

CD-08635

# POPULAR COMMUNICATIONS

APRIL 1983 \$1.75

## Rebel Communications In Afghanistan

**New Killer Electronic Weapons • The Strange Case Of "Operation Annie" • Build The DX'ers Dipole • Getting Those Non-Broadcast QSL's • A 5-Watt Spy Transmitter—WWII Vintage • Build A "Hidden Broadcast" FM Adapter • How To Buy A Telephone Answering Machine**



# IC-R70

# NEW!

The Commercial Grade Communications Receiver that everyone has been asking for..... at a price you can afford!



## GENERAL COVERAGE RECEPTION AT ITS BEST

Listen to the world of HF with the R70, a 100KHz to 30MHz commercial grade receiver designed by ICOM Incorporated, the leader in advanced receiver design. Built from knowledge gained by designing receivers for commercial, marine, and amateur use, the R70 surpasses other receivers on the market...even receivers costing more than twice as much.

Utilizing ICOM's DFM (Direct Feed Mixer), the R70 is a receiver which in normal usage is virtually immune to intermodulation distortion or cross modulation, yet still maintains superior sensitivity. Whether you are a SWL (short wave listener), Ham (amateur radio operator), maritime operator or commercial user, the R70 provides the features you need.

## DESIGN

The R70 incorporates an UP conversion system, utilizing a direct feed mixer proven to be the best design for minimizing interference from strong adjacent signals. A preamp is provided for making the weakest of signals readable. High grade filters in

conjunction with the built-in PBT (pass band tuning) system and notch filter, provide the ultimate in interference rejection. Selectable AGC (fast/slow/off), noise blanker (wide or narrow), and tone control improve readability under the worst conditions. An AGC derived squelch, operative in all modes, adds to operating ease.

Dual VFO's with three tuning rates provide quick QSY (frequency change), memory for an important station, or by equalizing the VFO's (A=B), a digital RIT. 13.8 VDC operation is provided as an option, 117 VAC is standard.

## HAM'ING

The R70 is an ideal general coverage receiver to complement any ham shack. Use it with your existing transmitter or transceiver to provide dual receiver capability.

The R70's built-in monitor system lets you listen to your own transmitted audio and a mute input automatically protects the R70's receiver from your signal.

An option for FM allows listening to the 10 meter FM activity.

As an additional plus to ICOM IC-720A owners, the R70 has an optional

interface that will allow the R70 to control the transmit frequency of the 720A for the ultimate in hamming versatility.

## SWL'ING

For the short wave listener, the readout section of the R70 gives all the information for logging a station to be returned to at a later time. Frequency, mode, VFO, signal strength are all displayed. A dial lock prevents accidental loss of a signal.

A front mounted speaker provides 3 watts of crisp clear audio. A record jack allows easy attachment of a tape recorder.

## ICOM SYSTEM

Like all ICOM HF products, the R70 fits into the ICOM system concept of accessories allowing you to use previously purchased accessories such as the HP1 headphone, SP3 external speaker, and AH1 auto bandswitching antenna.

## PRICE

Check with your local ICOM dealer for pricing on the R70. You will be amazed.

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 **ICOM**  
The World System

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All stated specifications are approximate and subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions.

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Pop Comm

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# Synthesized Hand-Held Scanner!

Communications Electronics,™ the world's largest distributor of radio scanners, now has even *lower prices* on our radio scanners. Chances are the police, fire and weather emergencies you'll read about in tomorrow's paper are coming through on a scanner right now.

With your scanner, you can monitor the exciting two-way radio conversations of police and fire departments, intelligence agencies, mobile telephones, energy/oil exploration crews, and more. Some scanners can even monitor aircraft transmissions! You can actually hear the news *before* it's news. If you do not own a scanner for yourself, now's the time to buy your new scanner from **Communications Electronics**. Choose the scanner that's right for you, then call our *toll-free* number to place your order with your Visa or Master Card.

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

## NEW! Bearcat® 350

**The Ultimate Synthesized Scanner!**

List price \$599.95/CE price \$384.00

**7-Band, 50 Channel • Alpha-Numeric • No-crystal scanner • AM Aircraft and Public Service bands • Priority Channel • AC/DC Bands:** 30-50, 118-136 AM, 144-174, 421-512 MHz. The new Bearcat 350 introduces an incredible breakthrough in synthesized scanning: Alpha-Numeric Display. Push a button—and the Vacuum Fluorescent Display switches from "numeric" to word descriptions of what's being monitored. 50 channels in 5 banks. Plus, Auto & Manual Search, Search Direction, Limit & Count, Direct Channel Access, Selective Scan Delay, Dual Scan Speeds, Automatic Lockout, Automatic Squelch, Non-Volatile Memory. Order your Bearcat 350 today!

## Bearcat® 300

List price \$549.95/CE price \$336.00

**7-Band, 50 Channel • Service Search • No-crystal scanner • AM Aircraft and Public Service bands • Priority Channel • AC/DC Bands:** 32-50, 118-136 AM, 144-174, 421-512 MHz. The Bearcat 300 is the most advanced automatic scanning radio that has ever been offered to the public. The Bearcat 300 uses a bright green fluorescent digital display, so it's ideal for mobile applications. The Bearcat 300 now has these added features: Service Search, Display Intensity Control, Hold Search and Resume Search keys, Separate Band keys to permit lock-in/lock-out of any band for more efficient service search.



## NEW! Bearcat® 350

## Bearcat® Rebate Offer

Get a coupon good for a \$30.00 rebate when you purchase a Bearcat 100, \$15.00 rebate on model 210XL, \$10.00 rebate on model 200. Offer valid only on purchases made between September 1, 1982 and October 15, 1982. Limit of one rebate per household. Offer good only in the U.S.A. Void where taxed or prohibited by law. Resellers, companies, clubs and organizations—both profit and non-profit, are not eligible for rebates. Employees of Electra Company, their agencies, distributors and retailers of Bearcat Scanners are also not eligible for rebates.

## Bearcat® 210XL

List price \$349.95/CE price \$229.00

**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. When you purchase the Bearcat 210XL between September 1, and October 15, 1982, you'll also get a factory rebate coupon good for \$15.00.

## NEW! Bearcat® 20/20

List price \$449.95/CE price \$276.00

**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. The Bearcat 20/20 automatic scanning radio replaces the Bearcat 220 and 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.

## NEW! Bearcat® 200

List price \$269.95/CE price \$179.00

**8-Band, 16 Channel • AC only • Priority Dual Scan Speeds • Direct Channel Access Frequency range:** 32-50, 138-174, 406-512 MHz. The Bearcat 200 is a scanner with high performance. Sealed one-piece keyboard lets you program each channel for automatic scanning. There's automatic lockout to by-pass individual channels. Direct Channel Access to go instantly to any channel. Plus Automatic Squelch, Dual Scan Speed, Selective Scan Delay and Automatic Search to let you find hidden frequencies.

## NEW! Bearcat® 100

**The first no-crystal programmable handheld scanner.**

List price \$449.95/CE price \$284.00

**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 1 1/4" case more scanning power than is found in many base or mobile scanners. The Bearcat 100 has a full 16 channels with frequency coverage that includes all public service bands (Low, High, UHF and "T" bands), the 2-Meter and 70 cm. Amateur bands, plus Military and Federal Government frequencies. It has chrome-plated keys for functions that are user controlled, such as lockout, manual and automatic scan. Even search is provided, both manual and automatic. Wow...what a scanner!

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

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

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CE price \$149.00

Looking for an excellent cordless telephone? We recommend the Fanon model FCT-200. This cordless phone is designed and engineered to provide many years of reliable service and put an extra measure of convenience into your home or office. It features extended range, automatic secure protection, two-way intercom between the Fanon-phone handset and a conventional phone plugged into the base. Manual secure lock override. Two-way call alert. Last number memory redial. High-low volume control and low battery indicator light. Full duplex, simultaneous conversation capability. Operates with most touch tone or rotary dial systems. FM quality - quiet operation. Rechargeable Nickel-cadmium batteries included. Under ideal conditions, the range is 700 feet. Order today!

### TEST ANY SCANNER

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

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## Bearcat® Four-Six ThinScan™

List price \$189.95/CE price \$118.00

Frequency range: 33-47, 152-164, 450-508 MHz.

The incredible, Bearcat Four-Six Thin Scan™ is like having an information center in your pocket. This four band, 6 channel crystal controlled scanner has patented Track Tuning on UHF. Scan Delay and Channel Lockout. Measures 2 1/4 x 6 1/4 x 1 1/2". Includes rubber ducky antenna. Order crystal certificate for each channel. Made in Japan.

## Fanon Slimline 6-HLU

List price \$169.95/CE price \$104.00

**Low cost 6-channel, 4-band scanner!**

The Fanon Slimline 6-HLU gives you six channels of crystal controlled excitement. Unique Automatic Peak Tuning Circuit adjusts the receiver front end for maximum sensitivity across the entire UHF band. Individual channel lockout switches. Frequency range 30-50, 146-175 and 450-512 MHz. Size 2 1/4 x 6 1/4 x 1 1/2". Includes rubber ducky antenna. If you don't need the UHF band, get the Fanon model 6-HL for \$94.00 each, and save money. Same high performance and features as the model HLU without the UHF band. Order crystal certificates for each channel. Made in Japan.

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Regency † M400 Scanner	\$229.00
Regency † M100 Scanner	\$195.00
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SP50 Bearcat AC Adapter	\$9.00
SP51 Bearcat Battery Charger	\$9.00
SP58 Bearcat 4-6 ThinScan™ carrying case	\$12.00
FB-E Frequency Directory for Eastern U.S.A.	\$12.00
FB-W Frequency Directory for Western U.S.A.	\$12.00
FFD Federal Frequency Directory for U.S.A.	\$12.00
TSG "Top Secret" Registry of U.S. Government Frequencies	\$10.00
ASD Frequency Directory for Aircraft Band	\$10.00
TIC Techniques for Intercepting Comm. Manual	\$12.00
CIE Covert Intelligence, Elect. Eavesdropping Manual	\$12.00
B-4 1.2 V AAA Ni-Cad batteries (set of four)	\$9.00
A-135cc Crystal certificate	\$3.00

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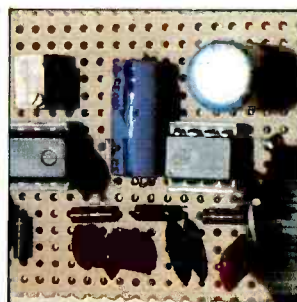
# POPULAR COMMUNICATIONS

APRIL 1983

VOL. 1, NO. 8



8



64



66

**FEATURES****Killer Electronic Weaponry 8**

There's plenty to say for missiles and tanks, as well as the efforts of the infantry, but electronics is equally awesome as a weapon. Here's the story.

**Rebel Communications In Afghanistan — COVER STORY 14**

A close-up look at the primitive two-way communications used by the Afghanistani rebels, who are giving the Soviets a run for their money!

by Tom Kneitel, K2AES

**The Strange Case Of "Operation Annie" 16**

No, it's not a Hollywood musical, but a secret broadcaster that helped turn the tide of WWII in Europe.

by Tom Kneitel, K2AES

**Getting Those Non-Broadcast QSLs 20**

Yes, QSLs from police, fire, commercial CW, ship, and other stations you'd probably not think of trying for—and a frank discussion of "secrecy of communications" laws.

by Joe Bellinni, KIA0DL

**Broadcasts From The Land Of The Headhunters 26**

Stasiun Bilong calling from one of the more exotic corners of the world. Here's how you can hear what they're saying.

by Gerry L. Dexter

**Selected 24-Hour English Broadcasts 30**

Around-the-clock international broadcast schedules.

by Gerry L. Dexter

**POP'COMM Scans The South Carolina State Troopers 32**

The inside scoop on the communications of this interesting state agency.

**Five Watt Spy Transmitter 36**

One tube did it all during WWII, and you can't get much smaller than that!

by Anson MacFarland, KVA4EX

**Build The DX'ers Dipole 48**

An all-band DX antenna that can improve your ability to hear those distant stations.

by Tony Earl, KNY2AE

**Scanning The American District Telegraph Company 62**

Major national private security company in the area of central station alarm operation. Here's their station roster.

by Rick Maslau, KNY2GL

**Eavesdrop On Hidden FM Broadcasts 64**

Build this simple SCA adapter and connect it to your FM broadcast receiver to tune in "private" broadcasts of music and news.

**Sampling Telephone Answering Machines 70**

Here's what to look for in these useful communications aids, and how to get the most for your money.

by Gordon West, WB6NOA

This month's cover: Courtesy of Soldier Of Fortune magazine. See story on page 14.

**DEPARTMENTS**

Beaming In . . . . .	4	POP'COMM Product Spotlight . . . . .	53
Mailbag . . . . .	7	Free Radio Focus . . . . .	54
Scanner Scene . . . . .	34	Washington Pulse . . . . .	59
Listening Post . . . . .	38	Satellite View . . . . .	66
RTTY Monitoring . . . . .	41	POP'COMM Products . . . . .	68
Radar Reflections . . . . .	44	On The Line . . . . .	70
Communications Confidential . . . . .	46	Communications Shop . . . . .	75
Survival . . . . .	50		

# BEAMING IN

BY TOM KNEITEL, K2AES

## AN EDITORIAL

### Dead Carriers

I suppose that April was the wrong issue to mention this, for surely some will say that it's a cheap shot at an April Fool story. April Fool story it's not, but it is nonetheless sort of weird. I'm referring to the fact that I opened up a respectable magazine, *OMNI*, and saw, believe it or not, coverage of the latest techniques in communicating with the dead (November, 1982 issue: "Radio For The Dead," page 146). Those same techniques and those working with them are also given coverage (including a front cover) in *New Realities Magazine* (Vol. 4 No. 6).

What these magazines and several other members of the media are so worked up about is a machine called *SPIRICOM Mark IV*, the apparent function of which has produced some early results in two-way communications with the dearly departed, a factor which has supposedly opened up all sorts of discussions of the technical and religious aspects of such contacts. At a conference of the prestigious National Press Club in Washington, D.C., *SPIRICOM*'s developer, George W. Meek, stated, "For the first time we have electronic proof that the mind, memory banks, and personality survive death of the physical body," and that *SPIRICOM* is only an elementary start towards perfection of a communication system using "electromagnetic and etheric energies" that should someday permit those living on earth to have telephone-like conversations very much like those alive in higher levels of consciousness. Beyond that, he said, there is the distinct possibility of a television-like device, although he cautioned that perfection of any of these devices is still off into the future and may take a bit of time.

Meek's experiments with such a machine are nothing new in the way of serious attempts at such a device. That ol' rascal, Thomas Edison, had spent a considerable amount of time in his declining years attempting to design and build a machine along the lines of *SPIRICOM*. He never claimed any success in those experiments. Others have made serious attempts too, such as the 1956 experiments by von Szalay and Bayless, who worked with a technique later called Electronic Voice Phenomenon (EVP). In 1959, a Swedish experimenter named Friedrich Jurgenson claimed that he'd accidentally had success with a technique essentially the same as EVP, which he's recorded on magnetic tape. Jurgenson's success seemingly inspired others to go forth with attempts to perfect EVP; these included Dr. Konstantine Raudive and his associates, Alex Schneider and Theodore Rudolph. These are heavyweight people. Raudive is a noted psychologist, Schneider is a physicist,

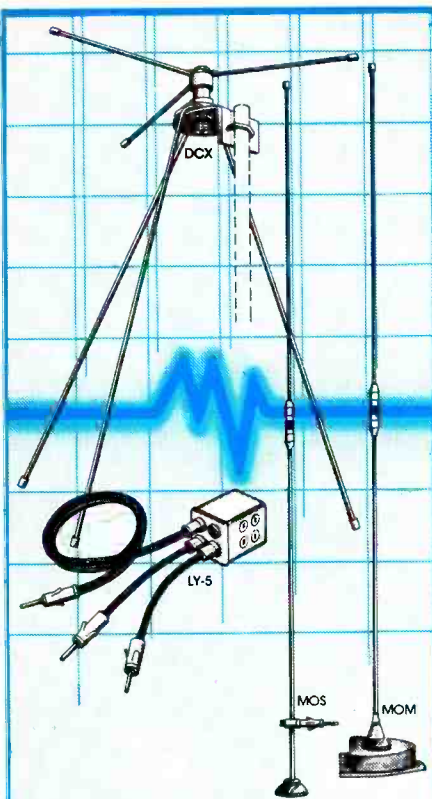
and Rudolph is a high frequency engineer who worked for Telefunken. Another associate of Raudive was Dr. Franz Seidl, an Austrian electronics engineer. Their independent and cooperative experiments produced results which they and many others found encouraging, if not altogether successful.

The basic EVP technique is really simple. A reel-to-reel tape machine is obtained and loaded with a high quality, low-noise tape. One microphone is replaced with a germanium diode and a coil feeding off a three inch antenna. The second track of the machine is fed with a standard microphone, located far enough away from the machine so as not to pick up any sounds from the machine itself or any noises from outside (such as passing traffic). Then, with the volume at maximum, the experimenter asks for voices to come through. This is repeated every minute or so and recordings are made for two or three minute periods, after which headphones are used to see if any disembodied voices appear on either the microphone or diode input tracks. Supposedly, the voices are very low but can be heard. I've tried this experiment myself without any success whatsoever.

The *SPIRICOM* experiments are far more complex, however, and a considerable amount of electronics hardware is required. One piece of equipment used by Meek is an R-390A communications receiver, which is tuned to 29.600 MHz (apparently one of the reception channels), which would imply that the departed are all 10 Meter band Hams. It is said that communications are via FM. *SPIRICOM*'s technique also uses a "special combination of 13 audio frequencies from 21 to 701 Hz; and the input of energy from an operator who has certain highly psychic abilities." The apparent communications are produced (or reproduced) by means of the artificially generated audio tones and have a distinctly mechanical quality, not at all unlike the voice that comes from a computer; they aren't always easy to understand. In fact, Meek, via his Metascience Foundation (P.O. Box 747, Franklin, NC 28734), sells tapes of some of his communications, as well as literature on his experiments (including instructions for building a *SPIRICOM* machine).

I've heard the *SPIRICOM* tapes, read some of the material, and have had correspondence on the topic with Dave Beauvais, KB1F, who has devoted a considerable amount of time toward trying to figure out exactly what this is all about. Despite Meek's proclamation that he has spanned the great

(Continued on page 74)



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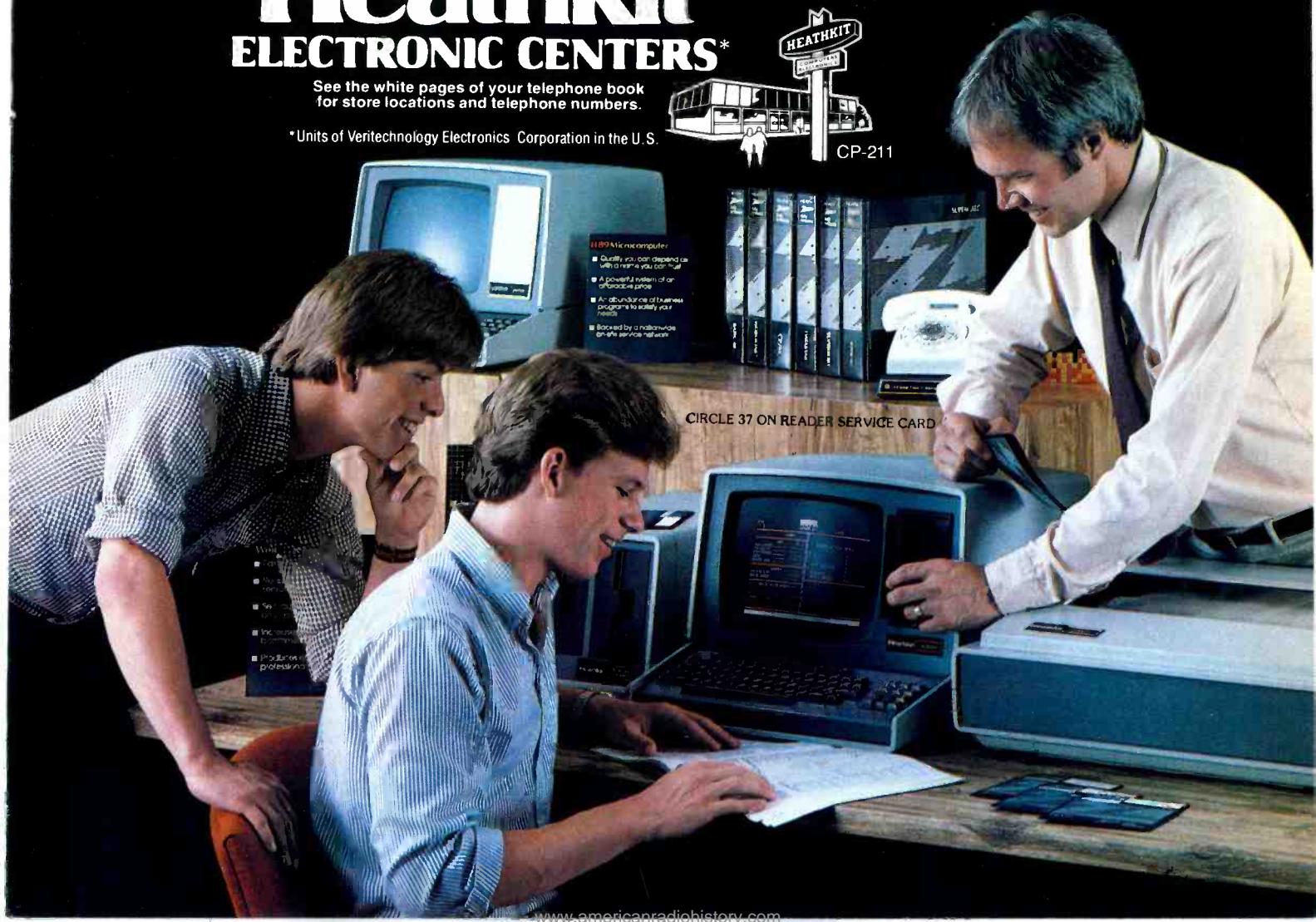
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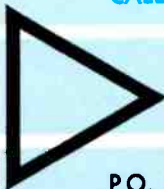
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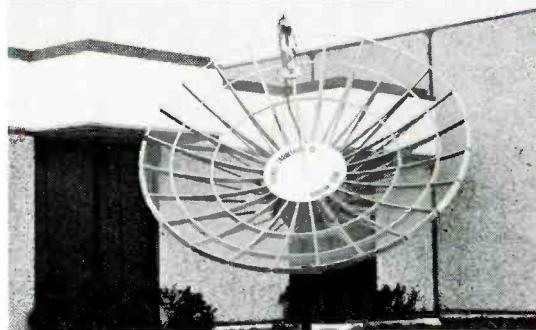
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The most interesting questions we receive will be answered here in each issue. Address your questions to: Tom Kneitel, Editor, Popular Communications magazine, 76 North Broadway, Hicksville, NY 11801.

### Spookspeak

After reading your November story on Spy Lingo, I admit to being impressed by the amount of information you've collected. Getting the buzzwords isn't very hard, but figuring out what they all mean is another matter. I used to be a member of the "Intelligence Community," but left when it became clear to me that we were gathering many times more raw intelligence than we could process, and what little was processed was invariably misinterpreted.

I'd like to add a little to your story; while your explanation of NORFORN was correct, it wasn't complete. Through mutual agreements, most classified NORFORN (No foreign) documents are nevertheless available to the British, Australians, Canadians, New Zealanders, and Israelis. Documents aren't marked NORFORN to keep them out of the hands of our allies, only away from our enemies.

An organization used to exist (and still may) called the Old Crows. The group was made up of present and former "Spooks" from within the electronics end of the various Intelligence Services. In fact, "Spook" was a word you should have included!

Name withheld by request  
Ohio

"Spook" was not included because, like other slang terms along the lines of "being wired" or "a black bag job," which are prevalent within intelligence work, the story was primarily intended to address itself to the official terminology rather than the slang. The slang sounds like a good topic for another story though! Your point regarding NORFORN is well taken!—Editor

### Pay Radio

I've heard of "pay-TV," but—would you believe the term "pay radio" is now being heard amongst the multitudes? Have you heard about this? What's it all about?

Morty Golden  
Sims, IA

National Public Radio, Panasonic, and a company called Codart are teaming up to offer radio listeners a chance to tape music off the radio without getting the record industry steamed up. The Codart system, just getting ready for a test in San Francisco, broadcasts music during the time when a

station would otherwise have been off the air. The broadcasts can be received on normal radios, but Codart subscribers don't have to stay up all night waiting to turn on their tape recorders since the program is received on a specially programmed tape recorder with a built-in timer. Subscribers will be sent a catalog listing the programming. When a listener wants to record a selection, he telephones a special number and is given a code to program into his tape recorder connected to an FM receiver. Inaudible signals transmitted by the broadcaster trigger the tape recorder to start recording at the appropriate moment.

Panasonic is manufacturing and marketing the receivers while NPR has agreed to provide programming for the system and to encourage member stations normally off the air between midnight and 6 AM to let Codart use their facilities. The home recording equipment is a one-time investment and sells for about \$110. Panasonic will be offering combined radio/recorders in a range of prices. The phone call (to an 800 number) is free. The fee for recording is about 50¢ or a single to \$5 for an album. For national distribution, NPR is working up a package of programs, including classical music, commentary, etc. The reason the recording industry isn't howling mad about the project is that the record companies will be receiving royalties from Codart for the recordings made. The record industry has long blamed falling sales on those who tape programming from the radio.

NPR will receive a fee for preparing the material over its satellite. Participating stations also receive a fee. The test in San Francisco is to find out what kinds of program materials are most desired so that the system can best serve the audience. Audience reaction will shape the type of equipment Panasonic will make. The San Francisco test should start sometime this month.—Editor

### Talking Bird?

In the book *The Home Satellite TV Book* by Anthony T. Easton, it says that if you put a shortwave communications receiver in place of the TV set at your earth station, you can receive nationwide telephone calls, radio news feeds, and other assorted satellite communications. Sounds like a good reason for communications type people to get into satellite TV.

Don Hicks  
Carson City, NV

A communications receiver normally tunes only as high as 30 MHz and is designed for reception of AM, SSB, and CW transmissions. TV receivers are designed to tune about 55 MHz for video and FM audio reception. Obviously such equipment isn't di-

rectly interchangeable at the output end of a TVRO converter. You don't say if the author of the book gave any additional information or qualifications toward accomplishing this feat. However, on the face of your very brief description, it doesn't sound easily feasible.—Editor

### Let's Have A Blowout

Oilwells seem to be prone to what we in Texas call a "blowout." In its most basic description, it's a well that has run wild and over which there seems to be no control. Violent flames bellow high into the air, pouring dense black smoke for miles and destroying any equipment that happens to be set up around the drilling site. About the only way to extinguish this costly disaster is by the use of explosives. The most well known expert in putting out these blowouts is Red Adair. Red and his crew seem to be called into service for each of these spectacular events, and somehow he always manages to get things under control—whether the blowout is on land or at an offshore drilling rig. News film of Red Adair at work has shown him using two-way communications to coordinate his crew. How can I find out the frequency used by Red Adair and his crew?

Mark Howe  
Paris, TX

Red operates out of Dewalt, Texas, and is licensed on 463.775 MHz under the callsign KTG243.—Editor

### Purple Pumpkin Eater

What do you know about a shortwave station calling itself "The Voice of The Purple Pumpkin"? This station has been heard on 7.409 MHz after midnight.

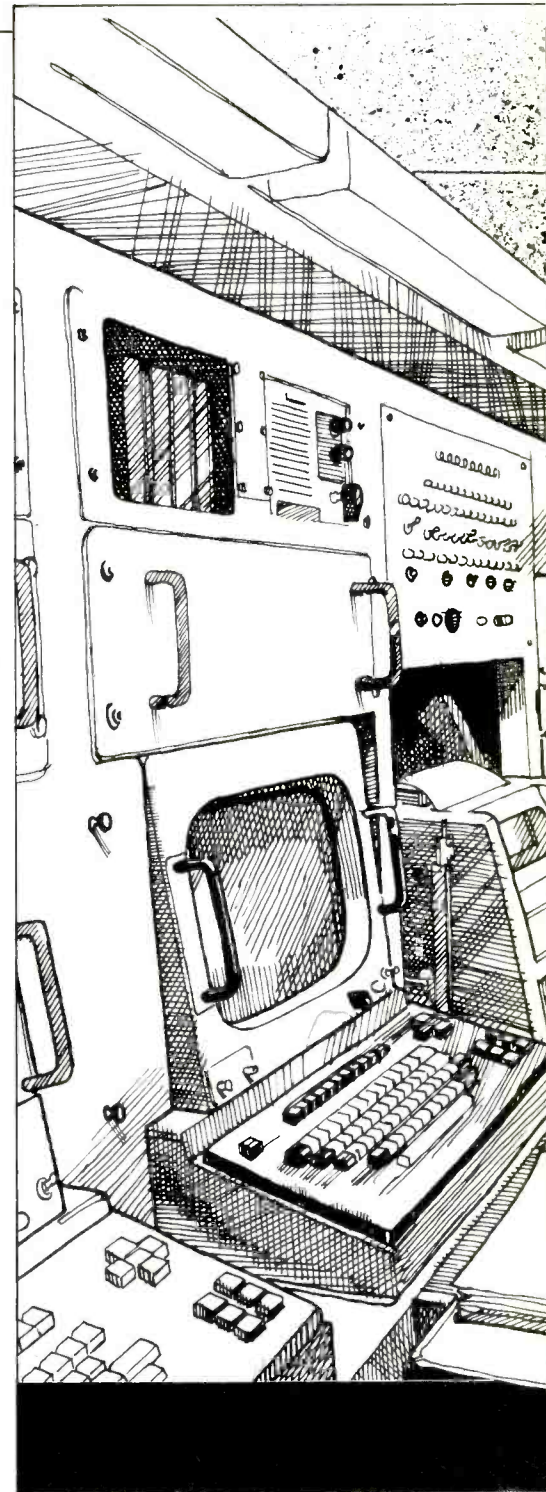
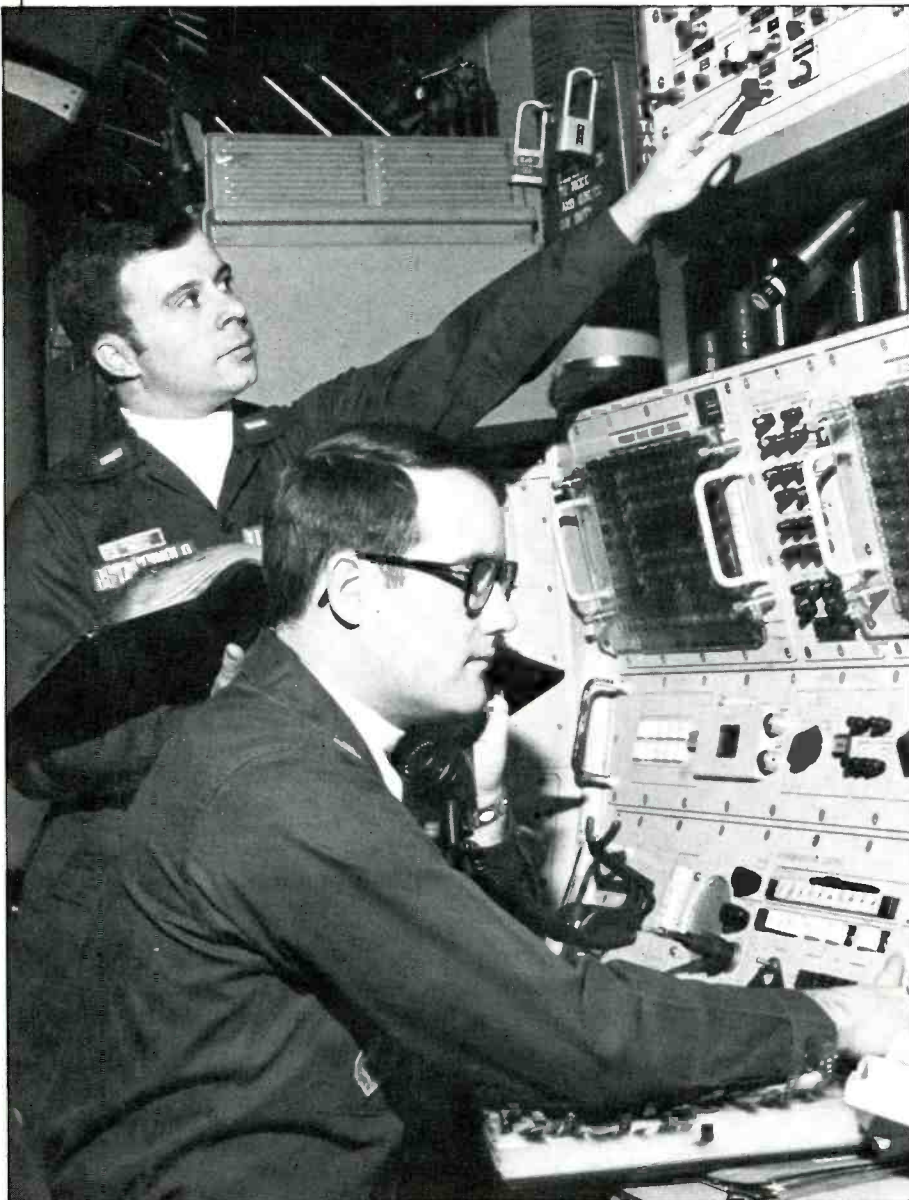
George Bennett  
Pine Bluff, AR

This is a pirate that appears every few years on various frequencies, obviously with a different owner each time. It goes back into the 1960's and was heard at times during the 1970's. In its early 1970's incarnation, it was located in Washington, D.C., and was on 7.345 MHz, using an ID which sometimes included the self-assigned callsign WSWL. Why a cult has formed surrounding this particular station name is beyond me; nevertheless, every couple of years, the ID is adopted by persons obviously dedicated to keeping it alive. Many of the stations you'll monitor between 7.350 and 7.450 MHz are pirates, especially those broadcasting in English and using unusual ID's. The current "Voice of The Purple Pumpkin" says it's "broadcasting live from downtown you-know-where."—Editor

# Killer Electronic Weaponry

*Tipping The Balance In Military Power*

*Communications is the method used to coordinate the deployment of our electronic weaponry.*



**A** turning point in the history of warfare was reached in 1982. A pair of brushfire wars finally proved what military strategists had increasingly been predicting: That the outcome of future battles will hinge less on how many tanks, ships, or aircraft are deployed than on the new technology of electronic warfare.

Even so, the proof was so spectacular that military brass all over the world bolted to attention. Thanks to electronic warfare, the scorecard for Israel's June 9 raid on Soviet-built antiaircraft missiles in Lebanon was so lopsided that a former Israeli intelligence



Ground based radar stations keep track of aircraft and satellites and watch for missiles.

major function of EW is to foil an enemy's use of EW methods through electronic countermeasures (ECMS) — and then to thwart hostile ECMs with counter-countermeasures (ECCMs). To counteract radar jamming for instance, one ECM technique would be to jump to other frequencies. And an ECCM might fool a jammer by returning false radar echoes that create a spurious target. The price of this electronic one-upmanship can easily escalate beyond the means of even industrialized Europe. "The time comes when you have to ask how much smaller countries can afford," says Britain's Menaul.

Just how potent electronic warfare can be was clearly demonstrated by Israel's fantastic success against Syria. The Israelis wiped Lebanon's Bekaa Valley clean of 19 surface-to-air missile (SAM) launchers without losing a single jet. In just one battle, they obliterated more SAM launchers than had been fielded against their country during the entire Yom Kippur war, when SAMs took a harrowing toll. In the first three days of that 1973 conflict, Israel lost more than 150 aircraft. The carnage stopped only after sophisticated radar-jamming gear was rushed in from the U.S.

The latest air war was lopsided, too, but this time in Israel's favor. When Syria sent up 60 Soviet-built MiG fighters to defend its SAM batteries, 90 U.S.-made Israeli jets pounced and shot down 36 MiGs — without a single loss. On the following day, Syria dispatched 50 more MiGs to challenge the Israeli air force — and not one of those jets returned to base, the Israelis claim. Rumors of a secret Israeli weapon quickly cropped up. But the consensus among Western military experts is that the only secret weapon was a devilishly clever and thorough battle plan,

chief declares that "shock tremors" must have ripped through Warsaw Pact countries, since the same missiles defend their air space.

The fight between Argentina and Britain over the Falkland Islands also points up the pivotal role of electronic warfare (EW), which did much to even the struggle between a NATO power and a Third World country. Because of Argentina's modest EW capability — the Exocet missile being only the most publicized example — Britain barely managed to escape humiliation, emerging the victor as much by dint of determination and luck as by military might. "We

fought yesterday's war," admits retired British Air Vice-Admiral Steward Menaul. "The Israelis fought tomorrow's war."

Syria learned the hard way that just possessing advanced weapons such as SAM-6 missiles does not mean much unless they can be employed. Denying an enemy the use of his weapons, typically by jamming signals that guide or control weapons, is the first objective of electronic warfare — and can be much more cost-effective than participating in a conventional arms race.

There is a flip side, however, to this superficial economic advantage, since the second



Grumman's EA6B Prowler can flood the airwaves with radar jamming signals. These can foul up the guidance system of a missile 600 miles away. (Courtesy Grumman)

based on hard-won experience, that exploited such unconventional weapons as little pilotless planes that collected vital data and helped carry out the attack (drawing). "Their tactics were bold and superb," says a high-ranking U.S. defense official.

Richard D. Delauer, Under Secretary of Defense for research and engineering, has been pushing for more emphasis on offensive EW tactics, along the lines of what the Israelis did in Lebanon — to use EW-based weaponry such as radar-seeking missiles and intelligence-gathering drones to destroy bombers and submarines before they can launch their missiles. The Defense Dept. is a little miffed that the Israelis have withheld full details on how they used U.S. weapons in Lebanon, but a 10-man evaluation team is ready to leave for Israel "at the drop of a hat."

