

ICD-086 3E

# POPULAR COMMUNICATIONS

FEBRUARY 1983 \$1.75

**The Amazing Goat Gland Radio Station • Scanning Sports Events • Hear These Mini-Broadcasters! • 24 Hour English Language SW Schedules • View The Army's Satellite Broadcasts • DX'ing Satellites**



**Get In On Uncle Sam's Hi-Tech Electronics**



# 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.

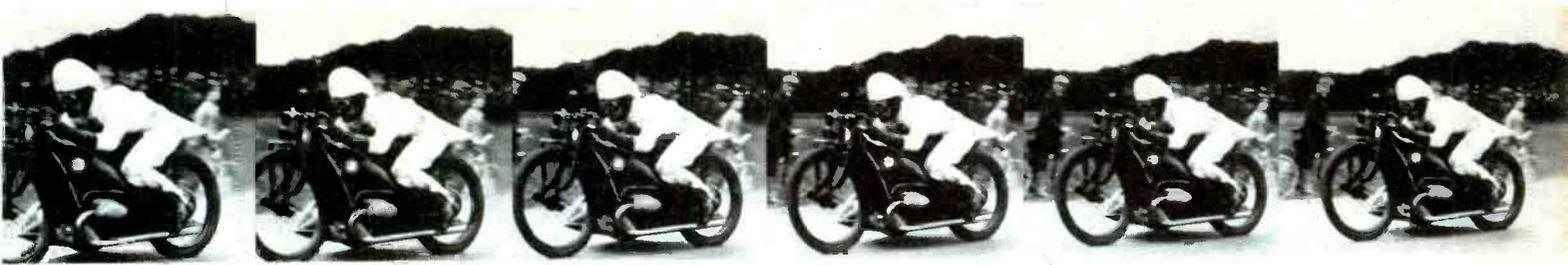
## PRICE

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

CIRCLE 75 ON READER SERVICE CARD

 **ICOM**  
The World System

ICOM America, Inc., 2112-116th Ave NE, Bellevue, WA 98004 (206)454-8155/3331 Towerwood Drive, Suite 307, Dallas, TX 75234 (214)620-2780.  
All stated specifications are approximate and subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions.



# INTRODUCING THE LATEST HEIR TO 59 YEARS OF GERMAN ENGINEERING.

While the fine lines and sculpted features of most sport bikes spring from the drawing tables of stylists, those of the BMW R65LS had a different birthplace.

The drafting tables of German engineers.

As a result, they are the recipients of the same pragmatic consideration and evolutionary refinement as the legendary engine that powers this 650cc machine.

The shapely sport fairing, for example, provides much more than cosmetic appeal. It helps reduce front-wheel lift by over 30%.

The LS handlebars are low, compact, and help to provide a seating position that "is sporting in a way that Japanese bikes, even with red paint, have not discovered" (Cycle World). (High bars are also available.)

The bike's slender tail,

artful as it too appears, was created in one of the most aesthetically indifferent environments known to man: the massive BMW wind tunnel! in Ismaning, Germany.

Even the wheels of the LS possess a beauty that goes far deeper than their gleaming enamel. Each rim section is made of a highly rigid aluminum alloy; each hub and spoke assembly is separately cast from a far more elastic aluminum alloy to provide added flexibility. And then everything—hubs, spokes and rims—is cast as

a single unit. Culminating in an exceedingly resilient "composite" wheel that not only helps

increase handling prowess but decreases unsprung weight.

In the end, the BMW R65LS is one sports bike whose graceful lines do not serve as camouflage for weak engineering. For it is a machine as adept at slicing through the wind and rounding corners as it is at turning heads.

Its price? A lofty \$3,790\*

But as a motorcycle columnist of AutoWeek observed, "a bad motorcycle is worthless; a good motorcycle is worth whatever it costs... By that standard, the R65LS is a bargain."

\*Manufacturer's suggested retail price. \$3,790. Actual price will depend upon dealer. Price excludes state and local taxes, dealer prep, destination and handling charges. © 1982 BMW of North America, Inc. The BMW trademark and logo are registered trademarks of Bayerische Motoren Werke, A.G.

## THE LEGENDARY MOTORCYCLES OF GERMANY.



CIRCLE 151 ON READER SERVICE CARD



# Moto-trak



Your key to ALL the satellites, ALL the programming, right from the comfort of your easy chair.

Satellite television offers so much to explore. Why settle for the one-satellite limitation of fixed dishes, or endless cranking at the dish in all kinds of weather? Enjoy all the convenience KLM's Moto-trak system has to offer . . .

- 12 automatic satellite selections at the twist of a dial
- Fully independent Azimuth and Elevation control, to search or optimize
- Spot LED "travel" indicators
- Constant LED Azimuth/Elevation readout
- Polarity Control, for all channels, horizontal and vertical
- 12' solid aluminum dish or 16' screened dish for a perfect picture

And, enjoy the reliability of a motorized mount that's precision engineered from the ground up. Not an afterthought or a flimsy add-on, KLM's Moto-trak uses industrial quality reduction motors, gear, and screw drives, state-of-the-art motor control electronics.

Best of all, the Moto-trak system is a perfect match for KLM's reliable SKY EYE II and new SR-3 Satellite Receivers. Complete systems are available NOW. Once again, more of the performance, features, convenience, and reliability you've come to expect from KLM.

**KLM**  
P.O. Box 816, Morgan Hill, CA 95037  
(408)779-7363

CIRCLE 27 ON READER SERVICE CARD

Send for KLM's  
**SITE SURVEY KIT**  
AZ-EL Tester, Manual,  
Sat-Coordinates \$29.95

# SR-3

(The one you've been waiting for!)



The SR-3 Satellite Receiver . . . once again, more of the performance, features, and convenience you've come to expect from KLM. Handsomely styled cabinet outside, state-of-the-art single conversion circuitry inside. Install the SR-3 up to 1000 feet from the dish; a single 50 ohm feedline makes it clean and easy. Select KLM's separate remote downconverter or the revolutionary "Ampliverter" that combines LNA and downconverter in one very compact package. And, enjoy these easy-to-look-at/easy-to-use features:

- Rapid "SCAN" for easy satellite tracking
- LED signal strength readout
- Positive detent channel tuning plus fine tune
- Full audio tuning/stereo version available
- Video inversion

The SR-3 with remote downconverter or Ampliverter is available NOW, just like KLM's new motorized dish systems with remote "Moto-Trak" control. More of the best from KLM.

**KLM**  
P.O. Box 816, Morgan Hill, CA 95037  
(408) 779-7363

CIRCLE 35 ON READER SERVICE CARD

# Why use other computer media when you could be using MEMOREX high quality error free media?

## Free Memorex Mini-Disc Offer - Get free discs!

You'll save money when you buy Memorex, because every carton of 10 Memorex 5 1/4 inch mini-discs sold by Communications Electronics has a coupon good for a free Memorex mini-disc. For every case of 100 Memorex mini-discs you buy from CE, you'll get 10 free Memorex mini-discs, directly from Memorex. The more you order, the more you save. Offer expires December 31, 1982. All Memorex flexible discs sold by CE are of the highest quality, certified 100% error free and backed by a full one year factory warranty.

## Flexible Disc Quantity Discounts Available

Memorex Flexible Discs are packed 10 discs to a carton and 10 cartons to a case. Please order only in increments of 100 units for quantity 100 pricing. We are also willing to accommodate your smaller orders. Quantities less than 100 units are available in increments of 10 units at a 10% surcharge. **Quantity discounts** are also available. Order 500 or more discs at the same time and deduct 1%; 1,000 or more saves you 2%; 2,000 or more saves you 3%; 5,000 or more saves you 4%; 10,000 or more saves you 5%; 25,000 or more saves you 6%; 50,000 or more saves you 7% and 100,000 or more discs earns you an 8% discount off our super low quantity 100 price. Almost all Memorex Flexible Discs are immediately available from CE. Our warehouse facilities are equipped to help us get you the quality product you need, when you need it. If you need further assistance to find the flexible disc that's right for you, call the Memorex flexible disc compatibility hotline. Dial toll-free 800-538-8080 and ask for the *flexible disc hotline* extension 0997. In California dial 800-672-3525 extension 0997. Outside the U.S.A. dial 408-987-0997 between 9 AM to 4 PM Pacific Time.

### SAVE ON MEMOREX FLEXIBLE DISCS

Product Description	Part #	CE quant. 100 price per disc (\$)
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8" SSSD Shugart Compatible, 32 Hard Sector	3015	2.09
8" SSSD CPT 8000 Compatible, Soft Sector	3045	2.99
8" SSDD IBM Compatible (128 B/S, 26 Sectors)	3090	2.74
8" SSDD Soft Sector (Unformatted)	3102	3.34
8" DSDD Soft Sector (128 B/S, 26 Sectors)	3115	3.34
8" DSDD Soft Sector (256 B/S, 26 Sectors)	3103	3.34
8" DSDD Soft Sector (512 B/S, 15 Sectors)	3114	3.34
8" DSDD Soft Sector (1024 B/S, 8 Sectors)	3104	3.34
5 1/4" SSDD Soft Sector w/Hub Ring	3481	2.34
5 1/4" SSDD 10 Hard Sector w/Hub Ring	3483	2.34
5 1/4" SSDD 16 Hard Sector w/Hub Ring	3485	2.34
5 1/4" DSDD Soft Sector w/Hub Ring	3491	3.09
5 1/4" DSDD 10 Hard Sector w/Hub Ring	3493	3.09
5 1/4" DSDD 16 Hard Sector w/Hub Ring	3495	3.09
5 1/4" SSQD Soft Sector w/Hub Ring (96 TPI)	3504	2.99
5 1/4" DSQD Soft Sector w/Hub Ring (96 TPI)	3501	3.99

SSSD = Single Sided Single Density; SSDD = Single Sided Double Density; DSDD = Double Sided Double Density; SSQD = Single Sided Quad Density; DSQD = Double Sided Quad Density; TPI = Tracks per inch.

## Special offer on Memorex computer tape.

If you mail your order to us and enclose prepayment, deduct \$1.00 per reel from our quantity 100 prices. This means Memorex 25JW can be as low as \$12.99 in 100 quantities. Memorex Computer Tapes are packed 10 tapes to a carton. Please order only in increments of 100 units for quantity 100 pricing. Quantities less than 100 units are available in increments of 10 units at a 10% surcharge. **Quantity discounts** are also available. Order 500 or more tapes at the same time and deduct 1%; 1,000 or more saves you 2%; 2,000 or more saves you 3%; 3,000 or more saves you 4%; 4,000 or more saves you 5% and 5,000 or more tapes earns you a 6% discount off our super low quantity 100 price. If you need further assistance or information to find the tape that's right for you, call the Memorex Computer Tape Technical Support Group at (408) 987-2937.

### SAVE ON MEMOREX COMPUTER TAPE

Product Description	Part #	CE quant. 100 price per reel (\$)
Memorex IV 2400 feet Wrightline Seal	25JW	13.99
Memorex IV 2400 feet Easy Load II Cartridge	25JR	14.99
Memorex IV 1200 feet Wrightline Seal	25FW	10.65
Memorex Quantum 2400 feet Wrightline Seal	27JW	16.20
Memorex Quantum 2400 feet Easy Load II Cart.	27JR	16.99
Memorex Quantum 1200 feet Wrightline Seal	27FW	12.50
Memorex Cubic HD 2400 feet Wrightline Seal	39JW	18.99
Memorex Cubic HD 2400 feet Easy Load II	39JR	19.99
Memorex Cubic HD 1200 feet Wrightline Seal	39FW	13.99

## New Memorex Lifetime Rigid Disc Pack Product Warranty

All Memorex disc packs sold by CE have a lifetime product warranty. This is your assurance that Memorex disc packs will give you a lifetime of performance and service. Only Memorex can offer you the superior reliability of their exclusive M Formula. In addition, Memorex will assist the original user in isolating and correcting any technical issues that relate to the Memorex product as well as, when appropriate, replace up to one set of read/write heads. If you need further information to find the rigid disc that's right for you, call the Memorex rigid disc compatibility hotline. Dial toll-free 800-538-8080 and ask for the *rigid disc hotline* extension 1642. In California dial 800-672-3525 extension 1642. Outside the U.S.A. dial 408-987-1642.

### SAVE ON MEMOREX RIGID DISC PACKS

Product Description	Part #	CE quant. one price per pack (\$)
Mark III 5 MB. Cartridge Front Load (8 to 32 Sect.)	95-522XX-03	65.00
Top Load (1-to 24 sectors)	94-522XX-03	70.00
CMD-16 "Phoenix Type" CDC Cartridge	98-26600-31	160.00
NCR Cartridge	98-26600-32	160.00
Mark VIII 80 MB. Error Free	72-16600-03	330.00
Flag Free	72-26600-03	320.00
Mark XI 200 MB. Error Free	03-35041	720.00
Flag Free	03-35031-02	560.00
DEC Flag Free	03-35031-03	560.00
Mark XII 200 MB. NCR/CDC Flag Free	03-39001-01	515.00
Honeywell Flag Free	03-39000-01	515.00
Mark XIII 300 MB. Error Free	03-47021	795.00
Flag Free	03-47009	670.00
Mark XIV 80 MB. Unformatted Error Free	74-16600-03	365.00
Flag Free	74-26600-03	300.00
Honeywell Format Flag Free	74-26600-08	315.00
CDC Format Flag Free	74-26600-09	315.00
Mark XV 300 MB. Error Free	03-49011	825.00
Flag Free	03-49001-01	725.00

## Smith-Corona TP-1 Letter Quality Printer Special Offer

Buy any Memorex product on this page, and get a Smith-Corona TP-1 letter quality printer for only \$585.00 plus \$20.00 shipping. Specify serial or parallel version.

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To get the fastest delivery from CE of your Memorex computer products, send or phone your order directly to our Computer Products Division. Be sure to calculate your price using the CE prices in this ad. Michigan residents please add 4% sales tax. Written purchase orders are accepted from approved government agencies and most well rated firms at a 30% surcharge for net 30 billing. All sales are subject to availability, acceptance and verification. All sales are final. Prices, terms and specifications are subject to change without notice. Out of stock items will be placed on backorder automatically unless CE is instructed differently. Minimum *prepaid* order \$50.00. Minimum *purchase order* \$200.00. International orders are invited with a \$20.00 surcharge for special handling in addition to shipping charges. All shipments are F.O.B. Ann Arbor, Michigan. No COD's please. Non-certified and foreign checks require bank clearance.

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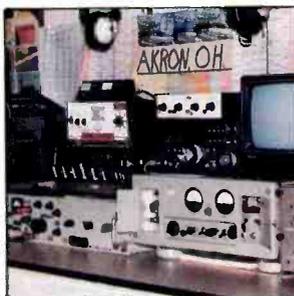
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# POPULAR COMMUNICATIONS

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*This month's cover:* Photographer Larry Mulvihill took this photo in the warehouse of Leed's Radio Co., Inc. in New York City. Leed's employee Jaime Cuevas displays some of the interesting military surplus electronics equipment now available to the public, as noted in our story on page 8 in this issue.

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# BEAMING IN

## AN EDITORIAL

**R**esponse to *POP'COMM* has really been great. We've made many new friends, gotten lots of mail, and lined up some exciting stories from experts in various fields who have come forth and made themselves known. Many readers have, in one form or another, stated that *POP'COMM* is an idea whose time has come; that's what we thought too when we set about bringing out the first issue last September.

A recurring sentiment expressed by many *POP'COMM* readers is the thought that being interested in DX'ing on a communications receiver or owning a scanner is a full fledged hobby within itself. We agree! For some curious and not fully understood reason, folks into monitoring seem to have traditionally been regarded as persons who are temporarily engaged in such pursuits while studying for (or waiting for) a Ham ticket, or are those who would otherwise be licensed Amateur Radio Operators if they could only get enough smarts together to obtain the license. While it's a fact that many do start out in monitoring and then decide that they want to also become licensed as Amateurs, it's also true that many who started out in Amateur Radio come to monitoring after they've obtained a Ham ticket. Fact is that neither hobby is necessarily a stepping stone to the other and lots of those engaged in either hobby never catch the bug for the other endeavor. For our part, we here at *POP'COMM* endorse the concept of giving the hobby of monitoring its rightful identity as an exciting and fully self-contained pursuit which fits very well with other communications interests, but isn't the step-brother to any of them.

Lots of mail has come in relating to *POP'COMM*'s "Free Radio Focus" column and our coverage of pirate and unlicensed radio in general. This mail runs heavily *pro* and heavily *con*. Those who like the in-depth coverage say that it's long overdue in a national publication. Those who don't like it claim that *POP'COMM* is endorsing the practice. Our position is that pirate broadcasting is a fact of life, it's nothing at all new (dating back to the 1920's and continuing through to the present). In fact, these days it's more in evidence than ever before. By ignoring it and pretending that it doesn't exist, *POP'COMM* will not make it go away. We are a news medium reporting on the current scene; we assume that our readers are seeking a publication that reports on which stations can be monitored on their equipment. The fact of whether or not a station is licensed does not bear upon its suitability to be monitored; indeed, some of the more interesting stations to be heard have been unlicensed—Radio Swan/Americas, Radio Free

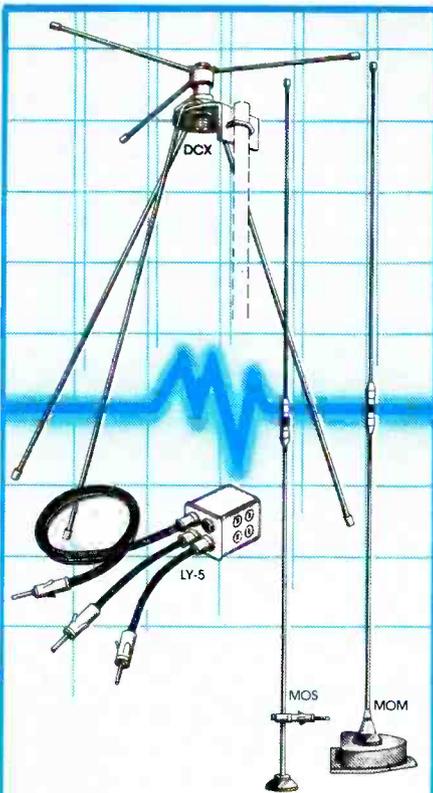
Hungary, ex-XERA, NTS Radio Free Russia, and the rest.

It boils down to running everything available about unlicensed operations, or declaring some unlicensed stations to be suitable for publication and others unsuitable, or completely eliminating any discussion of such operations. If we decided to selectively cover unlicensed stations, what criteria would be used? We decided to present all of the information we have available and leave it to the judgment of the readers to select what they want and ignore those they don't wish to know about or hear—that's why receivers have variable tuning! I'd like to also point out that *POP'COMM* also offers information on those unlicensed stations that have been closed down by the authorities.

As for the claim some have made that by presenting any information about unlicensed stations we are encouraging or endorsing their existence, seems to me that such a viewpoint is akin to saying that daily newspapers or the evening TV news endorses crime or war because they tell about them. Unlicensed stations have always been reported in the news media, including all Amateur Radio publications; that's why we cover these operations in *POP'COMM*, and because we are devoted to radio monitoring, we do it in depth. Certainly there is nothing illegal or unethical about monitoring these stations, even though some would prefer that you didn't know about them.

We've also had lots of mail about some of the communications frequencies we present on our pages. Overwhelmingly, readers say that these listings are a valuable part of our coverage and make each issue worthy of being kept on file for long-term reference. Interestingly, we have also received a few comments from those who are adamant about such listings, those who ask (or violently demand) that we discontinue presenting this information to our readers. One company in particular (whose frequencies were presented in a recent issue of *POP'COMM*) was somewhat bent out of shape at our listing of their communications system. Not being particularly familiar with the fact that FCC licenses are a matter of public record, they seemed to be under the impression that their communications system was the equivalent of an unlisted telephone number. They were not only astonished that we were able to obtain their frequencies, but were annoyed to see them printed on our pages and couldn't understand why anybody other than a hardened criminal might be interested in knowing

(Continued on page 74)



## HUSTLER Monitor Antennas Bring In All Of The Action

If you aren't using a Hustler Monitor Antenna, you're missing the action!

With a Hustler Discone or Mobile Tri-Band monitor antenna, your scanner will bring in every band — clearly and quietly from greater distances. And every Hustler monitor antenna meets the highest standards of quality and engineering in the industry — our own.

Our vertically-polarized DCX Discone Model covers all public service frequencies from 40 - 700 MHz. And, its unique coilless design minimizes signal loss.

Hustler's popular Monitor Match™ utilizes your car's antenna for up to five different bands. And, Hustler Tri-Band mobile antennas offer you more mounting configurations, plus the reliability of top-grade components throughout every model.

Don't miss any of the excitement. Bring it all in with a Hustler — Still the standard of performance.

**HUSTLER**

3275 North "B" Avenue  
Kissimmee, Florida 32741

An AMERICAN COMPANY

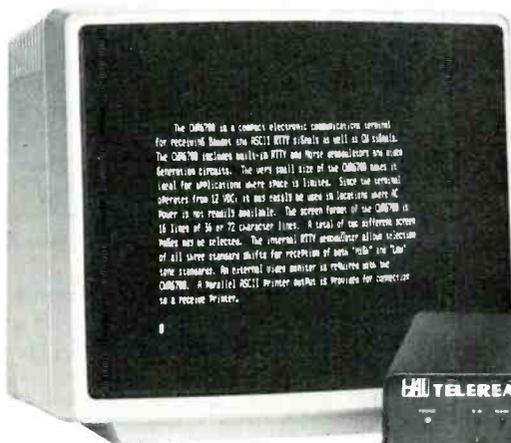
# PRINT THE WORLD

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
- Requires External Video Monitor (KG12NU Shown)

**HAL has a full line of RTTY and Morse code equipment and accessories. Write or call for our catalog. See the CT2100 and CWR6700 at your favorite HAL dealer.**



**HAL COMMUNICATIONS CORP.**

**BOX 365**

**URBANA, ILLINOIS 61801**

**217-367-7373**

# Uncle Sam's High Tech Electronics!

BY TOM KNEITEL, K2AES, EDITOR

**A \$25,000 receiver you can buy for less than \$500!  
Hobbyists, Hams, Survivalists, Guerilla Forces, & many others are gobbling them up fast! Why not you?**



Each time we find our nation involved in military hostilities there is a great rush to design and manufacture items required to take into battle. Just as sure as there are veterans at the end of these conflicts, so are there tons of used and leftover unused pieces of military surplus goods and equipment that became demilitarized. Some of it's your basic uniforms, sleeve patches, typewriters, food-stuffs, blankets, shoes, and boots—even bars of soap and mosquito netting.

It's not always the simple stuff, however. Military vehicles, scientific instruments, complex weaponry, and other sophisticated equipment is also part of the general housecleaning which takes place at the end of every military action. Electronics equipment is there too, some of it consisting of units which, only a few years before, had been considered highly classified. As soon as most of these goods become available to the public, they are gobbled up. Some of it gets shipped overseas (legally and illegally) and ends up in the hands of foreign military forces and guerillas—much of it is (quite legally) purchased by Americans for their own purposes.

After WWII, American Hams, hobbyists, and experimenters were treated to a fabu-

lous bonanza of surplus electronics. While during the war one of our top secret trinkets was the famous Norden Bomb Sight, only a few years after the war experimenters were buying these units on the surplus market at prices as low as \$25 and stripping them for their component parts—vacuum tubes, capacitors, resistors, lenses, knobs, and whatever. Other pieces of electronics had a better fate. These were military radios bearing such military names as ART-13, BC-348, ARC-5, BC-610, RBL, and dozens of others that were placed into civilian communications use by Hams, DX'ers, and others. Much of this equipment is still in use almost 40 years after it was produced; lots of it is still available from surplus dealers.

The Korean war produced a small crop of surplus electronics equipment, but it has been the recent Viet Nam War that looks like it will be generating the next motherlode of communications and electronics technology for the public. In Korea they made much use of leftover WWII gear, but by Viet Nam our technology had progressed to the point where the military was demanding newer equipment. Some of this equipment is now arriving on the military surplus market, and it's dazzling. Plenty of it hasn't yet reached

the military surplus market, but chances are that it will as time goes on.

Earlier military surplus equipment was discussed in detail in Ham publications. Books appeared on the topic (I wrote one myself), and in general there was a huge array of facts on how to make the most of earlier surplus electronics equipment. Yet, only occasional and isolated magazine stories have thus far appeared discussing the new bumper crop of surplus waiting in the wings, even though this newer equipment has high potentials for Hams, hobbyists, survivalists, paramilitary groups, and many others, many of whom are already happily using whatever has been placed on sale by surplus equipment dealers. *POP'COMM*, in this issue, will start filling the information void by itemizing the current surplus communications equipment of highest interest, and previewing the equipment that will probably be arriving at some point in the near future.

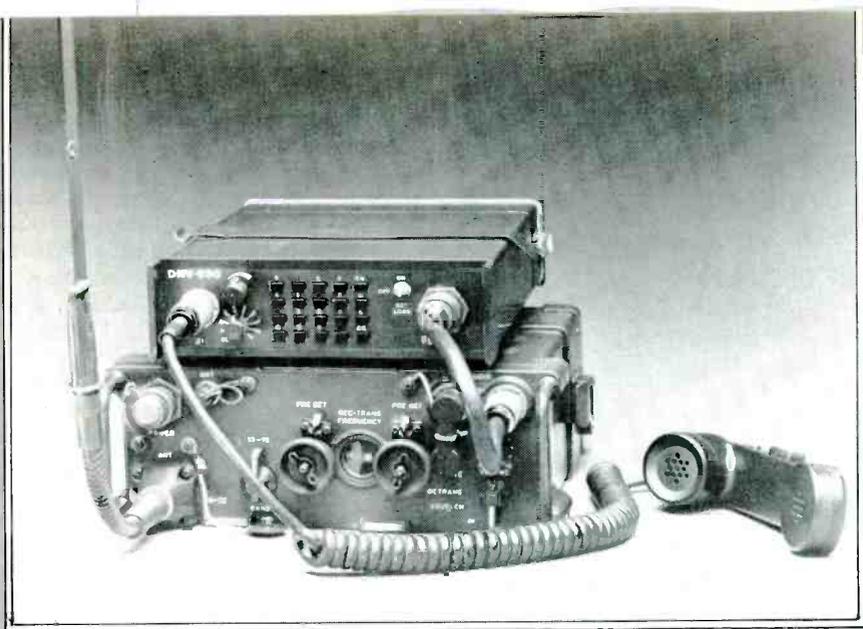
## Keep in Mind

With all of its many delights, one must keep in mind that there are significant differences between electronics equipment, which is not commercially made for the consumer, but is produced for the government's military use. With only few exceptions can it, even in new condition, be removed from the box and straightaway be placed into operation. It's good to keep this in mind so that the dream equipment you purchase doesn't turn into a nightmare.

For one thing, if the equipment has been previously used (and 80% of surplus electronics gear has been used), remember that it not only went off to war but it may well have been abused and mistreated by those who used it. Some of it is a bit grungy. Surplus dealers are generally candid in letting you know what kind of condition the equipment is in, freely using descriptive terms such as "used but in working order," "as-is but repairable," "checked and in working order," "missing components," or similar.

Assuming that a particular piece of equipment is either new or in used working condition, it must still be remembered that:

1. A lot of equipment requires operating voltages that differ from 117 VAC or 12 VDC, as required by consumer oriented equipment. Surplus gear may require 28 VDC, or 117 VAC but at 400 Hz rather than the 60 Hz in your household power mains. Or, they may require a special battery of unique size designed only for that specific unit. You may well have to use some inge-



(Left) It's not easy to pass up exotic mil surplus when it becomes available to the general public. This hobbyist, Bob, in Akron, Ohio, has a respectable assortment of these delights. Included are: R-13B, R-19, AM-914/TRC, BC-639A, R-278, AN/GRR-5, R-1121/TRC-87, AN/URR-35C, and AN/APR-4Y. (Above) Datotek's new DNV-630 voice scrambler.

nunity to power various pieces of surplus gear for your own purposes.

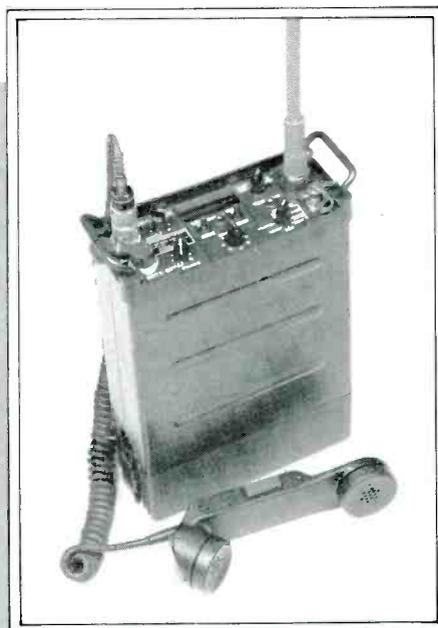
2. The connectors used on military electronics equipment are invariably types that differ from the kind you can pick up at your corner electronics store. Power, antenna, control, microphone, headset, and other connectors may have to be obtained which match up with these, or else you can change the connectors to suit your preferences. Some surplus dealers sell military connectors or you can match them up with "civilian" types made by companies such as Amphenol and others if you can obtain a cross reference of the mil types and the commercial type numbers.

3. Schematics and tech manuals aren't always available for every piece of mil surplus electronics, although many manuals do seem to be available from equipment dealers. If you can't locate adequate paperwork, you could have difficulty in operating it properly, or aligning it, or servicing it.

4. Parts and accessories for some pieces of gear are either getting scarce or cannot be located at all. This could include special i.f. components, relays, panel meters, connecting cables, etc. This is especially true for WWII and Korean War equipment, and even some more recently produced gear. In particular, equipment such as the AN/PRC-6, -8, -9, -10, AN/URC-11, AN/GRC-8, -9, -10 (all of which have been plentiful on the surplus market) may be difficult to use effectively because of component and accessory unavailability, although many persons are using them nevertheless. A flair for being resourceful is a definite asset when dealing with certain pieces of surplus.

5. With the exception of the Amateur and Experimental Radio Services, you can forget about getting a license from the FCC to operate mil surplus transmitters in the United States. In any event, aside from the

off-limits 225 to 400 MHz mil aircraft band, there are many individuals and groups using unlicensed mil surplus radios on all sorts of unauthorized frequencies and not suffering any consequences—although I don't rec-



The Harris Corp. recently designed this exotic manpack transceiver known as the AN/PRR-117. It offers anti-jamming and anti-detection type communications features and it's doubtful that it would ever be placed in the hands of the public. It operates from 30 to 90 MHz.

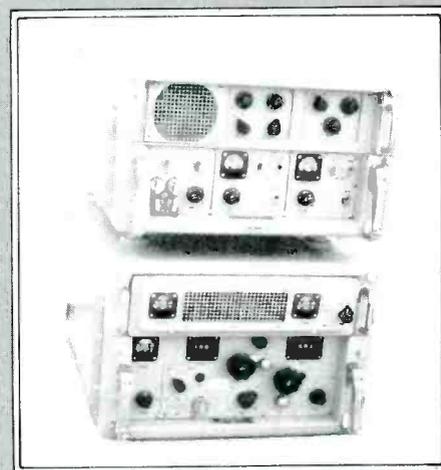
AN/PRC-6 transceiver.  
(Courtesy Fair Radio Sales)

ommend using any transmitting equipment without proper licenses.

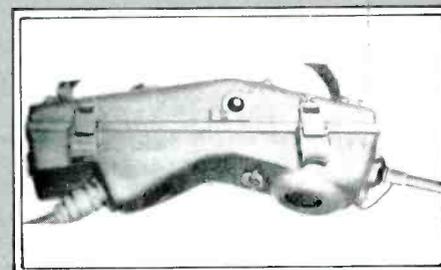
6. Some pieces of surplus equipment requires (to one extent or another) conversion work be performed to power supply, frequency determining, modulation, control, or other circuits in order to get it to do whatever it is you seek. Even with adequate schematics, bench equipment, and conversion information, such efforts are generally beyond the talents of a beginner and are best left to those with some experience in servicing. Neighborhood service shops probably won't touch such jobs.

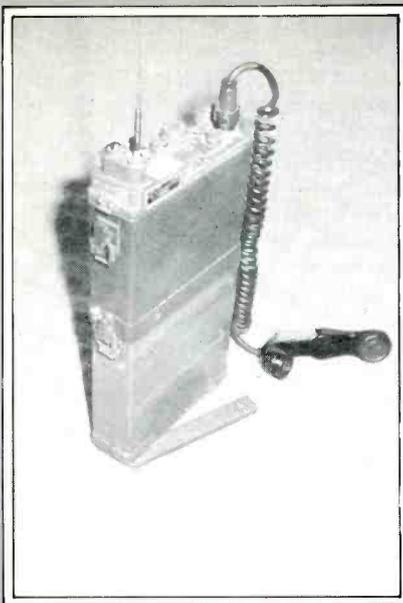
7. The best feature of mil equipment is its quality, durability, and price (as compared to its original cost or that of comparable commercial gear). The government doesn't skimp when it doesn't have to worry about cost—the AN/URC-68 costs about \$1200, the R-1121/TRC-87 about \$25,000. The equipment on the surplus market is a mere fraction of that cost. It is, nevertheless, wise to keep in mind that while Hollywood and TV show mil communications gear as some fantastic medium that surpasses all the laws of nature and physics, mil equipment is not without its definite limitations. As a mil surplus expert (and equipment dealer) candidly told me, "I would much rather sell equipment to people who have some idea of the capabilities and limitations of the equipment."

Keeping all of these things in mind, let's move ahead.



AN/FRR-59 receiver.  
(Courtesy Fair Radio Sales)





AN/PRC-8 manpack.  
(Courtesy H. Ancery's Communications)

AN/PRT-4 transmitter.  
(Courtesy Michael P. Murphy)



## Our Listings

We have assembled here an overview of some of the more interesting and/or (perhaps) useful appearing mil equipment. Some of the equipment dates back many years and is included not so much for nostalgia, but instead because it is still available on the surplus market and is currently being sought-after for communications tasks. Much of the equipment we list is Viet Nam era hardware and has not yet been seen on the surplus market, but it is mentioned in various texts and (hopefully) will be showing up as surplus in the future. This equipment is included for informational and reference purposes and gives you a capsulized view of what the equipment is and what it does. While some of these yet-unreleased sets will undoubtedly never show up as surplus, we've included them here because they are so totally fascinating.

Where equipment is generally known to be available on the surplus market, we have tried to include some idea of the price range in various conditions.

## Nomenclature

One of the first things you'll notice about mil electronics is that each piece of the stuff has been assigned a special identification code by Uncle Sam. This consists of various letters and numbers. The letters aren't random at all and are usually assigned from within the Joint Electronics Designation System. This system is shown in Table 1. These coded identifications are known as the *nomenclature* for a particular piece of equipment and they are quite informative in relating the nature and purpose of each set or its major component equipment.

All mil sets commence with the letters, "AN/." However, in our equipment listings here we have arranged the equipment in alphabetical order, ignoring the "AN/" component of the JEDS designation. Thus, the R-108/GRC is listed ahead of the AN/URC-100, since the latter set is shown under the letter "U." Individual components of sets (such as RT-524/VRC, T-195/GRC-19, etc.) are not assigned the prefix "AN/."

## Look & Learn

You can learn all sorts of interesting things by checking out mil surplus sets, even if you aren't into using them on the air. The manuals are also quite informative. For instance, the AN/URC-68 saw Viet Nam service by the CIA's MACV Special Operation Group (amongst others). Now that these are on the surplus market it's informative to note which crystals are installed in the sets—our listing for the AN/URC-68 discusses them! Try 'em in your scanner! They're still active.

If you check out the manuals you'll learn that the 20 to 28 MHz equipment was deployed to Armored Divisions; Artillery Divisions were given 27 to 39 MHz gear; while the Infantry Divisions operated from 38 to 55 MHz. Note the frequency overlaps so that Artillery can intercommunicate with Armored and Infantry.

**Table 1**  
**The Joint Electronics Type Designation System**

1. A complete set AN/GRC-103  
Indicates system \_\_\_\_\_  
Installation \_\_\_\_\_  
Type of equipment \_\_\_\_\_  
Purpose \_\_\_\_\_  
Model number \_\_\_\_\_  
Modification letter \_\_\_\_\_
2. Sample of a component used with a particular set: AB-952/GRC-103
3. Sample of a component not used with a particular set: S-69/GRC
4. Table of equipment indicator letters:

### Installation

- A-Airborne
- B-Underwater
- C-Air transportable
- D-Pilotless carrier
- F-Fixed
- G-Ground, general
- K-Amphibious
- M-Ground, mobile
- P-Pack, portable
- S-Water surface craft
- T-Ground, transportable
- U-General, utility
- V-Ground, vehicular
- W-Water, surface, and underwater

### Type of Equipment

- A-Invisible light, heat radiation
- B-Pigeon
- C-Carrier
- D-Radiac
- E-Nupac
- F-Photographic
- G-Telegraph or Teletypewriter
- I-Interphone and PA
- J-Electromechanical

- K-Telemetry
- L-Countermeasures
- M-Meteorological
- N-Sound in air
- P-Radar
- Q-Sonar
- R-Radio
- S-Special types
- T-Telephone (wire)
- V-Visual

### Purpose

- A-Auxiliary assemblies
- B-Bombing
- C-Communications
- D-Direction finding
- E-Ejection release
- G-Fire control
- H-Recording
- L-Searchlight control
- M-Maintenance and test assemblies
- N-Navigational aids
- P-Reproducing
- Q-Special or combination of purposes
- R-Receiving
- S-Detecting range bearing
- T-Transmitting
- W-Control

Our listing makes no claim to being an all-encompassing compendium of each and every communications set and component available (or unavailable) as surplus; only those we feel are of particular interest to our readers. There is older and outdated equipment that has been left out. We have also omitted some of the newer exotic equipment, which is either too "classified," too dangerous, or too useless for non-military use to include—such as the AN/ALQ-136 radar jammer, AN/UXC-4 tactical digital facsimile unit, AN/USQ-81 tactical display system, AN/TSQ-111 communications nodal control element, AN/TRC-170 tropo terminal and its associated digital multiplex terminal, and many others of that ilk. Oh well, we couldn't resist including a few of these just for good measure!

