLONE" in SSB at 1700. (Robert Margolis, IL)

15000: LOL1, Argentine Naval time station. Heard at 2230 with CW ID every fourth minute, voice ID every 5 minutes with heavy interference from WWV. (George Osier, NY)

15655: CW beacon transmitting "U" at 0200. (Robert Margolis, IL)

15963: YBU sending two sheets of five letter groups and one sheet of 5-digit groups via RTTY, 425/67N, at 2047. (Robert Margolis, IL)

16058: UNUT from the Soviet Union, sending coded letter groups in CW at 2040. (Robert Margolis, IL)

16380: English numbers spoken by male with accent. No recognizable format, but broken by directives in an unknown language. Transmitted in SSB at 1806. (Dennis Kosakowski, MA)

16458: YBU sending 5-digit and five letter traffic via RTTY, 425/67R, at 2206. (Robert Margolis, IL)

17432: German language numbers station with female announcer in USB at 2118. (Gregory Majewski, CT)

17975: Sunny 11 calling Allotment and Repossess calling Chairman 12 at various times on SSB. (Robert Margolis, IL)

18005: Red Breast working Valhalla on SSB at 2100. (Robert Margolis, IL)

18420: Belize City, Belize, testing RTTY with RY's and "OF ALL THE FISHES IN THE SEA THE MERMAID IS THE ONE FOR ME." Heard at 1745, 425 shift, 67 wpm. (Dallas Williams, CO) Nice to see an RTTY op with a fresh sense of humor. (Editor)

18620: Cuban Embassy RTTY traffic—"Circular 538"—directed to numerous African countries at 2325, 425 shift, 67 wpm. (Dallas Williams, CO)

18680: 5-digit Spanish numbers in AM with male announcer, sounded "live." Began at 1510 and ended at 1530 with "387-387-00000." (Joe Goetz, OH)

19013: PWZ33 Radio de Janeiro Naval, Brazil testing RY and SG in RTTY 850/66N, 0125. (P. N. Davis, IL)

20618: 5-digit group messages to GMN occur quite regularly in CW at 1830. GMN is not the callsign of a British station, but one adopted by a clandestine organization. (Robert Margolis, IL)

20823: 5-digit group CW traffic in operation similar to that on 20618. Transmission times are between 1900 and 2400, and CLP1, Havana, has been found to use this frequency for 5-digit and five letter traffic using CW or RTTY, 425/66N. (Robert Margolis, IL)

21752: At 1705 in CW, "VN N6NDBA" repeated until 1720 when it changed to "NB AD4TDB." (Harold S. Eisley, MD) This is another example of "cut" CW, where 1 through 0 correspond to AUV4E 6BDNT. (Editor)

22068: Five letter groups being sent by CCS, Chilean Navy, Santiago, to "HU." Was in RTTY, 850/66N, at 1912. (Robert Margolis, IL)

22362: CW Marker, HEB, Radio Suisse, Berne at 1925. Traffic list at 1900 and 2030. (J. Bedient, WI)

22472: NMO COMSTA Honolulu, Hawaii weather broadcast in CW, 0124. (P. N. Davis, IL)

Editor's Note: This is Ron Ricketts' final Communications Confidential column. Ron has done a fine job during his tenure as "Ute" Editor of *POP'COMM* and we hope that he will be able to contribute feature stories to the magazine as his time permits. Commencing in the April issue we will be welcoming as Utility Communications Editor, a man whose expertise in the field is unmatched—Mike Chabak. Mike was the "ute" columnist for SPEEDX for a number of years and is also the Coordinating Editor of the popular *SPEEDX Reference Guide To The Utilities*. Mike has some very exciting concepts to offer and we're looking forward to having the benefit of his insights and knowledge. PC

SCANNER SCENE

BY CHUCK GYSI, N2DUP

MONITORING THE 30 TO 900 MHz "ACTION" BANDS

We constantly get letters here at *POP'COMM* about how this police department or that law enforcement agency has switched to one or another system to elude scanner listeners.

One of the most common methods police agencies use to make it difficult for eavesdroppers is scramblers. You've heard them at one time or another; they sound like Donald Duck talking inside of a jar. Most often, an agency will use a scrambler only when they don't want certain things heard over the air. This could include information on a major crime in progress or even an order for the local delicatessen. The scrambler gives the agency a sense of power that they can elude their listeners. Some agencies even use scramblers on a full-time basis. If you try to listen to that, you'll start talking like Donald Duck too. However, for those interested, all it takes is a simple unscrambler, available for less than $50, to make those calls intelligible. However, most scanner listeners won't bother with unscramblers and the calls are still, for the most part, private.

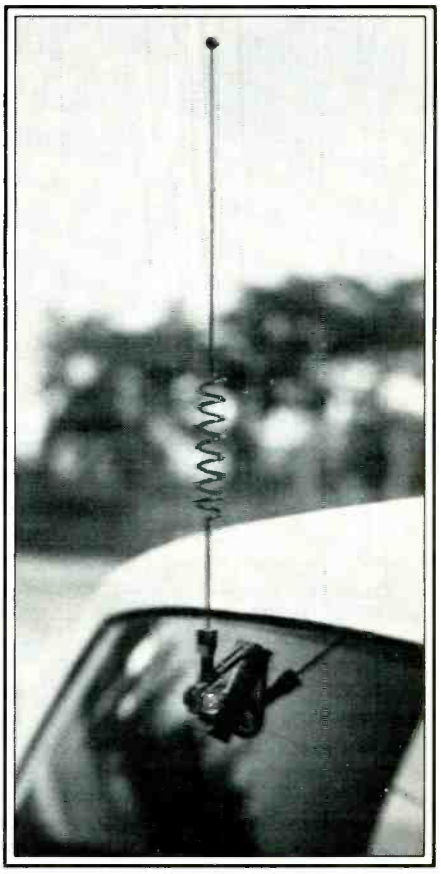
However, for some agencies, the necessity for secure radio communications brought about the advent a few years ago by Motorola of Digital Voice Protection (DVP). You can tell when DVP is being used by an agency because all you hear is a rush of static during transmission with a short tone at the end of the transmission. The FBI is switching over to DVP across the nation and the Secret Service uses DVP during occasional protective details. You might even find some police departments—such as in Pennsauken, New Jersey—using DVP on a full-time basis. In essence, DVP converts the human voice from an analog signal to a binary signal. There are thousands of available codes to use in DVP and each radio in a fleet has to be assigned the same code to talk to other units in the same fleet. There are always rumors in monitoring ranks about someone who has broken DVP coding to unscramble such signals, but to date there's no proof anyone has done it.

Scrambling and DVP aren't the only way to thwart listeners. Some federal government agencies have utilized spread-spectrum radios. In this type of system, the radios can be assigned a code, and if each radio is set to the same code, each transmitter sends out its signal over a series of frequencies in rapid succession, usually remaining on one frequency for only a fraction of a second. The only way you could possibly listen in on a system such as this is if you had maybe 20 radio receivers (that is if 20 frequencies were used to split up the transmitted signal), each tuned to the 20 frequencies used in the system. Then, by listening as the encoded transmitter switches from frequency to frequency on each of the radio receivers, you should be able to tell what is being said. Not too many people have the capability to do this, let alone figure out the frequencies used in such a system, considering the fact that each frequency is used for only a fraction of a second.

This 800-MHz trunking radio is made by Standard Communications and is compatible with E.F. Johnson trunked systems. The radio is 35 watts and can operate on up to 40 channels.

Another system that is slowly catching on for eluding scanner listeners is amplitude-compandored sideband radios. Many businesses are already using these radios on frequencies 5 kHz removed from routine business band channels on VHF high band. There also are reports that some government agencies are jumping on the ACSB bandwagon. We hope to explore this new technology in an upcoming article, but essentially it uses sideband on VHF frequencies. The sideband signals occupy a narrower bandwidth than FM signals and more channels can be assigned in the same bandwidth that an FM occupies. Because the signals are sideband and not FM, today's scanners cannot make such signals intelligible.

One of the easiest and more interesting techniques to avoid detection came across my desk the other day. The Wake County sheriff's office in North Carolina has switched over to a trunked 800 MHz radio-system for routine communications. Sure, many radio hobbyists can listen to the 800 MHz band these days, but with a General Electric trunked system, the radio system changes frequency every time a transmitter is keyed. The Wake County sheriff's office is using is a five-channel trunked set-up.



This coiled 800 MHz "On-Glass" antenna is made by Antenna Specialists and can be used with trunked radio systems.

As you might recall from a previous column we did on trunked radio, one channel in a five-channel trunked system is dedicated as a data channel and puts out a continuous signal that assigns mobile users to one of the other four remaining frequencies. The system is set up so that each mobile and control station in a fleet automatically switch to the same frequency each time the transmitter is keyed. Because there are other users on such a system, including business and possibly other governmental agencies, it would really be difficult to listen in to the communications as they switch from one channel to another because of the other users using the system as well. In fact, some trunked systems use as many as 10, 15, and 20 channels to handle the number of users.

In any event, the Wake County sheriff's office also is taking advantage of the telephone interconnect feature on its trunked system. This means sheriff's units can make phone calls via their radios and eliminate the need to find a pay phone. For instance, a sheriff's unit on patrol can call back the complainant of a minor crime and make out a formal report (usually for insurance purposes) without visiting the subject. This procedure allows the unit to remain in service. So far, Wake County has equipped its supervisors' cars with the trunked radios, in addition to the sheriff's car and its mobile command post vehicle. The county plans to eventually switch the remaining 50 patrol and investigation vehicles over to 800 MHz.

Scanner Law

A bill has been introduced in the New Jersey General Assembly to exempt amateur radio operators from that state's mobile scanner law. Currently, any person having a scanner or monitor radio in their vehicle can be found guilty of a misdemeanor. A key to the law is the radio has to be "operative on frequencies assigned by the Federal Communications Commission for fire, police, municipal or other governmental uses."

The current law exempts firefighters, police officers, first aid squad members, and governmental officials. However, the measure introduced as Assembly Bill No. 2393 would further exempt any resident of New Jersey holding a technician, general, advanced, or extra class amateur license. Nonresidents do not seem to be protected by the law, so be careful. The new law, if approved by the New Jersey Assembly and Senate, also would change the penalty from a misdemeanor to a crime of the fourth degree.

If you are interested in this bill, write to your state assemblyman in New Jersey.

Free For All

The FCC has dropped a system in which mobile telephone and paging frequencies were assigned on an exclusive basis to radio common carriers and telephone companies. In the future, RCCs and telephone companies will be able to file an application for any vacant frequency regardless of who it was initially allocated to.

The FCC said the ruling could help RCCs that offer paging service because telephone companies generally have been slower to enter that business and to utilize the frequencies that were allocated to them years ago.

Your Turn

What would you like to read about in Scanner Scene? Do you have questions about scanner listening? Is there a specific topic you would like us to write about? While we cannot personally answer every letter we receive here at *POP'COMM*, we do try to answer pertinent questions here in Scanner Scene. Many of your letters also have given us ideas for columns. Nothing goes unread. We'd like to hear from you. We'd like to hear what frequencies you like to listen to and always like to receive photographs of your radio set-ups. You can write to us at: Chuck Gysi, N2DUP, Scanner Scene, Popular Communications, 76 North Broadway, Hicksville, NY 11801. PC

SATELLITE VIEW

INSIDE THE WORLD OF TVRO EARTH STATIONS

BY MARK LONG WA4LXC/G5DEM

Spread Spectrum Technologies And Satellite Communications

The day of the personalized earth station has arrived. Dishes as small as 4-feet in diameter that can be mounted on a window ledge or any other convenient, easily accessible location now are bringing two-way data communications costs within reach of small businesses. This technology, the latest method to completely bypass the conventional telephone system, may soon allow home computer users a satellite window in the sky to other home computer enthusiasts.

Spread spectrum techniques were originally developed only for military uses where interference rejection and data secrecy were paramount considerations. These innovative products are now being introduced to the commercial market by companies such as Equatorial Communications of Mountain View, CA, Telecom General of Palo Alto, CA, Adcom of Melbourne, FL, and Nova-Net Communications of Denver, CO.

So today computers can both uplink and receive data directly from satellite via earth stations operating at powers less than 1 watt. This is accomplished by spreading the signal over a bandwidth much larger than that normally required. This causes the very weak signals received on earth below to have built-in redundancy. So even though portions may be lost in transmission, the message can be reconstructed by the sophisticated spread spectrum electronics. For example, a 9600 bit per second data stream normally requires about 7 kHz of bandwidth. A spread spectrum transmission would use several MegaHertz of bandwidth to relay the same message. In effect, dish size and power requirements are traded off for bandwidth.

Spread spectrum satellite relays have additional advantages over conventional methods. Each user on a given network can use a slightly different code to "spread" the signal. As a result, all the users can simultaneously use the same frequency because their packets of data are received only by electronics tuned to this code.

These methods also overcome one of the major limitations relating to antenna size. Antenna beamwidth, a measure of how narrow a region of the sky is targeted, increases as antenna diameter decreases. For home satellite television systems, an antenna smaller than 7 or 8 feet will have a wide enough vision to see more than one satellite if these vehicles are spaced 2 degrees apart or less. A 2-foot dish has a 9 degree beamwidth and can potentially see four satellites in addition to the desired one. The nature of the spread spectrum coding eliminates this concern and allows use of the small dishes. Other signals are simply not processed. This interference rejection is an important property of this new technology. And an additional advantageous byproduct is a good degree of encryption or message privacy.

This innovative commercially available technology is radically altering satellite communications. It is amazing to realize that as little as 10 years ago an earth station 32 feet in diameter was considered to be "small." So when Equatorial Communications began marketing one-way 2-foot dishes operating in the C-band (4 to 6 GigaHertz) in 1982, it was clear great changes were underway. Their two-way system was introduced in early 1984 to six test sites (including Citibank in New York and Niagara Mohawk Power Corporation in upstate New York) and proved to be successful. Today, elliptical 2′ × 5′ dishes are used as both an uplink and downlink. A controller interfaces

Figure 1: *Terminal-to-Host Computer Data Communication Network using spread spectrum and conventional satellite links.*

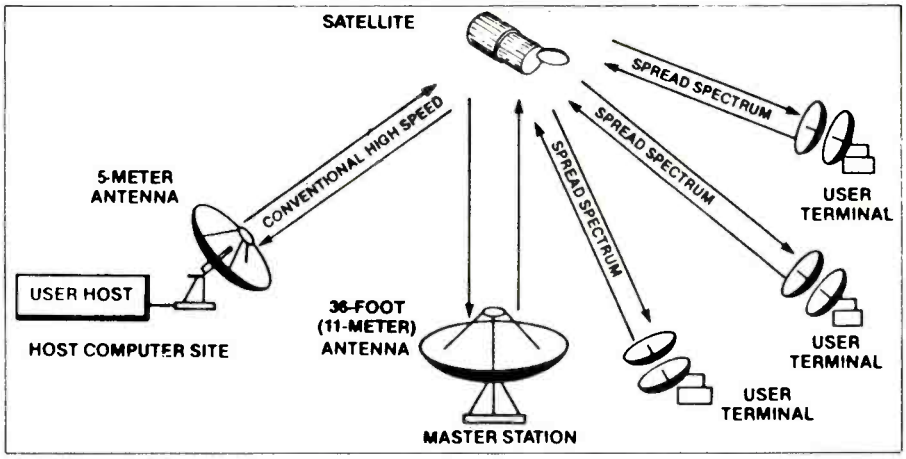


Figure 2: *Terminal-to-Host Computer Data Communication Network using spread spectrum satellite link and local terrestrial line.*