The U.S.'s growing leadership in EW is due to more than just its lead in basic electronics technology, although many of today's EW weapons would have been impossible 10 years ago, before the advent of the computer on a chip. Also, EW's rising importance has tracked the careers of Vietnam veterans, many of whom are now colonels and generals who saw firsthand the effectiveness of early EW systems. Today EW has top priority at Defense.

### The U.S. Drive

Last year the U.S. spent an estimated \$3.4 billion on EW research and procurement, and Pentagon officials say that EW is by far the fastest-growing item in the defense budget. Judith L. Comeau, defense electronics analyst at Goldman, Sachs & Co., pegs annual EW spending growth through fiscal 1985 at 25 per cent vs. 14 per cent for defense spending as a whole. The EW budget controlled directly by the Defense Dept., rather than by the individual services, is rising even faster: 27 per cent a year, heading for \$3.3 billion in 1984.

"Advances in microelectronics and optics (for EW uses) will be more significant than advancements in aeronautical and naval technologies," declares Norman R. Augustine, president of Martin Marietta Corp.'s Denver Aerospace and chairman of the Defense Science Board. Defense spending is shifting from new weapon platforms to EW equipment, in part because such hardware can extend the service life of current planes and ships by years, perhaps decades.

This drive to improve the U.S.'s EW capability is a major reason the Electronic Industries Assn. estimates that the total electronic content of all defense hardware will jump from 40.6 per cent (\$22.7 billion) in 1981 to 47 per cent (\$106 billion) in 1991. "Electronics has completely permeated modern military capability," observes William J. Lewis, staff specialist in the Defense Dept.'s new EW directorate. So the Pentagon is funding development of a new breed of superfast semiconductor chips that will pro-

vide a "quantum leap" in EW skills and will continue to keep the Soviet Union at a strong disadvantage, despite the 1,300 air defense radars and 1,800 SAM launchers installed in Eastern Europe. That no doubt explains why the Kremlin has assigned so many agents to pirate U.S. electronics technology.

EW is already prompting changes in fundamental U.S. military strategy. The Army, for example, has a brand-new master doctrine, called AirLand 2000, that stresses "electronic warfare (in) all combat forces to destroy, disrupt, and deceive" an enemy. The Army is now in the process of establishing an EW battalion in every division and developing some remarkable new weapons.

For example, the Defense Advanced Research Projects Agency is coordinating a joint Army-Air Force program called Assault Breaker. If radar surveillance indicated that enemy armor was massing behind the front lines, a special missile would be launched at that area. Flying in high over the tanks, it would spew out 30 or more small rockets that float slowly down on parachutes, scanning the terrain below with sensors tuned to find tanks and other armored vehicles. Then these rockets would cut their parachutes loose and swoop down on the hapless tanks. One Assault Breaker missile could knock out an entire tank company up to 30 mi. behind the battle area. The little rockets can also be salted by air along roads, where they will lie in wait — in effect, missile mines — until their sensors detect approaching tanks. The various missile designs are currently being worked on by Honeywell, Avco, Boeing, and Hughes Aircraft. Since the NATO command believes that its forces could stop the first wave — but only the first — of a Warsaw Pact invasion, Assault Breaker could be crucial to winning a European war.

The Air Force last fall finished its own EW master plan and set up a special Electromagnetic Combat Office to oversee its execution. One of the new office's responsibilities, says Colonel Tofie M. Owen, coordinator of EW research for the Air Force, is to shift the EW perspective "from looking at present



The Lockheed P-3C Orion carries highly advanced (and secret) computers, submarine sensors, and other electronics equipment. (Courtesy Lockheed)



The Grumman E2C Hawkeye can track more than 250 radar targets from 250 miles out and then radio the information to ships and fighter aircraft. (Courtesy Grumman)

threats to looking instead at projected threats — clear through the 1990's.

The Navy, too, completed an Electronic Warfare Master Plan — its first ever — less than a year ago. This plan, currently being updated for distribution to top Pentagon brass and operations commanders, is designed to merge air and submarine defenses. It will “orchestrate all the jamming, decoys, cover, and deception measures available to carrier battle groups,” says Commodore Hugh L. Webster, EW division director in the Office of the Chief of Naval Operations.

As the British experience with Exocet missiles made all too plain, the Navy has a horrendous problem. And the situation will only get worse. Notes one Navy source: “We have a much better, longer-range antiship missile in operation” — the Harpoon from McDonnell Douglas Corp., with a 70-mi. range, vs. the Exocet's 45 mi. A new version of General Dynamics Corp.'s Tomahawk cruise missile will extend that range to 700 mi.

A similar Soviet missile is already carried on the Backfire bombers assigned to naval operations. “Once those missiles are launched,” admits a high Navy officer, “there will be hell to pay.” So the trick is to spot the Backfires before they get within missile shooting range and force them to come within a carrier fleet's protective “bubble.” The Navy has already extended the defensive bubble of fleets to at least 200 mi. to meet the Soviet Backfire threat.

Forcing a hostile bomber to fly into that bubble is the mission of the EA-6B Prowler, packed by Grumman Aerospace Corp. with some of the world's most powerful radar-frequency transmitters. It can flood the air with jamming signals — but to jam a Backfire up to 600 mi. away, the EA-6B's effective range has to be extended. It is one of the Navy's top priorities.

An early-warning aircraft, also built by Grumman, works with F-14 fighters carrying long-range Phoenix air-to-air missiles to provide the outer ring of defense for a task force. The E-2C, a carrier-based cousin of the Air Force's AWACs, has a radar dome that sweeps 250 mi. in all directions and on-board computers that can track more than

250 targets and calculate intercept vectors for fighter pilots. Planes that penetrate those outer defenses will be met by missiles fired by a computerized battle-control system called Aegis. Developed by RCA Corp., this \$350 million system will go into operation later this year, aboard the cruiser USS Ticonderoga. If an enemy plane manages to evade all of a fleet's defenses and launch a missile, close-in antimissile defenses would either destroy the incoming weapon with antimissile missiles or “seduce” it into heading for a bogus target, an electromagnetic image of a ship projected over the ocean. Even if all defenses fail — and some “leaker” missiles are bound to get through — the Navy asserts that its ships could cope with the kind of damage that ultimately destroyed the HMS Sheffield.

On the other hand, a small but vocal group of critics, led by Senator Gary Hart

(D-Colo.), charge that antiship missiles have made big ships obsolete. They maintain that the costs of defending a \$12 billion carrier of the Nimitz class against a handful of missiles worth maybe a million dollars are escalating out of reason. Even if the Navy has the situation under control now, Hart's group contends, the next generation of super-smart antiship missiles will raise these stakes substantially. The new weapons will not need precise target data before they launch, and they will have ECM gear to overcome jamming — plus their own jammers to confound antimissile defenses. These big-ship skeptics advocate spreading the investment in naval power and building more, smaller ships.

The commander of the British fleet, Admiral Sir John Fieldhouse, also believes that the threat of sea-skimming missiles would best be countered by lighter, faster, and more maneuverable ships. One probable reason: intelligence reports that the Sheffield was attacked in part because a Soviet satellite, Cosmos 1355, collected preliminary targeting data as it passed over the Falklands on May 4, about four hours before the attack. “How much,” asks one critic, “will it cost to equip carriers with jamming gear that can blind spy satellites?”

Another nettlesome question is the indirect cost of arms exports. Colonel Jonathan Alford, deputy director of the Institute of Defense Studies in London, believes that the export of arms may no longer be worth the returns. The Royal Navy's ECM equipment, he points out, is designed to face Soviet weapons; it does not work against weapons produced by friendly nations. The two Exocets that hit the British freighter Atlantic Conveyor were diverted — they were aimed at the carrier Invincible — but



Portable air traffic control stations can be set up in almost any location to communicate with aircraft carrying advanced electronics devices. (USAF photo)

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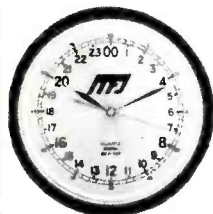
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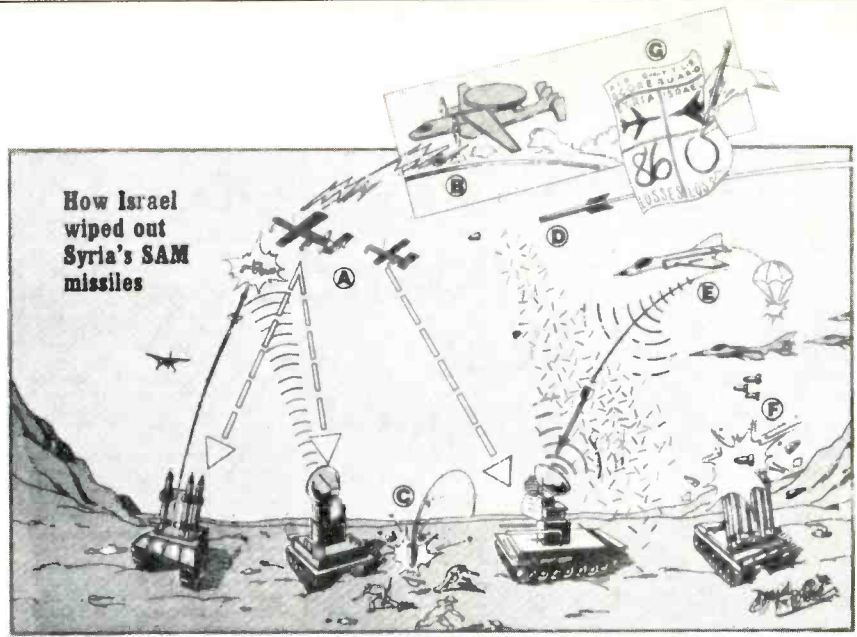
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Remotely piloted vehicles (A) flew into the Bekaa Valley, beaming signals that fooled the Syrians into believing the tiny plastic craft were Israeli jets. The Syrians turned on surface-to-air radars, allowing the RPVs to "fingerprint" the radar. These data were relayed to an E-2C command plane (B) so jammers on Israeli planes could be set to the right frequencies. As Israeli aircraft neared, the E-2C called for an artillery barrage to harass ground crews (C) and rockets to dispense aluminum chaff that prevented the radars from locking on the attacking planes (D). F-4 Phantom jets outfitted with Wild Weasel jammers and missile-diverting flares (E) fired missiles that home in on radar signals or on reflected light from the RPVs' laser target designators. Without their radar, the SAM launchers were "blind" and could be destroyed by conventional bombs dropped from F-16s (F). When Syria sent up its MiGs to defend the surface-to-air missile batteries, the E-2C command plane directed Israeli F-15s and F-16s to a point where they could fire long-range missiles before the Syrians detected them.



The AN/SSQ-77 Vertical Line Array DIFAR (VLAD) sonobuoy, which floats in ocean waters, can be dropped by aircraft to detect the sounds made by submarines. The buoy automatically radios the information to a military relay satellite.

only by the simple tactic of confusing them with chaff fired from the frigate Ambuscade.

Similarly, the British were unable to jam modern radars such as the Westinghouse Corp. units supplied in 1981 to Argentina by the U.S., after Washington lifted its ban on arms shipments. One of these radars was installed on a mountain overlooking Stanley, the Falklands capital, and also assisted in the attack on the carrier Invincible.

U.S. defense experts admit that the same situation applies to American EW weaponry. The Pentagon does not fund development of countermeasures for its own weapons. Israel, in fact, may be the only nation in the world that develops defenses for both Western and Soviet EW weapons. "Until seven years ago," says Benzion Nvaeh, head of R&D at Israel's Defense Ministry, "we concentrated entirely on the study of East bloc weapons. But in recent years we have been forced to closely monitor Western systems in order to be able to deal with them in combat."

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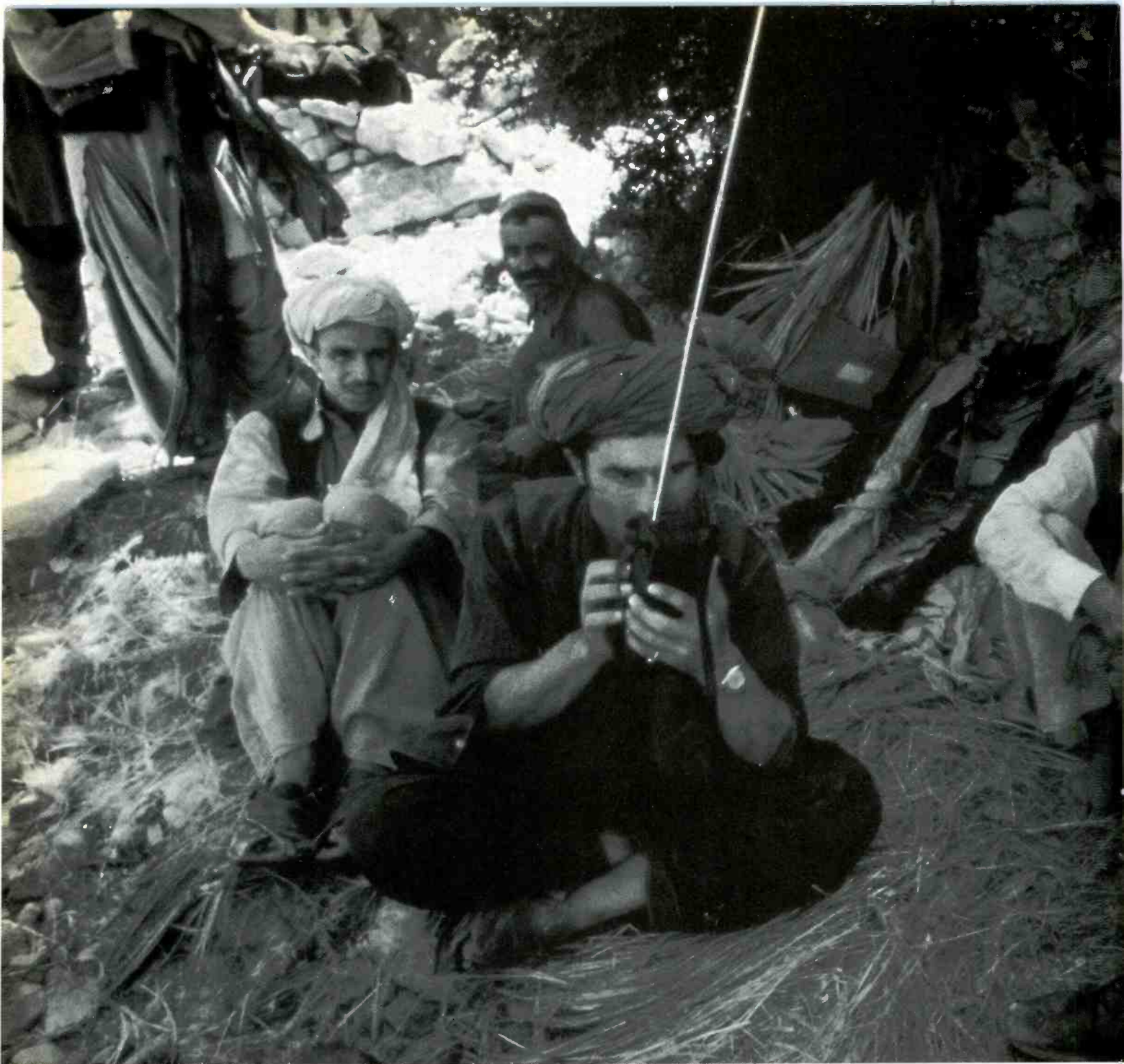
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[www.americanradiohistory.com](http://www.americanradiohistory.com)



*The communications system of the Mujahideen is comprised of a single pair of low-powered 49 MHz walkie-talkies!*

**Cover Story**

# **Afghanistani Rebel Communications**

***Unsophisticated But Obviously Effective***





**W**hen the Soviet military invaded Afghanistan in December of 1979, the consensus was that the takeover of the backward nation would be accomplished in short order. The Soviets devoted an enormous amount of troops and hardware to this effort and yet, more than three years later, they have accomplished only a few of their objectives.

Afghanistan is about the size of Texas but has a population of less than either New York or California. The land is mountainous and desolate, the local people are dispersed into isolated tribes, and most are illiterate, with few of the benefits of technology. Only one person out of 155 owns a radio, and only eight persons per hundred can even

read! The one thing the Afghanistani people have as their greatest asset is a determination to resist the Soviets, and while having the ability to read would be of some help in accomplishing that goal, certainly having some communications equipment would be of more definite aid.

Afghanistan has, since antiquity, been a favored invasion route, and until the 18th century was under the control of foreign empires. It would seem that after the nation was able to establish itself as a republic in the 1970s, the residents weren't about to sit by and be taken over by yet another foreign empire. When pro-Soviet leftists took over the government in a bloody coup in 1978, it

only set the stage for the 1979 Soviet invasion. That caused the local residents to obtain what arms they could secure and make a valiant attempt to toss out the invaders.

The Afghanistan freedom fighters, known as Mujahideen, were able to beg, borrow, and capture some weapons—an odd assortment of AK-47s and old .303 British Enfields, plus some Chinese weapons and Russian AKMs. They are organized into guerrilla bands, have no uniforms, and only the most primitive training; yet the Soviets have only been able to take control of about 10% of the land area, and from a political and military standpoint, the Soviets are not as well off today as they were more than a year ago.

While the Mujahideen have been able to make good use of many of the Soviet weapons and vehicles they've been able to capture, when it comes to communications, it's another story altogether. It's not that they don't realize that they require communications, it's that they are so unfamiliar with communications techniques and how to use the equipment that their communications potentials are unusually primitive. When you consider how effective their military tactics have been, it's all the more surprising how well they've done with what they have.

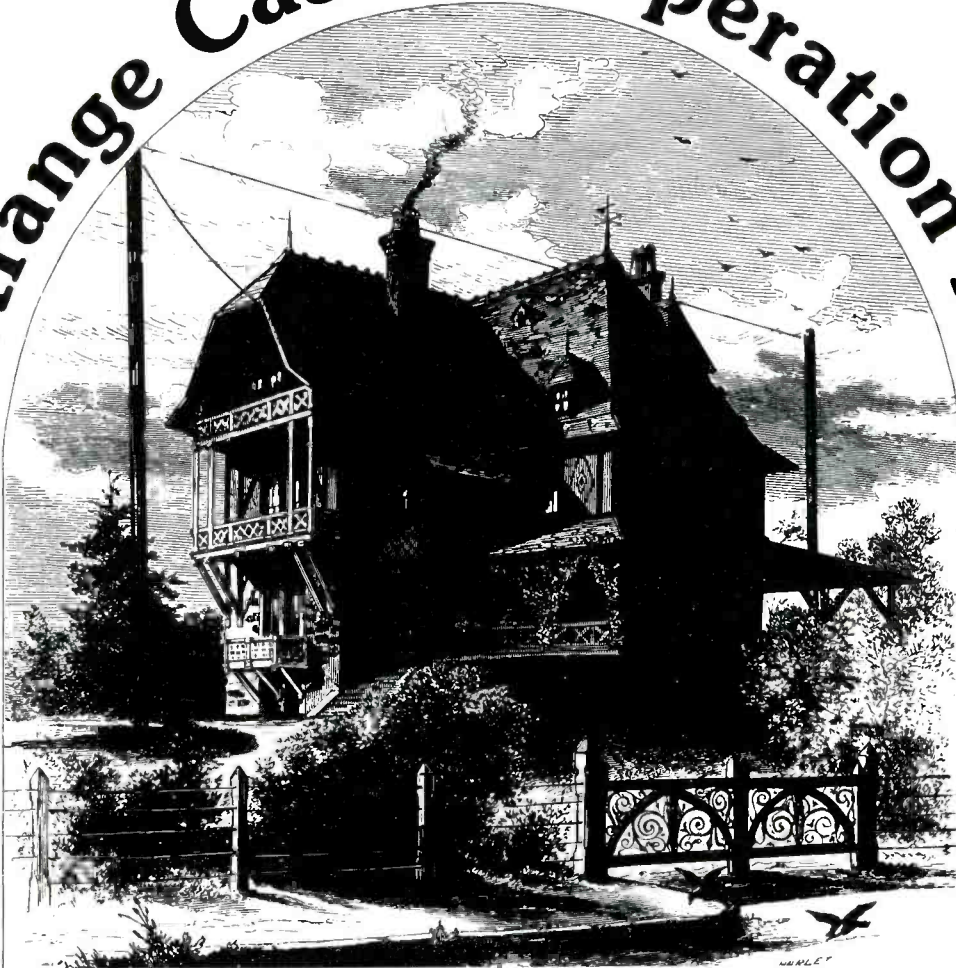
Sure they've captured Soviet communications equipment, but it doesn't do them much good. They can't read any of the instruction manuals, they can't figure out how to service the equipment (nor do they have the replacement parts), and even the equipment they can get operating is set up on Soviet frequencies. Those guerrilla bands that include members who can understand the Russian language have the advantage of being able to use that equipment to eavesdrop on the Soviets, but since few of the Mujahideen guerrilla bands have such members, even that ability is severely limited.

Recently, the Publisher/Editor of *Soldier of Fortune* magazine, Robert Brown, accompanied by SOF photographer Jim Coyne, went to Afghanistan to visit the Mujahideen. They were able to live with these fighters in the mountains and witness their operations. It was during that visit that Jim Coyne snapped a truly amazing photo. It appears on our cover this month, courtesy of *Soldier of Fortune*. In one dramatic photograph, Coyne captured one half of the entire Mujahideen communications system, that being a commercially made American 49 MHz hand-held transceiver! The other half of the rebel communications network cannot possibly be located more than a few hundred yards into the distance since that's the communications distance offered by the system. As far as is known, the two hand-held units consist of the total communications capabilities of the Mujahideen forces in Afghanistan! Presumably, this system operates on 49.86 MHz!

POP'COMM appreciates the kind cooperation of *Soldier of Fortune* in making this unique and exclusive color photo available to our readers.

by Tom Kneitel, K2AES

# The Strange Case Of Operation Annie



## **The Secret Broadcaster That Helped Turn The Tide Of WWII** BY TOM KNEITEL, K2AES, EDITOR

**I**t was the middle of the night, a time when many broadcast stations leave the air. But not The Voice Of The Rhineland (VOTR). That station was just beginning its daily programming. But then, VOTR wasn't quite like your average broadcast station—even though its sign-on announcement, "Attention: Here is The Voice Of The Rhineland" in German, didn't sound out of the ordinary. Nevertheless, VOTR was a most peculiar radio station.

VOTR operated on 247 metres, 1212 kHz, and was dedicated to bringing war news and information to German troops and civilians in the Rhineland. The studios of VOTR didn't look especially unusual, what with German military bulletins tacked to the walls, as were communications from the front lines.

VOTR operated only 4½ hours each day, commencing at the strange hour of 2 AM. Starting operation late in 1944, the station's career lasted a mere 200 days. Despite the station's relatively short life and abbrevi-

ated daily schedule, VOTR attracted a wide audience throughout Germany.

The reason that VOTR was able to garner such a large and devoted audience was because it offered its listeners something that was a rare commodity in German stations of the day. It served up large helpings of the truth, and in irrefutable detail. Truth was the main asset of VOTR, and the station built a solid reputation for veracity. Unless the station could have established an ironclad reputation for truth, there wouldn't have been any point in putting it on the air at all. Once that reputation had been firmly established, VOTR began gently shading the truth, then—ever so carefully—bending it, and ultimately switching to outright lies. By traversing from "truth broadcaster" to the realms of "black propaganda," VOTR wreaked havoc upon the German war effort.

Truth-telling and a strange broadcasting schedule were only a part of the peculiar things about VOTR. In fact, VOTR wasn't a German station at all. It was a clandestine

station operated by the U.S. Army's Propaganda Warfare Division under the secret code name "Operation Annie." Operating in constant fear of being revealed as a bogus station, VOTR was able to carry off its mission quite successfully.

Another peculiar aspect of VOTR was its location. Although claiming to be in the Rhineland, it was actually located just across the Our Sauer River in Luxembourg. It was in a stately old house between the villages of Vianden and Echternach, actually only a few miles from the German border. Luxembourg was liberated from German occupation in September of 1944, just three months before VOTR took to the airwaves.

Within the VOTR facilities was a highly trained staff of writers and technicians under the direction of a man named Brewster Morgan, a former producer for CBS Radio. But Morgan wasn't the main attraction of VOTR. That was Cpl. (later Lt. Col.) Benno Frank. Frank had been born in Germany and his dramatic training and ability to speak



The late Brewster Morgan, director of Operation Annie, was a successful radio producer before the war. Here he is in 1939, when he was with CBS.



Benno Frank, the main voice of VOTR, was born in Germany. His authentic accent, his intimate knowledge of the Rhineland and his experience in the theater all were of incalculable value to Operation Annie.



Field Marshal Model was, unintentionally, one of VOTR's most effective propaganda writers. His fatuous directives to German troops were read verbatim over the air. When German defenses began to crumble, von Rundstedt was removed as Supreme Commander. Model remained, was surrounded—partly through the success of VOTR. His final order for his troops was to keep fighting. He then killed himself.

in an authentic Rhine-Hessian dialect made him the perfect selection as VOTR's on-the-air personality. He addressed the audience so convincingly that it was more difficult to disbelieve him than it was to accept whatever he said as the gospel truth.

Operation Annie was inspired by several earlier undercover broadcasting operations used by the Germans themselves. In 1940, the Germans had established similar stations as part of their own propaganda efforts—The Voice of Peace, which claimed to be operated by French patriots, and The New English Broadcasting Station, supposedly operated by British dissidents. This time the tables were turned and it was the Allies' shot at black propaganda broadcasting.

VOTR was given an elaborately conceived cover story, which had been fabricated to lend credibility to the station. Supposedly, the station was located in the Rhineland and operated by German patriots who were only lukewarm to the Nazi regime and were annoyed that official German radio broadcasts had so little truth in them. VOTR said that the truth needed to be presented, and it was the station's patriotic duty to offer those truths. It sounded reasonable, and the location of the transmitter was so close to the

German border that it wouldn't arouse any suspicions that it might be elsewhere.

The station's dedication to truth was astonishing. In-depth and highly detailed eyewitness war news, presented from a German viewpoint, was the main attraction. After Allied air raids, while the official German broadcasting station in Berlin (and its satellite stations) was being vague and minimizing the damage done, VOTR would specify the names of the streets, shops, and factories that were hit, and offered the names of the families left homeless. The German soldiers in the field were eager to have this information and since it couldn't be obtained elsewhere, they sought out VOTR. Little did they know that reports weren't from eyewitness accounts (as claimed). The reports were painstakingly pieced together from close study of aerial reconnaissance photos matched up against street maps, telephone books, city directories, and information from interrogation of POWs and by reading the letters from home the POWs were carrying.

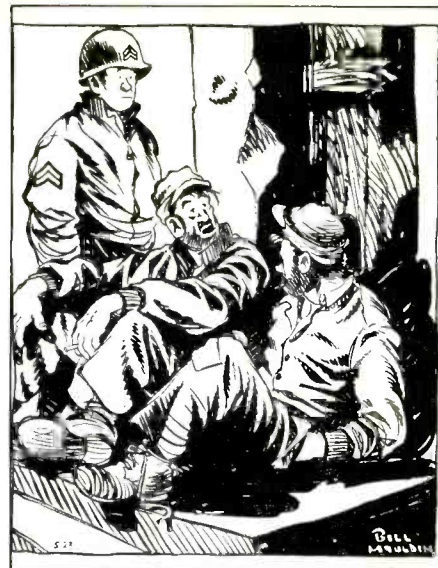
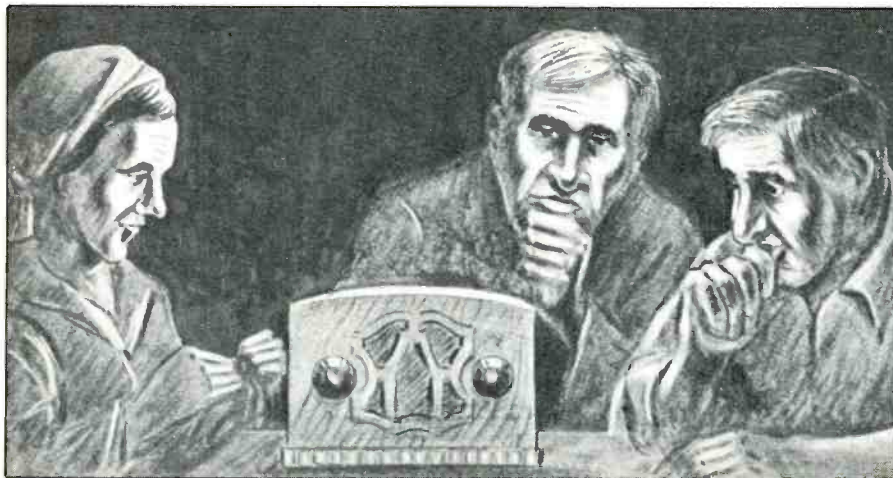
Even the German field commanders "bought" VOTR, along with its cover story, supposed location, and the station's wish (and ability) to present factual war news. They had also become part of VOTR's audi-

ence and realized that the station was presenting a bountiful harvest of difficult to obtain data simply not available from official sources in Berlin. VOTR was pleased to gain their confidence.

VOTR wasn't all just somber war news. Brewster Morgan knew enough about keeping an audience to realize what else it took. The station even scooped the official German radio with its sports coverage. Major German sports events took place on Sundays, and the station in Berlin didn't broadcast the scores until after the Monday newspapers went on sale carrying the scores. VOTR got the scores on the air in their Sunday night (2 AM Monday) broadcasts.

There was also plenty of music for the troops, including Strauss waltzes, Wagnerian arias, folk music, marches, patriotic songs, popular songs, and even the coarse and earthy songs from the beer halls, which could not be heard by monitoring the government station in Berlin. The music, it should be noted, wasn't strictly for entertainment purposes; the Operation Annie people knew that it would help to make the troops homesick and cause them to think (and worry) about their families.

Further towards the cause of bringing



Bill Mauldin's popular cartoon during WWII personified the wry humor of the G.I.'s. (Copyright 1944 by United Feature Syndicate, Inc.)

about a melancholic feeling in the German troops, VOTR was cleverly detailing reports of Allied air strikes upon German villages unreported by Berlin. While Berlin did report (to one extent or another) some air raids, there were many that they deliberately excluded from their reports. They even went so far as to ask civilians in those towns not to mention the raids in any of their letters to the troops. These revelations over VOTR had the effect of a one-two punch—they demoralized the troops and they underscored the fact that the official German radio was providing incomplete and distorted information. To add a final kicker to these depressing offerings, VOTR would follow-up such broadcasts with recordings of rousing speeches by various German officials in Berlin and other rear areas away from the front lines—speeches in which the troops were exhorted to fight to the last man and the final drop of blood in defense of *Der Fuhrer* and *Der Vaterland*. VOTR hoped that the troops would hear the self-impressed speaker and decide that maybe the guy ought to try a stint at the front lines himself before offering such grisly suggestions to others.

VOTR continually kept edging over into areas of gently bending the truth for generating whatever demoralizing results it could achieve, given the information available to work with. The station management felt that the truth should be presented, but it could be delicately enhanced for maximum impact upon the audience.

In one such instance, the daily broadcast led off with a routine news item that an enemy (Allied) force was heading towards a particular mountain town, but that there was absolutely nothing to worry about since the town was in a difficult to reach location and was so heavily fortified that it was virtually invincible. At the mid-point of the broadcast, the announcer's disturbed and shaky voice reported that—although he couldn't understand how it was happening—the enemy was actually closing in on the town and close combat was taking place in the streets—although surely they would be repelled by the town's defenders. By the end of the broadcast, the announcer solemnly reported that

the town had fallen to the enemy, that the defenders were forced to capitulate in the face of overwhelming disaster. In reality, the taking of the town had actually occurred the morning of the previous day. However, by recreating the blitz over the air, the station had taken the opportunity to raise the hopes of its audience that the German troops could easily muster a defense, only to send those hopes crashing to the ground and showing that there seemed to be no way of generating a defense against the allies, even in a supposedly impregnable fortress. VOTR's version showed that it could be accomplished in only four hours!

### A Model Major General

VOTR's psychological warfare experts had a natural ability to turn practically any scrap or tidbit of information to their benefit. But sometimes their raw material was so spectacular that there wasn't anything they could do with it than present it "as is." In one such instance, they put one of Hitler's highest ranking officers, Field Marshal Model, in to service as a staff writer!

Model had seen service as the commander of the German forces in the Ukraine, but as the Allied forces began shoving the Germans into a retreating action in France, Hitler himself selected Model to head up the German effort in the western zones. When VOTR was operational, Model led Army Group "B" under Karl von Rundstedt, Supreme Commander of the Western Front, and also the man who replaced von Rundstedt, Field Marshal Kesselring.

Model was a respected general, but he had a few idiosyncrasies. One of them was that he fancied himself an author of home-spun remedies and folksy household hints. During this especially trying period of the war, when German troops were weary and tired and were doggedly expending their last efforts to save their country from a crushing and humiliating defeat, Model was grinding out ream after ream of his domestic and patriotic homilies and including them in his Orders of the Day. Maybe it was instructions on making bread from acorns, or a recipe for a

stew created from potato and sawdust. One time, he advised how to wash underwear without using soap, followed by a recipe for making a fricassee of wild birds, hares, and squirrels caught in the field. And, of course, there were the constant fatherly reminders that it was the duty of every soldier to fully obey *Der Fuhrer* to the point of worship.

Probably the old Field Marshal had become somewhat burnt out after so many years of military travails. When his household hints were dispatched to his officers, they felt the material was so completely irrelevant and inappropriate that they managed to mislay them without sending them along the chain of command to the troops. This was grist for the VOTR mill, which obtained copies of Model's orders and read them over the air in their entirety. For, indeed, there wasn't anything Operation Annie's staff could do to doctor the text to have given this *schmaltz* any more of a demoralizing effect than it had just as it was created by Model. The troops must have had good reason to question their own leadership after hearing the drivel being dispensed by their Field Marshal.

### Further Bending The Truth

It wasn't very often that something as juicy as the Model writings would be presented for Operation Annie's use. Usually, they had to use sheer inspiration to create a desired response. One such case came after the station had become recognized as being a purveyor of truth. That's when they decided to fan the sparks of the growing discontent many German citizens had come to have about Hitler and the course he had led the nation on.

VOTR began reporting that in many areas of Germany, Nazi posters bearing the letters "N.S.D.A.P." (the initials of the Nazi Party) were being vandalized so that only the letters "N.D." remained. The station claimed that



VOTR's final broadcast called for one last spin of their theme song recording.

these letters meant "Neues Deutschland" (New Germany), that is to say, a Germany freed of the fanatics who were leading it to certain destruction. VOTR said that the Neues Deutschland movement was calling for immediate surrender, and how "true Germans" around the nation were risking life and limb to defy the government to save their towns, their homes and shops, and their families. A sufficient helping of factual information on anti-Nazi activities within Germany was mixed in to give this tale some teeth. Of course, the entire Neues Deutschland "movement" was a complete fabrication and a creation of the Operation Annie staff, but VOTR's listeners didn't know that. It didn't take long before localized Neues Deutschland groups were actually springing up in order to bring into reality what people felt was an active political movement. Later in the war, when the Allies marched into Germany, they saw many posters that had been mutilated as described via VOTR.

### Taking The Bait

Surprisingly enough, none of these many accomplishments comprised VOTR's ultimate mission. The station had merely been building its reputation for telling the truth and garnering a listening audience centered around the German troops defending the Rhineland. All other accomplishments were merely a bonus while the Operation Annie personnel awaited final instructions to make use of its reputation for being a reliable source of the truth. It came when General Eisenhower decided that it was time for VOTR to cash in its chips. By this time, the Allied forces were quickly moving in on the Rhineland from both directions. The only way out of the Rhineland for the German defenders was to retreat to the east across the Rhine River.

VOTR, which had built an audience that had come to trust its veracity, now did a complete flip-flop. In earlier broadcasts, they made much of how poorly the German cause was faring; now it was the Allied forces whose efforts were minimized. The German field commanders, already suspicious of the vague, distorted, and unreliable communications filtering through from Berlin (and which, by then, were also irregularly re-

ceived), were heavily relying upon VOTR for tactical information. They had no way of knowing that the Allies were making far larger advances than VOTR was reporting and that the German defenses were nowhere near as strong as VOTR was claiming.

VOTR was insisting that German lines in the south were holding firm, although the Allied 7th Army had broken through. Reports from the north indicated that General Patton's 3rd Army was moving very slowly when, in truth, Patton was 20 miles ahead of where VOTR's reports placed him.

Simultaneously, the Allied 1st Army was forging ahead and came upon the intact bridge spanning the Rhine at Remagen. Patton's army, located at Andernach, was only 15 miles from Remagen. Some of the German troops were making an effort to retreat by means of the Remagen bridge, especially those stationed in the Schnee Eifel (Eifel Mountains) to the west. VOTR was advising the German troops that there were far better retreat routes to take than by going through Remagen, but when the Germans relied upon this advice, they marched straight into the hands of waiting Allied troops. This same scenario was played out in several areas, including at crossings on the Saar to the south.

On a single day, 18 April, 1945, VOTR's deceptions managed to trap 350,000 troops from Army Group B, all of whom were forced to surrender.

The Allied forces rolled on, through the Rhineland and towards Berlin. There was no further need for Operation Annie and its radio station. Although it had served well, it had outlived its usefulness. Supposedly, VOTR was located in the Rhineland, an area that had been captured by the Allies. The natural ending for the operation would have been to throw the master switch, pack up the equipment, and go home. But VOTR was hardly a normal radio station, and its staff decided that it would have a demise truly befitting the entire operation. In the perverse way the American G. I. has of finding humor in almost any given situation (as brought into sharp focus by Bill Mauldin's two cartoon G.I.'s, Willie and Joe, during WWII), Operation Annie's mentors concocted a wildly dramatic finale for The Voice Of The Rhine. It was, indeed, a slow death. It took several days.

Commencing on 21 April, 1945, VOTR began advising its audience that it would remain on the air until the very last possible minute, although Benno Frank was saying that the Allied forces were drawing closer and closer, and were using direction finding equipment to zero-in on the transmitter. He didn't know how long the station could remain transmitting, he said.