If you're interested in seeing which pieces of mil surplus equipment are available, we invite you to contact dealers who handle this hardware. A listing of some of these dealers is included here.

## Military Communications Equipment

**AN/ARC-44.** FM air/air and air/ground transceiver operating 24 to 52 MHz. Has been replaced by the AN/ARC-54 transceiver. Major component is the RT-294B.

**AN/ARC-45.** UHF AM transceiver which replaced the AN/ARC-60. Major component is the RT-295.

**AN/ARC-51BX.** UHF AM transceiver for air/air, air/ground, and air/ship communications. Major component is the RT742. Another version is the AN/ARC-51A which has the RT-702 as its major component. The ARC-51BX is the standard UHF radio used by all services.

**AN/ARC-54.** Lightweight VHF FM transceiver for aircraft use; replaced by the ARC-131. Major component is RT-348.

**AN/ARC-55.** UHF AM transceiver for aircraft use. Was replaced by AN/ARC-51BX and AN/ARC-51X. The major component is RT-349, RT-349A, or RT-349B.

**AN/ARC-60A.** Lightweight VHF-AM transceiver for aircraft use. Was replaced by the AN/ARC-45. Major components are the R-508 and CV-431.

**AN/ARC-73.** VHF AM transceiver for aircraft use. Major components are the T-879 and R-1123.

**AN/ARC-102.** Lightweight HF AM/SSB transceiver for aircraft use. This replaced the AN/ARC-59 set. Major component is the RT-698.

**AN/ARC-114A.** VHF FM transceiver for aircraft use. Major components depend upon type of aircraft in which used. Transmits (10 watts) and receives on 920 channels between 30 and 76 MHz. Also guards 40.50 MHz. Requires 28 VDC. Can also transmit low power (1 watt). Weighs 7 lbs.

**AN/ARC-115.** VHF AM transceiver for aircraft use. Covers 1360 channels between 116 and 150 MHz, 10 watt output. Also guards 121.5 MHz. Requires 28 VDC. Weighs 7 lbs.

**AN/ARC-116.** UHF AM transceiver for helicopter use. Puts out 10 watts on 3500

channels between 225 and 400 MHz. Requires 28 VDC. Weighs 8 lbs.

**AN/ARC-131.** VHF FM transceiver for aircraft use. Major component is the RT-823. Replaces the AN/ARC-54.

**AN/ARC-134B.** VHF AM transceiver for aircraft use. Major component is the RT-857.

**AN/ARC-164(v).** Lightweight UHF AM transceiver for aircraft use. Major component is the RT-1167.

**AN/ARC-515R-1.** Combination navigational receiver and VHF AM transceiver. Major component is the RT-514R-1. For use in T-41B aircraft.

**AN/ARC-524A.** VHF AM transceiver for aircraft use. Major component operates on 360 channels 118 to 140 MHz with 15 watts output. Requires 28 VDC. For use in TH-55A aircraft.

**AN/ASC-15.** A grouping of sets (3 AN/ARC-131) in a compact housing for use in choppers for forward area observation.

**CV-431.** A component of ARC-60A. This is a frequency converter/transmitter operating AM from 228 to 258 MHz (16 channels), 2 watts output. Requires 28VDC.

**AN/FRC-93.** An HF SSB set for fixed or semifixed operation. Major component is the RT-718 transceiver. Used at Special Forces bases, USACC and Field Artillery units. A component of the AN/FRC-93 is the AM-3979 linear amplifier, which can step up the power output to 1kW (PEP). The AN/FRC-93 is made by Collins Radio.

**AN/FRR-59A.** This is an older tube-type triple conversion AM/CW/SSB communications receiver with full carrier suppression from 2 to 32 MHz in 4 bands. Offers simultaneous USB/LSB reception of different stations operating on the same frequency. Mechanical digital frequency readout. Operates from 117 VAC (60 Hz). Must have

easily cost the government \$25,000, weighing in at almost 300 lbs. and looking very impressive. But it has 88 tubes and is very difficult to service unless you have the very thick service manual, lots of experience, parts, and patience. In used condition, these are valued at \$250.

**G-133.** HF communications receiver for AM/CW/SSB from 200 kHz to 30 MHz. Older tube-type receiver is actually a Collins 51S1 receiver repackaged and modified for mil use by LTV-Temco. Operates from 117 VAC (60 or 400 Hz), plus 24 VDC for the AM BFO. Weighs 40 lbs. In top condition, valued at \$850; in repairable condition, sells for about \$700.

**AN/GRC-10.** VHF FM set for mobile, fixed, and semifixed installation by the National Guard and Army Reserve. Major components are the T-235 and R-125.

**AN/GRC-19.** An HF medium-power AM/CW set for mobile use by National Guard and Army Reserve units. Major components are the T-195 and R-392.

**AN/GRC-26D.** A high-power, shelter-mounted, RTTY station for mobile, fixed, or semifixed operation. Major components are the T-368 and R-390. Has been replaced by the AN/GRC-122 set. Used by National Guard and Army Reserve units.

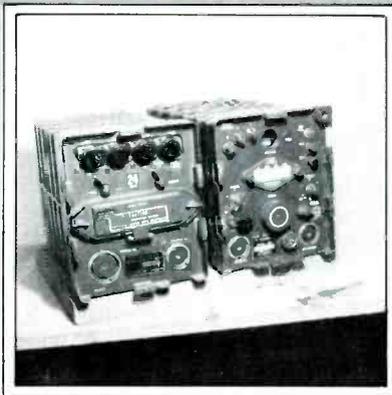
**AN/GRC-41.** An HF transmitting and receiving station for CW/AM operation. Can be used for half- or full-duplex operation from mobile, fixed, or semi-fixed installations. Major components are the T-368C and R-390.

**AN/GRC-46.** Medium-power HF AM/RTTY set. Shelter mounted. Replaced by the AN/GRC-142. Used by National Guard and Army Reserve units. Puts out 100 watts from 1500 kHz to 20 MHz, receives 500 kHz to 32 MHz. Requires 28 VDC. The AN/VRC-29 is the equivalent set.

R-388 receiver. (Courtesy Fair Radio Sales)



R-110/GRC receiver.  
(Courtesy Fair Radio Sales)



R-390 receiver. (Courtesy Eric Olthwaite)



**AN/GRC-50.** Transportable FM set for two-way communications in the UHF range. Major components are the T-893 and R-1331.

**AN/GRC-87.** HF low-power AM manpack transceiver. Similar to the AN/VRC-34 which is for mobile installations. Major component is the RT-77/GRC-9.

**AN/GRC-103.** Compact transportable UHF FM set which can handle up to 24 telephone channels when used with multiplex equipment. Major components are the T-983 and R-1329.

**AN/GRC-106.** An HF SSB set intended for use as a mobile link, but can also be used for fixed and semifixed installation. This replaces the AN/GRC-19 set. The major component is the RT-662. A variant set is known as the AN/GRC-106A and uses the RT-834 as its major component.

**AN/GRC-109.** Compact portable CW set used by Special Forces forward area patrols. Replaced by AN/PRC-70. The major components are the T-784 and R-1004.

**AN/GRC-122.** This set is one of a family of sets consisting of the AN/GRC-142, AN/VSC-2, and AN/VSC-3. These are vehicular mounted AM/SSB/RTTY stations. The AN/GRC-122 replaced the AN/GRC-26D and is deployed at Division HQ's, and consists of two RT-662's as its major component. An AM-3924 amplifier steps-up the power output to 1 kW.

**AN/GRC-125.** Vehicular, manpack, or fixed station set consisting of the RT-505 as its major component.

**AN/GRC-142.** Similar to the AN/GRC-122 but having only a single RT-662 as its major component, plus the AM-3924 amplifier. The AN/GRC-142 replaces the AN/GRC-46.

**AN/GRC-143.** A general purpose tactical microwave FM set using tropospheric

and diffractive scatter modes of operation. Major components are the T-961 and R-1287.

**AN/GRC-144.** A general purpose tactical microwave FM set. Major components are the T-1054 and R-1467.

**AN/GRC-160.** See the RT-841 for info on its major component. The AN/GRC-160 is a version of the AN/PRC-77.

**AN/GRC-163.** Compact, transportable VHF FM terminal used for point-to-point communications in an infantry Division. Major components are modified RT-442 and RT-524 units.

**AN/MRC-102.** A version of the AN/GRC-50; the major components are two AN/GRC-50's.

**AN/MRC-103.** A version of the AN/GRC-50; the major components are three AN/GRC-50's.

**AN/MRR-8.** An air or mobile transportable shelter containing an R-390/URR receiver. Includes RTTY equipment, diversity circuitry, security gear.

**AN/MRT-9.** An air or mobile transportable shelter containing HF RTTY transmitting and receiving equipment. Major components include the T-368 and R-390.

**AN/MS-57.** SHF equipment for FM operation 7.25 to 8 GHz via satellite. Runs 3 to 100 watts and weighs 1375 lbs. Operation is from 115/230 VAC (50 to 60 Hz), 22 to 30 VDC.

**AN/MS-58.** UHF equipment for FM operation 240 to 315 MHz via satellite. Runs 1 to 100 watts. Weighs 9500 lbs. Operates from same power as AN/MS-57.

**OA-2648.** Transceiver, which is the major component of the AN/VRC-24A set. Operates on 1750 channels (100 kHz spacing) between 225 and 400 MHz, AM mode. Power output is 1½ watts. Requires 24 VDC or 115/230 VAC (50 to 60 Hz).

**OA-2649.** Similar to OA-2648 except intended for use in set AN/TRC-68A.

**AN/PRC-6.** The familiar Korean War walkie-talkie. Major component is RT-196.

**AN/PRC-8.** Korean War manpack transceiver operating 20 to 28 MHz, 1 watt FM. Can also be vehicular mounted or used as fixed station. Weighs 8 lbs. Requires 1½ VDC, 6 VDC, 67½ VDC (receive), 135 VDC (transmit). Intended to be used with mil type BA-279 battery (no longer available), but some have said that these can be operated from two EverReady 457 or 467 types plus one 1½ volt and one 7 volt battery. Any combo of batteries in series to produce appropriate voltages would suffice but may be awkward to use. In good condition, these go for about \$30 (without accessories). Accessories may be available from some sources and should run an additional \$25 for the handset, antenna, battery box, canvas case, etc. Somewhat outdated rig with oft-encountered problems locating sufficient accessories and establishing appropriate battery arrangements to power it.

**AN/PRC-9.** The 27 to 39 MHz version of the AN/PRC-8. Similar pricing on surplus market.

**AN/PRC-10.** Like the AN/PRC-8 but covers 38 to 55 MHz with slightly less than 1 watt output. Similar surplus pricing.

**AN/PRC-25.** A short range portable FM transceiver. See RT-505/PRC-25 for info.

**AN/PRC-41.** Lightweight portable VHF/UHF AM transceiver for manpack, vehicular, or fixed operation. Major component is the RT-695. A similar set is the AN/PRC-41A which has the RT-695A as its major component. The primary difference is that the AN/PRC-41A can use "X-MODE" (secure voice, better known as scrambled speech).

**AN/PRC-47.** HF SSB set for portable, vehicular, or fixed station use by Special Forces. Major component is the RT-67.

**AN/PRC-64A.** Battery operated self-contained 4 channel (crystal controlled) HF set for AM/CW operation from 2.2 to 6 MHz, 5 watts on CW, 1½ watts on voice. Intended for use with mil type BA-1509 battery (probably no longer available) for supplying required 31.2 VDC. Probably can be powered by 20 "AA" batteries. Designed for Special Forces use in Viet Nam, now available on surplus market for \$180 in good operating condition and including 1 pair of CR-89/U and CR-78/U crystals. Extra crystals should cost about \$17 per pair.

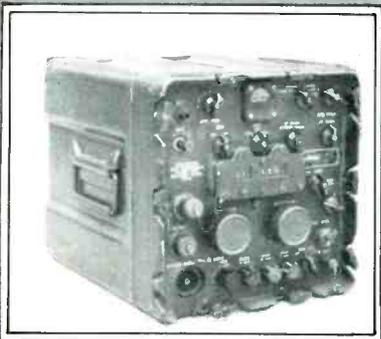
**AN/PRC-68.** Lightweight hand-held transceiver used by Infantry squads and platoons. Operates 30 to 80 MHz on 1000 channels (50 kHz spacing), 1 watt output. Requires 16 VDC and designed to be used with mil battery BA-1588/U.

**AN/PRC-70.** Lightweight manpack set for use in forward combat areas. Operates FM/AM/CW/SSB from 2 to 76 MHz, 30 watts below 50 MHz, 20 watts above 50 MHz. Has 25,000 channels spaced at 100 kHz, detent tuning. This Special Forces transceiver replaced the AN/GRC-109, AN/PRC-74, and AN/PRC-77.

**AN/PRC-74.** Low powered transistoriz-



*RT-66 transceiver.  
(Courtesy Fair Radio Sales)*



*R-392 receiver. (Courtesy Fair Radio Sales)*



*R-648 receiver. (Courtesy Fair Radio Sales)*

ed SSB/CW set for Special Forces forward area patrols and air assault uses. Designed for manpack use, it puts out 15 watts (PEP). Operates 2 to 12 MHz. Versions known as AN/PRC-74B and AN/PRC-74C operate 2 to 18 MHz. Requires 10½ to 17 VDC, 12 to 31 VDC, or 110/220 VAC to operate. Battery operated from 70 BA-30 types or 10 BB-418/U types, or from PP-4514/PRC-74 power supply. Replaced by the AN/PRC-70.

**AN/PRC-77.** Short range Special Forces voice manpack or vehicular transceiver. Major component is the RT-841/PRC-77. Replaced by the AN/PRC-70.

**AN/PRC-90.** Compact 3-channel UHF AM rescue transceiver carried aboard aircraft. Operates with ½-watt output, from a mil type 1568/U battery (14 VDC). Equipped with crystals for 243.0 and 282.8 MHz. Weighs 2 lbs. including battery. Waterproof.

**AN/PRC-117.** A microprocessor-controlled manpack set recently developed by The Harris Corporation. Major component is the RT-1406/PRC-117.

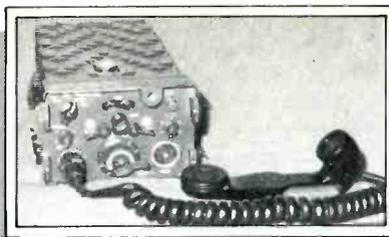
**AN/PRR-9.** Battery operated VHF receiver intended to be used in conjunction with the AN/PRT-4 transmitter. Small receiver clips to standard mil helmet or can be carried in pocket or harness. Requires mil type BA-505/U (6 VDC) battery. Frequency 47 to 57 MHz, crystal controlled on 2 channels. Weighs 11 oz. with battery. Replaced the AN/PRC-6 when used with matching transmitter. These receivers are in short supply on the mil surplus market and persons using AN/PRT-4 transmitters usually use a small pocket scanner in place of the AN/PRR-9.

**AN/PRT-4.** Hand-held low power battery operated VHF FM transmitter intended to be used by Infantry squad members. Operates 2 channels in the 47 to 57 MHz band (½-watt on one channel, ¼-watt on the other) and designed for use with the AN/PRR-9 receiver. Intended to be used with mil type BA-399/U (15 VDC) battery but can be adapted to operate from standard 9 volt types. Many sets on surplus market are equipped with 51.0 MHz crystal. In used as-is condition (minus antenna and battery box) are available for \$3.50. In top condition with the battery adapter for standard 9 volt types, they go for about \$30. A newer PRT-4A model (with 150 Hz tone for use with tone squelch sets) is \$35 in top condition. A nice little transmitter, it has been popular with Survivalists and many others.

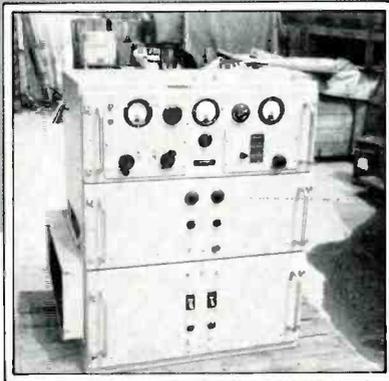
**R-48/TRC-8.** An older tube-type receiver offering variable tuning 230 to 250 MHz. Operates from 117 VAC. Has built-in speaker and squelch. Probably intended for guarding 243.0 MHz emergency frequency. For \$45 on surplus market not a bad deal, but at 75 lbs. its somewhat bulky.

**R-108/GRC.** Part of the old AN/GRC-8 set, this receiver covers 20 to 28 MHz FM with continuous tuning. An older tube-type rig requires 135 VDC and 6 VDC. Weighs 32 lbs. Can be located for about \$30. Not a bad set but powering it and obtaining components for it can be a problem.

**R-109/GRC.** Same as R-108 but 27 to 39 MHz. \$40 in used condition.



*RT-70 transceiver.  
(Courtesy H. Ancery's Communications)*



*R-2093 spectrum analyzer.*

*T-368 transmitter.  
(Courtesy Fair Radio Sales)*

**R-110/GRC.** Same as R-108 but 38 to 54 MHz. \$20 to \$50 in used condition.

**R-125/GRC-10.** Receiver for 54 to 80 MHz. \$20 to \$50 in used condition.

**R-125/GRC-10.** Receiver for 54 to 80 MHz used in conjunction with RTTY, FAX, and data circuits, although can be used for voice too. Continuous tuning. Requires 26 VDC or 115/230 VAC (60 Hz).

**R-174/GRR-5.** Older tube type (8 tubes) receiver covering 1500 kHz to 18 MHz in 4 bands AM/SSB/CW. Requires 90 VDC and 1½ VDC. Can be operated from standard 90 volt battery or two 45 volt types. No internal speaker but has 8 (and 600) ohm output. Weighs 23 lbs. Excellent condition price is \$50, good condition \$30.

**R-278.** UHF receiver covering 225 to 400 MHz in 100 kHz steps, autotune type tuning. Requires external speaker or headphones. Older set has 44 tubes and was made by Collins. Good way to monitor this band although it weighs about 115 lbs. In fair condition sells for \$150, in top condition and set to go for 117 VAC about \$250.

**R-388/URR.** Mil version of the Collins 51-J3 receiver. The R-388 covers 500 kHz to 30.5 MHz, has 5-step crystal selectivity, S-meter, crystal calibrator. Linear scale tuning in 30 bands, operates from 117 VAC (60 Hz). Well over 20 years old and not designed for SSB reception, but the BFO can be used to bring in SSB signals. In non-working condition, these sell for about \$250. If in top working order, expect to spend \$350.

**R-390A/URR.** Communications receiver for 500 kHz to 32 MHz operation. Older tube type rig has mechanical filters, triple conversion, crystal calibrator, and lots of nice features but requires use of BFO to copy SSB. A version called the R-390 has crystal filters instead of mechanical filters. The R-390A in good condition sells for \$225 to \$300, in top condition for \$450.

Weighs 95 lbs., looks impressive. Operates from 117 VAC (60 Hz).

**R-391/URR.** Similar to R-390A but with autotune arrangement and doesn't have mechanical filters. The autotune requires its own 24 VDC source. Valued at \$250.

**R-392/URR.** Receiver associated with AN/GRC-19 set covers 500 kHz to 32 MHz and operates from 28 VDC. Receives AM/CW (no SSB). Good used condition price: \$300.

**R-417.** Part of the AN/TRC-24, this receiver covers 50 to 1875 MHz in 6 bands and intended for RTTY, FAX, and other specialized emissions. Operates from 115 VAC (60 Hz).

**R-418/G.** Part of the AN/TRC-29 set. Receiver picks up 1.7 to 2.4 GHz and intended for pulse-position modulated accessory equipment. Operates from 115 VAC (60 Hz).

**R-442/VRC.** A monitor receiver intended to be set for any of 920 channels between 30 and 76 MHz for monitor/guard purposes. Requires 24 VDC. Part of AN/VRC-12, AN/VRC-44, AN/VRC-47, AN/VRC-48 sets.

**R-508.** Receiver component of the AN/ARC-60A set covers 228 to 258 MHz continuous tuning. Requires 28 VDC.

**R-543/TRC-29.** So called "order wire receiver" component of the AN/TRC-29 set. Requires 115 VAC (60 Hz). Operates 1.7 to 2.4 GHz.

**R-648/ARR-41.** Interesting older tube-type receiver with mechanical digital-type tuning 190 to 550 kHz and 2 to 25 MHz AM/CW. Has mechanical filters, BFO, dial lock. Requires 24 VDC for dynamotor. Weighs 35 lbs. Depending upon condition, these sell for \$150 to \$200.

**R-808/GRC-14.** Receiver with built-in RTTY converter will pick up voice/CW/FSK (narrow/wide) from 2 to 32 MHz. Requires 117 VAC or 24 VDC. It sells for \$200 or so and weighs in at 130 lbs. All in all, not a bad set.

**R-892/URR-44.** Older tube-type receiver covering 540 kHz to 19 MHz. Has built-in speaker. Probably intended for broadcast

reception rather than communications. Operates from 117 VAC (60 Hz). Weighs 70 lbs. Decent condition cost \$135 and good for broadcast use.

**R-902A/L.** Receiver for AM/CW reception in vehicles/aircraft. Covers 1500 kHz to 8 MHz, requires 5 VDC, 15 VDC, 36 VDC. Intended for remote control operation and controlled by 45-bit serial data stream. Available in new condition for \$150 but requires considerable conversion to housebreak it to civilian life.

**R-1004/GRC-109.** Part of the AN/GRC-109 set. Receiver picks up 3 to 24 MHz AM/CW via crystal control or continuous tuning. Requires 6 VDC, or 75 to 260 VAC (40 to 400 Hz).

**R-1121/TRC-87.** Motorola-built solid state 225 to 400 MHz UHF AM receiver which supposedly cost the government \$25,000 per set. Operates in 50 kHz-separated steps across entire band. Scarce on the surplus market but can be located with effort from \$250 to \$500. Requires 120/208 VAC (400 Hz—3-phase 4-wire) but most of those sold to surplus market seem to be operable in 117 VAC (60 Hz). Sensitivity can be improved by the addition of an external preamplifier accessory. A beautiful piece of gear.

**R-1123/ARC-73.** Receiver section of the AN/ARC-73 set picks up AM on 720 channels between 116 and 152 MHz. Requires 28 VDC. Intended to be used with remote control head type C-4074.

**R-1134/WRR-3.** A VLF receiver covering 14 to 600 kHz, AM/CW/FSK. Has mechanical digital frequency readout. Older tube-type set does a nice job. Operates from 117 VAC (60/400 Hz) and weighs 80 lbs. in repairable condition is available for \$215, in top condition about \$300.

**R-1287/GRC-143.** Receiver for use with multichannel PCM equipment (3200F9 mode) receives 4.4 to 5 GHz. Requires 115/230 VAC (47 to 63 Hz).

**R-1329.** UHF receiver for 500F9 type emission use, covers 220 to 1850 MHz in 4 bands. Requires 115 VAC (47 to 420 Kz).

**R-1331.** UHF FM receiver for 601 to 1000 MHz and 1350 to 1850 MHz, continuous tuning. Requires 115 VAC (47 to 63 Hz). Receives 1200F9 emission.

**R-1467.** Receiver picks up 3000F9 emission from 4.4 to 5 GHz. Requires 120 VAC (60 Hz).

**R-2093/TRQ-35V.** Mil version of the BR Communications Model RSS-4 HF spectrum monitor. Doubtful if these will reach the surplus market for a very long time to come, if ever. They are new, sophisticated, expensive. Worthy of mention since they employ the latest in receiver, microprocessor, and digital memory techniques. Covers 2 to 30 MHz in 3 kHz steps for AM/SSB/FM reception. A description of the unit could fill a book, but it employs a CRT to give the user a visual display of all signals within 25 kHz of center frequency, including what took place there within the previous 30 minutes! Checks noise levels, relative signal strengths, etc. Awe inspiring!

**RC-3A/GSQ-151.** Small receiver which

is a component of a seismic detection system. Operates from 9 volt battery and is tuned to 126.6 MHz. No speaker included. For \$12, it's an interesting little unit which should have some interesting applications.

**RT-60.** Small VHF AM transceiver for air/sea rescue purposes. Normally set for 243.0 and 282.8 MHz operation, although can operate from 240 to 260 MHz and 270 to 290 MHz. In repairable condition they are less than \$15. In good condition (with battery) they are about \$35.

**RT-66.** Older FM transceiver operating 20 to 28 MHz. Produced for Armored Division use in vehicles or fixed installations. Transmitter puts out 2 or 16 watts, continuous tuning or channelized. Circuit has 27 tubes, set weighs 42 lbs. Some of these sets reaching the surplus market have had the panel meters removed by the government. Can be operated from mil power supplies PP-109, PP-112, PP282 which deliver either 12 or 24 volts (depending upon model). With accessories and in good condition they sell for \$70 to \$75. Batteries and other components could be difficult to locate for these when you need them.

**RT-67.** Similar to RT-66 but intended for Artillery Division use 27 to 39 MHz. Similar pricing.

**RT-67/PRC-47.** Major component of the AN/PRC-47 operates 2 to 12 MHz, 20 and 100 watts (PEP) output, SSB and CW. Requires 24 VDC, 26½ VDC, or 115 VAC (400 Hz). Has digital tuning at 1 kHz, steps across operating range.

**RT-68.** Similar to RT-66 but 38 to 55 MHz Infantry version. Similar pricing.

**RT-70/GRC.** Older Korean War transceiver for 47 to 58 MHz FM. Operates from portable, mobile, or fixed locations. Puts out ½-watt. Has continuous tuning or 2 preset channels. Requires 90 VDC and 6 VDC, some have powered these with EverReady 479 90-volt battery and a 6-volt battery. Used (with some accessories) seems to be available for \$25 to \$40. The entire AN/VRC-7 set (which includes the RT-70/GRC, plus accessories) can be had in new condition for \$140. Parts and power availability could be a problem with these vintage sets, although they function well.

**RT-77/GRC-9.** This transceiver is part of the AN/GRC-87 and AN/GRC-34 sets. Runs AM/CW between 2 and 12 MHz, continuous tuning. Operates from 6, 12, or 24 VDC, depending upon set in which it is used. Puts out 15 watts CW and 7 watts AM.

**RT-174/PRC-8.** See AN/PRC-8.

**RT-175/PRC-9.** See AN/PRC-9.

**RT-176/PRC-10.** See AN/PRC-10.

**RT-196/PRC-6.** Older and somewhat outdated crystal controlled hand-held transceiver from Korean War. Operates short-range in the 47 to 55.4 MHz band. Requires 1½, 45, and 90 VDC. Uses type CR-23 crystal. Has 13-tube circuit, weighs 6 lbs. The AN/PRR-9 and AN/PRT-4 combo replaced these. In poor condition (missing parts) these are only \$3. Operable, they cost \$20 with crystals \$2 each. A nuisance to power and parts are hard to obtain.

**RT-246/VRC.** Transceiver is part of the

AN/VRC-12 set. Automatic tuning capability for 10 preset channels 30 to 76 MHz FM. Can run 10 and 35 watts. Requires 24 VDC and weighs 56 lbs.

**RT-294B.** Transceiver is part of the AN/ARC-44. Runs FM on 24 to 52 MHz with 8 watts output. Requires 28 VDC. Has 280 channels at 1 kHz spacing. Intended for remote control use with control head SB-327/ARC-44.

**RT-295.** Transceiver is part of AN/ARC-45. Runs AM on 1750 channels between 225 and 400 MHz. Requires 150 VDC, 28 VDC, 300 VDC. One watt output.

**RT-311/ARC-38.** AM transceiver for 2 to 25 MHz on 20 preset channels (autotune channel selection). Offers 100 watts output below 14 MHz, 90 watts above 14 MHz. Similar in design to Collins 618-S1, having 25 tubes and weighing 65 lbs. Requires 28 VDC, 250 VDC, 600 VDC, -50 VDC, -65 VDC, 6 VDC, and 117 VAC (400 Hz). Costs \$85 in fair condition. Doesn't offer SSB operation and not easily powered. In used condition it costs \$85. A used Collins 618-S1 (no VFO and for crystal control) is available for about \$55. If modified for SSB, about \$100. See RT-594 listing.

**RT-348/ARC-54.** Major component of the ARC-54. Transceiver runs 10 watts FM from 30 to 40 MHz, 50 kHz channel spacing. Requires 28 VDC.

**RT-380/AR.** Older 16-tube Collins-built AM/CW transceiver for 2 to 18 MHz. Puts out 100 watts on 10 channels. Has 600 ohm audio output. Requires 400 VDC, 750 VDC, and 28 VDC to fire it up. Similar to the Collins 18S4 rig. In used condition with crystals and dynamotor it runs about \$50. No SSB capabilities.

**RT-505/PRC-25.** Portable transceiver running 1 to 2 watts FM 30 to 76 MHz. Requires 24 VDC from mil battery BA-4386 for portable use. These batteries are available from Marathon Battery Co., Waco, TX. Offers 920 channels spaced at 50 kHz. Weighs 18 lbs. and except for 2DF4 power tube is all solid state. In good condition (with accessories), they are \$150 to \$200. In fair condition, about \$125. Very nice rig popular with Survivalists, etc.

**RT-524/VRC.** Part of the AN/VRC-12 and AN/TSQ-70A sets, and in modified form a component of the AN/GRC-163 set. Is a manual tuning version of the RT-246/VRC. Has a built-in speaker.

**RT-594/ARC-38A.** Like the RT-311/ARC-38 but has SSB operation. In used condition sells for about \$150.

**RT-662/GRC.** Transceiver is a major component of AN/GRC-106, AN/GRC-122, AN/GRC-144, AN/VSC-2, and AN/VSC-3 sets. Operates SSB/CW with 200 watts on CW, 400 watts (PEP) on SSB from 2 to 30 MHz (1 kHz channel spacing). Requires 27 VDC. Weighs 47 lbs. Nice set!

**RT-695.** Transceiver has AM operation crystal controlled between 225 and 400 MHz, 3 watts output. Requires 24 VDC and is major component of the AN/PRC-41 set. The RT-695A version can be used for scrambled speech with proper equipment and is part of the AN/ARC-41A set.

**RT-698/ARC-102.** Transceiver running 100 watts on AM/CW, 400 watts SSB (PEP) on 28,000 1 kHz spaced channels between 2 and 30 MHz. Requires 28 VDC. Weighs 64 lbs. To be used with type C-3490 remote control head.

**RT-702/ARC-51X.** UHF AM transceiver running 16 watts on 1750 channels between 225 and 399.9 MHz (100 kHz channel spacing). An inverter changes the aircraft's 28 VDC to 115 VAC (400 Hz). A guard channel (243.0 MHz) is provided.

**RT-718.** Transceiver puts out 100 watts PEP 3.4 to 5 MHz and 6.5 to 30 MHz, SSB/CW, continuous tuning. Built by Collins Radio. Requires 110/220 VAC (50 to 400 Hz), or can run on 12 VDC with a Collins MP-1 power supply. Nice rig! Part of AN/FRC-93.

**RT-742/ARC-51BX.** Transceiver is similar to RT-702/ARC-51X but has 50 kHz spacing between channels.

**RT-823.** FM transceiver for 30 to 76 MHz, 1 and 10 watt outputs on 920 channels. Requires 28 VDC. Part of AN/ARC-131. Weighs 27 lbs, plus 3 lbs for the C-7088/ARC-131 remote control head.

**RT-834/GRC.** Transceiver is another version of the RT-662/GRC but has 100 Hz channel spacing.

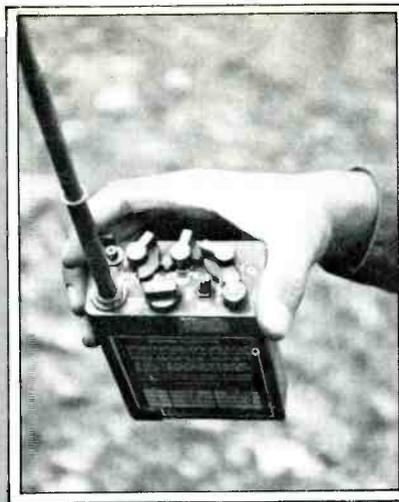
**RT-841/PRC-77.** Transceiver is part of the AN/PRC-77, AN/VRC-64, and AN/GRC-160 sets. Similar to the RT-505/PRC-25 but is solid state in design. Runs FM on 920 (50 kHz spaced) channels 30 to 76 MHz, 1 to 2 watts output. Requires 24 VDC. The BA-4386 battery can be obtained from Marathon Battery Company, Waco, Texas. In good condition with accessories, it sells for \$350; in new condition on the surplus market about \$600. A great transceiver that is very popular with Survivalists, mercenary forces, and others.

**RT-857/ARC-134.** Made by Wilcox, this transceiver runs 25 to 40 watts output on 1360 channels (25 kHz spacing) between 116 and 150 MHz AM. Requires 28 VDC. Needs the C-7197 remote control head for operation. Weighs only 20 lbs. The RT-857/ARC-134B version has 680 channels (50 kHz spacing).

**RT-1167/ARC-164.** Transceiver which operates CW or scrambled/unscrambled AM from 225 to 400 MHz (25 kHz spacing). Power output from 1 to 10 watts depending upon voltage input, 18 VDC, 24 VDC, or 28 VDC.

**RT-1393/USQ.** You won't be seeing this sophisticated new transceiver on the surplus market for quite a while. It's an advanced all-purpose HF rig running 100 watts on any of 284,000 channels (100 field programmable memory channels, simplex, duplex, or semi-duplex). Modes are AM/SSB/ISB. Has LED readout for frequency. Photos of this unit show it operating on 13855.5 kHz.

**RT-1406/PRC-117.** Transceiver operates 30 to 90 MHz, 2400 channels spaced at 25 kHz intervals. Preset channels 8. Requires 12 VDC and puts out 1 or 10 watts FM (a 1/10-watt model is available). Weighs less than 13 lbs. A feature of this transceiver is that it can operate in frequency hopping



AN/URC-68 transceiver.  
(Courtesy Michael P. Murphy)

*Survivalists have made excellent use of mil surplus gear, so have DX listeners.*



mode or in non-frequency hopping mode. When frequency hopping, frequency changes hundreds of times per second; is impossible to jam, and cannot be monitored or detected by unauthorized parties.

**T-74/CRT-3,** also called the BC-778. This old warhorse is better known as the "Gibson Girl" rescue transmitter which became famous during WWII and is still in use by the Navy. By grinding the hand crank, distress signals are sent out on 500 and 8364 kHz but can also be hand keyed on 500 kHz. Weighs 18 lbs. With antenna and ready to go they sell for about \$40. The older BC-778 version (without antenna) is \$30. All required power is supplied by hand crank.

**T-195/GRC-19.** Transmitter puts out 100 watts AM/CW 1500 kHz to 20 MHz, continuous tuning. Requires 28 VDC. Part of the AN/GRC-19 set. Weighs 125 lbs. A decent rig which suffers from lack of SSB abilities. Has 22 tubes in its circuit. In fair condition it brings \$125. A newer rig called the T-195B/GRC is available at higher cost.

**T-235/GRC-10.** Part of the AN/GRC-10, AN/GRC-39, AN/GRC-40, AN/MRC-68A, and AN/MRC-112 sets. Puts out 10 and 40 watts of 60F9 and 80F9 emission from 54 to 71 MHz, continuous tuning. Requires 26 VDC or 115/230 VAC (60 Hz).

**T-302.** Part of the AN/TRC-24, AN/MRC-54, AN/MRC-69, and AN/MRC-73 sets. Sends out various special emission types between 50 and 1875 MHz, 10 to 120 watts. Requires 115 VAC (50 Hz).

**T-303/G.** Transmitter is part of AN/TRC-29, AN/TRC-38, AN/TRC-39, AN/TRC-40, and AN/TRC-41 sets. Emission is 4500F9 via 10 watts output from 1.7 to 2.4 GHz. Requires 115 VAC (60 Hz).

**T-368/URT.** Transmitter is part of AN/GRC-87, AN/VRC-34, AN/GRC-26D, and AN/MRT-9 sets. Operates AM/CW from 2 to 12 MHz, 400 watts AM, 450 watts CW. Has continuous tuning. Operates from 115 VAC (60 Hz). Can be bought for \$500 and has been used by pirate and rebel broadcasters; however, its weight of 650 lbs. makes it rather cumbersome.

**T-389/TRC-29.** Part of AN/TRC-38, AN/TRC-39, AN/TRC-40, AN/TRC-41, and AN/TRC-29. "Order wire" transmitter component operates on 115 VAC (60 Hz).

**T-631/GRC-14.** Transmitter runs 400 watts 2 to 20 MHz. Operates from 117 VAC (60 Hz). Worth \$175 in good condition.

**T-784/GRC-109.** CW-only transmitter runs 10 to 15 watts on 24 crystal controlled frequencies 3 to 22 MHz. Requires 75 to 260 VAC (40 to 400 Hz) or 6 VDC.

**T-879/ARC-73.** Transmitter operates AM on 680 channels 116 to 150 MHz. Requires 28 VDC. Has about 20 watts output on 80 preset channels. Needs remote control head C-4074/ARC-73A.

**T-893.** Transmitter is part of several different sets. Runs 1200F9 emission, 8 to 30 watts between 601 and 1000 MHz, 1350 and 1850 MHz. Requires 115 VAC (60 Hz).

**T-961/GRC-143.** Transmitter used with AN/GRC-143, AN/TRC-112, and AN/TRC-121 sets. Uses 3200F9 emission, 1 kW output, 4.4 to 5 GHz. Requires 115/230 VAC (60 Hz).

**T-983.** Transmitter used with several sets. Runs 500F9 emission, 15 to 25 watts from 220 to 1850 MHz. Requires 115 VAC (47 to 420 Hz).

**T-1054/GRC-144.** Part of AN/GRC-144 and AN/TRC-138 sets. Transmitter runs 3000F9 emission, 1/4-watt output, 4.4 to 5 GHz. Requires 120 VAC (60 Hz).