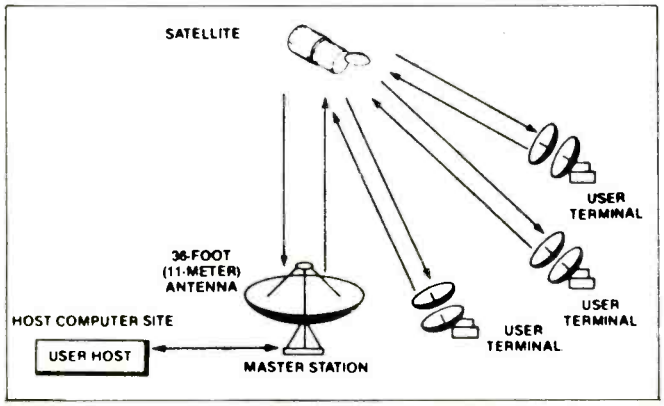
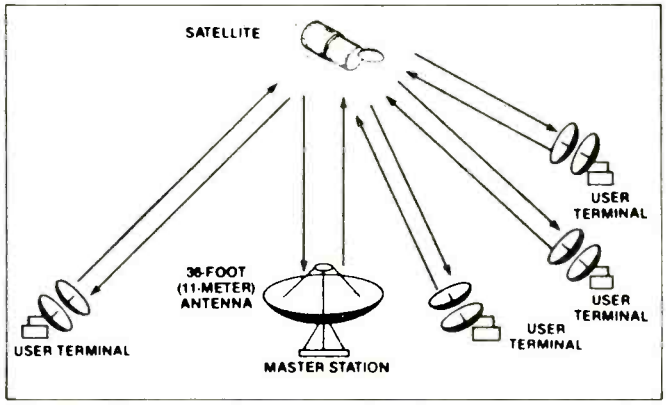
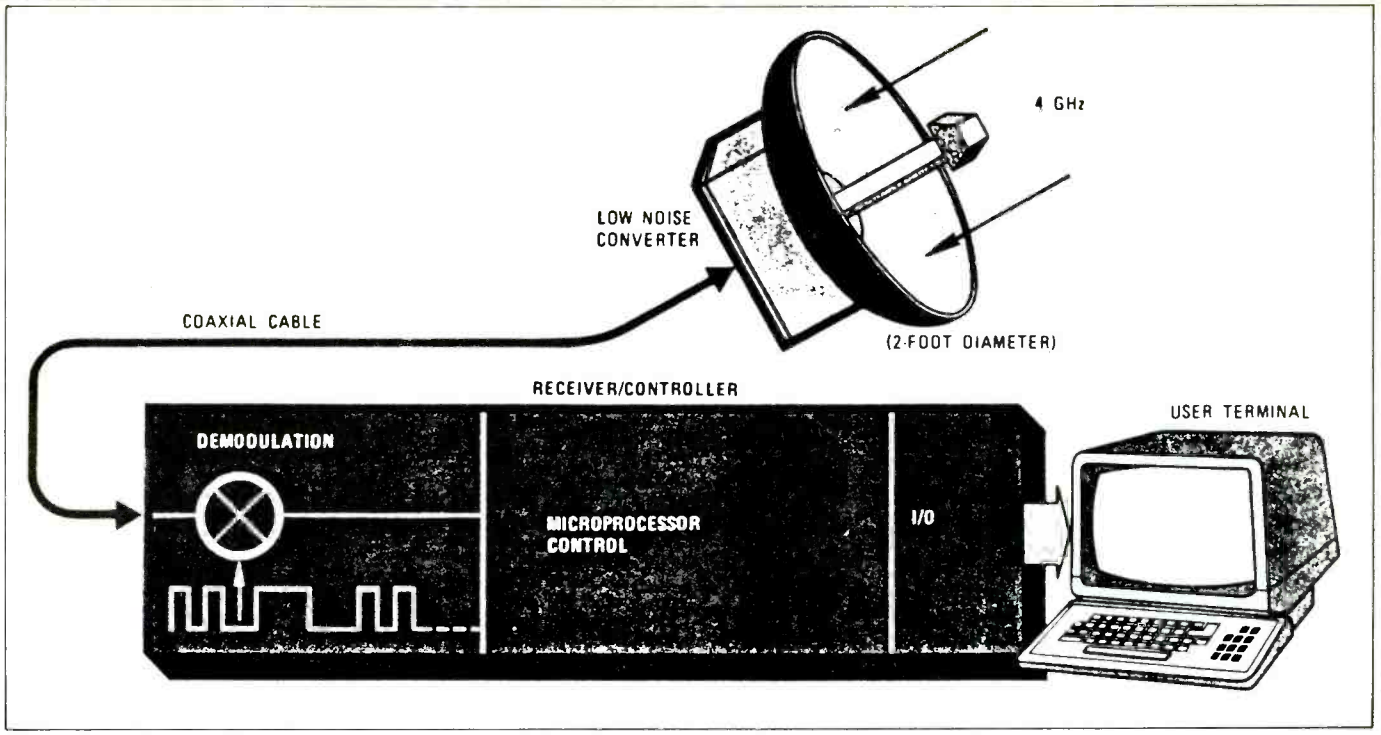
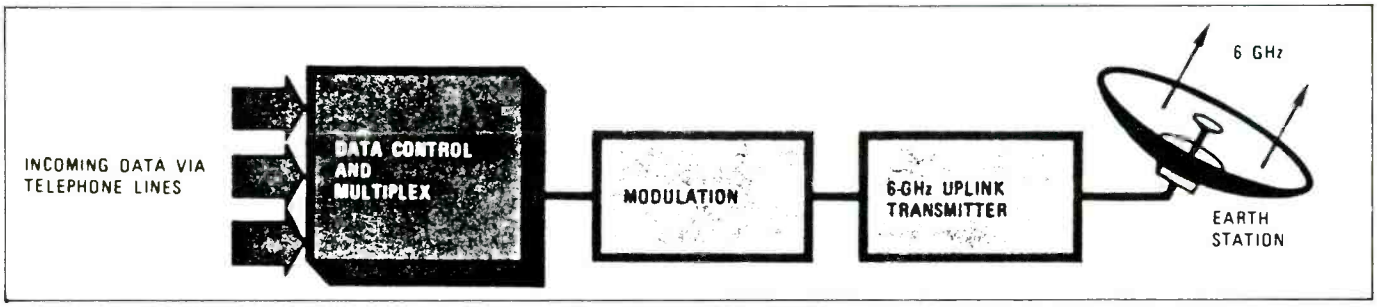


Figure 3: *Terminal-to-Terminal Data Communication Network.*





Downlink: *The satellite signal is transmitted at 4 GHz to the subscriber's 2-foot antenna, amplified, and converted to an intermediate frequency for transmission by coaxial cable to the controller. The signal is then demodulated and sent as a standard digital signal under microprocessor control to user terminals.*

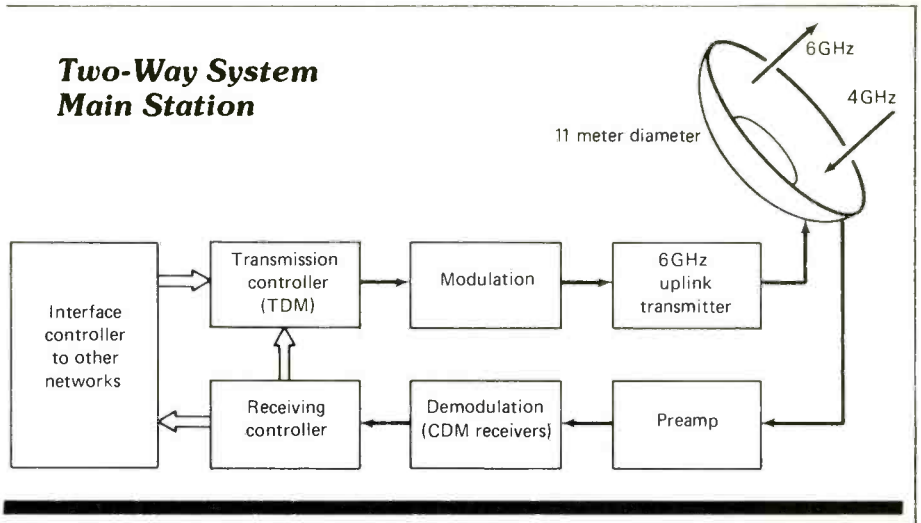


Uplink: *The transmitting earth station at the broadcast site has the primary antenna — approximately 16 feet in diameter — and fully redundant electronics. The data to be transmitted is multiplexed into packet format, modulated for radio transmission, converted to 6 GHz frequency, and transmitted through the primary antenna.*

between the user's computer and dish and is designed to understand most of the standard communications protocols.

The network is centered around an 11-meter (33-foot) master antenna. A subscriber can send data either via conventional leased land lines or satellite links to the network operation center where data is beamed to either one-way or two-way stations at up to 19.2 kilobits per second. Remote users can communicate to the master station at 1200 bits per second or to other users at the same rate by passing through this master control site.

The strength of this type of network lies in its scope and flexibility. Communications are distance insensitive by the very nature of a satellite's reach into the most remote corners of its continental span. Users can be added or removed from the network at will; leased land lines can be replaced one by one over any period of time with no disruption of existing communications networks. Any number of users can be linked by phone lines or microwave line-of-sight links to a shared spread spectrum uplink.



Network Type	Remote Antenna Size (ft)	Outlink Data Rate (Kb/s)	Returnlink Data Rate (Kb/s)	Typical Network Architecture
Low Speed Data Broadcast	2.0	64.0	—	1 Master 1000 Remotes
Inquiry/Response Data	4.0	500.0	1.2	1 Master 4000 Remotes
Inquiry/Response Data	4.0	500.0	9.6	1 Master 500 Remotes
Full-Duplex Voice	6.0	20 Chns.	1 Chn.	1 Master 200 Remotes
Full-Duplex Video Teleconferencing	6.0	1 Chn. (near full motion, color)	1 Chn. (freeze frame)	1 Master 100 Remotes

Table 1

Fancy 3-D sign erected by HBO outside of their new communications center at Hauppauge, New York. This is actually the second such sign, the original one having been vandalized soon after it was installed. The replacement sign shows early evidence of damage by vandals. (Photo by Tony Earll)

Probably the greatest advantage of a two-way interactive, low-cost network is the effect it can have on a company's data processing design. Previously, one or a limited number of larger computers would do centralized data processing and relay results to regional offices. Now, each office can do online inquiry-response processes via satellite, so truly distributed processing is now possible. This can substantially improve the efficiency of operation of many businesses such as banks or oil companies which have numerous daily transactions.

Equatorial Communications has now been joined by other companies that offer similar services. Adcom caters to larger users who desire to build and operate their own spread spectrum network. Its data rates and typical network architecture are listed in Table 1.

Telecom General, like Equatorial Communications, is also establishing its own network control center for the use of larger corporate clients. NovaNet Communications is establishing a rather unique niche in this rapidly growing market. It is catering to smaller business users by allowing them to share its communications network. Each company's earth stations and computers will be transparent to others on the same network by virtue of the coding capability of spread spectrum transmissions.

It is apparent that the data rates offered will increase over time as the technology is improved. However, even though this is a relatively new service, it is already a bargain for those businesses with sufficient daily data communications. And the future will probably bring further reductions in costs and increases in communications power.

Frank Baylin has recently authored *Satellites Today, The Complete Guide to Satellite Television*. It is available from ConSol Network, 1905 Mariposa, Suite B, Boulder, CO 80302. PC

RADAR REFLECTIONS

RADAR DETECTORS AND THEIR USE

BY JANICE LEE

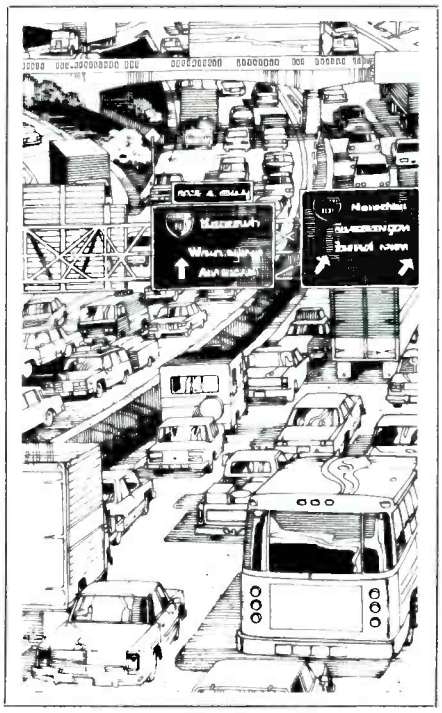
Connecticut Reduces Penalty For Radar Detectors

With a little help from their state legislature, Connecticut motorists may find themselves paying a sales tax when they buy their radar detectors and a "use tax" later if police catch them using those detectors. Recently the Connecticut Legislature decided to cut down on the volume of radar detector jury trials and to entice motorists into paying fines in lieu of requesting court appearances. Therefore, the legislature reduced a radar detector violation to an infraction carrying a fine of $35, with no provision for a jury trial. Prior to October 1983, fines were $100 and radar detector violations were criminal actions entitling the defendants to jury trials. Up to this time most radar detector defendants had requested jury trials; cases has been frequently dismissed because officers found it difficult to prove beyond a reasonable doubt that the defendants were actually using their radar detectors.

Under the new law, if radar detector owners react as the legislature has planned, they will be lured by these new bargain basement fines. Instead of fighting the summons in court, they will pay the "use tax," thereby fattening the state's coffers and reducing the glut of radar detector cases in Connecticut's courts. Rather than rejoicing that the violation's fine has been reduced by $65, radar detector owners need to be aware of the exact wording of Connecticut's radar detection law, and to continue exercising their right to appear in court whenever that law has been applied haphazardly. Although they can no longer request jury trials, motorists victimized by misapplication of the radar detector statute are still entitled to court hearings.

Coincidental to the new law, Connecticut State Police and local police departments have been trying to crack down on drivers using radar detectors during the last several months. In order to get a conviction for a radar detector violation, the officer must activate his radar and actually witness the illumination of the radar detector's signals. Unfortunately, not all of the law officers were briefed about the law they were told to enforce. As a result, motorists have been arrested for either installation or possession. Because mere possession of a radar detector is not a violation of Section 14-137-1.1, officers cannot legally seize radar detectors as if they were contraband.

Radar enjoys a 95% conviction rate due to the court's recognition of radar as an infallible tool. The strong statistics favoring radar and the millions of dollars in revenues produced by radar are often maintained, ironically, by the individual who receives an unjustified speeding ticket. Rather than pursue the ordeal of fighting the ticket in court—with little hope for success—the motorist pays the fine.



Electronics experts for over a decade have declaimed radar as a highly fallible instrument and estimates run as high as one out of three tickets may be issued in error. Other than the radar detector, the motorist has had little defense against this type of electronic surveillance.

With the new legal twist to their regulation, Connecticut promises to add revenue to the state coffers which clearly demonstrate how to play both sides of the street.

Police Chiefs Object To Proposed Ban On Radar In Delaware

A Senate bill aimed at eliminating the use of radar speed detection devices in Delaware's small towns has brought protests from some police chiefs.

One chief accused the bill's prime sponsor, State Senator Angelo T. "Bucky" Citro, of pushing the proposal because members of his family had been caught speeding.

However, several of Citro's Senate colleagues dismissed the chief's charge.

"I don't think he (Citro) would use it as a retaliation measure," said Sen. Thomas B. Sharp. "I've had a lot of complaints" about speed traps, he said. Sharp, one of 11 cosponsors, said he agrees with Citro that small towns such as Elsmere and Newport use radar "as revenue raisers, rather than for traffic control."

S.B. 505, under review by the public safety committee, is aimed at communities that Citro says have been misusing radar speed detection devices.

Under the proposed law, only six police forces could continue to use radar. Delaware State Police, New Castle County Police, and the police departments of Wilmington, Newark, Dover, and Milford.

Citro also said that if this bill fails to pass, "I will introduce a bill that all fines from radar go into the (state's) General Fund. We'll see how much enforcement the towns do if they're not getting the money."

Newport Police Chief Michael J. Caprigliione said he believes Citro is trying to "handcuff" police. If the radar law is passed, he said, "you might as well eliminate the speed limit . . . and take away our fingerprint patterns."

Grant Awarded For Radar Classes

The West Virginia Department of Public Safety has been awarded $55,762 to conduct highway safety training classes.

The money will fund 10, one week classes on radar operation at the West Virginia Police Academy for 180 state, county and municipal law enforcement officers.

One Man Force Maintains Order

U.S. Highway 65 cuts through Grady, Arkansas with no more than a blinking yellow light. But the person who thinks he can breeze through is mistaken.

After several months of relying on the Lincoln County sheriff's office and Arkansas State Police, the town of almost 500 has its own police force again. Lee Gullickson is the one-man police department.

Gullickson is the fourth person to have the job in a four-month period. Mayor Roger Klie said the town simply didn't have enough money to hold onto the other three, who left for other jobs. His job, he said, mainly deals with traffic and domestic disputes.

"Some people have accused me of running a speed trap, but that's not true. They just got used to being able to go through here without slowing," Gullickson said.

"I've had some of them even try to tell me they didn't see the town. Well, you can't miss all those signs, and even if you did, there's that blinking yellow light at the intersection. That means there's something there. Something to slow down for," he said.

"When I took this job I told the mayor I was going to enforce the traffic laws, even if it meant giving him a ticket," he said. "So far I haven't had to do that, but I would. Most people are learning." PC

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

WASHINGTON PULSE

FCC ACTIONS AFFECTING COMMUNICATIONS

New Mobile Satellite Service Proposed

The Commission proposed establishing a mobile satellite service (MSS).

The MSS is a communications network which would use one or two satellites to serve the purposes provided by antenna towers in terrestrial mobile radio services. MSS can cover vast areas with a distance-insensitive service by increasing the effective line of sight between transmitters and receivers. This would result in uninterrupted, universal service, with no requirements of population density or accessibility.

In November 1982 the National Aeronautics and Space Administration (NASA) asked the FCC to allocate spectrum for an MSS, to establish technical and regulatory guidelines for such a service and to authorize a licensee. It requested allocation of 20 MHz of UHF spectrum (821-825 MHz, 845-851 MHz, 866-870 MYz, and 890-896 MHz) which was being held in reserve for land mobile services. It also proposed an allocation of 70 MHz in higher bands for satellite-to-fixed station and fixed station-to-satellite services (feeder links or backhaul).

Applications for developmental licenses have been submitted by Mobile Satellite Corporation and Skylink Corporation.

According to NASA and the two MSS applicants, the MSS would use and develop many of the state-of-the-art technologies of terrestrial radio services. Frequency reuse, the highlight of terrestrial cellular radio, could be achieved in a future MSS by the use of spot beams, they said. Narrowband technologies, digital data transfer, high-gain and multiple-beam satellite antennas, multiple access techniques and modular mobile terminals are among the developments suggested for MSS.

The applicants noted that, although no commercial MSS is now in operation, several nations have begun preparations to initiate such services. Canada has developed a proposal, recently submitted to the International Frequency Registration Board, to initiate an MSS in 8 MHz of the UHF mobile reserve. Such a service would necessarily be coordinated with, or else could preclude, use of this spectrum in the United States.

The Commission proposed an initial allocation of 8 MHz (821-825 and 866-870 MHz) and raised the issue of an additional—or substitute—allocation at 1.5 GHz.

It also said it would consider in this rulemaking:

- Whether the public interest would be served by allocating spectrum for MSS;
- What necessary services should be provided by an MSS;
- Whether applicants should be required to use state-of-the-art technology to use the allocated spectrum efficiently; and
- What regulatory requirements and licensing procedures must be resolved before creating an MSS.

FCC Declines To Establish A New Private Radio Service

The FCC decided not to adopt the proposal to allocate 8 MHz of 900 MHz spectrum for a new private radio communications service (PRCS) for personal communications use.

In January 1983, the Commission proposed to set aside spectrum between 806 and 947 MHz to satisfy the general public's desire for an inexpensive mobile radio system that could accommodate both personal and business communications. Under the proposal, a person would be allowed to install a low cost unit in an automobile for personal and business communications: (1) between a vehicle and the home or office; (2) between a vehicle and the public telephone network; (3) with other specified vehicles; and (4) in some instance, with a group of vehicles simultaneously.