The final broadcast commenced at 2 AM, 25 April, 1945. The VOTR staff had to interrupt a gala staff "last day" party to present the program. The staff spared no effort to create the proper atmosphere for the dramatic grand finale. Benno Frank told his audience that the enemy was close at hand, his voice was shaky and unnerved and his bulletins were coming on a rapid-fire basis.

His narrative was suddenly interrupted by the sounds of rifle and pistol fire, hand grenades, many voices shouting loudly, and general confusion. Benno Frank could be heard yelling for someone to play the station's theme song recording—a traditional Rhineland folk tune. The music came on with a very scratchy sound; it was obvious the record was laboring under several cracks on its surface. A few seconds after the music began it suddenly stopped—as did the short but bizarre career of The Voice Of The Rhineland.

### Epilogue

The head man at Operation Annie, the late Brewster Morgan, eventually received an Army commendation for heading a small task force to capture Radio Leipzig (Germany) under combat conditions. After the war, he was active as a producer of TV commercials and eventually became one of the producers of the NBC-TV program "Fire-side Theatre" (1949-1955).

VOTR's main on-the-air personality, Benno Frank, lived for a while in the former home of Gen. von Kleist. After the war ended, he was given the responsibility for re-establishing German cultural institutions. In 1960, the West German government decorated him for his work in contributing to the peaceful relations between Germany and the world community.

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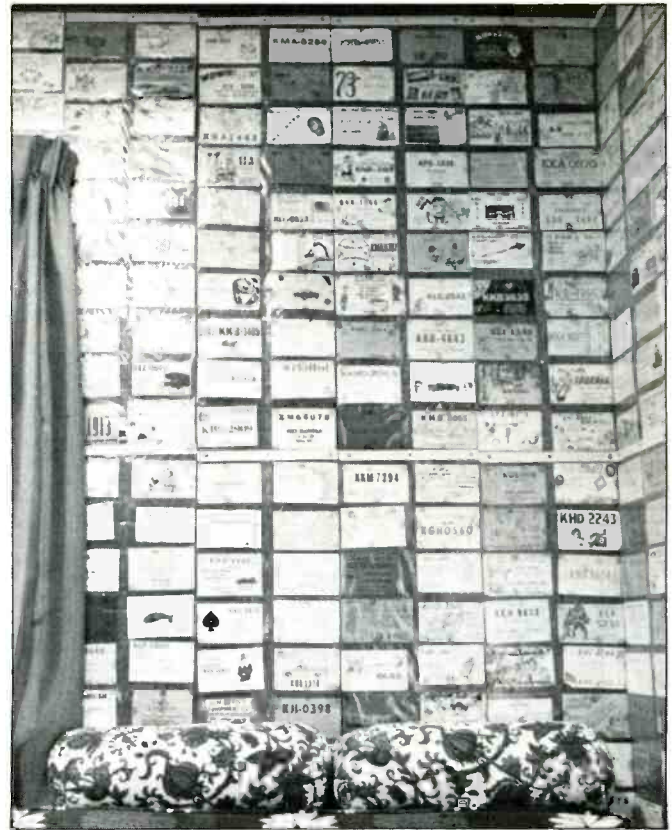
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# Here's How To Get Those Non-Broadcast QSLs!

**Scanner & Communications Receiver Users Who Like To Monitor Two-Way Stations Face Unique Hurdles When It Comes To Obtaining QSLs!**

BY JOE BELLINI, KIA0DL

Communications hobbyists who like to tune the AM, FM, and SW broadcast frequencies have it made when it comes to getting reception verifications—better known as *wallpaper*, *pasteboards*, or *QSL cards*. Even those within our ranks who like to monitor the Ham frequencies are more often than not rewarded with a QSL card in response to their reception report directed to a station they've received. Most stations in all of these categories will be most cooperative in responding to listeners' reception reports by sending, in return, a printed card made up for verifying reception. Those that don't have cards will often send a letter. You can even get QSL cards or letters from most of the pirate broadcasters now in operation. Collecting these QSLs is an exciting and interesting aspect of the hobby.

There are, of course, some broadcasters and Hams who cannot be QSL'd because of a policy which dictates being uncooperative with DX'ers. They are entitled to their policies, of course, but when it comes to commercial, military, or other federal communi-

cations stations you'll hear on your scanner or communications receiver, well that's another story altogether. These stations may be operated by law enforcement agencies, or used for aeronautical or maritime communications, or any of dozens of other kinds of operations ranging from fire to railroad uses. For the most part, such stations don't have QSL cards to send out. Worse than that, their normal operations don't really make it very likely that they will respond to reception reports if, indeed, they even know what it is that the listener wants when a QSL is requested!

For one thing, whether such stations are monitored when using AM, SSB, CW, FM, RTTY, or even FAX, most of these stations are either under the impression that their communications are private and cannot be heard by others, or else they have the notion that they would prefer that their transmissions not be intercepted by those to whom they aren't addressed. Stations licensed by the FCC even have a so-called Secrecy of Communications provision in the Com-

munications Act to reassure them that their communications are basically private.

These do not make for optimum conditions when seeking QSLs from non-broadcast stations. However, in the aftermath of the popularity of CB radio, there are at least many communications users who have more of a notion of what a monitor means when a QSL is requested than there were several years back.

In all, QSLs can most definitely be obtained from many two-way communications stations if one approaches the problem with some tried and proven methods. Let's look them over here.

## Secrecy of Communications

Even though it affects only non-broadcast stations licensed by the FCC and has no bearing upon transmissions from stations licensed by other nations, a general familiarity with the intent and uses of the secrecy provision (Section 605) of the Communications Act should be of prime importance to the listener. It's a good idea to obtain a copy

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of the Section and read it through.

Although this Section is more often encountered in wire-tapping escapades than in connection with scanners or communications receivers, it nevertheless still applies. Section 605 states that anything a person might hear over a scanner or a communications receiver (with the exception of broadcasts, Ham, or emergency transmissions) "belongs to" those who are sending out the message and those to whom the message is specifically addressed. That being the case, you can't benefit from any information you might receive, nor can you sell it, tape it, rebroadcast it, or even divulge its contents to anybody. The letter of the law says that you can't even make reference to the fact that there was a message at all.

For practical purposes, it's a law that doesn't come into play very often when it comes to communications hobbyists, for even CB transmissions are included under Section 605's coverage. It's difficult to detect violations of the law and chances are that someone would have to file a formal complaint against a listener with the government, and then prove their case, to make use of Section 605. Unless the infraction of Section 605 made headlines or caused actual harm, it would be more trouble than it would be worth for most persons to pursue a listener with Section 605. Nevertheless, there have been problems with those who have run afoul of this Section, and it is the law and it's always good to know what's involved with things you'll hear from FCC licensed stations over your scanner or communications receiver.

A few years ago, a scanner owner got into hot water by monitoring a federal frequency used by the Treasury Department. It wasn't that he was just listening (there isn't any law against that), but what he was doing was contacting persons who were under surveillance and warning them. For his deeds, he ended up in front of a judge who didn't seem to find much merit in the warnings given out by the listener. He was convicted and punished! In another incident, a TV news crew found themselves in a ticklish spot when, after monitoring another federal frequency, they appeared at the rendezvous spot for a kidnapper to pick up a ransom. The kidnapper never showed up and some said that it was the news crew who scared him off. Charges were brought against the news crew.

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 REMARKS—

A hard to verify country, Lithuania, was QSL'd by Tom Kneitel by the prepared card method. This was for reception of station LYG running CW on 5940 kHz.

Examples of similar serious problems in recent years include:

- In 1979, in a Northeastern city, the victim of an organized crime extortion cooperated with the FBI and arranged to pay the criminals. Agents relayed the payoff location to other agents by radio.
- On arriving, the victim was searched and beaten by the criminals. Agents rushed in to save him from serious harm; they found radio scanners set to the FBI frequency.
- In a Midwestern office, agents relayed the address of a fugitive's hideout to radio cars. A citizen listened in, found the telephone number for that address in a city directory, and warned the suspect that the FBI was on the way. Agents arrived minutes after the suspect fled and it took another two weeks to apprehend him.
- On July 11, 1979, Colombian nationals engaged in South Florida narcotics was opened fire with machine guns on a liquor store in a crowded suburban Miami shopping center. Two rival drug traffickers were killed, and two bystanders were wounded. The men were never caught. Inside their abandoned van, agents found armor-shielded walls, automatic weapons, and radio scanners tuned to FBI frequencies.
- In a California case still under investigation, a motorcycle gang gained enough information by monitoring FBI transmissions to identify an agent investigating them. They began telephoning threats to the agent and his family.

For the general hobby enthusiast who is listening for personal enjoyment and achievement, Section 605 should not become a threat; but all listeners should be aware of the Section, including how to live with it. Living within it means keeping things you hear to yourself. The question is whether or not you are flirting with problems by seeking out a QSL. It's obvious that the news

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Broadcast stations, like this one from Chicago's WCFL, usually have their own QSL cards.

crew and the others I mentioned were cruising for trouble, and even if there hadn't been any law covering these things, one would only need common sense to evaluate their actions. Moreover, Section 605 is regularly broken, bent, and dented by countless persons and companies regularly monitoring scanners for commercial benefit—and this includes the news media, some insurance adjusters, ambulance and tow truck operators, and others. These people are generally discreet enough to avoid hassle.

I know of no scanner or communications receiver owners who have sent out reception reports to business, industrial, public safety, aero, maritime, land transportation, or most other categories of stations that can be monitored who have been bashed over the head with Section 605 based upon their sending a reception report and asking for a QSL in return. Even military and governmental stations have been known to QSL.

Keeping these things in mind when sending for a QSL, you want to be sufficiently descriptive in discussing what you've heard so that the person who receives the reception report will be able to decide that it was their station that was monitored.

On the other hand, you don't want to be so specific that the person receiving the report will become annoyed at your having intruded upon his privacy. This is a thin line listeners have to walk and it may take experimentation to find out where that line lies.

Just saying that "Your station was heard on 8.456 MHz at 0227 on April 7th" is too vague and can't be expected to prove to the station that their signals were actually monitored. On the other hand, you'd probably irritate a station operator by including in your report something that stated "Your station was monitored 4/6/83 on 151.965 MHz at 3:47 PM CST. The dispatcher was talking to Charlie in Unit 3 and was really giving him hell for being so rude to Mr. Smedly over at the hardware store and said that Mr. Smedly said that if the delivery man ever showed up stoned again he'd punch him in the mouth." Somewhere between these two extremes are the makings of a reception report that will bring back a QSL for your reception.

A perhaps-suitable approach might be, "Your station was monitored on 6 April 1983, 151.965 MHz, 3:44 to 3:50 PM CST. Dispatcher contacted several mobile units, including Unit 3 at 3:47 and Unit 2 at 3:50. At 3:51, Unit 1 called the dispatcher."

There's no guarantee that this reporting method (or any other, for that matter) is going to produce results, but it has a lesser chance of being offensive than one that goes into details the station operator will find irritating. Actually, you're dealing in percentages. You'll never get a 100% return, but you may be able to improve your returns from perhaps 30% to 60% if you're lucky. And there are other tricks of the trade.

### Other Tricks

Getting the report to the right person and address is a bit of an art in itself. For stations you hear on your scanner, try addressing your report to the "Chief Dispatcher" or a similar title; you can probably obtain the address from a local telephone directory.

For non-local and overseas stations you'll hear on a communications receiver, it starts to get complicated. Your best bet is to check through the "utilities" columns in DX club newsletters, since they frequently provide addresses for writing to these stations. Clubs such as SPEEDX and ASWLC have been especially worthwhile and useful in offering this type of information.

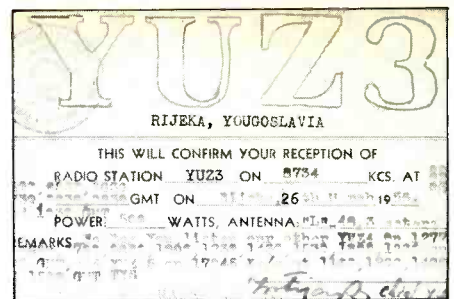
In your report, mention the strength of the signals and if there was any interference noted from other stations on the frequency (if you can identify the interfering stations, give that information, too). Discuss the quality of

the signals and the relative strength of mobile units or other stations heard in communication with the station receiving your reception report.

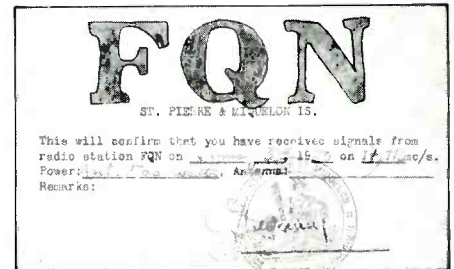
Mention the type of equipment (receiver/scanner, antenna, etc.) you are using. Say how high your antenna is mounted and, if it is directional, which way it is oriented (vertical, horizontal, east, north, etc.)

In your report, add in the little extras—those items that so often help to explain the purpose of your report and interest in their communications. This breaks the ice and tilts the balance towards your receiving a favorable response and getting a QSL. Mention that your hobby is listening on a scanner and/or communications receiver and that you've been doing it for so many months or years. Tell about some of the more interesting stations you've heard and/or the types of stations in which you may specialize. If you have a registered monitoring station ID, such as I have (my ID is KIAODL), be sure to say so. I always include this in my reports and find that it's a most definite asset.

Then, let's gently get around to the basic purpose of your report—to secure a QSL or verification of your reception. Assume that the person who receives your report doesn't know what a QSL is. Also assume that the station does not have a printed QSL to send to you in response to your request. Explain then that one aspect of your hobby is collect-



Station YU2Z3 in Yugoslavia was verified by Tom Kneitel using a prepared card. The station noted much information about itself on the QSL.



Station FQN in the rare St. Pierre and Miquelon Islands obliged Tom Kneitel with this prepared QSL.

ing QSLs, and say what they are—a verification certifying that you actually did hear their station. You may wish to say how many QSLs you've already received from other similar stations.

You are also going to have to provide the station with the QSL card you hope they will send back to you. These are called "prepared cards" and they contain all of the information possible, written by you. The idea is that the station personnel have only to sign the card and drop it in a mailbox to get it back to you. That means that you'll have the card addressed to you and also supplied with a postage stamp. If it's an overseas station, include an International Reply Coupon (IRC) instead of a stamp since American postage stamps cannot be used when sending a card or letter from overseas. IRC's can be purchased at most post offices and can be exchanged in most nations of the world for sufficient postage to get a letter overseas.

You might wish to leave some blank space on your prepared QSL where the station personnel can add any remarks. Often they will write in interesting facts regarding additional frequencies or perhaps certain technical or operational details relating to the station. And make certain that there's a spot for a signature.

Keep copies of the various letters you send out, and if you use several letter formats, you'll find which are the most productive and which ones are the least productive. If you've got a particularly rare station you're trying to for, you may wish to send a repeat report after several months if an earlier one was a dud.

Follow these simple rules and chances are that you'll strike it big in the rather tricky art of QSL'ing stations you'll hear on a communications receiver or scanner.

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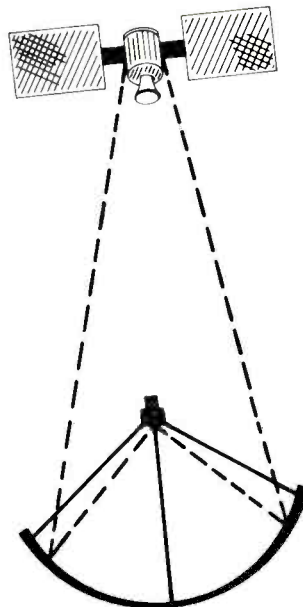
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\*Shortwave reception will vary with antenna, weather conditions, operator's geographic location and other factors. An outside antenna may be required for maximum shortwave reception.

†Based on a comparison of suggested retail prices.

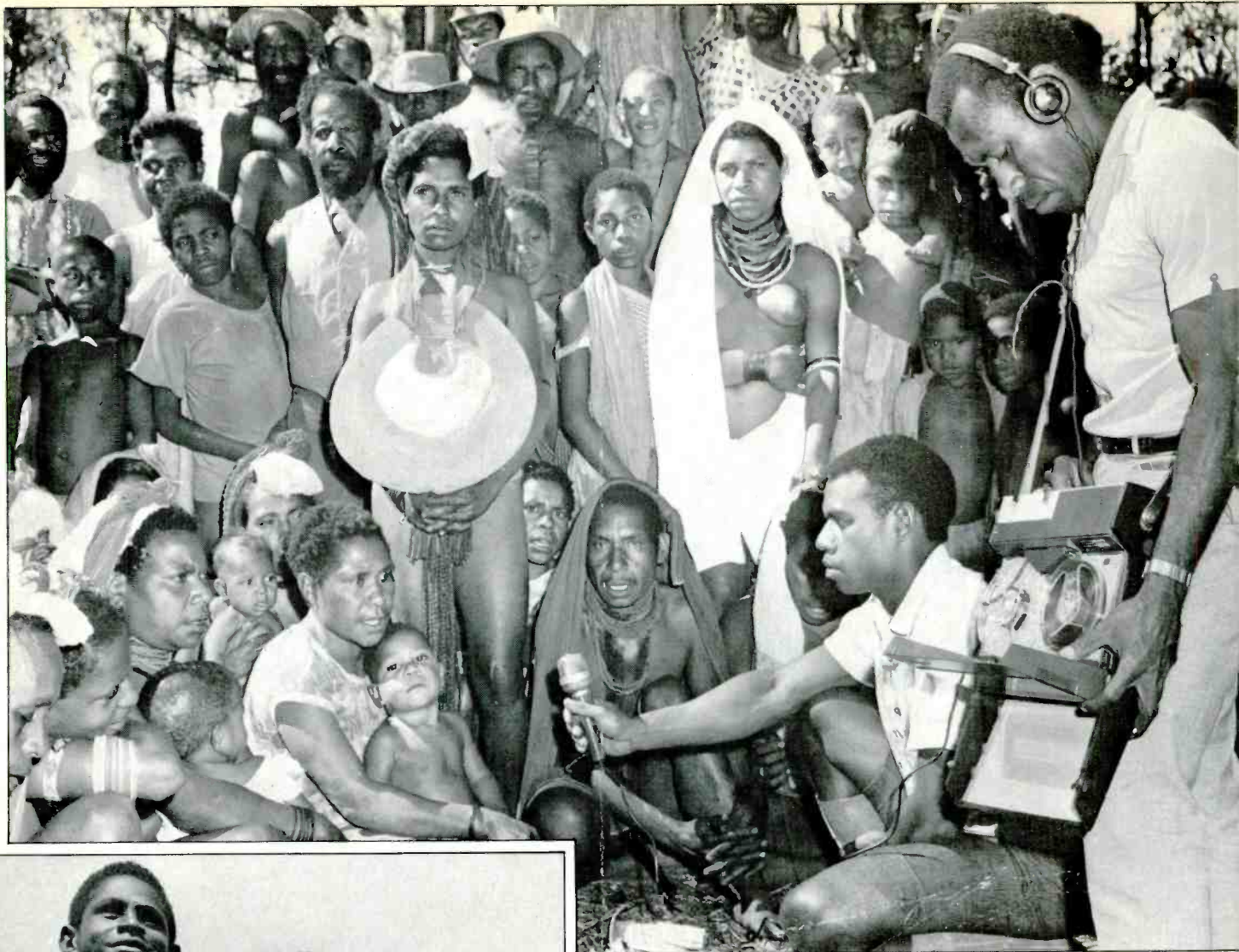


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*A village recording session.*



*From The Land Of The Headhunters*  
**Stasiun Bilong**  
**Papua New Guinea**

BY GERRY L. DEXTER

**P**apua New Guinea. A land of wild orchids. Home of the Cargo Cult. And platform divers. Some of the world's most formidable terrain. And, even now, still a few headhunters!

Papua New Guinea encompasses some six hundred islands located west of Australia and east of Indonesia, with names that ring familiar to those who remember World War II. Names like Bougainville and Rabaul.

This country of 2.3 million people is still greatly underdeveloped, and many of the tribes are still considerably isolated from each other. In fact, there are over seven hundred different languages in use and there are instances where tribes located only a mile or two from each other cannot communicate. The difficulty of travel over high mountain ranges, deep valleys, and treacherous swamplands has kept them apart over the centuries.

Of the hundreds of languages, three are most widely used: English, Melanesian Pidgin (popularly known as Pidgin English), and Police Motu. The latter is really a hybrid developed from various native tongues by police patrols in their travels.

The island of New Guinea (the other half

is now a part of Indonesia called West Irian, and before that it was Dutch New Guinea under the control of the Netherlands) was discovered by the Portuguese in the 16th Century, who named it "Illos dos Papuas" from the Malay meaning "frizzy-haired people." The Spanish got into the act later and named it New Guinea because the coastline reminded the explorers of African Guinea. Thus, the two names in use today.

Still later, the Australians got involved due to their concern about foreign influences so close to their own shores. Although there have been Dutch, German, and Japanese influences briefly, Britain and Australia have shared major responsibilities for the country until Papua New Guinea celebrated its independence in September of 1975.

Like the land itself, the shortwave listener will find DX'ing the stations of Papua New Guinea interesting, enjoyable, and challenging. Radio broadcasting in the area has been around for over forty years.

Major developments in broadcasting were instituted by the Australians, who devoted years to improving and expanding radio facilities and in training locals for the takeover of the broadcasting system.

The National Broadcasting Commission of Papua New Guinea was created out of the old Government District Radio Service which, in actuality, was simply the Papua New Guinea service of the Australian Broadcasting Commission.

The National Broadcasting Commission has several divisions. The headquarters operations are situated at Boroko, near the capital of Port Moresby. The provincial stations are known collectively as Radio Three. There are two other local services—Radio One on mediumwave, which airs everything from English lessons to Bible readings to news, cultural affairs, politics, requests, shipping forecasts, and BBC drama from 5:15 AM to midnight daily.

The other local service, Radio Two, was introduced a few years ago. It is a commercial service on FM stereo, also operating from 5:15 AM until midnight and carrying everything from the U.S. syndicated show *American Top 40* to Australian horse racing. The public and potential advertisers have been slow to accept the idea of commercials on the radio, but officials of Radio Two believe the service will eventually reach a higher level of acceptance and become completely successful.

The NBC was actually established in 1973, two years before independence, charged with reflecting the drive towards national unity as well as expressing the country's culture and attending to the educational, social, and entertainment needs of the population as well.

Just two years after the establishment of NBC, 85% of the programming was created within the country, compared to a much larger percentage of imported programming that had been used. The number of languages in use on the air had dropped to only 13, reflecting progress toward the eventual goal of using only the three main languages in broadcasts.



*Radio North Solomons in Kieta town; on the left are housed the broadcast studio and the tape record library. The building on the right is the office complex, with the news-room at ground level.*



*Studio visitors look on as a disc jockey at Radio East New Britain does his thing.*

The staff of NBC is much larger than one might expect, numbering nearly one thousand people who are involved in everything from engineering and announcing to producing programs, research and development, building and transportation, office employees, news readers and writers, maintenance personnel, and so on. NBC even produces its own in-house weekly magazine, has its own women's club, and sells cassettes of native music through local record dealers.

The organization is also involved in the operation of the National Parliament translation system, operates its own broadcasting training school, and does very extensive on the scene recording of village cultural activities in order to preserve and encourage those traditions.

Television has been under study for quite

some time but has not yet been introduced in the country. Thus, radio remains the most important communications medium in Papua New Guinea. Even so, radio hasn't yet reached all of the population. As late as 1975, NBC estimated the number of persons who had never heard a radio broadcast to be some 800,000 persons. But, it's safe to assume that number has now been reduced.

It is at the provincial level that the lives of the people and the popularity of radio are most intertwined. The listening audience each week ranges from 6,100 people for Radio Manus to over 45,000 for Radio Central. The provincial stations receive anywhere from 5,000 up to over 20,000 letters each year.

The provincial stations, which are the most interesting to DX'ers, are busy with far



Radio East New Britain's new studios were opened last June in Rabaul.

more than just maintaining a daily schedule of radio broadcasting. The staffs, which average around 24 people, make numerous trips and visits to village, churches, schools, and missions within their coverage area. Some of these "Recording Patrols" as they're known are akin to expeditions lasting a number of days and requiring long hauls up river or over hazardous territory in order to get to some of the isolated villages and record special events.

Like their NBC parent, local programming is as varied as possible, with offerings of everything from news to special musical requests, personal messages, and dramatic programs. Surprisingly, American country-western music is very popular and the DX'er may hear it if he tunes these stations.

In Rabaul, Radio East New Britain recently celebrated its 20th anniversary with the dedication of a new studio building. As the former Radio Rabaul, it was the country's first provincial station. The last was Radio Enga at Wabang, which is reported to be using a shortwave frequency of 2.410 MHz.

Radio North Solomons (formerly Radio Bougainville) went on the air from Keita. The station receives a lot of mail from the other Solomon Islands and is typical of the Papua New Guinea local stations in the amount of local involvement and its liaison work with the provincial government.

Radio Northern in Popondetta celebrated its tenth anniversary last year and has an especially challenging job since the terrain in the station's coverage area is especially difficult. The local government is pushing to get more power for Radio Northern so that its signals can be better heard in the out of the way places.

For the DX'er, Papua New Guinea offers an interesting challenge, both in the target and in what the target will be broadcasting when it is heard. Most country lists divide Papua New Guinea into five radio countries—Papua, New Guinea, New Ireland,

New Britain, The Admiralty Islands, and Bougainville. Check our list of Papua New Guinea stations for names, addresses, and frequencies.

One of the easiest Papua New Guinea stations to log is the national station on 4.890, which is a fairly regular performer, often noted as early as 0800 GMT.

The 90 meter band outlets range from the fairly easy Radio East New Britain on 3.385 to Radio Morobe and Radio Gulf, which are less powerful and frequently suffer from interference by utility stations. On a really good Papua New Guinea morning, though, you can note most of them. Reception of

these stations will vary considerably depending upon where you live. They aren't much of a challenge if you live in California. Just the opposite is true if you live in the eastern part of the United States.

Things get trickier on 120 meters—the 2 MHz band. You'll find that reception is much more difficult and it takes better than average conditions to bring in the stations operating on this band. Best periods are right around local sunrise during the fall and spring equinoxes.

Normal sign off time for most of the Papua New Guinea stations is 1300 GMT (8AM EST) which, fortunately, is a convenient one propagationally as it allows just enough time to take a log before the band drops out.

The stations of Papua New Guinea are pretty good verifiers, although sometimes the pressure of local mail and other activities will cause a delay in replying or require a follow-up by the DX'er. Most, however, will reply on the first or second report. Sometime ago, NBC requested that reports for the provincial stations be sent directly to their headquarters in Boroko, but the local stations still do reply if you write to them directly. The NBC headquarters address is P.O. Box 1359, Boroko. The present verification card shows a map of the country with all of the station locations marked and is quite an attractive QSL.

DX'ing Papua New Guinea combines an element of challenge, an exotic target, and some fascinating programming, making it one of the most enjoyable of the world's countries at which to aim your antenna.

So, why not give it a try. Tomorrow morning, grab a bottle of *lolly water* (soda pop in Papua New Guinea) and go after *stasiun bi-long Papua New Guinea!*

### Stations Of Papua New Guinea

Frequency	Name	Power	Address
2.340	Radio West New Britain	2 kw	P.O. Box 142, Kimbe
2.376	Radio Chimbu	2 kw	P.O. Box 228, Kundiawa
2.410	Radio Enga*	2 kw	P.O. Box 96, Wabang
2.428	Radio Manus	2 kw	P.O. Box 10, Lorengau
2.450	R. Western Highlands	2 kw	P.O. Box 311, Mt. Hagen
2.468	Radio Popondetta	2 kw	P.O. Box 137, Popondetta
3.205	Radio West Sepik	4 kw	P.O. Box 35, Vanimo
3.220	Radio Morobe	2 kw	P.O. Box 1262, Lae
3.245	Radio Gulf	2 kw	P.O. Box 36, Kerema
3.260	Radio Madang	2 kw	P.O. Box 2036, Madang
3.275	R. Southern Highlands	2 kw	P.O. Box 104, Mendi
3.290	Radio Central	2 kw	P.O. Box 1359, Boroko
3.305	Radio Western	10 kw	P.O. Box 23, Daru
3.222	Radio North Solomons	10 kw	P.O. Box 35, Kieta
3.335	Radio East Sepik	10 kw	P.O. Box 65, Wewak
3.360	Radio Milne Bay	10 kw	P.O. Box 111, Alotau
3.385	Radio East New Britain	10 kw	P.O. Box 393, Rabaul
3.395	Radio Eastern Highlands	2 kw	P.O. Box 311, Goroka
3.905	Radio New Ireland	4 kw	P.O. Box 104, Kavieng
3.925	Ntl Bcstng Commission	10 kw	P.O. Box 1359, Boroko
4.890	Ntl Bcstng Commission	10 kw	P.O. Box 1359, Boroko
5.965	R. Western Highlands	2 kw	P.O. Box 311, Mt. Hagen
5.985	R. East New Britain	10 kw	P.O. Box 393, Rabaul
6.020	Radio North Solomons	10 kw	P.O. Box 35, Kieta
6.040	Radio Milne Bay	10 kw	P.O. Box 111, Alotau
6.080	Radio Western	10 kw	P.O. Box 23, Daru
6.140	Radio East Sepik	10 kw	P.O. Box 65, Wewak
9.520	Ntl Bcstng Commission	10 kw	P.O. Box 1359, Boroko
9.575	Radio Morobe	2 kw	P.O. Box 1262, Lae

\* Radio Enga may not yet be on the air.

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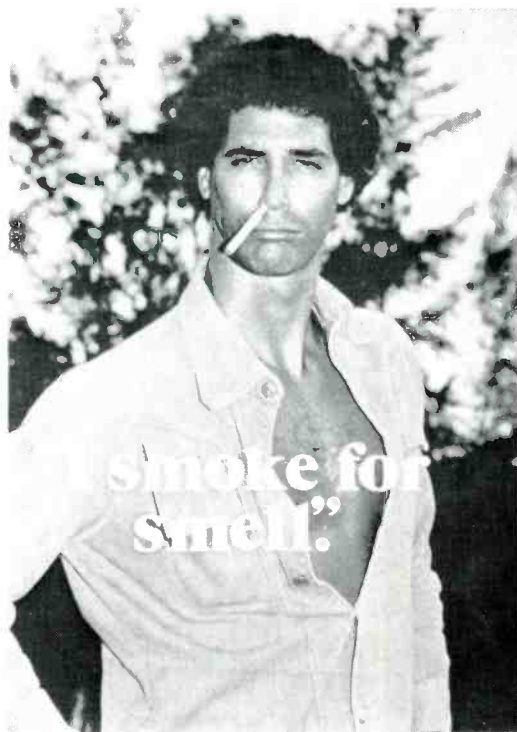
BY GERRY L. DEXTER

The following list was accurate at the time of compilation. Many stations operate in English at various times, too many to be included in our list here. Some English broadcasts may start sometime into the hour listed. Times are Greenwich Mean Time.

## English Broadcasts For Spring, 1983

Time (GMT)	Station	Frequencies	Time (GMT)	Station	Frequencies
0000	Israel	9.815, 11.640, 15.585	0500	Spain	9.630, 11.880
	Albania	7.065		United Arab Emirates	17.715
	East Germany	9.730		Norway	11.870, 15.175
	Spain	11.880		Kuwait	15.345
	Luxembourg	6.090		England	9.510
	Norway	11.875	0600	Solomon Islands	9.545
	Bulgaria	15.110		Sierra Leone	5.980
	Ecuador	15.155		Norway	11.755, 11.900
	Falkland Islands	3.958		Malaysia	15.295
	China	11.650, 15.120, 15.520		Australia	17.755
	Mexico	11.770, 15.430, 17.765	West Germany	9.700, 11.905	
	USSR	7.440, 9.700, 9.800	North Korea	11.660	
	England	6.175, 7.325	0700	Cook Islands	11.760
	0100	Israel		9.815, 11.640, 15.585	East Germany
Vatican		9.665, 11.845		Ghana	6.130
Italy		9.575, 11.800		Japan	15.190, 15.325
West Germany		9.565, 9.590, 6.085		Netherlands	9.895, 11.720
Czechoslovakia		11.990		Bulgaria	11.720, 15.110
Argentina		9.690, 11.710, 15.345		Zimbabwe	7.330
Italy		9.575	0800	Australia	11.770
Hungary		9.585		Cook Islands	11.760
Austria		9.770		Monaco	9.495
Greece		15.595		Guam	11.840
0200	Brazil	15.290, 17.830		Norway	9.590
	Japan	15.195, 17.825	0900	Guyana	5.950
	South Korea	11.810, 15.575		Australia	5.995, 11.775
	South Africa	5.980, 9.615, 11.900, 15.325		Papua New Guinea	4.890
	Hungary	9.585		Philippines	11.890
	Switzerland	11.715, 15.305		Switzerland	9.560, 9.625, 15.305
	Taiwan	11.740	Tanzania	9.750	
	Egypt	9.475, 12.000	England	6.195, 9.510	
	Netherlands	9.590	1000	Solomon Islands	5.020
	China	11.650, 15.120		South Korea	9.570
0300	Austria	9.770		Ecuador	11.925
	England	6.175, 7.325		Japan	11.875, 15.235
	Poland	15.120		India	15.350
	United Arab Emirates	15.300, 17.775	1100	North Korea	9.977, 9.745
	Czechoslovakia	11.990		Australia	9.580
	Uganda	15.325		Costa Rica	6.075
	Costa Rica	5.055		Sri Lanka	11.835
	0400	South Africa		7.270	Mongolia
Roumania		9.570, 11.940	South Africa	15.220	
Cuba		11.930	Mozambique	11.820, 11.835	
New Zealand		15.485	1200	Kampuchea	9.695, 11.938
Belize		3.285		Finland	15.400, 21.475
Bulgaria		11.750		Thailand	11.905
Nigeria		15.420		Mongolia	6.383, 7.235, 12.070
Guatemala		3.300		Turkey	9.650
USSR		9.580, 9.735, 15.240	Seychelles	11.865	
0500		Israel	15.505, 15.585	Bangladesh	15.285
	Nigeria	7.255	China	9.820	
	Ecuador	9.745	1300	Japan	9.505
				Finland	15.400, 17.800
		South Korea		9.720	
		Vietnam		15.010	
		Laos		7.028	
		East Germany	9.665		

Time (GMT)	Station	Frequencies
1400	Sweden	21.615
	Malaysia	7.160
	Indonesia	11.790
	Singapore	11.940
	Belgium	21.525
	Guam	9.535
	China	11.600
East Germany	21.465	
1500	Finland	15.400, 21.425
	Nepal	9.590
	South Africa	15.220
	Iran	15.084
	Sri Lanka	15.425
	East Germany	21.600
	Vatican	15.110
	Roumania	15.250, 11.775
1600	France	11.845, 15.300, 17.620, 17.795
	Portugal	21.475
	Pakistan	15.530, 15.535, 17.640
	South Korea	11.830
	United Arab Emirates	15.320, 17.765
	Jordan	9.560
	West Germany	11.785, 15.405
1700	Cuba	11.760
	Saudi Arabia	11.855
	Nigeria	11.770
	Japan	9.505
	Portugal	17.880
	England	15.070, 15.400
	USSR	15.150, 15.525
1800	Norway	15.175
	Switzerland	17.830, 17.850
	Uganda	15.250
	Haiti	11.835
	Kuwait	11.675
1900	Canada	15.325
	Afghanistan	15.077
	Kuwait	11.675
	South Korea	9.870
	Norway	11.735, 11.850
	Ivory Coast	11.920
Belgium	15.590	
2000	Algeria	15.160, 15.215, 15.370
	Israel	11.640, 15.475, 15.585
	India	9.912
	England	11.750, 15.260
	Cuba	15.365
2100	Brazil	15.280
	Libya	11.815
	South Africa	9.585
	India	11.620
	Iraq	9.745
	Egypt	9.805
	Nigeria	15.120, 17.800
2200	Turkey	9.560, 11.770, 11.900
	Yugoslavia	9.620
	South Africa	9.585
	Japan	9.745, 17.755
	Belgium	17.595
	Italy	11.800, 15.330
Lithuania	11.770, 15.100	
2300	Sweden	9.696, 11.705, 15.270
	Haiti	11.835
	Grenada	15.045
	India	17.805
	Ukraine	9.800, 12.020
	USSR	9.610, 9.765



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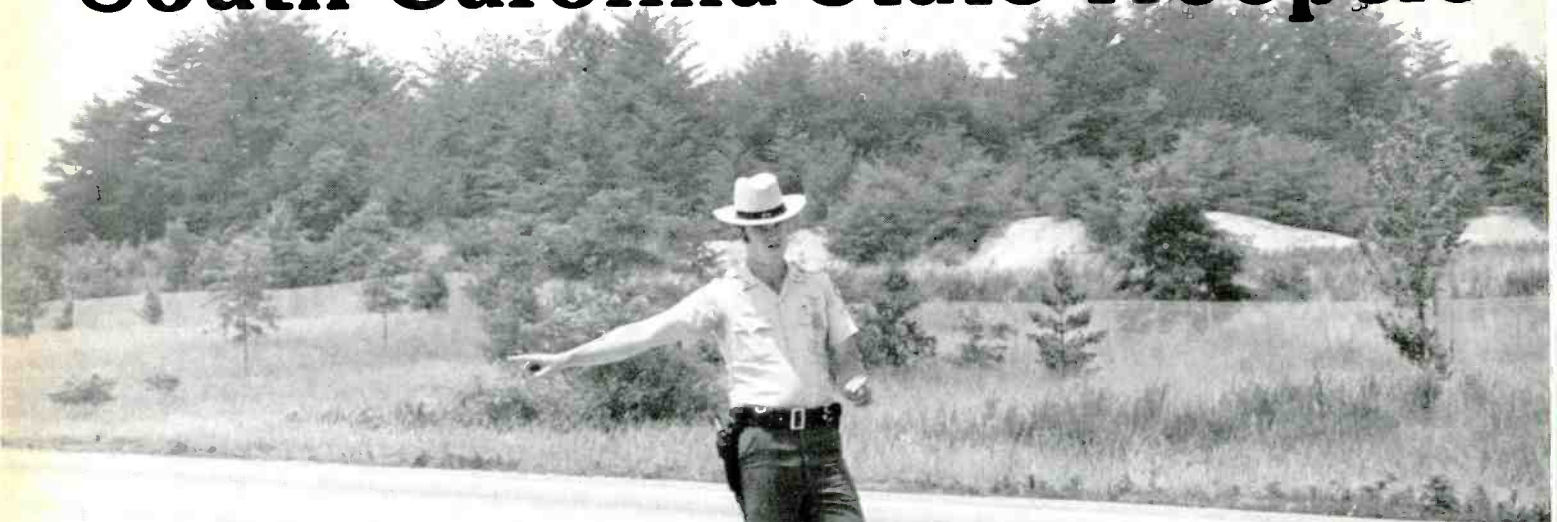
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# Scanning The South Carolina State Troopers



**T**his month we present frequencies and code signals used by the state law enforcement agency in South Carolina. We wish to thank reader Corey Wallin, Registered Monitor KSC4GJ, for sending this information to us. Readers are invited to pass along codes used by various federal, state, and county agencies, and those used by agencies in major metropolitan cities.