**AN/TRC-24.** Transportable multichannel VHF/UHF set. Major components are the T-302 and R-417. National Guard and Army Reserve use.

**AN-TRC-29.** Transportable tactical microwave FM set for National Guard and Army Reserve use. Normally used in rear area multichannel system. Major components include the T-389/TRC-29, T-303/G, R-543/TRC-29, and R-418/G.

**AN/TRC-38.** Similar to AN/TRC-29 but containing dual transmitting and receiving equipment (same major components).

**AN/TRC-39, AN/TRC-40, AN/TRC-41.** Similar to AN/TRC-29 but has triple transmitting and receiving facilities.

**AN/TRC-68A.** VHF/UHF AM set for

Airborne assault operations, close support fixed installation on ground. Major component is the OA-2649/TRC-68A.

**AN/TRC-80.** Transportable microwave FM station for tropo scatter propagation. Provides 5 voice and 1 RTTY channels. Deployed with Pershing missile systems. Type 120F9 emission, 1 kW output, 4.4 to 5 GHz frequency range. Requires 120/280 VAC, 4-wire 3-phase 400 Hz, power.

**AN/TRC-87.** Ground UHF station. A major component is the R-1121.

**AN/TRC-90.** Transportable microwave FM terminal set deployed with National Guard and Army Reserve units. AN/PRC-47 sets are used to communicate between these units during initial installation.

**AN/TRC-97B.** Transportable tactical microwave FM set for line-of-sight, tropo scatter, or obstacle gain diffraction propagation. Deployed to National Guard and Army Reserve units. Operates with 10,000F9 emission, 4.4 to 5 GHz, 1 kW output. Requires 120/208 VAC (400 Hz).

**AN/TRC-108.** Similar to the AN/GRC-50 and with same major components.

**AN/TRC-109.** Similar to the AN/GRC-50 but with dual set of major components.

**AN/TRC-110.** Similar to the AN/GRC-50 but with triple set of major components.

**AN/TRC-117.** Similar to the AN/GRC-50 but with dual set of major components.

**AN/TRC-129.** Similar to AN/TRC-90.

**AN/TRC-132.** Tropo scatter microwave FM system. Has multiplex operation, 1 kW output, 4.4 to 5 GHz. The AN/TRC-132A version runs 10 kW output. Requires 208 VAC 3-phase 60 Hz.

**AN/TRC-138.** This is a version of the AN/GRC-144 that can function as a radio repeater. Same major components.

**AN/TRC-143.** Similar to the AN/GRC-50 and with same major components.

**AN/TRC-151.** Similar to AN/GRC-50 but with dual set of major components.

**AN/TRC-152.** Similar to AN/GRC-50 but with triple set of major components.

**AN/TRC-156.** Advanced TACSATCOM-1 ground terminal operating FM 240 to 315 MHz, 2 or 20 watts output. Requires 20 to 28 VDC. Weighs 120 lbs.

**AN/TRC-157.** Advanced TACSATCOM-1 ground terminal operating FM 240 to 315 MHz, 1 to 500 watts output. Requires 115/230 VAC (60 Hz).

**AN/TRC-177.** You won't see this one on the surplus market. A time signal set intended for use with the TRANSIT satellite to be used with the new "HAVE QUICK" anti-jamming systems. System depends upon use of precise time signals.

**AN/TRR-30.** Advanced TACSATCOM-1 ground FM receiver for monitoring alert signals. Receives 7.25 to 8 GHz. Requires 18 to 30 VDC.

**AN/TRR-32.** Advanced TACSATCOM-1 ground FM receiver for monitoring alert signals. Receives 240 to 315 MHz. Requires 18 to 30 VDC.

**AN/TSC-61A.** Transportable air traffic control ground station. Contains AN/ARC-51BX, AN/ARC-73A, AN/ARC-102, and AN/VRC-46 sets.

**AN/TSC-74.** Shelter mounted control center for ground communications system.

Contains AN/GRC-106, AN/VRC-46 sets.

**AN/TSC-79.** Advanced TACSATCOM-1 ground terminal running up to 3 watts FM on 7.25 to 8 GHz. Requires 20 to 28 VDC.

**AN/TSC-80.** Transportable SHF TACSATCOM ground terminal running 1.5 to 500 watts FM from 7.25 to 8 GHz. Requires 115/230 VAC (60 Hz).

**AN/TSC-85.** Similar to AN/TSC-80 but running 500 watts.

**AN/TSC-93.** Similar to AN/TSC-85.

**AN/TSQ-70A.** Transportable air traffic control ground station. Contains AN/ARC-51BX, AN-ARC-73A, AN/ARC-102, RT-524, R-511.

**AN/TSQ-71A.** Shelter for dual GCA installations, including AN/ARC-51BX, AN/ARC-73A, AN/VRC-46.

**AN/TSQ-72A.** Air traffic ground control station containing AN/ARC-51BX, AN/ARC-73A, AN/ARC-102, AN/VRC-46, amongst other equipment.

**AN/URC-10A.** Portable VHF AM transceiver for air/sea rescue. Has 2 channels 240 to 260 MHz, puts out 2/10 of a watt. Requires 16 VDC.

**AN/URC-11.** Single channel (243.0 MHz) UHF AM hand-held air/sea rescue transmitter. On the surplus market for \$45 each. Power requirements and lack of parts availability make this Korean War vintage set less than fully appealing.

**AN/URC-68.** Transceiver used in Viet Nam by Special Forces and CIA related units. Small and compact, it operates 38 to 42 MHz and 230 to 250 MHz via 4 preset channels. Requires battery BA-1112/U (11 to 16 VDC) but can be adapted to operate from 10 standard "AA" batteries with slight modification. Built-in speaker and mic, but external 8-ohm speaker can be used for fixed station operation. Puts out 2/10-watt on UHF, 1/2-watt on FM low band. Crystals commonly encountered in these sets include 38.90, 40.10, 40.50, 41.00, 235.0, 241.0, and 245.5 MHz. These cost the government \$1200 each and are quite popular with Survivalists, mercenaries, and others. Seem to be available in top condition with battery and some crystals for \$150. Extra low-band crystals go for \$12 each. Terrific little rig.

**AN/URC-100, AN/URC-101, and AN/URC-104.** Newly designed Motorola transceivers with latest innovations. Don't expect to see these on the surplus market for a very long time. Formerly known as AN/PRT-250, they offer UHF AM, satellite UHF FM (via SATCOM) and VHF low band. The URC-100 and URC-104 operate 30 to 88 MHz, 225 to 400 MHz. The URC-101 operates 116 to 150 MHz and 225 to 400 MHz. These sets can operate with scrambled speech. They are all man-pack type units. Photos of the URC-101 show it tuned to 120.6 MHz.

**AN/VRC-7.** See RT-70 for information.

**AN/VRC-12.** Short range vehicular and fixed station units designed for general tactical uses. Can run scrambled speech. Major components include the RT-246/VRC, RT-524/VRC, and R-442/VRC.

**AN/VRC-24A.** Similar to the AN/TRC-68A but for vehicular installation. Major component is the OA-2648/VRC-24A.

**AN/VRC-29.** Similar to the AN/GRC-46 but intended for use in armored personnel carriers. Same major components (AN/GRC-19). Deployed to National Guard and Army Reserve units. Replaced by AN/VSC-3.

**AN/VRC-34.** A vehicular installed version of the AN/GRC-87.

**AN/VRC-12, -43, -44, -45, -46, -47, -48, -49.** A series of short-range vehicular and fixed station units for general tactical use. All consist of various combinations of the following major components: RT-246/VRC, RT-524/VRC, R-442/VRC.

**AN/ARC-53.** Vehicular version of the AN/PRC-25 and GRC-125. Same major component.

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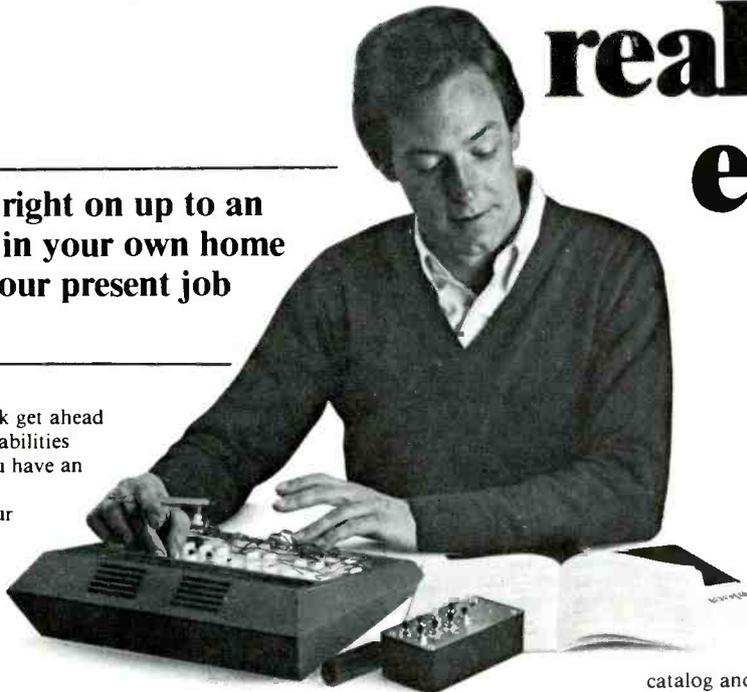
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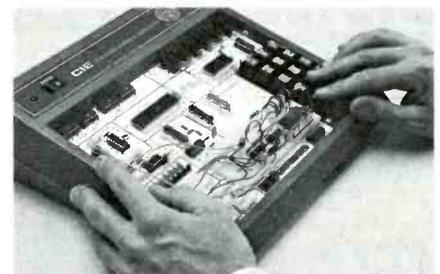
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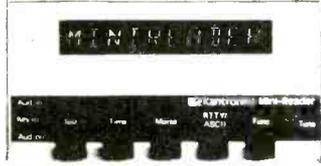


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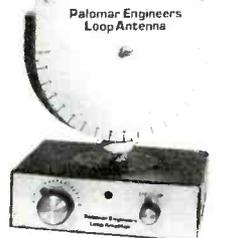
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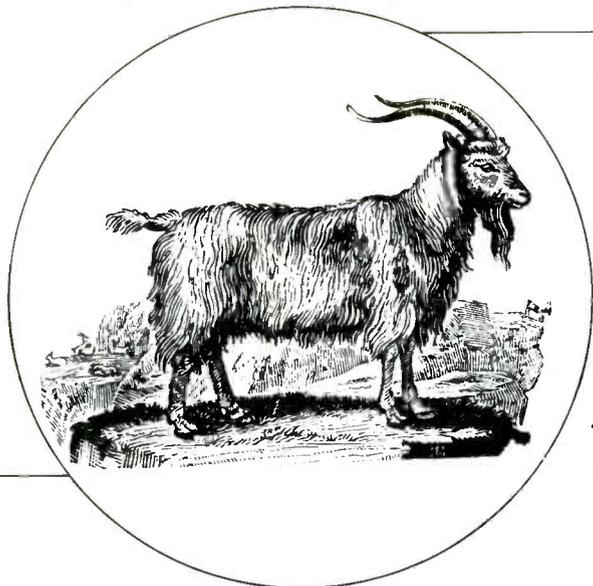
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**Dr. Brinkley & His**

# Goat Gland Radio Station

**The Medical Quack Who Parlayed A Back Room Radio Station Into \$10-Million And An International Incident!** BY TOM KNEITEL, K2AES, EDITOR



**T**he sun rose over the eastern horizon, blanketing the rural Kansas landscape with its golden rays. Seated at a microphone in a small homebuilt studio was a balding bespectacled gent with a goatee. "Hello Kansas, hello America. Here is your friend, Dr. John R. Brinkley, the early bird, coming to you over KFKB."

That sunny day in 1923 marked the first day of broadcasting for the spectacular Doctor Brinkley and his radio station, KFKB. Within a relatively brief period of time, Doc Brinkley's station became one of the most controversial broadcasters in the nation—and attracted as many devoted listeners as the 50,000-watt major stations such as KDKA, WJZ, and WLW. But Doc Brinkley's station was running only 500 watts in 1923. Since the only other station on his frequency (1050 kHz) was located in Los Angeles and had a 100 watt transmitter (station KNX), Doc had virtually a clear channel. Brinkley's little station was to be the forerunner of a broadcasting station which caused agony for the Federal Radio Commission (and later, the FCC), pitted the State Department against the Vice President of the nation, vexed the American Medical Association, and ultimately ended only after an army marched on Doc Brinkley and forcibly removed him from the airwaves.

Doc Brinkley had hung out his shingle in a little town called Milford, Kansas, in 1917. Milford was nothing to write home about. With a population of fewer than 200 souls and unpaved streets, it wasn't even shown on most maps. It didn't take him long to learn that it wasn't easy to earn a living treating the occasional sprains and broken bones that came to his office at 5th and Barry Streets. Obviously, he surmised, there must be a better way. So he set his mind to figuring out what it might be.

His brainstorm eventually produced about \$10 million for him. The basic ingredients were some surgical instruments, lots of billy goats, and (most importantly) a way of reaching the public with his idea. KFKB was his pathway to the public.

## The Brainstorm

Brinkley looked into the history books for his inspiration. He read about Ponce de Leon and his search for the Fountain of Youth, and how many men before and after Ponce de Leon had sought a magic elixir which would restore their vitality—more specifically, fading sexual powers. His idea was to offer them that magical restoration. But how?

Furthermore, his books explained how, throughout history, the goat has been the symbol of lechery. Brinkley may have read, in Herodotus (Book 2), that the people of the Nile Delta venerated male goats—"One of them is held in particular reverence, and when he dies the whole province goes into mourning. . . . In this province not long ago a goat knew a woman, in full view of everyone." Herodotus identified this billy goat with the Greek god of fecundity, Pan. The Greek historian, Plutarch, wrote that the most beautiful women were selected to mate with a divine goat. Yes, throughout the ages, the goat had most definitely been ensconced in the mind of the public as the essence of sexuality.

He deduced that it was obviously all in the glands of the otherwise smelly and cranky animals. He calculated that he might soup-up the depleted glands of older men by running them in parallel with the glands of virile young billy goats. Brinkley foresaw this technique bringing happiness to many wives, improving marriages, and producing an all around glow of youth and vigor in those who were his patients. This was the reasoning behind what became his multi-million dollar brainstorm—the renowned *goat gland transplant*.

Now to peddle this concept to the public. Such an outrageous idea would need the showmanship and ballyhoo of no less than a Barnum, and Doc Brinkley rose to the occasion in grand style. The concept was logical and simple, so totally believable; it played upon the deep rooted fears of many people. It was, as they say, "a natural." It was so clever, in fact, that feature stories about

Brinkley and his miracle operation began appearing in newspapers and magazines across the nation. That's when he decided to establish KFKB—the call sign stood for "Kansas First, Kansas Best."

His 500 watt transmitter could be monitored over great distances and it wasn't long before he had attracted listeners throughout the entire Midwest and as far away as the Dakotas and Texas. He presented local amateur talent, country music, gospel music, farming information, recipes for pies and preserves, and similar programming. However, the premier performer on KFKB, and the star audience getter, was kindly Doc Brinkley—in person!



*Here's the ol' goat gland hustler himself, Doc Brinkley. Through a succession of licensed and even unlicensed broadcasting stations, he parlayed a crackpot scheme into many millions of dollars and an international incident which it took an army to finalize. (Photo: Kansas State Historical Society, Topeka)*

His on-the-air image was that of the homespun country doctor, a deeply religious family man who was primarily interested in helping all of his "many troubled friends out there in radioland." He spoke to listeners directly, calling them by name, and he asked them to write to him about their ailments. Letters poured in, and Doc read their problems over the air and offered his observations and advice, even suggesting his own approach to curing them. He made no charge for this service, although the cures he recommended invariably consisted of coded numbers which related to specific medicines. A listener with migraine headaches would be told to take "Number 27" every morning and "Number 6" each night. Someone with pains in the stomach was advised to take two tablespoons of "Number 14" before each meal. Listeners could ask for medicines by those numbers at local drug stores or might wish to send their money to the Milford Pharmacy so that Doc Brinkley could attend to the prescription personally.

Local druggists, of course, could only supply these nostrums if they were members of the Brinkley Pharmaceutical Association. If they were willing to provide Brinkley with a percentage of the sales price for the items, Brinkley would send them information which would enable them to fill orders on the medicines (all of which were common over-the-counter items). This arrangement proved to be extremely lucrative for Brinkley and the members of his Association.

KFKB was the focal point of all of this. All a sick person had to do was listen to the sta-

tion for a while and surely they'd hear about someone else having symptoms which were similar to theirs; they didn't even have to bother to write to Doc Brinkley. The day after he would prescribe "Number 11" for someone who had sciatica, druggists throughout the listening area would sell out their inventories of that item; but only if they were affiliated with Doc!

All of this, however, was only the icing on the cake—pin money. It was not Doc's trump hand. Those who wrote to the station were added to a gigantic mailing list and would receive full details of his major attraction—the goat gland operation—which he also hawked at length over KFKB.

Milford became a thriving community centered around Brinkley and his enterprises. His clinic cost \$100,000 to construct, and patients converged there to receive his miracles. He was performing about 10 goat gland transplants each day at a minimum cost of \$750 each, although if the glands of very young goats were requested the fee was \$1,500. Brinkley built houses for his medical staff and an apartment house for his other employees. He owned the pharmacy. He presented the town with the Brinkley Memorial Church.

He became so celebrated a personality that he ran for governor of Kansas (three times) and almost won when Alf Landon ran against him. Brinkley received no less than 183,000 votes in the 1930 election as a write-in candidate, even after thousands of ballots were invalidated because his name was spelled incorrectly or entered in the wrong place. Certainly had all of those votes

been counted, he would have won. He even received 20,000 votes in Oklahoma for the Kansas election.

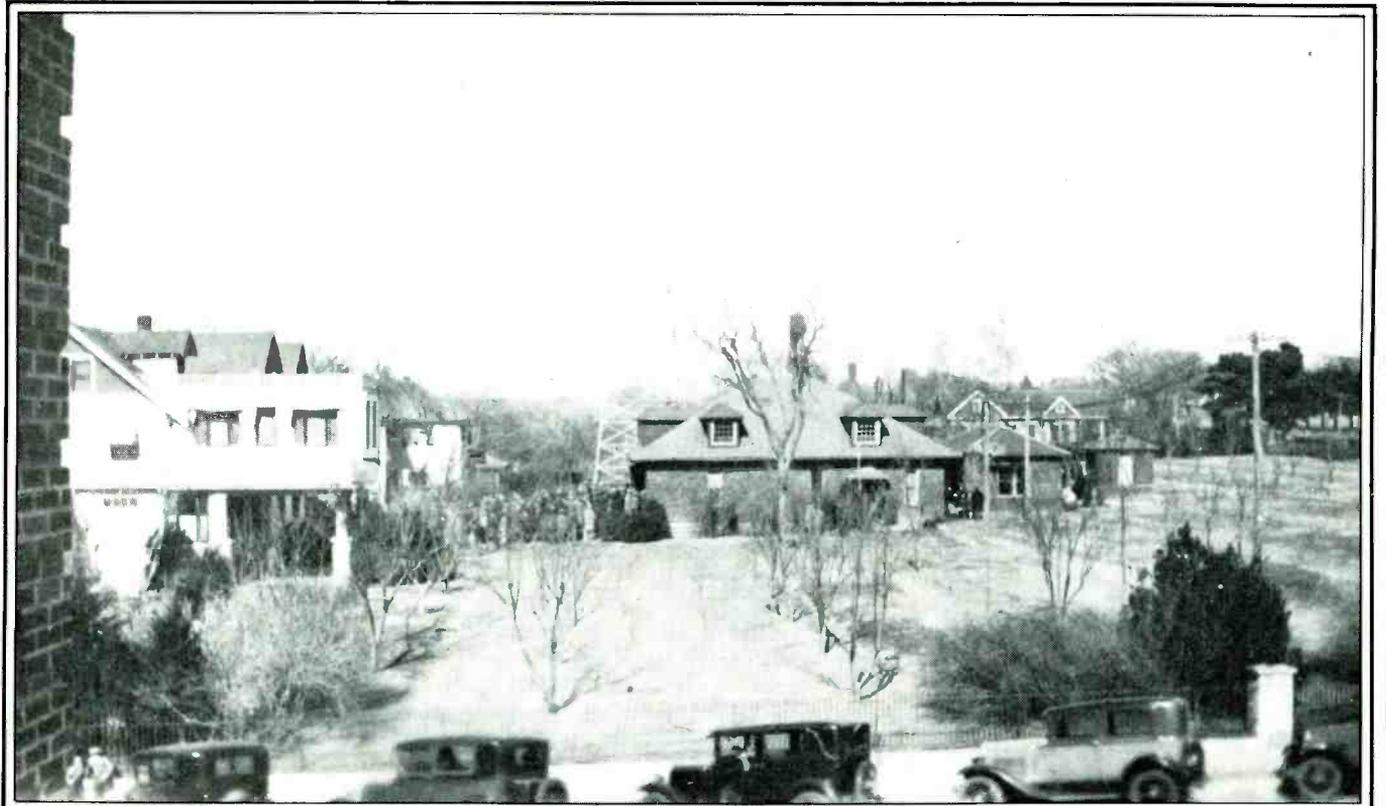
His politics? Voters were promised free school books, lower taxes, paved roads throughout the state, free auto licenses, and lots more. He even said that he would build artificial lakes in every Kansas county so that the water would evaporate to bring farmers rain. One can only speculate as to how he might have served as Governor of Kansas since he contributed financial backing to William Dudley Pelley's *Silver Shirts*, a homegrown fascist group.

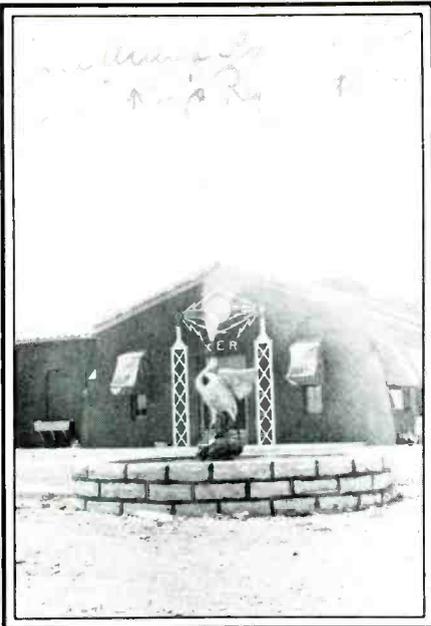
By 1930, KFKB had done a bit of growing. In fact, it was running 5,000 watts and had increased the scope of its coverage area. At about the same time, station KNX in Los Angeles (which shared the frequency with KFKB) also increased its power to 5,000 watts, possibly to fend off KFKB's signals from the KNX area.

Brinkley was, by then, receiving lots of national attention and it came to pass that not everybody was happy with his medical practices. Enter the American Medical Association, which was less than delighted about the prescribing of drugs over the radio. Also, they didn't seem to think that goat gland transplants were of very much value. Furthermore, the AMA was trying to check up on the exact nature of Doc Brinkley's medical education and degree.

Yes, Brinkley did have a degree. It had been conferred upon him by an institution called the Eclectic Medical University of Kansas City, and he seemingly was licensed

*Doc Brinkley's original radio station, KFKB in Milford, Kansas. Photo does not show a second radio tower out of camera range to the right. You may be able to make out a large crowd of people standing around the base of the tower waiting for the clinic to open for the day. (Photo: Kansas State Historical Society, Topeka)*





When the government revoked the license of KFKB, Doc slipped over the border into Mexico and established a new and more powerful station, XER. (Photo: Kansas State Historical Society, Topeka)

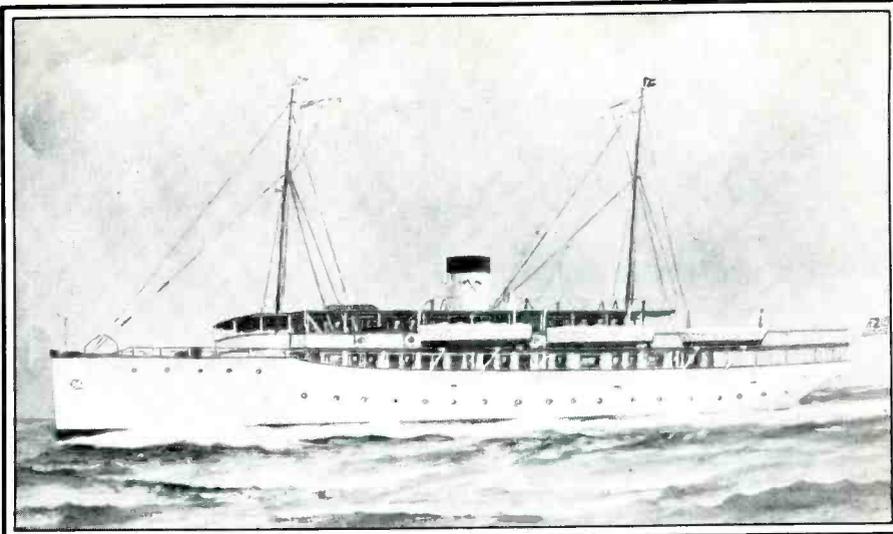
to practice medicine in several states, including Kansas. The AMA was unimpressed; the President of the AMA later described Doc Brinkley as being "Without anything resembling a real medical education, with licenses purchased and secured through extraordinary manipulations of political appointees, and with consummate gall beyond anything ever revealed by any other charlatan."

Doc Brinkley was canny enough to quickly evaluate the potential threat to his thriving sanatorium and pharmacy business. He pulled all of the political strings he could locate, filed libel suits, defended his position via indignant and outraged orations over KFKB. Ultimately, his medical license was revoked by the State of Kansas and, in 1931, his radio station license for KFKB was cancelled by the Federal Radio Commission. The FRC claimed that KFKB wasn't broadcasting in the public interest.

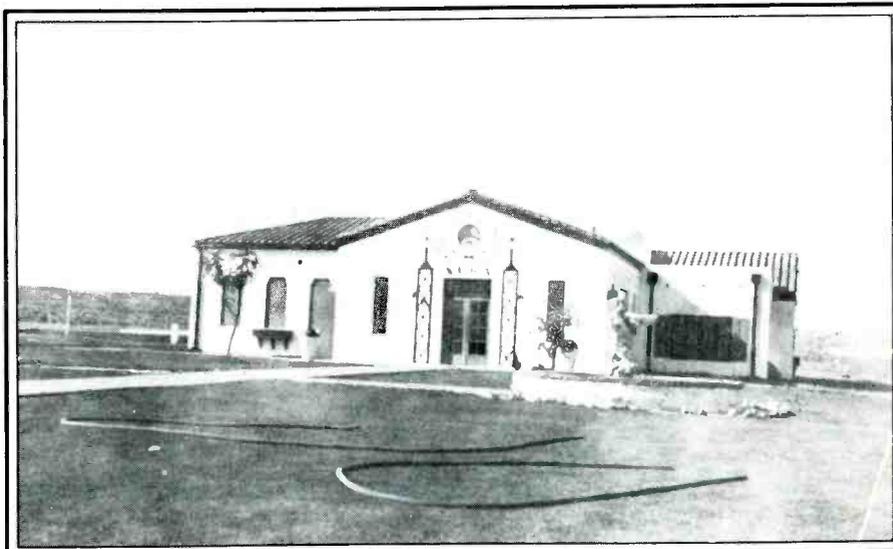
### Down But Not Out

Within a few months, it seemed that KFKB had risen from its own ashes. Doc's radio voice turned up from Villa Acuna, Mexico, just across the Rio Grande River from Del Rio, Texas; it was still selling the goat gland transplants at the Milford clinic. Yes, Doc Brinkley had a new radio station—a better one than KFKB.

Doc was on the airwaves under the Mexican callsign XER. So as not to have to share his frequency with any other station, he was operating on 735 kHz, located midway between two regulation broadcast frequencies. And XER was running 75,000 watts; 50% more than any American broadcaster. XER could be heard so well that stations in Canada on adjacent frequencies were com-



Doc Brinkley's large luxury yacht. At several points in his amazing career he threatened to turn it into a high-seas pirate broadcasting station. (Photo: Kansas State Historical Society, Topeka)



After the Mexican government revoked XER's broadcasting license he managed to get them to issue him a new license for a station known as XERA. A new coat of paint on the building and a more powerful transmitter seemed to be the major differences between XER and XERA. (Photo: Kansas State Historical Society, Topeka)

plaining that it was interfering with their nighttime coverage. Listeners throughout North America having older TRF-type receivers could hear nothing but XER on any frequency within 50 kHz of 735 kHz.

The Mexican postal authorities, within a year, had begun taking a dim view of Doc and his station. They blacklisted XER and returned all mail sent to its Villa Acuna address, marking it with a big rubber stamp stating "FRAUDULENT." Mail sent to the station at its address in Del Rio, Texas, was still getting through, however.

### Up And Away!

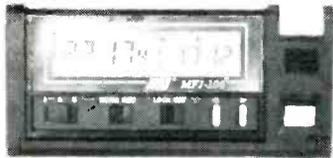
By early 1932 Brinkley said that he would double XER's power to 150,000 watts. That made American broadcasters apprehensive since the existing 75,000 watt transmitter was annoying them. Brinkley also realized that his clinic in Milford had only a limited

lifespan remaining, what with his staff surgeons functioning under the directorship of a Chief of Staff who no longer had a license to practice medicine in Kansas. He built a new clinic in Del Rio, where his license was still valid, and sent the wreckers to tear down the building in Kansas. These arrangements took several trips between Milford and Del Rio in Doc's private aircraft.

Del Rio became his headquarters. His mansion was built right on the banks of the Rio Grande—he could see the transmitting towers of XER, across the river in Mexico, from his bedroom windows. He had "about a dozen" (his estimation) Cadillacs. They were all red, to match the color of his brick mansion. When his wife decided to paint the exterior of the estate green, he purchased all new cars—green Cadillacs to match the house. He also owned a large yacht in addition to the cars and private aircraft.

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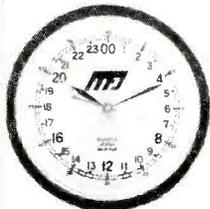
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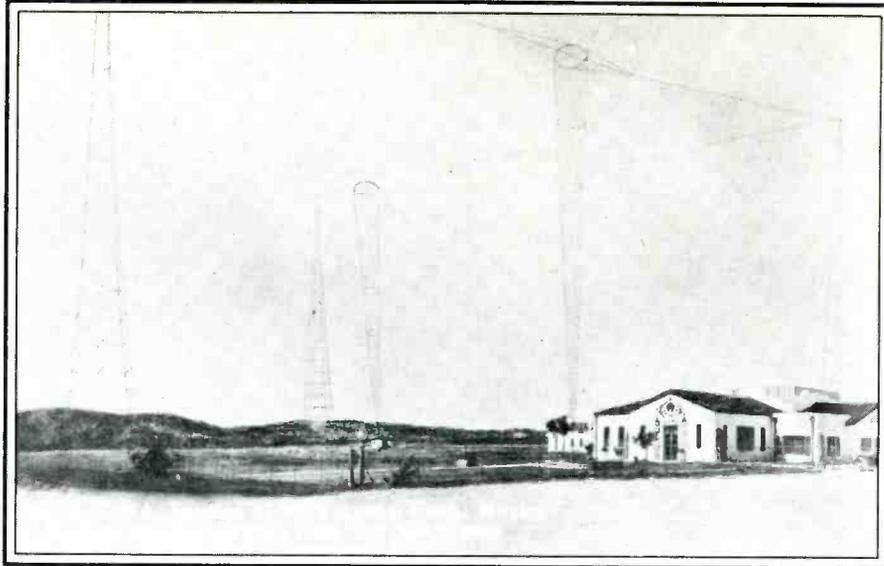
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Three huge towers supported the complex antenna system at XERA. The half-million watt signal blanketed the hemisphere. (Photo: Kansas State Historical Society, Topeka)

Doc's medical practice had become slightly modified at this point. He pretended to perform prostate surgery, peddled a panacea which was apparently a little hydrochloric acid mixed with blue dye, and he had devised a new so-called "compound operation" to replace the basic goat gland procedure. The new operation was supposed to be a lot better than the old discarded one.

XER, as announced, upped its power to 150,000 watts in 1933. The license for such a powerful station was actually not all that difficult to obtain, especially since relations between Mexico and the United States were in no great shape. Although the United States Government registered a number of complaints (via the State Department), Mexico was not overly concerned about XER's operations. The State Department's complaints finally stopped because (it was rumored) the Vice President of the United States, Charles Curtis, intervened on Brinkley's behalf. Curtis was a native of Kansas who had run his early political campaigns over KFKB!

Nevertheless, in late 1933, the Mexican Government seemed to lose patience with XER. They decided that broadcasts relative to medicine or health could only be made after permission had been obtained from the authorities. They said that broadcasts must be in Spanish, but could also be translated into other languages. They also forbade foreign studios for stations licensed in Mexico. Brinkley bristled at this change in attitude and suggested that he might place a broadcasting station aboard his yacht and transmit from international waters.

In 1934, Mexico revoked XER's license and the station was shut down. Was Doc Brinkley dismayed? No way!

Somehow, he managed to get another radio license from Mexican authorities and late in 1935, under a license granted to The Brinkley Hospital, he had a new radio station—a better one than XER. This was called XERA, The Sunshine Station, and it was

on 840 kHz, a clear channel in the United States. The station was better than XER because while XER ran only 150,000 watts, XERA ran 250,000 watts. Frugality ruled, however, and XERA was located in the old (but repainted) XER building and used the same transmitting towers. Now he was really in business on the airwaves.

DX'ers throughout the Western Hemisphere reported hearing XERA at night "almost like a local," according to radio publications of the day. Interestingly, Doc Brinkley was an avid reader of DX publications and frequently wrote to them in defense of his broadcasting policies, being quite sensitive to criticism. Moreover, he flatly refused to issue any QSL's for XERA, a fact which didn't at all sit well with the DX'ing community. By 1936, when XERA was increased to 300,000 watts, a DX'er wrote to Brinkley complaining about his non-QSL policy. Brinkley replied, "We will not verify programs. We receive between 2,000 and 3,000 requests a week for verifications. This would require quite an extensive department to handle, added expense to us, simply to satisfy a lot of curiosity. If you have time to listen to XERA sometime during the evening, I would appreciate your telling me how its signal compared with WLW, the distance of course being considered." (At that time, WLW in Cincinnati was testing with 500,000 watts, under a special limited experimental license from the FCC.)

The DX'er who received this letter promptly wrote to RADEX, a national DX'ing magazine and, in so many words, said that Brinkley had brass bunions for refusing to QSL while specifically requesting signal comparison reception reports. Brinkley saw it and wrote a scathing letter to the editor of the publication, saying, "For my trouble in answering this individual's inquiry I asked kindly if they had time and heard XERA would they kindly tell me its signal strength in comparison with WLW. You then stated in your magazine that I am willing to take all

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X



CLEAR CHANNEL

F

APARTADO NUM. 30

CD. ACUÑA COAH., MEXICO

This 1955 QSL letter from Ciudad Acuna's current representative on the broadcast band shows the tower in Mexico and the studio in Texas, also a transmitter power of 50 kW. Today, XERF runs 250 kW.

you will give me 'but try to get me to give you anything.' This, to me, shows the small caliber man you are. It is unfortunate that the little magazine to which you contribute is worsted by such an individual. Evidently your brain is contracted, because when an editor purposely and viciously mis-states facts without any reason, then I have nothing for him but contempt."

Even when the station power was upped to 350,000 watts in 1937, he still refused to QSL. However, he surprised DX'ers by temporarily silencing XERA one night so that American DX'ers could hear a special DX broadcast from a rare station in Brazil on XERA's frequency.

The Brinkley station was blanketing the hemisphere and the money was rolling in, not that the AMA or the American Government was any happier about Doc's activities than they were when he was in Kansas. In 1937 he reported that his income was \$1,100,000 per year and, while this is a lot even by today's standards, by 1938 standards it was an income which truly staggered the imagination. In 1938, he brought a lawsuit against the AMA because he said that things they said about him in a story had sliced his income down to a paltry \$810,000.

The suit created national headlines as Brinkley paraded many of his patients to the witness stand—none of whom were permitted to offer testimony; Doc's hope was that their good words would establish his reputation to the satisfaction of the jury. In the opinions of the medical experts who testified against Brinkley, his goat gland transplant wasn't actually a transplant, his medications were worthless, and if there was any apparent value to his medicines and surgical procedures, it was purely psychological. Brinkley lost his lawsuit.

Brinkley decided to redouble his efforts and rebuild any damage done to his reputation by the trial. In 1939 he upped the power of XERA to 500,000 watts. Moreover, in a burst of public relations enthusiasm, XERA

started issuing QSL's! Cards and letters from the station were signed by Julia Andalon.

In 1941, new international radio frequency allocations were issued and since Mexico was a party to these treaties, they ordered XERA off the air. Brinkley couldn't bring himself to pull the switch on XERA—it was his primary medium for reaching his public. At that point, Mexico revoked XERA's license. Brinkley kept right on broadcasting with his 1/2-million watt station. Finally, in

desperation, the Mexican Government sent its army to the XERA building. Troops surrounded the station and, under force of arms, shut it down.

Again Brinkley raised the possibilities of broadcasting from his ocean going 170 foot yacht, operating from off the coast of Texas in international waters. But before he could put this plan into action, he died—ending an 18 year career that was certainly the most unusual in broadcasting.

### Aftermath

Today, Del Rio has, for the most part, forgotten Doc Brinkley. Just across the Rio Grande River in Villa Acuna, now called Ciudad Acuna, stands radio station XERF. XERF is a 24-hour a day English language gospel radio station with offices in Del Rio, Texas. In 1946, it was running 50,000 watts. By the late 1950s, it had begun running 250,000 watts and thus became one of the most powerful broadcast band stations in the Americas—five times more powerful than any broadcaster in the United States. During the evenings it can be heard over a large portion of North America.

And what about Milford, Kansas? It's still not on most maps of the United States. In the center of town stands the Brinkley Memorial Church bearing an inscription which (in part) reads: "Erected to God . . . in appreciation of the many blessings conferred upon me, by J.R. Brinkley." Motorists driving through rural Geary County probably pass the inscription and wonder who J.R. Brinkley was.