While proponents of the PRCS asserted that this service could offer the public a variety of benefits, the Commission concluded that its predominant use would be in the nature of a convenience or luxury. The FCC pointed out that much of the service to be provided by PRCS could be obtained from existing private and common carrier radio systems.

PRCS was one of many proposed uses for the remaining 41 MHz of land mobile reserve spectrum in the 900 MHz band. The limited spectrum available precludes authorization of all the pending service proposals. After weighing a number of factors, the Commission concluded that traditional private land mobile and cellular services, as well as mobile satellite service, must take priority over a personal radio service in deciding how to apportion the land mobile reserve. For the same reasons, the Commission dismissed a petition filed by MURA Corporation which requested 900 MHz spectrum to establish a similar personal radio service.

FCC Technical Rules Reexamined; Certain Rules Deleted

The Commission set some guidelines for technical regulation and eliminated some specific technical rules.

On February 17, 1983, the Commission adopted a Notice of Inquiry and Proposed Rulemaking in this proceeding to examine technical regulations with the intent of eliminating those that no longer served useful purposes, replacing those that were overly burdensome with less constraining regulations, and retaining those found acceptable.

The Commission reached some general conclusions to provide guidance in this and future proceedings.

For the purposes of examining the need for specific rules, the technical regulations were divided by their intended purpose into the categories of interference control, spectrum efficiency, interoperability and technical quality.

In the area of interference control it was found that such rules were the highest priority but that such rules must be structured so they do not have unrelated side effects.

Spectrum efficiency was also a high priority but rules should be structured to set efficiency standards rather than mandate a specific technology.

Some degree of Commission intervention may be needed in the interoperability area for new services involving large public participation. The need and nature of this intervention will have to be addressed on a case-by-case basis. However, interoperability can be left to the marketplace in many services, especially non-distress systems which have been operational for a long time.

Finally, technical quality in almost all cases except those dealing with distress systems should be left to marketplace determination as it has been in most services.

The FCC proposed elimination of specific rules dealing with receiver frequency stability, selectivity, desensitization and image frequency rejection of auditory assistance devices (Part 15); and minimum transmitter modulation capability, audio harmonic distortion, audio frequency response and preemphasis characteristics, carrier-amplitude regulation, noise levels and video signal characteristics (Part 73).

After considering the comments filed in response to the February 17 Notice, the Commission determined that the existence of adequate competition and diversity in the supply of a service or equipment was the principal factor in deciding whether to regulate the technical quality of that service or equipment. It said most services and equipment under FCC jurisdiction were sufficiently competitive to warrant deregulation of technical quality.

Therefore, the Commission said, it would eliminate the Part 15 and most of the Part 73 rules mentioned above.

Troublesome Broadcast Violations

The FCC deleted many of its preventive type regulations such as those dictating how

often to measure frequencies, what meter readings to log, and what kind of equipment to use to check modulation. Instead, the Commission is relying on the licensee to insure that the frequencies are within tolerance, the power is proper, and the modulation is not excessive.

However, we have noticed from our inspections five areas where too many violations are occurring and these are listed.

Frequency Tolerance. Keep the frequency within the allowable tolerance. It is 20 Hz for AM stations, 2,000 Hz for FM stations, and 1,000 Hz for the video carrier of TV stations. It is .01 percent thru .0005 percent for remote pickup stations and .02/.002 percent for low power TV or TV translators. See Sections 73.1545, 74.464, and 74.761.

EBS Tests. Make EBS tests at all AM, FM, and TV stations once a week on random days and times between the hours of 8:30 a.m. local time and local sunset. The results must be recorded in the station log. The tests should be made using the method shown in the EBS checklist given to all broadcast stations. See tests Section 73.961(c) and logs 73.1820.

Operation not Authorized in License. Operate at times and with modes or power specified in the station license. Do not operate non-directional when directional is specified. Do not neglect to change power at sunset or sunrise as called for in the station license. Refer to operation, Section 73.1745.

Directional Antenna System Tolerance. Keep the antenna base currents and antenna monitor currents within the allowable 5% tolerance. See Section 73.62.

Antenna Tower Painting and Lighting. The condition of lighting fixtures at all towers required to be illuminated must be inspected once each 24 hours. Integrity of lights may alternately be guarded by an automatic indicator of light failure or an automatic device to sound an alarm upon light failure. All towers shall be cleaned or repainted as often as necessary to maintain good visibility. Further, mechanical control devices, indicators, and alarm systems used to maintain tower lighting must be inspected for proper functioning at intervals not to exceed three months.

The factions of failure or improper functioning of tower light(s) must be recorded in the station record. Record the nature of the failure, the date and time of the failure, and the date, time and nature of repair. See log (station record) and inspection—Sections 17.47, 17.49, 17.50, 17.56, 73.1213, 73.1820, and FCC Form 715.

The Commission suggests that licensees should promptly review the activities at their station and correct any violations. Should the violation rates not decrease, we will increase our enforcement efforts and issuance of monetary forfeitures for these and other violations.

ON THE LINE

NEW AND EXCITING TELEPHONE TECHNOLOGY

BY GORDON WEST, WB6NOA

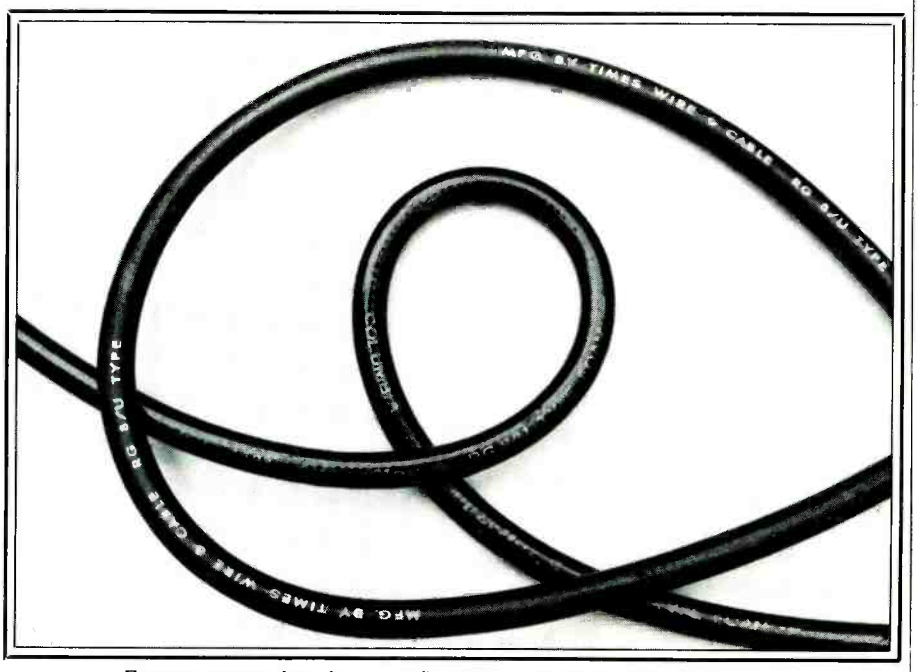
That new "long distance" cordless telephone service proposed by General Electric was just killed by the Federal Communications Commission. Although the FCC already granted General Electric an experimental license for testing the PRCS system in Syracuse, New York, it just closed its file on this 900 MHz proposal.

The cancelled PRCS service was a combination cordless telephone/intercommunication radio service that was strikingly different from today's cordless phones as well as today's citizens band and general mobile radio service system. Like cordless telephones, you would install your own PRCS base station into your own home telephone lines, which would take you all of about 30 seconds. Unlike cordless telephones, the range would be up to 5 miles away from your base transponder to a portable or mobile handset setup.

If you needed more than 5 miles coverage to your phone base station, you could extend your coverage by going through an automatic repeater. While it might cost $5.00 per month to rent "air space" on repeaters, you could be able to travel up to 25 miles away from your home and still be able to receive incoming and place outgoing phone calls directly to your home base station.

If you're slightly out of range on simplex, your mobile unit would automatically select a repeater for extended coverage. Same thing with incoming phone calls—your base transponder would first try you direct, and then switch over to a repeater that you have rented.

It would also be possible, using PRCS, to intercommunicate with other PRCS users. You could either go direct, or through a repeater. Again, range would be 5 miles simplex, and up to 25 miles via a repeater.



Foam coax tends to be more flexible, as shown in this photo.

Technical Overview of PRCS

Reading over FCC Docket 83-26, it was found that the proposed PRCS service had been well thought out. All radio equipment would be FCC type accepted and would contain automatic transmitter identification systems (ATIS). This would automatically identify the radio unit on the air, and also guard against unauthorized calls as well as announce itself as stolen equipment.

The band that would contain the PRCS channels would be 8 MHz wide and broken up into two segments—898 MHz to 902 MHz, and 937 MHz to 941 MHz. These two frequency bands surround the proposed amateur radio band at 902 MHz to 928 MHz. The FCC had "reserved" these frequencies for new types of radio communications services.

There would be 133 channels, broken into 5 control channels, 30 direct talk channels, and 97 repeater and 1 party line channel. The 5 control channels would be utilized for automatically switching incoming and outgoing calls to vacant channels, or searching for incoming calls.

Thirty direct channels could be utilized over and over again in heavily radio congested areas because of their limited 4 to 5 mile range. These direct channels could be used for simplex communications—individual talk and listen, very similar to regular two-way radios.

The repeater channels would be used for extending the range between mobile units or between a mobile and a base station. This would allow you to make phone calls up to 25 miles from your home. The repeater merely extends your communications—it does not have any telephone equipment at the sight. This means that all your telephone calls would be billed directly to your home phone to which your base transponder is interconnected. Special binary lockout codes would keep any other user from being able to use your home phone or being able to intercept outgoing phone calls.

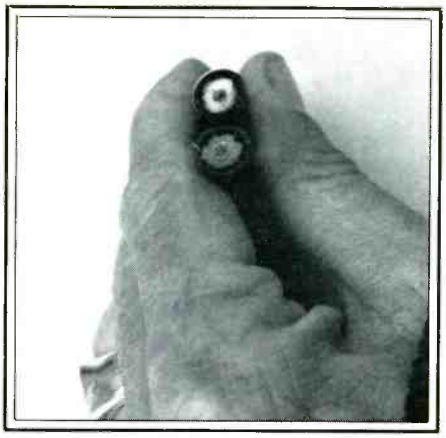
The one proposed "party line" channel would allows users to communicate with any other user to inquire about directions, roadside assistance, and any other necessary communications.

The actual equipment would be wideband frequency modulation, 30 kHz deviation, with a maximum transmitter power not to exceed 10 watts. Power amplifiers would not be allowed, nor are they really necessary at this frequency range. The transceivers would undoubtedly be PLL synthesized in order to accommodate all of the frequencies in such a small package.

The transmitters would undoubtedly employ full duplex circuitry for telephone calls. This would allow users to talk and listen simultaneously. However, on the simplex local talk channels, push-to-talk would probably be the mode of operation. Same thing with the party line channel, too.

We probably would not see portable equipment—like a portable cordless telephone. Rather, at 10 watts, to prevent any danger of radiation, the transmitter and antenna would be permanently mounted in a vehicle and would have similar characteristics to today's cellular telephone service. Just think, you too would be able to sport that curly 900 MHz antenna, but at about one-tenth the cost of a cellular telephone system!

Repeaters would be strategically located on mountain tops and would be owned and operated by private businesses in the radio communications industry. They would charge up to $5.00 per month to allow you to use their repeaters for extending the range of your PRCS system. The repeaters, as proposed, would run anywhere from 30 watts to 100 watts, depending on how high up on a mountain they are located. Antenna polarization would be vertical and directional antennas might be used to bolster coverage in a particular community. Repeaters



The difference between good and bad—the bottom coax is water damaged and cannot be used.

would be prohibited from interconnecting to each other, and repeaters would not be interconnected to the telephone system. You would only use the repeater to extend the range of your own telephone system.

The cancelled PRCS system had similar functions to today's cellular radio system. Your base and mobile phone setup would always be scanning for vacant channels to place a call, or signals that you have an incoming call. During peak usage hours (traffic time), your unit would automatically time itself out to prevent long-winded conversations. This would allow others to use some of the same channels. Most units cannot be manually operated to eavesdrop on another channel in progress, which gives you some privacy. Binary digit codes would insure that only you could use your home phone, or receive phone calls from your home phone setup.

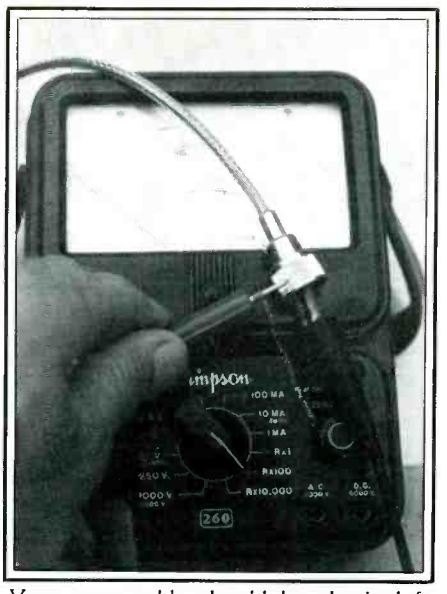
Your hand unit would be able to store frequently dialed phone numbers, and you would also be able to use it as a calculator or a note pad to remember new numbers.

Why Did The FCC Vote No On PRCS? Cellular Pressure!

There was plenty of opposition from the cellular telephone industry to the new PRCS service. While both services are dramatically different, the cellular folks believed that they might lose some business to the less-expensive PRCS systems. While the PRCS system is not a substitute for the long-range and area coverage of cellular, it is an affordable alternative to making local phone calls if you're within a few miles of your house. After all, if we can get one-eighth of a mile with a cordless telephone, the demand for at least 5 to 25 miles through an extended radiotelephone service was certainly there. PRCS equipment, which could have sold for under $350 for a complete setup of two units, would surely fit the bill—too bad the FCC gave it a thumbs down. Cellular wins. PRCS goes out the window. Thanks Charlie.

Feedlines

Let's now focus in on those lines that you use between your antenna system and your VHF scanner receiver, your ham set, CB



Your coax cable should be checked for moisture at least once a year.

radio, or shortwave receiver. We will take a close look at what makes up good quality coax cable, and talk about some new types of cable to improve your VHF and UHF reception dramatically.

You all know what coaxial cable looks like —round cable varying in size, with a center conductor surrounded by a dielectric, then the braid surrounded by the jacket.

Let's start from the jacket, and work in. There are ten types of outer protective jackets, but only two are popular ones that we may choose from.

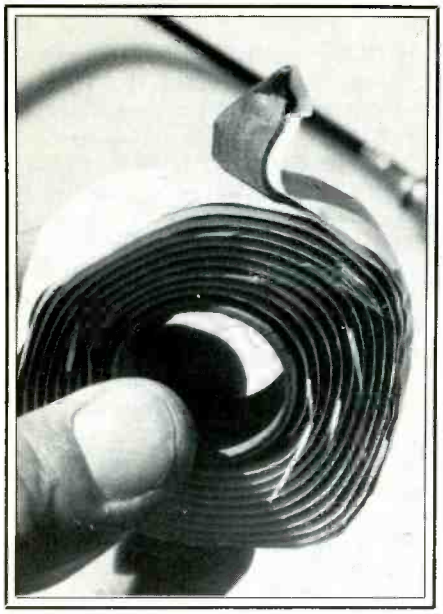
Type 1 coaxial cable jackets are found in very flexible coax cable. The jacket features a low temperature, plasticized, polyvinyl chloride (PVC) sheath that contains the plastic extender to keep the cable flexible. This cable actually has a life expectancy of only two years from the date of manufacture because the plastic extender migrates through the shield braid and begins to attack the dielectric insulation that surrounds the center conductor. Just as soon as the dielectric begins to deteriorate from the extender material, radio frequency losses increase. This is why you are encouraged to stay away from bargain-priced coaxial cable.

The more rigid coaxial cable jacket contains a non-contaminating, medium-temperature, plasticized, synthetic resin (usually black) and has a minimum life of 20 years from the date of manufacture. This cable is not as flexible, but it is abrasion resistant and cannot be affected by sunlight. This type of cable jacket is called Type 2A, and it does not contain any extenders which would contaminate the dielectric surrounding the center conductors. If the cable is non-contaminating but gray in color, it's called Type 2 and has the same service life as Type 2A non-contaminating cable. You can even bury this type of coaxial cable in the ground. The most popular "RG" number for this type of cable is RG-213/U, and is a replacement for RG-8U coax.

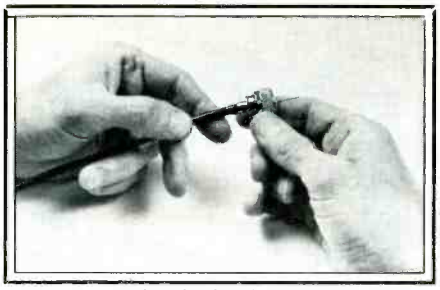
This "RG" business has been around for some time and is a throwback to military specifications. Unfortunately, those that manufacture cable now produce coax line that doesn't necessarily meet the "RG" specifications, yet this same cable still sports the "RG" nomenclature.

How does the cable manufacturer cheapen coax cable? They either use less braid for less than 98 percent shielding, or they use smaller center conductor wire. Less than a thick, 98 percent braid will cause a lot of your transmitted and received energy to leak out of the cable. RF leakage is a direct function of the polosity or number of openings in the coax cable, and there are literally thousands of minute openings. At VHF and UHF frequencies, some manufacturers offer aluminum foil braid that keeps leakage to an absolute minimum except at the ends.