The South Carolina state law enforcement agency can be monitored on 42.08, 42.10, 42.12, 42.14, 42.26, 42.34, 155.445, 155.64, 155.955, 159.03, 460.05, and 460.25 MHz.

## Codes Used

- 10-1 Receiving poorly
- 10-2 Receiving well
- 10-3 Cancel, disregard
- 10-4 OK, permission granted
- 10-5 Relay
- 10-6 Busy
- 10-7 Out of service at \_\_\_\_\_
- 10-8 In service
- 10-9 Dispatching too rapidly
- 10-10 Out of car, radio left on
- 10-11 Stay in service
- 10-12 Officials or visitors present
- 10-13 Weather & road conditions
- 10-14 Convoy or escort
- 10-15 Prisoner(s) in custody
- 10-16 Complete assignment quickly
- 10-17 Any message for \_\_\_\_\_?
- 10-18 Have you heard from \_\_\_\_\_?
- 10-19 Return to \_\_\_\_\_
- 10-20 Location is \_\_\_\_\_
- 10-21 Telephone \_\_\_\_\_
- 10-23 Interference, stand by
- 10-24 On scene
- 10-25 Assignment completed
- 10-26 Operator/officer on duty?
- 10-27 Holding suspect/car—RUSH reply
- 10-28 Full registration on \_\_\_\_\_
- 10-29 Wanted?
- 10-30 Against rules/regulations

- 10-31 Drivers' license check
- 10-32 Suspension follows or negative
- 10-33 Emergency at this station, all others cease transmitting
- 10-34 Chasing \_\_\_\_\_ on Highway \_\_\_\_\_, direction of \_\_\_\_\_
- 10-36 Correct time
- 10-37 Empty weight
- 10-50 Wreck
- 10-51 Wrecker
- 10-52 Ambulance
- 10-54 Road blocked
- 10-60 Next message number?
- 10-61 Request reply
- 10-82 Hotel reservations for \_\_\_\_\_
- 10-88 Furnish tel. number of \_\_\_\_\_
- 10-89A Radio tech needed at \_\_\_\_\_
- 10-89B Radio tech will arrive at \_\_\_\_\_
- 10-93 Frequency check
- 10-94A Give me a test count
- 10-94B Transmit carrier with no modulation

## Signals

- 1 Trouble with prisoners, need assistance
- 2 Advise hospital, wreck victims enroute
- 3 Wreck victims at \_\_\_\_\_ Hospital
- 4 Meet \_\_\_\_\_ at \_\_\_\_\_
- 5 Converge with \_\_\_\_\_ on Hwy \_\_\_\_\_
- 6 Alleged drunk driver
- 7 Alleged drunk pedestrian
- 8 Driving under suspension
- 9 Speeding
- 10 Holdup, armed robbery
- 11 Mental case
- 14 Handle by mail

- 15 \_\_\_\_\_ delivered to addressee
- 16 Permission to send \_\_\_\_\_ to HQ
- 16A Permission for radio repair
- 16B Permission for car check
- 17 Permission to use car for \_\_\_\_\_
- 18A Hit & run, property damage
- 18B Hit & run, personal injury
- 18C Hit & run, fatality
- 19 Send \_\_\_\_\_ to HQ for another vehicle
- 20 Permission to visit HQ
- 21 Make CONFIDENTIAL investigation
- 22 Operator has no info on that subject
- 23 Void
- 24 Violation public service
- 25 If no stolen report, check owner for disposition
- 26 Resume normal operations
- 27 Advise \_\_\_\_\_ am being delayed
- 28 Defective traffic light at \_\_\_\_\_
- 29A Highway defect at \_\_\_\_\_ road
- 29B Highway defect at \_\_\_\_\_ bridge
- 29C Highway defect at \_\_\_\_\_ shoulder
- 30 Storm in progress at \_\_\_\_\_
- 31 Water over highway
- 32 Ice conditions
- 32A Ice conditions, need sand
- 33A Washout, need flares
- 33B Washout, need barricades
- 35 \_\_\_\_\_ is calling you
- 36 Fire or smoke conditions
- 37 How do you receive?
- 38 Tree(s) down across Hwy \_\_\_\_\_ at \_\_\_\_\_
- 39 Dead animal
- 40 Give to local broadcast stations
- 41A Fire (auto)
- 41B Fire (woods)
- 41C Fire (structure)
- 42 Don't use transmitter, see tech
- 43 Tower lights out at \_\_\_\_\_
- 44 Private cars holding race
- 45 Permission to go 10-7 because \_\_\_\_\_
- 50 General broadcast
- 51 URGENT
- 52 \_\_\_\_\_ stations only, rebroadcast
- 99 Unable to copy, change location





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List Price \$263.00

**Scanner World Price \$209.99**

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## Shipping Charges

Add \$3.00 per scanner, \$2.50 per antenna and \$2.50 for all accessories ordered at same time. (Example: 1 scanner and 1 antenna has total shipping charge of \$5.50.) C.O.D. shipments will be charged an additional \$2.00 per package. Full insurance is included in shipping charges. All orders are shipped by United Parcel Service. Shipping charges are for continental USA only. Outside of continental USA, please ask for special shipping quote.

## MONITORING THE 30 TO 512 MHz "ACTION" BANDS

### Scanning Made Difficult

Whether it was communications scramblers, the switch to the 800 MHz band, or the like, law enforcement officials have always been searching for the radio system that could afford them complete privacy. The basic scrambler set-up has proven somewhat effective for the agencies that carry out only a small percentage of their communications in the scrambled mode. But even in these instances, many devices are now available to the hobbyist that can easily "descramble" all the activity. The recent advancement in the scrambler field of "Digital Voice Protection" (which has been especially popular recently with the F.B.I., Secret Service, and Drug Enforcement Administration) renders the scanner enthusiast helpless in any attempts to descramble DVP encoded communications. For the time being, though, DVP will probably not become all that prevalent as it is expensive and often difficult to use; we'll cover scramblers in-depth soon in POP'COMM. As I mentioned in a previous article, a number of public safety agencies have been switching to the less crowded and harder to monitor 800 MHz band, especially since Bearcat no longer produces an 800 MHz band scanner. A converter such as a Hamtronics would be your best bet.

Overall then, communications companies have found a strong market for products that supply their customers with as much privacy as possible while making it ever more difficult for the scanner hobbyist to listen in on the officials whose services they're paying for. This is a major reason why the police, who have scrambler capability, don't use it all the time. If they did use their gear continuously, the uproar from the public would force them to do away with the equipment altogether.

There have been efforts to outlaw scanners entirely in some regions (mobile use of monitors has been made illegal in many sections of the nation), and the inability to enact such a law has manifested itself in much of the scrambling that goes on today. It's sometimes a case of "big brother" thinking he knows what's best for the public that employs him. Although excellent cases for the use of scrambling can be made in particular circumstances, overall I, and many of the hobbyists I've spoken with, just don't believe that any more than the most essential of scrambling is right. It goes right along with the classifying of the previously declassified government frequency list: the attitude that secrecy will serve the people best certainly must have its limitations, and it seems quite evident that these limits have been increasingly exceeded.



The very versatile Citi-Com Plus™ from Wilson Electronics, Inc., has many new and exciting features.

A while back, Wilson Electronics, a subsidiary of Regency (makers of professional and amateur communications gear), introduced their new "Citi-Com Plus" product line. The Citi-Com Plus is revolutionary in that it allows for business and public safety agencies to transceive on any of ten channels in the VHF-hi range of 134-174 MHz and the UHF range of 420-512 MHz (both in three different band segment models), and it's all programmable! But not only can you punch-up any frequency on the Citi-Com just like on a scanner, these units also allow for the programming of any of the "CTCSS" sub-tones, which most communications systems rely on to separate them from other agencies on the same frequency. The ten (or less) frequencies can be scanned and a "priority" capability can be activated, which samples the priority channel once after every two subordinate channels, hence three times within the scanning of ten. The unit is especially useful for mobile operators with its small size, night display lamps, and overall convenient packaging. However, the unit is also available in the base station configuration that includes the radio, base microphone, power supply, and mounting tray. The Citi-Com can also be used in an R.C.C. (radio common carrier) mobile phone-pager type system. The new Wilson transceiver, with a 25 watt output, sensitivity to .35 microvolts, and relatively low price, would seem to be a real gem. According to all accounts from very satisfied users, this radio is truly excellent.

I've also been hearing whispers that "the

best thing" about the Citi-Com is that non-licensed and non-authorized frequencies can and are being programmed into the unit for surveillance operations. Yep, while routine operations will be carried out over the regularly authorized channel to keep all of us buffs quiet and happy, the real interesting stuff may be going on over a crowded business channel or an obscure marine or forestry frequency. I suppose some may say that this just poses a new challenge for the true hobbyist who revels in the long hours spent searching for the active frequency, but it must be remembered that channels may change from day to day or even hour to hour as this new unit allows for ten possible frequencies. Also, remember that this activity is illegal; yet, ironically, I have been told of certain police agencies doing it. Circumventing the law in this case is a step beyond what's going on with scramblers (which are, of course, not illegal). And, yes, I realize that any transceiver can operate on unauthorized frequencies by the simple expediency of plugging in crystals for those frequencies; this new unit makes it a lot easier and more inexpensive.

### Aircraft Monitoring Revisited

In the November, 1982 issue, I told of my exploits during a flight to Washington, DC, when I took out my programmable portable and was overwhelmed with all that I could monitor. If you read that article, you'll remember that I was later informed by a stewardess that I could not use the scanner on board, although she did not tell me exactly

why. Well, now I know why. A number of you were kind and concerned enough to write in or call and educate me on my wrongdoing. John Sutton of Winnipeg, Ontario wrote that the intermediate frequency of many radios cause interference with some navigational instruments, which can result in incorrect readings. I certainly should have known better and assume that is the reason why the stewardess asked me to put the thing away. I regret that I implied that I would use a scanner on a flight again as I now surely would not. I have heard of Hams receiving permission to use their gear on planes and thus scanner buffs may be able to receive similar rights from the flight captain.

### Frequency Manuals

Also in the November, 1982 issue, I wrote of an excellent scanner manual for the northwest for which I did not have the mailing address. I have now learned that the guide is called *The Police and Fire Radio Callbook for the Pacific Northwest* (including parts of Canada) and it's put out by Mitchell Publications, P.O. Box 277, Seahurst, WA 98062. Check with the publisher regarding the price.

Scanner Master has come out with a new metropolitan New York City Guide which includes the City, Rockland, and Westchester counties to the north, all of Long Island, and much of northeast New Jersey. Edited by long-time New York City hobbyist Rick Prelinger, this guide contains comprehensive listings of code and unit numbering systems, along with maps and exact frequency usages for particular agencies in the very crowded and much misunderstood New York metropolitan area. Highlights include hundreds of interesting business licensees, a painstakingly researched analysis of the New York City agencies (some 31 pages out of 150 are on NYC public safety alone!), and terrific coverage of the Port Authority System. *The New York Metro Guide* is priced at \$12.95 plus \$1.75 first class mailing from Scanner Master, P.O. Box 428, Newton Highlands, MA 02161.

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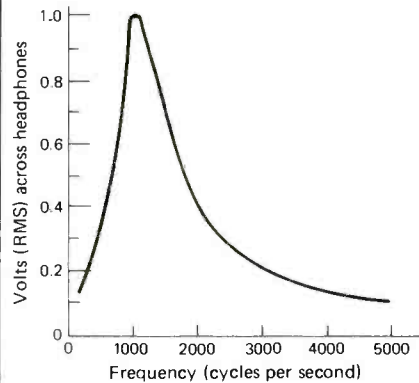
# CW Peaking Your Headphones

BY DAVID FARMER, KMT7CX

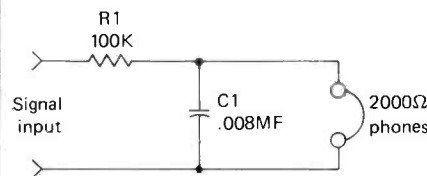
Those of us who like to copy CW frequently seek out different ways of increasing selectivity and shutting out any interfering signals or sounds that degrade CW reception. All sorts of tricks have been tried, including the installation of crystal and mechanical filters within receivers as well as external accessories designed for the purpose of improving CW reception.

Here's an idea which I've found to work, and despite its utter simplicity, it works well. I tune-up my headphones for CW reception!

Since magnetic headphones have inductance, it's easy to tune them with a parallel capacitor. The secret ingredient here is the inclusion of a series resistor (R1) to decouple the output of the receiver. The higher the



Graph indicates the degree of frequency peaking that may be obtained by proper selection of capacitor C1. BFO control should be adjusted to peak the CW signal at the same frequency.



Components R1 and C1 may be installed in phone plug shell. R1 isolates the receiver's low impedance output. C1 becomes part of an L/C peaking circuit; the phone inductance supplies L.

value of R1, the sharper the resonant peak; lower resistance flattens it.

My 2,000 ohm headphones were tuned to 1,000 Hz (1 kHz) with a .008  $\mu\text{f}$  capacitor (a .005  $\mu\text{f}$  and a .003  $\mu\text{f}$ , 5% or 10% mica, connected in parallel). This value was determined experimentally with a capacitor decade box adjusted to give the 1,000 Hz peak response shown in the graph. The lower the capacitance, the higher the frequency of the peak and vice versa.

This peaking circuit works best with receivers having the usual capacitor or transformer-coupled headphone output. If you have an older tube-type receiver, you may have one in which the headphones are plugged directly in series with a tube plate. If that's the case, R1 will considerably reduce the plate voltage, so connect a 2,000 ohm 1/2-watt resistor across the headphone jack of the receiver.

While this modification will produce beautiful CW reception, the headphones will be of little value for copying voice or music. Therefore, you might wish to modify a spare pair of headphones, or else put the circuitry in a separate setup which is removed from the headphones when voice or music reception is desired.

# One Tube Did It All – You Couldn't Get Much Smaller Than That!

## Five Watt CW Spy Transmitter

BY ANSON MacFARLAND, KVA4EX

How important have miniature transmitters and receivers been for undercover operations in recent years? I don't have to tell you, but it's difficult for many folks to realize that in the late 1940s, a portable broadcast receiver was the size of an overnight case and, with its batteries, weighed in at between 10 and 15 lbs. Contrast that with today's espionage equipment, which can fit into tie clips or may be imbedded into a tooth filling! Even a standard commercial transistor broadcast portable need not be larger than the space it takes to mount the loudspeaker and two control knobs. That's why the miniature equipment used for espionage work during WWII has always fascinated me, and also because it took so much ingenuity to design and build it. The response to previous information I've presented on this equipment in POP'COMM's pages indicates that I'm not at all alone in this fascination.

An unusual story of the use of undercover receiving equipment was recently passed along to me by a reader in Missouri who asks that I not use his name; it's a story that typifies the importance of this equipment and the cleverness it took to design it and get it to operate. It concerns an American engineer who managed to build and conceal a tiny radio set by means of which he and his fellow POW's kept in touch with the world outside a Japanese prison camp in Java during the early 1940s.

The radio builder was Gaylord A. Buchanan, then of Claysville, PA. Buchanan had lost his leg during his third year at the U.S. Naval Academy in Annapolis, but was permitted to complete his course there. After graduation, he went to work for the Sperry Gyroscope Company, which sent him to Singapore. He escaped the Japanese during their occupation of Singapore but was later captured in Java.

Obtaining two small RCA "acorn" type tubes from a New Zealand Air Force officer in the prison camp, Buchanan salvaged other parts from a wrecked Philips Radio and then, with a charcoal fire, copper, and Plexiglas, built the set into an aluminum cup which he fitted into a recess hollowed out in his artificial leg. Apparatus for rectifying the

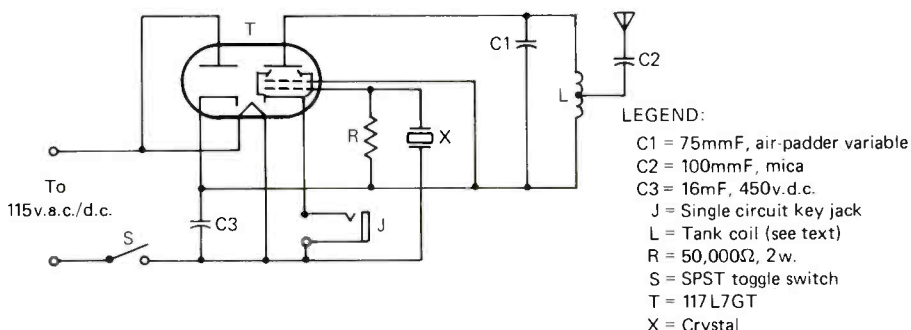


Fig. 1. Circuit diagram of the 1 tube, 5 1/2-watt CW transmitter.

current and cutting its voltage was built into a Dutch canteen. A wire supporting a mosquito netting bar in his quarters was used for a receiving antenna.

When the receiver's original radio tubes blew out, Lt. Louis E. Biechlin (USN) of South Akron, Ohio, located ones in another wrecked radio set. However, these were too large to be concealed in Buchanan's artificial leg, so they were built into the false top of a stool used by the prisoners. The stool was left out in the open where it was constantly under the eyes of the prison guards. However, the set didn't work too well, so the prisoners rebuilt it into the soles of a pair of bath clogs, over which they put extra crepe rubber soles. Still later, the set was hidden in the hollowed-out end of a teakwood beam in the ceiling of their quarters—and it was never discovered! Wish I had the schematic used here; unfortunately, I don't.

What I can offer you is a miniature 5 watt 4 MHz transmitter, which is about as basic and miniature as they could get back in the days of vacuum tubes. It was built in a Bud Mini-box or similar.

If a 117L7 tube wasn't handy, a 117M7 could have been used. For higher output, a 117N7 was used, although the wiring connections were different. A 117P7 had the same connections as the 117N7 and provided the same power as the original 117L7.

This was an AC/DC circuit and, as such, provided a bit of a shock hazard. For the sake of safety, the circuit was best used in

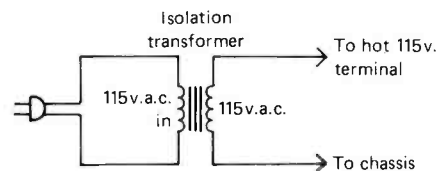
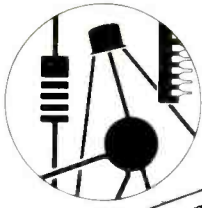


Fig. 2. If you don't want a bad shock, this isolation transformer is your best bet.

conjunction with an isolation transformer, such as the one shown in Fig. 2; it certainly was better than fooling with a "hot" chassis!

The chassis of the rig needed to be connected to a good ground for best results. The schematic is shown in Fig. 1. Coil L1 consisted of 32 turns of #20 enam. copper, close wound on a 1 1/2" diameter form. To save space, the plate tuning capacitor (C1) was mounted within L1. The antenna coupling capacitor tap was taken 6 turns down from the plate end. A 0-50 ma. milliammeter in series with the oscillator cathode lead to ground aided in tuning up the transmitter. With the antenna connected, C1 was adjusted until the cathode current was about 45 ma. Any AC ripple in the rig's output was removed by adjusting C1 for lower capacity. Actually, the rig was operable on any number of frequencies by changing the L/C values.

This is the type of small CW transmitter that could be slapped together from receiving tubes for use on any number of clandestine frequencies.



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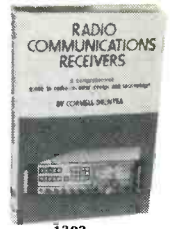
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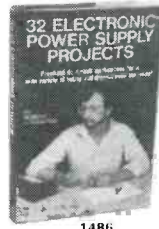
1451  
List \$18.95



1473  
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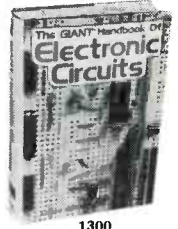
1393  
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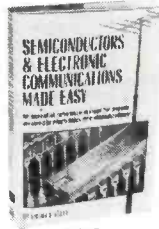
1486  
List \$17.95



1199  
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1435  
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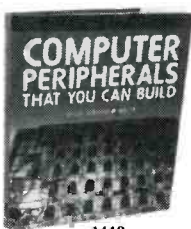
1465  
List \$15.95



1317  
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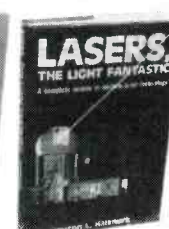
1120  
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1449  
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1390  
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1108  
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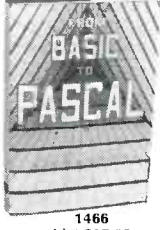
1506  
List \$12.95



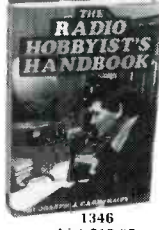
1225  
List \$16.95



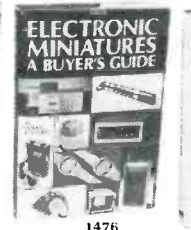
1260  
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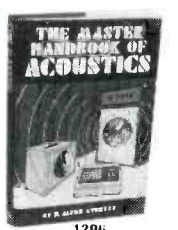
1476  
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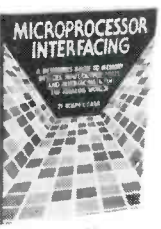
1436  
List \$16.95



1296  
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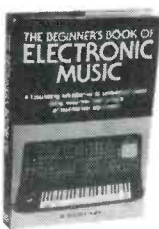
1487  
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1396  
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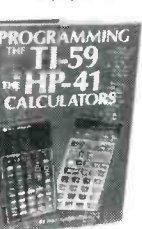
1160  
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1438  
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## WHAT'S HAPPENING: INTERNATIONAL SHORTWAVE BROADCASTING BANDS

**S**pring is rapidly approaching, and that means a couple of things to DX'ers and shortwave listeners. The equinox, with its period of equal daylight in both the northern and southern hemispheres, often means unusually good lower band conditions. On the higher meter bands, signals should begin to hold up much later into the evening and even early morning hours than they do during the winter months. These are two points to keep in mind as you search the frequencies this time of year.

### Spotlight On Kuwait

Oil is Kuwait's middle name. With lots of this black gold under its land and a relatively small population, Kuwait enjoys one of the highest per capita incomes in the world. Income and sales taxes are unknown!

Radio Kuwait began its operations in 1951 with a 500 watt shortwave transmitter, and the same year added another transmitter of 1 kilowatt. After another nine years went by, transmitters of 10 and 50 kilowatts were added to the shortwave complex. In 1968, four 250 kilowatt transmitters joined the shortwave complex. In 1979, two 500 kilowatt units were added, along with a rotating directional antenna. Still another two 500 kilowatt units are being installed.

Radio Kuwait began with only three and a half hours of broadcasting per day. Today it runs a total of seven different programs.

The main program is aired in Arabic from 0230 to 2215 and beamed on shortwaves to the Middle East, Morocco, and Europe. A second program, also in Arabic, runs from 1000 to 1600 GMT but is on mediumwave only (1341 kHz), intended for the Arabian Gulf area. The English program is on shortwave and directed to Europe, India, Pakistan, Bangladesh, and Sri Lanka specifically, but is also heard regularly in the United States and in most other areas of the world.

There's a stereo music program, but that runs only on local FM channels. The Urdu language program is aimed at East and Southeast Asia from 1600 to 1800 GMT. From 0800 to 1000, a Persian language program is carried (again, on mediumwave 1341 kHz only). Finally, the Holy Quran Program goes out from 0200 to 0500 for East and Southeast Asia on the big 250 kilowatt shortwave transmitters.

Radio Kuwait's programming is remarkably varied, with topics ranging from industrial and scientific development in Kuwait (a regular series), to press reviews, programs on Islamic Theology, The Making of Islam, book reviews, sports, and serialized dramas. Musical offerings are even more diverse and include jazz, rock, disco, French songs, the Afro-American beat, Latin rhythms, pop



hits, country and western, marches—something for everyone!

The identification, in Arabic, is "Huna Al Kuwait," in Urdu "Yeh Radio Kuwait Hai," and "Inja Radio Kuwait" in Persian.

Frequencies in use (at various times) for Radio Kuwait are: 21.685, 21.570, 21.545, 17.650, 15.495, 15.345, 11.990, 11.675, 11.650, 9.660, 9.650, 9.540, 7.120, and 6.055.

English is currently aired from 0500 to 0800 on 15.345 and again from 1800 to 2100 on 11.675.

Radio Kuwait verifies reception reports with an attractive folder card. Write Radio Kuwait, P.O. Box 397, Kuwait.

### On The English Language

We've mentioned Dan Ferguson's *Guide to English Language Shortwave Programs* before, but there's been a change from quarterly to monthly publication, a move designed to provide more up-to-date information to the subscriber. Subscription rates may have gone up over the \$12.00 quarterly rate, but \$12 would get you going for at least the major part of a year. To subscribe, you can write to Dan Ferguson at P.O. Box 8542, South Charleston, WV 25303.

Another source of information about stations with English programs and when they are scheduled is the *International Listening Guide*. Included in the hour-by-hour survey are station name, type of program, target area, and frequencies. A companion publication, the *International Program Guide*, has schedules for regular programs in English from the major shortwave stations, but does not include frequencies. The *Listening Guide* is published monthly, the *Program Guide* periodically. Although both are published in Germany, they are available through a United States distributor. For more information, write to Rob Harrington, P.O. Box 3434, Littleton, CO 80161.

### Peking = Beijing

Radio Peking is no more! No, the station hasn't closed down, it's just changed the way it spells its name—from "Peking" to "Beijing." The spelling change is another step in the complete conversion to romanizing Chinese names and places, which officially began in 1979.

### Mailcall

Don Teeter of Oakland, California writes to tell us he likes *POP'COMM* a lot and was infected by the SWL bug about 15 years ago. Currently, he's using a Panasonic RF4900 receiver.

Peter J. DeHart of Middletown, Pennsylvania admits to a fondness for DXing stations in the Pacific Ocean area. We agree Peter, and lament the fact that there are so few targets there. It was a sad day when Fiji went off shortwave many years ago.

Home F. White of Omaha, Nebraska is a retired military radio operator and enjoys HCJB's "DX Party Line" and Radio RSA's "DX Corner." We'll be doing a summary on DX programs down the road a bit, Homer, so watch for that!



Tom Gavaras of Plymouth, Minnesota in his well-equipped listening post.

## Listening Reports

Let's see what's being heard! Remember, all times and dates are GMT unless otherwise indicated. Remember, too, the changeability of the shortwave animal.

**Afghanistan** Radio Afghanistan's current schedule is from 1000 to 1030 on 6.230, 15.255, and 21.460 and from 1900 to 1930 on 9.665, 11.960, and 15.077. Both time segments are for English broadcasts. You are really hearing Afghanistan only if you're listening on 6.230 or 15.077; transmitters on the other frequencies are actually in the Soviet Union. (Stark/SPEEDX) Don Teeter of California hears Radio Afghanistan daily at 1900 on 9.665.

**Albania** Radio Tirana, heard daily at 0000 on 7.063 and again at 0100 on 9.748 and 7.120. (Don Teeter, CA)

**Angola** A Voz de Angola noted on 9.535 with good strength in Portuguese at 0544. (Mike Nikolich/CADX)

**Argentina** Radiodifusion Argentina al Exterior (RAE) has English at 0100 and announces these frequencies: 6.060, 6.180, 9.690, 11.710, and 15.345. (Peter DeHart, PA)

**Benin** Radio Benin is noted in French on 4.870 from 2215 to 2330, with revolutionary songs and talk. Sign off time is observed to vary. (Peter DeHart, PA)

**China** Radio Beijing to North America runs from 0000 to 0100 on 11.650, 15.120, and 15.520, from 0100 to 0200 on 11.650, 15.120, and 15.520, from 0200 to 0300 on 11.650 and 15.120, from 0300 to 0400 on 11.650, 15.120, and 15.520 and from 0400 to 0500 on 11.650 and 15.120, and from 1200 to 1300 GMT on 9.820. (Hecht, Radtke, Stewart/ASWLC)

**Clandestine** The Voice of the Sudanese Popular Revolution believed the station heard in Arabic on 17.940 at around 1405 sign on, continuing until 1805. Very clear identification mentioning "Sudanese" was heard at 1530. (Peter DeHart, PA)

**Egypt** Radio Cairo is being heard daily at 0200 on 9.475. (Don Teeter, CA)

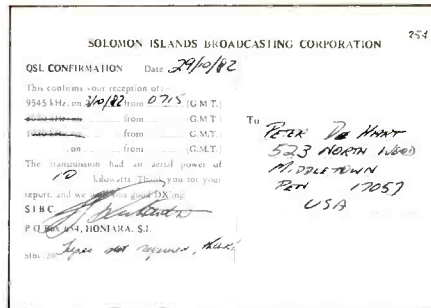
**Ethiopia** The Voice of Revolutionary Ethiopia noted by Richard Wood in Saudi Arabia on 9.560 from 1200 to 1800 in its external service. (DSWCI)

**Greece** Radio Athens was monitored at 0300 on 9.685. (Don Teeter, CA)

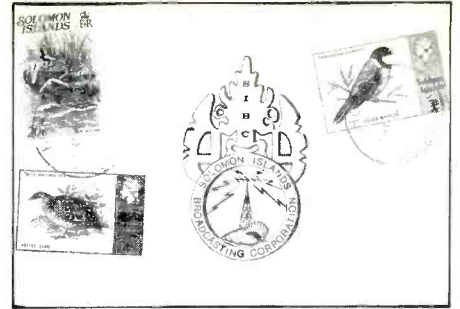
**Guatemala** Active stations in Guatemala include Radio Nacional on 6.180 and 9.760 from 1800 to 2300; Adventist World Radio's "Union Radio" on 6.090 operating 24 hours a day; La Voz de Nahuala on 3.360 from 2100 to 0400; Radio Maya de Barillas on 3.325 from 2100 to 0400; Radio Tezulutlan on 4.835 and 3.370 from 2100 to 0300; and Radio Chortis on 3.380 from 2100 to 0300. (Oswaldo Oscar Juarez/NASWA—*Listener's Notebook*)

**Honduras** Radio Variedades and Radio Cadena Zeta network heard in local evenings on 6.000 with severe interference. (Glicksman/CADX)

This is a bit of a different arrangement with Radio Variedades, a station in Tegucigalpa



Peter DeHart of Pennsylvania has this QSL from the Solomon Islands Broadcasting Corporation in his collection.



providing the programming on 6.000 and El Eco de Honduras in San Pedro Sula owning the transmitter. (editor)

**Hungary** Radio Budapest is on the air to North America from 0200 to 0230 on 6.025, 9.585, 9.835, 11.910, 15.220, and 17.710; it is also on from 0300 to 0330 on the same frequencies. Wednesdays and Saturdays it is on these frequencies, but only from 0400 to 0415. The 0200 to 0230 time period is not used on Mondays, GMT. (Hesch, Pfeffer, Stark/SPEEDX)

**Iceland** Look for the Icelandic State Broadcasting Service on 13.797 from 1830 sign on, in Icelandic, with music and talk. (John Moritz, Ohio, NASWA-Update)

**Ivory Coast** Radio Abidjan plans 250 kilowatts on 15.230. (WRTVH via Radio Netherlands Media Network)

**India** All India Radio from New Delhi is scheduled in English from 1000 to 1100 on 15.205, 15.320, 17.387, 17.705, 17.875, and 21.695; from 1330 to 1500 on 11.810 and 15.335; from 1745 to 1830 on 9.595 and 11.620; from 1945 to 2045 on 9.755 and 11.865; from 2000 to 2230 on 9.912, 11.755, and 15.110; from 2245 to 0115 on 7.215, 9.605, 11.765, 11.900, and 15.300, as well as 17.805 to various areas of the world. (Stark/SPEEDX)

**Laos** The foreign service from Vientiane has English from 1330 to 1400 on 7.028. Active regional Laotian stations, even tougher to hear, include Pakse on 6.587, Hua Phan on 4.653, and Udom Sai on 6.860. Stations located at Xieng Khouang, Luang Prabang, and Savannakhet have not been noted recently. (UADX via DSWCI)

**Montserrat** The Voice of Germany (Deutsche Welle) relay in the Caribbean Island of Montserrat is scheduled in Spanish from 0200 to 0330 on 11.965; English from 0500 to 0550 on 11.705; German from 0600 to 1400 on 11.705; Spanish and Portuguese from 2130 to 0050 on 11.865; and English again from 0100 to 0150 on 9.545. (Andre Tatter, *Asian DX Review*, via RIB)

**Malawi** Look for the Malawi Broadcasting Corporation on 3.380 from 0245 to 0530, 0600 to 1715 on 7.130, and 0400 to 2110 on 5.995. (Clive Rooms, WDXC)

**Mali** Radiodifusion National du Mali at 0700 in French on 7.110. Local languages also heard. (Tom Laskowski, IN)

**Namibia** The Southwest Africa Broadcasting Corporation is now using 4.965 for 24 hours a day. (Richard Binby/DSWCI)

**New Caledonia** Radio Noumea carries the Adventist World Radio program in French around 0830 on Tuesdays and Fridays on 3.355 and 7.170. (Arthur Cushen/WDXC)

**New Zealand** Radio New Zealand has heard "loud and clear" at 0400 on 17.705 and then again at 0500 on the same frequency. (Don Teeter, CA)

**Norway** Radio Norway is scheduled to North America from 1400 to 1430 on 21.700 and 25.730 (or 21.730); from 1700 to 1730 on 15.175 and 25.615 (or 21.700); from 0400 to 0430 on 9.590 (or 9.685), 6.185 (or 9.765), and 9.610 (or 6.030). English is carried Sundays only (Monday, GMT), other days are Norwegian except for opening and closing identifications. (Chinsky; Fraser/SPEEDX)

**Papua New Guinea** Radio West New Britain heard on 2.340 tentatively, from 1156 tune in airing rock and island music. (Glicksman/CADX) Radio Madang on 3.260, noted from 1323 with country western music and announcer in Pidgin English. (Nikolich/CADX)

**Poland** Here's the latest schedule from Radio Polonia. In English and Polish to North America: 0200 to 0300 and 0300 to 0355 on 15.120, 11.815, 9.525, 6.135, and 6.095; 1130 to 1255 on 17.865, 11.840, and 9.525. The general English service runs from 0630 to 0700 on 9.675, 7.270, and 6.135; 1200 to 1225 on 7.285 and 6.095; 1400 to 1430 on 7.285 and 6.095; 1600 to 1630 and 1730 to 1800 on 9.540 and 6.135; 1830 to 1855 on 7.285, 6.135, 5.995, and 3.955; from 2030 to 2055 on 7.285 and 6.095; and 2230 to



Radio Kuwait's folder-style QSL.

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2300 on 7.270, 7.125, 6.135, and 5.995. The African service in English is aired from 1230 to 1300 on 15.120, 11.840, 9.675, and 9.525; 1630 to 1700 on 11.840, 9.675, 9.525, and 7.125, with those same frequencies used at 1830 to 1855. Finally, from 2000 to 2030 on 9.675, 9.525, 7.145, and 7.125. (Harold Frodge, Midland, Michigan)

**Portugal** Radio Renascenca, the Catholic operated station, is supposed to have a North American service scheduled from 0145 to 0345 on 9.695. (Andy Sennitt/DSWCI)

**Qatar** The Qatar Broadcasting Service is scheduled from 0400 to 0700 on 9.680; from 0700 to 1300 on 17.895; 1300 to 1700 on 9.715; and 0245 to 2130 on 9.570. (RIB)

**Seychelles** FEBA, the Far East Broadcasting Association, has English scheduled from 1225 to 1230 (5 minutes) on 11.865 and 15.320; 1500 to 1600 on 11.865 and 15.325; 0400 to 0500 on Saturdays and Sundays on 11.810 and 15.200. (SCDX)

**Solomon Islands** The Solomon Islands Broadcasting Corporation was noted on 9.545 at 0830 with ten minutes of news from the Southwestern Pacific area. Identifications are for "Radio Happy Isles" and "SIBC." (Peter DeHart, PA) Don Teeter in California also hears them on 9.545 from 0700 to 0800.

**Somalia** Peter DeHart in Pennsylvania reports Radio Somalia around 2030 in local language on 6.792 with good signals and music for about an hour. He notes that the words "Mogadiscio" and "Somalia" are distinctive in the station identification.