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\*Education Technology & Services, see page 81 October 1981 Issue of Ham Radio Magazine.

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Bands: MW 525-1610 KHz, SW1-3 3.2-30 MHz, FM 88-108 MHz

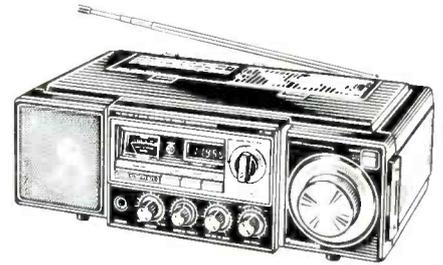
The Panasonic RF-2900 is a portable five-band shortwave radio with digital five digit fluorescent frequency display. Full coverage from 3.2 to 30 MHz. on SW. Covers SSB and CW. Double superheterodyne receiver. Fast/slow 2 speed tuning. AFC switch on FM, narrow/wide selectivity switch for AM and SW. FET RF circuit. BFO switch and pitch control. RF gain control. Tuning battery meter. Separate bass/treble tone control. SW calibration control. Dial light switch. Digital display on/off switch. Separate power switch. Detachable dial hood included. Rack type handle. Includes whip antenna and ferrite core antenna, speaker, earphone, recording output jacks, AC line and detachable adjustable shoulder belt. Made in Japan.



Command Series  
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CIRCLE 19 ON READER SERVICE CARD

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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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CIRCLE 49 ON READER SERVICE CARD

# DX'ing The Last Frontier

BY HARRY HELMS, KR2H

Can you remember back to October 4, 1957? That was the date Sputnik I was launched. Anyone who could tune to 20005 kHz could hear the “beep-beep-beep” of Sputnik’s beacon transmitter as the satellite circled the globe. For several days afterward, recordings of the Sputnik beacon were a staple of nightly news broadcasts.

Many things in space technology have changed over the past 25 years, but not the ease with which transmissions from orbiting space vehicles can be received. And now you can also eavesdrop on the voices of astronauts and cosmonauts in Earth orbit!

The Russians still use numerous frequencies near 20 MHz for both manned and unmanned missions. One very active frequency has been 19995 kHz, used for spacecraft beacons. This channel was first used for the Soyuz series of manned space vehicles and continues to be used for the Salyut series of manned space stations. It’s worth checking anytime the Soviets have a crew aloft; the most commonly reported signals are a series of rapid, “stuttering” pulses or rapid clicks.

Another active channel during Salyut missions is 19946 kHz, which is used for telemetry transmissions from Salyut. Signals on this channel tend to be multiplexed—the end product can sound a bit like badly scrambled slow-scan TV signals you can run across in the Amateur bands.

Other frequencies to check include 15008, 18008, 18060, 19954, and 20008 kHz. You’re liable to hear all manner of clicks, beeps, chirps, “trills,” and “tweets” on these channels. However, you may run across CW signals from time to time. These are believed to be communications from the Soviet cosmonauts to ground stations. Soviet voice communications, when translated, sound perfunctory and “plastic.” Close observers of the Soviet space effort feel these CW transmissions are where the “real” communications are carried on. I remember seeing a photo of the interior of a Soviet manned spacecraft. There, at the pilot’s control panel, was a telegraph key! Don’t bother trying to decode the CW—it’s not the International Morse or any known variation.

Check other frequencies around 20 MHz whenever Soviet cosmonauts are up. The Soviets usually introduce a new frequency or two each mission.

How can you be sure you’ve actually tuned into an orbiting satellite? The best evidence is *Doppler shift*. Doppler shift is a change in the frequency of a received signal caused by the movement of a satellite in orbit. The most common example of Doppler shift is the way the pitch of a train whistle or ambulance siren seems to change as the

train or ambulance approaches and then moves away from you.

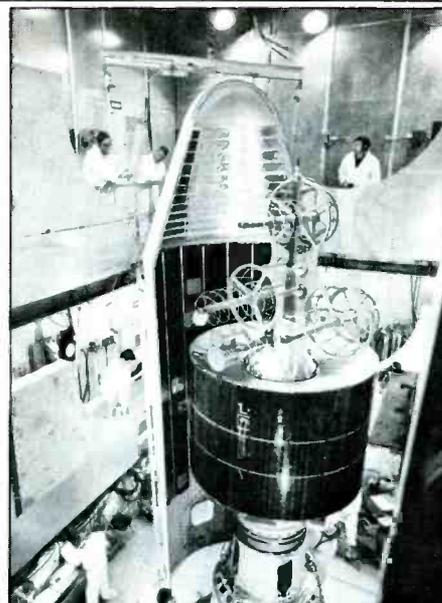
Doppler shift will cause a satellite’s apparent frequency to be higher than the actual frequency as it approaches your listening location. As it approaches closer, the received frequency will nearly equal the actual frequency. When the satellite moves away from your listening post, the received frequency will drop below the actual frequency and continue to do so. In short, if the signal you’re listening to doesn’t seem to be dropping in frequency, it’s almost certainly not from a satellite.

When listening for satellites below 30 MHz, have your receiver’s BFO on. If your receiver has selectable sidebands, use the upper sideband (USB) position.

The Soviets are not the only ones using frequencies around 20 MHz. The Chinese space program, still based upon the Soviet model, uses frequencies near 20 MHz.

Voice communications from manned Soviet vehicles are surprisingly easy to hear. The main Soviet voice channel, 143.625 MHz, has been in use since Yuri Gagarin became the first man in space back in 1961. It’s still used today. All transmissions are FM using 30 kHz deviation. This frequency is often used for contact with tracking ships (those humorously named “fishing trawlers”) and is worth tuning to if you’re located within a few hundred miles of a major body of water (such as the Atlantic and Pacific Oceans or the Gulf of Mexico).

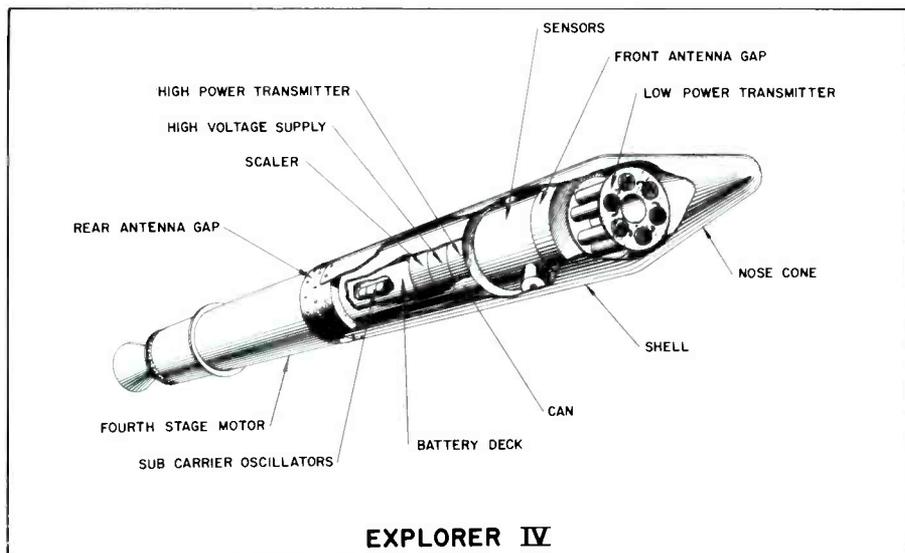
A distinction should be drawn between military and scientific Soviet space missions. All Soviet missions have strong military backing and applications; however, in some



The MARISAT-A satellite is readied for launch in 1976. (NASA photo)



The Navy’s FLTSATCOM-A was first put into orbit in 1978. (NASA photo)



EXPLORER IV

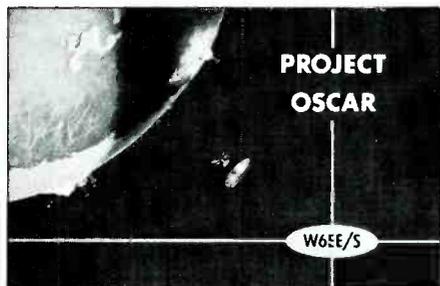
EXPLORER IV went up in 1958. Some listeners even received QSL cards from the satellite.



Rare QSL from the original SPUTNIK launched 25 years ago. (Courtesy Tom Kneitel).



QSL from AUSTRALIS-OSCAR 5 launched in 1970 and active on 2 frequencies. (Courtesy Tom Kneitel).



A QSL from OSCAR II, monitored on the Ham bands. (Courtesy Tom Kneitel).

flights, the military slant is more overt. Normally, Soviet space missions are subject to great attention by Soviet press agencies. But in military missions, only minimal details are given. One such military mission was Salyut 5 in August, 1976. Listeners noted that voice transmissions on 143.625 MHz would end whenever Salyut 5 was in range of ground stations in the USSR and would be replaced by telemetry-type signals. Alert European listeners noted that when voice transmissions on 143.625 MHz stopped, new signals would immediately begin on 143.825 MHz. These sounded like highly irregular telemetry. It is likely that similar anomalies will be observed on future Soviet military missions.

Two other frequencies are used by Soviet manned vehicles (such as the Soyuz series) that transport cosmonauts to and from the Salyut space stations. These are 121.625 and 121.750 MHz and use 30 kHz deviation FM. These are in the 108 to 136 MHz aeronautical band and should easily stand out among the AM signals there.

Unfortunately for listeners, the Space Shuttle isn't tuned in so easily. Most Space Shuttle communications take place on super-high frequencies such as 1640 MHz. However, two Space Shuttle voice channels should be easy for anyone with the proper equipment to monitor. They are 259.7 and 296.8 MHz, and are AM.

It's also possible to listen to launch support and control operations. These usually consist of transmissions between the launch control center, support aircraft aloft, and recovery and tracking vessels downrange. Those from the Kennedy Space Center at Cape Canaveral identify as "Cape Radio" or "Orion Control." All transmissions are in SSB and can be found on 6723, 13218, 14896, 19640, and 22760 kHz. Similar launch support transmissions from Vandenberg Air Force Base, California, can be heard on 22760 kHz.

Listeners have also reported CW transmissions during Soviet manned space mis-

sions on 19990 and 19995 kHz. Rough direction finding indicates the transmissions originate from the Soviet launching site at Baikonour in the Kazakhstan region of the USSR. These CW transmissions likewise do not follow any known variation of the standard Morse code.

Space transmissions below 30 MHz can be tuned in on any communications receiver covering the appropriate frequencies. However, you may find an external preamp or pre-selector helpful when trying to snag weak signals. Antennas can be simple: a dipole cut for 20 MHz or a longwire fed into an antenna tuner will do fine. Soviet voice transmissions on 143.625 MHz are well within the range of any receiver capable of tuning the Amateur two-meter (144 to 148 MHz) band. However, almost all Amateur two-meter FM receivers are set up to receive FM using 5 kHz deviation. The "wide band" Soviet voice signals will be quite distorted on most two-meter FM receivers. There are many surplus receivers covering two-meters available, however, and these have wider bandwidths or can be easily modified for wider bandwidths.

As you can see, listening to voices from orbit isn't impossible or even difficult. Give it a try, and report the results to "Communications Confidential" each month.

## Some Currently Transmitting Satellites

**ATS-1** 135.55, 135.575, 135.60, 135.625, 135.645, 136.47, 137.35 MHz

Applications & Technology. Synchronous, circular equatorial orbit over 151 W. Long. (near Hawaii) with apogee of 19627 NM and perigee of 19561 NM after launch on 7 December 1966. The Spin Scan Cloud Camera returned the first photo covering nearly the entire disc of the earth and has since returned many thousands of photos. Communications, spacecraft technology, and science experiments included in payload.

**ATS-3** 135.55, 135.575, 135.60, 135.625, 136.47, 136.645, 137.35, 412.05 MHz

Applications & Technology. Nine experiments involving communications, meteorology, earth photography in color, navigation, stabilization and pointing, degradation of surfaces in space and ionosphere.

**ATS-5** 135.55, 135.575, 135.60, 135.625, 136.47, 136.645, 137.35, 412.05 MHz

Application & Technology. To conduct carefully instrumented gravity gradient orientation experiment directed toward providing the basic design information for the stabilization and control of long-lived spacecraft in synchronous orbit.

**EXPLORER 27** 40.00, 41.00, 136.74, 162.00, 324.0, 360.0 MHz

Geodesy mission. Ultrastable oscillators for precise Doppler tracking of orbital perturbations to obtain description of planet's gravitational field; laser tracking experimentation. Continuation of EXPLORER 22 ionospheric measurements.

**EXPLORER 50** 136.02, 136.80, 137.58, 137.98 MHz

Also known as IMP-J. To study cislunar radiation environment over significant portion of solar cycle, interplanetary magnetic field and earth's magnetosphere.

**GOES 1** 136.378, 468.85 MHz

Also called SMS-C. Geostationary Operational Environmental Satellite.

**GOES 2** 136.38, 468.825, 468.85 MHz  
Geostationary Operational Environmental Satellite, similar to GOES 1.

**GOES 3** 136.38, 468.825 MHz  
Along with other GOES devices, part of system to provide earth imaging, monitor the space environment, and relay weather data.

**IUE** 136.86 MHz  
International Ultraviolet Explorer to obtain high resolution data of stars and planets in the UV region of the spectrum.

**LANDSAT 2** 137.86 MHz  
Earth Resources Technology Satellite to locate, map, and measure earth resources parameters from space and demonstrate the applicability of this approach to the management of the world's resources.

**LANDSAT 3** 137.86 MHz  
Same mission as LANDSAT 2.

**NIMBUS 5** 136.50 MHz  
A stabilized earth-oriented platform for the testing of advanced systems, sensing and collecting meteorological land geological data.

**NIMBUS 6** 136.50, 401.20 MHz  
Meteorological satellite. R&D of instruments for expanding capabilities for the remote sensing of atmosphere.

**NOAA 6** 136.77, 137.50 MHz  
Operational weather satellite.

**NOAA 7** 136.77, 137.77 MHz  
Operational weather satellite.

**SMS 2** 136.38, 468.825 MHz  
Developmental meteorological satellite providing continuous observation of environmental phenomena. To aid in designing an environmental network for observations and early warning.

**TRANSIT** series 54.00, 149.988, 150.00, 324.0, 399.968, 400.0 MHz  
Navigation satellite series. Provides precise position on earth regardless of weather or time of day. (This information courtesy CRB Research.)



Programs are sent from the Army's Academy of Health Sciences via this transmitting dish, which feeds them into the WESTAR III satellite. Downlink frequency is 4160 MHz. (U.S. Army photo)

# Yes! You Can Monitor The Army TV Satellite Network

## Army Instructors Use Commercial "Bird" WESTAR III

BY RICK SONNTAG

**E**ducation through the ultimate in correspondence courses which travel 45,000 miles instantaneously, is being offered daily by the U.S. Army Health Services Command (HSC), headquartered at Fort Sam Houston, Texas.

HSC is the first military organization to exploit a satellite positioned 22,500 miles in space to meet educational needs of its personnel. The Health Services Command television satellite network is capable of providing timely, accurate, and relevant education and training to all Army Medical Department personnel regardless of assignment, job specialty, or location.

The satellite TV system has been telecasting since November 1979 from studios at the Television Branch of the Academy of Health Sciences.

The original network has now been expanded to include Fort Hood, TX; Fort Polk, LA; Fort Sill, OK; Fort Leonard Wood, MO; and Fort Campbell, KY; as well as Fort Sam Houston.

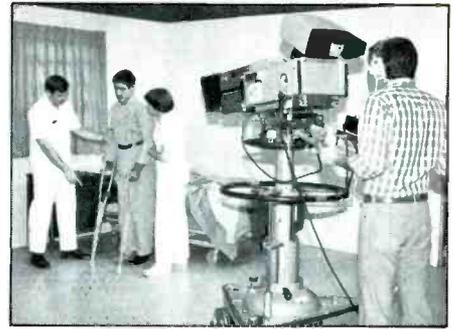
There are two daily network programs, each one an hour in length. The first is called "Studio B" and is aimed at "hands on" readiness training for the enlisted viewer. These

programs include such subjects as obtaining vital signs and charting, alcohol and drug abuse requirements for the Skill Qualification Test, and how to carry a litter correctly—almost any medical skill subject is presented to help enlisted soldiers become more proficient in their military job.

The programs train the soldiers without sending them to a special school or course. The expertise provided by those who conduct seminars and panel discussions can be passed to many posts at the same time, covering a wide range of topics during a short period. In addition, soldiers can see models, diagrams, photos, and film, all of which adds increased dimension to the subject.

Noncommissioned officer development programs are also included on "Studio B," and occasionally there are programs dedicated to the physician's assistant.

The second program is geared toward professional medical personnel—primarily physicians and nurses. Produced by Brooke Army Medical Center, it provides the latest information in areas ranging from acute injuries seen in emergency rooms to newer concepts in understanding and management of heart disease.



SP/5 William Ley, Studio B satellite team member, offers a demonstration for the Army's TV audience. (U.S. Army photo)



A U.S. Army teleconference about officer training. Photo taken from WESTAR III satellite, courtesy of Mark Long.

Through the use of two-way telephone communication during live programming, viewers can ask questions of the instructor. This provides a unique approach to educational television.

Because of the portability of the HSC system, experiments have been conducted in teleconferencing and teleconsultations. Examples are satellite transmission of conference at Letterman Army Medical Center in San Francisco and William Beaumont Army Medical Center in El Paso. The Letterman conference drew approximately 275 military and civilian physicians. Through the teleconference concept, an additional 200 Army physicians viewed the conference and received Army Medical Association Category I continuing medical education (CME) credits for the experience.

Demonstrations designed to measure the satellite's potential for teleconsultations have been conducted in the field of radiology, including uses in forensic dentistry. Results have been extremely favorable and could potentially extend the services of radiologists to remote sites for both health care and training.

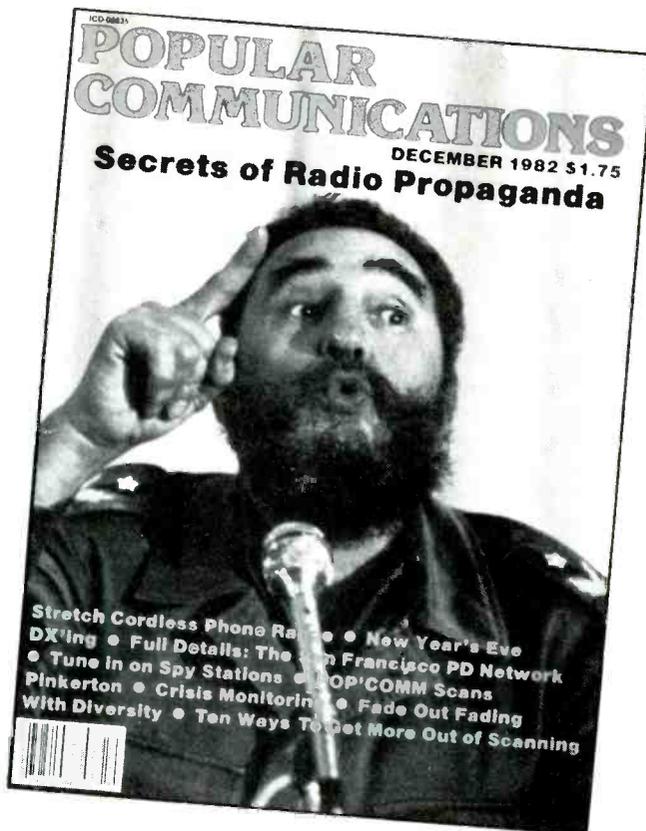
Through the space-age revolution of satellite communications, HSC's health care personnel receive continuing education and training each day, thus enhancing their readiness position of providing quality health care in peacetime and in war.

The programs utilize the Westar III satellite on a frequency of 4160 MHz. Officials say over 300 persons outside the Army have heard the transmissions.

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## ESTABLISHING SURVIVALIST COMMUNICATIONS SYSTEMS

### *The Licensing Dilemma*

**E**stablishing a Survivalist communications system has several basic facets that must be addressed prior to becoming directly involved with transmitting equipment. It's my intention to bring some of these to your attention so that you can decide upon a course of action. I've based my observations on a number of Survivalist installations known to exist in this country.

#### **Licensing**

Within the United States and its territories and possessions the law requires that all transmitters (with the exception of certain specific low powered equipment) be licensed by the Federal Communications Commission. In the case of Amateur Radio stations, operators must pass a test in order to use such a station on any authorized Amateur frequency. Several types of Amateur Radio license ("Ham ticket") are available, each type having certain qualifications which are covered in the test for that particular license, and each type of license granting certain specific operating privileges. One type of Ham ticket permits only CW operation on HF frequencies; other types grant various operating privileges in specific frequency bands.

At the present time, operators must demonstrate a knowledge of CW in order to obtain any type of Ham ticket, although there is some possibility that a new category of Amateur Radio license may be created which eliminates the CW requirement and will permit voice operation on some VHF bands. All types of Ham ticket exams require that licensees demonstrate a certain amount of technical knowledge and that they are familiar with the FCC's rules and regulations governing Amateur stations.

CB stations are permitted to operate on 40 specific 27 MHz frequencies using AM or SSB. It appears that the FCC may be eliminating the requirements for obtaining licenses to operate CB stations. At the present time, a license is required, but no operator proficiency test is required—only the filling out of a simple application form. Stations are subject to operation in accordance with FCC rules and regulations.

Persons may also be qualified to obtain licenses in a number of business, industrial, and other radio services. No operator proficiency exam is required, as in Amateur radio. However, the FCC has established guidelines that state qualifications which must be met prior to the granting of a license. For the most part, these radio services are explained in FCC Part 90 covering Private Land Mobile Radio Services. Some of the



*The Regency VX-7 is a precision short range communications device that operates in the 49 MHz license-free band. This makes it worthy of serious consideration for those who are wrestling with the dilemma of obtaining a license.*

services covered in this Part include: Special Emergency Radio Service, Business Radio Service, and the Special Industrial Radio Service. A license in any of these radio services will normally entitle the licensee to operate on only one specific assigned frequency, and most likely in the 30 to 50 MHz, 150 to 160 MHz, or UHF bands. Only certain FCC type-accepted equipment may be licensed. Each radio service has been established with various rules and regulations regarding permissible communications that may be conducted under the terms of the license grant. None of these radio services would seem to permit private Survivalist communications systems, however, under the terms of the license grant.

The General Mobile Radio Service is a radio service operating in the 462 MHz band. No operator proficiency exam is required in order to obtain the FCC's license, and the licensees may utilize such stations for personal efforts, such as Survivalist systems. Several channels are available for license grant and repeaters may be used.

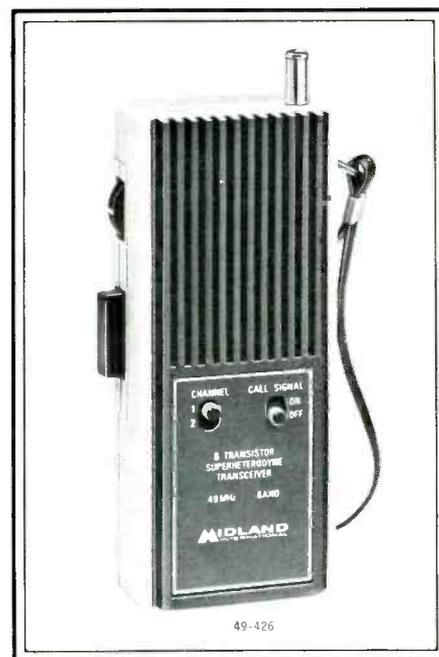
#### **Unlicensed**

Operating minus an FCC license is not unknown. However, it's clearly against the

law. If caught by the authorities, the operator of an unlicensed station could face fines or imprisonment, or both. Such a station could well cause interference to authorized services, and that's one of the reasons the government has looked with disfavor upon such operations.

Those who operate unlicensed stations generally offer several reasons to justify their actions. You may agree or disagree with them, but for whatever it may be worth to you, some of those reasons include:

1. Chances of actually getting caught are minimal providing care is taken.
2. Chances of actually causing interference are minimal providing care is taken.
3. Not wanting to be listed in the government's computer.
4. Unwillingness to comply with prescribed operating rules.
5. Use of equipment that can't be licensed.
6. To maintain secrecy of location and operations.
7. To use frequency(ies) that cannot be obtained under a license.
8. Those who foresee a total collapse of our society due to war or other national ca-



*Midland International's 49-426 low powered unit comes equipped for operation on 49.86 ("Channel C") and you can also add a second channel. Nice little unit doesn't require a license and should give coverage of up to half a mile. Don't forget that short-range coverage is often an asset, offering privacy and the ability to avoid detection.*

lamily cite that FCC licenses and rules will be worthless scraps of paper under such circumstances—same as a pistol permit, hunting or fishing license, drivers' license, paper money, or deed to land.

The most popularly encountered unlicensed communications stations at the present time are called "Free Band" stations. These operate in the general frequency range of 26.500 to 26.960 MHz and 27.410 to 27.990 MHz using AM and SSB. There are, however, unlicensed long-range and short-range communications found throughout the radio spectrum from 2 to 500 MHz. While not all of these are operated in conjunction with survival communications, a number of them are. The many Survivalists using PRC-77 military surplus transceivers (30 to 76 MHz band) are operating without licenses, as are those operating on Maritime Radio Service frequencies such as 156.375, 156.40, 156.525, 156.625, and 157.425. If Survivalist communications taking place on the Business Radio Service frequencies of 30.84, 33.12, 33.40, 35.02, 42.98, 151.625, 154.57, 154.60, 457.525, 457.55, 457.575, and 457.60 are coming from licensed transmitters, undoubtedly the operations are outside of the grant of the license. Same with Special Industrial Radio Service frequency 151.505, also seemingly in use by Survivalists.

Authorized unlicensed communications may take place, according to FCC regulations, using certain specific low-powered FCC-approved equipment on the following frequencies: 49.83, 49.845, 49.86, 49.875, and 49.89 MHz. Equipment such as the Regency VX-7 and various hand-held transceivers are available for this purpose. Unfortunately, while some of this equipment is intended for serious communications work (such as Regency's VX-7), some of the gear we've seen thusfar for this band consists of units that are little better than a child's walkie-talkie.

Although there are Survivalists operating on some frequencies below 26.965 MHz, we know of none authorized by the FCC, with the possible exception of those operated by licensed Amateurs in the Amateur Radio Service. Of course, systems that rely upon being licensed in the Amateur Radio Service will require that *all stations in the system* be operated by persons who are individually licensed in that service.

## Determining

Based upon these factors, the Survivalist should assess his communications requirements and then determine a course of action. Whether to be licensed or not appears to be a matter of requirements and viewpoint; operating while unlicensed is certainly not recommended. It is not necessary, at this time, to possess any type of FCC license in order to purchase transmitting equipment—hence the large number of unlicensed stations.

Let's look at some of the uses of communications equipment to be utilized by hypo-

thetical Survivalists. These would include:

1. For long-range communications with other stations located outside local, region, or national areas.
2. For medium-range communications to stations within a regional area.
3. For short-range communications within a camp or compound; covering mobile, hand-held, and base station operations for security or other purposes.
4. For mobile or portable communications uses while in-transit.

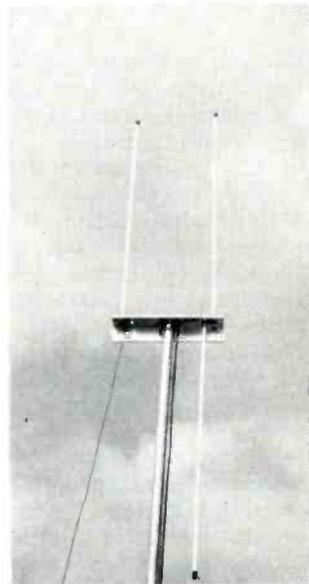
It's easy to see how a well-rounded Survivalist could determine that no single frequency or band of frequencies would be suited to all of these uses, and it isn't at all difficult to see the dilemma which therefore faces the Survivalist seeking to establish a licensed system. Unfortunately, the FCC has not established a Survivalist Radio Service to meet these demands, and it is not likely that such a service will ever be established. The service would need too many frequencies, be too hard to administer, and there is every reason to believe that whatever frequencies might be so allocated would be misused to the point of being totally useless at such time as they were really needed for emergency communications. The lessons the FCC learned by turning more than 20 million people loose on CB and then expecting them to obtain licenses and follow rules and regulations—well, those lessons were learned well and that's why they'd be gun shy ever to try anything like that again.

Current federal Civil Defense plans look toward various regional and even national mobilization plans whereby things will be neatly organized and under the complete control of various federal, state, county, and even local authorities. These plans do not seem, in any way, to consider the possibilities for a total breakdown of these systems where there might be no such authorities operating on a meaningful basis. They do not take into account the widespread panic which could ensue—when it came down to "every man for himself." Apparently, they do not foresee the possibilities that such a situation could come to pass. For the government to establish a Survivalist Radio Service, such as I've outlined, would cause them to admit this possibility. This is another reason it's doubtful we'll see the creation of such a radio service. That doesn't mean the service isn't required. It is required.

Those who are inclined to be licensed will find ways of becoming licensed, as many have already done. Those who are not inclined to be licensed will probably operate without licenses, regardless of opportunities they may have; that's *their* problem.

In various future issues we will be delving into the selection, installation, storage, and effective operation of Survivalist communications systems. During those discussions, I'll be assuming that everybody has obtained whatever licenses may be required for operation in one or another radio service, or is seeking information on obtaining such licenses. Those who decide to forego the formalities of licensing do so at their own risk.

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## WHAT'S HAPPENING: INTERNATIONAL SHORTWAVE BROADCASTING BANDS

**G**lad you could stop by again. Hope you are keeping those tubes or transistors busy and those dials spinning, coming up with some interesting catches.

As we continually stress here in "The Listening Post," shortwave broadcasting is a constantly changing scene, with propagation factors causing a DX station to show up for a few days, only to disappear for months or years. Or, a Latin American broadcaster's shortwave outlet will suddenly vanish for reasons ranging from lack of a replacement part to a shortage of electrical power to simple disinterest on the part of the station's ownership.

Yet another element in the always-changing shortwave broadcasting picture is the never-ending upgrading game, a sort of electronic "keeping up with the Joneses" which goes on with the major broadcasters and even some of them that aren't so major.

Within the past year or so, construction has begun or been completed on, or plans have been announced for a number of stations involving new, high power transmitters, new antenna systems, or even new relay bases, all designed to help the broadcaster get his programming to the listener on a more reliable basis.

The Austrian Radio has new high power transmitters and a new antenna system to help pump out a bigger signal. Radio Netherlands has broken ground for a new transmitting plant which will eventually include four 500 kilowatt transmitters. The Voice of Germany now has an agreement with Sri Lanka to put a new high power relay base there. And the Voice of America is working on concluding an agreement to do the same thing, also in Sri Lanka. Radio France International plans a relay station in French Guiana. Radio Norway may have their 500 kilowatts on the air by now.

One country that really needed higher power was Denmark. Radio Denmark stuck to its two frequencies of 15.165 and 9.520 MHz, taking whatever interference came along and suffering the consequences for years. Now, they too have the magic 500 kilowatts and there are more of these transmitters in the planning stages for Denmark if they can agree on a place to put them.

Many people concerned with shortwave broadcasting, including various government telecommunications agencies, regret the move to these gigantic power levels. Despite a recommendation to limit future power growth at the World Administrative Radio Conference, it seems likely that the power game on shortwave will continue.

### Turkey Talk

Talking about high power leads us to a brief look at the nation of Turkey, where

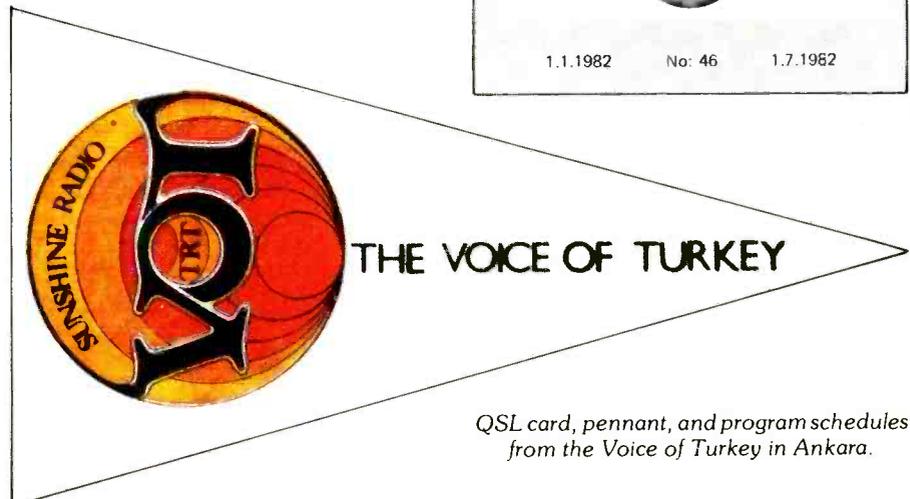
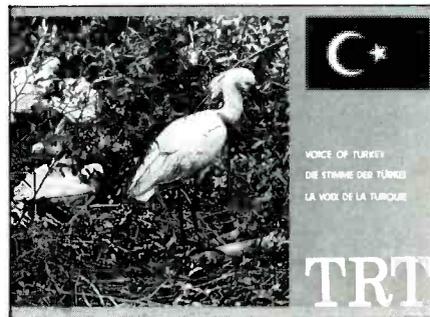
higher power is also in vogue. Turkish radio and television (the Voice of Turkey, Radio Ankara, Sunshine Radio, take your pick of the various names used by the official government radio) has recently put their own 500 kilowatts on the air. Like Denmark, Turkey too was in a situation that did not allow for much more than fair reception of their programs in many areas of the world, including the United States.

Radio Ankara has been around since 1938, making them a member in good standing of the pre-World War II shortwave broadcasters. You can check for English to North America from The Voice of Turkey from 2200 to 2300 GMT on 11.900 and again from 0300 to 0400 on the same, and perhaps other frequencies. English to Europe is scheduled from 2000 to 2100 and 2200 to 2300; to Southeast Asia from 2200 to 2300 and 1200 to 1300; and to The Balkan Countries and the Far East from 0900 to 1000. Needless to say there are also rather extensive broadcasts in Turkish.

Frequencies for the Voice of Turkey include: 7.105, 7.155, 9.560, 9.615, 9.660, 11.900, 11.955, 15.125, 15.220, and 17.760. Reception reports are welcomed. Address them to the Voice of Turkey, P.O. Box 333, Yenisehir, Ankara, Turkey.

The Voice of Turkey isn't the only broadcast listening target in the country, however. At one time there were a considerable number of very low power, very limited schedule high school and university stations operating in the 7 MHz range. To our knowledge, none were ever heard at much of a distance, and the status of these stations today is unknown. They probably no longer exist.

There are two targets you do have. One is the Voice of Meteorology from Ankara, which is essentially a weather station with regular musical broadcasts as well so that



QSL card, pennant, and program schedules from the Voice of Turkey in Ankara.

shortwave broadcast DX'ers feel free to qualify it as a broadcasting station. The station operates in Turkish only with weather reports and Turkish folk music on 6.900 MHz with 2.5 kilowatts. Sign on is listed for 0455 GMT but it has been reported as early as 0400. It can be heard in North America with good conditions and some careful tuning. Reception reports on this one can be sent to the Turkish State Meteorological Service, P.O. Box 401, Ankara.

If you log the meteorological station, hustle down to 6.340 MHz and try for Turkish Police Radio at about the same time. The power is less, 1 kW, but it, too, can be heard and sometimes with surprisingly good signals if conditions are right. The station has a somewhat erratic verification track record, but they're certainly worth a try if you hear them. The address is Turkey Police Radio, T.C. Iciseri Bankanligi, Emiyet Genel Mudurlugu, Ankara.

Incidentally, we'll be doing these country closeups fairly regularly, so your suggestions on where to travel will be welcome.

## New Man

The Association of North American Radio Clubs, which is an umbrella organization representing all the major United States and Canadian DX Clubs, has a new Executive Secretary. Terry Colgan of 8120 Ripplewood Drive, Austin, Texas has taken over as ANARC's number one for a two-year term. Terry replaces Dave Browne, who guided ANARC since 1974. Dave was the first ANARC Executive Secretary to continue in office for more than just one term, thus giving the organization some much-needed stability. ANARC grew in stature and accomplishments under Dave's leadership and for that he deserves a thanks and "well done!" And best wishes from "The Listening Post" to Terry Colgan as he assumes ANARC's helm.

## Mail Call

Larry Rempala of Illinois notes that he is returning to DX'ing after a long time away from the hobby and is getting back into listening and sending reception reports. He's using a 30 year old Zenith Transoceanic.

"I love it!" That's the reaction of Bill Mayer of Pennsylvania to *Popular Communications*! Bill goes on to say that he and many other DX'ers have waited a long time for a magazine like this. Bill says he's 17 years old and has been listening for about three years. He's used a General Electric ten band portable and Realistic DX-200, and an ex-Navy TCS-12 from the World War II period which was in mint condition. The only thing lacking at the moment is a power supply.

Dale Park of North Dakota has been SWLing since the mid-60's and began with a Knight "Span Master" kit, then moved on to an RCA GR-10, Hammarlund HQ145X, and Drake R4B, which is now in use along with an FRG-7 and R-1000. Good to hear from all of you and don't be shy about sending in pictures of you and your equipment. We'd love to use them!

## Publications

You can get a list of just about everything there is in the way of currently available publications relating to listening and DX'ing by writing to Radio Netherland's Media Network in care of Radio Netherlands, P.O. Box 222, 1200 JG Hilversum, Holland. It includes some cassette tapes, too. Best of all, the list is free for the asking.

To keep up to date on who's where and when with English language broadcasts, we suggest Dan Ferguson's *Guide To English Shortwave Programs*, which is issued every other month. Single copies are \$2.50, a full year's subscription is \$12.00. Write Dan Ferguson, P.O. Box 8452, South Charleston, West Virginia, 25303.