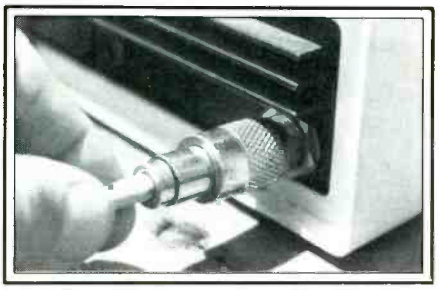
Conductor losses in the center conductor are dependent on the size of the center conductor, its conductivity, as well as the loss



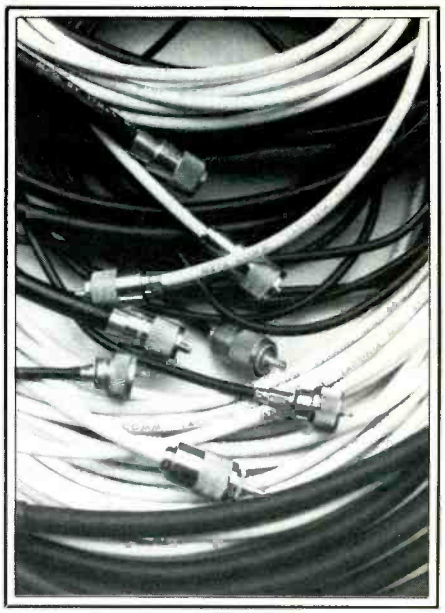
Coax seal™ is a great aid in keeping moisture out.



Small coax has higher losses than RG8.



Always look for any loose connections.



Which coax to choose?

factor of the insulation. The higher the frequency, the higher the losses. The larger the cable, the less attenuation or loss. This is because there is more cross-sectional area of conducting material to carry the current. Conductor losses are a direct function of the conductivity of the conductors, too.

Insulation loss is a function of the dielectric constant and the loss-power factor of the dielectric. Air has the lowest loss with a dielectric constant of 1.0. Polyethylene and teflon have dielectric constants at approximately 2.0. Foam, as a mixture of air and dielectric, has an effective dielectric constant of approximately 1.6—so foam cable, when new, has less loss than solid dielectric cables. However, foam cable after about a year in moist air will have much higher losses because the foam collects moisture.

The characteristic impedance of coaxial cable also factors in on which cable you plan to use for your scanner monitor or your shortwave set. The characteristic impedance of a piece of coax is a function of the ratio of the diameter of the two conductors. The standard impedance of cables for two-way radio has been 50 ohms, which is the same impedance used for antennas, transmitter, and receivers in the two-way radio service.

Scanner antennas usually have an impedance near 72 ohms, so the coaxial cable should have the same impedance. Unfortunately, scanner manufacturers are sometimes hesitant to indicate the output impedance of their receivers, so either 50-ohm or 72-ohm coax cable will work nicely with your scanner monitor set.

The smaller sized coaxial cable is called either RG-58U or RG-59U. RG-58U is 50-ohm impedance, and the 59U is 72-ohm impedance. The 59U is normally used for television antenna installations as well as cable TV setups. There is some excellent RG-59U available that feature a 100 percent foil shield outer conductor. This would be ideal to use for a scanner receiver.

The next size up from RG-58 is affectionately called, in the industry, RG-8X. This cable is larger than 58, but smaller than the large garden hose RG-8U. RG-8X is sold only with a foam dielectric, so its life expectancy for the serious user is only two years. However, it has dramatically lower losses at VHF and UHF frequencies than RG-58U; so if you can use it for only a couple of years, go for it.

If you're really serious about your radio monitoring or radio communications hobby, only use the larger cable, RG-8U, RG-213, or if you are really loss-conscious, Belden 9913.

Let me give you an example of the better characteristics of the larger cable versus smaller cable at UHF frequencies: Let's say you wish to monitor a distant police department transmitter on UHF. Your signal is coming in at 460.100 MHz and is barely above the noise level using RG-58U to your scanner antenna 100 feet away on your chimney.

One hundred feet of RG-58U at 460 MHz has a loss of almost 11 dB. This means the signal will arrive at your scanner almost 10 times as weak as when it hit the antenna!

However, if you switch to RG-8U, the loss would only be 5 dB, a loss of only about 3½ times your original signal—rather than 12 times.

If you really wanted the ultimate in minimum signal loss, go to the larger Belden 9913 coax cable that has less than 1.5 dB loss per 100 feet at 400 MHz! Compare that to an almost 12 times loss for the smaller RG-58U, and I think you'll see the benefit of bigger coax for UHF runs.

Another area where your coax cable may fail in an installation is at the connection point to the antenna. Leaving a PL-259, or a BNC plug, or simply a stripped back piece of coax exposed to the elements will surely cause a system failure after the first rain. Although you may think you're hearing a lot with your shortwave set, chances are you won't be hearing but half of what's really on the frequency—especially at higher frequencies. All exposed connections should be thoroughly sealed against the weather. Commercially available coax plug sealant is a good choice, with silicon seal as a second choice. Black tape will give you only a false sense of protection—moisture usually gets in black tape, and after a year, it peels right off of most exposed connections.

Keep your antenna connection absolutely weather-tight for minimum losses.

The type of receiving equipment will generally dictate what type of plug you must use on the radio end of the circuit. Make sure to solder all plug connections carefully, and check them out with an ohmmeter. Be careful—some antennas may look like a DC short, so disconnect the cable at the antenna end before metering out your newly installed coax connector at the radio end! Never, never, NEVER meter a plug at the antenna end when your radio setup is still hooked up to the coax cable down below. Enough current will pass through the coax and your radio to possibly damage the front end transistors from your ohmmeter—so never use an ohmmeter at the antenna with the radio still connected.

Finally, always inspect your coax cable for breaks in the outside protective jacket. If you discover any, discard the entire piece and start off over again with new non-contaminating coax. Good coax cable will give you tremendously increased range and reception at UHF and VHF frequencies. Down on high frequency for shortwave listeners, you probably won't hear a lot of difference on signal strength from good or bad coax. However, good 98 percent braid coax will dramatically lower the susceptibility of your shortwave set to pick up random noise from within the house.

Good coax cable makes good sense for the serious radio monitor. PC

BROADCAST TOPIX

BY MARK J. MANUCY, W3GMG

DX, NEWS AND VIEWS OF AM AND FM BROADCASTING

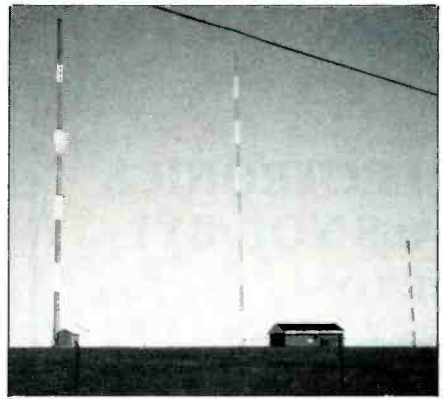
Have you noticed how many call letter changes are being listed each month? I have . . . I have to put the list together and there are more and more and more. The list has grown to about 50 to 60 each month. During 1983 there were about 400 changes. By the end of 1984 the number had almost doubled. The pace will probably not lessen since the FCC has a different approach to call letter changes than it did a few years ago. Deregulation took the hassle out of changing call letters, so stations are taking advantage of the informality in changing call letters. Even some of the old line stations of the 20's and 30's have changed their ID's. It's great if you collect call letters. It's frustrating if you don't.

The FCC has increased protection to the Alaskan AM stations operating class II on 1-A and 1-B channels. They are now classed as 1-N. This means they will have to be at least 10 kw within five years or they will revert to class II stations. Of the 15 stations involved, 11 are already 10 kw or more.

In an effort to upgrade AM broadcasting, the NAB (National Association of Broadcasters) has released a report encouraging AM broadcasters to create an industry-wide campaign to: promote the benefits of quality receivers and raise the consciousness of the general public; to establish a technical center at the NAB to collect and disseminate AM information; to encourage broadcasters not to boost audio above 12 kHz; to reduce transient distortion in transmitters; to improve AM transmitting antennas through broadbanding; to do research to reduce skywave from antenna in undesired directions.

This is great! I have been in favor of improved AM broadcasting for years and it will make for better listening and DXing all around. Just last month I mentioned about how poorly stations sound in the new wide band receivers that boost the high end of their audio range.

This of course leads me into a little more discussion about the Sony SRF-A100 receiver. My FCC friend, of course, wanted his unit returned. The Sony so impressed me that I purchased one and have been enjoying good AM and AM stereo for about a month now. This is the kind of receiver the NAB wants to see on the market. Let me give you a quick rundown on it. Referring to the picture, the lefthand most button is the power switch. Next is the volume, which is very smooth operating and has good dynamic range from low to high without sharp increases in volume for small increments of the knob rotation. The tone control is next, which is of the treble cut variety, but it too has good range. The switch in the center controls the bandwidth on AM from wide (to the left) to narrow. The narrow position is "wider" than most portable radios but still enables one to separate stations (except locals) at 10 kHz increments. This switch on FM controls local and distant reception. The switch to the left of the tuning knob (on the far right) selects AM mono, AM stereo, and FM. FM mono/stereo is automatic.



The transmitter building and antenna system of CJLS, Yarmouth, Nova Scotia, Canada. This station operates on 1340 kHz with 5 kW. The transmitter and antennas are located at Shebouge Harbor near Yarmouth. (Photo by K. Kneitel)

Two of the finest receivers ever made grace the shack of George Tobin. The Hallicrafter SX42 (bottom) and the SX-62. Both models tune 540 kHz to 108 MHz AM/FM/CW.

This receiver uses a forced stereo reception on AM—that is: manual switch to either mono or stereo, mono can be heard in the stereo position, but so is extra noise. To select the different AM stereo systems, there is a small switch on the left side marked AM STR, A-B. The A position receives the Motorola, Harris, and Magnavox systems and the B position receives the Kahn system. Below this switch is the external power (4.5 volts) and the headphone jack. I also bought the new Sony "in the ear" headphones model MDR-W30L and they are really terrific! They actually fit in the ear and sport a response of 16 to 20,000 Hz. They weigh half an ounce and for the first time I can lay on my side while wearing headphones! The cord is a short 3 feet so the radio has to stay close by, but these "new fangled cans" are worth considering for any radio. They retail for less than $20.

One caution: turn the radio on before using headphones or plugging them in. There is a loud pop that could hurt your ears or possibly damage the headphones.

The tuning of the SRF-A100 is smooth and sufficient for a portable radio, but unless you know your dial (and where the stations are), it is difficult to locate stations (even locals at times) because the calibration is poor. The sensitivity is not poor; in fact for as short as the loop is (about 3½ inches), the sensitivity is amazing. However it can be improved and I'll tell you how shortly. The radio comes with a strap that fastens from end to end (as shown) or it can be attached to hang the radio vertically. In this position the AM loop is also vertical, which degrades the AM reception except maybe for strong local stations. It is easier to carry the radio this way.

Those of you who have been walking with FM radios are certainly familiar with the FM stereo signal dropping in and out. This is one reason for the popularity of small tapes for runners and walkers. This radio is no exception on the FM band and, as a matter of fact, when headphones are used with the radio, the headphone wire becomes the FM antenna so that the metal antenna does not have to be extended. In the city, FM reception almost always must be done in the local position since the intermod is so bad on the FM band of the radio. AM stereo has all the drawbacks of regular AM reception—that is bridges, noisy power lines, etc. There is one place AM stereo has it all over FM . . . walking (running). The signal is there! No dropouts, flutter. If you do run, this model might be a bit heavy, so Sony has a cigarette box size model without the speakers and wide/narrow switch at about $10 less.

The daytime reception from Baltimore is good. I can receive WPKX (730, 5 kW) in Arlington, VA about 40 miles and WMAL (630, 5 kW) in Washington with good stereo. I can also receive WNBC (660, 50 kW) in New York, about 200 miles, in stereo but noisy. At night, reception is excellent and at times the clear channel stations can be received in the wide position to enjoy all the audio the station is transmitting. Marvin Collins, Chief Engineer of KFI/KOST in Los Angeles, tells me his Sony SRF-A100 goes with him everywhere (as does mine). He says although he does not have AM stereo in his car yet he has found his Sony gives good

reception of KFI in the mountains where FM simply does not make it. He's a DXer too, and while in Hawaii this past summer he heard KFI in stereo on two different islands. As soon as the signal is listenable in mono, it's listenable in stereo. By the way, Marvin is good for QSLs, so listen for KFI on 640 kHz. KFI's address is 610 S. Ardmore Avenue, Los Angeles, CA 90005.

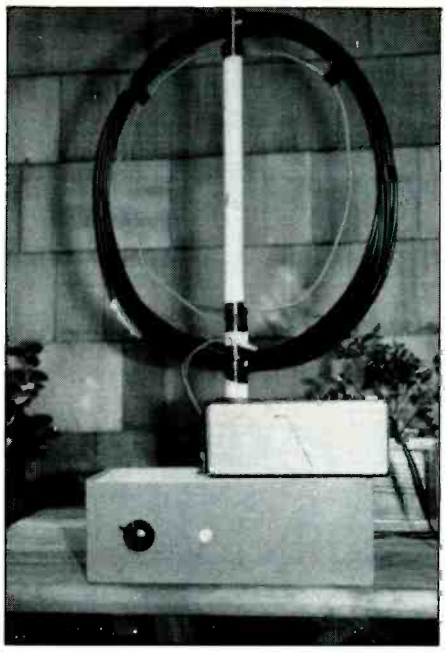
Mail Call

Since I just gave the KFI address, a note from Tom Charbonneau in Reading, Massachusetts asks where to get BC stations' addresses. Seems a lot of mail comes back to him marked insufficient address. For the DXer, this can be a problem. The easiest solution for stations of 10 kw and more is the *World Radio TV Handbook*, which is available from many sources advertised in *POP'COMM*. For those stations below 10 kw, the problem can become expensive. The *Broadcasting Yearbook* is probably the most readily available source. This is published by *Broadcasting Magazine* at 1735 DeSales Street, N.W., Washington, DC 20036. The cost is $75. This being a bit expensive, check at your local library to see if they have a copy. The next possibility is to check with a local radio station to see if they have an old copy they might give you or sell at a reduced price. Some stations might also have an old copy of *Standard Rate and Data*, which has two editions but could provide addresses of needed stations. All else failing, you could send a care package to me with the following—blank stamped envelope for addressing to the station and 25 cents for each station and I will address the unknowns for you. Be sure to include an SASE for the station to return the QSL in. My address is at the end of the column.

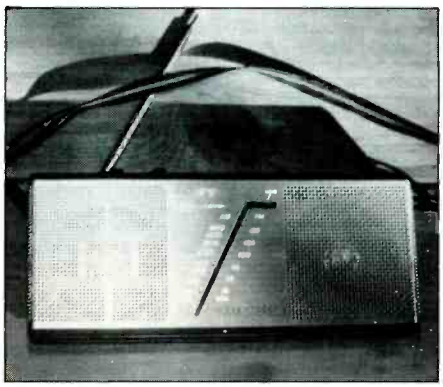
The *Standard Rate and Data* lists station rates, schedules, and facilities. The networks have lists of their affiliates, including the regional nets. Maps of each state, population data, and ethnic broadcasts are shown, as well as a call index to stations. This 800-page book is published monthly and does have a lot of information that could be helpful in DXing. The cost is $175 per year from Standard Rate and Data Service, Inc., 3004 Glenview Road, Wilmette, IL 60091. They also publish a book listing TV stations and the radio is split into large and small market editions.

Frank Collins of Bastrop, Louisana has logged the RPU of one of the local BC stations. The station uses a frequency near the weather broadcast frequencies (see November '84 Broadcast Topix) to broadcast the play by play back to the studio. The pressbox "chatter" is heard on the RPU frequency while the commercials are on the air from the studio.

We received a letter from Steve Anderson, another west coast reader, who spent a part of his summer trying to log an Alaskan station. He has not had a whole lot of luck. Steve, I know the Alaska boys hear the States, so it should be possible for you to hear Alaska. I would suggest you try building or buying a loop antenna. Read on.



This is one of the simple but powerful loops to be described next month. Shown with Sony SRF-A100 in operating position.



Sony SRF-A100 AM STEREO receiver.

Rowland Ely from Maine wants to know if SX-62's are still available. Anyone have one to sell? I know George Tobin has one, but I hope to have first dibs on his and his SX-42! Rowland, suggest you visit hamfests in your area and check ads in *CQ*, *QST*, etc. Also subscribe to one of the used gear papers; there are several.

William Dragoo from Muncie, Indiana asks about AM boosters for car radios. First thing I'd try would be the antenna trimmer to be sure it is properly peaked. If you have a "built in the windshield antenna," I would consider replacing it with a standard whip mounted on the cowl. The Spring '84 *Special Projects Magazine* had a BC signal booster. Check the local library for back issues of *Popular Electronics*, *Radio Electronics* and others. I'll try to come up with something for our column in the next few months, Bill.

Panciano Cansino sent a note requesting more information on early 50's receivers but sent me no return address. Actually, that is a bit of a broad question and difficult to answer without telling me where you are coming from. Send me some more info and I'll do what I can.