**Sweden** Radio Sweden International has English to America from 0230 to 0300 on 9.695 and 11.705; from 1400 to 1430 on 21.615; and from 2300 to 2330 on 9.695 and 11.705. (SPEEDX)

**Surinam** Stitchting Radio Omroep Suriname has an English program at 0400 on 4.850. (Peter DeHart, PA)

**Tahiti** Radio Tahiti heard at 0300 in Tahitian and French on 15.170. (Peter DeHart, PA) It is noted daily at 0400 on 11.825. (Don Teeter, CA)

**Tanzania** 9.750 is the current frequency for Radio Tanzania in English from 0330 to 0530, 0900 to 1030 (extended to 1530 on Sundays), and again from 1530 to 1915. (Richard Ginby/DSWCI)

**Upper Volta** Radio Television Voltaique was heard in French on 4.815 at 0538, with talk and native music. A possible newscast was noted at 0555. (Gliksman/CADX)

**Zambia** The Zambia Broadcasting Service has been logged on 4.911 with sign on using the Fish Eagle bird call interval signal at 0355 and identifying as the Zambia Broadcasting Service. (Tom Laskowski, IN)

**Zimbabwe** A new service of the Zimbabwe Broadcasting Corporation is "Radio Four," scheduled to use 7.330 from 0700 to 1830 in English and African languages. (Richard Ginby/DSWCI)

??? An Arab station on 4.850 with sign off and anthem at 0000, with chanting be-

December 1982  
Vol. 11 No. 12  
All Times GMT

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ADDRESS: 5505 Midland Rd, Midland, Michigan, U.S.A. 48840

YOUR QSL CONFIRMED  
DATE: 22-5-73  
REQ: 3294, 322  
SERVICE: General  
SIGN: [Signature]

Rhodesia is now Zimbabwe, making this Rhodesia Broadcasting Corporation QSL an impossibility now. This one belongs to Harold Frodge of Midland, Michigan.

fore leaving the air. Sometimes does not use an anthem. (Peter DeHart, PA)

With thanks to: SPEEDX, Lake Elsinore, California; Don Teeter, Oakland, California; Chicago Area DX Club, Chicago, Illinois; Peter J. DeHart, Middletown, Pennsylvania; American Shortwave Listener's Club, Huntington Beach, California; Danish Shortwave Club International; North American Shortwave Association, Levittown, Pennsylvania; Radio Netherlands Media Network; Review of International Broadcasting, Knoxville, Tennessee; World DX Club, England; Tom Laskowski, South Bend, Indiana; Harold Frodge, Midland, Michigan; Radio Sweden's Sweden Calling DX'ers.

Don't forget—we welcome your reports, complete with a few program details! We also look forward to receiving schedules from stations, high contrast copies of your QSLs, shack photos, comments, and questions. We'll try to include as much information as we can each month. Let's hear from you!



## THE EXCITING WORLD OF RADIOTELETYPE MONITORING

As I am writing this, the standby carrier mark signal of INA (Iraqi News Agency) in Baghdad, Iraq, is displayed on my green screen monitor with a frequency of 13524.0 kHz prominently showing on my receiver. Although many news services will quickly sign on their transmitter carrier, transmit the daily news broadcast, and then sign off rapidly, others will have a carrier on for at least 15 minutes before starting the daily news transmission. A typical pre-news transmission header would be a sequence of RY's (several lines) and the usual station mnemonics and name abbreviations. This header sequence is very helpful to the listener who would like to optimize the signal by carefully tuning the receiver, pass band select, bandwidth, and AGC in order to get that elusive solid copy.

Examples include Figures 1 and 2, where a continuous "RY . . . PSE QJH1 DE 6YU TESTING" and "RY . . . ORA DE BAP44 XINHUA BEIJING" is used to adjust both transmitting and point to point (PTP) receiving equipment. RY signifies alternate ones and zeros where R's five bit (Baudot) code is a binary 01010 and Y's five bit code is a binary 10101—a format used to test the ionospheric propagation conditions by sending at the maximum data rate—changing from 01010 to 10101 is more demanding on propagation and receiving conditions than, let's say, R(01010) to J(01011). This represents a single bit change rather than a complete 5 bit change. Dakar, Senegal is the location of the strong (S9) FSK signal found at 10407.5 kHz, 50 baud, normal phase.

As shown in Figure 1, 6VU is the call sign of ASECNA, or Agence pour la Securite de la Navigation Aerienne en Afrique et a Madagascar. Conditions were ideal, and perfect copy of all RY's are noted. Figure 2 illus-

trates less than perfect reception of XINHUA, or New China News Agency, logged at 14923.2 kHz, 50 baud, reverse phase. The call sign of this transmitter is BAP44. One can see several dropouts caused by fading by noting an early carriage return code (01000) rather than an R Baudot character. Also, note the occasional S Baudot character (00101) instead of the transmitted or intended Y (10101), a change in only one most significant bit.

Basic analysis of the actual received character versus the intended RY pattern allows one to debug the overall equipment used, including the antenna. The above noted example shows several dropouts, rather errors of omission, instead of errors of insertion. This also indicates that a different antenna or switching to a horizontal polarized antenna would help. Actual garbling or extra characters tend to indicate multipath distortion. Multipath distortion occurs when the transmitted signal arrives at the particular antenna by several paths. This echo will insert wrong characters due to the resultant time delay and the unpredictable distortion. Options include switching antennas, multiple receivers (known as diversity), and by using either the mark or space tone *only*. Many demodulators have a switch for mark only, space only, or mark *and* space. Some demodulators have a *threshold control*, allowing the slicer, or signal separator, to automatically detect either mark/space tone.

The inexpensive demodulators use single tone anyway, so the most productive option is to have a rotary coaxial switch be able to select a vertical or horizontal antenna, depending on the changing conditions of the ionosphere and MUF (maximal usable frequency). If cost was no object, a popular method to reduce multipath distortion or

fading might be to use two receivers to combine signals from two different frequencies and be able to select the optimum signal from either. This method is, for the most part, utilized in military installations to reduce fading and multipath.

With the advent of low cost stable digitally synthesized receivers that have programmable preselecs, one can rapidly switch between frequencies to obtain good copy. While not as ideal as multiple receivers, due to the realtime signal optimization of the combiner, it is a low cost compromise. Amateur Radio and some military traffic uses 170 Hz shift rather than 425 Hz shift for news transmissions or 850 Hz shift, which will reduce selective fading. Selective fading means that either mark or space will fade, but not both mark and space tones. A narrow shift such as 170 Hz tends to minimize the effect of selective fading due to frequency dependent ionosphere effects. Of course, a narrow shift requires better audio filters for mark and space and also requires a more stable receiver with careful on-frequency tuning, as any mistuning is intolerable for error-free reception.

An exciting new receiver has recently been made available from many radio supply stores—the ICOM IC-R70. Finally, we have a hobbyist priced receiver that will allow 10 Hz incremental tuning! This is most desirable for RTTY, especially narrow shift FSK. This has normally been accomplished by an RIT or incremental fine tune potentiometer. Fine tuning on the R70 is built-in with the synthesized 10 Hz rate; no guessing involved with this receiver! It is a most welcome introduction to the world of RTTY monitoring. Stability is rated less than 250 Hz in the first hour—less than 50 Hz long term. This is excellent when comparing

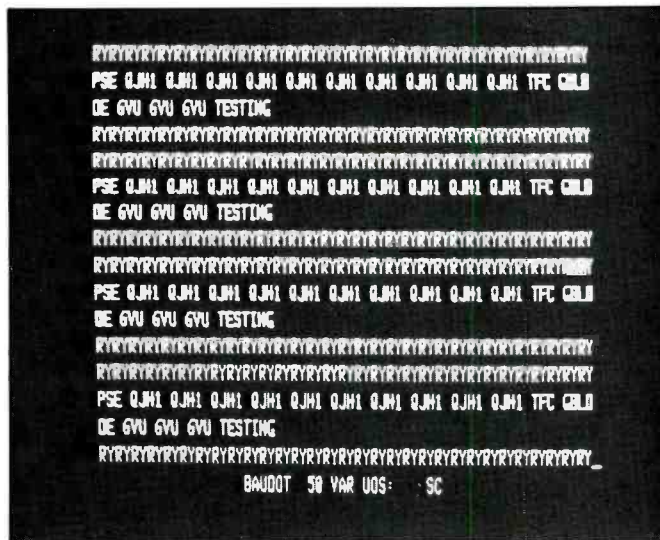


Figure 1.

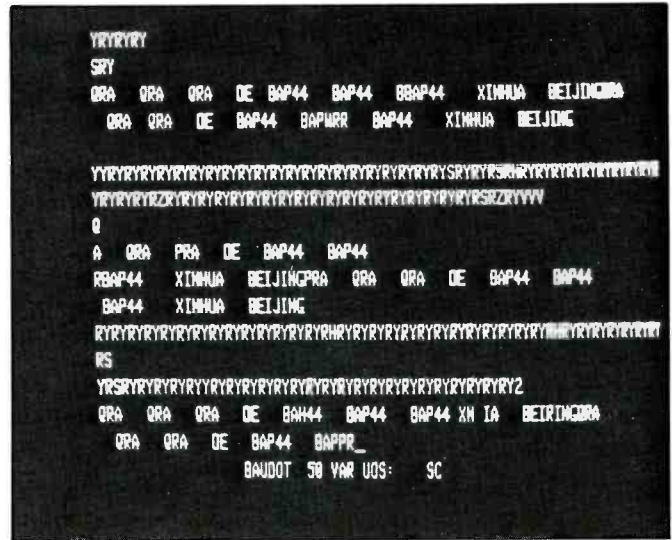


Figure 2.

price/performance specs. The next step in performance is a quantum jump in price, almost twice the price of the IC-R70.

The new Kenwood R-2000 has most first class features for voice and SSB reception, but it's 50 Hz digital incremental tuning without a potentiometer for finer than 50 Hz tuning leaves a need for finer (at least 10 Hz) adjustments for narrow shift RTTY. Well, any low cost receivers that are synthesized, hence stable, are welcome since a growing group of RTTY enthusiasts would enjoy a greater selection. In future issues of POP'COMM, we hope to review, in depth, new receivers and RTTY demodulators.

One very useful list, the *World Wide Radio Teletype Call Sign List of Utility Stations, List C, 7th Edition*, has helped identify call signs of utility stations, listed mnemonics and abbreviations for regional states, and ITU country/geographical symbols. This list is used as a quick reference for the abbreviations often incoherently displayed.

For example, Figure 2 shows BAP44 as the call sign; looking up BAP alphabetically in the *World Wide Call Sign List*, one finds the transmitter location as Beijing, China, confirming the displayed location.

VRN35 is located at Victoria Island, Hong Kong, according to my call sign list, along with 3,000 other alphabetical listings. I also received a special supplement to the *List of Radio Teletype Stations in Frequency Order, 8th Edition*, from Universal Electronics, 1280 Aida Drive, Reynoldsburg, OH 43068. These stations that are listed are unique in that all the listings are either SITOR or FEC. Both SITOR and FEC and synchronous codes, as opposed to asynchronous codes, such as Baudot or ASCII. Synchronous codes are not readable on most demodulators. In fact, the only hobby unit to display SITOR and FEC is the Universal Electronics M-600 multicode reader. A full, in-depth report will be provided to POP'COMM readers on the M-600, as this unit is currently being tested.

Initially, it appears that synchronous codes are a small minority on HF as compared to Baudot. Also, the higher speed of synchronous codes seems to have a higher error rate in a receive-only environment. Keep in mind that most synchronous codes are sent in blocks that are confirmed by the listener's equipment.

In order to recognize the sound of SITOR,

try listening to WCC in Chatham, Massachusetts at 13081.5. An unmistakable chirping is the SITOR news and messages to ocean going vessels. Four frequencies are logged that have English news: 1) 8713.0 kHz, 2) 17203.0 kHz, 3) 17210.5 kHz, 4) 17230.0 kHz. Careful synchronization is necessary for good copy, and several seconds are required in order to synchronize the receiver.

Even though Morse Code is still very popular, a transitional change to TOR has been noted in recent times. TOR, or Telex over Radio, represents characters that are 7 bits long and comprise a ratio of four marks to three spaces. SITOR and SPECTOR are not only the evil organization in 007 films, but trademarked versions of TOR! Certainly, we would like to see more demodulators with this option, especially since all the required hardware is built into most demodulators. Only an addition in software is required to interpret these unique codes. After all, microcomputers are quite happy interpreting and looking up any codes that are programmed in it. TOR has three modes of operation—forward error correction is sent as an unidirectional data flow, while all receivers check the three space/four mark ratio to see if any hits or errors are present. If errors arise, there is no problem since redundant characters are automatically sent and entered into the display memory if finally correct. Secondly, Selective, FEC TOR is sent to particular recipients as the call signal enables or wakes up the receiver. Thirdly, ARQ TOR is two-way traffic set up as half duplex. Half duplex is transmitting one direction at a time but a reply is automatically given to retransmit the message upon receiving any errors, including dropouts.

So much for TOR. Let's look at some of the readers' questions. All personally addressed questions will be answered directly, but some deserve to be in print because of a common interest. Many letters begin with:

- Q. I am contemplating the purchase of one of the new XXX terminal units. What unit do you recommend?
- A. This is really an open-ended question with definitely more input needed to qualify your wants and needs. You should answer the following questions:
1. What is my budget's upper limit to purchase a TU display?
  2. Do I need portability and 12 volt operation?
  3. Will it be necessary to interface the TU to a microcomputer? Future plans to purchase and use the TU with a microcomputer?
  4. Is the TU easy to tune? a monitor scope output?
  5. What are all of the available options? Is video output built-in or an option?
  6. Can a printer for hard copy be added, if desired?
  7. Is it desirable to use a separate terminal unit to apply the serial output

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and use the first TU as the video source or actual display?

8. If video output is provided, what is the character density? (i.e., 16 x 36, 16 x 72 characters/page)
9. CW capability?

Bare minimum requirements would include all the standard shifts—170 Hz, 425 Hz, 850 Hz, and variable shift control with standard speeds of 45, 50, 74 and 100 baud. Some tuning indication, such as LED's or a scope output, is necessary. Any of the terminal units offered by HAL Communications Corp., Universal Electronics Inc., Digital Electronic Systems (INFO-TECH series), Kantronics, and Advanced Electronic Applications, Inc. (MBA Reader) are first rate, quality units that will work fine for RTTY reception. I've personally used TU's manufactured by all of the above manufacturers and find only small differences when divided into two separate categories—portable and home terminal units.

Comparing a low cost portable unit with home TU's tends to be an unfair comparison, as a single line display should not be equated with a multiline display. For a lightweight portable application, I really like the bright green vacuum fluorescent display used in both the Kantronics Mini-Reader and the MBA-RO code reader. The INFO-TECH 200F and Universal Electronics M-600 are extremely flexible, as the various codes are programmed into the single chip microcomputers employed in each unit.

A super demodulator for world news, ship traffic, and weather monitoring is the HAL CWR-6700 Telereader. Designed specifically for receive only HF listening fans, the desirable features are built in, such as the six standard speeds, adjustable space for nonstandard shifts, two page video display, and many other features. Both the HAL units and INFO-TECH series have so many features, a complete review will justify a separate column in upcoming issues of POP-*COMM*. Any specific questions should be sent directly to the manufacturers, and a

prompt answer will be given. I've listed those TU manufacturers that have been responsive and supportive to the RTTY hobby user.

Info-Tech  
Digital Electronic Systems  
Dept. JJ  
1633 Wisteria Court  
Englewood, FL 33533

Universal Electronics  
Dept. JJ  
1280 Aida Drive  
Reynoldsburg, OH 43068

HAL Communications Corp.  
Dept. JJ  
Box 365  
Urbana, IL 61801

Kantronics  
Dept. JJ  
1202 East 23rd Street  
Lawrence, KS 66044

MBA-RO Reader  
Advanced Electronic Applications  
P.O. Box 2160  
Dept. JJ  
Lynnwood, WA 98036

Kantronics has a new newsletter called *Computers & Amateur Radio*. It is worth it to consider subscribing, especially at \$4.00. This publication has several RTTY tips and application notes.

Also, a truly programmable interface is offered by Kantronics—the Kantronics Interface. The Kantronics Interface is offered with specific programs to make this unit compatible with popular home computers. This will allow RTTY news monitoring and various expansion (TOR?) options mainly in software flexibility, and also a test vehicle for unique character generalization, such as required for three shift Cyrillic.

Loggings this month will focus on the Chinese news services:

Frequency	Location	Time	Language	Shift	Baudot Rate	Normal/Reverse Phase
<b>XINHUA - New China News Agency</b>						
14923.2 kHz	Beijing	0150 GMT	English	425 Hz	50 baud	Reverse
15700.0 kHz	Beijing	1500 GMT	French	425 Hz	50 baud	Reverse
15855.2 kHz	Beijing	0750 GMT	Test RY	425 Hz	50 baud	Reverse
16126.0 kHz	Beijing	0650 GMT	English	425 Hz	50 baud	Reverse
16412.0 kHz	Beijing	2330 GMT	Spanish	425 Hz	50 baud	Reverse
18857.0 kHz	Beijing	1100 GMT	English	425 Hz	50 baud	Reverse
19077.0 kHz	Beijing	0930 GMT	Arabic	425 Hz	50 baud	Reverse
19850.0 kHz	Beijing	0600 GMT	English	425 Hz	50 baud	Reverse
20964.0 kHz	Beijing	0500 GMT	English	425 Hz	50 baud	Reverse
9491.0 kHz	Beijing	1517 GMT	English	425 Hz	50 baud	Reverse

**CNA - Central News Agency, Inc. - See Figure 3 and Figure 4**

13563.0 kHz	Taipei	0230 GMT	English	425 Hz	50 baud	Reverse
7695.0 kHz	Taipei	1450 GMT	Test RY	425 Hz	50 baud	Reverse
16224.0 kHz	Taipei	0230 GMT	English	425 Hz	50 baud	Reverse
10960.0 kHz	Taipei	0300 GMT	English	425 Hz	50 baud	Reverse

Keep me posted of your loggings!

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# RADAR REFLECTIONS

## RADAR DETECTORS AND THEIR USE

BY JANICE LEE



### **"All Right, Where's The Fire" — Just In My Face, Says Maui Cop**

A Maui traffic cop spotted a car that, according to the police officer's radar gun, was racing down the highway well in excess of 80 miles per hour. The traffic cop stopped the car and gave the driver a ticket.

There'd be no big deal there, except the driver of the car was also a police officer, in uniform, on duty, driving his own marked police patrol car.

Not too surprisingly, Maui police are reluctant to discuss the case, except to officially acknowledge that it happened.

"The first question is, did it happen?" said Police Chief Joseph Cravalho. "Yes, it did."

But after that, Cravalho said, he could not comment "because it involves a personnel matter which could possibly lead to a disciplinary action." He said it would be premature to release information on the citation, including names of the officers involved.

Inquiries to other Maui police officers reveal only that everybody knows about it, but nobody's talking.

The main question is whether the officer cited was responding to an emergency call. On that, Cravalho said, "That's one of the things under investigation."

It's apparent, though, that the officer giving the ticket didn't think so. The ticket is now sitting in the files at the Lahaina District Court where the officer eventually is expected to appear to respond to the charge.

That, however, may not happen until the internal police investigation is completed. Cravalho could not say when that would be.

It is rumored that the officer cited was a patrolman who was conducting a normal patrol in one of the west Maui beats. He's still on the beat and, said another officer, "very embarrassed about all this."

### **Most Patriotic Costume Award**

The most patriotic costume award was recently given to the El Paso, Texas Police Department. If you have driven the freeway in El Paso, you have probably noticed their new radar car. It has red, white, and blue flashing lights. Makes you positively proud to be an American and get a ticket!

### **Speed Trap Revisited**

In a modern version of the old Southern speed trap, the 31 man police force in tiny Hacienda Village, FL produces one-third of the town's annual budget.

Because of its strategic location at the intersection of two of Broward County's most traveled roads, an estimated 110,000 vehicles pass through the 2.5 square mile village every day.

And the people of Hacienda Village—all 126 of them, living mostly in one trailer park—have not let such a golden opportunity pass them by.

The town employs one policeman for every four residents. And those 31 well-equipped, no-nonsense officers, armed with five police cars, two state-of-the-art radar units, and one BMW motorcycle, issue between 650 and 800 traffic tickets a month.

All of the revenue generated by the diligent police force, along with additional

compensation for special details and security agreements, is enough to fund one third of Hacienda's \$390,000 annual budget.

### **1982 Radar Roundup: Significant Victories For The Motorist**

Electrolert, Inc., manufacturers of the Fuzzbuster® radar detector line, have over the past several years spent more than \$1 million on judicial proceedings, lobbying efforts, and in litigation on behalf of individual motorists. During 1982, several significant victories were achieved as a direct result of Electrolert's vigilance in the nation's judicial arenas. The following is a recap of radar/radar detection cases which were resolved during the year.

#### **Michigan Overturns Fuzzbuster® Prohibition**

On September 28, 1982, the Michigan Supreme Court upheld the legality of radar detectors. The ruling by the state's highest court overturned a previous appellate decision which held that radar detectors could be banned under a 1929 "police radio" law enacted long before the advent of police radar and radar detectors.

In the late 1970's, Michigan State Troopers began using a statute originally aimed at deterring robbers and burglars from eavesdropping on confidential two-way communications by the police to apprehend motorists who had equipped their vehicles with radar detectors. The police action was upheld by the state's lower courts and the penalty meted out to the motorists for possession of the devices was a high misdemeanor calling for a fine up to \$500 or incarceration for up to one year or both. Motorists arrested had their radar detectors confiscated whether or not they were in operation at the time, in addition to being subjected to what the high court called a "criminal stigma."

In addition to overturning the prohibitions upheld by the lower courts, the Michigan Supreme Court questioned the propriety of police radar use by calling radar "electronic surveillance by the police (which) is a serious business and an intrusion into the privacy of anyone who is subjected." Of even greater impact, however, was the Michigan Supreme Court's declaration that: "The police derive their authority from the Legislature, not the constitution. The Legislature alone can empower the police to engage in electronic surveillance." To date, no such legislative authority has been granted to the police in Michigan.

#### **New York State: Obstruction Of View Or Obstruction Of Justice?**

The Greene County Court of New York ruled unconstitutional the arrest of motorists

with Fuzzbusters® under a state law which outlaws any obstruction to the driver's view. The decision by the County Court overturned the lower court's conviction under the state's Vehicle and Traffic Law pertaining to the obstruction of view.

Since radar detectors are not illegal by state law, New York Troopers began apprehending drivers who owned such devices and charging them with obstructed vision under the vehicle code. Presiding Judge John J. Fromer in County Court agreed with the appellant that the law was vague. "The radar detector clearly obstructs only the driver's vision of an area of the automobile's hood," Fromer wrote in his decision. "The clear intent here was to arrest the defendant because he had a radar detection unit. The officer didn't use that charge however... clearly such contortions shall not be supported by a court of law."

### Federal Suit Filed Against Washington, DC

Electrolert's suit, filed the end of September, seeks injunctive relief challenging D.C. Commissioners' Order #61-2026, which prohibits simple possession of any device that can detect police radar and the use or sale of such devices. Charging that the order is unlawful, discriminatory, and arbitrary and is in direct violation of the Commerce Clause and other provisions of the United States Constitution, the plaintiffs (Electrolert, Inc., George Sadler, a Maryland resident and Poptronics Electronics, Inc., a Maryland retailer) are seeking a declaratory judgment to restrain the District from enforcing the order.

In the complaint, Electrolert charges irreparable harm from loss of sales and that it "... has no adequate remedy at law due to the actual and threatened arrests pursuant to the Commissioners' Order." The company states that the action is brought "... to vindicate its own interest and the interest of its actual and potential customers who have been injured ..."

The plaintiffs cite the Commerce Clause, The Supremacy Clause, and the Due Process Clause of the U.S. Constitution as the basis for their action. The Commerce Clause, which is contained in Article I, Section 8 of the Constitution, restricts any legislative activity which impermissibly interferes with interstate commerce. Radar detectors may be legally purchased and used in virtually all other jurisdictions of the country.

### Radar Blips: One Nation Under Surveillance With Liberty And Justice For All?

A class action lawsuit was filed in Seattle to bar the use of police radar based on its proven inaccuracies... Police officers in Locust Grove, Georgia were fired for ticketing influential citizens after being told they had not been issuing enough tickets to satisfy the chief's quota... Two former Iowa policemen sued CMI, Inc., manufacturers of police radar equipment, on the grounds that it gave off too much radiation... 101 people were refunded fines totalling about \$12,000 by the Pennsylvania Department

of Transportation for an illegal speed trap... A Wisconsin attorney had a speeding conviction dismissed when he was unable to obtain repair and maintenance records he sought for the radar unit used... The Nebraska Legislature gave first round approval to a bill for the regulation of radar use... Ten motorists in Pennsylvania had speeding convictions dismissed because the police had used speed/timing devices which had no authorization... "The Citizens' Coalition for Rational Traffic Laws" was formed to challenge the federal government's 55 MPH limit... The FCC instituted an investigation of CMI, Inc. because they may illegally have made changes to their units without government approval... Eight motorists in Missouri were not prosecuted because the radar guns used to nab them had not been certified for accuracy... An Arkansas Sheriff urged that radar use be discontinued so that his officers could go after "serious crime."

Traffic fatalities in Central Florida dropped 26% and injuries declined 7% during a "radar-free" experiment by the Florida Highway Patrol... A New Jersey police officer, in addition to failing to provide a police escort to the hospital, issued a speeding ticket to a motorist who was about to become a father for the first time, although a judge later suspended the fine but left the ticket on his record... A Florida trooper was suspended

for what he claims was not meeting his department's quota and he admitted he lacked faith in radar's accuracy... A bill to outlaw radar detectors in Louisiana fizzled in a House committee in June... A decision to curtail a traffic enforcement program was made by a Texas municipality because the project had "lost sight of its original objectives and become a system of numbers to raise money" according to the town's police chief... Florida Judge Alfred Nesbitt, renowned for his tough stand on radar which ultimately led to the state's enactment of radar performance standards, was cited for speeding although his car was on cruise control under the posted limit... The Florida Cabinet okayed new standards for police radar equipment developed by a special commission created to look into radar's fallibilities... Two Wisconsin state troopers claimed that one-day suspensions were due to their failure to meet department ticket quotas... Iowa deputy police chief, "Elmer" is a real dummy, claims his proud chief. Elmer, made of pantyhose, pillow stuffing, and crumpled newspapers, is most of the time on duty on the outskirts of town in a marked police cruiser and has been cited as a valuable peace officer by his supervisors!

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

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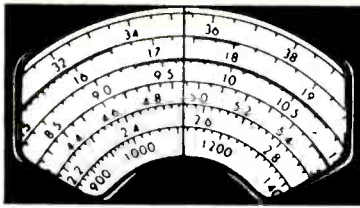
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# COMMUNICATIONS CONFIDENTIAL

BY HARRY L. HELMS

## YOUR GUIDE TO SHORTWAVE "UTILITY" STATIONS

**G**oing . . . going . . . almost gone! That's the situation today with many point-to-point stations, especially those handling overseas telephone calls.

As the name implies, point-to-point stations are located at a fixed geographical location and are used to communicate with similar fixed stations. Before the development of satellite communication systems, point-to-point outlets carried the bulk of international telephone calls. Many DXers who have been in the hobby for several years can recall the fun of listening in to such conversations, with callers usually oblivious to the fact that many other people could be listening in. Such stations used voice markers to adjust receiving equipment and hold a frequency before transmissions. This enabled DXers to hear and verify many otherwise rare or impossible to hear countries, such as Bermuda, Guam, Martinique, etc.

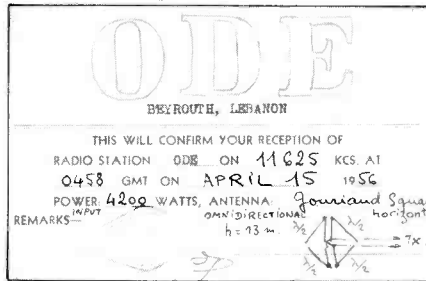
However, satellites today carry the vast majority of international telephone calls. As a result, point-to-point outlets are being dismantled or kept strictly for backup purposes. A few point-to-point outlets can still be heard, however. One nation that doggedly sticks to such outlets is Argentina. LPL, General Pacheco Radio, often runs a Spanish language voice marker with a male announcer on 8759.2, 12988.5, 13162, and 17285 kHz during the evening hours.

Other voice markers are usually in English and a foreign language (commonly the native language of the country where the station is located). A typical voice marker may go like this: "This is a test transmission for circuit adjustment purposes from a station operated by Cable and Wireless, Limited. This station is located near St. Georges, Bermuda." If you heard such a marker, you could get a QSL by copying the marker word for word, indicating the time and frequency on which you heard the transmission, and sending your report to the Chief Engineer of the organization and to the location mentioned in the marker.

But hear point-to-point stations while you can. They are a vanishing breed!

One reader asked if there are any frequencies on which he could listen for ship-to-ship communications on shortwave. Yes, there are several frequencies set aside exclusively for intership use. All transmissions will be in SSB, and you'll find best listening at night unless you live near the coast. The frequencies are:

- 2003 Great Lakes only
- 2082.5 All areas



- 2142 Pacific coast south of 32 degrees latitude, daytime only
- 2203 Gulf of Mexico only
- 2638 All areas
- 2670 All areas
- 2738 All areas except Great Lakes and Gulf of Mexico
- 2830 Gulf of Mexico only

Ken Stryker of the Longwave Club of America sent a copy of their bulletin and the following schedule of U.S. Coast Guard Longwave weather broadcasts. All broadcasts are in CW and all times are in GMT:

### Time kHz Call and location

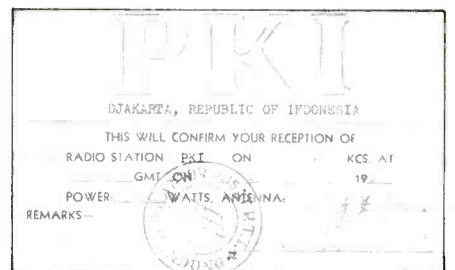
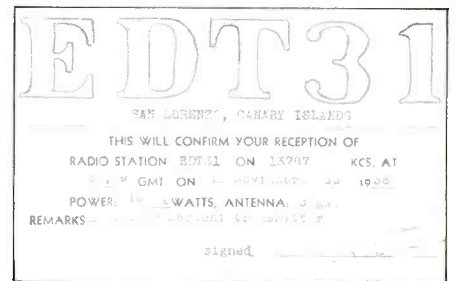
- 0050 472 NMF, Boston, MA
- 0100 440 NMA, Miami, FL
- 0100 466 NRV, Guam
- 0120 448 NMN, Portsmouth, VA
- 0120 466 NMR, San Juan, PR
- 0330 420 NMC, San Francisco, CA
- 0420 472 NMQ, Long Beach, CA
- 0430 450 NOX, Adak, AK
- 0433 448 NMW, Astoria, OR
- 0500 440 NMO, Honolulu, HI
- 0530 470 NOJ, Kodiak, AK
- 0630 470 NOJ, Kodiak, AK
- 0800 466 NRV, Guam
- 1350 472 NMF, Boston, MA

Thanks, Ken. Those who are seriously interested in longwave, the LWCA is the club for you. Their address is 45 Wildflower Rd., Levittown, PA 19057. Tell them that *POP' COMM* sent you.

### Listening Reports

Here are this month's listening reports, some of them provided by the Longwave Club of America (LWCA) and the American Shortwave Listeners Club (ASWLC). We'd like to see your reports here; send them to Harry Helms, P.O. Box 157, Rockefeller Center Station, New York, NY 10185. Be sure to include an SASE if you'd like a reply.

When reporting, please include the frequency, time in GMT (that's Eastern time plus five hours) and details on what you heard. For example, if you hear a Spanish



"numbers" station, mention where it was and whether it's using four or five groups. And be sure to put your name and location on your letter as well as the envelope. This lets me give you credit for your loggings.

Now to this month's reports.

- 270:** HHP, CW beacon, Port-au-Prince, Haiti, 0455 (Joe McCusker, NY/LWCA)
- 294:** J, CW beacon, Jupiter, FL 0440. (Joe McCusker, NY/LWCA)
- 305:** UIS, CW beacon, Isabella, Cuba 0415. (Joe McCusker, NY/LWCA)
- 1613:** RAB, CW beacon, Rabinal, Guatemala 0330. (Harold Frodge, MI/ASWLC)
- 1710:** Two alternating tones in SSB, during hours of darkness. Navigation beacons? (Carl Olson, Chevy Chase, MD) Possibly, but more likely some sort of signalling transmission or a spurious response in your receiver. (Editor)
- 3090:** Five-digit Spanish numbers station with female announcer around 0530. (Lani Pettit, IA/ASWLC) A very active frequency for numbers stations for the past several years. (Editor)
- 4040 to 4045:** Numerous five-digit Spanish numbers stations observed in this range around 0100 and 0500. (Lani Pettit, IA and Thad Adamaszek, OH/ASWLC)
- 4143.6:** Here's a frequency that's a goldmine of coastal station activity! The following stations have been heard during the night hours in SSB, passing traffic with ships at sea: KDM, Seattle, WA; KIU, Seattle, WA; KLX, Houston, TX; KMH, Golden Meadow, LA; KQM, Honolulu, HI; KZA, Lafayette, LA; NMA, Miami, FL; WDC,

Greenville, MS; and WDK, Morgan City, LA. (Spence Naylor, CA/ASWLC)

**4225.2:** XFM, Manzanillo, Mexico, CQ marker in CW 0600. (Sam Neal, TX/ASWLC)

**4291:** TIM, Puerto Limon, Costa Rica, CQ marker in CW 0800. (Arch Dawson, CA/ASWLC)

**4670:** Much Spanish language numbers activity on this frequency lately; mostly four-digit stations but some five-digit stations; all with female announcers 0200-0330. (Lani Pettit, IA, Stewart MacKenzie, CA, and Robert Marsh, TX/ASWLC)

**5248:** VL9, Vancouver, BC, traffic to remote areas (Yukon, etc.) in SSB, 0430. (Stewart MacKenzie, CA)

**5320:** This is a channel heavily used by the U.S. Coast Guard for ship-to-shore operations, all in SSB. Among the shore stations are NOY, Galveston, TX, and NMN, Portsmouth, VA. (Spence Naylor, CA/ASWLC)

**5808 to 5814:** This frequency range has been hopping with four-digit Spanish numbers activity between 0200-0400; sometimes parallel to another station between 8416-8418 kHz. (Lani Pettit, IA/ASWLC)

**5812:** "Flapping" sound similar to that made by a tape recorder when end of tape is not properly threaded onto a reel; maybe a numbers station with tape trouble? 0215 GMT. (Harold Frogde, MI/ASWLC) Very interesting! (Editor)

**6264:** FUM, Papeete, Tahiti, V marker in CW 0750. (Arch Dawson, CA/ASWLC)

**6435:** CLQ, Havana, Cuba, CQ marker in CW 0915. (Sam Neal, TX/ASWLC)

**6491.5:** PKC, Palembang, Indonesia, CQ marker in CW 1245. (Spence Naylor, CA/ASWLC)

**6540:** WWA3, San Juan Aeradio, San Juan, PR, working an American Airlines flight in SSB 0550. (Stewart MacKenzie, CA)

**6761:** "Bullet 32," "Upset 51," and "Time Out" among the military tactical call signs heard on this frequency in SSB around 0130. (Brent Levit, TX/ASWLC)

**6824:** Five-digit Spanish numbers station with female announcer 0540. (Lani Pettit, IA/ASWLC)

**6910:** "N61" calling "N52" in SSB at 0000; no contact made. (Ronald Baker, CA) Interesting! (Editor)

**7405:** Five-digit German numbers station; identified as "Papa November" with female announcer and weird music background 0600. (Lani Pettit, IA/ASWLC)

**7525:** Five-digit Spanish numbers station with female announcer 0730. (Lani Pettit, IA/ASWLC)

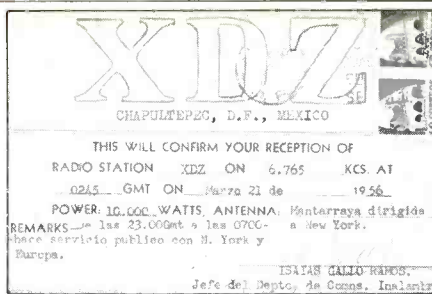
**7858:** Five-digit Spanish numbers station with female announcer 0500. (Lani Pettit, IA/ASWLC)

**8441.4:** 9YL, North Post Radio, Trinidad, V CQ marker in CW 0057. (Spence Naylor, CA/ASWLC)

**8470:** XFL, Mazatlan, Mexico, CW CQ marker 0456. (Spence Naylor, CA/ASWLC)

**8580:** URL3, Sevastopol, USSR, V marker in CW 0456. (Spence Naylor, CA/ASWLC)

**9050:** Five-digit English numbers station



with female announcer 0103. (Thad Adamaszek, OH/ASWLC)

**9072 to 9075:** Numerous four-digit Spanish numbers stations in this range 0115-0300. (Lani Pettit, IA/ASWLC)

**9265 to 9267:** Numerous five-digit German numbers stations in this range 0100-0500. (Lani Pettit, IA/ASWLC)

**10610 to 10613:** Numerous four-digit English numbers stations in this range 0300-0500. (Lani Pettit, IA/ASWLC)

**10744:** Five-digit English numbers station, female announcer 0305. (Gary Kite, MS)

**11243:** Here are a few of the military tactical call signs heard in SSB on this frequency: "Spacegun," "Honeydew," "Eggwhite," "Redeemer," and "Doom 62"! (Lani Pettit, IA/ASWLC)

**11247:** Air Force 2 working Andrews AFB in SSB around 1700. Conversation between "Frank," "John," and "Brandywine" regarding "speech material." This was one a day before President Reagan spoke on television. (Ronald Baker, CA) An excellent bit of eavesdropping! (Editor)

**12730:** UFL, Vladivostok, USSR, V marker in CW 1500. (Spence Naylor, CA/ASWLC)

**12800:** "D3E51" CQ marker in CW 0700. (Mike Lawrence, WI) Anyone out there have a clue as to who this is? (Editor)

**14511:** "ABM6USA" calling "AAA6USA" in SSB around 0130. (Ronald Baker, CA) Those calls resemble those used by MARS (The Military Affiliate Radio Systems) but the frequency range is popular with smugglers. (Editor)

**14968:** "K" marker repeated 0500. (Stewart MacKenzie, CA)

**15235:** "DR," "PU," and "OU" markers here around 1500. (Spence Naylor, CA/ASWLC)

**16874.5:** ZLO, Irirangi, New Zealand, 0625 "DE ZLO." (Arch Dawson, CA/ASWLC)

**17131:** UJQ, Kiev, USSR, "DE UJQ" 1945. (Arch Dawson, CA/ASWLC)

**20895:** Five-digit Spanish numbers station with female announcer 1700. (Eric Buene-man, MO/ASWLC)

**22452.7:** XSQ, Guangzhou, China, CQ marker in CW 1740. (Spence Naylor, CA/ASWLC)

**23337:** "Time Out," "Cisco," "Cognizant," and "Replica" among the military tactical call signs heard on this frequency in SSB at 0025-0115. (Brent Levit, TX/ASWLC)

That's all until next month! See you then in *POP COMM!*



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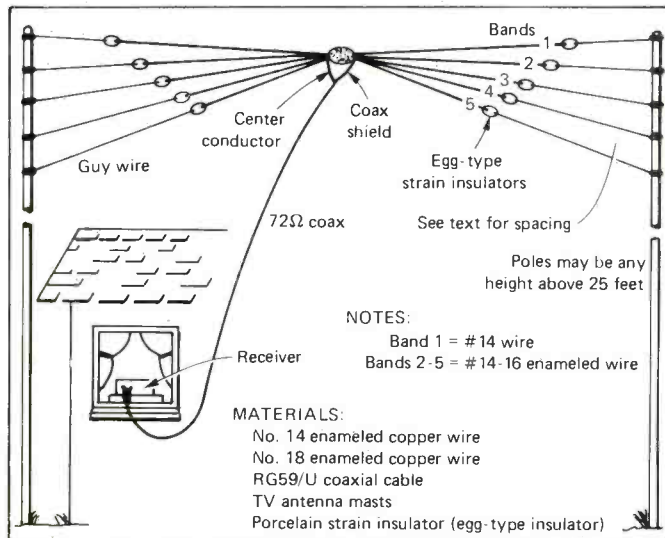
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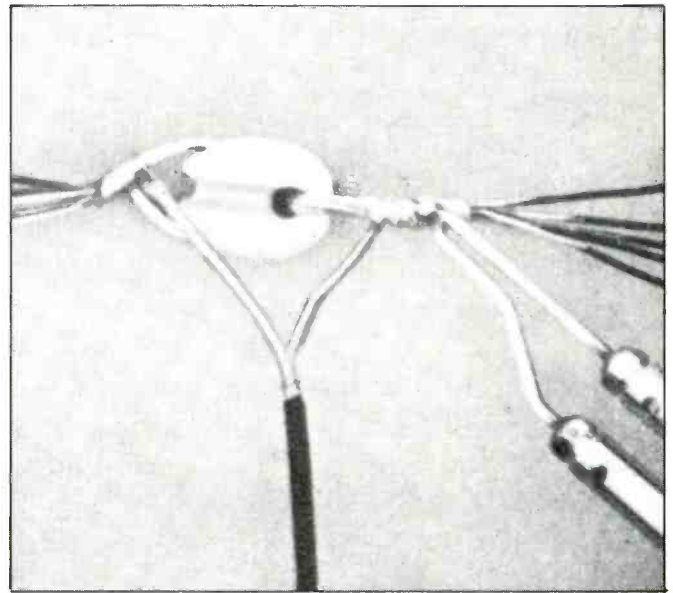
# Build: The DX'ers Dipole

## An All-Band Antenna Which Will Improve DX Reception

BY TONY EARLL, KNY2AE



Poles could be TV antenna masts attached to side of house. Antenna should be at least 25 ft. above ground. Wire for top dipole should be heaviest since it provides support for dipoles under it. Support (or guy) wires should be attached firmly to poles so they don't slip and change spacing of elements.