## What's On

**Austria** From Vienna, ORF is on the air to North America from 0130 to 0200 and 0330 to 0400 on 9.770 and 5.945; to the West Coast from 0430 to 0500 on 12.015 and again to North America from 1230 to 1300 on 21.535. The station has a new antenna system in use and is interested in reception reports. (Fraser in SPEEDX)

**Brazil** The external service of the Brazilian government radio, Radio Bras, features English from 0200 to 0300 on 15.290 and 17.830 and again from 1815 to 1915 on 15.125 and 17.805. (Black and Seitner in SPEEDX)

**Bulgaria** Radio Sofia beams to North America on this schedule: 0000 to 0100 on 9.700 and 15.110 and 0400 to 0500 on 11.750; and 2130 to 2200 on 15.135, from 2230 to 2330 on 9.700 and 15.110. (Sharp in SPEEDX) Radio Sofia noted from 0400 to 0430 on 11.765 with an English program on Bulgarian history and geology. (Rempala, Illinois)

**Burma** The Burma Broadcasting Service on 5.985 was heard by Stewart Mackenzie in California in Burmese at 1310. It is also on 4.725 at 1220.

**Cape Verde Islands** A rare one to try for is Emissora Oficial de Republica de Cuba Verde. Logged on an occasional basis by Bob Hill in California around 0800. (*Listener's Notebook* column, NASWA/Frendx)

**China** Stewart Mackenzie in California hears Radio Peking on 10.245 in Chinese at 1715; on 12.110 at 1745 also in Chinese; in Arabic on 15.880 at 1840; and in the home service at 1235 on 4.975. He hears the People's Liberation Army Radio (Fukien Front station) on 4.840 at 1230 in Chinese. Larry Rempala in Lisle, Illinois hears English from Radio Peking from 0200 to 0300 on 17.715.

**Clandestines** The anti-Castro La Voz de Cuba Independiente y Democratica was raided by the Federal Communications Commission. One transmitter in a home and another, mobile, transmitter were seized. The broadcasts were being made from Miami and Ft. Lauderdale, Florida. Nonetheless, the station apparently has retained at least one transmitter and continues to have its program carried over Radio Clarin in the Dominican Republic.

Mike Schulsinger in Springfield, Ohio notes La Voz de Sandino on 6.225 around

0400 and wonders about its backing. So do we Mike. Apparently its run by ex-members of the Samosa Guardia Nacional. If anyone finds an address for this station or the group, we'd sure like to have the information!

**Costa Rica** One of the long time religious broadcasters is Faro del Caribe (The Lighthouse of the Caribbean), TIFC in San Jose. English is featured Monday through Friday from 0200 to 0305, on Saturdays 0205 to 0300, and Sundays 0135 to 0305 on one or more of these frequencies: 5.055, 6.035, 6.175, or 9.645. (Moore in ASWLC)

**Dominican Republic** Along with programs of its own, Radio Clarin in Santo Domingo carries programs of La Voz del Cuba Independiente y Democratica on 11.700 beginning at 0030. (ASWLC)

**Falkland Islands** Everything old is new again. The Falkland Islands Broadcasting Station is back on 3.958 where they were a number of years ago—right in the middle of the 80 meter ham band unfortunately. Things don't get any easier! Try around early evenings, up to 0130 sign off.

**Finland** Radio Finland is scheduled to our continent from 1200 to 1225 on 15.400 and 21.475 except Sundays. On Sundays it's from 1330 to 1500; also 1400 to 1425 on 15.400 except Sundays and 1500 to 1525 on 15.400 and 21.475. (Hesch, Packard, Taylor in SPEEDX)

**France** The "Paris Calling Africa" program from Radio France International is aired daily, in English, from 1600 to 1700. Try one of these frequencies: 21.620, 21.580, 21.525, 17.850, 17.905, 17.720, 17.620, 15.315, 15.300, or 11.845. (SPEEDX)

**Guatemala** Try 6.180 in evenings or early mornings for La Voz de Guatemala. Radio Tezulutlan has added 3.370 to its long-in-use 4.835. Again, try evenings or early mornings.

**Haiti** There's never much activity from this region, but one station has returned to the air. Try 6.155 for Radio Citadelle. It's been logged around 0930 and again around 2330. (Jack Jones, in *Listener's Notebook*, NASWA/Frendx)

**Honduras** If you tune 6.000 on the nose some evening, you'll hear a station announcing as Radio Variedades, from the Honduran capital city, Tegucigalpa. But actually, this program is being relayed over an old-timer returned. The transmitter on 6.000 belongs to El Eco de Honduras in San Pedro Sula.

**Iceland** Check 13.797 for the Icelandic State Radio noted at 1855 by Stewart Mackenzie in California.

**Indonesia** The Voice of Indonesia noted on 11.790 with English news by a woman at 1455; and Radio Republik Indonesia's outlet at Ujung Pandang on 4.719 at 1005. (Mackenzie, California)

**Israel** Kol Israel was observed in English on 17.630 from 2230 to 2300 and 0500 by Rempala, Illinois. It is scheduled to North America and Western Europe at 0500 to 0515 on 21.760, 15.585, 15.105, and 11.640; 1200 to 1230 on 21.760, 21.625, 17.630, and 15.405; from 2000 to 2030 on 21.495, 17.630, 15.585, and 15.425; from 2230 to 2300 on 15.425, 17.630, 15.585, and 11.640; from 0000 to 0030, 0100 to 0125 and 0200 to 0225 on 15.585,



Terry A. Klasek of St. Louis, Missouri in his shack with Hammarlund HQ-180 and Panasonic portable receivers.

11.640, and 9.815. (Bill Mayer, PA)

**Italy** "World Music Radio," a group which used to transmit regularly over Radio Andorra before Andorran shortwave broadcasting was closed down, is now on the air over an Italian quasi-pirate station, Radio Milano. Try 6.222 on the weekends. Eventually, broadcasts are planned for 24 hours a day with higher power and one or more additional frequencies. Reports go to P.O. Box 4078, Amsterdam, Holland. RAI in Rome was noted by Dale Fisher in North Dakota to 0120 on 9.575 and 11.800.

**Kampuchea** The Voice of Kampuchea is on in English, French, and local languages from 0000 and from 1200 on 9.695 and 11.940, with 15 minutes of English at the beginning of each of the two transmissions. (Manning, ASWLC)

**Malta** The government of Malta has shut down the Voice of Germany relay station on the island. The station also carried a number of other programs from various organizations. (Radio Netherland Media Network via *Listener's Notebook*/NASWA-Frendx)

**Mexico** An old-timer, La Voz de la America Latina, XEWW has reactivated a 19 meter band frequency, 15.176. Reported on 9.515, a channel from the old days, and on 15.160. (Bob Hill and Jack Jones, *Listener's Notebook*/NASWA-Frendx)

**Mongolia** Radio Ulan Bator is scheduled daily except Sundays from 1200 to 1235 and 1400 to 1435 and 1445 to 1520 on 6.383, 7.235, and 12.070. (Radtko/SPEEDX)

**Nepal** Radio Nepal has a schedule of 1435 to 1520 on 3.425 and 9.590. (Whitte/SPEEDX). They are frequently noted earlier, especially on their 90 meter band outlet.

**Netherlands Antilles** Trans World Radio from the island of Bonaire, 9.730 from 0445 to 0500. (Rempala, Illinois)

**Nigeria** Radio Nigeria from Lagos was noted at 0600 on 7.255 with African music and news about Nigeria. Heard with a good signal. (Robert King, Austin, Minnesota) One of the several Nigerian broadcasting organizations, which are all part of the Federal Radio Corporation, is Radio Kwara from Ilorin. They are scheduled on 7.145 from

0400 to 2303 in English and local languages. (SPEEDX)

**Qatar** The Qatar Broadcasting Service in Doha runs its Arabic programs from 0245 to 0705 on 9.570 and 15.505; from 0705 to 0900 on 9.570; from 0900 to 1600 on 9.570 and 17.910; 1600 to 1700 on 17.910; and 1700 to 2130 on 15.505. (Welch/SPEEDX)

**Saudi Arabia** The Broadcasting Service of the Kingdom of Saudi Arabia has English from 1100 to 1200 (1000 to 1300 on Thursdays and Fridays) and from 1700 to 2100 on 11.855. (Laskowski/ASWLC)

**Sierra Leone** The SLBC was noted with news in English at 0645 on 5.980. (MacKenzie, California)

**South Korea** Radio Korea is on to the Americas from 0200 to 0300 on 11.810 and also from 0530 to 0630 and 1330 to 1430 on 9.750. The General Service runs from 0000 to 0100 on 7.275, 0200 to 0300 on 15.575, 0400 to 0500 on 9.640, 1300 to 1400 on 6.135, and 2130 to 2230 on 15.375. (Berri, Lambert, Thompson/SPEEDX)

**Sri Lanka** The SLBC on 11.800 noted in Hindi at 1520 by Stewart MacKenzie.

**Sweden** Look for Radio Sweden to North America from 0230 to 0300 on 9.695 and 11.705, also at 1400 to 1430 on 21.615, and again from 2300 to 2330 on 9.696 and 11.705. (Pickard/Zilmer/SPEEDX)

**Taiwan** The Voice of Free China was heard at 2140 to 2240 on 9.685, 11.825, 15.270, 17.800, and 17.890 by Dale Fisher in North Dakota. Some or all of these may have been relays by WYFR in the USA.

**Unidentified** Larry Rempala in Illinois needs help with an Arabic-speaking station he heard around 2240 somewhere between 11.700 and 11.800. He thought the ID sounded something like "Voice of Schabeir or Schabere." There are a dozen or more Arabic-speaking stations in this area, so it's impossible to say for sure. Perhaps Algeria?

**United Arab Emirates** Radio Dubai is scheduled to North America from 0330 to 0400 on 15.300. (Smith/SPEEDX)

**United States** We have this schedule for

WRNO Worldwide in New Orleans: 1800 to 2000 on 15.420; 2000 to 2300 on 17.775; 2300 to 0100 on 11.855; 0100 to 0300 on 9.705; and 0300 to 0500 on 6.185. On Sundays: 0600 to 0800 on 9.550; 0800 to 1000 on 6.115; and 1000 to 1400 on 9.670. (Bill Mayer, Pennsylvania)

**USSR** Russian loggings from Stewart MacKenzie in California: Frunze on 4.050 in Russian at 0935 (in single sideband); Khabarovsk on 4.610 at 0955 in Russian; Zhigulevsk in Russian on 7.310 at 1605; Magadan on 7.320 in Russian at 1610; Petropavlovsk on 9.580, RadioMoscow World Service at 1645; Khabarovsk with the home service in Russian at 1703 on 11.690; Vladivostok on 4.040 in Russian at 1150; and Petropavlovsk on 4.485 in Russian at 1205.

**Vatican State** The Vatican's brief broadcasts to North America are scheduled from 0100 to 0115 on 6.015, 9.605, and 11.845. (Ewing, Picard/SPEEDX)

Please keep in mind that transmission times, frequencies in use, and programs are continually being changed and adjusted. In addition, propagation plays an important part in what can be heard, especially on the lower bands below 7 MHz, and thus we cannot guarantee complete accuracy of schedules and logging information.

Thanks to: SPEEDX, Lake Elsinore, California; Larry Rempala, Lisle, Illinois; Glenn Hauser's *Listeners Notebook* column in *Frendx*, the publication of the North American Shortwave Association; Mike Schulsinger, Springfield, Ohio; The American Shortwave Listener's Club, Huntington Beach, California and Stewart MacKenzie; Bill Mayer in Allentown, Pennsylvania; and Dale Fisher, Dickinson, North Dakota.

Let's hear from you with your loggings, schedules, comments, questions, good copies of your more interesting QSLs, and photos of you and your listening post.

We'll be back again next month with more from "The Listening Post."

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CIRCLE 65 ON READER SERVICE CARD



# Going GMRS

BY GORDON WEST, WB6NOA

## UHF-FM Personal Radio Service Has Many Uses And Is Still Underutilized

**C**lass A Citizens Band was what it was first called. Now it is simply abbreviated "GMRS." This almost-unknown oasis of 8 channel pairs (16 discrete frequencies) is nestled between a crowded sea of business and telephone frequencies in the UHF/FM service. There are only 22,000 licensed GMRS stations on these channels, and the frequencies are wide open for new systems.

The GMRS channels have been around for over a decade, and those that operate on these frequencies say little about their systems. There is a good reason why these

system operators are so quiet—they want these frequencies all to themselves.

Base and Mobile	Mobile Only
462.550	467.550
462.575	467.575
462.600	467.600
462.625	467.625
462.650	467.650
462.675	467.675
462.700	467.700
462.725	467.725

GMRS frequencies.

### Forgotten Frequencies

These 16 frequencies are divided into 8 channel pairs. Each channel pair has a 5 MHz separation. Repeater stations transmit on the low frequency pair. Mobile units transmit to the repeaters on the upper frequency pair. Mobile units may also inter-communicate between themselves (simplex) on the repeater output frequency, the lower frequency pair.

There had been little use of these 8 channels until about four years ago. The advent of an economical UHF transceiver, as well



When the San Diego County (Calif.) Construction Industry Freeway Patrol established its services, they decided to use GMRS as a backup to CB Channel 9.

Typical GMRS hand-held unit is small and efficient. (Photo courtesy Tamaphone)

GMRS has been put to work by a number of emergency service organizations such as the ARCO "Go Patrol."





REACT teams have recently begun making use of GMRS UHF-FM communications because staying-in-touch between the base and mobile units is often difficult on 27 MHz, due to skip interference and crowding.

GMRS in-action on the campus of a university in Southern California.

Yaesu offers lots of useful accessories along with their GMRS hand-held, including carrying case, battery charger, cigar-lighter power plug, etc.

Midland's GMRS Model 70-625 mobile unit has a remote control head and loudspeaker. Transceiver itself can be trunk-mounted.

Standard Communication's GMRS mobile unit doing double-duty as a base station with the simple addition of a console containing a power supply and loudspeaker.



as UHF portable equipment and UHF repeaters, made it less expensive to develop a GMRS system.

Now that UHF equipment is pouring in from Japan, more and more individuals and businesses are considering going GMRS. It's also snagged the interest of Survivalists and those providing emergency services.

"About eight years ago, I was quoted \$5,000 for a couple of mobile units and the use of a shared repeater on GMRS. Last month I bought two mobile units, brand new, at \$495 each. I pay \$20 a month repeater usage fee, and it's the best radio system I have ever used," comments Bill Alber, a search and rescue coordinator in the San Francisco Bay area.

"I also like this system because I am not restricted to just business or emergency communications for our rescue group. I may also

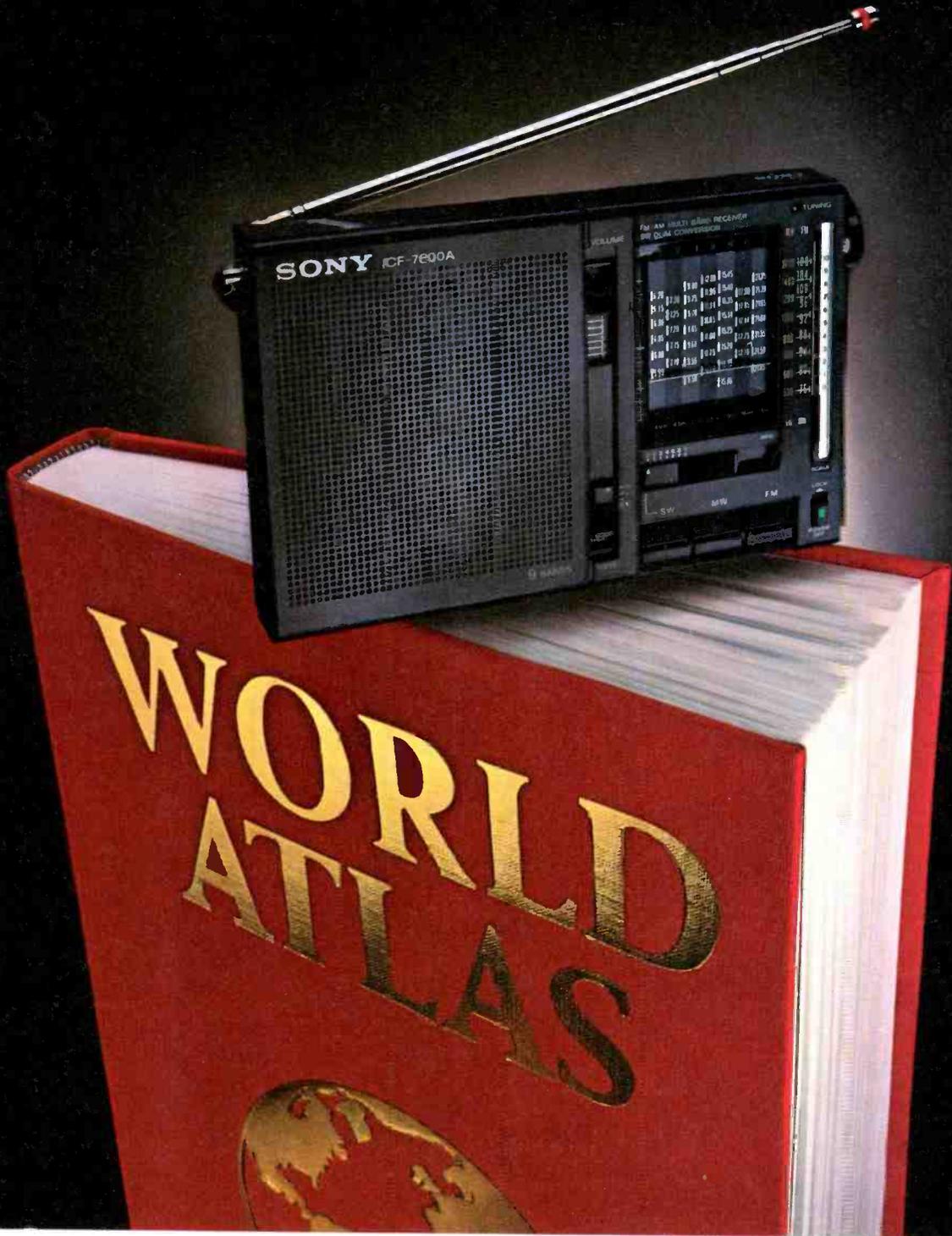
communicate personal messages with my family, and that's completely legal," adds Alber.

### REACT And GMRS

REACT teams throughout the country are just finding out about the GMRS system. Going GMRS allows them to intercommunicate among team members and individual team units up to 150 miles away. REACT units throughout the country have adopted the frequency pair 462.675 MHz for their operations.

"Class D citizens band congestion is so bad we can barely hear another 27 MHz REACT base station 5 miles away. It's almost impossible to conduct any form of intercommunications on the 27 MHz CB band. Because of the congestion, we are barely able to hear distress calls on Channel





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CIRCLE 74 ON READER SERVICE CARD

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

allows us to coordinate our monitoring guard of Channel 9, and increases the utility of our operation," comments Gene Richards, at a local national REACT conference.

"Sure I wish I had a GMRS unit. That's class to talk over one of those small portable sets as opposed to this huge CB radio with a mile-long antenna. Those small GMRS sets also sound so much clearer," comments another REACT delegate.

Narrow band ( $\pm 5$  kHz) FM modulation keeps out static and allows for crystal clear communications. Up to 50 watts of power output is allowed to make any mobile or base station heard clearly. Now add a gain antenna, selective signaling, and subaudible tone (CTCSS), and you're talking ultra-clear, very sophisticated, communications.

## Getting on GMRS

Monitoring GMRS frequencies with a scanner is a snap. Simply tune in the base and repeater side of the 8 channels. This way you will hear both sides of the conversation loud and clear through the repeater. You may also hear local mobile units as they "talk around" the repeater on simplex.

Getting on a GMRS system is a lot tougher than just tuning in on a frequency and using it. Operation on GMRS most definitely requires licensing, and your license does not give you all the GMRS channels—only one channel pair. Your GMRS license allows you to communicate with specific stations on a specific frequency. It is not a license that will allow you to talk to random or unknown stations on many frequencies.

## FCC Form 574

Applicants for a GMRS license must first fill out FCC Form 574. This form is available from any FCC office.

The easiest way to handle this whole licensing matter is to let a GMRS equipment dealer help you out. These dealers will help you plan your system, choose an open channel, and guide you on to the UHF airwaves with a minimum of hassle. They may also assist you in your equipment considera-

tions, channelization, subaudible tones, and other add-ons to your GMRS system.

Many dealers work closely with local REACT units in supplying both communications equipment, as well as licensing assistance. Many of these same dealers own and operate the repeater that REACT units may transmit through.

For some REACT members, this is great. For others, it may be a problem if your members may decide to buy the equipment from an organization other than the one supplying the repeater!

REACT members presently using GMRS are also quite concerned about an FCC move to rewrite the GMRS rules (Docket No. 82-84). Most REACT members feel the GMRS rules rewrite is too long and technical, which would confuse the service.

## The Future Of GMRS

The proposed FCC rewrite of the rules may determine the overall utility of the GMRS for private users and REACT. Single channel licensing and strict licensing procedures may help to keep GMRS on the right track.

Licensing stations for operation to only one system may restrict the utility of GMRS. Many REACT members are hoping the new rules may allow "master" GMRS systems throughout the country on a single frequency pair that any REACT member may use. FCC rules now prohibit a GMRS user from coming up on another system without specific written approval from that system.

GMRS is in its infancy, yet the 8 channels could provide for some well planned national and regional systems. Since personal, business, and Survivalist communications are well suited to these frequencies, the future of GMRS appears rosy.

For those of you wishing to check out currently available GMRS equipment, ask your local communications dealer about units produced by Standard Communications, SBE, Ritron, Aerotron, Yaesu, Midland International, Tamaphone, ICOM, and other manufacturers. There's equipment for every possible type of use now being produced.

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CIRCLE 57 ON READER SERVICE CARD

# FREE RADIO FOCUS

BY AL MUICK

## ACTIVITIES OF UNDERGROUND BROADCASTERS

**W**elcome to another month of information for you counter-culture types out there! We've got lots of material this month, including the second half of the story on Radio Gerona, plus how to build a stereo signal generator for FM, and a slew of pirate radio information. So, let's begin . . .

A station called KSSR was heard on 14547 kHz in the 1800 GMT time slot with rock music, promos for a pirate radio newsletter, and some comment about the FCC. The DJ's name is Bud Weiser and he says to look for them on or near that frequency in the future. The address is Box 4948, Arcata, CA 95521.

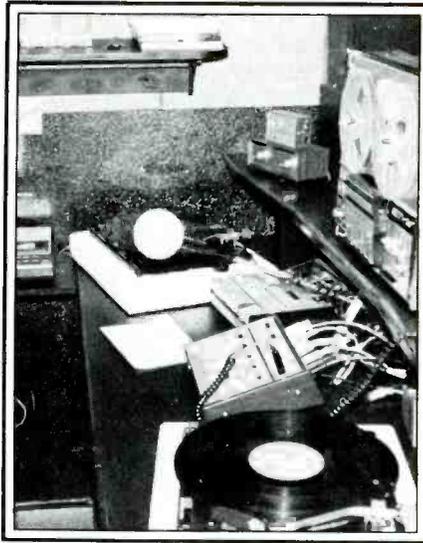
Another "newbie" is Radio Toronto, the Voice of Free Ontario, heard playing music from *J. Geils Band* on 7425 kHz at 0100 GMT. Free Radio is operating in Canada because the FCC (Canadian type) does not go after them.

KQSB is still alive and well and living in California and they continue to operate sporadically on 7425 kHz. 7425 is the most recent frequency to have grown popular with Free Radio stations (the previous ones have been in the 6.2 to 6.3 MHz range), but unfortunately, it suffers extreme interference from jammers and utility stations.

SYNCOM Radio will be testing with experimental shortwave stereo programs this winter! It's not a new idea, but SYNCOM is one of the first stations to put this idea into practice! This will be accomplished by running two frequencies in the same band in parallel...one for each channel. To obtain a stereo effect, you will need two receivers, preferably connected to different antennas. Place them two feet apart, or better yet, use a pair of stereo headphones. You can expect difficult reception at first, since neither frequency will be hi-fi or more than 25 watts out and each will be connected to an antenna with a different radiation pattern. Thanks to Chuck Felcher of SYNCOM and to Gregg Bares for that information.

Radio Alpha Corona is a new station that was heard (being relayed by SYNCOM) on 7430 kHz with rock music, ID, etc., but with very poor modulation. The address was not clearly heard, but I hope to have more info on this one in the future. That about does it for the pirate news this time, so let's go on to the second and last installment of the Radio Gerona International story . . .

"Free Radio listeners should always make their reports over a time span of twenty minutes, except when the station suddenly leaves the air (as in a raid), or when the station is no longer audible (as in pirate DX tests from Europe to the USA and vice versa). They should always comment on the reception using the standard SINPO code or a clearly written statement as to what recep-



*A closeup view of the Radio Gerona control room and studio.*



*None other than Daniel Kay at the controls of Radio Gerona.*

tion conditions were like. Most important are the amount of program details included. Always try to include as many of these as possible, as even if you correctly report the other conditions of reception, omission of program details will almost always result in a non-QSL from the station. Tell the station what you have in the way of receiving equipment and antennas, and always include return postage!

"Another way to ensure QSL's from pirate stations is to include a critique of their programming, and the inclusion of some music requests is generally not adverse to station policy. These previous pointers should pose no problem to listeners of Radio Gerona because it always has an excellent signal and exceptional audio quality, and the programs are professionally produced. Nevertheless, if you have criticisms or any ideas about the station, send them along as they are requested and treasured by most operators because, in the long run, they are trying to please the listeners! It was through suggestions and criticisms that Radio Ge-

rona International began to include music in their programs other than hard rock.

"Recently, Radio Gerona began to use the new frequency of 6225 kHz in the 48 meter band because of interference in England via another free radio station, WEFR. In the coming months, RGI will again use 6225 kHz and the programs will be lengthened, as will the transmission times. The various DJs at RGI all use their own studios, which are outfitted with equipment to the specifications of the DJs. The programs are recorded the week before transmission and are still current on transmission day. At this time, the following DJs are active on RGI.

Hendrik Gerona: Station manager + DJ for the Dutch and English programs.  
Brutus Pancake: DJ for the English letterbox program + Record Request Show  
Daniel Kay: DJ for the German program + DX Telegram

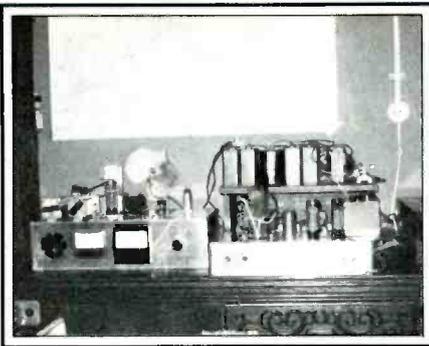
"Radio Gerona has several transmitters at its disposal. The 48 meter xmtr has an EL34 tube as the power amplifier and supplies about 30 watts to the antenna. The 41 meter xmtr has only an 807 tube in the final and supplies 10 watts to the antenna. The xmtrs are modulated with an amplifier in the final stage which uses two EL34 tubes and thusly acts in push-pull configuration. All transmitters are crystal-controlled, with the following crystals currently being at RGI's disposal: 7350 kHz—41 meters; 6290, 6275, 6235, and 6225 kHz—48 meters.

"RGI is very interested in the letters, commentaries, and criticisms of all of its listeners and requests everybody who writes in the future to pay attention to the fact that the reception report that you send must adhere to the format previously mentioned. Aside from that, letters are always welcome and will be answered as long as return postage is enclosed. The new address for RGI is: Postbus 77, NL-8100 AB Raalte, Holland."

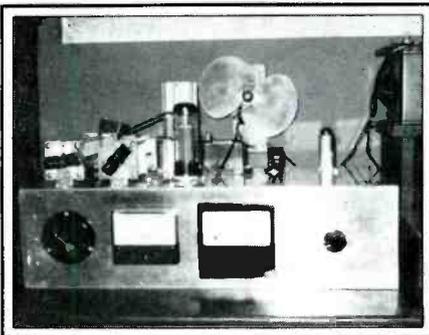
### **Pirate Television Takeover**

Jumping to another section of the globe, a strange kind of pirate television has come to Belize, a small country of many races and languages on the Caribbean coast of Central America. Local entrepreneurs are pirating TV signals from the satellites of U.S. networks, and what sleepy little Belize is viewing is a cross-section of life in those United States: football and baseball, which are not played here; the local news from Chicago; and situation comedies set in suburban homes that seem like mansions to the people here, who live mostly in tiny, wooden, unpainted houses.

"My students have all become Cubbies," said an American priest who teaches school



Radio Gerona's modulator, power supply, and transmitter.



The transmitter at Radio Gerona is a tube designed unit, all homebrew. Fan on the wall offers air cooling and heats the studio.

in Belize. "They're all Chicago Cubs fans, and I have to take time out from class to explain the fine points of the game."

"The way it's going," Attorney General Sais Musa said, "the next prime minister of Belize may be Chicago's Mayor Jane Byrne." One of the pirated signals is that of Chicago's WGN-TV which, like Atlanta's WTBS, broadcasts via satellite to cable-television companies throughout the U.S.

Musa has the power to close down the pirate broadcasters, but admits such a step might have "serious political repercussions." This country of perhaps 140,000 people has an estimated 12,000 television sets, and neighbors and relatives gather around every set every evening. Halting TV now might cause riots.

While the government ponders what to do about it, television is changing Belizean life, the same way it changed life in the United States about 30 years ago. Some parents are finding it a mixed blessing. Taxi driver Egbert Catuse said his four children, ages 9 to 17, "just stopped doing their homework."

What makes U.S. television so popular here is that Belize is the only Central American country where English is the official language—a legacy of the days when it was British Honduras and, until independence a year ago, a British colony.

Two years ago, Belize had no television. Some people had TV sets, though, and they played video cassettes on them. Then Arthur Hoare, 65, a Belize City boat builder, had an idea. He bought a used dish antenna for \$18,000, installed it in the backyard of his home and began making cassettes of

CONFIRMING YOUR RECEPTION OF  
 1616 WFTM STRANGE  
 1620 KHZ  
 1625  
 1632  
 1636  
 Pirate!  
 MIDNIGHTS  
 WART  
 WART RADIO AM  
 590 AM 1600 WART 1650 ON 1620 kilohertz  
 FREQUENCY  
 YOU RECEIVED OUR SIGNAL ON 10/10/82 @ 0435 UCT.  
 MODE: A.M.; AUDIO Processed, Filtered, clipped.  
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 ANTENNA: 3 PHASED DIPOLES ZEPPE'S, 27 FEET HIGH. FACES COME OUT OF THE RAIN.  
 RETARDED PHASE H FIELD GROUNDWAVE.  
 LOCATION: EASTERN SEABOARD, U.S.A.  
 OUR ENGR: R.F. MYSTIC, a.k.a. "SPALLCASE"  
 STAFF: DJ: CRYSTAL GOBLIN (shattered)... 73. BE HAPPY and  
 AND: MGR: DVG. ROTOLARTAN, a.k.a. "ORONLPILOT" GOOD DX... Crystal Boblin  
 THANKS FOR LISTENING "WART" J.J.  
 TOAD CYTOMEGALOVIRUS PCST GROUP

Reader Frank Decker of Syracuse, NY, passed along this QSL from WART, 1619 kHz. Station was monitored last October at 0530 GMT. Description of equipment and listing of five frequencies on QSL appears to be based upon future plans at WART.

American TV programs brought in by the antenna. The cassettes were rented out to Belizeans who had video cassette players.

"A few months after we started doing that," Hoare said, "I realized that with a transmitter we could put the signal out to our neighbors."

A year ago, he financed a 110-foot broadcasting tower and transmission equipment by selling two dozen families TV forever, for about \$3,500 each.

The government's position on TV was that it reserved to itself the authority to broadcast television and that anyone broad-

casting without a license was a lawbreaker. But 24 families? Why bother?

Then a local TV expert found that he could tune other people's TV sets to Hoare's channel, and hundreds paid him several hundred dollars to do so. The taste for television spread, and it suddenly took off in Belize.

Hoare then installed a system of scrambling his broadcasts so only those who rented special equipment from him could watch it. An angry mob appeared at the door, but he solved that problem too.

"I sold them subscriptions," Hoare said.

Large-size wall chart lists all the official DX Countries in the world with a host of valuable data about size, population, government, etc. No shack is complete without one! 23" x 35", two colors, on heavy poster stock. Mailed by First Class mail, folded in 9" x 12" envelope. Only \$2.95 each, post-paid.

## 1982 DX Countries Chart

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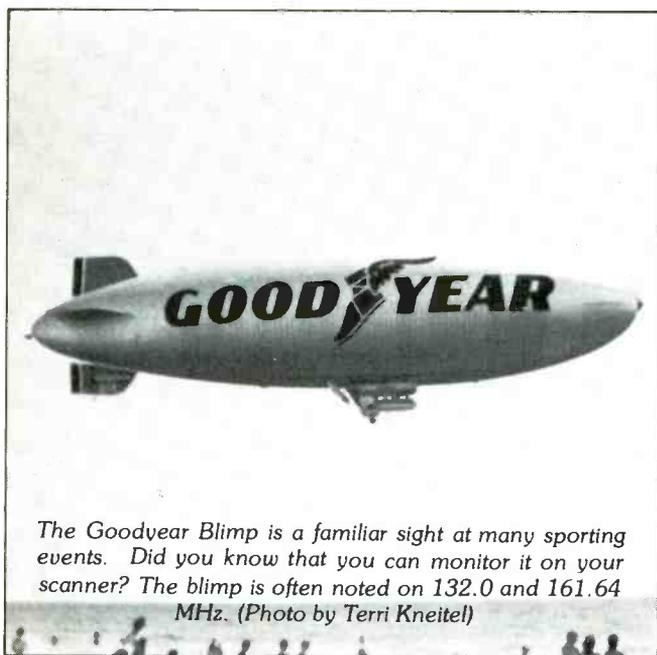
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# Year 'Round Sports Monitoring

## Behind The Scenes At America's Favorite Sporting Events Via Your Scanner

BY RICK MASLAU, KNY2GL



The Goodyear Blimp is a familiar sight at many sporting events. Did you know that you can monitor it on your scanner? The blimp is often noted on 132.0 and 161.64 MHz. (Photo by Terri Kneitel)



Not only do the stadiums and tracks often have their own communications systems, the various teams and participants are also radio-equipped—and the teams take this equipment with them as they travel from city to city. Communication is used for security, crowd control, parking, maintenance, for use on the field between the coaches and team executives, racers and pit crews, at check points along a course, and a dozen other applications which will be of high interest to anybody attending the event.

We have gathered about 170 such frequencies as used by more than 100 different teams, stadiums, tracks, and professional sports organizations. Chances are the sports you like best are represented in our list. If you know of any not included, please pass them along.

In the event you are attending a professional sporting event and you know there is radio in use but don't know the exact frequency, you can always try monitoring some of the more frequently encountered channels—you might just luck out. Best bets include: 151.625, 154.54, 154.57, and 154.60.

And, no, this trick won't work if you're watching the action on ABC's *Wide World of Sports*. You've gotta be there in person with your portable scanner!

### Year 'Round Sports Monitoring

Air Shows (various)	122.9, 123.1, 123.3, 123.45, 123.5
Amer. Motorcycle Assn.	151.625
Amer. Motorcyclist Assn.	151.925
Aqueduct Racetrack, NY	151.865, 154.60, 464.975
Arlington Stadium, TX	464.875
Atlanta Braves	462.575, 463.325, 467.575
Atlanta Int'l. Raceway, GA	154.60
Atlantic City Racing Assn., NJ	158.46
Balloon Media Inc.	151.625
Balloons Aloft	123.3, 123.5
Baltimore Colts Football	151.715, 154.60
Belmont Park, NY	151.685, 151.835, 464.975
Boston Red Sox	463.325, 464.075
Bristol Int'l. Raceway, TN	468.85
Buffalo Bills	154.60, 467.85, 467.90
Caesar's Palace, NV	461.775, 466.775
Candlestick Park, CA	154.60 (vehicle parking)
Champion Sparkplug Co.	464.55 (at auto races)

Although not covered in our story, be aware that some of the two-way systems used, especially in the automotive field, are on CB frequencies. Race driver Ramon Stewart (Above) is one of those who relies upon 27 MHz for communicating with his pit crew.



What's yer pleasure—baseball, football, golf, soccer, auto racing, air shows, thoroughbred racing, hockey, motorcross? Chances are, if you're a sports fan, you take your enjoyment in bits and pieces, a little at a time, depending upon the seasons. We Americans like our sports, especially professional sports.

If you're a person who likes professional sports so much that you don't limit your enjoyment to sitting in front of a TV set and, instead, actually attend the events in person, you're in for a treat. Chances are that you can bring a portable scanner with you to your favorite game or event and catch some of the behind-the-scenes conversation taking place between the participants. Maybe you've noticed that two-way radio is in heavy use at some of these happenings. That's where you come in.