AM Stereo Stations

50 kw Stations

Call	Sys.	Freq.	Location
WAAY	K	1550	Huntsville, AL
KFQD	K	750	Anchorage, AK
KFRE	H	940	Fresno, CA
KFI	C	640	Los Angeles, CA
KMPC	K	710	Los Angeles, CA
KTNQ	K	1020	Los Angeles, CA
KZLA	C	1540	Los Angeles, CA
KRAK	C	1140	Sacramento, CA
KNBR	K	680	San Francisco, CA
KDAY	H	1580	Santa Monica, CA
WTIC	K	1080	Hartford, CT
WGBS	K	710	Miami, FL
WSB	C&H	750	Atlanta, GA
KBOI	C	670	Boise, ID
WGN	H&K	720	Chicago, IL
WLS	H	890	Chicago, IL
WMAQ	K	670	Chicago, IL
WOWO	M	1190	Ft. Wayne, IN
WHAS	C&H	840	Louisville, KY
WNOE	H	1060	New Orleans, LA
WBZ	C	1030	Boston, MA
WJR	C	760	Detroit, MI
KFAB	C	1110	Omaha, NE
KROW	H	780	Reno, NV
WKBW	C	1520	Buffalo, NY
WABC	K	770	New York, NY
WNBC	K	660	New York, NY
WQXR	K	1560	New York, NY
WBT	K	1110	Charlotte, NC
WGAR	H	1220	Cleveland, OH
KRMG	C	740	Tulsa, OK
KVOO	C	1170	Tulsa, OK
WESC	H	660	Greenville, SC
WSM	C&H	650	Nashville, TN
KKYX	C	680	San Antonio, TX
KFAM	C	680	Salt Lake City, UT
KSL	K	1160	Salt Lake City, UT
WRVA	K	1140	Richmond, VA
KOMO	H	1000	Seattle, WA

KEY: PWR = Power Day/Night SYS = system C-C Quam (Motorola) H-Harris K-Kahn M-Magnavox

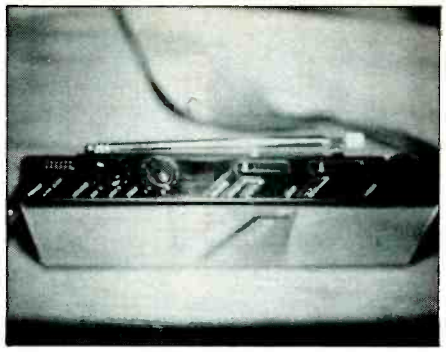
Station Updates

Call	Location	Freq	Pwr	Ant
AM				
WDLP	Panama City, FL	590	5/2.5	2
KGLE	Glendive, MT	590	1/0	O
KUOM	Minneapolis, MN	770	25/2.5	N
WKXY	Sarasota, FL	930	5/.5	2
KORE	Eugene, OR	1050	5/0	O
WOKL	Altoona, WI	1050	5/0	O
WCFB	Tupelo, MS	1060	1/0	O
KRPX	Price, UT	1080	10/5	N
WKST	New Castle, PA	1280	5/1	N
WLRP	San Sebastian, PR	1460	2.5/.5	D
WJKX	Moss Point, MS	1460	1/0	O
WMOO	Fairhope, AL	1550	50/1	N
WKVL	Clarksville, TN	1550	2.5/0	O
WSDL	Slidell, LA	1560	1/1	N
WPGC	Morningside, MD	1580	50/0	D
FM				
KRLX	Northfield, MN	88.1	.10	16′
KPBS-FM	San Diego, CA	89.5	N/C	1900′

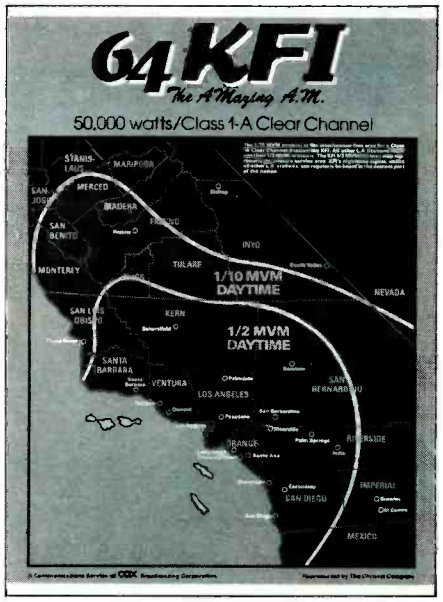
FM

Call	Location	Freq	Pwr	Ant
WUMF-FM	Farmington, ME	90.5	N/C	N/C
WBUR	Boston, MA	90.9	9.1	N/C
KNLB	Lake Havasu City, AZ	91.1	N/C	200′
WGIT	Hormigueros, PR	92.1	3	580′
WRLT	Asheboro, NC	92.3	100	1010′
KBOQ	Marina, CA	92.7	1	567′
WGTZ	Eaton, OH	92.9	31.6	600
KQIZ-FM	Amarillo, TX	93.1	100	N/C
new	Riverton, WY	93.1	100	884′
WTMI	Miami, FL	93.1	N/C	1023′
KRNA	Iowa City, IA	93.9	N/C	1903′
WAYU	Lewiston, ME	93.9	27.5	640′
KROK	Shreveport, LA	94.5	N/C	1000′
WSRQ	Eden, NC	94.5	100	1532′
WINZ-FM	Miami, FL	94.9	N/C	1023′
KTTI	Yuma, AZ	95.1	25	30′
KBBY	Ventura, CA	95.1	9.55	966′
WMET	Chicago, IL	95.5	4.1	1568′
KIXI-FM	Seattle, WA	95.7	100	1220′
WSEY	Sauk City, WI	96.7	.475	1656′
KFMJ	Grants Pass, OR	96.9	N/C	2178′
WFOX	Gainesville, GA	97.1	84	1471′
WYNY	New York, NY	97.1	6.8	1340′
KCFM	Florissant, MO	97.1	100	561′
WJAD	Bainbridge, GA	97.3	100	1013′
KNLR	Bend, OR	97.5	97	536′
KWBO	Hot Springs, AR	97.5	100	870′
KGLK-FM	San Angelo, TX	97.5	100	411′
KFNW-FM	Fargo, ND	97.9	N/C	992′
WCOS-FM	Columbia, SC	97.9	100	985′
WBFM	Seneca, SC	98.1	100	500′
WTUL-FM	Waterville, ME	98.5	50	302′
KTUX	Carthage, TX	98.9	N/C	730′
KDEA	New Iberia, LA	99.1	100	984′
WSFM	Harrisburg, PA	99.3	2.48	528′
KVOS	Denver, CO	99.5	N/C	1311′
WIWI-FM	St. Croix, VI	99.5	25	1151′
WEZN	Bridgeport, CT	99.9	29	N/C
KEZQ	Jacksonville, AR	100.3	44.2	1369′
WDMS	Greenville, MS	100.7	N/C	450′
KKHK	Kanab, UT	101.1	N/C	786′
WNOE-FM	New Orleans, LA	101.1	N/C	1004′
WEAZ	Philadelphia, PA	101.1	12	1010′
WWDE-FM	Hampton, VA	101.1	N/C	535′
WKES	St. Petersburg, FL	101.5	N/C	1429′
KNUE	Tyler, TX	101.5	N/C	1074′
WOWQ	Du Bois, PA	102.1	22.5	695′
WGNI	Wilmington, NC	102.7	N/C	1066′
KMJI	Denver, CO	103.3	N/C	1302′
WVJP-FM	Caguas, PR	103.3	38	1741′
WTTF-FM	Tiffin, OH	103.7	50	430′
WKIR	Jackson, TN	104.1	N/C	655′
KMYZ-FM	Pryor, OK	104.5	N/C	1130′
KIVA	Santa Fe, NM	105.1	N/C	1821′
KCNB	Waterloo, IA	105.7	N/C	1322′
KLSS	Mason City, IA	106.1	100	1000′
WMAR-FM	Baltimore, MD	106.5	24	N/C
KKRB	Klamath Falls, OR	106.9	43	1124′
KINB	Poteau, OK	107.3	100	N/C
KMAF	Topeka, KA	107.7	N/C	1214′
WBCY	Charlotte, NC	107.9	N/C	1700′

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



Controls on SRF-A100 described in text.



Anyone requesting information should also include a stamp—otherwise I will just answer in the column, which will be about five or six months after I receive your letter.

That is what Henry Perry did in asking more about FM DX antennas. Henry is in the wide open spaces of Lawton, Oklahoma, and if my answers brought more questions, just include another stamp! My time is free! The paper is supplied by *POP'COMM*.

Jack Roberts had one of his QSLs in last month's column, but I had just finished printing the text so did not have time to respond. He uses an old Hammarlund HQ-129X for receiving and obviously, does a good job. Thanks, Jack.

Speaking briefly about books I've found on early radio, here is a short list of books to look into:

A History of Broadcasting in the United States: Three Volumes: I - *A Tower in Babel* until 1933, II - *The Golden Web* 1933-1953, III -*Tube of Plenty* 1953-. Written by Erik Barnouw, published by the Oxford Press.

Broadcasting regulation in the United States: *Tune In, Tune Out*. Written by Ann E. Weiss, 1981, published by Houghton Mifflin Co.

A survey of TV and Radio: *Broadcasting In America* 2nd edition. Written by Sydney W. Head, 1972. Published by Houghton Mifflin Company.

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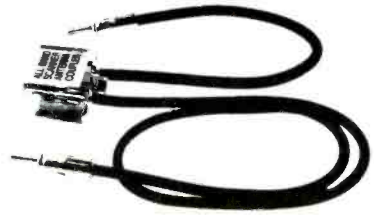

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Call Letter Changes

Old	New	Location
AM		
new	KELM	Madison Lakes, MN
new	WMGJ	Gadsden, AL
new	WNUY	Scottsmoor, FL
new	WMXY	Hogansville, GA
new	WWKM	Harrison, MI
new	WCRR	Rural Retreat, VA
new	WSBM	Florence, AL
WXOR	KEZC	Yuma, AZ
KVOY	KKAM	Palm Sprgs, CA
KDES	WQBR	Atlantic Bch, FL
WJNJ	WGPL	Washington, GA
WLOV	WMLA	Normal, IL
WRBA	WKYY	Lancaster, KY
WIXI	KNZS	Pittsburg, KS
KSEK	KCNN	Oklahoma City, OK
KXXY	WXTO	San Juan, PR
WBMJ	WKZF	Fayetteville, TN
WIXC	WQDQ	Thompson Station, TN
WAAS	KFRZ	Brigham City, UT
KBUH	KMOB	Moab, UT
KURA	KLTZ	Salt Lake City, UT
KWHO	KGNW	Seattle, WA
KSPL	KCFO	Tulsa, OK
KAKC	WIVK	Knoxville, TN
WHIG	WOSH	Oshkosh, WI
WYTL	WLTA	Clarkesville, GA
WIAF	WXYT	Detroit, MI
WXYZ	WPFD	Fairview, TN
WBLP	KIKN	Pharr, TX
KJTA	WAYE	Birmingham, AL
WTWG	KRGL	Myrtle Creek, OR
KROR	KLKI	Anacortes, WA
KAGT	WVVW	St. Marys, WV
WRRR		

Old	New	Location
FM		
new	KQTA	Kodiak, AK
new	KXAR-FM	Hope, AR
new	KROK	De Ridder, LA
new	WLRF	Pomona, NJ
new	KAGR	Ventura, CA
new	KSPK	Walsenburg, CO
new	KOSX	Chubbuck, ID
new	KJWR	Weir, KS
new	WBUQ	Bloomsburg, PA
new	KQFE	Springfield, OR
new	KYXI	Yuma, AZ
new	WJFR	Jacksonville, FL
new	WSMD	St. Marys, MD
new	KAIO-FM	Russellville, AR
new	KZYR	Avon, CO
new	KKSS	Yucca Valley, CA
new	KATW	Lewiston, ID
new	WXPL	Fitchburg, MA
new	WVLA	Woodville, MS
new	KUEZ	Missoula, MT
new	KYSX	Bismarck, ND
new	KBAL-FM	San Saba, TX
new	KTCV	Kennewick, WA
new	KTRZ	Riverton, WY
KDES-FM	KDES	Palm Spgs, CA
WGLY	WTHM	Goulds, FL
KMVC	KZDX	Burley, ID
WMLA	WTWN	Leroy, IL
KDBQ	KQWK	Pittsburg, KS
WROK	KWKH-FM	Shreveport, LA
WAWZ-FM	WAWZ	Zarephath, NJ
WRLX	WKSF	Asheville, NC

FM

KPEN	KLZE	Los Altos	KGBB	KMGW	Anoka, MN
KYND-FM	KHHT	Minot, ND	KKIB	KTLA	Breckenridge, MN
WLAT-FM	WYAV	Conway, SC	WKOZ-FM	WBKJ	Kosciusko, MS
KFRZ	KFRZ-FM	Brigham City, UT	KCAP-FM	KZMT	Helena, MT
KWHO-FM	KLTQ-FM	Salt Lake City, UT	KCIE	KUTT	Fairbury, NE
WBCR-FM	WBCR	Beloit, WI	KTMS-FM	KKOO-FM	Santa Barbara, CA
new	KSPK	Walsenburg, CO	KCFO	KCFO-FM	Tulsa, OK
new	KOSX	Chubbuck, ID	WMQP	WCCR	Clarion, PA
new	KJWR	Weir, KS	WTQY	WKSX	Johnston, SC
new	KQFE	Springfield, OR	WTOX	WWGO	St. Andrews, SC
new	WBUQ	Bloomsburg, PA	KMIO-FM	KIXK	Merkel, TX
KYSY	KSUP	Juneau, AK	WOSH	WMGV	Oshkosh, WI
KVRS	KMXX	Sterling, CO	KQKZ	KJCY-FM	Mountain Home, ID
KMFE	KXUU	Emmett, ID	KQNK-FM	KNTX-FM	Norton, KS
WMLA	WTWN	LeRoy, IL	WMYQ-FM	WNNW-FM	Newton, MS
WIVQ	WLRZ	Peru, IL	KWHW-FM	KRKZ	Altus, OK
KSMX	KFTX-FM	Ft. Dodge, IA	WKTM	WXLY	N. Charleston, SC
KTTL	KMCS	Dodge City, KS	WUNF-FM	WCQS-FM	Asheville, NC
KBRA	KLZS	Witchita, KS			

A book about CBS Radio: *As It Happened* (Memoir). Written by founder of CBS, William S. Paley, 1979, published by Doubleday & Company.

Commerical Broadcast Pioneer: *The Weaf Experiment,* 1922-1926. Written by William Banning, 1946, published by Harvard Press.

An introduction to Radio in America: *The Magic Medium.* Written by Edward Jay Whetmore, 1981, published by Wadsworth Pub.

The *Broadcasting Yearbook* must also be mentioned. The early books can be found as reference only in many libraries. I must thank the Pratt Library in Baltimore for finding the early volumes that had been misfiled. They date from the 1930's. Check with your library . . . I understand some are throwing out old volumes such as this. If they are used they will be kept.

AM Stereo

Although I have already spoken about the new Sony AM stereo radio, I want to give you some input to the stations broadcasting in stereo. I think the total count is about 500 by now and I was going to publish a list, but that many stations would take up too much room. What I have done is listed the 50 kw stations as I have them from the manufacturers. If you want the complete list, send me $2 to handle the duplicating costs and 37 cents postage. I also have computer lists on tape, paper, and disk for the Commodore 64. Write for more info, including a stamp.

All of the AM stereo systems sound good. At night AM has never sounded so alive with music, all kinds of music—classical, country, pop, rock, oldies, jazz, or whatever. Many of the FM stations have given up on these formats, but the AMers have hung in there and are now doing their thing in stereo. It really sounds great. Please excuse me for repeating myself over and over. The *Radio Electronics 1985 Annual* has an AM stereo decoder that can be added to certain car radios to receive the C-QUAM (Motorola) stereo system. It is available in kit form.

In order to boost the signal level of AM signals to get a better stereo signal, a loop antenna may be employed. There are many types of loops available and I will discuss several next month. If you are wanting to increase your AM reception, you'll be interested in these loops. They will work very well with a small portable radio that has a built-in loop as well as the more sophisticated Kenwood and ICOM. I am not talking about the "active" antenna you see advertised. These are strictly for the BC band. If you want to start collecting parts, the main ingredients are RG-59 (the TV coax), less than 100 feet and a large variable capacitor. One from a junked AM radio will do fine. If it has two sections, so much the better. Find an SPST switch, also. These loops will take a signal that will not light the signal light on the previously mentioned Sony receiver and bring it to full brightness. All of this without batteries or connecting wires! See you next.

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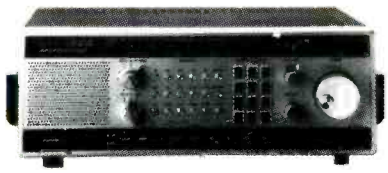

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LISTENING POST

BY GERRY L. DEXTER

WHAT'S HAPPENING: INTERNATIONAL SHORTWAVE BROADCASTING BANDS

Shortwave is making some splashes in the media! The September 13, 1984 edition of the *Louisville Times* newspaper featured a special section on shortwave listening, including a quote from *POP'COMM* bossman Tom Kneitel. The article pointed out some of the easier stations to hear and noted the great increases in shortwave's popularity during the past few years.

In mid-December, the Ray Briem Show on ABC Talk Radio devoted the entire all-night program to a call-in show about shortwave, which featured well-known DXer Dr. Richard E. Wood, American Shortwave Listener's Club President Stewart Mackenzie, and phone calls from a lot of other hobby "names." We welcome this kind of exposure for our hobby. While very few of us may own a radio station or a newspaper, we'd encourage you to "spread the word" whenever and wherever you get the chance.

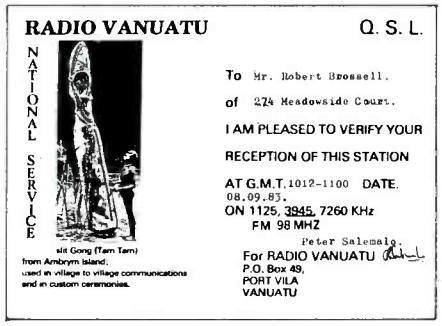
The Assemblies of Yahweh station WMLK in Media, Pennsylvania began tests in November (on 15.110 and 15.150) and should be on with a regular schedule by now. We haven't received a schedule but you can try those two frequencies during local daytime as a start.

Radio Netherland's new high power transmitters at Flevo should also be on the air on a regular basis now. The 500 kilowatt units were initially scheduled from 0700-1730 on 5.955, 1830-2330 on 6.020, 2030-2330 on 9.715, 1630-2330 on 11.730, 1830-1930 on 11.740, and 0645-1230 on 11.930. The entire complex is computer-controlled.