Pour on the solder when connecting the coax to dipole elements at center porcelain insulator. Then cover both connections with electrical tape.

It's an old story—deciding which antenna to use for shortwave listening. Sure, there are random length long-wire antennas for all-around coverage, but they're only resonant at a few frequencies and you end up with a compromise.

And then there's the dipole. It's resonant and will give optimum performance at its resonant frequency; that's the frequency to which it has been cut. To cover the major bands, you'd have to have lots of dipoles and lead-in cables, plus a switching system to permit you to select the right antenna for your desired band at any given listening period. Our DX'ers Dipole is a better approach and will give you coverage on any five bands of your choice. And you don't have to do any switching or use more than one single lead-in cable!

### Theory

If you look at the basic diagram, you'll notice that the antenna is actually five dipoles connected at their mid-points where they attach to the lead-in cable, a section of 72-ohm coax.

The shorter elements are resonant on

high frequency bands and vice versa. When you are tuned to a specific frequency band for which a section of your antenna is cut, your receiver will obtain all of the benefits of that particular portion of the antenna; the others are sort-of disconnected from the antenna circuit. It needs no traps, no tuning units, and it has the same basic characteristics of a single-band dipole. Its maximum receiving potential occurs when the antenna is erected so as to be broadside to the signals you want to copy.

### Building It

Keeping in mind the size limitations of your roof or yard, select from our chart any five bands. These can be any mixture of shortwave broadcast, utility, or Ham bands. If you're seeking a specific band which isn't shown in the chart, you can compute your own measurements by dividing a frequency (in MHz) in the middle of your favorite band into 468. Your answer will be the total length of the antenna in feet. Example: You want to hear the new 30 meter Ham band on 10 MHz as well as you can, but those dimensions aren't shown. Divide 10 into 468. You

come up with 46.8, and that's the overall length of the entire dipole which will be resonant exactly on 10 MHz.

Before you actually do any cutting of wire, add another 9 to 12 inches to your computations. This is to compensate for the several inches of wire which will be required to connect the antenna to the insulators at each end.

Use #14 copper wire for all of your dipoles, or at least for the longest one you'll be using. Shorter ones can be made from #18 copper wire, which is less expensive.

For each of the five antennas, cut to the proper length as shown in the chart, or calculated by our formula. Cut each length of wire exactly in half. Wrap the wires through the insulators, twist and solder them liberally. Solder and braid the coax feedline (type RG-59/U as used for TV installations is fine) to one side of the dipole(s), and the center conductor of the coaxial cable to the other side of the dipole(s). Be certain to scrape the enamel insulation and any dirt from the wires prior to soldering. Then wrap the solder joints with electrical tape or cover with silicone or other appropriate sealant to keep



ANTENNA LENGTH vs. FREQUENCY\*

BAND (meters)	FREQUENCY (MHz)	LENGTH (ft., in.)
80	3.5	133-8
49	6.0	78-0
40	7.0	66-10
31	9.0	52-0
25	11.0	42-6
20	14.0	33-5
19	15.0	31-2
16	17.0	27-6
13	20.0	23-4
10	28.0	16-9
6	52.0	9-0

NOTE:

\*Length (ft.) = 468/Frequency (MHz).

out moisture and provide some mechanical strength. The antenna can now be mounted between two poles or any convenient structures. Mount the longest dipole at the top, pulling it reasonably taut and using insulators to separate the dipoles with a 6 to 12 inch separation between each (at the masts). Twist the guy wire around the pole and cover with electrical or other plastic tape to prevent it from sliding down. Don't mount this anywhere near electrical lines, not only to remove any possibilities of noise-pickup, but as a safety factor. Antennas mounted near power lines offer a serious hazard—shock or electrocution—to those erecting them, or using them!

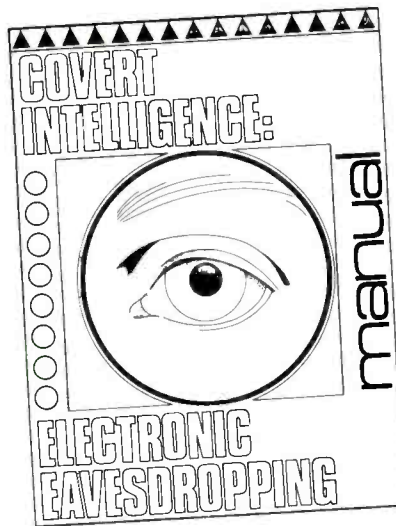
Then attach the coaxial cable to the communications receiver as you would a regular dipole antenna. Flip on the receiver and tune across the bands. Hooray! It does an excellent job on the bands, and not too bad a job on the frequencies in between.

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## ESTABLISHING SURVIVALIST COMMUNICATIONS SYSTEMS

### Single Sideband Communications: 27 MHz

**L**ast month, we discussed the possibilities of utilizing 27 MHz AM communications for at least a portion of your survival communications system. This month, let's look at Single Sideband (SSB) on 27 MHz, since this is definitely a totally different communications scene than that of AM operation.

SSB is the voice transmission mode used on frequencies below 30 MHz on the Ham bands, military bands, aero frequencies, maritime frequencies, and for many other types of non-broadcast purposes, although some broadcasters are now using SSB, too. The reason that SSB has become so popular and has edged out the old familiar AM operations in so many critical applications is that it's less prone to being adversely affected by noise, because it permits more stations to utilize a given segment of the radio frequency spectrum without interfering with one another (as compared to AM operations), and, perhaps best of all, stations utilizing SSB systems will be able to communicate over at least twice the distance (ground wave) of AM systems using the same wattage and antenna systems.

These operations require special SSB equipment, although since SSB is a type of AM, most commercial SSB transmitters and receivers are also capable of straight AM operation in addition to their SSB capabilities. For practical purposes, it is not advisable to mix AM and SSB operations on the same frequency within the same operational area—the AM operations cause a howl (heterodyne) in SSB receivers while SSB transmissions usually override AM voices and make "copy" all but impossible through SSB's distinctive "Donald Duck" sound. Since SSB requires more electronics to achieve, SSB equipment is more expensive than AM-only gear; most who have used SSB, however, agree that the price differential is a small amount to pay for the vastly increased communications potential that SSB offers over AM.

Operating SSB equipment differs only slightly from a standard AM transceiver. In an AM rig, you select your frequency or channel and commence your operations; on SSB, you have the option of selecting the upper sideband (USB) or the lower sideband (LSB) of that frequency for your communications. Theoretically, it is possible for one group of stations to be communicating on the upper sideband of a particular frequency while another group of stations operates on the other (lower) sideband of the same frequency. In actual practice, with most commercially available equipment, several miles would have to separate the sta-



*The new SSB transceiver just brought out by American Antenna. It's a bundle of electronics housed in a relatively small package.*

tions in the two different networks to fully avoid interference—although this is still a factor which is out of the question on AM. It's usually the case that those using SSB on given bands establish voluntary guidelines which specify whether stations are expected to use either the upper or the lower sideband of a given frequency or band as the preferred communications mode.

To try to capsule SSB's theory of operation in a few brief words isn't easy, and certainly it leaves out many salient factors which bear upon fully understanding SSB. In any event, I'm going to attempt to give it an oversimplified explanation intended only to provide a general understanding of what we mean when we refer to SSB.

In a standard AM transmission, a "carrier" signal is broadcast with a "sideband" on each side of it. Both sidebands carry the same voice information. Imagine yourself as the carrier with two loaded seabags (sidebands), one in each of your hands as you try to carry them down a passageway. First, you'll need a wide corridor and, second, you'll have to divide your strength between the two seabags.

Now, remove one seabag, step to the side of the passageway and use both hands on the remaining seabag. You now need only a third of the space you needed before, and you can concentrate all of your strength on transporting the single seabag. In a similar manner, SSB eliminates one of the sidebands and even virtually eliminates the carrier itself, placing all of the power into the remaining sideband, which effectively triples

your power over an AM signal. This is why an AM set, which is rated at 4 watts output power, would be rated at 12 watts (peak effective power) output if it was capable of operating in SSB mode.

Because you can select either the upper or lower sideband, SSB effectively increases the number of channels in a band, and even permits available frequencies to be located with less spacing between them than would be required with AM. In the 27 MHz band, where the FCC has allocated 40 channels, there would theoretically be 80 SSB frequencies if it were an all-SSB service. Since the FCC has not established these channels for exclusive SSB use, and has taken the position that AM and SSB communications may operate on any or all of them without restriction, AM and SSB users have generally attempted to voluntarily separate their operations, although SSB users appear to be far more diligent in attempting to maintain this isolation than are AM operators. SSB operations on 27 MHz are most often found using LSB on frequencies 27.155 and from 27.305 to 27.405; this corresponds to Channels 16 and 30 to 40. There is also some use of SSB on 27.065 MHz, the emergency frequency (Channel 9), and an increasing amount of Survivalist SSB use of 27.365 MHz (LSB). Repeated efforts to secure designated exclusive SSB frequencies in the 27 MHz portion of the spectrum have been rejected by the FCC.

SSB operations on 27 MHz differ from AM on many levels. Where AM "CB" operations long ago took an unfortunate turn to-



Radio Shack's Navajo TRC-490 SSB base station. This is a popular and reliable unit.



Survival communications here includes a scanner, a communications receiver, and an SSB base station.

wards a so-called "10-4 goodbuddy" approach to things, those who frequented the SSB frequencies in the 27 MHz band looked upon such proceedings with a considerable amount of annoyance, shock, and perhaps even horror. For the most part, those who have embraced SSB on 27 MHz have not even really considered themselves so-called "CB'ers," as the term is generally used. They have fought off all attempts by newcomers to bring the goodbuddy mentality and operating practices to the frequencies they use, they seldom (if at all) even switch over to use AM mode, have rejected the use of "CB handles" to identify themselves, will not allow the use of "10 codes," and don't tolerate youngsters in their networks. In fact, they become rather hostile towards those who either try to use such approaches to communications on frequencies upon which they operate.

This has resulted in far fewer stations using SSB than are on the AM-side of 27 MHz, and those who are using SSB have traditionally been an older and more serious group of communicators, be they hobbyists, rescue teams, or Survivalists. They refer to themselves as *Sidebanders*, and they constitute a totally different scene than those who are CB'ers. These people are sometimes considered snobs or elitists by AM operators, but they have their own national organization and they seem quite happy being off doing their own thing.

Most manufacturers were producing 27 MHz SSB transceivers during the band's big "boom" years. However, in recent years, the amount of 27 MHz SSB equipment on the market has been somewhat restricted to a few brand names seen nationally, although the SSB equipment being marketed appears to be basically the same models offered several years ago. One exception is the new microcomponent 27 MHz mobile transceiver now being introduced by American Antenna of Elgin, IL (same company which brought out the K-40 mobile antenna, K-40 power mike, and K-40 radar detector).

K-40's microcomponent 27 MHz rig is an all new design that has enabled their engineers to take advantage of many of the latest techniques, permitting the production of a high quality transceiver that has many of the

features of a base station, yet is housed in a very small package. The K-40 SSB transceiver weighs less than 3½ lbs. and is only an inch and a half high! Packed inside of the cabinet are no less than 79 diodes, 34 transistors, 5 FET's, 9 IC chips, and 12 LED's.

The receiver of the K-40 is rated at ½-µV sensitivity for 10 dB S/N on AM and 0.2 µV (nominal) on SSB. AM sensitivity is 5 kHz at points 6 dB down and 1.2 kHz on SSB. The transmitter puts out a full 4 watts AM and 12 watts (PEP) on SSB.

We have tried one of these new K-40 SSB rigs and feel that it's a welcome addition to the communications tools available for 27 MHz operation—small, rugged, well designed and produced, and with many applications for those interested in serious and reliable communications. It's quite a precision piece of engineering! Most Sidebanders who have seen it seem to agree that it's the type of rig whose time has definitely arrived.

With the K-40 in a standard mobile installation, we had reliable communications with another mobile unit 15 miles distant and a base station 25 miles away. Using the K-40 as a base station command post with a portable ground plane antenna, we had no difficulty maintaining reliable communications with another base station 30 miles away. This not only speaks well for the K-40 in particular, but points up the suitability of using 27 MHz SSB communications in conjunction with Survivalist activities, especially

since this rig is only a fraction of the size of the SSB transceivers we've been used to working with. SSB transceivers have traditionally been a bit bulkier than AM-only rigs, but not the K-40, which is smaller than many AM transceivers. That means it takes up less storage space and is easy to transport, and, of course, you have the many advantages SSB has to offer you. And because SSB has fewer people using it than does AM, there was far less channel crowding than with an AM rig. A secondary bonus is that AM operators can't copy SSB transmissions, thus offering you a bit of an edge in the area of voice security for your operations.

Under existing FCC regulations, all 27 MHz stations must be licensed. It appears that the wheels are turning towards the day when these FCC requirements will be dropped, but for now all it takes to operate a 27 MHz SSB transceiver is a regular CB license. Stations on SSB are still required to mention their FCC assigned callsign once during a contact, but after that, SSB stations are free to use their own identifications.

Traditionally, SSB stations use identifications known as "Sideband numbers," such as are assigned to members by various user organizations. There are many local and regional organizations in a constant state of either coming into or going out of existence. However, a great many operators have been using membership identification numbers assigned by the national Sidebanding

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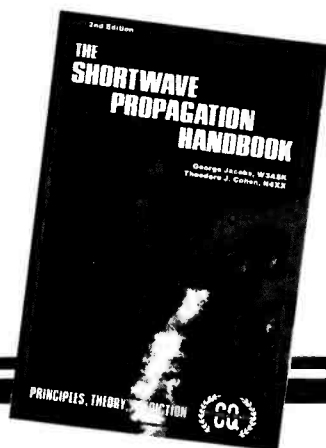
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Emblem of the SSB Network, a national 27 MHz user organization active in Survivalist communications. See text for information on this worthwhile group.

organization, The SSB Network, P.O. Box 908, Smithtown, NY 11787. This group, which has been in operation since 1964, is active in both the hobby and Survivalist aspects of Sidebanding. Membership in the SSB Network calls for a one-time registration fee of \$8 (no annual dues) and brings its members a membership card with the individual number of the member, a similarly inscribed wall certificate, and all sorts of useful extra items and information on proper operation of an SSB communications system for maximum effectiveness, including *dos and don'ts*. The SSB Network's publication, *SSB Net Notes*, is revised annually and is available to members at no additional fee. If you're into SSB, or plan on getting into it, you'd be well advised to become a member of this large international organization. You can join based upon the information here, or you can obtain a membership application by sending them a stamped and self-addressed #10 (4½" x 9½") return envelope.

By the way, the SSB Network also has copies available of the definitive work on 27 MHz SSB operations, Tom Kneitel's *SSB Handbook*. This 119 page book is \$7.95 per copy, plus 70¢ postage to the U.S. and Canada (including APO/FPO addresses).

I've found that my own participation in the SSB Network has been a definite asset to my Survivalist communications activities, and my SSB Net membership number, when used on the air, has brought me into contact with other members who have been of great aid to me in my pursuits. In fact, if you hear a station on 27 MHz SSB identifying as SSB-295, that's me! Be happy to offer you any help I can!

My intention here has been to give you an overview of some of the ways in which you can put the excellent communications tool known as SSB to your own use. Even if you've considered 27 MHz for some of your operations but rejected it for whatever reasons, I'd suggest that you give serious consideration (or reconsideration) to the many benefits of Single Sideband.

This month's guest columnist was  
Bill Sanders, SSB-295.

# PRODUCT SPOTLIGHT

## ADFS-922/ADFS-932 Narrow Noise Bandwidth Automatic Direction Finders

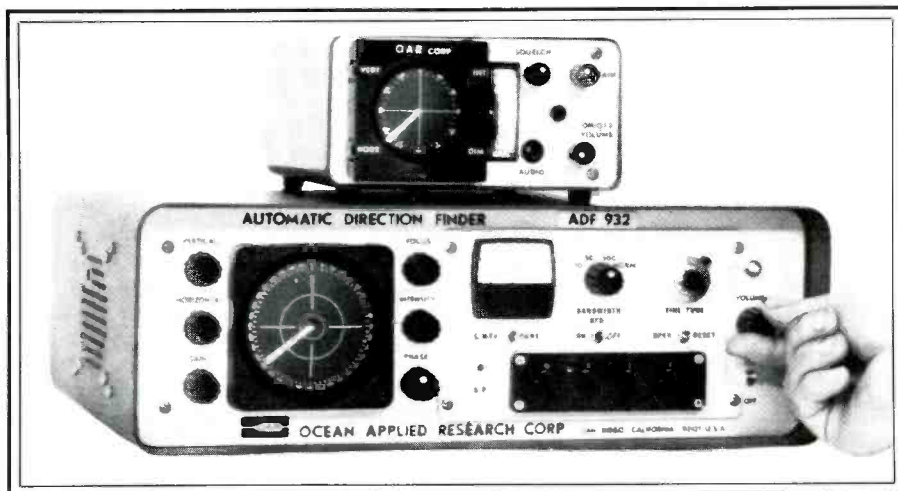
**M**odel ADFS-922 and ADFS-932 Narrow Noise-Bandwidth Automatic Direction Finders each consist of a compact Receiver-Indicator Unit; choice of a small land vehicle/aircraft or fixed station/shipboard type antenna array; and required length of interconnecting cable.

Both systems are advancements of the Ocean Applied Research (O.A.R.) Model ADFS-210 and ADFS-930 Automatic Direction Finders. Greatly improved sensitivity and selectivity has been achieved by adding special phase-lock loop and correlation detector circuitry to the basic Model ADFS-210 "Watson-Watt" type direction finder design.

Model ADFS-922 has 10 crystal channels for tuning. Frequency range is  $\pm 1\%$  of any customer-specified center frequency setting between 27 and 50 MHz. Model ADFS-932 has synthesizer tuning in 1 kHz increments over a 10 MHz tuning range.

In other respects, the two ADF models are basically the same. Relative compass bearing of received signals, from  $0^\circ$  to  $360^\circ$ , is indicated by a thin line trace running from the center to the outer edge of a circular cathode ray tube (CRT). Relative field strength meter and panel speaker are also provided. Four different receiver bandwidth settings can be switch-selected by the operator: 10 Hz, 50 Hz, 500 Hz, and 5000 Hz. A signal-to-noise ratio (S/N) improvement of roughly 27 dB is obtained when switching from the 5000 Hz to 10 Hz noise-bandwidth position. System accessories available include the Model RD-409 miniature CRT "slave" display shown above; Model DBR-419 Digital Bearing Readout; and matched radio beacon type transmitters for marking objects that need to be tracked, relocated, and/or recovered.

Design features of the ADFS-922 and ADFS-932 Automatic Direction Finders make them well suited to mobile or fixed station tracking of low level HF/VHF radio signals in high-noise areas, such as built up areas of large cities. The Model ADFS-922 was specifically developed by O.A.R. for tracking matched 27 to 50 MHz radio beacon transmitters attached to targets such as



drifting buoys, torpedoes, missiles, mines and other ordnance, land and marine animals, automobiles, etc.

Limitations of the Model ADFS-922 for some applications are its relatively narrow frequency range—0.5 to 1.0 MHz—and a tuning capacity restricted to 10 spot frequency channels. Model ADFS-932 has a full 10 MHz frequency coverage, plus a synthesizer that can be manually programmed to receive virtually any desired frequency channel in the 10 MHz tuning range. It is often chosen by customers who have radio beacons operating on a large number of frequency channels. Other users, such as "PTT" type organizations, rely on the system for quick and accurate mobile tracking of HF/VHF communication transmitters.

The standard antenna mount supplied with the Model 922 and Model 932 systems for automobile and aircraft type installations is a low silhouette, ferrite core loop array. It is typically mounted on the belly of airplanes. Quickly, temporary mounting on the top outside surface of metal automobile roofs may be accomplished using the set of four rain gutter clamps supplied by O.A.R. with each antenna. Another approach is placing the antenna inside the car, on top of the package tray located behind the rear seat in many passenger automobiles. Permanent type installations include suspending the antenna 2-3 inches below the center of met-

al roof surfaces inside automobiles, and placing the antenna inside special plastic automobile roofs.

The special narrow noise-bandwidth settings (10, 50, and 500 Hz) enable the Model 922 and 932 systems to ignore non-coherent noise present in all types of open-air operating environments, and also allow additional amplifications of weak signals. This means typical tracking distances of 1 to 5 miles in built-up urban areas when homing from automobiles on 0.1 to 1.0 Watt transmitters. Longer tracking ranges are obtained from elevated base-station type ADF installations, and aircraft.

A basic advantage the Model 922 and 932 have over other systems for mobile tracking applications is the CRT direction display. Aside from direction information, length of the bearing trace changes dynamically with change in strength of the signal and thus indicates relative distance to the target, near or far away, and whether range is opening or closing at a slow or fast rate.

The manufacturer of this interesting piece of equipment is Ocean Applied Research, 10447 Roselle St., San Diego, CA 92121. They also produce a number of other direction finding receiving equipments covering the frequency bands between 50 kHz and 500 MHz.

*This material extracted from manufacturer's literature.*

# FREE RADIO FOCUS

BY AL MUICK

## ACTIVITIES OF UNDERGROUND BROADCASTERS

**H**ello once again. I have enclosed this month a schematic for a 15 watt AM transmitter some use on the 7.3 to 7.4 pirate band. Also, I have finally uncovered the second part of the WRFI story and will include that this month.

And, as Paul Harvey says, "It's time for news!" Gregg Bares, in his *SELECTIVITY* newsletter, reports that WTBJ will soon be or has already reactivated. Gregg says he got a letter from the station operator who says they have returned to the airwaves after a year of setbacks, moves, and construction. They are currently operating with 140 watts on 3740 kHz with a 100 foot longwire antenna. The DJ says they have a library of over 3000 records!

From R.F. Burns of Radio Clandestine: **H.R. 3239 BECOMES LAW!** On September 13, President Reagan signed into law legislation of considerable importance to radio enthusiasts. Here are some of the details that should be known by anyone who operates a pirate bootleg station in the U.S. SECTION 104 would authorize the FCC to use volunteers to assist the FCC in several matters, including *monitoring for violations!* SECTION 113 would authorize the commission to allow the operation of CB and radio control services without individual licenses (looks like one point for our side—all). SECTION 117 would incorporate into the Communications Act definitions of "willful" and "repeated" consistent with the prevailing judicial views of these terms. SECTION 125 would direct courts of competent jurisdiction to *seize* and *retain* illegal radio equipment or unlicensed equipment used in violation of the Communications Act. SECTION 126 would *exempt* Amateur Radio operators from the interception provisions of Section 605 of the Communications Act. This would allow them to report violations to the FCC. Although this is now law, the date of the implementation is not known. Thanks to *SELECTIVITY* for that info.

A plug here if I may. *SELECTIVITY* newsletter is the publication of the Society for Hearing Illegal Transmissions. If you're interested in this society and would like to receive a copy of their newsletter, please write to Gregg Bares, P.O. Box 32052, Washington, DC 20007 and include an SASE for more information, and be sure to tell him that Al Muick sent ya.

The Voice of Pridonia, 5Q7, is a new station that will hit the air soon. The main operator is Rufus T. Firefly, the president/dictator of Pridonia. They will conduct a "hit and run" schedule similar to that of Radio Clandestine. Their frequency ranges are 7.3 to 7.4 MHz USB and 21.450 to 21.600 MHz LSB, and their signature tune is a duck call and musical background for three minutes

followed by the Pridonia National Anthem. They'll be on the air once or twice a month to avoid detection. Thanks to John Santosuosso for that info.

Now on to the foreign Free Radio scene. Further to the data presented last month, it is now reported from France Inter that the Holleaux Commission has presented a preliminary report on the use of the VHF-FM band in the Paris region. The Commission was set up by the Minister of Communications to examine all requests for exemption from the broadcasting monopoly law for private local radio stations. While there were more than 150 requests for frequencies, the Commission has allocated only 17 channels for the Paris area. The Committee says that some of the stations should merge, since they are aiming at the same audience. For example, one channel was allocated for the Christian churches, one to the Jewish community, one for the immigrants, one for youth and students, and so on.

While Radio France is satisfied the allocations will allow its programs to continue to be heard unobstructed, the two main private radio federations are not satisfied with the Commission's proposal. A week later it was reported that the Holleaux Commission has divided up the new channels into five groups. Seven FM channels are allocated for 500 watt stations intended to cover areas from 10 to 15 kilometers from the center of Paris. Each of these channels will be shared by many existing stations. Likewise, stations

will share the channels allocated for 100 watt transmitters covering areas 5 to 8 kilometers from the center of the city.

Two more frequencies have been allocated to 30 watt neighborhood stations. There are also a number of stations whose applications have not been approved, such as Radio Libertaire, which is an anarchist station. A further 50 channels have been approved for stations in the suburbs in a belt 40 kilometers from Paris. The newspaper, *Le Quotidien de Paris*, says that in many cases, several large organizations have been thrown together with groups that are more involved in cultural or social issues, and small stations that are capable technically lack the financial resources. The French Minister of Communications, Georges Filloud, has said that some financial grants will be made to local stations. The newspaper says it hoped this money will really be forthcoming. The paper says it has tried to establish the criteria used by the Commission for approving stations. It says that there are groups that have been on the air that have not received permission to continue broadcasting, while other groups that only exist on paper were given frequencies. Thanks to Jean Rodier in France via Sweden Calling DXers for that information.

From Barry Stephens of the old European Music Radio comes this list of pirate stations that are active in the London area. There is a list for both mediumwave and VHF-FM, and the VHF-FM stations are being raided every three weeks.

### MEDIUMWAVE

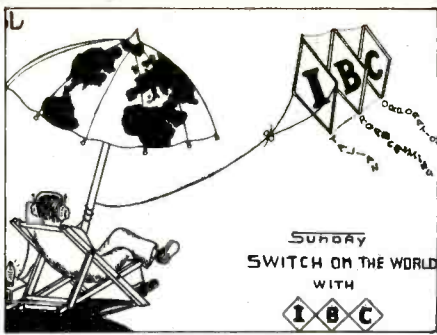
Station	Frequency
Radio Jackie	1320 kHz
Radio City	1260 kHz
Floss Radio	1350 kHz
County Radio	1275 kHz
Southern Radio	1415 kHz

### VHF-FM

Station	Frequency
Thameside Radio	90.2 MHz
Radio Telestar	92.8 MHz
Radio Horizon	94.4 MHz
Radio Jackie FM	94.0 MHz
Radio Invicta	92.4 MHz
Parkside Radio	89.9 MHz
Uptown Radio	94.2 MHz
Radio Zodiac	94.4 MHz
Flashback Radio	92.0 MHz
Radio Alfa	90.2 MHz
Liberation Radio	92.5 MHz
Radio Horizon	94.4 MHz
Radio Skyline	90.2 MHz
Gaywaves	103.8 MHz
Our Radio	103.8 MHz
Radio Alfa	90.2 MHz
DBC Radio	103.8 MHz
RSL	92.6 MHz
London Music Radio	94.4 MHz
Radio Phoenix	90.2 MHz
Alice's Restaurant	90.2 MHz

Day of the week	Broadcast times
Sunday	8 am - 7:30 pm
Sunday	12 noon - 3 pm
Sunday	10 am - 5 pm
Sunday	8 am - 8 pm
Sunday	11 am - 6 pm

Day of the week	Broadcast times
Sunday	7 pm - 1 am
Sunday	7 pm - 8 pm
Sunday	8 pm - 1 am
Sunday	8 am - 1 am
Sunday	10 am - midnight
Sunday	12 noon - onwards
Sunday	7 pm - 10 pm
Sunday	3 pm - 6:50 pm
Sunday	2 pm - 11 pm
Monday	8 pm - 11 pm
Tuesday	7 pm - 11 pm
Wednesday	8 pm - 11 pm
Wednesday	8 pm - 10 pm
Wednesday	7 pm - 9 pm
Wednesday	9 pm - midnight
Thursday	8 pm - 11 pm
Friday	6 pm - 1 am
Saturday	6 pm - 3 am
Saturday	8 pm - 11 pm
Saturday	7 pm - 11 pm
Saturday	11 pm - 3 am



**ABC ENGLAND**  
48 METRES SHORT-WAVE every Sunday

To: Albert J. Muick Thank you for your reception report for ABC ENGLAND dated 6th FEB. 1977. This card confirms that you received ABC ENGLAND on the above date on 6270 kHz at 11.30 hrs GMT.

REMARKS:  
See letter

ABC ENGLAND, 42 ARRAN CLOSE, CAMBRIDGE, ENGLAND

From Ken Weiner in Southbury, Connecticut, comes the following Free Radio News. Ken says he heard a station ID'ing as PRC on 1615 kHz (I wonder if this might be PRN, who used to broadcast there a lot) and they had a very good pirate format. The signal was fair (with some fading), and the DJ's said that they would like to hear from their listeners. The address is P.O. Box 747, Ex-

eter, NH 13833. Ken also heard KW Radio with a jazz/rock music format and telephone calls. They used a loop number of (212) 283-9977 and the DJ's were Richard Nixon, Jimmy Carter, and God (original DJ's, HI-a!). KW Radio was also on 1615 kHz. Thanks a lot for the news, Ken. If anyone else out there has any news, please send it to Al Muick, 3rd Opns Bn USAFSA, CMR Box 1912, APO New York 09458.

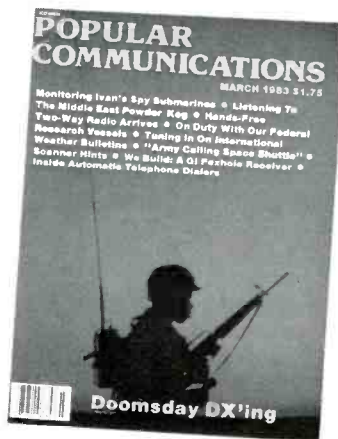
Now for the long-awaited and much-belated Part II of the WRFI story:

"Everything went fine for two months; then about a week after the last letter (late April): knock, knock. Well, we had a crash procedure ready, which included things like: know your rights, keep cool, and how to scramble the transmitter adjustments. The rule was, 'no papers, no let in,' but mainly to just play it cool the best way. As it turned out, Ozmo the Great was the only person around when they arrived and he

played it absolutely cool. No hassle: open the door, take one look, and start laughing. They were (I almost hate to admit it) pretty cool too, and dug the joke. They'd waited in the driveway for the album to end before bothering to knock, and let Ozmo do a decent sign-off complete with a call for me to haul up there (we were on a hilltop, five miles out of town).

"Well, anyway, they waited til I got there, we talked shop for awhile, they told us who finked (the chief engineer for the local cable company—he's since quit his job and left town) and they very nicely asked for a tour. After it was clear that they were on our side (they referred to the local station personnel as backstabbers), in addition to assuring us they didn't really want to see anyone get clobbered (I hope they were serious), we opened some beers (for ourselves), showed them our toys, and played some off-the-air tapes for everyone's amusement. In return, they played the tapes they had recorded from 20 miles away (where they happened to be) over the previous two nights (they just missed the infamous molesting of the Barbie Doll, live, as it happened). Whew! Then it was *their* show; they had about \$50,000 worth of goods in a vintage green sedan, including a phased direction-finding array build into the roof, which had been de-metallized and reconstructed in laminated dielectric. Almost worth the price of admission to see, but not quite. On their way out, the two engineers offered to allow us to include material in our favor in their report to the DC

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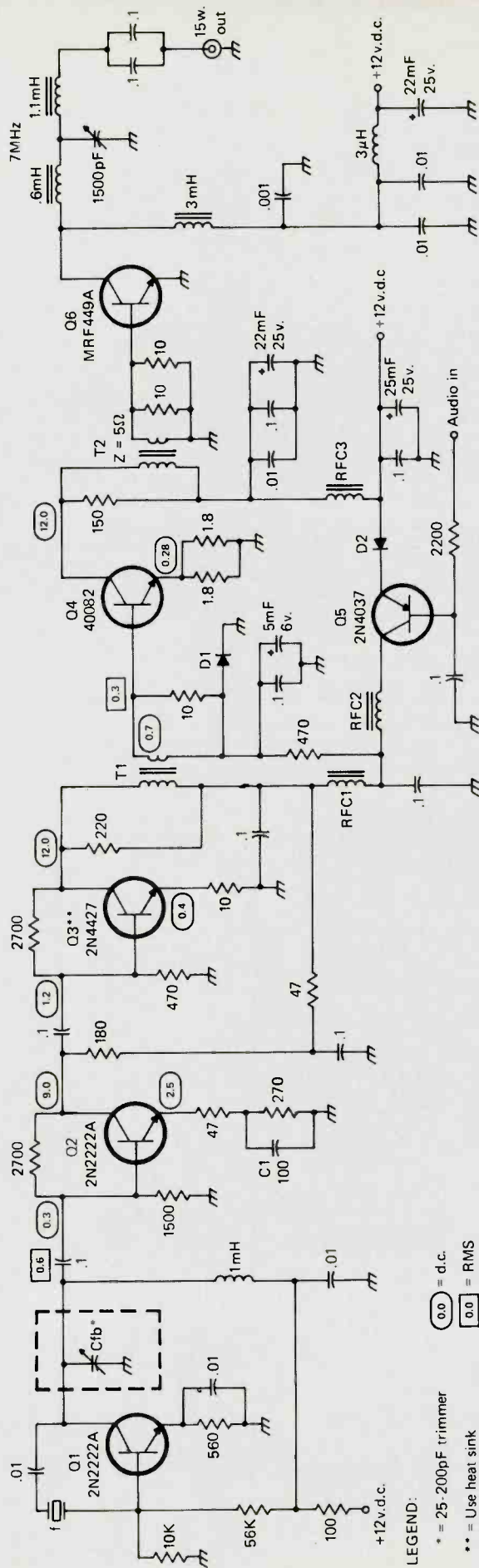
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office, so the following weeks I sent off copies of the letters we had received while on the air, all of which were definitely in our favor.

"The field engineers who got us have since been helping in many ways to find some way of getting back on the air. None of the equipment was confiscated, and the equipment and studio are still set up and waiting (the transmitter has been de-commissioned temporarily, so that Jack Daniels can't switch it back on when he's high). What we are waiting for now is the next phase, where we apply for experimental authorization for various antenna radiation and propagation studies. I'm working on an engineering proposal right now, and hope to get it into a connection in the broadcast bureau later this month. Rumor has it they'll cut the red tape, and we can run at least 10 times our previous output power. We're alive and kicking—so stay tuned."

In this month's technical corner, we have construction details of a 15 watt AM transmitter some stations are using on the 7 MHz pirate band (7.3 to 7.4 MHz), and it can, of course, be used as a standby Ham transmitter. This construction entails three parts: the oscillator, the driver/modulator, and the power amplifier.