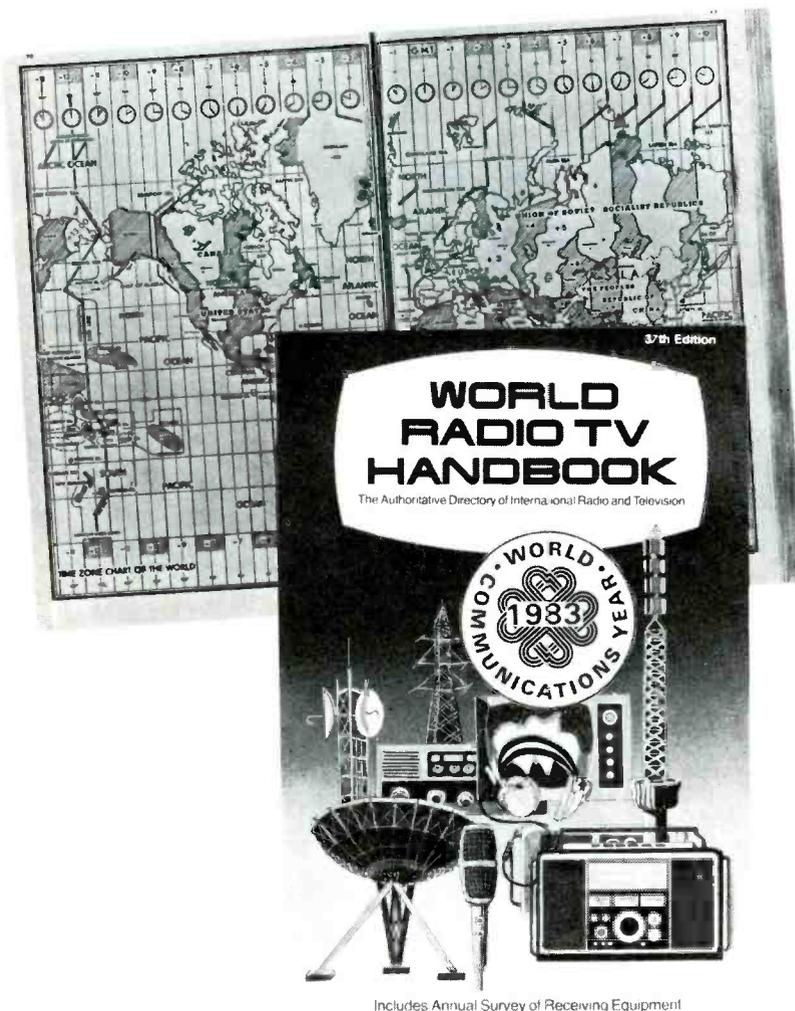
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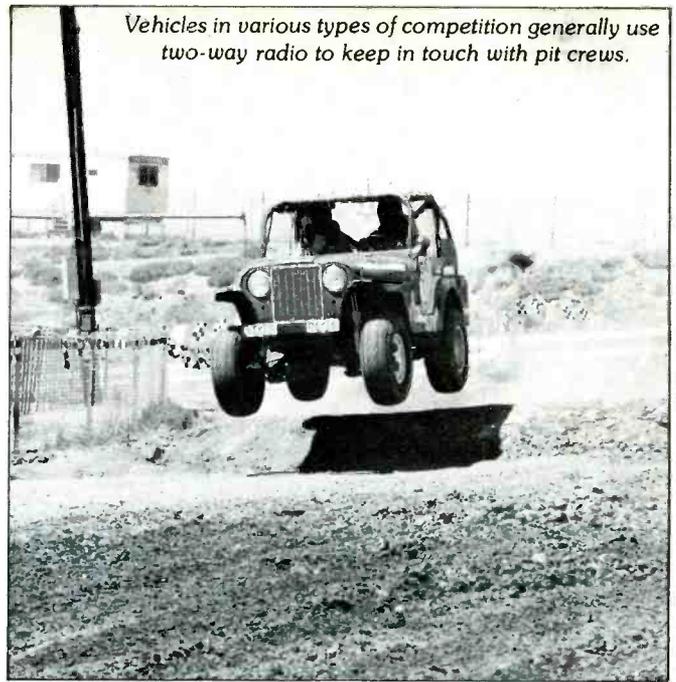
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SIGNATURE \_\_\_\_\_ DRG20258

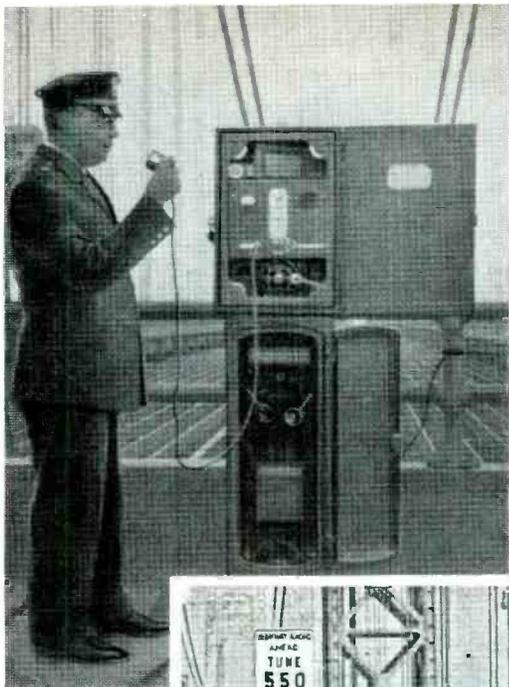
Air shows and races are invariably coordinated using two-way radio, all easily monitored on a scanner.



Vehicles in various types of competition generally use two-way radio to keep in touch with pit crews.



Churchill Downs, KY	457.575, 457.60	New York Giants Football	154.54
Cincinnati Reds	462.175, 467.175	New York Islanders Hockey	467.90
Cleveland Indians	154.515	New York Jets	151.625, 151.835
Cleveland Stadium, OH	154.57, 154.60	New York Racing Assn.	151.865, 154.60
Dallas Tornado Soccer	464.55	New York Rangers	467.75
Darlington Raceway, GA	464.50, 469.50	Oakland Hockey Club	464.50
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Delaware Park, DE	151.655	Olympia Stadium, MI	154.57
Daytona Int'l. Speedway, FL	154.515, 154.54, 464.775, 464.90, 469.775	Orange Bowl, FL	154.57
Dover Downs Int'l Speedway, DE	151.895	Penn Nat'l. Turf Club, PA	154.57
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Goodyear Blimp	132.0, 161.64	Pimlico Racetrack, MD	464.975
Green Mountain Racetrack, VT	154.60	Pittsburgh Steelers	151.625, 467.75
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Hialeah Park, FL	151.865	Pontiac Stadium, MI	154.515, 462.1625, 462.675, 462.70, 462.75
Hollywood Turf Club, CA	154.57, 154.60	Prof. Golf Assn.	464.55
Hot Air Hangups (balloons)	151.625	Prof. Golf Broadcast Assn.	154.57, 154.60
Hot Air Inc (balloons)	151.625	Race Track Security Co.	151.625
Indianapolis Speedway, IN	154.60	Riverside Int'l Speedway, CA	154.54
Int'l Amphitheatre, IL	31.00	Road America, WI	464.375, 464.525, 469.525
Int'l. Race Drivers Club	154.57	Roosevelt Raceway, NY	42.96, 462.625
Int'l Raceways Ltd., WA	151.955	St. Louis Football Cardinals	469.50
Int'l. Racing Radio Crew Inc.	155.22	San Francisco 49'ers	151.775
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Liberty Bell Racetrack, PA	27.51, 27.53	Talladega Int'l Speedway, AL	464.775, 469.775
Lime Rock Race Course, CT	151.985	Tampa Bay Buccaneers	151.775
Little Rock Mun. Auditorium, AR	155.715	Tampa Bay Soccer Club	151.625, 154.57
Los Angeles Dodgers	154.57	Texas Rangers	464.5375
Los Angeles Turf Club, CA	154.57, 158.46, 466.7125, 466.8625, 466.9125	Texas Stadium, TX	154.57
Madison Square Garden, NY	154.60	The Omni, GA	464.375
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National Rifle Assn.	467.60	Yonkers Raceway, NY	154.54, 154.60, 462.625
New England Patriots	151.625, 154.57	York City Auditorium, NE	155.055

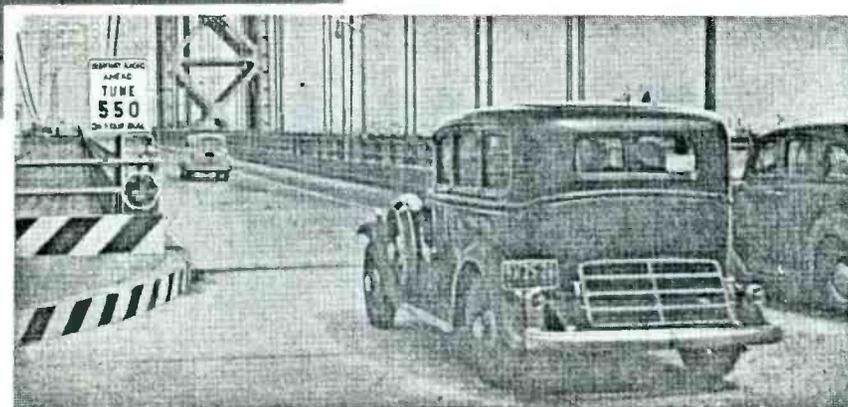


# Can You Monitor These Mini-Broadcasters?

## Little Known DX Challenge Awaits Adventuresome Listeners!

BY "SMOKI" WHITFIELD

*In the original roadside broadcasting experiment of the late 1930s, a low-power transmitter was established on the George Washington Bridge to help motorists find the right road to take for the New York World's Fair.*



*Motorists seeking the World's Fair were instructed to tune their car radios to 550 kHz in order to hear the mini-broadcaster.*

**F**rom time to time, DX club newsletters note that a listener has snagged a so-called Travelers Information Station (TIS). Much of the time, members see the listing and shrug it off as a harmonic or an error. Fact is that these mini-broadcasters (mostly running 10 watts) offer an exciting and little known DX challenge to anybody with a standard AM broadcast receiver.

These stations presently operate on two channels, 530 kHz (just below the low frequency edge of the standard AM broadcast band) and 1610 kHz (above the high frequency edge of the band). Their purpose is to advise motorists of local conditions that will be of interest to them; and, despite their low power, they have been picked up from over hundreds of miles away when DX conditions are right. Somehow, however, all of this remains virtually unknown to DX enthusiasts. I've spent a bit of time collecting information on TIS and I felt that I'd share what information I have with other DX'ers in the hope that they can pioneer an almost unexplored area of the hobby.

### Going Back

TIS is nothing new. It goes back to the 1930s in one form or another, which makes it all the more surprising that it has remained so obscure to listeners.

Developed originally by the Halstead

Traffic Communications Corp., the first TIS installation was created in conjunction with the 1939 World's Fair in New York. The station was located on the George Washington Bridge, which connects New Jersey to New York City across the Hudson River. The idea was to guide out of town motorists to the proper bridge exits leading to the World's Fair. At the approach to the bridge, a driver would see a sign reading "Highway Radio Ahead, Tune 550 on your dial." The motorist, tuning the car radio accordingly, would hear a repeating recording with the information. The recording was made on a magnetic tape and could be changed at any time. The antenna for this station stretched the entire length of the bridge.

Modifications and improvements in this system were used by the armed forces during World War II. After the war, a similar system was established to provide information to vehicles going through the Holland Tunnel, another traffic artery connecting New York City and New Jersey.

### The Current Scene

TIS operations are covered in FCC Regulations under Section 90.242. These regulations specify that stations must be licensed in the Local Government Radio Service, cannot interfere with broadcast stations operating on adjacent frequencies, and the trans-

mitting site must be located in the vicinity of transportation terminals (air, train and bus), public parks and historical sites, bridges, tunnels, and at intersections of Federal Interstate Highways with other roads. Transmissions must be non-commercial in nature and should relate only to traffic and road conditions, traffic hazard and travel advisories, directions, availability of lodging, rest stops and service stations, and descriptions of local points of interest.

A maximum power of 50 watts may be used by stations having a cable antenna, with an antenna length of slightly less than two miles. Power and antenna length, however, must be adjusted so that the actual radiated signal strength is relatively low (not exceeding 2 microvolts per meter when measured at 197 feet from the antenna). This means that stations with long antennas will be running lower power than those with shorter antennas.

Stations using a conventional radiating antenna can't exceed 10 watts into a vertical monopole or directional array, and the antenna can't exceed 49 feet above ground level. These parameters may be reduced to make certain that the signal strength doesn't exceed 2 microvolts per meter at slightly less than a mile from the antenna.

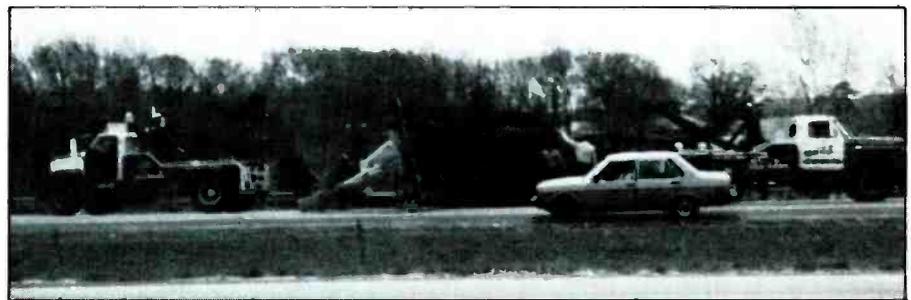
It does appear that the FCC is willing to grant some variances to these regulations upon the showing of a need for uses or tech-



The Tennessee State Highway Department keeps motorists advised about major construction projects by means of TIS stations.



These days motorists can hear TIS stations warning them of construction delays and offering advice on where to park at airports.



Many TIS transmitters are portable and can be quickly set up at sites of accidents to warn approaching drivers of the best detours around the site.

nical standards not included in the rules, hence some stations licensed under experimental authorizations. Since federal stations (at national parks, etc.) are not licensed by the FCC, it is not clear if they are required to adhere to FCC regulations, although certainly they would most likely be operating within the spirit of those tenets.

These days, TIS transmitters provide many services. Experimental TIS station KQ2XUB, for example, operates on 530 kHz at the Los Angeles Airport. Operating from 7 AM to 11 PM (local time), KQ2XUB advises arriving vehicles of parking availability at the airport. Other stations at different airports known to be providing similar broadcasts include KON247, WXK790, KI2XDR, and another station (callsign unknown) at the Cincinnati Airport.

Station KMB824 is used to let motorists on the Chicago Expressway know where the construction tieups are located. Other stations providing similar info in different areas include KMH441 and WXW950. Station WQF465 advises visitors to the campus of Ohio State University where to park and provides additional campus information.

Station KID774, located at Gettysburg National Military Park by the National Park Service, gives arriving visitors information on parking, facilities, and things to see. Actually, it seems that TIS units may well be operating at most major facilities under the jurisdiction of the National Park Service, al-

though the list provided here shows only a few such installations reported by DX enthusiasts. In fact, the listing I've provided along with this story is most likely incomplete to a great degree and shows only those stations I've monitored myself or ones I've noted as having been monitored by others. That being the case, I'd greatly appreciate additional listings to be forwarded to me in care of POP'COMM so that I can, in the future, compile a more complete listing for all readers to use.

## Monitoring Thoughts

The best time to listen for DX would be at night. However, there's no guarantee that you'll hear anything without difficulty. You have to keep checking the frequencies—sometimes you just get lucky. At times you can hear several stations babbling away, and it's a trick to separate what they are saying and try to identify them.

The lower of the two TIS frequencies, 530

## Travelers Information Service

State	Callsign	Location	Licensee	Watts	kHz
AZ	WXK790	Phoenix	City of Phoenix	10	1610
CA	KQ2XUB	Los Angeles Airpt.	City of L. A.	10	530
CO		Curecanti Rec. Area			1610
IL	KMB824	Chicago X-way	State of Ill.	10	1610
IL	KMH441	Highland Park	State of Ill.	10	1610
IA	KI2XCL	Davenport	State of Ia.	10	1610
IA	KJJ386	Davenport	State of Ia.	10	1610
IA	KI2XCM	Walnut	State of Ia.	10	1610
MN	KI2XDR	Minn/St. Paul Apt.	State of Minn.	20	530
MT		Yellowstone Park	Nat. Pk. Svc		1610
OH		Cincinnati Apt.			1610
OH	WQF465	Columbus	State Univ.	10	530
OK	WYG289	Tulsa	City of Tulsa	10	530
PA	KID774	Gettysburg	Nat. Pk. Svc.		1610
TN		Gatlinburg			530
TN	WXW950	Knoxville	State Hwy. Dept.		530
TX	KON247	Houston Airport		10	1610
WA		Mt. Ranier	Nat. Pk. Svc		1610
WA		Naches	Nat. Pk. Svc.		1610
WY		Devils Tower	Nat. Pk. Svc.		1610

kHz, it should be noted, can also offer some misleading signals, although they are nonetheless fascinating. It seems that some drive-in theatres use 530 kHz (and 540 kHz) to transmit the sound tracks of their films to the vehicles attending the showing. If you know of any of these, please send their names and frequencies to me and I'll include them in the listing I'm compiling for POP'COMM. One such drive-in theatre is in Bayshore, NY and it utilizes 530 kHz and 540 kHz.

The 1610 kHz frequency also has its own fascinations. A "dead carrier" sometimes heard here turned out to be a 100 watt experimental station (KK2XBS) operated by Lawrence Beir Associates in Greenville, North Carolina. What you are more than likely to monitor here in the evenings is a 15 kW religious broadcaster called "The Caribbean Beacon," which is located on the island of Anguilla in the West Indies. Although a nice DX catch in itself, it will cover over any of the feeble TIS signals you might otherwise hear. This station operates from 2200 to 0500 GMT and after that the frequency is reasonably clear.

A radiobeacon station in Colombia (South America) has been monitored on 1610 kHz by a few listeners. This station, using the ID "TDA," is located in the city of Trinidad and normally operates limited hours rather than continuously.

The general operation of a TIS station has not changed much from the very first experimental one used in 1939. A tape recording is made with the information, and since it is on a repeating loop, it continually gives its message. At such times as the information status changes, a new tape is made and placed on the air. This, indeed, is very similar to the Automatic Terminal Information Stations (ATIS) found operating in the VHF aero band at most airports in order to give a capsulized picture of weather and runway conditions to pilots.

## Take A Listen

Give both of these frequencies a listen and see what you can come up with. I've given you enough information here to get you started and if you are willing to send in any data on 530/1610 kHz operations we can cook up a really good and usable monitoring guide for all to keep handy. As far as I know, nothing of that type has ever been compiled.

Moreover, here's a chance for you to zero in on some interesting DX stations that offer a unique challenge—low power mini-broadcasters! Who knows, maybe somebody can be the first to QSL a TIS station! Any readers who furnish listings or additional info on TIS operations (or a photocopy of a TIS QSL card or letter) will be given full credit in any future stories POP'COMM runs containing that information. Here's your chance for fame and glory; more than that, a chance to contribute useful research in the cause of better DX monitoring!

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**76-023**

# RADAR REFLECTIONS

RADAR DETECTORS AND THEIR USE

BY JANICE LEE

## Experts Refute Claims By NJ State Police Of "Detector-Proof" Radar

Spokesmen within the radar detector industry refute the claims that the recent acquisition of police radar beam interrupters made by the New Jersey State Police are "Fuzzbuster®-proof." Electrolert, Inc., manufacturers of the Fuzzbuster®, took exception to the claims made by the New Jersey State Police that these devices can, in fact, "foil" radar detectors, the sole purpose for which these gadgets were purchased.

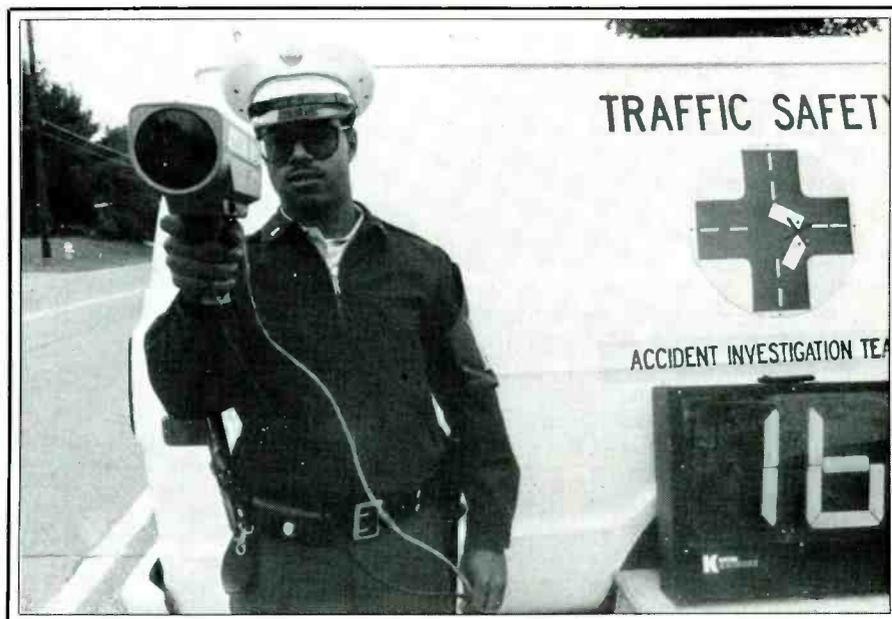
The State of New Jersey has recently publicized their bulk purchase of a module known as a beam interrupter which, when it is fitted to a radar unit, interrupts the continuous radar signal when the unit is not in the process of clocking a vehicle's speed. The sole purpose of such a gadget, which does not enhance the radar unit's performance, is to thwart motorists using radar detectors.

"We are continually correcting the false impressions promoted by manufacturers of 'detector-proof' radar units and now these new beam interrupters. The whole story is not being told about such equipment, which is claimed to be 'invisible' to radar detectors. Motorists as well as police officers are being misled by an incomplete presentation of the facts," says Dale Smith, inventor of the Fuzzbuster®.

The radar waves emitted by traffic radar are picked up by the radar detector which signals the motorist that police radar is in use. The beam interrupter, by cutting off the signal between clockings or emitting only a low-power signal, theoretically is invisible to the radar detector. In practice, however, the use of the device is only minimally effective.

While an officer has deactivated the radar unit by means of a beam interrupter, it is true that no tell-tale radar signal is being emitted to be received by the radar detector—nor is the unit able to clock a vehicle when it is in this mode. Once the officer activates the unit to obtain a speed reading on a vehicle, every detector-equipped motorist within its range will receive a warning. In short, while the first vehicle clocked may have insufficient warning of the radar's presence, the beam used to clock that one will alert all detector-equipped vehicles within several miles that radar is in use.

New Jersey has long been a target for criticism by experts of police radar in that it has the heaviest concentration of police radar in the country. New Jersey's radar arsenal is in part comprised of at least 800 K-55 units, a brand of unit that has been cited by authorities for its fallibilities. A long-term study into police traffic radar commissioned by the National Highway Traffic Safety Administra-



This Military Policeman from Ft. Devens, Massachusetts uses a new video radar display (lower right), which allows drivers to see just how fast they're going. The radar is set up at various locations around post where most speed limits are under 30 mph. (U.S. Army Photo by G.L. Brown)

tion resulted in a federal standard for radar performance published last year in the Federal Register. Ten distinct equipment errors were attributed to the K-55 based on that standard and the unit's margin for error was found to be compounded by operator errors. One of the most significant findings made by the National Bureau of Standards, which conducted the government's study, demonstrated that many of those unit features which are intended to combat the use of radar detectors are directly responsible for undermining the radar's overall accuracy.

"In light of substantial documentation by independent experts, I believe the rational approach would be for New Jersey to spend the tax-payer's dollar on developing performance standards for the thousands of radar units on its highways, rather than on gadgets such as the beam interrupter which have been proven to be of dubious merit," summarized Electrolert's Smith.

## Michigan Supreme Court Halts Prohibition

The Michigan Supreme Court recently released a decision upholding the legality of radar detectors. The ruling by the state's highest court overturns a previous appellate decision which held that radar detectors could be banned under a 1929 "police radio" law, enacted decades before the advent of radar and radar detection devices.

The Michigan Legislature in 1929 enacted a statute aimed at deterring robbers and burglars from eavesdropping on confidential two-way communications by the police. In the late 70's, Michigan State Troopers began using the statute to apprehend motorists who had equipped their vehicles with radar detectors, a law enforcement action which was heretofore upheld by the state's courts.

The police rationale held that outlawing radar detectors would preclude a motorist from escaping apprehension for a speeding violation, a civil infraction. The penalty meted out to the motorist for equipping his or her vehicle for a radar detector became a high misdemeanor calling for a fine up to \$500 or incarceration up to one year or both, thereby carrying with it what the high court called "a criminal stigma."

The Supreme Court justices' opinion also addressed the controversy created by the Michigan Court of Appeals, which expanded the statute to include any devices which could detect police signals, such as voice transmission; inasmuch as anyone equipping their vehicles with CB radios could be in violation of this statute. The attorney for the defendant in each of the suits leading to the present decision, Jesse Bacalis, addressed the furor over the previous ruling in 1980 in saying, "I really don't think they recognized the consequences of their logic . . ."

The court, in response to the issue of intent on the part of the 1929 legislators,

maintained that: "Words do not stand outside their history. They draw their meaning from it . . . A court's responsibility when it construes a statute is to implement the purpose and intent of those who enact it . . . The lodestar of statutory construction is legislative purpose or intent."

It remains to be seen if those motorists who were apprehended under the prohibition and had their devices confiscated by the police will gain relief through the high court's latest decision. Although no provision for the return of the confiscated units was addressed by the court, these motorists may seek the return of their radar detectors and to expunge the criminal charges from their records either individually or in a class action suit against the state.

Electrolert, Inc., the manufacturer of the Fuzzbuster®, lent technical assistance to Jesse Bacalis, of the firm of Bacalis and Associates of Detroit, during each step of the judicial proceedings. Bruce Garfield, Vice President of Marketing for the firm, estimates that the reinstatement of Michigan as a marketplace will have a great deal of impact on sales. "Until 1978, Michigan alone comprised 10% of our sales and I anticipate that the court's affirmation of Fuzzbusters'® legality will soon see us back in that position or better."

Electrolert, Inc. has spent more than \$1 million on judicial proceedings, lobbying efforts, and in litigation on behalf of individual motorists. Counted among one of Electrolert's significant accomplishments has been the introduction in Florida of minimum performance standards for police radar itself. This move by the Florida Legislature was in response to findings by experts of the high incidence of error by police traffic radar.

The state's only recourse to the Supreme Court decision will be to introduce a new radar detector bill in the Legislature. No state legislature has succeeded in enacting a Fuzzbuster® ban since 1962, due to constitutional issues and the difficulty of framing and enforcing such a ban.

For the first time, a high court has addressed two of the most significant issues surrounding the use of police radar. First, in their opinion this week, the court questioned the propriety of police radar use: "Electronic surveillance by the police is serious business and an intrusion into the privacy of anyone who is subjected." Of far 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.

### Troopers Blame Punishment On Missed Quota

Two Wisconsin State Patrol troopers claim that they face one-day suspensions because they failed to fulfill traffic quotas, WAOW-TV recently reported. Officers Larry Doxruide and Ken DuPlayee told the sta-

tion they had proof that failure to write enough tickets was the sole reason for their suspensions.

Lt. Thomas Cantwell said the officers were suspended for several reasons. He said tickets were one criteria in the evaluation, but he denied that the officers were to be disciplined for failing to meet any quota.

WAOW said it had obtained a handwritten transcript of a May 10 grievance hearing in which one of the troopers was told by an examining officer that the only reason for his reprimand was that he did not meet his MSA, or Measurable Standard of Activity. The MSA is synonymous with a ticket quota, WAOW said.

Other documents the station said it had obtained reportedly showed that other troopers who were below patrol standards in other areas of evaluation were not suspended.

### Retired Pilot Accuses Cop of Speeding

Russell Granger, 63, a retired Navy Pilot, was arrested and fined \$30.25 for chasing down a police car and accusing the cop of speeding. He told the City Court in Bartlett, TN, it happened this way: "I drove up beside him and said, 'You cannot drive like that on the streets of this city.'" Granger said he argued with the policeman to no avail, then headed home. A short time later, three squad cars pulled up to arrest him on disorderly conduct charges. Judge C.V. Lyons fined Granger \$5 plus court costs. "If, however, you would like to appeal, I can assess a higher fine which would enable you to do so," the judge said. Granger declined the offer.

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

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# POP'COMM's 24-Hour English Language Shortwave Listing

BY GERRY L. DEXTER

This is a *selected* listing of shortwave broadcasts aired in English. There are many more, and many of the stations listed here (i.e. Radio Moscow, the BBC, Radio Peking, and others) have English segments that run over a period of several hours. Others may have only some English during the time they are listed. Additionally, many other frequencies may also be in use for English at the times given for a particular station. If you don't find the station on the frequency listed, try other possibilities. The listings selected by *Pop Comm* are intended only as a guide. Remember that schedules and frequencies frequently change.

## English Language Shortwave Broadcasts

Time (GMT)	Station	Frequencies
0000	BBC London Radio Peking Radio Berlin Intl Radio Sofia Radio Luxembourg	6175 15120, 17855, 18860 9730, 11975 9700, 15110 6090
0100	HCJB, Ecuador RAI, Rome Voice of Germany Austrian Radio Radio Budapest Radio Prague Vatican Radio	15155, 17890 9575, 11800 6040, 6085, 9545, 11865 5945, 9770 (from 0130) 9835, 11910, 15220 5930, 7345, 11990 9605, 11845
0200	Radio Bras, Brazil Radio RSA, S. Africa Radio Netherlands Tirana, Albania Radio Warsaw Radio Bucharest Voice of Greece	15290, 17830 5980, 9580, 9615 6165, 9590 (from 0230) 7120, 9750 (from 0230) 7145, 7270 9570, 11940, 15380 15595
0300	Radio Portugal Radio Uganda Radio Dubai, UAE  Voice of Free China Radio Bagdad, Iraq Radio Warsaw Voice of Kenya Radio Cairo	9765, 11925 15325 11940, 15320, 17715 (from 0330) 5985, 11825 11925 9525, 11815, 15120 4915 9475
0400	Radio Lesotho Radio Havana Voice of Nicaragua Swiss Radio Intl Radio Botswana	4800 11725, 11760, 11930 5950 9725, 11715 4845
0500	IBA, Israel Radio Ghana Voice of Nigeria Voice of Greece Radio Thailand Radio Casino, Costa Rica Radio Kuwait	9815, 11640, 15105 3366 7255, 11770 9865 11905 5954 9650
0600	ELWA, Liberia Radio Amman, Jordan Spanish Foreign R.	4765 9560 9630, 11880
0700	Vanuatu Radio Cook Islands Radio New Zealand Radio Australia	7260 11760 15485 9570
0800	FEBC, Philippines KTWR, Guam Radio New Zealand BBC, London Radio Pyongyang, N. Korea	11890 11840 11960 9510 15245
0900	Radio Japan Radio Oman R. RSA, S. Africa Radio Peking Radio Philipinas	9505 11890 9585 11600 9580
1000	Voice of Nigeria Radio Singapore Solomon Islands Radio Japan Radio Australia	15120 5010, 5052, 11940 5020, 9545 11875 6045
1100	Voice of Vietnam Radio Australia Radio Finland Radio Pakistan Pyongyang, North Korea 4VEH, Haiti	10080, 12035 9580 15400 11645 9745, 9977 9770, 11835
1200	Austrian Radio BSKSA, Saudi Arabia Ulan Bator, Mongolia Voice of Philippines Radio Belize Radio Peking Voice of People of Kampuchea	21525 (from 1230) 11855 6383, 12070 9580 3285 11600, 15520 11938
1300	Radio Japan Port Morseby, Papua/New Guinea Radio Canada	11815 4890 9575, 11955
1400	Belgian Radio HCJB, Ecuador All India Radio Voice of Indonesia Radio Sweden	21525 15155 11810, 15335 11790, 15150 17790
1500	BBC, London Radio Korea, S. Korea Radio Lebanon Voice of Revolutionary Ethiopia Voice of Greece Radio Bangladesh	15260, 15400 9720, 11830 9545 9560 17755 15280
1600	Radio France Intl. Radio Pakistan Zambia Bcstng Service Radio Tanzania Radio Yugoslavia	11845, 15300, 17850 15565, 15585 9580 9685 15240

1700	BSKSA, Saudi Arabia Radio Havana, Cuba BBC, London Voice of Nigeria	11855 17765 15070, 15260 15120
1800	Austrian Radio Belgian Radio Swiss Radio Intl.	15185 17595 17850
1900	All India Radio Radio Afghanistan Spanish Foreign Radio Radio Sofia, Bulgaria	11620 11960, 15077 9765, 11840 15110
2000	Radio Yugoslavia IBA, Israel Radio Algeria WYFR, USA WRNO Worldwide, USA	9620 15425, 15585, 17685 9510, 15370 15440 15420
2100	Radio Mexico Voice of Nigeria R. RSA, South Africa BBC, London Radio Moscow	15430 15120 11900 15260 11840
2200	Radio Free Grenada BBC, London Radio Canada Radio Jamahiriyah, Libya Radio Ankara, Turkey	15045 11750 5960, 9755 11815 9725, 11770, 11900
2300	Radio Moscow Radio Sweden Radio Iran	11720, 9685, 9600 11705, 15380 15084

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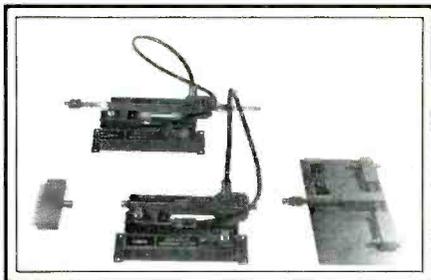
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CIRCLE 61 ON READER SERVICE CARD

# PRODUCTS

## REVIEW OF NEW AND INTERESTING PRODUCTS

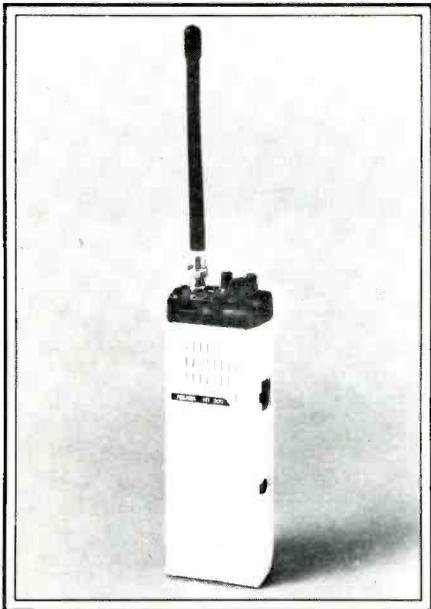


### TVRO Triplexer

The #3930 earth station triplexer allows the combining/separation of up to three different block down-converted spectra.

The 3700-4200 MHz band, plus the down-converted 270-770 MHz and 950-1450 MHz bands from separate TVRO receivers, can be combined without affecting each other and impressed on the coax for transmission. The spectra can then be separated at the receiving site and processed individually. The #3930 allows approximately 20 db (min.) isolation between the nearest frequencies of adjacent spectra and nominal insertion loss in less than 2 db.

Price is \$3270 per set and delivery is four weeks. For more information, contact Emily Bostick, Microwave Filter Co., Inc., 6743 Kinne St., East Syracuse, NY 13057, or circle number 105 on the reader service card.



### Hand-Held Marine Transceiver

Regency Electronics, Inc. announced the introduction of the Polaris MT900, an all-channel VHF hand-held transceiver. The MT900 features a thumb-wheel channel se-

lector which provides access to the micro computer where all the U.S. and International marine channels have been stored. The unit also features a selectable power output for 1 or 3 watt operation, as well as a Channel 16 override switch.

Suggested retail price for the MT900 has been set at \$429.00, which includes belt clip, wall charger, carrying case, and flexible antenna. For more information contact: Regency Electronics, Inc., 7707 Records Street, Indianapolis, IN 46226, or circle number 104 on the reader service card.



### Crystal Controlled Pocket Weatheradio®

Radio Shack, a division of Tandy Corporation, now offers drift-free reception of National Weather Service broadcasts in a compact, pocket-size package. The new Realistic® Crystal Controlled Pocket Weatheradio® (12-151) is \$19.95 at Radio Shack stores and participating dealers.

The Realistic Crystal Controlled Pocket Weatheradio receives continuous weather broadcasts from the National Weather Service on 162.40, 162.475, or 162.55 MHz VHF frequencies. The Weatheradio features an RF amplifier for greater sensitivity, a 1½-inch speaker, telescoping antenna, and carry strap.

The compact Realistic Crystal Controlled Pocket Weatheradio measures 4¼" x 2¾" x 1" and requires a 9V battery (not included) for operation.

For further information, write: Tandy Corporation/Radio Shack, 1800 One Tandy Center, Ft. Worth, TX 76102 or circle number 103 on the reader service card.



### A Way To Eliminate The Threat Of Surreptitious Tape Recordings

A common concern of many CCS clients has been: what happens if I walk into a meeting and someone is recording every word I say—or someone places a tape recorder in my home or office and has a recording of everything that takes place.

After approximately ten years research, CCS has developed a solution to this problem—The Tape Recorder Nullifier.

The Tape Recorder Nullifier is a miniaturized system that will render any hidden running tape recorder inoperable and therefore harmless. Never before has a system such as this been perfected so that it nullifies only the recording without harming any other electronic equipment in the area.

With the proliferation of ultra miniaturized and pocket sized recorders, secret taping has become a common and quite effective means of industrial spying. A recorder is simple to place in the target area and simple to operate. Now the Tape Recorder Nullifier can alleviate the fears of people doing business. And such a discovery could virtually eliminate the threat of blackmail and industrial espionage.

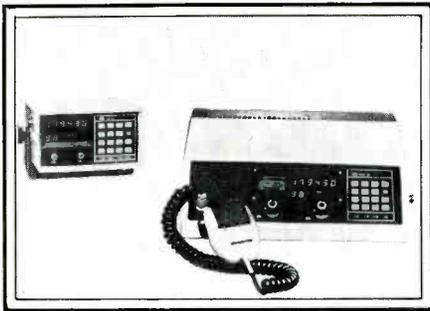
For more information, contact CCS Communication Control Inc., 633 Third Ave., New York, NY 10017 or circle number 101 on the reader service card.

### KMC 95 Marine HF SSB

King Radio's KMC 95 has begun living up to its claim of being the "Marine HF SSB radio which stands out from the rest."

The KMC 95 is a full-feature HF SSB with 2.0000 to 29.9999 MHz frequency range. Direct entry is provided to access all 280,000 available synthesized frequencies. 276 channels are stored in memory; 99 user programmable channels; 176 ITU public correspondence radiotelephone channels, and the international distress frequency (2182 kHz).

The user programmable channels (either



simplex or semi-duplex) may be recalled by entering the channel number (1-99), and the ITU channels require only the three or four digit channel designator be selected.

The KMC 95 is also designed to use a remote control, the KMC 95R, which provides all of the functions of the KMC 95 from locations other than the radio room. One or more KMC 95R's may be mounted at convenient locations on the vessel.