Off? On? Maybe? Another chapter in the saga of the Maldive Islands story is at hand and the ending of this one isn't happy. According to the Union of Asian DXers, Radio Maldives did return to the air for tests early in 1984, but the shortwave transmitter broke down at that time. Costs of repair are too high, so unless the Maldives government comes up with the money for new transmitters at some future date, Radio Maldives will remain off the shortwave bands.

Of the two shortwave broadcasters in the United Arab Emirates, the less frequently reported is the Voice of the UAE, whose 250 kilowatt transmitter uses 9.695. Now there are four new 500 kilowatt transmitters in use, or due on shortly. Transmissions are scheduled from 1000 to 2200, presumably all in Arabic, on a lot of new frequencies including: 17.820, 15.330, 15.275, 15.115, 11.915, 11.890, 11.715, 9.655, 9.630, 9.595, 7.255, 7.145, 6.185, 6.155, and 5.960—not all of them in use at any one time however. If you log this one, their address is the Voice of the UAE, P.O. Box 637, Abu Dhabi, United Arab Emirates.

A royal commission is looking into the operations and future of Radio New Zealand. That station has been struggling for years with low power, limited frequency choices, and antiquated equipment and has lately been forced to simply relay the New Zealand Broadcasting Corporation's domestic service. Lots of listeners are happy with the opportunity to hear domestic programming but a foreign service is among the areas being considered, along with 250 kilowatt transmitters.


RADIO VANUATU Q. S. L.

NATIONAL SERVICE

slit Gong (Tam Tam) from Ambrym Island, used in village to village communications and in custom ceremonies.

To Mr. Robert Brossell,
of 274 Meadowside Court,
I AM PLEASED TO VERIFY YOUR RECEPTION OF THIS STATION
AT G.M.T. 1012-1100 DATE. 08.09.83.
ON 1125, 3945, 7260 KHz
FM 98 MHZ
Peter Salemalo.
For RADIO VANUATU
P.O. Box 49,
PORT VILA
VANUATU

Robert Brossell values this nice card from Radio Vanuatu.

Craig Campbell's listening post in Iowa.

This nice monitoring post belongs to Randy King of Lincoln, Nebraska.

Adventist World Radio has applied to the FCC to put a shortwave station on the air from Guam, according to a report in the SPEEDX bulletin. Land has been purchased and site preparations are already underway according to the report.

Radio El Salvador is back. After sputtering along for the past couple of years on isolated tests, it's being heard regularly in the evenings now. Check 9.587, 5.992, or (less frequently) 11.983. Transmitter power is 10 kilowatts and programs are a relay of the domestic service. It remains inexplicable why a country under the gun and with heavy U.S. support remained off shortwave for so long, hasn't got high power transmitters, and isn't employing an English language foreign service to tell the government's side of the story.

Speaking of countries that have been off shortwave, a story in *The New York Times* quoting the Grenadian Consulate General Joseph Burke states that shortwave was to have been reactivated by the end of 1984. A new transmitter is apparently available to replace the one destroyed in the U.S. invasion. Former frequencies were 15.045 and 15.105, so keep an ear on those spots.

Readers who need Equatorial Guinea for their logs have a better shot at it now with the country's "International Service" currently being widely reported on 15.106-107 until sign off at 2200. It's in Spanish but does carry some U.S.-produced religious programming. Addresses announced are Box 851, Malabo and Box 441, Bata.

Two new clandestine stations have come on the air in recent months. An anti-Nicaraguan using a very soft-sell approach is Radio Monimbo, on the air daily at 0000 and 0200 for an hour each time. It's heard with very good signals on 6.230. As yet there are no clues as to which group is behind this one. Another new one is Radio SPLA operated by the Sudan People's Liberation Army and Sudan People's Liberation Movement. The station is scheduled on 9.610 at 1300 to 1400 daily in English and Arabic. That frequency is, however, blocked by the Australian at that hour.

DX Ontario, the bulletin of the Ontario DX Association, states that reception reports on Radio Norway International should really be sent to the Norwegian Telecommunications Administration, which operates the transmitters. Their address is: Norwegian Telecommunications Administration, Frequency Management Office, Shortwave Section, St. Clavs Place, P.O. Box 6701, 0130 Oslo 1, Norway. Programming comments and such should go to Radio Norway International, N-Oslo 3.

The International DX'ers Club of San Diego, which has been mentioned in these pages in the past as a source of information and comment on equipment, had to suspend its operation in December, 1983 after the death of founder Larry Brookwell. We're sorry to state that, while a yearlong ef-

fort was made to find someone to take over the club, no one could be located and the club has now officially folded.

In The Mailbag

Ed Lyon of Orono, Maine checks in with his first contribution and a mammoth one it is, too. Ed says he's just gotten back into shortwave following a youthful interest dating back some ten or fifteen years. His main complaint is what he feels is excessive interference from WYFR. Ed also has some unidentified stations—one in Arabic on 15.060 (Saudi Arabia, we suspect), another in Arabic on 15.415 (probably Libya), and still more Arabic on 15.235 (the BBC?).

Craig A. Campbell of Iowa City, Iowa recently attended his first hamfest and found himself a few equipment bargains. Craig recommends attending such events even if you're not a ham. We've got a photo of Craig's shack to show you this month.

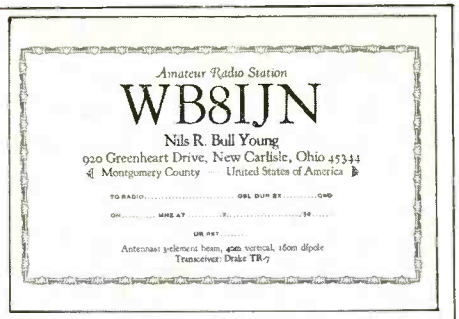
Mark S. Kulick of Lansford, Pennsylvania says he's been a listener for years but is just now getting serious about it. He recently got out of the Air Force and is using the DX-200 he had while on his tour of duty.

Keith Anderson of Houston, Texas was happy to see his contributions in Listening Post and notes that his shack contains a DX-100 and a Hallicrafters SX-62B, coupled to an indoor antenna.

David Bushell of Olympia, Washington has a strong interest in religious broadcasters on shortwave and wonders about getting a list of such stations. There are a lot more of them out there than most people think, David—from the famous HCJB in Quito, Ecuador to Radio Cultural Amauta in Huanta, Peru. As far as we know, no one has ever compiled such a list. Even the *World Radio TV Handbook* only indicates a religious affiliation on the better-known stations. It may be that this is a project you'll have to do yourself, compiling your own list over time.

Nils R. Bull Young of New Carlisle, Ohio who is WB8IJN, runs his own print ship and sends his ham QSL card in lieu of a shack photo. Thanks!

"Yankee Doodle" was heard on single sideband on 6.875 by Steve Unekis of Catlin, Illinois and Steve wonders about the Voice of America's use of single sideband. It's a feeder station, Steve, transmitting VOA programming to one of the relay sites for pick up and rebroadcast.



It helps to be able to print your own QSL cards in your own print shop like Nils R. Bull Young does.

One of the many colorful QSLs offered by the Voice of Free China in Taiwan.

Listening Reports

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

Alaska KNLS heard on 6.100 at 0724 with Big Band music. Schedule received says station is on in English on 6.100 from 0700 to 0900 beamed to Japan and on 7.355 from 1730 to 2000. (Phelps, CO)

Albania Radio Tirana, 7.300 heard at 0345 with cultural program. (Hawk, NE) Opening English half hours at 0129 and 0229 on 7.120. (Lyon, ME)

Radio Gjirokaster home service on 5.020 and parallel 5.057 to 0415. (Shute, FL)

Algeria Radio Algiers at 2011 on 17.745 in English with news, martial music, talk about 1954 revolution, ID, schedule, into Spanish at 2030. (Paszkiewicz, WI) English at 2029 on 17.745 giving frequencies. (Lyon, ME) 2000-2030 news in English, pop music, QSL'd promptly. (Weiss, VA)

Antigua Deutsche Welle relay on 17.810 in English with relay station ID. (Lyon, ME)

Australia Radio Australia, 15.395 from Carnarvon site at 0325 in English with pop music. (Mackenzie, CA) On 6.060 at 1630 with news in English. 15.240 at 0415 with pop music in English, parallel to 15.160 and 15.395. 17.795 at 2335 in English now ruined by Havana. Parallel with 15.395. (Mackenzie, CA) 5.995 at 0955 with English, ID, country music to Papua New Guinea and Southwest Pacific. 6.045 with English at 0930. (Ort, NY) Sign on with "Waltzing Matilda" theme at 0755. (Lyon, ME) 6.150 at 0940 with English. 9.580 excellent with news in English at 1205, Australian news at 1230. (Ort, NY)

Austria ORF on 11.665 in English at 0435 with "Report from Austria." (Mackenzie, CA)

Belgium BRT with "Brussels Calling" on 17.610 at 1425 in English. Off at 1445. Mailbag on Mondays at 1430. (Lyon, ME)

Belize Radio Belize, 3.285 at 0430 in English with 50's rock and ute QRM. (Phelps, CO)

Botswana Radio Botswana on 4.848 at 0345 with their unmistakable interval signal of bells and mooing cow. (Brossell, WI) At 0350 on 7.225 with anthem and ID at 0358 in English and vernaculars. (Salmi, MA)

Brazil Radiobras, 15.290 at 0150, announcements in Portuguese, ID and into English at 0200. (Lyon, ME)

Radio Nacional Amazonas, 6.060 at 0800 in Portuguese with Brazilian pops. Excellent signal. (Phelps, CO) 11.780 at 2325 heard in Portuguese with frequent IDs. (Salmi, MA)

Radio Inconfidencia from Belo Horizonte on 15.190 at 2338. (Shute, FL)

Radio Glob, Rio de Janeiro on 11.805 heard at 0040 with pop music and announcements in Portuguese. (Brossell, WI)

Bulgaria Radio Sofia in English at 2250 on 9.700 with letterbox program. (Lyon, ME)

Cameroon RNC on 5.010 (Garoua, Editor) at 0435

Radio Korea in Seoul doesn't do badly in the attractive QSL department either.

One of the displays at the 1984 ANARC Convention in Toronto. The 1985 edition will be held in Milwaukee, Wisconsin in July.

with news in English at 0504 and again at 0553. Parallel to 4.795 and 4.850 (Doula and Yaounde respectively, Editor). (Lyon, ME)

Canada CBC Northern Quebec Service on 6.195 at 0500 with news in English. (Phelps, CO)

CFRX, Toronto on 6.070 with news, commercials, talk show, ID for medium wave (CFRB) outlet from 0700. (Phelps, CO)

CKZU Vancouver, 6.160 at 0710 with CBC's "Radioactive" program. (Phelps, CO)

Radio Canada International on 15.325 at 1904 with news and features. (Shute, FL)

Chad Radio National Tchadienne heard on 4.904.5 at 0515 with African vocals, announcer in French. Sign on variable around 0456. (Lyon, ME)

China Radio Beijing at 1200 with news in English on 15.520. (Ort, NY) At 1100 in English on 9.820. Schedule given as 1100 on 9.820, 1200 on additional 11.650, 0000 and 0100 on 15.385 and 15.520, 0200 on 15.385. (Lyon, ME)

Chile Radio Nacional de Chile on 15.140 from 2330-0000 with news, music, and commercials in Spanish. (Phelps, CO)

Clandestine Voice of the Liberation of Iran at 1640 on 15.555 in unidentified language (probably Farsi, Editor). Briefly into English and giving address. European classical themes used with talk. Sign off with choral anthem about 1800. (Lyon, ME) 9.026 in Persian at 0420 and occasional military QRM. (Mackenzie, CA)

La Voz del CID at 2217 on 10.040 in Spanish with "Musica Libre" program, CID IDs by man and woman at 2300. (Paskiewicz, WI)

Colombia Radio Sutatenza, 5.075 at 0201 with ID and music. Everything was in Spanish, heavy ute QRM. (Phelps, CO)

Costa Rica Radio Reloj, 4.832 with Latin pops, noted as late as 0600. Also good from around 0815-0900 on 6.005. (Lyon, ME) 4.832 at 0655 in Spanish. (Salmi, MA)

Radio Columbia at 0058 in Spanish on 4.850 with talk, music, IDs. (Paszkiewicz, WI)

Cuba Radio Havana Cuba in English to Europe on 17.885 at 2010 following broadcast in French. Other outlets noted include 17.795 in Spanish at 1530 and 2225, 11.815 in Spanish at 1720, 15.125 in French at 2055 and 2120, 17.885 in French at 1915 and 1955, 6.115 in English at 0130. Also 17.760 and 9.550 at 1500, 1100 on 9.550 in Spanish. Also at 1355 on 11.760. (Lyon, ME) 9.550 at 1305. (Ort, NY) Tentative Havana on 11.640 in English from 0425 to 0433 sign off. (Mackenzie, CA)

Czechoslovakia Radio Prague in English on 6.055 at 2315. Also on 5.930 at 0145. 5.930 at 0100 in English, offering musical selections for taping. (Lyon, ME)

Denmark Radio Denmark with English ID at 1400 on 15.165. (Lyon, ME)

Dominican Republic Radio Clarin, 11.700 at 0045 with Latin music, news, game show at 0130. Radio Earth at 0300. (Lyon, ME)

East Germany Radio Berlin International on 15.450 in English at 1355. 9.620 at 0020 in English, into Spanish at 0025. (Lyon, ME)

Ecuador HCJB on 21.480 at 2130-2200 in English with "DX Party Line." (Mackenzie, CA)

Radio Quito on 4.920 at 0345 in Spanish with songs, IDs. (Salmi, MA)

Egypt Radio Cairo on 9.475 at 0200 with announcements and Egyptian music. Better at 2115 on 9.805. (Weiss, VA)

El Salvador Radio El Salvador 9.587 at 0152 with pop music. (Shute, FL) 2344 in Spanish with ballads, pop music, ID, time check, announcements. Heterodyne from 9.590. (Paszkiewicz, WI)

France Radio France International at 0300 in English on 11.670 and 11.995 with news and frequent use of electronic sound effects. (Lyon, ME)

Finland Radio Finland with English on 17.800 at 1312. Repeat broadcast noted at 1410 on 15.400. (Lyon, ME) 15.400 at 1205 with heavy Voice of America QRM. English with local weather and "Compass North." (Ort, NY)

Gabon Africa No. One on 4.810 with sign on at 0500. Also at 2255 on 11.940 and 4.810 with ID and sign off at 2300. (Salmi, MA)

Ghana Ghana Broadcasting Corporation heard on 4.915 with African vocals at 0551, into English news at 0600. (Lyon, ME)

Great Britain BBC World Service at 0820 on 9.505, 11.860, and 15.400. (Lyon, ME) From 2300-0000 on 9.590 with news, Big Ben, "Meridian." (Kulick, PA)

Greece The Voice of Greece with ethnic music at 0105 on 9.865. (Lyon, ME)

Guatemala Radio Cultural, TGNA, on 3.300 at 0345 with English religious program, into Spanish at 0400. (Salmi, MA) 0400 with religious programming. (Brossell, WI) 0415 with ID in Spanish and easy listening music. (Phelps, CO)

Radio Nacional de Guatemala on 6.180 at 0530 with what seemed a test broadcast, in English and Spanish. (Phelps, CO)

Guinea Voix de la Revolution, 4.910 at 2315 to 2335 fade. Local music was played and there was a man announcer in English. (Ort, NY)

Honduras Radio Luz y Vida on 3.250 with "Unshackled" in English, and then an ID in Spanish at 0402. (Phelps, CO)

HRVC, La Voz Evangelica, 4.820 at 0410 with religious programs in English. (Phelps, CO)

Hungary Radio Budapest, 9.835 at 0215 in English. Poor signal. Are others having difficulty getting good reception of this one? (Ort, NY)

Iran Voice of the Islamic Republic of Iran on 9.022 from 2010 in English. At 1550-1725 on 15.084 with religious recitations and music. Jamming. (Lyon, ME) Believe jamming comes from Iraq. (Editor)

Iraq Radio Baghdad on 9.610 at 1931 with anthem, tone, then off the air, then back with bird interval signal, anthem, ID in German, various music selections and Palestine program at 2008. (Lyon, ME) 2055 in English with comment on Iran-Iraq relationships. (Ort, NY)

Israel Kol Israel on 9.815 at 2230 sign on giving frequencies as 11.960, 11.655, 9.815, and 9.440 plus one other I missed (probably 7.412, Editor). Other English broadcasts announced for 0000, 0100, 0200. Into Hebrew at 2300. (Lyon, ME) 11.655 at 0000-0030 with news, features, and then into another language at 0030. (Kulick, PA)

Italy RAI on 9.575 at 0100 with female announcer and news in English. Shuffles papers, plays one song and English off at 0120, into French to Canada. (Lyon, ME) The RAI lady announcer is notorious. (Editor) 0100 with news in English. (Phelps, CO) On 15.385 at 1905 with interval signal. (Shute, FL)

Italian Broadcasting Corp. (semi-pirate) on 11.585 at 0415 in Italian. Two announcers with comments and pops. (Mackenzie, CA)

Japan Far East Network, 6.155 at 0840 in English with 60's rock, news at 0900. (Phelps, CO)

Radio Japan on 15.300 (via Gabon, Editor) at 0001 in English with news, current affairs. (Shute, FL) 17.825 at 0000 in English with news, press comments, parallel to 15.300. Also at 1645 on 9.505 in Japanese. (Mackenzie, CA)

Kuwait Radio Kuwait at 2045 in Arabic on 9.840 with vocals and talk to 2211 sign off. Parallel with 11.990 and 15.485. (Lyon, ME)

Libya Radio Jamahiriya, 15.450 and 17.930 at 1935 in Arabic. Also at 1505 on 17.940. Also at 2305 on 9.890. (Lyon, ME) Beware—both the 17 MHz frequencies are often used by the Libyan-run anti-Sudanese clandestine. (Editor)