The oscillator is a simple but effective one-transistor Pierce oscillator with a 50 ohm output impedance. Capacitor Cfb is needed depending on the parallel capacitance of your crystal. Typically, a small 25-200 pF trimmer capacitor will be required to provide enough feedback to induce oscillation.

The driver/modulator unit is broadband from 3.5 to 29 MHz and will produce 1.5 watts output into 50 ohms from 10 milliwatts of drive. To aid in your construction of this critical part of the circuit, DC and RMS voltages are labeled at test points on the schematic. Overall gain for the circuit at 7 MHz is 31 dB with slight gain variations elsewhere in its amplification spectrum. T1 consists of 30 turns of #28 enameled wire on the primary and is wound on an FT-50-43 toroid. The secondary has 4 turns of #28 enameled wire. T2 uses 16 turns of #28 enameled wire on the primary and looped through an Amidon BLN-43-302 ferrite balun core. The secondary consists of four turns of #28 enameled wire. RFC1, RFC2, and RFC3 are all 250  $\mu$ H units. They are made by winding 20 turns of #28 enameled wire on FT-37-43 toroid cores. D1 and D2 are 1 ampere, 50 PRV rectifier diodes. C1 at the emitter of Q2 can be selected to provide the overall gain in this strip.

The collector of the class C power amplifier, Q6, employs a T-network to transform the 5 (actually 5.6) ohm collector to a 50 ohm load. The collector RF choke is followed by a second one, which with the associated bypass capacitors decouples the amplifier from the power supply.

All parts in this project are rather easy to come by. Total expenditures for parts should average around \$60, but will be considerably less for those who have a well-stocked junkbox. This rig uses a tuned antenna and 50 ohm coax.



# WASHINGTON PULSE

## FCC ACTIONS AFFECTING COMMUNICATIONS

### **FCC Judge Revokes Licenses Of Three Mid-West Amateur Radio Operators; Finds Three Others Unfit To Be Amateur Radio Service Licensees**

FCC Administrative Law Judge Joseph P. Gonzalez has revoked the station licenses of three mid-west Amateur Radio Operators and found three others unfit to be licensees in the Amateur Radio Service for conspiring to obtain Amateur Advanced Class Radio Operator licenses by fraud.

Judge Gonzalez concluded that Indiana Amateurs Harry R. White, licensee of WA9CYV at Indianapolis, Glenn C. Mottern, licensee of WB9CWZ at Newberry, and Robert W. Lloyd, licensee of WB9LTA at Lebanon, had used the services of a former FCC employee at the Commission's Gettysburg, PA, facility to obtain their Amateur Advanced Class Radio Operator licenses without taking the required qualifying examination. Therefore, he revoked their station licenses and suspended their radio operator licenses for the remainder of term.

The judge also found that Robert W. Kirkham, who subsequently surrendered his licenses for K9APH and W3BZU at Indianapolis rather than have them revoked, had conspired with Carrol W. Everhart, former licensee of Amateur station WB9AWN at Indianapolis, and Hugh Kelly, former licensee of WB9NON and WB9TBR at Green Bay, WI, to obtain Amateur Advanced Class Radio Operator Licenses through the same employee at the Gettysburg facility, and therefore were unfit to be Commission licensees.

### **Review Board Upholds ALJ's Action Revoking Californian's Amateur Radio License**

The FCC Review Board has upheld Administrative Law Judge Thomas B. Fitzpatrick's action revoking the license of Kenneth L. Gilbert of Monterey Park, CA, for station KB6TG in the Amateur Radio Service and suspending his Amateur Advanced Class Radio Operator License.

In an Initial Decision released May 24, Judge Fitzpatrick determined that on March 18, 1981, Gilbert had used his station to transmit indecent language and willfully interfered with other Amateur communications, a determination Gilbert protested. The Review Board noted that Gilbert had interfered with other Amateurs' transmissions, causing them to switch frequencies in a vain attempt to elude his interference. Such deliberate interference, the Board em-

phasized, is a serious offense prohibited specifically by the Communications Act and warrants removal of a station license and suspension of an operator license.

Therefore, the Board revoked Gilbert's license for KB6TG and suspended his Amateur Advanced Class Operator license for the remainder of the term.

### **Oklahoma City Amateur's Station License Revoked, Operator License Suspended; Authority Clarified On License Revocation And Suspension**

The FCC revoked the Amateur Radio Service station license of William M. Rogers, Oklahoma City, for station WD5FPO, suspended Rogers' Technician Class Amateur operator license and denied his application for a General Class operator license for repeated violations of Amateur Service and Citizens Band rules and lack of candor in dealing with the FCC.

In its action and related concurrent action (Theodore E. Sousa, SS Docket No. 78-89), the Commission ruled that its authority to revoke a license under the Communications Act extends to revocation of a license that was renewed after the FCC staff became aware of but before it had acted on rule violations by the licensee. The Commission also found that the Act empowered it to suspend an operator license in one service for infractions committed in another service in which no operator license is required.

The Commission's action reversed in part a 1980 decision by the FCC Review Board and affirmed an Initial Decision issued earlier that year by Administrative Law Judge Walter C. Miller. The Board, in partly reversing the ALJ, had found that the FCC could not legally revoke Rogers' station license because it had issued a routine renewal of the license before taking action against him for the violations.

The Review Board also rejected the ALJ's finding that Rogers' evasiveness and lack of candor during the FCC's investigation and the hearing on the case formed an additional basis for revocation and suspension. The Board ruled that the candor issue was not specified against Rogers and thus was not properly at issue in the proceeding. The Board then addressed to the Commission the question whether Rogers' Amateur operator license could be suspended for infractions committed in the CB Service, for which no operator license is required.

Rogers paid a \$150 forfeiture in 1976 for three CB violations the previous year: transmission on an Industrial Radio Service fre-

quency, failure to identify himself by call sign, and transmission with an overheight antenna. In 1977, Rogers was issued his Amateur station license and a Novice Class operator license.

In March 1978, Rogers was monitored while transmitting on a Federal Aviation Administration frequency, during which he failed to identify by call sign and failed to observe required silent periods. Also in March 1978, before his two-year license terms expired, Rogers applied for a Technician Class operator license and renewal of his station license. Those applications were granted for five year terms in May. In September, 1978, he applied for upgrading to General Class operator and renewal of the station license.

Meanwhile, in April, 1978, the FCC issued alternative notices of violation to Rogers, since it did not know whether he was using CB or Amateur equipment during the violations. In March, 1979, he was ordered to show cause why his Amateur station license should not be revoked. The order suspended his Technician Class operator license, subject to request by him for hearing, and designated his General Class application for hearing. Rogers requested a hearing on the suspension.

Rogers' statements in response to the orders and in hearing were inconsistent as to his responsibility for the violations and whether they were committed with CB or Amateur equipment. He surrendered his CB license in May 1978 and later claimed inaccurately that he had done so on FCC instructions, in penalty for the violations.

The Commission, citing its order in the Sousa case, said the staff's knowledge of the violations at the time of Rogers' 1978 station license renewal did not preclude later revocation. Consideration of events during a previous license term would be precluded only if those matters were actually considered—not merely known—when the renewal was granted and cognizance of information known to part of the staff cannot be imputed automatically to the entire agency.

Any station license may be revoked for willful or repeated violations of the Communications Act or FCC rules, the Commission said. The record of the case shows Rogers is unqualified to remain a licensee and justifies revocation.

Candor need not be separately designated as an issue for hearing, the FCC stated. The Commission has a right to expect candor from all of its licensees, since the ability to rely on the representations of applicants and licensees is basic to the functioning of the regulatory process.

Rogers was given notice during the hearing that his candor was in question. The ALJ found a pattern of misrepresentation that is

fully supported by the record and serves as additional grounds justifying revocation, suspension, and denial.

The Communications Act's grant of power to the FCC to suspend a license is intentionally broad, disagreeing with the Review Board's view that Congress did not intend suspension in one service as a sanction for violations in another service. The Act authorizes suspension for violation of any provision of the Act or any regulation made pursuant to it, the FCC noted. In a case of serious and knowingly repeated violations, suspension is appropriate.

### **Reconsideration Of General Use Designation For Certain Business Radio Service Channels In Detroit Area Denied**

The FCC has denied Exposition Communications & Technology, Inc. reconsideration of a 1981 action changing the designation for two Business Radio Service pairs—464.500/469.500 and 464.550/469.550 MHz in the Detroit area from temporary to permanent and temporary operation.

Exposition, which rents radio equipment for short-term use by entities producing trade shows, conventions, sporting events, etc., pointed out that such large events need effective low-power communications that can be provided only on the assurance that a given frequency will not be taken over by high-power permanent systems. Therefore, it asked that the Commission reinstate the itinerant operation in Detroit to protect short-term users who operate with 15 watts or less from large radio systems users who will preclude such operation through the use of high-power transmitters, continuous radio traffic, and other operations.

The Commission pointed out while it had permitted permanent systems to operate on these frequencies along with itinerant systems, it had retained the 35-watt transmitter power limitation which is applicable to both systems, giving neither an advantage over the other.

Furthermore, the Commission noted that for Exposition and other short-term users who wish to operate in the Detroit area in the future, three other frequencies—27.49, 35.04, and 151.625 MHz—are available for itinerant operation in the Detroit area. In addition, the rules also permit itinerant systems to use 11 full power, general use channels and 21 low power, general use frequencies between 25 and 470 MHz.

### **FCC Declines Rulemaking To Expand CB Service**

The Commission has denied three petitions for rulemaking to expand the Citizens Band radio service and create single-sideband-only channels.

The petitions involved a request to set aside frequencies above CB Channel 40 (27.405 MHz) for single sideband (SSB) operation only; a proposal by the Washington

State CB Radio Association to create a "Hobbyist Class" in the Amateur Radio Service to operate on frequencies above CB Channel 40 using broad restructuring and expansion of the personal radio services to provide four CB-type radio services at 27, 220, and 900 MHz and set aside frequencies for SSB-only operation.

Users of SSB transceivers complain about having to share the 40 CB channels with users of the more popular AM (amplitude modulation) transceivers. Each modulation mode is permitted on each CB channel on a take-turns basis. However, many SSB users claim they need channels where only SSB is permitted, and some have even modified their equipment to transmit illegally outside the authorized CB frequency band. Proponents of the petitions before the Commission had said their proposals would alleviate these problems.

The Commission said it would not consider Washington State's proposal to allocate the frequencies between 27.410 and 27.950 MHz for SSB-only operation in a "Hobbyist Class" within the Amateur services without a Morse code proficiency examination because it would violate the International Telecommunication Union's regulations, to which the U.S. is a signatory.

Regarding the other proposals, the FCC said that while the number of users per channel (loading) is still high, the CB service overall is shrinking and expansion of channels is not warranted. Finally, allocating more frequencies above CB Channel 40 would increase the problem of CB interference with television reception and would exacerbate the Commission's enforcement burden, the agency said.

The Commission concluded that "The congested conditions which may have inhibited the coexistence of SSB and AM operations have been significantly alleviated by documented shrinkage in this service. There is no compelling need to expand the service or to set aside sideband-only channels within the service. To the extent that the problem still exists, the public interest plainly lies not in more channels but in more cooperation among users."

### **FCC Proposes Elimination Of Individual Licensing In R/C And CB Radio Services**

The Commission proposed rules authorizing operation in the Radio Control (R/C) and Citizens Band (CB) Radio Services without individual station licenses. It said eliminating individual licensing of R/C and CB stations would be a significant deregulatory action which would result in savings to the Commission and reduce the paperwork involved in filling out temporary permits and application forms.

Eliminating station licenses would also eliminate individual station call signs. In the CB service, a station would have to be identified by the license plate number of a vehicle licensed to the CB operator. If no vehicle was owned, identification would be by home address.

The FCC requested comments on whether license plate numbers are the most appropriate means of identification, and, if not, what would be a preferable alternative. Also, comments are sought on whether rules requiring CB identification would help resolve interference problems without FCC intervention, and whether effective use of voluntary and uncompensated CB radio operators would require some sort of unique CB identification.

The FCC noted that in eliminating individual station licenses in these two services, there would be no need for minimum age requirements now required for operation in the R/C and CB Radio Services.

During the proceeding, R/C and CB uses must be licensed. However, the Commission stated it would not accept R/C or CB renewal applications filed more than 90 days before the end of the license term.

R/C and CB rules will continue in effect, and, by and large, are not affected by this proceeding. The Commission indicated it intends to enforce R/C and CB operating rules even if station licenses are eventually eliminated.

### **Ship Radiotelegraph Operator Fined For Interference To Coast Guard On 400 kHz**

Edward J. Wendrow, Jr., the radio officer of the vessel, *Santa Lucia*, was fined \$500 for willfully leaving the ship's transmitter in a condition causing harmful interference to United States Coast Guard's operations on 500 kHz, the international distress frequency. The radio officer left the ship docked at Norfolk, Virginia, with the main antenna connected, power applied, and the main transmitter adjusted for efficient operation on 500 kHz.

When the United States Coast Guard complained of continuous interference on the distress frequency, engineers from the FCC Norfolk district office located the vessel using radio direction finding techniques. The FCC engineers disabled the transmitter with the aid of the ship's captain.

The terms of FCC commercial radiotelegraph operator licenses state that the operator is responsible for insuring proper functioning of the transmitting equipment. Mr. Wendrow has paid the fine.

### **Puget Sound VHF Maritime Public Correspondence Channeling Rules Proposed**

The FCC proposed to amend channel assignment and, for certain types of service, power and antenna height rules for VHF maritime public correspondence stations in the Puget Sound area of Washington state. The proposed changes would increase the efficiency of spectrum use principally by providing for reuse of VHF frequencies as local channels while limiting antenna height

to reduce interference. There would be no resulting degradation of service.

Present rules are based on a channeling arrangement with Canada. The proposal was coordinated informally with the Canadian Department of Communications and, if adopted, will be formalized with that department of the Canadian government.

The North Pacific Marine Radio Council requested the rulemaking, basing its petition on a study it conducted in which telephone companies serving those regions of the United States and Canada participated. Public coast stations interconnect with telephone systems on land to provide common carrier radiotelephone service with ships in coastal and inland waters.

The proposal would provide for assignment of one primary and one supplementary channel to each public correspondence sector, except for three sectors in which no supplementary channel is available. Any of the channels covered by the assignment plan could be used as a local channel in a sector except those designated as the primary and secondary channels in that sector.

At present, one or two primary and supplementary channels are assigned to a sector, and only two channels (24 and 25) are available as local channels in the entire region. The amendments, by permitting optimum reuse of frequencies, would provide more flexibility without loss of service quality.

Under the proposal, inland water primary and secondary channel antennas would be limited to 500 feet and effective radiated power to 60 watts. Local coastal water channels would be limited to antennas of 250 feet and power of 10 watts. Inland water local channels would be limited to 8 watts with a 50-foot antenna or 2 watts with a 100-foot antenna. No antenna height limit or power change was proposed for coastal water primary and secondary channels.

As at present, coast stations conforming to the U.S./Canadian arrangement could be established in either country without prior coordination. Applications at variance with the arrangement require preliminary local U.S./Canadian coordination, and informal coordination may be provided jointly by members of the Council and appropriate Canadian representatives. Existing stations at variance with the modified plan may have to modify to comply.

### **Inquiry Begun Into Use Of Radio Rescue Devices By Small Vessels In Maritime Services**

The FCC began an inquiry into use of portable, low power, and relatively inexpensive Emergency Position Indicating Radio Beacons (EPIRBs) that can be used by the crew of a relatively small vessel to rescue its members during "man overboard" situations without outside assistance.

This action comes as the result of a petition by Gerald T. Weiss, who has developed such a device. In his petition, he noted that the existing classes of EPIRBs are designed primarily

ly for use by large vessels and life rafts. These EPIRBs are large and expensive, require outside monitoring and, sometimes rely on aircraft or land-based Coast Guard stations to receive their distress signals.

For the millions of recreational boats, there is no rescue device designed to be used for the "man overboard" cases that occur during poor visibility and adverse weather conditions or at night.

Weiss stated that the rescue devices he has developed are small and could be attached to clothing or a life preserver. They would be activated manually by a person fallen overboard to alert the vessel's crew and allow it to "home-in" at short range and rescue that person.

The Commission said that while it recognized that recreational boaters could use radio beacons for "man overboard" distress purposes, it felt some aspects of the proposed devices required further consideration. The Commission asked for comments on the following questions:

- Are the proposed frequencies of 2,182 kHz, 8,364 kHz, 156.75 MHz, and 156.80 MHz acceptable for the operation of these devices? If not, what are the frequencies that should be used?
- What technical requirements should be regulated by the Commission?
- What operating rules or limitations should be placed on these devices to prevent them from interfering with stations currently authorized to use the same frequencies?
- Should the non-technical requirements be regulated by the Commission and, if so, what form of equipment authorization should be used?
- What scheme of licensing should the Commission require for the operation of these devices?

### **First Authorization Granted For Integrated Mississippi Communications System**

The Commission has granted the application of Waterway Communications System, Inc., to establish and operate an automated, integrated, interconnected Inland Waterways Communications System (IWCS) on the Mississippi, Ohio, and Illinois Rivers and the Gulf Intracoastal Waterway.

The application is the first granted under the FCC's decision (Gen. Docket No. 80-1), released March 11, 1981, establishing the IWCS Service to provide for such systems, operating in the 216-220 MHz band, to meet the need for better ship to shore communications for traffic on the Mississippi and connecting waterways. Watercom is a subsidiary of Texas Gas Transmission Corp.

The Commission denied objections to Watercom's application filed by WJG Telephone Company, Inc., licensee of four public coast radio stations on the river system, and Gateway Communications, Inc., licensee of television station WOWK-TV (Channel 13), Huntington, WV. TV Channel 13 (210-216 MHz) is adjacent to the band allocated for IWCS systems.

The FCC said neither Gateway nor WJG raised a substantial and material question of fact providing a potential basis for denying Watercom's application. It noted that the rules authorizing the service include a specific condition against harmful interference to television reception and technical limitations to restrict the interference contours of IWCS stations located within fixed distances of TV stations operating on Channels 10 and 13.

The order establishing the service recognized that the initial planning and implementation phases of a system would be in the nature of a prototype development. In that context, it said, Watercom's application adequately satisfied requirements. It gave Watercom two years to put the system into operation, rather than the normal eight-month period granted a public coast station. Where specific information not included in the application is required for a particular station in the future, the FCC said Watercom must file it at least 60 days before the station goes into operation.

The Commission said there was sufficient showing of financial ability to establish the system. It rejected various other arguments by the petitioners.

### **FCC Authorizes Closure Of Two West Coast Public Coast Stations**

The Commission has authorized ITT World Communications Inc. to close Class I-A public coast radiotelegraph stations KOK at Los Angeles and KLB at Seattle.

ITT said it would expand the service and upgrade the equipment of KFS near San Francisco to provide essentially the same service as KOK and KLB, which it wants to close due to the high costs entailed in renewing the two stations' on-site leases.

In comparison to the financial impact on the licensee in keeping the stations operational, closing them would have little impact on users, the Commission noted. Nevertheless, it would keep the frequencies and site locations now authorized for KOK and KLB open for six months should someone want to apply to run them. In addition, ITT would be expected to live up to its promise to upgrade KFS' service.



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CIRCLE 15 ON READER SERVICE CARD

Scanning The:

# American District Telegraph Company

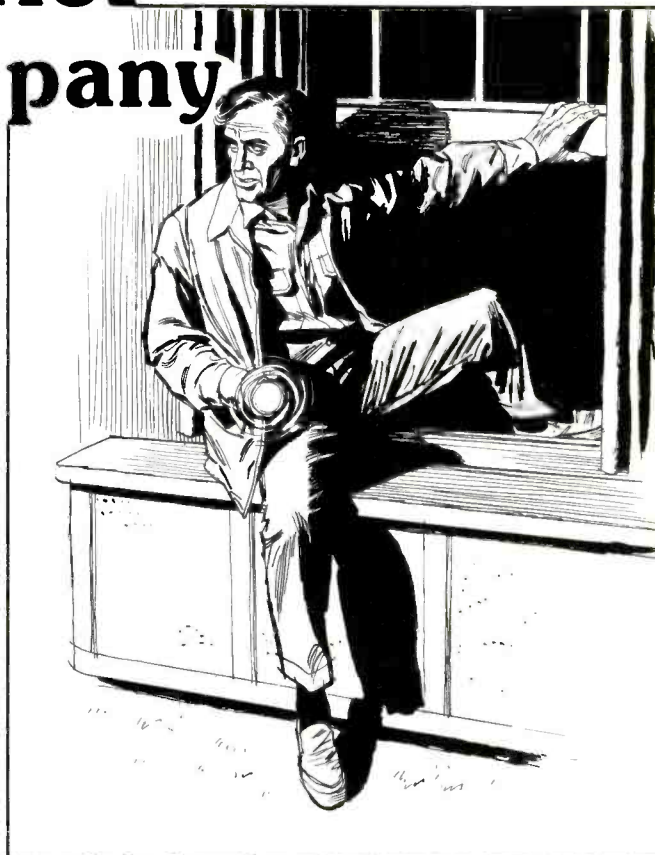
BY RICK MASLAU, KNY2GL

The American District Telegraph Company, popularly known as ADT, is a major national private security service providing alarm systems of all types, including closed circuit TV. One of their best known services—provided for homes, commercial and industrial customers, and banks—is called the central station alarm system.

A central station alarm system requires that various intrusion sensing devices be installed at the customer's location. These are connected to a master control panel which, in turn, has the ability to notify security officers at a central alarm company office if there is a break-in, or a fire, or some other reason for concern. At the alarm company offices, inputs from a large number of customers are carefully and constantly monitored. If one of the warning lights activate at this office, it's only a brief instant before the alarm company reacts and dispatches its own security personnel and/or the police.

ADT's customers are often identified by a distinctive decal placed on doors and windows to ward off potential intruders.

Here's the ADT communications system nationwide:



## American District Telegraph

<b>AL</b>	Birmingham	<b>KXP701</b>	460.95	<b>ID</b>	Boise	<b>KJV979</b>	464.625
		<b>WAU443</b>	460.95	<b>IL</b>	Chicago	<b>KQC72</b>	460.95
<b>CA</b>	hand-helds	<b>KZ4412</b>	154.60			<b>KQC74</b>	460.95
	Almaden	<b>KML214</b>	460.95		Cicero	<b>KQC75</b>	460.95
	Banning	<b>KCT983</b>	460.95		Peoria	<b>KQC76</b>	460.95
	Coalinga	<b>WZE932</b>	806.625		Rock Island	<b>KRU893</b>	460.95
	Corona	<b>KMJ998</b>	460.95		Rockford	<b>KQC72</b>	460.95
	Jackson	<b>KWI450</b>	460.95			<b>KXH641</b>	460.95
	Riverside	<b>WAK578</b>	460.95	<b>IN</b>	Evansville	<b>WBY385</b>	460.95
	Sacramento	<b>WPM79</b>	460.95			<b>KDN343</b>	460.95
<b>CO</b>	Denver	<b>KTZ857</b>	463.925			<b>WCQ709</b>	460.95
		<b>WLC64</b>	463.925		Indianapolis	<b>WFN952</b>	460.95
<b>CT</b>	Glastonbury	<b>KYF727</b>	460.95		Mishawaka	<b>WYU583</b>	460.95
	Hartford	<b>WBA261</b>	460.95	<b>IA</b>	Des Moines	<b>KZZ796</b>	460.95
	New Haven	<b>WCM756</b>	460.95			<b>KCT411</b>	460.95
	No. Branford	<b>KIR281</b>	460.95	<b>KS</b>	Kansas City	<b>KZG801</b>	460.95
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<b>FL</b>	Jacksonville	<b>KVY457</b>	462.175			<b>WRY992</b>	460.95
		<b>WAB714</b>	462.175			<b>WCT48</b>	460.95
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		<b>WCT50</b>	460.95		Braintree	<b>KCV579</b>	460.95
	Orlando	<b>KXX863</b>	460.95		Brockton	<b>KDI517</b>	460.95
		<b>WCZ803</b>	460.95		Cambridge	<b>WCB920</b>	460.95
	W. Palm Beach	<b>KIQ925</b>	460.95		Springfield	<b>WDP677</b>	460.95
		<b>WCM840</b>	460.95			<b>WCB880</b>	460.95
<b>GA</b>	Atlanta	<b>KDM945</b>	460.925			<b>WCB881</b>	460.95
		<b>KGR56</b>	460.925	<b>MI</b>	Worcester	<b>KAK376</b>	460.95
	Savannah	<b>KAZ478</b>	460.95		Grand Rapids	<b>KYQ954</b>	460.95
						<b>WAQ740</b>	460.95
					Kalamazoo	<b>WAX736</b>	460.95
					Lansing	<b>WAY609</b>	460.95

	Leslie	<b>KYX969</b>	460.95
	Oshtemo	<b>KYT989</b>	460.95
	Saginaw	<b>KBL341</b>	460.95
		<b>WBV585</b>	460.95
<b>MN</b>	Minneapolis	<b>KZM325</b>	460.975
<b>MO</b>	St. Louis	<b>KRU982</b>	460.95
<b>NE</b>	Omaha	<b>KXB983</b>	460.95
<b>NV</b>	Reno	<b>WFM733</b>	461.00
	Virginia City	<b>WYR427</b>	461.00
<b>NJ</b>	Alpine	<b>KFU635</b>	460.95
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<b>NY</b>	Albany	<b>KAM517</b>	460.95
		<b>WBT560</b>	460.90
	Buffalo	<b>KAW469</b>	461.975
		<b>WFB265</b>	461.975
	Lafayette	<b>KIS858</b>	460.95
	Mineola	<b>KEJ400</b>	460.95
	New York	<b>WQS370</b>	157.74
	Rochester	<b>KWK760</b>	460.95
		<b>WAE957</b>	460.95
	Syracuse	<b>WCP313</b>	460.95
		<b>WCP344</b>	460.95
<b>NC</b>	Charlotte	<b>KZL462</b>	460.95
		<b>WBN739</b>	460.95
<b>OH</b>	Cincinnati	<b>KQJ569</b>	151.685
		<b>KLP720</b>	460.95
	Cleveland	<b>KDF721</b>	460.95
		<b>WCV21</b>	460.95
		<b>WCV22</b>	460.95
		<b>WCV23</b>	460.95
	Columbus	<b>KUM532</b>	460.95
		<b>WAE901</b>	460.95
	Dayton	<b>KWW529</b>	460.95
		<b>WAK579</b>	460.95
	Louisville	<b>WRP344</b>	463.30
	Masury	<b>KWW531</b>	360.95
	Springfield	<b>WYT267</b>	460.95
	Youngstown	<b>WAK580</b>	460.95
<b>OK</b>	Oklahoma City	<b>KWR663</b>	464.80
		<b>WAJ221</b>	464.80
<b>OR</b>	Portland	<b>KTJ413</b>	460.95
		<b>WKH60</b>	460.95
<b>PA</b>	Allentown	<b>KCA478</b>	460.95
		<b>WCA463</b>	460.95
	Erie	<b>KSX941</b>	463.975
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	Signal Mtn.	<b>KYW300</b>	460.95
<b>TX</b>	hand-helds	<b>KD9861</b>	154.57
			154.60
	Dallas	<b>WAU441</b>	460.95
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		<b>WXG719</b>	461.775
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	Houston	<b>KLS368</b>	460.95
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	San Antonio	<b>KVK783</b>	460.95
<b>US</b>	hand-helds	<b>KU7145</b>	165.60
	portable base	<b>KXL853</b>	464.55
<b>UT</b>	Salt Lake City	<b>KVN970</b>	460.95
<b>VA</b>	Hugenot Village	<b>KYW299</b>	460.95
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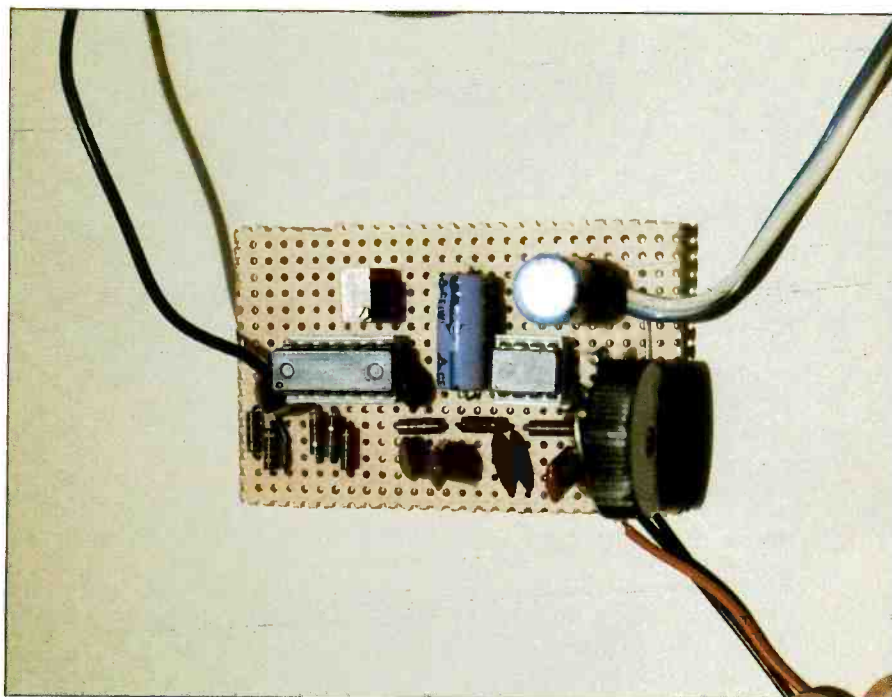
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CIRCLE 5 ON READER SERVICE CARD

## Eavesdrop On "Hidden" FM Broadcasts With This

# SCA Adapter

BY LAWRENCE G. SOUDER



Construction on perforated board is easy and inexpensive.

SCA are background music, storecasting, detailed weather forecasting, digital control and data signals for telemetering and remote control, and programming of interest to particular professional, educational, and religious groups.

Standard FM stations broadcast the SCA service on the same carrier with their regular programming by means of frequency multiplexing. Before the SCA program reaches the FM transmitter, it is mixed with a 67.5 kHz subcarrier, the effect of which is to shift the entire frequency span of the SCA audio up into the range of 59.5 kHz to 74.5 kHz, well beyond the audible range. The resultant signal goes to the transmitter along with the regular program feed. The two signals do not interact, and each program will reach only its intended receiver in spite of the fact that they both ride on the same RF carrier.

Ordinarily, to receive an SCA service, you must pay a monthly charge in return for which you have the use of a special SCA radio receiver. These receivers, however, are not tunable, so you can only access one SCA service.

The circuit shown here will adapt any standard FM radio to receive SCA broadcasts for a total one time cost of about ten dollars. Also, since this adapter uses a tunable FM radio, you can access all SCA broadcasts in your area, not just one.

### About The Circuit

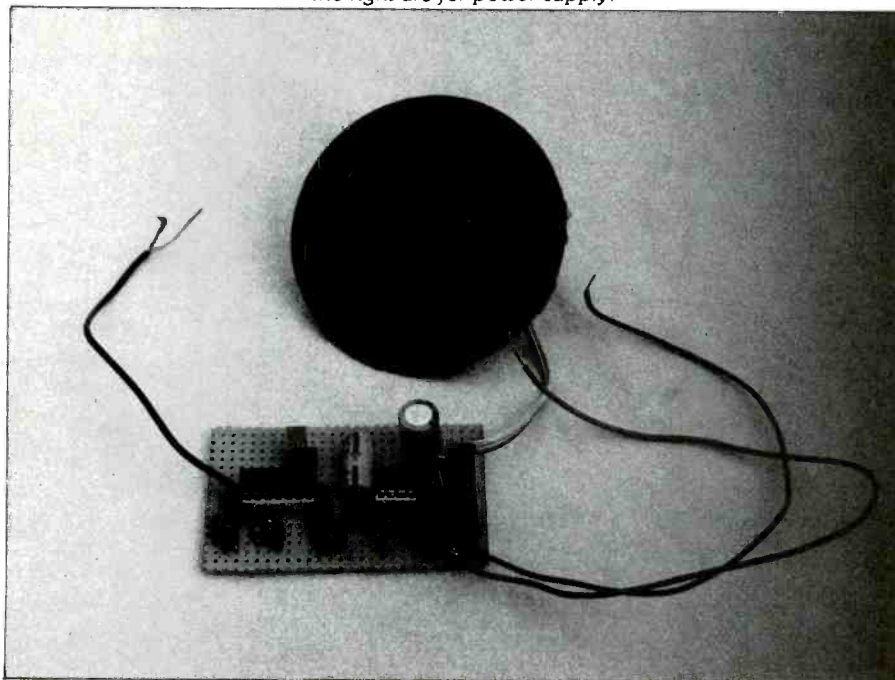
The input to this adapter attaches to the output of the FM detector of your receiver. If the receiver is tuned to a station broadcasting an SCA service, the output of your FM detector will have two components: the regular program's audio signal in the 30 to 15 kHz frequency range and the SCA signal in

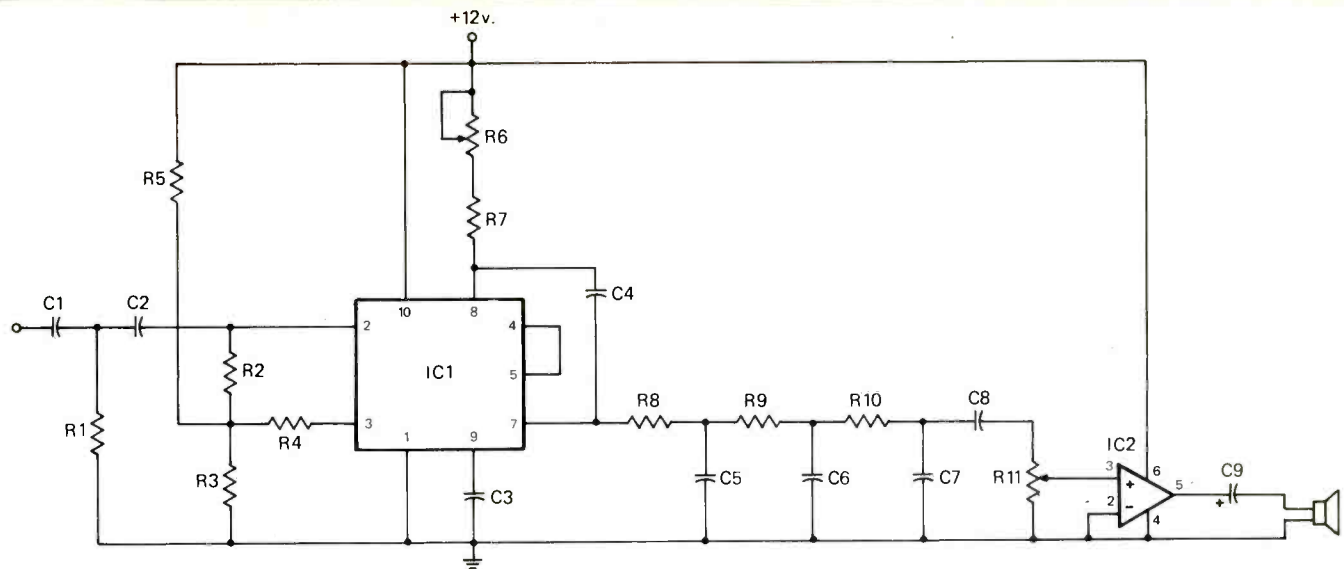
**T**he old cliché about other people's gardens applies to many things, including monitoring. It's tempting to think that the only interesting communications are heard on shortwave DX bands or exotic microwave frequencies. As a matter of fact, some of the most intriguing broadcasts are in your own backyard—namely, the local FM broadcast band. No, I am not referring to the usual rock stations, but rather to stations that broadcast commercial free music, continuous stock market and financial news, special medical news programs for physicians, and reading services for the blind. You've never heard of such stations? Then read on and discover the world of SCA.

### What Is SCA?

SCA stands for subsidiary communications authorization. The FCC grants this authorization to standard FM broadcast stations who wish to carry other special services in addition to their regular programming. Access to these services is usually limited to special interest groups and then only on subscription. Some of the services broadcast by

The coaxial cable on the left connects to the host radio for signal, and the two wires on the right are for power supply.





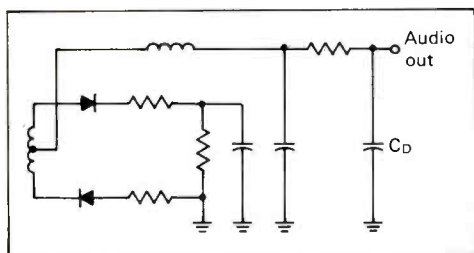
### Parts List

All resistors are 1/4 watt unless specified.

C1, C2—470 pf  
 C3, C4—.001 mfd  
 C5, C7—.022 mfd  
 C6, C8—.04 mfd

C9—470 mfd electrolytic, 16 v.  
 R1, R2, R3—4.7 k  
 R4—5.6 k  
 R5—10 k  
 R6—20 k linear pot  
 R7—2 k

R8, R9, R10—1 k  
 R11—5 k audio pot  
 IC1—NE 565 PLL  
 IC2—LM 386 PA  
 Speaker—8 ohm



the 59.5 kHz to 74.5 kHz frequency range. Successive stages in your receiver are sensitive only to the former audio component. This adapter, however, responds to the latter SCA component.

Figure 1 is the schematic of the SCA adapter. The components C1, C2, and R1 are a high pass filter that discriminates between the high frequency SCA component and the low frequency audio component of the FM detector. The actual demodulation of the SCA signal occurs at IC1 by means of a phase-locked loop technique. The demodulated SCA signal, now at audio frequencies, feeds a low pass filter made up of R8, R9, R10, C5, C6, and C7, which provides de-emphasis and attenuates high frequency noise. IC2, an audio amplifier, drives a speaker, the volume of which is controlled by R11.