A separate antenna coupler (KMC 96) provides fully automatic antenna tuning and eliminates time-consuming installation adjustments. The KMC 95 system will tune most marine whip and backstay antennas.

The KING system also includes output to drive radio-facsimile (FAX) recorders to provide up-to-the-minute weather charts on board virtually anywhere in the world. Shortwave broadcasts of news, weather, and entertainment can be easily accessed throughout its frequency range.

Emergency communications on the international distress frequency (2182 kHz) is available with the push of a button. Other emergency or fleet frequencies are stored in the 99 user programmable channels.

A digital clarifier for improving reception of slightly off frequency transmitting stations and manual frequency or user channel "scanning" is included. A "transmit eavesdrop" feature allows monitoring of the transmit frequency when in semi-duplex operation to verify the channel is clear.

For more information, contact King Radio Corp., 400 N. Rogers Road, Olathe, KS 66062, or circle number 102 on the reader service card.



### New Superhet Radar Detector

Electrolert, Inc., Tipp City, Ohio, has introduced a radar detector to its expanding line of Fuzzbuster products. The unit, The Fuzzbuster Superhet, utilizes advanced

technology that actually searches out all radar signals at greater distances, even over hills and around curves, and warns drivers well in advance to check their speed. Fuzzbuster Superhet is 100 times more sensitive than a conventional radar detector.

The new unit picks up all bands and types of radar, even low power and "pulse" radars. The Fuzzbuster Superhet senses only radar, virtually eliminating false signals.

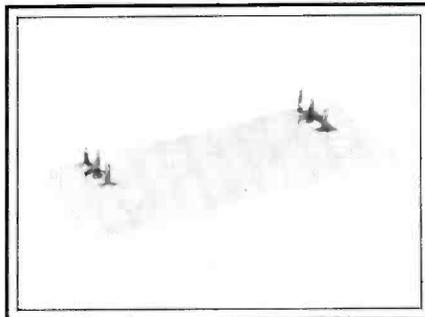
The sophisticated circuitry is a double-conversion design utilizing a novel phase detection scheme and is housed in a handsome deep gray case trimmed in chrome. The Fuzzbuster Superhet has such features as a Highway/City Selector that adjusts the unit to specific driving conditions.

A warning indicator light illuminates as initial contact with radar is made. A photoelectric sensor automatically adjusts the brightness of the warning indicator light from very bright for daytime driving to dimmed for night use.

An LED Alarm Panel indicates the driver's distance from the radar source by sequentially illuminating (left to right) as the vehicle nears the radar.

The Audio warning can be controlled at the desired level by simply turning the volume control knob.

For information, write: Bruce Garfield, Director of Marketing, Electrolert, Inc., 4949 South 25A, Tipp City, OH 45371, or circle number 106 on the reader service card.



### T-Band Circuit Board BPF

Model #3376-T9 is a bandpass filter to reject spurious noise from signal processors operating on channel T9.

The 75 ohm filter is housed in a 3-1/8" x 1-1/2" x 1/2" seamless steel case with circuit board pins.

The price is \$75 each. Delivery is 10 days or less. Filters for other T-channels are available. For further information, contact Microwave Filter Co., Inc., 6743 Kinne St., East Syracuse, NY 13057, or circle number 107 on the reader service card.

### Radio Headset For High Noise Environments

Controlonics Corporation announces a new Unex radio headset for use in high noise environments with applications in police, security, broadcast, and industrial communications. Designed for two-way radios, the new dual muff headset RHS-8A is an improved version of the Unex RHS-7. The 8A



provides a larger ear dome design which affords a higher level of protection against ambient noise, and its modular design (mechanical configuration, cords, and connectors) and integrated electronics allow easy serviceability and adaptation for a variety of applications and requirements.

The noise cancelling electret microphone picks up intended voice transmissions, but rejects background noises, including industrial machinery and nearby conversation. Virtually no extraneous noise is returned to the ear by sidetone, thus allowing clearer communications and reducing listener fatigue. The broad flat frequency response provides excellent tone, increasing voice recognition.

All Unex headsets, lightweight, single muff and dual muff, feature the noise cancelling microphones and modular flexibility, and all are designed to deliver superior communications in maximum user comfort.

For more information on the Unex RHS-8A dual muff radio headset, write: UNEX, Division of Controlonics Corporation, Five Lyberty Way, Westford, MA 01886, or circle number 112 on the reader service card.



### 40 Watt Hailer

Regency Electronics announced the introduction of a 40 watt Marine Hailer, the Polaris HA440. The unit has an intercom system that allows communications from the HA440 to up to four different remote locations on board. The Fog-Horn features automatic settings for inland, Great Lakes, or International operation, as well as a manual mode. Other features include a siren that can be sounded momentarily or locked on, and auxiliary inputs and volume control for a cassette player or radio.

Retail price for the HA440 has been set at \$179.00; optional horn will be available for \$60.00. For more information, contact Regency Electronics, Inc., 7707 Records Street, Indianapolis, IN 46226, or circle number 111 on the reader service card.



## Noise Bridge With Built-in Range Extender

MFJ Enterprises, Inc. introduces its new and improved model MFJ-202B Noise Bridge. It allows quick adjustment for maximum performance of any antenna—single, multiband, dipole, inverted vee, beam, vertical whip, or random systems.

You can measure resonant frequency, radiation resistance, and reactance of your antenna. It tells you whether to lengthen or shorten your antenna for minimum SWR over any portion of the band.

The MFJ-202B will measure resistance to 250 ohms and has a wide capacitance range of  $\pm 150$  pf. It includes a built-in range extender that shunts large unknown impedances down to its measuring range.

You can tune transmatches, adjust tuned circuits, measure inductance, RF impedance of amplifiers, baluns, transformers, and other RF circuits.

It can also be used to determine electrical length, velocity factor, and impedance of coax cable. With a transmatch and dummy load, it can synthesize RF impedances for test purposes.

The MFJ-202B front panel has pushbutton ON/OFF and range extender switches, reactance adjustment, and a resistance adjustment. It measures  $4\frac{1}{2}'' \times 2'' \times 4\frac{1}{2}''$  and is housed in a rugged black aluminum cabinet with eggshell white front.

MFJ provides a 30 day money back trial period. If you are not satisfied, you may return it within 30 days for a full refund (less shipping). MFJ also provides a one year unconditional guarantee.

The MFJ-202B RF Noise Bridge is available from MFJ Enterprises for \$59.95 plus \$4.00 shipping and handling.

For more information, contact MFJ Enterprises, Inc., P. O. Box 494, Mississippi State, MS 39762, or circle number 109 on the reader service card.

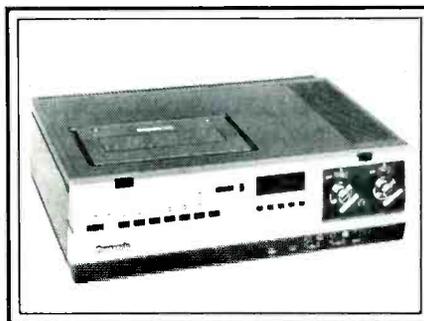
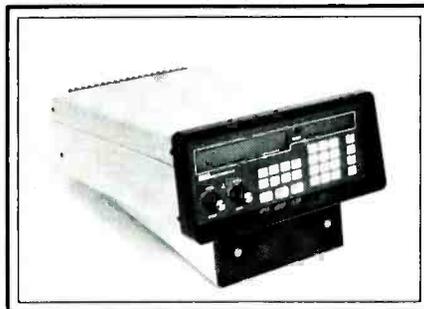
## Keyboard-Operated HF Transceiver

Communication Associates, Inc., Huntington Station, New York, has announced the DIGISCAN family of microprocessor-based HF SSB transceivers for the commercial and leisure boat markets. The first transceivers to offer total, simplified keyboard control, DIGISCAN is available with an output power of 150 watts.

A number of special features are incorporated in the new design. DIGISCAN offers microprocessor controlled frequency selection of 284,000 channels by keyboard, the

capability of programming 100 channels, and the convenience of a built-in emergency channel. The transceiver scans HF channels for voice activity and stays on frequency with a stability of 0.5 Hz/MHz. Remote control interface with telephone lines, computer, teleprinter, and facsimile is possible with a minimum of low cost accessory equipment. The solid-state design uses no motors or rotary switches.

Units are available in a readily-transportable desk top unit (model 150-ZX). DIGISCAN is the transceiver for the computer age. For information, contact: Communication Associates, Inc., 200 McKay Road, Huntington Station, NY, 11746, or circle number 110 on the reader service card.



## VHS Unit Features Forward And Reverse Search Control And Azimuth Recording Heads

Panasonic has introduced a new 8 hour\* VHS videocassette recorder/player, Model PV-1265, with the capability of forward and reverse search modes, which provide viewing at many times the speed of normal playback in the SLP mode. The new forward and reverse search feature makes finding a desired spot in a recording quick and easy.

Panasonic's azimuth recording system allows more video information to be recorded onto a smaller tape area than conventional systems. Because of this, it offers excellent video reproduction with minimal crosstalk interference.

Model PV-1265 also incorporates frame by frame viewing in the SLP mode so action can be stopped to analyze a sporting event or a favorite scene. The PV-1265 allows automatic recording of one program in one 24 hour period with its built-in electronic digital timer. Its two mechanical tuners, one for UHF and one for VHF, and an automatic Fine Tuning switch facilitate tuning.

For ease of operation, a four digit memory counter automatically stops the tape when the counter reaches "0000." The unit's SP/LP/SLP switch selects the desired tape speed for recording and it automatically selects the playback speed at which the tape has been recorded.

Other convenience features built into Model PV-1265 include front mounted audio and video in and out jacks, and a wired remote pause control is provided. The unit is also equipped with TV/VCR switch and built-in switchable RF modulator for channels 3 or 4.

The lightweight aluminum chassis in Model PV-1265 insures strength and stability for the direct drive head cylinder while its capstan servo system maintains constant tape speed for clear sharp pictures. To protect tapes, the unit automatically stops tape movement at the end of the cassette.

For information, contact Panasonic, 1 Panasonic Way, Secaucus, NJ 07094, or circle number 108 on the reader service card.

\* The new unit can record up to 8 hours with NV-T160 Tape.

## Eavesdropping Manual

The official U.S. Government manual for using hidden transmitters and telephone taps for intelligence gathering is here. Covering both theory and application of bug-ging, it was prepared for dissemination to federal intelligence gathering agencies. Detailed text is enhanced by graphs, charts, schematics, and illustrations intended (as the book states) "to help inform law enforcement personnel concerning the application and functioning of undercover communications equipment."

Partial listing of contents: Selection of transmitter frequencies; Power output vs. coverage range of hidden "body transmitters" worn by undercover agents; Detecting persons wearing hidden transmitters; Lab/field tests of surveillance transmitters/receivers; Telephone tap transmitters and how to connect/receive them; Non-radiating "hard wired" telephone taps and room bugs; The famous "Infinity Transmitter" or "Harmonica Bug;" Induction phone taps without a direct connection; Dialed number recorders; Tape recording conversations; Appendix of suggested reference books about surveillance/undercover communications. In addition to the original manual, schematics and parts lists are provided for building a miniature VHF surveillance transmitter and also a miniature receiver for detecting VHF room bugs and hidden "body transmitters." These are simple 2 and 3 semiconductor devices anyone can build from easily available parts.

*Covert Intelligence: Electronics Eavesdropping Manual* is now available for \$8.95, postpaid by Book Rate Mail. If First Class Mailing is desired, add \$1. If your local electronics dealer doesn't stock it, it may be ordered from the publisher, CRB Research, P.O. Box 56, Commack, NY 11725. If you're interested in knowing the fascinating way it's done, this is the book for you!



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

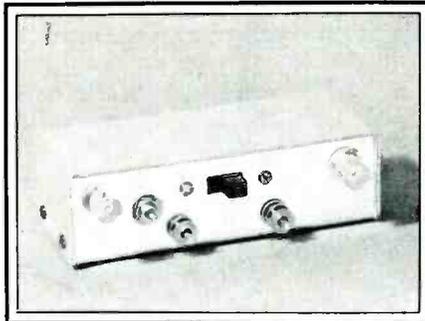
### **Bettering Your Reception – Scanner Preamplifiers**

If there is one question that consumes the mind of every scanner enthusiast, it surely would have to be, "how can I increase my reception range?" How often have you heard over an intercity, state, or county channel that a high speed chase or general alarm fire is occurring in a distant community and, overjoyed that you're about to catch some fantastic action, you quickly look up the city's frequencies, program them in, and you hear . . . nothing. You wait a while, hoping that you just missed some traffic and that soon everyone will be back on the air. But, still nothing. Perhaps you try another antenna, or if you've got more than one, another scanner; deep down in your heart though, as you give the frequencies a few more minutes of your time (and certainly a few openings of the squelch setting to check if they're down in the muck), you know that you're just plain out of range.

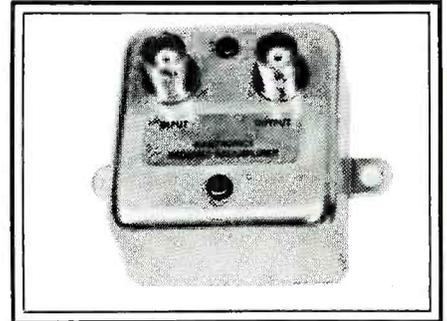
This problem is annoying enough, but when a friend who lives close by calls to tell you to listen in to so and so's police or fire department because the monitoring is just "amazing," that's when you really feel like giving your radios the heave-ho right out onto the street. The really terrific action just occurs too infrequently for us to feel ambivalent when we miss it.

Although in many instances your location or the power of the transmitting station simply dictates that you're never going to be able to pick up certain agencies, more often than not there are a number of techniques you can employ which, within reason, will allow you to receive everything. Not enough can be said for outdoor antennas. When erected correctly, high and away from electrical wires and other buildings and trees with proper cable and connectors, even a simply constructed homebrew antenna will do quite a job for you. If you already have an aerial, then you should consider raising it even higher. There is always a bit of a trade-off when you perform this procedure however: the higher you go, the more the antenna receives and sends down, the coax eventually losing any strength they had as you force them to travel further before your scanner can amplify them for you. Generally speaking though, it will usually be to your advantage to raise your aerial.

If your antenna has been up for more than a year, it is always wise to give the connections a good going over. You may find that something was loose or just plain broken. Water and/or dirt stuck in between your PL259s and SO239s is a problem you can easily remedy. It's really worth the half or full day spent climbing on the roof or the tower,



Vanguard Labs' narrow band pre-amp.



One of Hamtronics' pre-amps.

unbuckling the guy wires and lowering the masts in order to console yourself with the fact that, without spending any more money, you're doing all you can do in the never-ending search for DX.

If you are willing to lay out a few bucks, then a number of options open up for you which separately will usually be quite sufficient, but taken as a whole will prove outstanding in their monitoring results. First, you can add to that single antenna overhead, optimally by two or more. Thus, if your existing antenna does a very good job in the Ultra-High range, then you would buy (or if you're handy, make) a VHF-hi and VHF-low antenna, stick them up (as far away as you can from one another) on the roof, and alternate the three depending on if you're trying for a particular station or just scanning in general (then either the VHF-hi or your first aerial would be the best bet).

Those of you who have three or more radios (or two or more if you live in a region where one of the three main bands is not used) may wish to have your scanners tuned specifically to a particular section of each band. In other words, if you're only interested in monitoring the fire agencies on 33 MHz, then it is possible for a technician to narrow the sensitivity so that your unit will be "hottest" where you want it to be most. Of course, you do lose a great deal of sensitivity the further you move away from the center frequency which the technician tuned your radio to.

You can have one scanner tuned for one range within each of three bands, but if, for instance, you plan to hook-up your VHF-low antenna to one unit for 33 MHz reception, you'll have trouble receiving even moderately close stations in the VHF-hi and UHF bands. With an antenna and scanner both tuned to a specific frequency segment, you do severely limit monitoring of other ranges. But, reception of that one segment will be fabulous. Non-repeated mobiles 25 miles or more away can come in like gang-

busters while bases 50+ miles off also break through. Naturally your reception will still depend somewhat on location, conditions, and quality of technical craftsmanship.

While there is a good deal more that can be said about these and other techniques that you can employ in the DX search, this month we'll focus in on my favorite of all reception enhancing devices, the scanner pre-amplifier.

A scanner pre-amplifier is put in line between your scanner and your antenna. Placing the pre-amp right before the radio, thus with a short lead going from the pre-amp box into the input jack of your scanner, will normally work very well. However, you can do better. By placing the pre-amp at the antenna site, with a short lead going from your aerial to the pre-amp before long coax length to your scanner, you will not only amplify those very weak signals which would not usually make it to the pre-amp right behind the scanner, but you will also not amplify those unwanted signals that your coax naturally picks up on its own. Pre-amps directly before the scanner tend to overload the front end of the radio (causing you to lose all signal when a nearby station transmits) or, in the least, cause noise in the radio. These problems can be very easily lived with, but if you have the capability to mount your pre-amps in a weatherproof box below your antennas, you'll be doing yourself quite a service.

Pre-amplifiers work by having the incoming signal applied to an rf amplifier-transistor which, you guessed it, amplifies that signal. A pre-amp specifically tuned to one portion of a frequency range (i.e. 33-34 MHz) will provide the most gain in that region, but it will attenuate signal outside the range. If you really are looking for those fire companies down on low band or perhaps the state police in a neighboring state located between 154 and 156 MHz, then a factory tuned pre-amp absolutely cannot be beat! A good unit will perform like a champ for many years.

From my location in the Boston area, with a beam antenna directed southwest and a pre-amp at the beam site tuned at 460 MHz, I can receive Providence, Rhode Island police on 460.100 MHz, while I know many friends ten miles outside of Providence who simply cannot receive the relatively low power transmitters of the city's police.

Pre-amp performance does depend on its tuned radio frequency and its noise factor. Those who have only one scanner to work with can still use a pre-amp by purchasing a "wide-band" unit that may have a variable gain control so that you can wring maximum performance at a particular frequency, although no wide-band unit will come close to the single segment type (which may also have a variable gain control that you normally set once and leave alone). This is the trade-off you have to decide upon: do you want to sacrifice some potential performance in a pre-amp by going with the 30-900 MHz unit (which also works well with converters), or do you sacrifice 98% of your scanner's range by limiting yourself to one specific segment that you'll be capable of monitoring? If you choose the wide-band method, then before you buy you may want to check the manufacturer's graph of where his unit provides the highest gain, as you may have a particular region that you're most interested in.

Other considerations include the fact that pre-amps require nine or twelve volts of power and generally the power cannot be shut off to the units without your losing an awful lot of signal that would be present if the pre-amp wasn't in line at all. Also, if you live in a densely, or even semi-densely (75,000) populated region, there is a good chance

that, because of all the communications traffic going on around the pre-amp, your scanner will become overloaded and you'll lose everything and/or hear pagers, taxis, the weather, and more over your favorite public safety channels.

Pre-amps are invaluable if you live away from such a populated area and wish to home in on that city with all the action, but you may have problems otherwise. Filters will reduce the problem of intermod and overload ("garbage"), but it basically depends on your location and luck. I live in metropolitan Boston and have no trouble, even when I use two pre-amps in series (only for real pre-amp nuts), but others swear that they'll never bother with the little buggers again.

The following companies manufacture scanner pre-amplifiers:

- Capri Electronics—see *POP'COMM's* October '82 issue for details. Their address is Rt. 1, Box 91-1J, Canon, GA 30502.

- Hamtronics, Inc. 65 Moul Road, Hilton, NY 14468. Phone (716) 392-9430. Single frequency and wideband units.

- Vanguard Labs. 196-23 Jamaica Avenue, Hollis, NY 11423. Phone (212) 468-2720. Vanguard specializes in custom tuned preamps with extremely high gain. Vanguard also sells units built in weatherproof housing for easy outdoor installation.

- Wintenna, Incorporated. 911 Amity Road, Anderson, SC 29621. Wideband unit with inside variable gain control and outdoor section placed before antenna.

- RMA Electronics. 32 Mountain Home Road, Londonderry, NH 03053, does custom pre-amp work, including the installation of pre-amps inside your scanner itself.

## KNOCK OUT IMAGE INTERFERENCE

Now you can tune out strong interfering signals such as mobile phone, aircraft, FM, ham radio or weather band broadcasts and avoid front end overload in your scanner.

The Capri Electronics RF Notch Filter can be used with any scanner that has a Motorola type external antenna jack. No modifications to your scanner are necessary. Works with outside antenna systems as well as with the whip that comes with your scanner.

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## May We Recommend . . . .

**The North American Short Wave Association, P.O. Box 13, Liberty, IN 47353.** NASWA has been around since 1961 and now has well over 2,000 members. Their specialty is short wave broadcast (SWBC) coverage and they're good at it. Each month they publish *FRENDX*, a really good 56 page publication filled with columns which are brimming over with news and information on the world of SWBC DX. In addition to *FRENDX*, they also send out a mid-month update consisting of several pages of late breaking frequencies, new stations, schedule changes, etc. Membership in NASWA is \$16 per year in North America and includes a First Class Mail subscription to *FRENDX*. A sample copy of *FRENDX* is \$1.

**Association of North American Radio Clubs, 1500 Bunbury Drive, Whittier, CA 90601.** ANARC isn't exactly a DX club; it's an umbrella organization to which many individual clubs belong. However, the group's news publication is available to individuals. The newsletter contains inside info on member clubs, news of DX conferences and conventions, special features which usually relate to clubs—both in general and also specific organizations. The newsletter costs \$5 in North America and you'll get a copy every month for a year. A sample copy is 50¢.

When writing to the above, please mention that you saw it in *POP' COMM!*

## NEW AND EXCITING TELEPHONE TECHNOLOGY

### Can You Turn Cordless Insecurity Into Security?

**Y**our new cordless telephone is indeed convenient. You can place and receive phone calls around your house or office. Just turn on your handset and you're on the air. Your cordless call will be heard loud and clear by the party on the telephone.

Your cordless call is also heard loud and clear on any programmable scanner radio, as well as any common AM band broadcast radio receiver within 600 feet! If you think your conversation is private, don't believe it!

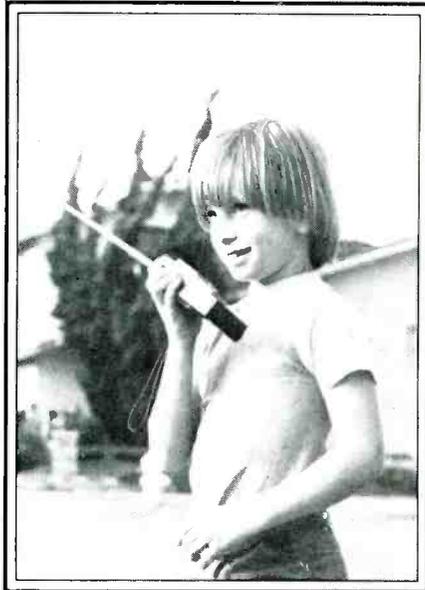
#### AM Radio Reception

Ninety percent of all cordless telephone systems utilize frequencies just above the AM broadcast band. The telephone side of the conversation, plus your own cordless handset audio re-transmitted through the telephone, is broadcast between 1700 kHz and 1800 kHz. Most clock radios, pocket AM radios, automobile AM radios, and even those new portable AM/FM stereo radio systems easily tune a few hundred kilohertz above the AM broadcast band. Simply turn the dial all the way to the right, and where the music stops, juicy cordless telephone calls begin.

That's right. Any inexpensive AM broadcast radio will tune slightly above the broadcast band and intercept your cordless call. If the little AM pocket radio won't quite tune high enough, a simple tweak of the small calibrating tuning capacitor does the job nicely. I have yet to see any type of AM radio that couldn't be tuned or tweaked all the way up to 1800 kHz.

The telephone side of the conversation is fed from the transponder into the AC power lines for distribution. The actual output power into the AC power line is about 100 milliwatts. Although this is extremely low power at 1700 kHz, your AC power lines make an excellent antenna. It's possible to detect cordless telephone systems on the same power line up to one-half mile away! Tuning in the telephone side of the cordless call is a snap with any type of plug-in AM radio because the same power that powers the clock radio also carries cordless telephone calls impressed over the power line.

The Frequency Modulated telephone signals are fed into the power line through tiny capacitors in the transponder. This allows the RF signal, using FM, to be transferred onto the AC line with little loss. The signal still remains Frequency Modulated, so you will need to utilize AM slope detection for tuning in the calls clearly. All you need to do is tune slightly off the FM frequency to hear



Toy walkie-talkies share cordless channels.

the calls clearly. This also means that eavesdroppers simply need to turn their AM radio dial all the way to the right, and tune in the signal so it sounds clear. They will hear the telephone side of the conversation at full volume, and your cordless re-transmitted voice at about half volume.

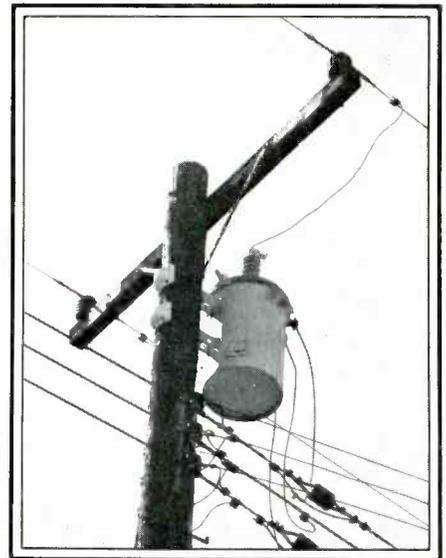
This idea of transmitting radio signals on AC power lines is old hat. Intercom systems have been using this trick very successfully. In fact, don't be surprised if your "cordless" intercom systems that plug into AC might also pick up your cordless calls loud and clear. The intercom systems operate on the same exact frequencies as the cordless telephone base transponder near 1700 kHz.

Other systems that operate near 1700 kHz off of the AC power lines might be tone-coded signals to activate remote control light circuits, security alarms, household light dimmers, and a host of other appliances that receive commands over the wiring from a central computer control unit. Someone listening in on your conversation at the high end of the AM radio band will hear a lot of other signals, too!

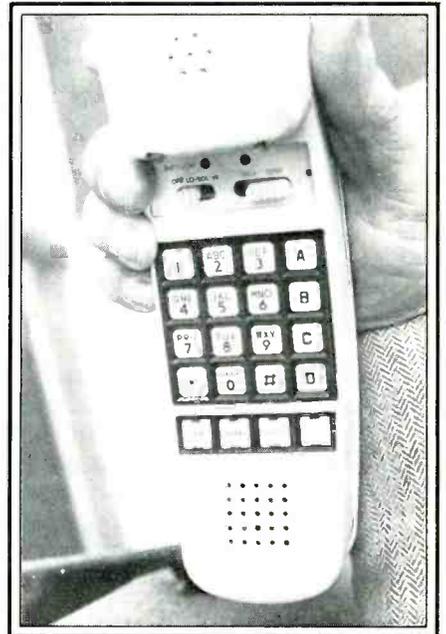
#### Scanner Eavesdroppers

The cordless handset transmits back at 49.83 MHz to 49.89 MHz. This radio energy is indeed "wireless." It travels through the air, rather than on AC power lines. This energy goes off in all directions from your handset. The little rubber antennas will keep the range down dramatically. Using the tele-

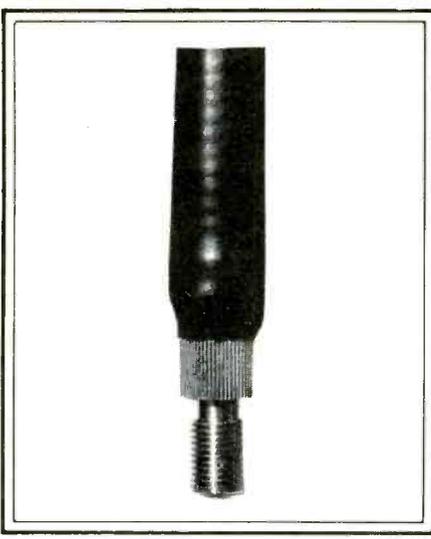
scopic antenna on your cordless handset will provide maximum RF radiation back to your base transponder. It also provides for maximum reception, up to a quarter mile away, by anyone with a scanner radio! The scanner user needs simply to scan the five cordless channels, or search between the lower and upper frequency limits. I prefer searching because some cordless handsets are slightly off frequency.



Power lines transmit the 1700 kHz signal.



New 49/49 MHz Pathcom set.



*This antenna will confine the range.*

With an outside scanner antenna, I can routinely hear cordless handsets up to five blocks away. When people are transmitting from an office building near a window, or on the third story of their house, the range is even greater! The longest cordless handset reception was achieved by an operator on his cordless telephone over one mile away!

Only one side of the conversation is usually heard at 49 MHz. Most handsets rarely couple the telephone audio into your transmitted voice audio. If you turn your scanner up loud enough, you can sometimes pick out the attenuated telephone side of the conversation, too.

There are plenty of other types of conversations at 49 MHz that you will pick up with your scanner. Toy kiddie talkies, head-set communicators, wireless microphones, TV and hi-fi remote controls, radio controlled model planes, cars and boats, security alarms, and a myriad of other transmitting devices that operate on the "no-license" Part 15 FCC band.

### 49/49 Phones

Electra Corporation and Pathcom are now producing cordless telephones that operate full duplex at 49 MHz. Both channels are transmitted simultaneously on two of the five 49 MHz cordless frequencies. Many users will also modify their equipment to an outside 49 MHz antenna to increase range. This allows you to receive the telephone side of the conversation up to a half mile away! Some enterprising users have also modified the handset to accept an outside or mobile antenna. This gives them better than one mile coverage to the base unit with an outside antenna. Picking up these signals is as easy as shooting fish in a barrel!

### Security

If you operate a cordless system and wish to decrease the amount of radiation by both your transponder and the handset, there are some nice tricks.

Coil your AC transponder line cord in a tight loop. Plug it into an outlet that has the

third ground wire socket. Try to find an outlet that has conduit covering the AC wires. This will allow only small amounts of signal to "leak out." Without going into your equipment, this is about all you can do to minimize the transmitted signal at 1700 kHz over your AC wiring.

On the handset, run the collapsible antenna all the way down. Only allow enough of the antenna to protrude to where the calling party can hear you clearly at your farthest point from the transponder. If you are within 50 feet of the transponder, keep the antenna all the way down.

The telescopic whip on the base transponder, on most units, has nothing to do with transmitted range. It only allows for received range, so leave it fully extended unless you are encountering interference from other units. If you find your base transponder constantly chattering because of similar units on the same frequency, run the antenna down as far as possible for minimum reception.

On the new, more expensive 49/49 MHz systems, keep both the base transponder antenna, as well as your cordless handset antenna, retracted as much as possible to maintain minimum range. You will find that both antennas may be fully collapsed for good results up to 40 feet away from the transponder. Running both antennas all the way out only increases your chance of being heard by a radio eavesdropper.

Until the FCC authorizes more cordless frequencies on bands not easily tuned in, such as 900 MHz, you can expect your cordless call not to be at all private. Some folks specifically make every effort to eavesdrop on as many calls as possible. The curious can easily tune their AM radio into some juicy conversations a couple of houses or offices away. Since the FCC offers no provision for privacy or interference protection, do expect that any device operating on Part 15 frequencies to be easily tuned in by the curious radio eavesdropper.



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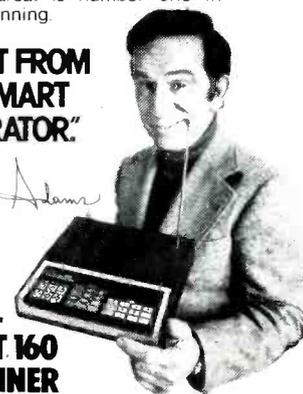
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# RTTY

BY JOSEPH JESSON

## THE EXCITING WORLD OF RADIOTELETYPE MONITORING

Commercial RTTY monitoring using a suitable demodulator and personal computer seems to be the most flexible means of data reception and display. The temptation of using a personal computer for universal code conversion by receiving one code and converting to another, more usable code, is overwhelming. Where some demodulators have an integral display (a vacuum-fluorescent display such as offered on the Kantronics Mini-Reader), many offer a direct video output, as Info-Tech, Hal, IRL (optional), and Microlog do. However, the use of a personal computer to decode, display, and store RTTY signals is fraught with problems.

The first major problem is one of software. Where can I find universal code converter software? Unfortunately, this does not exist. However, software to convert basic Baudot (CCITT2) to ASCII exists and many commercial programs will support this. Check for a public domain version of Baudot to ASCII for your particular machine.

Public domain software is generally free, normally accessible by downloading the source code from a public bulletin board. Details can usually be given by finding a local computer club and attending meetings. For the adventuresome soul, one who would like to write his own programs, an exceptional code table list is available from Universal Electronics, Inc., 1280 Aida Drive, Reynoldsburg, Ohio 43068 for \$8.00.

Code tables include: Cyrillic, third shift Cyrillic, Greek, Hebrew, Arabic, Korean, Amharic, Thai, Japanese (6 unit) and last, but not least, Baudot. Also, a good tutorial on code conversion and CCITT definitions are included. These tables are recreated in the conversion software to allow each of these to be converted to ASCII or displayable code. Many of these code tables require changing the character generator IC in order to display the correct font. This character generator IC creates a series of dots on the CRT as the electronic beam is swept over the phosphor coated face. By changing character generator IC's, any display font is possible,

within the dot timing resolution.

This is quite a task for the beginner, and since this is an advanced project, let's get back to simple Baudot to ASCII conversion and its computer implications. After buying a suitable demodulator and personal computer, another problem will be obvious—noise. Noise can be a problem in two forms—radiated emissions from the computer, and susceptibility of noise generated errors by the computer. Of the two, the first is a nightmare, difficult to suppress and control.

With grandiose schemes racing through my mind, I purchased an expensive CPM personal computer to complement my RTTY DX'ing equipment, only to find to my horror that false signals and radio frequency interference hash covered from 4 MHz to approximately 30 MHz! After weeks of attempting to control this noise, I achieved some success. This effort included painting the inside of my computer case with silver-based paint, carefully placing foil over the keyboard section, and installing a power line filter. Installing the computer in another room helped also, but keeping the antenna at considerable length and insuring a secure coaxial ground will be the most profitable for the control of computer generated noise.

In spite of all of the above safeguards, I still turn off my computer and terminal unit if a received signal is to be completely verified! The Federal Communication Commission has a set of regulations, Part 15 A and B, docket no. 20780, that requires all computer and terminal units to meet FCC limits on radiated noise by October 1, 1983. Although a plus for assuring compatibility between digital equipment and sensitive HF receivers, this is proving to be an expensive testing procedure for manufacturers. Well, at least one will have control over many sources of electromagnetic noise pollution with these strict measures.

Interestingly enough, our government sets limits on terminals and computers used in embassies and government secure areas. These low emissions are verified by govern-

ment standards known as the Tempest qualifications—the toughest in existence. Associated with digital noise is actual information and one could derive viewed or printed text data based upon noise signatures!

Let's look at what one can do in order to solve persistent noise problems. As mentioned, a power line noise filter would be the first device to try. Power line filters are available from many sources and should be available at the local electronic parts distributor.

Severe power line common-mode noise can be solved with an isolated and shielded transformer, such as that made by the Topaz Corporation, 3855 Ruffin Road, San Diego, CA 92123. The next step would be to insure that the video output cable (if used) is double shielded coax with a minimum length. Use shielded cables for all input and control lines. At least 50 feet of coax with the antenna mounted furthest from the terminal unit should also be used to reduce radiated noise. Standard shielding effectiveness is approximately between 70 and 80 percent. This percentage is usually a rating of the surface area covered by the shield braid.

Tighter shielding involves using aluminum or copper foil wrapped around the conductors. This foil technique gives a nearly perfect covering, reducing coupling and mutual capacitance to negligible levels. The best practice involves shortest-distance wiring (reduced inductance) and a common return conducting plane near the signal conductors. This ground plane can be sheet copper placed just over or under signal wires. The idea is to provide a ground return path for each signal wire near the wire.

Unfortunately, to reduce noise beyond this point, major terminal unit redesigns are required. Let your equipment manufacturer know whether his unit is RF quiet or noisy. Quiet designs can be a genuine promotional item, whether a microcomputer based terminal unit or general computer is used with a sensitive HF receiver.

Let's look at loggings this month.

JAMAHIRIYAH NEWS AGENCY/AJ/AA/9:40/ NNNNN CZCZI RR ESP

JANA/8 INST LIBYA PARIS, SAFAR 13

DEC 10, JAMAHIRIYAH NEWS AGENCY//

THE FREJZAIENPAPER LE HATIN YESTERDAY SAID THAT EXPLOITING THE ALLEGATIONS AGAINST THE JAMAHIRIYAH PEOPLE IN THE PRESENT CLIMATE IN AMERICA DRIVES ONE TO CONFIRM ALL THE DOUBTS AROUND SUSPICIOUS MOVES BEING PLANNED BY THE U.S. ADMINISTRATION. THE PAPER ADDED THAT THE MANY OBSERVERS ASSERT THAT THE U.S. ADMINISTRATION IS TRYING TO INCREASE THE HATRED AGAINST LIBYANS AS TO DIVERT THE ATTENTION OF THE AMERICAN PEOPLE AWAY FROM THEIR DOMESTIC PROBLEMS CAUSED BY THE PRESENT ADMINISTRATION.

Here's a hard copy printout from the Libyan news agency. Much of their commentary is anti-American.