Madagascar Radio Netherlands Relay at 2030 sign on in English to Africa on 11.740. Excellent level. (Brossell, WI)

Malawi Malawi Broadcasting Corporation heard at 0600 on 7.130 with East African music. No announcements until possible ID in English at 0630. Tentative, with bad QRM from ham stations. (Phelps, CO)

Monaco Trans World Radio at 0622 on 7.160 with music box interval signal, ID in English at 0605 with frequencies and program details. (Salmi, MI)

Netherlands Radio Netherlands, 15.560 between 1530-1620 with variety of music to sign off. Also on 17.605. (Lyon, ME)

Netherlands Antilles Trans World Radio, Bonaire on 9.535 at 0400-0500 with religious programming. (Kulick, PA)

New Zealand Radio New Zealand on 17.705 at 0030 in English with news, weather, current events. (Mackenzie, CA)

Nicaragua Voice of Nicaragua on 6.014.7 at 0325 in Spanish. Into English at 0400 with news, reports on CIA activities in Nicaragua, mailbag program called "Contact 248." Also at 0155 in English, into Spanish at 0200. Always a high-pitched hum on the frequency. Jamming? (Lyon, ME) It seems so. (Editor)

Nigeria Voice of Nigeria's West African Service on 7.255 at 0500 in English. Regularly heard with excellent signal. (Phelps, CO) 15.120 at 1800 with news and commentary. (Brossell, WI) At 0950 with religious program at 1015, news at 1030. QRM from Deutsche Welle from 1055. (Lyon, ME)

Northern Marianas KYOI, Saipan, 15.190 at 0500 in English and Japanese. English ID, rock were also heard. (Mackenzie, CA)

Paraguay Radio Nacional on 9.735 at 2219 with ID in

Spanish, light instrumental music, classical, Andean at other times between 2340 and 0100. (Lyon, ME)

Poland Radio Polonia, 0200 on 7.145 with sign on and ID. Poor. (Lyon, ME)

Portugal Radio Portugal on 6.060 sign on at 0025. Also at 0257 ending French to Canada and into English at 0300 to sign off at 0330. (Lyon, ME)

Qatar Qatar Broadcasting Service, 17.910 at 1225. Poor in unidentified language. (Ort, NY)

Saudi Arabia BSKSA on 11.855 at 1617-1643 with BBC classical music program in English. (Weiss, VA)

Singapore BBC relay on 17.710 at 0020 in English with "Radio Newsreel," drama at 0030. Parallel to 15.435. (Mackenzie, CA)

South Africa SABC on 4.840 (4.835? Editor) in English with news program called "Radio Today." (Lyon, ME) 3.250 at 0324 with pop music, English announcements. (Phelps, CO)

Radio RSA, 3.230 at 0417 with news headlines and "Good Morning Africa." (Phelps, CO) 6.010 at 0150 with interval signal, into English. (Shute, FL) 21.530 signing on with birds and guitar interval signal, ID in English at 1700 and into German. 4.990 and 9.585 at 0400 in English. (Lyon, ME)

South Korea Radio Korea, 9.870 in English at 1605 with news. (Mackenzie, CA)

Spain Radio Exterior de Espana at 1255 sign on on 11.790, 17.650, 17.660. At 1800 on 15.535, 17.660. Also at 2235 on 9.630. Also 7.105 at 2215 in Spanish. (Lyon, ME) To North America on 9.630 at 0110-0200 with news, folks songs, press review, Spanish language lesson. Into Spanish at 0200. (Kulick, PA) In English at 0105. (Hawk, NE)

Sweden Radio Sweden International, 17.860 at 1417 with stamp collector's program. (Hawk, NE) 1418 in English, unknown language at 1430. (Lyon, ME)

Switzerland Swiss Radio International at 0145 on 6.135 in English. (Lyon, ME)

Tahiti Radio Tahiti, 15.170 at 0140—some nights it's there, some nights it's not. Island music, current rock, sometimes comedy skits. Also on 11.825 but barely audible. (Ort, NY) 11.825 at 0540 in Tahitian with Polynesian songs. (Salmi, MA)

Taiwan Voice of Free China on 5.985 in English at 0130-0200. (Kulick, PA) Via WYFR. (Editor). 2305 in Chinese, into English at 0100, back to Chinese from 0200 to past 0400. 15.130 in Spanish at 2100, Chinese at 2200-2300 when WYFR programming takes over and Taiwan programs move to 5.985. Also on 9.675 in Chinese at 0315. (Lyons, ME) At 0215 on 11.740. (Hawk, NE) 15.270 in English at 0335. 15.345 at 0355 in parallel to 17.890. (Mackenzie, CA)

Turkey Voice of Turkey on 9.660 at 2215 to sign off at 2250. Also announces 9.720. (Lyon, ME)

Uganda Radio Uganda's domestic service on 5.025 (usually 5.026, Editor) at 0403 with news and ID in English. (Salmi, MA)

Ukraine SSR Radio Kiev, 9.685 in English at 0030-0100. Ukranian poetry, announced repeat broadcast for 0300. (Lyon, ME)

United Arab Emirates UAE Radio, Dubai on 15.435 at 0300 sign on in Arabic. Jammed by 0305 though 11.730 was in the clear. (Mackenzie, CA) 15.300 and 15.320 at 1608 in English with answers to questions on Arabic history, identifications with Tchaikovsky theme, into elevator music. (Lyon, ME)

United States Voice of America with Jazz Hour at 0310 on 5.995, 11.580, 11.675, and 11.740 at 0000. (Lyon, ME)

United Nations Radio (via VOA, Editor) 9.680 at 0815 with "UN Africa," into French at 0830. (Lyon, ME) 9.565 at 0613 with ID in English, news in several languages. (Shute, FL)

WRNO on 15.420 at 1909 announcing toll-free number for requests (1-800-222-0221). (Shute, FL) Jazz at 1846. (Lyon, ME)

Upper Volta (Whoa! We should have listed this under Bourkina Fasso, the country's new name. Old habits die hard. Editor) Ouagadougou heard at 2317 on 4.815 in French with talk by woman, singing in vernaculars, ute QRM. No ID so tentative. (Paszkiewicz, WI)

USSR Radio Moscow world service often between 1200 and 1900 on 15.100 and 15.475. To Britain and Ireland 1900-2000. Other frequencies noted are 9.765, 11.840, 15.135, and 15.540, with 11.840 a split-second delay. (Lyon, ME) 11.840 and possibly others are via the Havana relay. (Editor) 15.100 at 1600-1700, features, music, reports, IDs. (Kulick, PA)

Vatican State Vatican Radio in English at 0050 on 6.105. (Lyon, ME)

Venezuela YVTO time station, 6.100 in Spanish and IDs, time announcements at 1010. (Lyon, ME)

Radio Capital, Caracas, 4.850 variously between 0200 and 0730. All Spanish with pop music in English. (Lyon, ME)

Radio Rumbos, 9.660 at 0230 with IDs in Spanish. Lost after a few minutes. (Phelps, CO) At 0330 strong with music and talks in Spanish. (Brossell, WI)

4.980 Ecos del Torbes at 0227 with songs, Spanish IDs. (Salmi, MA)

Vietnam Voice of Vietnam on 15.010 at 1355 with man and woman giving news in English. Fair. (Ort, NY)

West Germany Bayerischer Rundfunk, at 2115 on 6.085 in German with piano music, news and sports, time pips and ID at 2300. (Paszkiewicz, WI)

Voice of Germany on 9.735 at 0745 in German. (Lyon, ME)

That's the lot. Our thanks to Sheryl Paszkiewicz, Manitowoc, WI; David E. Salmi, Maynard, MA; Ed Lyon, Orono, ME: Robert Brossell, Pewaukee, WI; Harold Ort, Staten Island, NY; Chris Hawk, Omaha, NE; Stewart Mackenzie, Huntington Beach, CA; Michelle Shute, Pensacola, FL; Robert M. Weiss, Fairfax, VA; Stephen W. Phelps, Colorado Springs, CO; and Mark S. Kulick, Lansford, PA.

Remember we are looking for your reports, questions, comments, news, clippings, copies of your QSLs, program schedules and suggestions, along with photos of you in your shack. Til next month, good listening! PC

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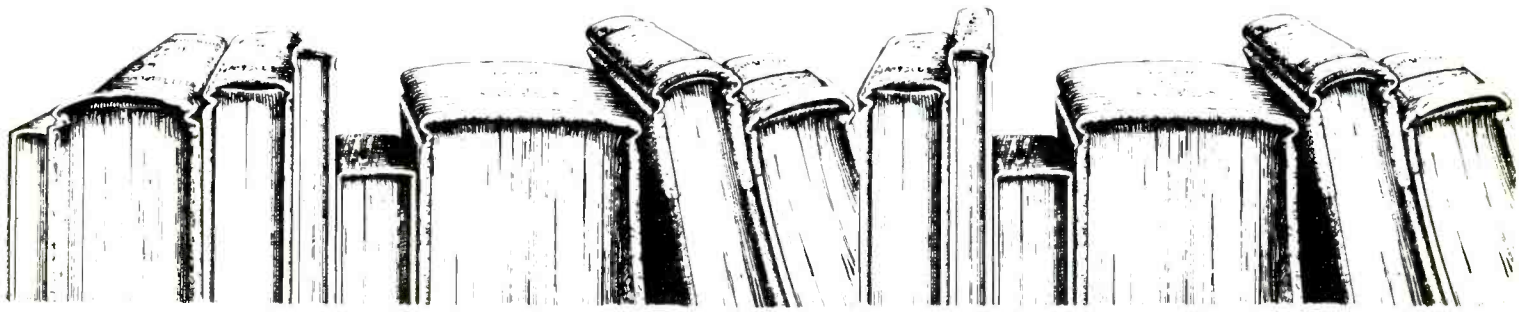

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PIRATES DEN

FOCUS ON FREE RADIO BROADCASTING

BY DARREN LENO, WDØEWJ

The headlines of a British newspaper heralded the arrival of Channel 36, London's first pirate TV station. The British government, which saw its radio broadcasting monopoly fall to hundreds of AM and FM pirates, is now worried it may lose its TV monopoly as well.

And it will if Jim Young, Trevor Jay, and their two associates have anything to say about it. The four men designed and built the portable Channel 36 transmitter. It can be operated almost anywhere, from a high-rise apartment to the back seat of a car, and is capable of delivering a hefty 2,000 watts of power.

Britain's newest TV station will broadcast pop music videos, community programs, and American movies.

"It's a form of protest," said Jim Young. "We developed the transmitter . . . and we applied to the Department of Trade and Industry for a broadcasting license, but we were turned down."

Channel 36 will operate every evening from a small back room above a south London sewing machine shop after the regular stations leave the air, from about midnight onward.

The pirates, if caught, could face a three month jail sentence and a $5,000 fine. (Thanks to Frank Decker of New York for this information).

Across The Dial

KPRC: Neil Wake of Arizona reports hearing KPRC on 3740 kHz at 0425 GMT. This looks like a new frequency for KPRC, which is also active on 91.5 MHz in the FM band. 1616 kHz near the AM band, and 6275 kHz SW. When will you be on TV, guys?

New Wave Radio Int'l.: Cliff Priddle of Oregon heard this pirate with his portable Sony receiver, which he brings with him while he works on a sea-going tug boat. NWRI was operating on 7400 kHz after 0430 GMT.

Radio Blackmore: "AM 1610 and various shortwave frequencies." Robert Gregory in Tennessee caught this pirate on 7435 kHz after 0245 GMT with music and comedy.

Radio Clandestine: Bill Barrow of Wisconsin heard RC on 7425 kHz after 2330 GMT. Unfortunately, atmospheric noise made copying this veteran pirate difficult for Bill. But Michelle Shute of Florida didn't have any trouble picking up this transmission. She reported a very strong signal.

Radio Heartland: This pirate was relayed over the facilities on another pirate when Bill Barrow heard them on 7425 kHz after 0300 GMT. Ron Peebles of Ohio heard a parallel broadcast on 6280 kHz. Such relays are not uncommon among pirates. They often exchange program tapes with each other, hoping to confuse FCC direction finding techniques, or to reach a different geographical audience. They QSL reports sent to Box 6024, Chicago, IL 60680.

Radio Idiot: Apparently, this new pirate is a fan of the Rolling Stones. They played quite a few songs by this group according to Bill Barrow of Wisconsin. Bill heard this pirate on 7425 kHz at 0120 GMT.

Radio North Coast Int'l: Rich Little's comedy album "Reagan in the White House" was featured on a broadcast of RNCI. Jim Nuznoff of Ohio heard his first pirate on 7392 kHz at 0225 GMT. Michelle Shute of Florida tuned in RNCI one evening on 7407 kHz after 0000. K. C. Ross of Illinois reports this pirate on 7408 kHz after 0100. John Friberg, Jr. of New Hampshire caught them on 7410 kHz at 0000. It looks like they've been busy! Reception reports should be sent with 3 First Class stamps to RNCI, PO Box 245, Moorhead, MN 56560.

Radio Shane: A country music pirate calling itself Radio Shane was heard on 7425 kHz at 0140 GMT by Bill McCollum of Nebraska. The announcer spoke with a "country drawl" and played music by Hank Williams. Rick Cunningham of Texas also tuned in to this broadcast, and reports hearing the announcer say "This is Radio Shane calling out deep into the Texas night time, lookin' for Shane. Come back Shane . . . come back . . . we need you. This is Radio Shane. More country music."

Radio Soundwave: Daryll Symington of Ohio heard Radio Soundwave after 0400 GMT on 7425 USB. The address announced on the air was PO Box 393, East Moline, IL 61244. A song was dedicated to the "special lady in Mexico City."

In a letter to A*C*E, Radio Soundwave claimed to be running 350 watts PEP into a vertical antenna at about 20 feet.

WDX: *POP'COMM* Editor Tom Kneitel in New York caught the WDX Thanksgiving night program on 1620 kHz. Noted at 0530, signals were weak with marginal copy. A loop phone number of (212) 569-9979 was announced but didn't seem to work when it was tried. Professional station promos give WDX a nice sound.

WIMP: Over in Virginia, Joe Erwin heard WIMP on 7410 kHz at 0500 GMT. This is Joe's first pirate, so he's looking forward to receiving a QSL card for a reception report he sent to PO Box 982, Battle Creek, MI 49016. Congratulations, Joe.

WMTV: It continues to be heard. Rob Peebles of Ohio heard them on 7417 kHz after 0500 GMT. Chief Engineer Dave said WMTV was running 50 watts into a sloper, while the DJ claimed he was also operating a 10 watt FM transmitter. Their mailing address has changed since our listing in the January, 1985 issue. It is now P.O. Box 1945, Delray Beach, FL 33444.

WPRI: Andy Bohn in Ohio tuned into WPRI after 0000 until 0117 on 7420 kHz. The station was playing rock music and taking requests on the phone line.

Radio Free Insanity Fined

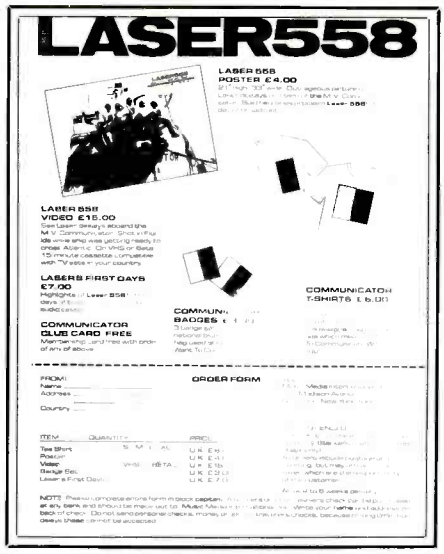
The verdict is finally in from the Federal Communications Commission. Radio Free Insanity (RFI) has been found guilty and was sentenced to pay $500 to the FCC over a 10-month period.

RFI station manager the "Electric Buddha" said "It's not such a bad deal. I asked them in my last letter to reduce it to $100 . . .

Radio Free Insanity's "Scorpio" likes to wear a bag over his head while he's on the air.

SW pirate KQSB sends these QSL cards to listeners around the world.

*Readers with a computer and telephone modem may find the A*C*E RBBS a useful tool for locating info on pirates. Call (913) 677-1288, 24 hours a day.*



Laser 558 offers these collectables to its listeners. Note the New York address.

but they didn't go for it." RFI expressed no regrets about broadcasting without a license in spite of the fine.

Radio Free Insanity operated from Indianapolis, Indiana and was closed on April 9, 1984 at 0009 GMT during a transmission on 7415 kHz.

The FCC raid on RFI was led by George Sklom, Assistant Engineer in Charge of the Commission's Chicago Field Operations Bureau.

RFI gained a wide following of listeners with their rock music format that featured songs from the 1960's and early 1970's.

At least one person took such a liking to RFI that he began his own Radio Free Insanity after the original was closed down, and the RFI on the shortwave bands today is not the original (nor is it endorsed or affiliated by the latter in any way).

In a letter addressed to this column, the operator of the current RFI said "We begin our broadcasts on 7440 kHz (local) Friday, Saturday and Sundays." Programming will include rock music, commentaries, and a comedy segment, and will commence at 0230 GMT "sharp." The letter was signed by "Omac," the station manager.

Michelle Shute of Florida commented after hearing the second RFI, "Maybe they should change their name to Radio Free Profanity. They sure use enough of it!"

West Coast Pirates

I am told that the following AM and FM pirates are currently operating on the west coast of the U.S. and are anxious to be heard by listeners in their areas.

KDX "Studio 54" is running 125 watts on 540 kHz in the Los Angeles area from 0915 to 1130. This station plays rock and country & western music.

KBLA "the Boss of the Beach" runs 75 watts on 830 kHz in the Long Beach, California area. They broadcast from 0600 to 1200 and play rock music.

KDXR "FM 90" is active in north-central Orange county, California from 1830 to 2100 on 90.1 MHz. This station plays punk rock music.

KMZQ "Magic 104" can be heard playing "oldies" on 104.1 MHz in the Santa Barbara, California area after 0500 until 1200.