### Hooking Up The Adapter

You need to make only two connections between your FM radio and the SCA adapter, input signal, and power supply. Both IC's in the adapter require about +12 volts, which you can usually steal from your host radio. Just make sure that this voltage is positive with respect to ground, no greater than 12 volts, and adequately filtered.

To provide the input signal for the adapter, first locate the FM detector of your radio.

Figure 2 shows a typical example. Now isolate the capacitor  $C_D$ , which shunts the signal path, and disconnect it. This capacitor is the standard deemphasis in the FM detector, which attenuates the higher frequency audio. Unfortunately, it may also attenuate the SCA signal as well, so you must disable it. Finally, connect the input of the adapter to the output of the FM detector by way of a shielded cable.

### Aligning The Adapter

Alignment is simple, since only R6 requires adjustment. Just tune the receiver to a station known to broadcast SCA, turn down the volume of the regular program, and adjust R6 until the SCA service is heard in the adapter's speaker.

If you don't know which stations in your area broadcast SCA, you may find alignment with an oscilloscope easier. Attach the scope probe to pins 4 and 5 of IC1 and adjust R6 until the frequency of the square wave displayed is about 67.5 kHz, the frequency most often used for the SCA subcarrier.

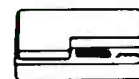
### Using The SCA Adapter

Since the frequencies of SCA stations are not publicized, the best way to find SCA broadcasts is to tune in the regular program of each FM station in your area and switch on the adapter. Most metropolitan areas have at least a few SCA services (Philadelphia currently has eight). Also, although the standard subcarrier frequency for SCA is 67.5 kHz, it is not the only one used. This means you may find other SCA stations by tuning R6 as well. Lately, the FCC has proposed rule changes that would encourage broadcast stations to use SCA. So if you don't find many SCA services now, you should hear more of them in the near future.

Whatever you do, be sure to use the SCA adapter solely for your own private, non-commercial amusement. Since SCA broadcasts are not intended for the general public, they are protected by the secrecy provision of the Communications Act of 1934.

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## INSIDE THE WORLD OF TVRO EARTH STATIONS

### ***DX'ing Those International Satellites Part Three: Bob Behar And Hero Communications***

**M**ost of us in North America take for granted the full spectrum of television programming available from our broadcast and cable networks. Yet, in many parts of the world today, television services are either minimal or non-existent. To fill this void, a new generation of satellite TV pioneers are installing TVRO systems at remote and exotic locations abroad.

One company in South Florida has developed 5, 6, and 7.5 meter INTELSAT-quality earth stations. In the last two years, Hero Communications has installed fully-automated high-efficiency terminals in Africa, Asia, North and South America, The Pacific, and the Caribbean. At TVRO industry trade shows, Hero Communications President Bob Behar regularly supplies reports on the international satellite TV services viewed by Hero technicians at installations on four continents. These reports are aiding the growth of an entire new market for satellite TVRO technology.

Four years ago, when the home satellite TV industry was only a dream, Bob Behar was down in South America putting in a radio-telephone system. During his visit, the World Cup Soccer games brought the country to a standstill! Bob became very involved in watching the tournament. But just before the final week of competition, he had to fly back to the United States. When he arrived back home, Bob was astounded that the games were not even televised here. Although most people in the world have an intense interest in these games, Americans hardly seemed to notice their absence.

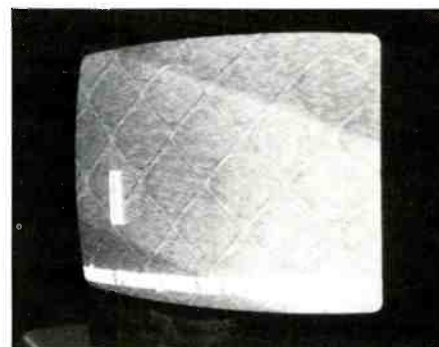
Bob discovered that the World Cup games were relayed across the planet via the INTELSAT global satellite system. Here was a video service guaranteed to be in high demand throughout the world. If he could develop a system that would provide commercial-quality reception of these games, he would have an innovative and highly-profitable business.

Bob flew out to a trade show in Omaha and gained hands-on experience with the essential electronics by putting together an 11 meter uplink terminal. This new-found knowledge, coupled with Bob's ten years of experience in broadcasting, provided the foundation for Hero Communications.

Prior to the 1982 World Cup games, a gentleman from Brazil who owned a TV station in the middle of the Amazon, flew up to Miami to see Bob. The Brazilian government had arranged for the installation of a number of 7 meter terminals throughout Brazil as part of a nationwide system for distributing a variety of television programs in-



*INTELSAT reception while in Kuwait, September, 1982. (Photo courtesy of Hero Communications)*



*Reception of French programs via Symphonie bird. Photo taken in Kuwait. (Courtesy of Hero Communications)*



*Reception of Gorizont from Kuwait, September, 1982. (Photo courtesy of Hero Communications)*

cluding the World Cup games. But many of these earth stations were unfinished as the opening date for the 1982 World Cup Games approached. This man's station served a community of about 10,000 people; he feared the consequences if he failed to provide World Cup coverage.

Brazil just happens to be one of the countries that leases several 1/2 transponders from INTELSAT for the internal distribution of Brazilian television signals. Bob swung his 6 meter Hero antenna over to the Brazilian-leased INTELSAT in about two minutes time, and showed his visitor television direct from Brazil. The gentleman scratched his head and said, "That's not supposed to be there." Bob said, "This is the signal that you want to get back in Brazil. If we are getting it here in Miami and it's broadcast quality, you'll be able to watch it back home. Here's the dish you'll need."

The Brazilian entrepreneur called his associates back home to tell them that he had found the necessary equipment. The Hero 6 meter dish antenna was taken back to Brazil as excess baggage. About a week later,

Bob flew down and put the terminal in.

"Once we satisfied the customer by broadcasting the first World Cup match, we got our chance to play." Bob swung the dish antenna over to where Westar IV was supposed to be. "I couldn't believe what I was seeing. It was just incredible. There were full color pictures of Westar. They had sparkles in them, but they were there, almost 400 miles further south than the pattern showed there should be any signal."

"Westar IV is a fluke; its footprint reaches all the way down into Brazil. My recommendation into that market would be a 7.5 meter dish. For Satcom IIIIR we have experiences working it all the way down into Venezuela and Columbia. There are signals from two sets of Satcom IIIIR transponders: 3, 7, 11, 15, 19, and 23 on the vertical side and 4, 8, 12, 16, 20, and 24 on the horizontal side. You can pretty much expect signals all through the Caribbean on these sets. Our recommendation is a 6 meter dish, 100 degree LNA, and the receiver of your choice."

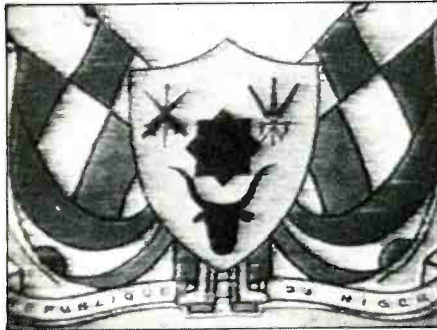
The high demand for World Cup Soccer coverage has since taken Hero Communications technicians to a number of other locations around the globe. Over 30 terminals were installed in a number of countries, including Kuwait, Saudi Arabia, Columbia, Honduras, Belize, Ecuador, and Southern Africa prior to the 1982 games. A customer from Cameroon, a country without any official television broadcasting whatsoever, arranged for Bob to come over and install a system so that the World Cup games could be broadcast there. "It's a real good feeling to know that . . . they were able to watch their own team play because of our efforts." While in Cameroon, Bob was able to catalog the various types of INTELSAT, Soviet, and Franco/German satellite TV services now available throughout Africa.

The 1982 World Cup Soccer games are





Bob Behar addressing attendees of the STTI satellite show, Atlanta, Georgia, October 31, 1982. (Photo by Jeffrey Keating)



Republic of Niger on INTELSAT bird. Photo taken in South Africa, October, 1982. (Photo courtesy of Hero Communications)



Reception of Gorizont from Kuwait, September, 1982. (Photo courtesy of Hero Communications)

now history. Their satellite distribution via INTELSAT occupied more than 4000 hours of transponder time, providing television coverage to over 2.5 billion people worldwide for some portion of the tournament. Every one of the five INTELSAT satellites visible from Bob's location in Miami carried the games in one video standard or the other. It was up there in many languages, including French, Spanish, English, and German. The Soviet satellites were even carrying the games.

On one occasion, Bob had an interesting entourage of people walk into his office. "We were in one of our hectic moods trying to get antennas out of the door for the upcoming 1982 World Cup games. And this gentleman shows up in my front office with about 18 bodyguards and three limousines parked out in front. He quickly asked me if I could go to the airport with him and explain what satellite television was. He was in-

trigued by the 6 and 7.5 meter dishes that we have out in front of our warehouse.

"I jumped into the limo, and on the way to the airport, explained to him through an interpreter just what these antennas could do. And his next question was could I get a signal in Saudi Arabia? Having had the experience in Cameroon, I knew that there were INTELSAT signals available all over the continent on hemispheric beams. I said yes, and proceeded to outline what he could expect to see. The gentleman said fine, could you ship one over? It was as simple as that. By the time we had arrived at the airport, we had agreed on the price and the terminal was on its way over to Saudi Arabia within a few days.

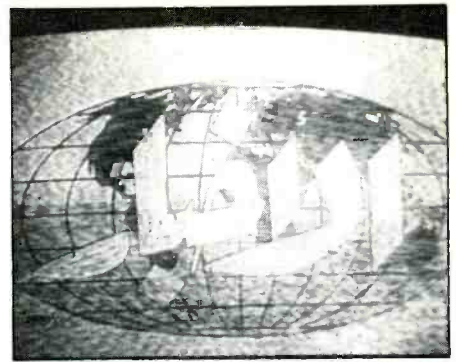
"The paperwork for Saudi Arabia was taken care of rather quickly, which kind of surprised me, having dealt with Middle Eastern countries in the past. This told me that we were dealing with a pretty high official. One of our technicians who practically lives on a jet plane was told to go to New York, take a Saudi Arabian airline and get off in Riyadh. There will be someone to meet you."

After his arrival in Saudi Arabia, the Hero technician spent the next two weeks installing the system. During this time he learned that their client was the Crown Prince. While Hero Communications was finalizing some aspects of the installation, the Crown Prince became King of Saudi Arabia.

"We finished the installation and we found some problems with the audio subcarriers. INTELSAT has a nasty habit of putting the audio somewhere else." The King had three channels of TV with sound and seven without. He asked if Hero could do something about it and they did.

"We spent a lot of time searching for the audio portion of several INTELSAT video transponders. We now make three separate modifications to our receivers so that they can receive audio in sync, audio on a separate subcarrier, and audio somewhere else altogether."

Hero Communications is also involved in Central and South America, installing commercial earth stations that receive American programming for redistribution via Low Power TV stations or cable networks. "We have been concentrating on providing cable-subscription TV systems to people through-



INTELSAT reception while on South Africa, October, 1982. (Photo courtesy of Hero Communications)



Hero Communications international TVRO system with Sharp multi-standard monitor. (Photo courtesy of Hero Communications)

out the Caribbean. We have systems in El Salvador, Guatemala, Columbia, and Venezuela. We are providing not just what you would call a viewable picture, but we are providing a picture that can be sold."

Because of his pioneering efforts in the field of earth station technology, Bob Behar was elected President of SPACE (The Society of Private and Commercial Earth Stations), the home satellite TV trade organization. So during 1983, Bob will be busy not only abroad, but in the U.S. as well, representing the TVRO industry.

If you would like to learn more about satellite television, *The World of Satellite Television* by Mark Long and Jeffrey Keating is available from the Solar Electronics Int., 156 Drakes Ln., Summertown, TN 38483. The price is \$8.95; 224 pages with over 200 photos and illustrations.

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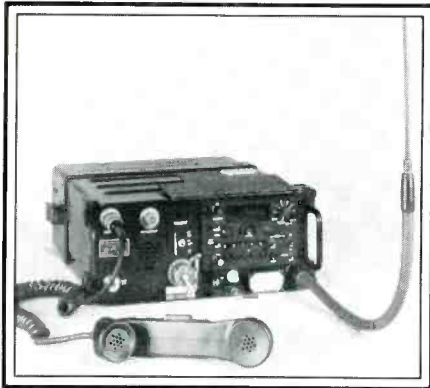
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# PRODUCTS

## REVIEW OF NEW AND INTERESTING PRODUCTS



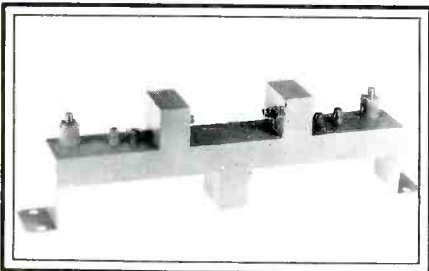
### New Tactical Manpack Transceiver

A portable transceiver that provides ground-to-air, point-to-point, and satellite communication capabilities is available from the Motorola Government Electronics Group.

The AN/URC-104 provides military field units tactical double coverage with both the 30-88 MHz and 225-400 MHz frequencies. The transceiver's 9,320 channels are in 25 kHz steps and can carry transmissions of clear voice, secure voice, and data. A memory unit stores eight pre-set frequencies which can be scanned or switched into use and displayed on an LED readout.

AC, DC, AC/DC, or battery power supplies permit the transceiver to be used almost anywhere. The battery pack can be a self-contained rechargeable unit, or standard military throw-away battery.

Additional information about this new transceiver is available from: Motorola Government Electronics Group, P.O. Box 2606, Scottsdale, AZ 85252.



### Common Carrier Interference Notch Filter

The #4150(3)-( ) (25) notch filter reduces mutual interference between common carrier terrestrial links and other services.

Notch is 35 dB at center frequency and 3dB bandwidth is 25 MHz. Center frequency is customer specified within 5.925 to 6.525 GHz band.

SMA, type N or WR 159 waveguide flange connectors are available. Approximate size is 11" x 1 3/4" x 2 1/2".

For more information, contact Emily Bostick, Microwave Filter Co., Inc., 6743 Kinne Street, East Syracuse, NY 13057. U.S. toll-free 1-800-448-1666 (collect 315-437-3953 in NYS/CAN/HI/AK), or circle number 109 on the reader service card.



### Keyboard Programmable Two-Way Radio

Regency Electronics announced the introduction of the Regency 250, a 10 channel keyboard programmable transceiver.

The Regency 250 operates in the VHF frequency range of 134-174 MHz, with 25 watts output. Individually keyboard-programmed simplex or semi-duplex frequencies can be set with different CTCSS tones.

A special feature of the 250 is a built-in scanner with a programmable priority channel. The Regency unit has been upgraded with many modifications and performance improvements.

A late November production date has also been scheduled for the company's new 800 MHz mobile/base transceiver. Quantity production follows an extensive six month field testing program designed to ensure high quality units on the initial run.

The unit will be made at Regency's two-way radio manufacturing facility in Satellite Beach, Florida, and will be available for sale in late November. For more information, contact Regency Communications, 1227 S. Patrick Drive, Satellite Beach, FL 32937, or circle 108 on the reader service card.

### Realistic PRO-54 Patrolman® Scanning Receiver

Radio Shack now offers a way to receive police, fire, railway, mobile telephone, weather, and other frequency communications with a new 5-band, 8-channel scanning receiver—the Realistic PRO-54 Patrolman (20-123), available at participating Radio Shack stores and dealers.

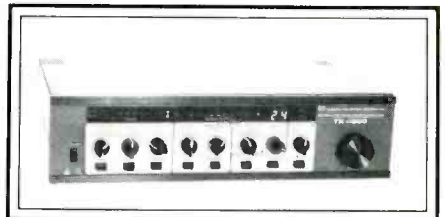
The PRO-54 automatically locks in on ac-



tive channels and resumes scanning at the end of a conversation; a two-second scan delay prevents missing return transmissions. Features include individual channel-lockout switches to temporarily bypass unwanted channels; rotary volume and squelch controls; LED channel indicators; manual/scan switch; headphone jack; telescoping antenna; and a jack for an external antenna.

The PRO-54 scans ten channels per second and has a better than 1 microvolt sensitivity (for 20 dB quieting) and selectivity of 9 kHz, -6 dB; 15 kHz, -50 dB. Five band frequency coverage includes: VHF-Lo—30-50 MHz; VHF-Ham—144-148 MHz; VHF-Hi—148-174 MHz; UHF-Lo—450-470 MHz; and UHF-Hi—470-512 MHz.

The Pro-54 measures 2-7/8" x 9-1/2" x 7-1/2" and is U.L. listed for 120 VAC at 60 Hz operation. The scanner requires up to eight crystals.



### Satellite Television Receiver

Telecom Industries Corporation introduces the new TX 4000 Satellite Television Receiver and TX 404 Downconverter. The TX 4000 is the most sophisticated satellite receiver ever developed for the home earth station market. Containing such advanced features as selectable bandwidths, variable gain, and matrix stereo, the TX 4000 is at the same time user friendly with controls grouped in Audio, Video, IF, and Tuning sections. The new patent pending TX 404 Downconverter provides dual conversion in a compact LNA mounted design. For more information, contact Telecom Industries Corporation, Marketing Services Department, 27 Bonaventura Drive, San Jose, CA 95134, or circle number 103 on the reader service card.



### 'Phone Stuff

Kraco's new compact, slimline cordless telephone system (top photo) is a multi-featured unit that fits anywhere in the home and provides a remote range up to 700 ft. Handset features include auto redial, mute and slide volume controls, and built-in rechargeable circuitry. Base features LED on, charging, secure and in-use indicators. Suggested retail is \$149.95.

Kraco's new deluxe cordless telephone system (bottom photo) is unique in that it has a built-in speaker phone with separate 12-button dial pad on the base—providing two phones in one unit. Full-featured portable handset, with remote range up to 700 ft., has LCD clock, elapsed call timer, number dialed readout, built-in rechargeable circuitry, auto redial among many others. Suggested retail is \$229.95. For information, contact Kraco Enterprises Inc., 505 East Euclid Ave., Compton, CA 90224, or circle number 101 on the reader service card.



### New Portable Emergency Radio

General Electric's Audio Electronics Products Department has announced the introduction of HELP 2, the world's smallest emergency portable 27 MHz radio.

HELP 2 is a super compact portable, full power 27 MHz radio designed to match to-

day's downsized automotive trends without losing the power and performance necessary for distant, survival, and emergency communications.

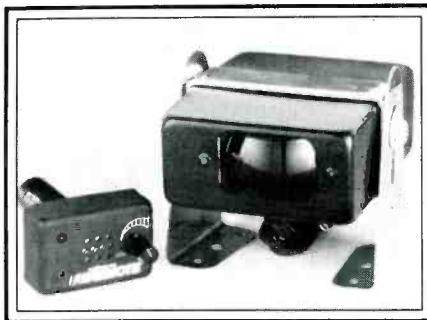
General Electric pioneered the portable 27 MHz concept for the car with the introduction of HELP! in May 1980.

HELP 2 is easy to operate, easy to store, and features full channel AM performance. The new sleek configuration is actually 73 percent smaller than the original HELP!—small enough to fit into most auto glove compartments or under car seats.

HELP 2 comes complete in a fully contained rugged carry case with a full performance 4 watt, 40 channel transceiver, a uniquely designed magnetic mount collapsible whip antenna, and a cigarette lighter power adapter. The unit's easy-to-use styling allows for one-hand and even one-finger operation.

Other features include: Phase Lock Loop (PLL) circuitry plus electronic scanning for easy channel selection with a 10mm LED channel readout, instant channel 9 recall button for instant access in emergencies, a four segment TX/RX (transmit/receive) meter to measure receiving signal strength and relative modulation levels, built-in sensitive condenser microphone, and built-in Automatic Noise Limiter (ANL).

Handsomely styled in black, red, and silver, the unit weighs less than one pound. GE's new HELP 2, model 3-5910, has a manufacturer's suggested retail value of \$99.99. For more information, circle number 106 on the reader service card.



### Wireless, Remote Radar Detector

The Fuzzbuster Remote Wireless radar detector has been added to the line of Fuzzbuster products. Electrolert has designed the new unit to be simple to install in almost any foreign or domestic automobile.

The remote portion fits behind the grill with only two necessary connections—grounding and power.

The interior radar alarm panel can be used two ways; either plug the unit directly into the cigarette plug, or use the cigarette adaptor plug that comes with the unit. The adaptor plug can be used if the driver wishes to place the radar alarm panel elsewhere around or under the dashboard.

There are no connections or cables between the remote package and the radar alarm panel, eliminating any drilling or routing of wire through the firewall.

The Fuzzbuster Remote utilizes dielectrically coupled wave guide technology that provides optimum protection against all types of radar.

The new unit has a volume control knob so the audio warning can be adjusted to the desired level.

A warning indicator light allows visual verification of radar.

The Fuzzbuster Remote's power indicator light illuminates when unit is in operation.

For information write: Bruce Garfield, Director of Marketing, Electrolert, Inc., 4949 South 25A, Tipp City, OH 45371, or circle number 105 on the reader service card.



### Pleasant Phone Ringer

A Pleasant Phone Ringer kit, Model GT-1218, is available to replace the sometimes unpleasant and monotonous ring of a conventional telephone bell. Heath Company, the world's leading manufacturer of high-tech electronics in kit form, is offering the device, which is activated by an incoming call and will play one of four tunes or tones the user can select or change at any time.

The pre-programmed integrated circuit in this one-evening kit is a true polyphonic synthesizer and alerts the owner of phone calls in one of four ways: a beeping signal, an upbeat four-note chime, ten seconds of Beethoven's "Für Elise" or 20 seconds of "Romance" by Rubinstein.

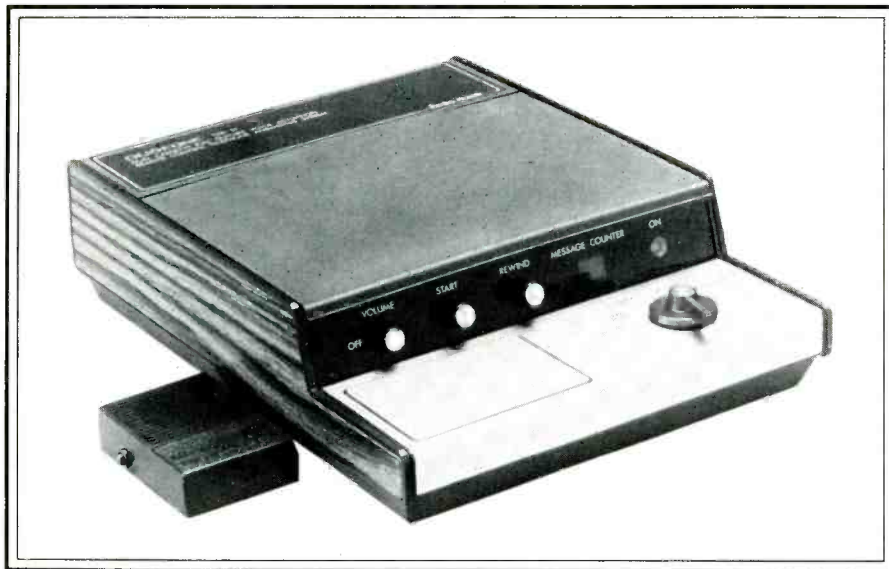
A pushbutton switch lets the user choose either the standard telephone bell, or one of the four pleasant signals from the Phone Ringer, which are selected by jumping a small wire to separate sockets on the internal circuit board. Housed in a beige snap-together case (5 7/8"H x 4 3/4"W x 1 1/4"D) with an internal speaker, the Pleasant Phone Ringer includes two connector leads for remote speakers, a variable volume control, modular phone plug with six feet of cable, and keyhole slots in the caseback to facilitate wall mounting.

The Pleasant Phone Ringer installs between any modular telephone outlet and a modular telephone set (except wall mount set). It is powered up to a year by two 'C' cell alkaline batteries and is approved by the FCC for direct line connection.

For information, contact Heath Company, Benton Harbor, MI 49022, or circle number 102 on the reader service card.

## NEW AND EXCITING TELEPHONE TECHNOLOGY

### Sampling Telephone Answering Machines



The DUōFONE TAD-31 from Radio Shack is only one of the various telephone answering systems available.

**“H**ello, this is John Smith, and although it sounds like I’m here, I’m really not. You are listening to my telephone answering machine . . .”

Telephone answering devices are the latest rage, and computer technology now allows us some fantastic options when selecting telephone answering equipment. However, not all of these “extras” may be useful, and you may be paying too much for a fancy device that may be “overkill” for your home phone system. Conversely, if you are planning on purchasing a telephone answering machine for your business phone setup, you may wish to spend top dollar and get a device with the most features.

#### In The Beginning

Early model telephone answering machines did their job well, but were less than refined. Outgoing messages usually sounded like they were recorded in a barrel. Someone calling your phone would instantly detect a pre-recorded message, and many times hang up. The early machines gave little latitude on how you recorded your outgoing message. If you talked too long, you exceeded the tape limit. If you didn’t talk long enough, an agonizing wait by the caller would take place prior to the beep tone.

On those early machines, the beep tone signaling when to leave a message sounded similar to a wounded mongoose. The signal tone was usually so terrible that few callers would go ahead and leave a message!

Messages left were also hard to retrieve unless you had a lot of time on your hands to sift through the dial tones recorded by those who simply hung up on your electronic genius. Let’s face it, those first generation telephone answering machines were electronic bears to work with. Although they got the job done, they did not do it with much style.

The outgoing messages that most users would leave were also deplorable. The advent of prerecorded outgoing messages helped considerably. Instead of reaching the party you were calling, you might end up with a John Wayne sounding voice telling you, *podner*, to leave your message or else!

#### New Technology Adds Class

Within the last three years, the microprocessor LSI (large scale integrated) circuit has revolutionized these telephone answering machines. When you reach a telephone answering machine nowadays, you may not even know you aren’t talking to a person.

“Hi, this is John Doe, and thanks for calling. Wait just a moment. Before I let you tell me who you are, let me have you say a few words; leave your name and message, and I promise I’ll get right back. You can then decide whether you have reached me in person, or whether I’m really on Memorex™!”

Let’s take a look at some of the features that we might choose in selecting an answer-telephone for ourselves or for a business. Remember, even though answer-telephones are priced extremely low, the more goodies

and features on the device, the higher the price tag. Here we go!

#### Basic Features

There are some basic features that you should look for when selecting a telephone answering machine. You should be able to listen to the incoming message from across the room without having to pick up the phone. If it’s someone you want to talk to, pick up the phone and you are connected. If you want to call them back later, let them leave their message and phone number.

Fast forward and fast rewind for message retrieval is handy to help sift through the many calls you may have received. This lets you pick up messages quickly without having to listen to every word.

An easy way of programming your outgoing message is also important. Built-in microphones are okay, but hand-held microphones tend to give you better clarity. Some sort of timer that lets you know how long you can talk for your outgoing message is also handy. A little something may let you know that you only have five more seconds to wind up your outgoing recorded message.

Some systems have separate changeable tape cassettes for outgoing messages. This is handy when you want to switch from your weekday message to your weekend message. Instead of having to rerecord over the first outgoing message, you simply slip in your alternate tape. You can also toss in one of those fancy prerecorded tapes and have a simulated movie star’s voice tell the calling party to leave their message.

Other niceties found on your regular everyday telephone answering machine might be a single control knob for easy operation, volume control which enables you secretly listen to messages left without anyone else being able to hear who said what, and pleasant-sounding beep tones to signal when the caller is to talk, and when they have talked too much.

#### Remote Message Retrieval

Here’s an extra feature that will cost a bit more money. However, it’s well worth it. No matter where you are, you can call your own telephone number and command your answering machine to play out all the messages. There are varying degrees of sophistication on these remote message retrieval systems.

The inexpensive units will allow you to dial your phone number and retrieve the messages as they were left on the tape. If someone hung up, you listen to several seconds of dial tone.

More sophisticated remotes operate off of the touch pad of the telephone you are using to call home. Instead of a remote beeper to hold up to the telephone mouthpiece, you simply key enter some numbers on the pay telephone and presto, your machine goes to work, playing back recorded messages.

Even more sophisticated remote units and companion telephone answering machines allow you to know how many messages you have received before it answers your call and costs you money. If there were no messages, hang up to save toll charges and time. You can even play back all your messages, or just the newest ones. You can even erase messages remotely, too, with the more sophisticated systems. It's recommended that business users have the most sophisticated remote systems around for call retrievals. On non-critical phone calls to your house, a simple remote beeper system may be fine—especially if you don't call in long distance.

### Even More Features

The more expensive telephone answering machines may use voice activation circuits for incoming and outgoing calls. If your incoming message is a short one, only a small amount of tape is used up. If the person leaves a five minute message, they are not cut off. As long as someone is talking, the machine keeps working. These circuits are also smart enough to recognize the steady drone of a dial tone and will not record this dial tone as an incoming message.

Better telephone answering devices have selectable ring pickup times. If you want to catch 'em on the first ring, you have it. However, you may want at least five rings to go by before your machine jumps into action. Some machines also tell you how many messages you have, by how many times they ring before they come up on line.

Other neat features found in more expensive answering machines are message numbers, telling you how many people called today. They can also announce to the calling party that there is no room left on your cassette to leave a message.

Some telephone answering machines actually have a built-in telephone with handset. This means you only have one apparatus on your desk—not two. Some of the handsets are even cordless! Some of the answering machines also double as a professional tape recorder. They may record messages within the room, or over the telephone lines in accordance with FCC telephone recording procedures.

### Installation

There is little to installing these devices. Simply unplug your present phone plug from the modular jack, plug in the equipment, and plug your telephone back into the equipment or into a second receptacle on the phone jack. Now, record your outgoing message, set up your machine to take incoming messages, and walk away with the confidence that you won't miss a single call.

Put some fun into recording your outgo-

ing messages, and you will increase the number of messages left on your machine. Dull monotone outgoing messages with huge time gaps between your last words and the moment the beep goes off will usually result in nothing but a dial tone. Put some zip into your messages, and everyone will want to leave a message back. Make it fun sounding, and fun for the caller to speak into your piece of electronics.

Telephone answering machines also provide some degree of security. Burglars will never know whether you are home or simply not taking phone calls.

Be careful not to announce that you are away on a trip and no one is at the house to take the phone call and leave a message. This is only inviting someone to come on over and snatch up all of your electronics. Rather, tell them that you will be unavailable to actually talk over the telephone—be mysterious and no one will realize that you have actually left town.

Telephone answering machine have never been more sophisticated. They work flawlessly and give crystal-clear messages. If you are not able to take incoming phone calls, they are the perfect answer.

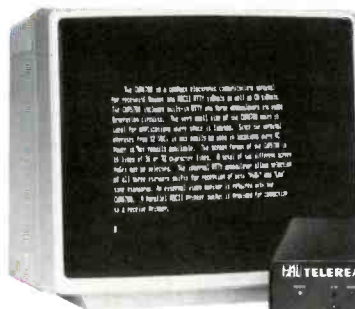
## PRINT THE WORLD

Stay in touch with world events, monitor weather, ship traffic, news, and radio amateurs. Connect to your receiver external speaker jack and display shortwave radio teleprinter and Morse code transmissions. Two models for the shortwave listener—the "deluxe" CT2100 and the compact CWR6700.



CT2100

- Baudot or ASCII RTTY—45 to 1200 baud
- 5-100 WPM Morse Code
- 4 RTTY Demodulators
- Receives High Tones, Low Tones, 103, and 202 Modem Tones
- 2 or 4 Page Video Display—72 or 36 Characters per Line
- ASCII Printer Output
- RS2100 Accessory RTTY Tuning Scope
- 120 or 240 VAC, 50/60 Hz Power
- KB2100 Keyboard Available for Transmit
- Requires External Video Monitor (KG12NU Shown)



CWR6700

- Baudot or ASCII RTTY—45 to 300 baud
- 4-50 WPM Morse Code
- High and Low Tone RTTY Demodulators
- 72 or 36 Characters per Line
- 2 Page Video Display
- ASCII Printer Output
- 12 VDC, 0.8 Amp Power Input
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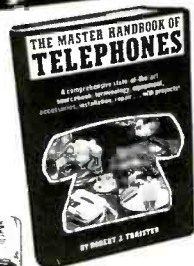
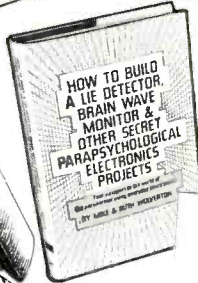
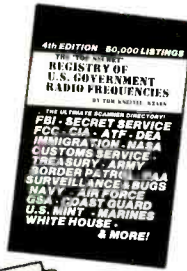
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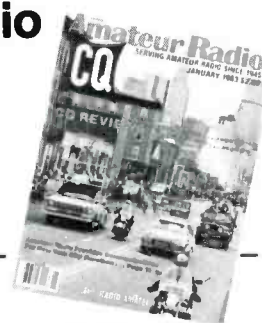
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## Beaming In (from page 4)

beyond with his experiments, I must say that I've thusfar not been convinced of his success; assuming, of course, that there is actually a basis for believing that such communications *might* be possible or even desirable. One of the snags in trying to buy Meek's experiments is that they won't work unless the operator of the SPIRICOM has "certain highly psychic abilities." Another glitch is the major factor that Meek's experiments were done under the most unscientific and uncontrolled conditions imaginable, and are totally unverified and unduplicated by others. Moreover, there are various factors concerning the entire series of communications that several of those who have attempted to analyze the SPIRICOM tests believe raise more questions about the validity of the claimed results than they sought to answer in the first place. I've got an open mind on the subject.

All of the hullabaloo over Meek's announcement and the coverage it has received in the media caused me to look back more than a decade. When the magazine *Electronics Illustrated* was in publication, its editor decided to run some stories on various forms of communications. Yours truly, being the resident nonconformist on *EI*'s staff, was promptly handed a Ouija Board and instructed to write a feature story on communicating with the "other side." I thought they were kidding, but they were quite serious. In fact, they were *deadly* serious. (Sorry 'bout that).

I tinkered with the Ouija Board off and on for a few months, with results that ranged from disappointing to humorous, bizarre to reasonably interesting. I hadn't written the story for *EI* and really was sort of hoping they'd forgotten the story assignment. They hadn't. Eventually, the Editor, Bob Beason, began pressuring me to turn in the manuscript for publication. I put together some of the materials I had assembled, including a few transcripts, and worked it all into the story they wanted. Were they really going to run it? I had my doubts until I saw the November, 1970 issue on the newsstands. Yup, they ran it; didn't change a word I submitted to them.

Interestingly, that one story produced more mail from readers than just about anything I had ever written for *EI*, and I had a monthly column in the magazine that ran for almost ten years! Readers were sending me their own Ouija Board experiences—both good and bad. One guy asked me if I could ring up his grandpappy to find out where the family gold was hidden; a major university wanted me to give a lecture on my experiences; and no less than three radio talk shows invited me to appear to discuss these communications (or whatever they were). I received a number of letters from devoted readers who feared for my "psychic and spiritual safety," having become convinced that I had been lured into the clutches of vari-

ous demonic forces which, they claimed, "are the only ones you can get on a Ouija Board." It also landed my name on the mailing lists of countless groups and organizations of folks using one method or another to try to reach the "other side." I'm still getting mail from some of these groups as the fallout from *that* story, which appeared more than 12 years ago! Parker Brothers must have sold an extra thousand Ouija Boards in November of 1970 and some say (jokingly, *I hope*) that the FCC was considering a way to issue licenses for this new band, while no less than two radio manufacturers were trying to rush transceivers onto the market. For a time there I thought I was going to become the modern day answer to Madame Blavatsky.

All in all, it made me realize that this whole communications with the "other side" thing is quite a bit more of a popular and volatile topic than I had at first imagined. It is surrounded by a curious melange of swamis, gurus, mediums, hoaxers (and the hoaxed), crackpots, those who sincerely feel that it offers real dangers, and also those who think that such communications might be both worthwhile and beneficial. Beneath this high profile periphery, nevertheless, are serious scientific researchers who are exploring the possibilities of establishing such communications, or at least trying to determine if there is any valid reason to feel that such communications could take place—if there is, in fact, "anybody there" with whom to communicate. Still open for discussion is what possible benefits might be achieved by those who achieve such communication, other than the basic fact of establishing such a contact. Some have speculated upon the potentials it might offer for historic, religious, military, espionage, artistic, intellectual, and even crime detection information to pour forth. Others see it as tampering in areas that might best be left untapped, fearing the unleashing of terrifying forces that could offer misleading and incorrect "revelations" or, at the very worst, provide a pathway for entities which would somehow do all of us in.

Spooky? Well, maybe! At its best, it does at least have the potential to answer the question if anybody is "there" (wherever or whatever "there" might be). Does it scare me? I am frightened by people on the New York City subways. I'm afraid of drivers on the Hollywood Freeway. I'm afraid of people who look at me funny in the next lane on the highways. Fear of disembodied voices coming over a radio receiver has never been my bag. Personally, I think we've probably all got a lot more to fear from the ecological disaster we are making of our environment than we do from the possible manifestation of "voices from the beyond."

Anyway, I've still got my FM broadcast receiver tuned to 100 MHz listening for E. T. to call home (per my comments in the October, 1982 issue), and now I'm also tuned up on 29.600 MHz to await any messages that might be coming through from Emperor Charlemagne, Edison, Houdini, or even Judge Crater. If I hear anybody worthwhile, I'll let you know.



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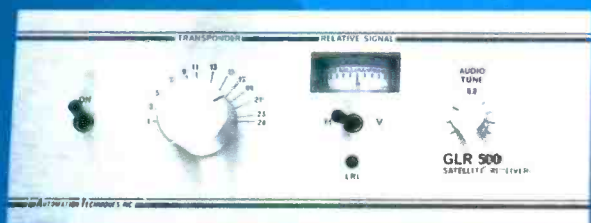
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DOC . . . . .	31
DX Communications . . . . .	67
Digital Electronic Systems . . . . .	63
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Electronic Discounters . . . . .	47
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Tennessee Electronics . . . . .	24
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Universal Communications . . . . .	73
Universal Electronics . . . . .	75
Z-Tech . . . . .	35, 43

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