KSBR "Shake & Bake 102" broadcasts with 10 watts on 102.3 MHz from Coalinga, California—a city unfortunate enough to have been the site of a devastating earthquake last year. This station will be moving to 93.5 MHz soon, and is reportedly run by DJs at KOLI-AM.

KENT "Super 66" has a hefty 150 watts on 660 kHz AM. Readers in Kent, Washington should look for this pirate most evenings after 0700.

KRDJ from Seattle can be heard on 104.5 MHz after 0600 playing "oldies but goodies."

Cliff Richey, Jr. of California reports hearing what he thinks was a politically radical pirate operating on 87.5 MHz from 0915 to 0939 GMT in the Livermore, California area. No ID was mentioned, and the station abruptly left the air. Has anyone else near Livermore heard anything like this?

Out in the midwest, Mike Pingetzer of Nebraska has heard KDOW operating near Cambridge, Nebraska on 107.1 from 0701 to 1515.

On the east coast, Al Spremo has been hearing the regulars in New York City—KPRC on 91.5 MHz after 0500, Stereo Nine on 91.9 MHz after 0430, and WHOT on 91.5 MHz after 0700.

In Canada, Saul Chernos has heard a new FM pirate. CHZM has been operating afternoons and evenings on 100.0 MHz in Toronto.

Clandestines

George Zeller, Ohio's great clandestine chaser, has recently logged the following stations.

La Voz del CID	7470 kHz	0400 GMT
	7352	0015 GMT
Radio Farabundo Marti	6961-6980	0100 GMT
(this station changes frequencies regularly to avoid jamming by the El Salvador gov't.)		
Radio Impacto, Costa Rica	6150	1145 GMT
Radio Quince de Septiembre	5555	0500 GMT
	6215	
	7050	
(This station may use all three frequencies at the same time.)		
Radio Venceremos	6868	0300 GMT
	6556	0000 GMT
Voice of the Libyan People (in Arabic)	15050	1845 GMT

Pirate Radio RBBS

Readers with personal computers and telephone modems may be interested to learn about a new service sponsored by the Association of Clandestine radio Enthusiasts (A*C*E).

The A*C*E Remote computer Bulletin Board System (RBBS) is on-line in Kansas City 24-hours-a-day. Callers will be able to read current loggings, news updates, and articles related to pirate radio stations. Clandestine and Spy broadcasters are also included. Both public and private messages may be entered onto the RBBS. A*C*E is hoping to soon offer some of the many popular public domain software programs for SWLs and DXers that are available from the ANARC Computer Committee.

Dial 913-677-1288 to take advantage of this free service. First-time callers may find access somewhat restricted until their password is validated, usually within 24 hours.

The Pirates Den will accept loggings for this column on the A*C*E RBBS. Just leave them for Darren Leno. For more information, contact A*C*E, PO Box 452, Moorhead, MN 56560.

In Conclusion . . .

The Free Radio Address Directory is a six page alphabetized list of pirate addresses. It covers nearly 90 stations that have been active since 1978. The cost is $1 cash. Write DVS, Box 5074, Hilo, HI 96720.

The New York DX Association sponsors the DX Newsline, a recorded message featuring DX tips and general broadcast information. The number is (212) 981-4866. New York area callers should leave their name and address at the end of the message if they would like to receive membership information about the NYDXA.

I would like to thank the people listed in this column for their participation in Pirates Den. I sincerely appreciate the support and enthusiasm readers have been showing. I'd like to encourage you to send copies of your pirate QSLs, tips, loggings, photos, magazine and newspaper articles— anything having to do with pirate broadcasting, to this address: The Pirates Den, c/o Popular Communications, 76 N. Broadway, Hicksville, NY 11801.

Remember, most pirates broadcast on or near the frequencies mentioned in this column, usually during weekend evenings. PC

RTTY

THE EXCITING WORLD OF RADIOTELETYPE MONITORING

BY JOSEPH JESSON

Letters continue to inquire about RTTY reception of military and government communications. It is true that most of the military and government communication is quite secure and encrypted to prevent,casual monitoring of the most secret of communication. When I say most, I mean the U.S. and the larger governments' military RTTY communication. Certain third world military and embassy RTTY (such as Cuba) can be monitored using suitable decoders. One needs to be able to select odd baud rates rather than the standard 45, 50, and 75 baud rates.

A computer would be ideal for first measuring the shortest bit time (directly related to baud rate) and calculating the baud rate required to translate the pulses into meaningful Baudot characters and finally readable plaintext.

The AEA programs are some of the few programs able to measure baud rate. A vast 40% to 75% (depending on baud) of all RTTY HF signals are military and encrypted. I do not know of *anyone* able to read U.S., U.K., or Soviet military communications other than the RY test message or simple "Hi family . . ." basic greeting type messages.

My column will not focus on encrypted military communications but will publish third-world military frequencies and other choice bits of information such as time, shift, and baud rate. Other questions in the mailbag include: "Do I need an audio processor?" and "Is my radio OK for RTTY?".

An audio processor is fine for RTTY but not required. I found a good audio processor has a sharp notch filter, useful for nulling out any interfering audio heterodyne or "beat tone." Adjacent RF carriers will mix with the intended FSK (Frequency Shift Keying) RTTY carrier to produce a false mark or space tone. An audio processor can notch out the erroneous tone and provide clean copy, a luxury but not necessary to start. In fact, a good IF crystal or mechanical filter is preferable over an audio filter.

Unfortunately, the interfering signal will affect the receivers automatic gain control and reduce the signal gain and hence reduce the *intended* RTTY signal. In a learning stage, the adjustable audio filter adds quite a bit of complexity on top of learning to "read" an RTTY signal by adjusting baud rate, shift, phase, and fine tuning. A radio suitable for RTTY reception is a stable and selective one. Currently, most of the receivers in the market are more than adequate in sensitivity. Selectivity is expensive, so that would be a good place to start. A selectivity specification of 1.8 to 2.3 kHz is ideal for general RTTY monitoring.

Keep in mind the need for a "shape factor" that is better than three to be suitable for quality RTTY monitoring. The shape specification refers to the ideal rectangular window (1:1) of a "perfect" IF filter. Expensive crystal or mechanical filters have a shape factor of 1:2 to 1:3 (not required for general RTTY monitoring). Stability is a key parameter to watch when judging receiver suitability for RTTY. A drift of greater than 200 Hz can be really annoying while listening to RTTY. Your finger has to be continually adjusting the tuning knob while trying to get solid copy.

Even a small 50 Hz drift (50 Hz "peaking" after tuning the HF receiver for optimum copy) can increase RTTY errors significantly. Most synthesized HF radios have a stability specification of 50 Hz per hour—adequate for general RTTY monitoring.

Satellite RTTY monitoring represents a whole new experience for the dyed-in-the-wool HF RTTY DXer. In fact, I like to think of satellite digital communication as several HF 10 kHz to 10 MHz bands! Every digital data transponder represents a new band, an extremely large territory to explore. And in order to explore satellite RTTY listening, several ingredients are necessary, including your stable synthesized HF receiver. Instead of watching these endless old movies and other video "delights," try exploring satellites for data and other strange signals.

If you want a brand new exciting territory to explore, try connecting your HF receiver to the "raw" IF output of a TVRO receiver or FM (70-75 MHz) receiver. Keep your RTTY demodulator connected to your receiver's audio output. We have not brought this to our readers in the past due to a lack of complete details on exactly how to monitor RTTY signals on satellite TV. A brand new book, *The Hidden Signals on Satellite TV* has now revealed the specifics on doing this. The book (available from Universal Electronics, Inc., 4555 Groves Road, Suite 3, Columbus, Ohio 43232, $16.95 ppd) discusses many of the non-video services carried on the satellites including telephone channels, world news, audio subcarriers, teletext, and of course our interest, RTTY. Chapter 5 reviews the FSK data on subcarriers and the FSK data equipment required. One must keep in mind the satellite is a real Babel of modulation techniques, both digital and analog (voice). Everything under the sun may be found from SSB voice to 1.5 megabit digital data being transmitted to earth waiting to be listened to or watched on your monitor. A minimum configuration would include the standard video fare—satellite dish antenna (4 ft. works OK for some RTTY signals), TVRO receiver with an IF output jack (0-4.2 MHz bandpass or "raw" output) and, of course, your favorite HF receiver and associated demodulators.

Any standard demodulator will work but, as we mentioned earlier, all types of modulation are being used and the complete shack will include several other demodulators to handle the potpourri of signals. I would recommend other demodulators, such as data modems, in addition to your

```
 * START @ LOCAL TIME:09:29:09, 25 NOV 84  *

GLGL

LAT0061 4 XAFP-MA01
PETROLEO NOTA-2AHOJA
      LAS TEMPERATURAS ELEVADAS PARA LA ESTACION, EN EL HEMISFERIO
NORTE, EXPLICAN EN GRAN MEDIDA ESA FALTA DE EXITO Y SE SEGUIA
ESPERANDO EL REPUNTE DE LA DEMANDA, SEGUN HIZO NOTAR UN EXPERTO.
   SIN EMBARGO, NUMEROSOS PAISES DE LA OPEP, TIENEN TAMBIEN UNA
GRAN RESPONSABILIDAD, SI NO RESPETAN LAS REGLAS DE LA ORGANIZACION
ACERCA DE LOS PRECIOS Y DE LAS CANTIDADES DE PETROLEO VENDIDAS.
   NIGERIA, PAIS CUBIERTO DE DEUDAS Y UNICO MIEMBRO DE LA OPEP QUE
HAYA BAJADO OFICIALMENTE SUS PRECIOS EN OCTUBRE, ES ASI CITADO
ESPECIALMENTE ENTRE LOS QUE DIERON UN REPUNTE A SU PRODUCCION.
   IRAN, EN GUERRA, HA HECHO LO MISMO, APROVECHANDO LA REDUCCION
VOLUNTARIA DE LA PRODUCCION DE ARABIA SAUDITA. ESE TAMBIEN SERIA EL
CASO DE OS EMIRATOS ARABES UNIDOS (EAU).
   OTROS PAISES, COMO VENEZUELA E INDONESIA, PRODUCIRIAN MAS QUE
SUS NUEVOS  CUPOS, EN VIGENCIA DESDE EL PRIMERO DE ONOVIEMBRE,
(RESPECTIVAMENTE 1,555 Y 1,189 MILLONES DE BARRILES DIARIOS.
   IRAN Y LOS EAU TAMBIEN ROMPIERON LA UNIDAD ACERCA DE LOS
PRECIOS : TEHERAN OTORGO REBAJAS, HASTA DE DOS DOLARES EL BARRIL DE
CRUDO LIVIANO Y UN DOLAR EL BARRIL DE PESADO, INDICARON VARIAS
FUENTES.
   LOS EAU, POR SU PARTE, ADEMAS DE LAS REBAJAS, HAN ACRECENTADO
LOS MARGENES DE LAS COMPANIAS QUE OPERAN EN SUS YACIMIENTOS.
   SIGUE.HCM.
AFP  251535 GMT NOV 84
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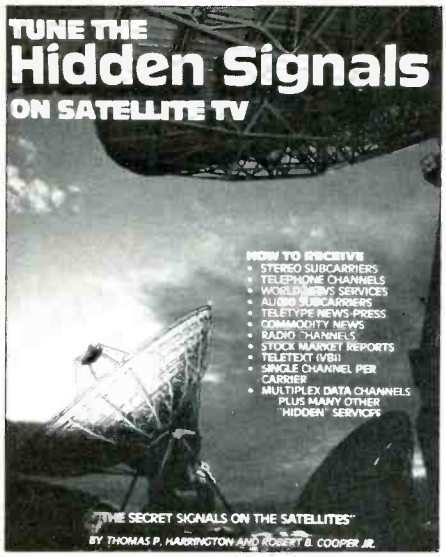
Figure 1



The Hidden Signals on Satellite TV *contains detailed information on how to monitor RTTY signals on satellite TV.*

standard demodulator. *The Hidden Signals* points out the need for a stable satellite receiver by defining the width of a single FM signal at 0.000015% bandwidth at 46 Hz! Two TVRO receivers that have the necessary unfiltered baseband video/audio output are: USS/MA5PRO SR-2, United Satellite Systems, St. Hilaire, MN 56754, and MACOM M-1 receiver from MACOM, Box 1729, Hickory, NC 28603.

A source of surplus 2000 baud and 2400 baud ICC (Racal) modems for satellite RTTY use was found—ERA, 601 Linden Place, Evanston, IL 60202, (312) 475-1082. A 2000 baud modem (Model 2200/20) is priced at $150 ppd and a 2400 baud modem (Model 2200/24) is $200 ppd; send SASE for list. I found new 2400 baud modems to be out of my budget at $800 to $4500 each, depending on features. Satellite DXing is not an inexpensive hobby, but it is a new growth area. One has to be adept at HF RTTY DXing in order to move into the more complex satellite listening.

Al Quaglieri sends us the MARS-NET RTTY schedule. USAF HQ station "AIR" transmits a weekly broadcast for MARS-NET station each Wednesday at 1900 GMT on 7832.5 kHz and 15515.0 kHz, and at 0200 GMT Thursdays on 4873.5 kHz and 7832.5 kHz.

The usual test tape at 45 baud begins 10 minutes before the hour, followed by the broadcast on the hours. A test tape at 74 baud immediately follows the 45 baud broadcast. This broadcast is also sent via CW at 15 WPM (0100 GMT) Thursday on 6995.5 and 13997.5 preceded by a two minute test.

Figure 1 is a reliable, usually 57 or better signal strength, 425 Hz RTTY French News Agency found on 15908.0 kHz during the morning (1500 GMT) through afternoon hours. This RTTY signal provides a good initial checkout of your RTTY system. Let me know any new RTTY loggings. PC

Beaming In *(from page 4)*

hearings. By then we will also have the final transcript of the tape of a recent phone call you made to the National Park Service in which you said they were yellow and acted as if they were stoned."

"No — no — my vacation! I asked for a brochure on Yellowstone Park."

Ah yes, I can hear it now! The phone call I made to the Postal Service asking about rates for me to send a reception report to Radio Havana Cuba must have triggered the flashing lights on a few dozen computers. (Maybe it's just as well that when they asked for my name I gave them yours.)

The phone company, of course, hasn't yet seen all of the potential this brings up. For a slight extra fee they ought to offer their customers an all new service—*privacy!* The Postal Service figured this out more than a century ago; a postcard costs a certain fee to send out, but everybody can read what you've got to say. If you want privacy you've got to use an envelope, which costs extra. Given the choice, most folks opt for privacy and pay the extra fee.

Knock, knock.

"We understand that you place most of your 'phone calls under the extra fee privacy facilities now being offered. At your hearings, you'll be expected to explain what you've got to hide."

Oh, forget it! PC

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PANARAMIC ADAPTER, Watkins-Johnson SM8512-6, 455 kHz IF Input, 5 kHz, 20 kHz, 50 kHz spread. Excellent condition $395.00. Frederick 1203 Variable Shift RTTY Demodulator. The best! $395.00. Excellent condition. Frederick 1202 Fixed 850 Hz Shift RTTY Demodulator. $125.00. Frederick 1500A receiver. Crystal controlled. $360.00. Tektronics 3L5-R564B-2B67 Spectrum Analyzer. $600.00. HP 3330 B Automatic Synthesizer. $1800.00 Joe Jesson, 21414 W. Honey Lane, Lake Villa, IL 60046. (312) 356-6817.

WANTED TO BUY a Montgomery Ward's Transatlantic All-Band Receiver. Shortwave. In good shape. Or one like it in price. Gene Perryman, Rt. 2, Box 1104, Kendrick, Idaho 83537.

SWL ANTENNA BOOKS. Your SASE brings complete outlines. Ed Noll, Box 75, Chalfont, PA 18914.

FM-PLL SIGNAL GENERATOR kits, 88-108 MHz, meets FCC specs. Send S.A.S.E. to: JT Communications, 546 Silver Crs. Ct., Ocala, FL 32672.

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"SUPER SAVINGS" ICR-71A $659.50, Kenwood R-2000 $495.50, HX-1000 30ch $239.50, MX-5000 $385.50, BC-250 $254.50, Radio Tap $189.50, MFJ, Sony, Panasonic, antennas, more!! 25 page picture catalog $1.00 (refundable). Galaxy Electronics, Box-1202, 67 Eber Ave., Akron, Ohio 44309. (216-376-2402) 9-5 p.m. EST.

FM-DX sampler tape cassette with how-to primer $3.00. Radio and electronics catalog 20¢ stamp. FM Atlas, Adolph, MN 55701-0024.

SOLAR ELECTRICITY. Photovoltaic systems for remote power or emergency backup. Generate electricity by sunlight. Send $1.00 (refundable with order) to Springhouse Energy Systems, 418 Washington Trust Building, Washington, PA 15301 (412) 225-8685.

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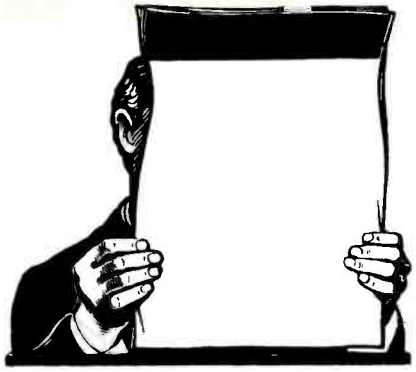
CHESS BY AMATEUR RADIO. License unnecessary. Information: K2VJ, Box 682A, Cologne, NJ 08213.



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:

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AD INDEX

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Uniden® Bearcat® scanners are approved for use in neighborhood crime prevention programs.

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The World Class World Receiver

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Options. FM, RC-11 wireless remote controller, synthesized voice frequency readout, IC-CK70 DC adapter for 12 volt operation, MB-12 mobile mounting bracket, two CW filters, FL32-500Hz and FL63-250Hz, and high-grade 455KHz crystal filter, FL44A.

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