Frequency	Location	Time	Language	Shift	Baudot Rate	Normal/Reverse Phase
<b>PL - Prensa Latina</b>						
14901 kHz	Havana, Cuba	1850 GMT	English	425 Hz	50 baud	Normal
16248.2 kHz	Havana, Cuba	1900 GMT	English	425 Hz	50 baud	Reverse
18193.4 kHz	Havana, Cuba	2210 GMT	Spanish	425 Hz	50 baud	Reverse
Prensa Latina often varies from 100 to 800 Hz off of previous logged or listed frequency. In this particular case, the frequency change seems to be one of equipment stability since changes may occur within an hour of monitoring.						
<b>VNA - Vietnamese News Agency</b>						
15744.1 kHz	Hanoi, Viet Nam	1445 GMT	English	425 Hz	50 baud	Normal
<b>TASS - Telegrafnoje Agentstvo Sowjetskoje Sojussa The Official Soviet Press</b>						
22782 kHz	Moscow, USSR	1400 GMT	English	425 Hz	50 baud	Reverse
22791 kHz	Moscow, USSR	1400 GMT	English	425 Hz	50 baud	Reverse

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- Scanning The Ohio Highway Patrol
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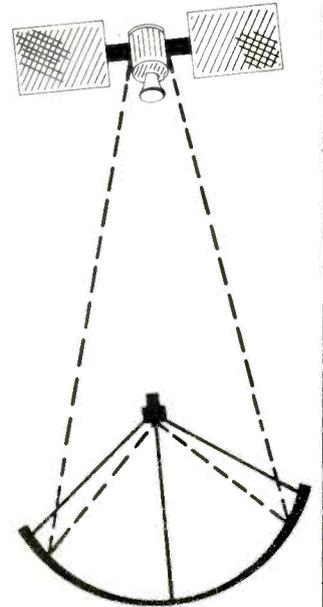
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CIRCLE 5 ON READER SERVICE CARD

INSIDE THE WORLD OF TVRO EARTH STATIONS

## DX'ing Those International Satellites Part One: The Soviet Superbirds

Once the first flush of excitement over direct reception of over 100 channels of American and Canadian entertainment programming has begun to fade, you may want to take your dish for a spin beyond the portion of the Clarke Belt that contains the North American domestic satellites. There is a whole other universe of international television waiting for you. At least one foreign satellite is viewable from just about anywhere in the U.S., with most areas seeing several more. If you live east of the Mississippi, as many as nine international satellites hover above your southeastern horizon.

From our location here in Tennessee, we can view television programming from seventeen countries. Satellite DX'ing offers an exciting new adventure to communications enthusiasts and can be an invaluable educational tool as well, with a wide variety of applications from foreign language development to the study of international political affairs. It gives us a window into the global village that reveals the daily lives and views of millions of people throughout the world.

Last spring, I was provided the opportunity to take a TVRO system to London, England to demonstrate satellite television reception outside of the reach of our powerful North American domsats. A communications show at the Wembley Exposition Hall was featuring the latest in personal communications equipment and one of the local entrepreneurs was intrigued by the idea of satellite television. "Will we be able to see anything?" he wondered.

While conducting research for our satellite TV book, I had learned that there was a Soviet satellite with the most powerful footprint in the world stationed in the southwestern European sky. I was sure that it would provide a good demonstration of satellite TV in action and underline the exciting possibilities for the upcoming Direct Broadcast via Satellite (DBS) services due in Europe by the mid 1980s. So, we assembled an experimental terminal that consisted of a 13 foot petal aluminum dish, 100 degree LNA, TVRO receiver, and multi-standard television monitor and took off for the Isles.

Since I had no opportunity to conduct an on-site survey before the trip, it was fortunate that a skyscraper near the Wembley Exposition Hall did not obstruct our view of the Gorizont (Russian for horizon) satellite at 14 degrees West over the Atlantic. The temporary installation of our dish on the second floor patio just off from the bar went without



Familiar 0167 Gorizont test pattern is usually run between video feeds on the Atlantic based satellite at 14° West.



TV Logos for the various Eastern European countries are usually seen prior to each country's news feeds at 1330 GMT daily.

a hitch. Armed with a couple of recently-legalized British CB walkie-talkies (which allowed us to coordinate between our receiver and monitor on the first floor and the dish on the second), we were able to pin-point the Russian satellite within a matter of minutes. We were all amazed at the quality of the Russian programming we saw. We all expected the programs to be drab and dull. But we tuned into full color animations, feature movies, news and documentaries, music, chess matches, and sporting events. Russian ice hockey has some of the most skillful players in the world and a selection of East European soccer matches drew crowds of spectators to our area of the exhibition.

All of the above programs were being transmitted via Gorizont's spot beam channel, which provides excellent reception throughout Europe on an 8 foot dish. Two additional channels were also active on Gorizont during the exposition. One of these channels is on a global beam, which allows it to be seen throughout Europe, Africa, and parts of North and South America as well. This global transponder is used by INTER-SPUTNIK, the international satellite cooperative of the communist countries.

News events and entertainment programs from the Soviet Union, E. Germany, Poland, Czechoslovakia, Hungary, Yugoslavia, Bulgaria, Rumania, and Cuba were observed at that time, along with UPITN newsfeeds uplinked from London in English at 1300 GMT daily! Our British audience was especially interested in the American movies which appeared in English with Spanish subtitles. These, along with selections of Caribbean rock and roll and Central American news items were all being relayed via Gorizont from Cuba.

A third channel on hemispheric beam was also observed running occasional video or a test pattern. All three transponders were received well from London with only the global beam channel showing a minimal amount of noise or sparkles in the picture.

The Soviet engineers who designed and built Gorizont installed 15 watt amplifiers for the global and hemispheric beams and a 40 watt amplifier for the European spot beam. While the use of high power levels has given Gorizont a strong and far-reaching signal, the satellite is limited to a maximum of 6 channels. Soviet ground control can select between global, hemispheric, and spot beam antennas for any transponder. The Russian video standards turn out to be excellent. When BBC and ITV television crews came out to videotape the system for the evening news, their technicians were amazed at the high quality of the transmissions.

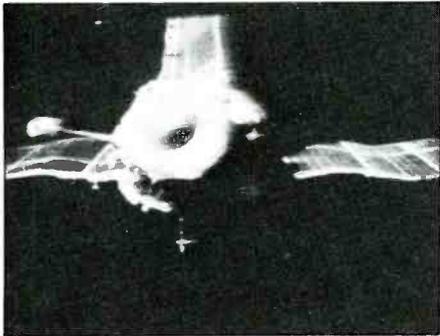
### Gorizont Transponders

3675 MHz Spot Beam Europe	below 1
3725 MHz o/v (occasional video)	1
3775 MHz o/v	3
3825 MHz Global/Northern Hemi Beam (seen in Eastern U.S.)	6
3875 MHz Global Beam (seen in Eastern U.S.)	9
3925 MHz o/v	11

After returning to the U.S., I found myself wondering if I could watch European television from right here in Tennessee. Could it be possible? I plugged the relevant numbers into my satellite locator computer program and out came the coordinates 5 degree elevation at 100 degree azimuth. Five degrees was barely over the treetops here. After wrestling with our dish's mount for a while, I finally got it swung around to the correct co-



Soviet TV provides the westerner with a unique perspective on the Russian people themselves.



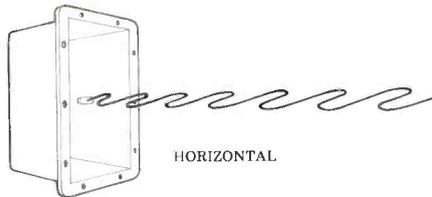
TV footage from the Soviet Soyuz space station was observed during recent mission involving three men and two women cosmonauts. Same footage later showed up on Ted Turner's CNN news, which shows that we weren't the only American earth station pointed Gorizont's way on that occasion.

ordinates. At 5 degrees, the antenna looked like it was almost standing on edge! I slipped into the workshop and began tuning up and down the band. There on channel 9 on my receiver was the now familiar 0167 Russian test card, a bit noisy but recognizable.

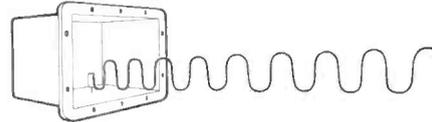
I fine tuned the dish's elevation and was able to identify a second channel on Gorizont on TR 6 also running test pattern. The second channel was a bit weaker than the first, but still recognizable. I tuned back up to TR 9 and there was the Moscow evening news complete with audio in Russian (of course!) on a 7.5 MHz subcarrier. Although the 5 degree elevation angle allowed earth-generated noise to weaken my reception of the global beam channel somewhat, I considered myself lucky. If I lived three hundred miles to the west, Gorizont's signals would not have made it over my eastern horizon.

In order for you to be able to view international television, you must make a few minor adjustments to your TVRO equipment. For the best possible reception by your home TVRO, you will need to change your LNA polarity from horizontal/vertical (which is used by all North American domestic satellites) to the right hand circular which is used by all Soviet and INTELSAT satellites. Instead of positioning the microwave energy in either a vertical (straight up and down) or horizontal (lying flat) plane, circular polarization is transmitted in a spiraling pattern. Although your regular feed can

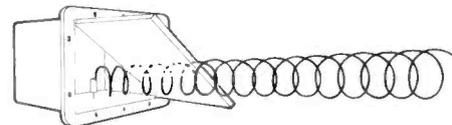
#### POLARIZATIONS



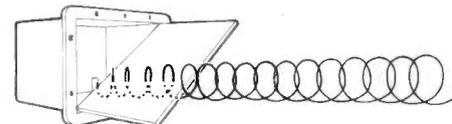
HORIZONTAL



VERTICAL



LEFT HAND CIRCULAR



RIGHT HAND CIRCULAR

still pick it up, you will end up losing between 2 to 3 decibels of signal. This can make the difference between watchable video and snow city on many of the international satellite channels.

Fortunately, modification to circular polarization (CP) is a simple affair. A dielectric insert is available (see address at end of article) which slips right inside the mouth of scalar-type feedhorns at a 45 degree angle to the LNA probe (see illustration). Unlike the horizontal/vertical polarized feed systems that we are all accustomed to, a circularly polarized feedhorn does not require rotation for optimum performance when receiving CP signals.

There are several electronic methods for encoding the picture and color components of video being used in the world today. The United States (as well as many Central and



One particular INTERSPUTNIK newsfeed showed the late Soviet Premier Brezhnev tending to his diplomatic duties.

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CIRCLE 71 ON READER SERVICE CARD



Almost directly overhead, Molniya bird displays Orbita-I test pattern before switching to the next satellite entering the transmit zone that lies above Hudson Bay, Canada.

South American countries and Canada) uses the NTSC color coding system with a 525 line screen that flashes at a 60 Hertz rate. The Soviet Union and most Eastern European countries use the SECAM color standard with a 625 line screen and 50 Hz rate. Since Gorizont uses a mix of East European SECAM TV with Cuban programs in NTSC, a multi-standard monitor must be used for full color display of all available programming. There are several companies now manufacturing them and we would recommend getting one for any first class international earth station installation.

Black and white reception of Soviet and East European television is possible, however, with your regular TV set. For the experimenter who occasionally might wish to view one of the international satellites, two simple adjustments will provide monochrome reception. First, readjust the set's vertical hold control to stop the picture from rolling. Then, readjust the vertical linearity control to reduce the picture's height so that the 625 line picture will all fit on the NTSC 525 line screen.

Those of you who live west of the Mississippi cannot receive Gorizont because it falls below your southeastern horizon. However, there is another series of Russian satellites that transmits Soviet television programming from almost directly above your head. These satellites can provide reasonable quality video into earth stations using a 10 foot or larger dish. English satellite experimenter Steve Birkill first brought the Molniya (Russian for lightning) satellites to my attention during our visit with him following the Wembley show (see *POP' COMM* November, 1982). Steve has been watching Molniya satellites now for the last three years from his Sheffield home. Indeed, these birds can be seen from most locations in the world that are north of the equator.

Instead of maintaining a geostationary position in the Clarke Belt, Molniya satellites travel in a U shaped orbit which takes them from one apogee over the Soviet Union to perigee down near Antarctica and then back up to a second apogee some 20,000 miles over Hudson Bay, Canada. For about six hours, the Molniya satellite will maintain its position in a small area directly above Hudson Bay, with about a one hour period at

apogee where the satellite hangs in the northern sky, virtually motionless. It is during this six hour period that the Molniya transmits a single channel (TR [9]) of television back across the North Pole into the Soviet Union. In Siberia there are a number of 10 meter terminals which track the Molniya satellites, providing regional television and radio services via terrestrial broadcast stations to numerous cities, villages, and rural areas. In the Soviet Union, this TV service is referred to as Orbita-I.

Outside of the one hour at apogee, the satellite must be tracked at approximate intervals of 10-15 minutes. At the end of the six hour period, the satellite's TV channel is turned off as the gravitational field of the earth accelerates the bird along its pendulum-like orbit, carrying it rapidly beyond our North American skies and out of view. The Soviet engineers have four Molniya birds inhabiting this particular orbit, with their location spaced at specific intervals so that as one is leaving the Hudson Bay area, the next bird in line is just arriving. By switching video from one bird to the next at this time, something akin to continuous television coverage can be maintained over a 24 hour period.

At this point, you may be asking why the Soviets would bother with a non-geostationary system of four birds when a single satellite in the Clarke Belt could give continuous coverage without requiring complicated tracking equipment? One good reason is that the northern-most regions of the Soviet Union cannot view the satellite belt that lies over the equator. Also, the first Molniya system went into service in the mid 1960s when the Soviets did not have a powerful enough rocket to boost their birds into geosynchronous orbit. Once the technology and hardware was committed to the Molniya program, it became a very expensive proposition to switch over to a totally new system. It's my opinion that the Molniya type of satellite communications system is worth learning about. In this day and age of rapidly filling orbital slots in the prime "real estate" of the Clarke Belt, Molniya does illustrate a practical alternative that may see further development in the future.

Next month, in Part II of "DX'ing Those International Satellites," we'll give you instructions on how to receive Molniya from your location. We'll also take a look at the INTELSAT international satellite system and tell you where to find an additional 12 channels of Central and South American domestic television services that are within view of American TVRO stations.

If you would like to learn more about international and domestic satellite TV reception, *The World of Satellite Television* by Mark Long and Jeffrey Keating is available for \$7.95. Also available: Circular polarizing dielectric insert with instructions: \$14.95, and Satellite Locator Computer Print Out for all international and domestic satellite systems within view of your location (please include your latitude and longitude coordinates): \$3.00, from SOLAR ELECTRONICS, Dept. PC, 156 Drakes Lane, Summertown, Tennessee 38483.

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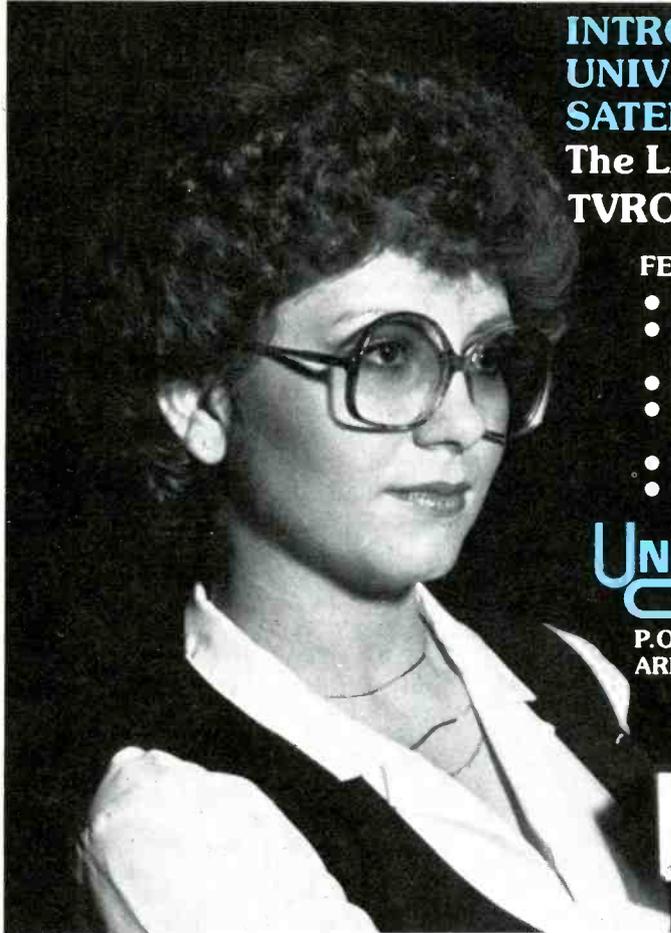
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# WASHINGTON PULSE

## FCC ACTIONS AFFECTING COMMUNICATIONS

### **Coast Station Notification Of Owners/Operators Regarding Inability To Deliver Ships' Messages**

Sometime on October 25 or 26, 1980, the 523-foot-long U.S. freighter *SS POET* disappeared in the North Atlantic Ocean about 500 miles east of Delaware Bay. No distress message was heard from the *POET*, and no trace of the ship or its 34-person crew has ever been found. In recent years, several other vessels have met a similar fate.

The National Transportation Safety Board (NTSB), in its investigation of the disappearance of the *S.S. POET*, has made several recommendations. Of particular concern to Commission licensees is the recommendation (NTSB Safety Recommendation M-81-54) concerning an owner/operator notification procedure.

The NTSB has recommended that the Commission request (on a voluntary basis) public coast stations, other than Class III, "to notify the owner or operator of any U.S. -flag vessel over 1000 gross tons that fails to respond to a traffic list after 48 hours regardless of the originator of the message."

The FCC advised the maritime community of the NTSB Recommendation and requested affected licensees to participate on a voluntary basis.

### **Private Microwave Licensing Policy Study**

The FCC's Private Radio Bureau announced the availability of its report "Private Microwave Licensing Policy Study." The staff study was prepared by the Private Radio Bureau's Planning Staff.

This study was initiated to review current microwave licensing policies, rules, and procedures in order to make recommendations which would reduce burden on the FCC and/or licensees and applicants. The study focused on deregulatory actions where they do not reduce the capability of the FCC to perform the licensing function.

This report provides a focus for further discussion within the FCC and with microwave users, regarding implementation of those changes which are most feasible and will bring about the greatest savings in cost and time. These changes must be viewed in terms of the overall goal of performing the microwave licensing function most efficiently and effectively.

The report may be reviewed at the FCC Library, Room 639, 1919 M Street, N.W., Washington, D.C. 20554, and a limited number of copies are available at the FCC Office of Public Affairs, Room 207, 1919 M Street, N.W., Washington D.C. 20554, (202) 254-7674. Copies may be purchased

from the Downtown Copy Center, 1114 21st Street, N.W., Washington, D.C. 20037, (202) 452-1422, as well as thirteen FCC authorized distributors (a list of the distributors may be obtained from the Office of Public Affairs).

For information concerning the contents of this report, contact Mr. Art Leahy or Ms. Rose Crellin, Planning Staff, Private Radio Bureau, Federal Communications Commission, Room 5002, 2025 M Street, N.W., Washington, D.C. 20554, (202) 254-3301.

### **Meteor Burst Communications Service Proposed**

The FCC is seeking comments on a proposal for a new Meteor Burst Communications Service in Alaska. The agency proposes to allocate the frequencies 42.40 and 44.10 MHz to common carrier stations in the Rural Radio Service and 44.20 and 45.90 MHz to private radio stations.

The proposal is in response to a rulemaking petition by Meteor Data, Inc., which proposes to establish a common carrier communications service using meteor burst communications.

The effect of meteor ionization on radio propagation was discovered around 1940. Meteor burst communication uses the phenomenon of meteor trails, produced daily in the earth's atmosphere at heights of 80 to 120 km, to reflect radio waves in the VHF frequency range for distances up to 2000 km. The ionized meteor trails last only from a few milliseconds to a few seconds, but communication is possible because billions of meteors are constantly entering the earth's atmosphere. Since the meteor trails are of such short duration, communication is intermittent and data transmission at a very high rate or burst is necessary; thus the technique is commonly referred to as meteor burst communications. Due to propagation phenomena, meteor burst communication provides 24 hour availability for transmission and is not susceptible to variations of the ionosphere that frequently degrade other types of high frequency communications.

Except for three experimental licenses granted to private users, all current meteor burst systems are licensed and operated for government use only.

Meteor burst communications could contribute to individual safety and accident prevention since the systems can function from remote and even hazardous locations without the need for a human operator, and could provide an alternative to more elaborate and costly satellite, microwave, or VHF links, the FCC said.

Alaska is considered an ideal location for trying this technology because the four fre-

quencies proposed for allocation have no existing licensees and because of its geographic location.

Stations using meteor burst communications would be prohibited from causing harmful interference to stations operating in accordance with the allocation table.

### **License Revoked**

FCC Administrative Law Judge Joseph P. Gonzalez revoked the license for Amateur Radio Service station N6BHU licensed to David Hildebrand, Hollywood, CA. Gonzalez also suspended Hildebrand's operator's license.

The case against Hildebrand was initiated in March, 1981 after the Private Radio Bureau issued an order directing Hildebrand to show cause why his licenses should not be revoked and suspended for violation of FCC rules prohibiting transmission of communications containing obscene, indecent, or profane language.

Although Hildebrand admitted to engaging in the prohibited communications, he argued that the Commission did not show that the words used during his transmissions were patently offensive to listeners in the Los Angeles area. Additionally, Hildebrand contended that such language has been used for many years by Amateur operators in that area without objections from the FCC.

However, in an initial decision issued September 24, Judge Gonzalez concluded that Section 97.119 of the rules explicitly authorizes the Commission to impose sanctions on licensees who willfully engage in offensive broadcasting. Judge Gonzalez found the language used by Hildebrand to be obscene and offensive, noting that a large audience could have been exposed to these transmissions, including individuals under 17 years of age.

After finding that the transmissions demonstrate Hildebrand does not have the necessary qualifications to remain a Commission licensee, the judge ordered Hildebrand's station license be revoked and the Private Radio Bureau's suspension of his operator's license affirmed.

### **Spectrum Alternatives Report Available**

The FCC Office of Science and Technology has issued a report titled "A Comparison of Alternative Spectrum Regulatory Approaches." The report compares alternative spectrum regulatory approaches in terms of their impact on licensee choice. The current method of spectrum management is analyzed and contrasted with a free market approach and approaches which combine elements of an administrative approach with a free market approach.

Five broad FCC rule groupings are examined in terms of their rationale and utility under the present approach, and their utility under the various alternative approaches. The report suggests that these rules do not generally serve to promote efficient spectrum utilization under the present approach, but may be needed for social or equity reasons. Under the various alternative approaches, the report concludes that most, if not all, of these rules would be inapplicable or unnecessary.

A limited number of copies of the report are available from the Office of Public Affairs, Room 207, 1919 M Street, N.W., Washington, D.C. 20554; telephone (202) 254-7674.

Copies may be purchased from Downtown Copy Center, 1114 - 21st Street, N.W., Washington, D.C. 20037; telephone (202) 452-1422.

## New Experimental Stations

The FCC Office of Science and Technology, Frequency Liaison Branch, took the following actions:

**KE2XMF, WESTERN GEOPHYSICAL COMPANY OF AMERICA**, Galveston, TX. Granted License for experimental research station to operate on 1638.5-1642.5 MHz band for the sole purpose of maintenance and testing of MARISAT shipboard terminals prior to shipment for installation.

**KE2XMD, JAPAN RADIO COMPANY, LTD.**, Clifton, NY. Granted License for experimental developmental station to operate on 1639.750, 1639.975, and 1636.5-1645 MHz for development and demonstration of a computer network to be used between fleets of ships and shore fleet management facilities using INMARSAT.

**KM2XHW, PLESSEY DYNAMICS CORP.**, Newark, NJ. Granted License for experimental research station to operate on 16050, 16250, 16450 MHz to develop Electronic Measuring Instrument to be exported to Egypt.

**KM2XHX, JON B. JOLLY, INC.**, Maple Valley, WA. Granted License for experimental developmental station to operate on 49.18 and 47.70 MHz to develop a meteor burst communication system.

Granted License for experimental developmental stations to Airfone, Inc. at various locations shown below, on various frequencies in 900 MHz range, to collect data pertaining to the interference generated by highpower radar units. Frequency every 6 kHz and \* indicates Pilot Channel

KM2XIA	945.004-945.185	*945.194	Orlando, FL
KM2XIB	945.804-945.984	*945.994	Boston, MA
KM2XIC	945.204-945.384	*945.394	Wilmington, NC
KM2XID	945.004-945.184	*945.194	New Orleans, LA
KM2XIH	944.604-944.784	*944.794	Charleston, SC
KM2XII	944.604-944.784	*944.794	Seattle, WA
KM2XIJ	945.404-945.584	*945.594	Houston, TX
KM2XIK	944.804-944.984	*944.994	Tallahassee, FL
KM2XIL	944.404-944.584	*944.594	Miami, FL
KM2XIN	945.884-945.984	*945.994	Klamath Falls, OR
KM2XIO	944.204-944.384	*944.394	Austin, TX

Granted License for experimental developmental station to NEC America, Inc. at

three locations in Fairfax, Virginia to operate local Distribution Radio (LDR) equipment to verify operation performance in an actual city location; to demonstrate operation and performance of system and confirm compatibility of NEC-LDR equipment with various data termination equipment. **KM2XIQ** on 10572.5 MHz; **KM2XIR** on 10637.5 MHz; **KM2XIT** on 10637.5 MHz.

**KM2XIW T-CAS AMERICA, INC.**, Continental U.S., Hawaii, Alaska, and Puerto Rico. Granted License for experimental developmental station for the purpose of making field strength surveys on frequencies specified in Part(s) 21, 74, 78, and 94 of Rules.

**KM2XIX, WESTINGHOUSE COMMUNICATION SERVICES, INC.**, Anne Arundel Co, MD. Granted License for experimental developmental station to operate on 1250-1350 MHz band for development of phased array technology and signal processor and solid state transmitter technology.

**KM2XIY, University of Texas**. Near Mt. Davis, TX. Granted License for experimental research station to operate on 160.200 MHz to develop a strain surveillance system required by U.S. Govt. contract.

**KM2XIZ, RUSSELL G. WICKER**, River-ton, UT. Granted License for experimental developmental station to operate on 902-903 MHz band to develop equipment and antenna equipment for the 902 MHz band to be used by Amateur Radio Service.

**KM2XJA, LOCKHEED CORP.**, Plainfield, NJ. Granted License for new experimental developmental station to operate on 3000-3400 MHz and 3400-3800 MHz bands to develop identification system.

**KM2XJB, JOHN J. BILODEAU**, Salem MA. Granted License for experimental developmental station to operate on 902-904 MHz band to develop equipment for use in 902 MHz band under WARC 79 for Amateur Radio.

**KM2XJC, EATON CORP.**, Deer Park, NY. Granted License for experimental developmental station to operate on 9250-9410 MHz band to develop, test, and demonstrate airborne radar system with weather and search capabilities.

**KM2XJD, THE BOEING COMPANY**, State of Washington. Granted License for experimental research station to operate on 45,000 MHz and 95,000 MHz to gather data for analysis and research on experimental instrumentation radars.

**KM2XJE, GENERAL ELECTRIC RADIO SERVICES CORP.** Burlington, Underhill, VT. Granted License for experimental research station to operate on 2850, 2890, 2910, and 2950 MHz for in-house technical development work looking for future contracts from defense area.

**KM2XJF, WESTINGHOUSE COMMUNICATION SERVICES, INC.** Anne Arundel County, MD. Granted License for experimental developmental station to operate on 1030 MHz to develop phased array and solid state transmitter technology and develop programmable signal processor techniques.

## National Industry Advisory Committee To Be Strengthened

In a major move, the FCC has voted to restructure and strengthen the National Industry Advisory Committee (NIAC), which advises the Commission on national defense and emergency preparedness planning.

The strengthened NIAC was deemed necessary to provide the Commission with advice on national security and emergency preparedness issues in the new competitive communications environment.

FCC Defense Commissioner Mimi Weyforth Dawson indicated that it was essential to have such advice in an era of high technology and that future communications planning for national security and emergency preparedness must consider new technologies, such as Direct Broadcast Satellites and cellular radio systems.

Dawson said it is vital to the public interest that the Commission seek the best advice available from industry and from all planners in the national security and emergency preparedness community, especially in view of the evolving structure of the common carrier networks and driven by the AT&T antitrust trial settlement and by competitive forces.

Dawson and FCC Managing Director Edward J. Minkel recommended these changes after a thorough review of NIAC activities. Chief executive officers and knowledgeable private citizens will participate in NIAC deliberations. Key topics for investigation include better integration of all available communications resources in any emergency—including those of the common carriers, private radio, cable, broadcasting—and expansion of the Emergency Broadcast System.

## TV Game Manufacturer Fined For Equipment Marketing Violation

The Federal Communications Commission issued a Notice of Apparent Liability to Coleco Industries, Inc. for marketing its Colecovision Model 2400 prior to Commission authorization. Coleco agreed to pay the forfeiture of \$2,000.

In addition, the Commission determined that early versions of the model 2400 were in violation of its conducted interference limits. These models can have a somewhat higher than normal potential for interfering with television receivers. The Commission has since issued Coleco an equipment authorization for a modified game which is now being sold by retailers. Coleco has undertaken to inform consumers who purchased earlier versions of the game of Coleco's policy of repairing or exchanging games should any interference be reported. No further action by the Commission is anticipated.

## Problems in Gulf Marine Communications Noted

A recent intensive monitoring and educational program conducted in the New Orleans/Gulf of Mexico area by the Commis-

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**3. Self-instruction courses:** Evaluation and programming courses from Heathkit/Zenith Educational Systems.

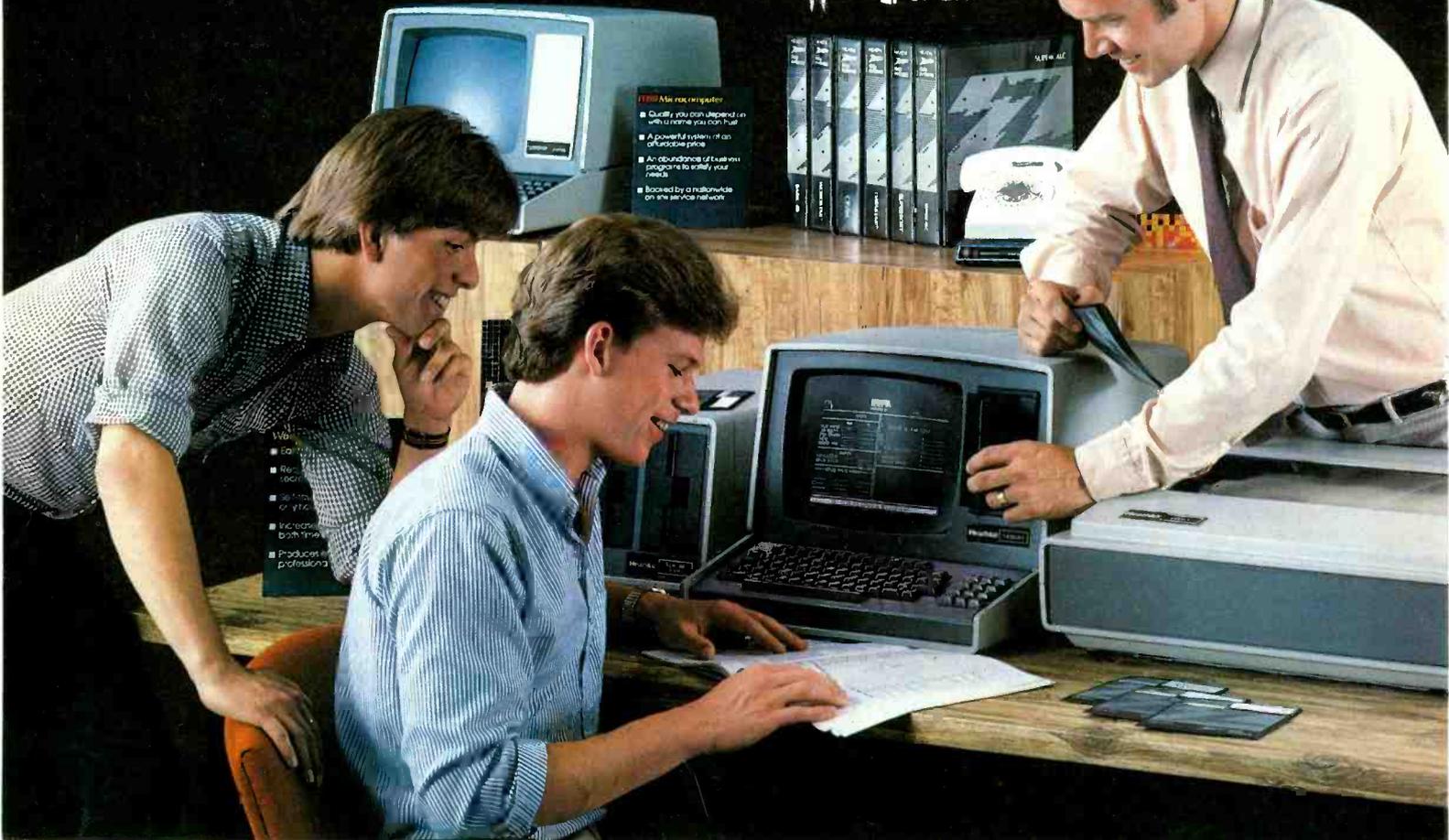
**4. Service support:** Before and after the sale – consultation by phone, carry-in service by trained technicians.

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sion's Field Operations Bureau has identified several problems which adversely affect marine radio communications in that area.

According to Richard M. Smith, Chief of the Field Operations Bureau, "operators in the New Orleans/Gulf Coast area have responded favorably to our educational/monitoring efforts and we expect to soon see a marked improvement in marine radio communications there."

The most serious problem is the failure of operators to reduce transmitter output power to the one watt level when using the "bridge to bridge" frequency. This channel is used for navigational communications between vessels such as in meeting and passing situations. Because of the proximity of the vessels, only low power is required for satisfactory communications. Use of excessive power causes interference to other users of the channel.

Another serious problem is the improper use of authorized channels. Modern synthesized frequency controlled marine transmitters are capable of operation on many channels; however, operators must restrict their communications to the type permitted by the Commission's Rules for the particular channel in use.

Some of the more commonly used channels are:

Distress and Emergency	Channel 16
Calling	Channel 16
Intership Safety	Channel 6
U.S. Coast Guard	Channel 22
Navigation (Bridge to Bridge)	Channel 13
Also Navigation (Bridge to Bridge - New Orleans only)	Channel 67

A complete listing of VHF marine channels and rules for proper operations is contained in the booklet entitled *How to Use Your VHF Marine Radio*. Requests may be directed to any FCC district office or to Regional Services Division, Washington, D.C. 20554.

### Conditional Waiver Of Rules Granted For Cordless Telephones

The FCC granted a request by American Telecommunications Corp. (ATC) waiving Section 15.7 of the rules for a cordless telephone marketed by ATC.

Cordless telephones operate without a license under the provisions of Part 15 of the rules. They consist of a base unit and a portable handset which communicate via two-way radio in place of the telephone cord. This allows freedom of movement. The portable handset of most cordless telephones transmits in the 49 MHz band subject to the technical and certification requirements in Subpart D of Part 15. The base units operate in the band 1.6-1.8 MHz using carrier current techniques to couple a radio frequency (RF) signal onto the house wiring and telephone lines. This signal sets up a radio field which is received by the associate receiver in the remote handset.

The Commission said that Section 15.7 applies to cordless telephone base units as it does to other carrier current devices. Sec-

tion 15.7 requires that the radiated signal must not exceed a prescribed field strength limit and that the device must not cause harmful interference.

The FCC Laboratory tested a number of cordless telephones and found that none complied with the limit in Section 15.7. Nevertheless, the Commission has received only a few reports of interference from cordless telephones, primarily to Amateur Radio in the band 1.8-2.0 MHz.

The Commission shortly plans to institute a rulemaking to establish new rule provisions and frequencies for cordless telephones. As an interim measure, it granted ATC's request for waiver of Section 15.7, provided that certain conditions are met. These conditions are:

- The telephone shall operate in the band 1625 kHz to 1800 kHz;
- The RF currents on the power cord and telephone line shall not exceed 90 milliamps (mA) on any single power conduc-

tor, 12 mA on the telephone line, and 12 mA where measuring all power cord conductors together, including ground;

- The base unit must have a label attached with the following statement: "The base station of this phone is a radio link operating under the terms of a waiver granted by the FCC. Use of this phone may not ensure privacy of communication. Operation is subject to two conditions: (1) It may not cause harmful interference and (2) it must accept any interference received, including that which may cause undesired operation," and
- The base unit must be certificated as meeting the conditions of the waiver.

The waiver applies only to cordless telephones produced until October 1, 1984. Units sold under the waiver will be permitted to operate for the lifetime of the equipment.

The Chief Scientist was to grant similar waivers to other manufacturers who could meet the same conditions.

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February 1983 / POPULAR COMMUNICATIONS / 73

# MAILBAG

## LETTERS TO THE EDITOR

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

### Quick Igor, The Antenna!

What would you say about the idea of using a kite or weather balloon to support a long wire receiving antenna which would be vertical and consist of the cord holding the kite or balloon? It seems to me that if lightweight wire were to be used, it wouldn't have much difficulty staying up and the length of the antenna could be varied by raising and lowering the kite or balloon.

Martin Maisels  
Kingman, AZ

While, offhand, such a scheme would seem to have lots of merit, I would strongly advise against trying it. The hazard potentials for this arrangement getting hit by lightning or else coming into contact with power lines far outweigh any benefits it might offer as a replacement for a more orthodox antenna. Basically, it isn't safe to use such an antenna. Last person to try it, I think, was Dr. Frankenstein—and look at the trouble he got himself into!—Editor.

### A Birdie In The Band?

After reading the October issue "Scanner Scene," I tried the trick of pushing the decimal point before entering an out-of-band frequency on my Regency scanner. I was scanning between 406 and 420 MHz. In doing this, I found that on some frequencies (406.937, 406.975, 411.675, 411.825, etc.) I was receiving what sounded like a very strong "open carrier." There was no voice of any kind, just the carrier. The scanner was picking up stations on other frequencies, but I'm puzzled by the several "open carrier" frequencies.

Ron Walker  
Beale AFB, CA

My guess is that the mystery signals were no more than phantoms generated from within the frequency determining circuits of your own scanner. These "birdies" (as they are called) aren't uncommon in keyboard programmable scanners and there really isn't much you can do to eliminate them. At least knowing what they are saves you the time and trouble of listening to them with the expectation that somebody is eventually going to commence sending traffic.—Editor

### Rose Of Old Tokyo

Your December issue story on radio broadcast propaganda was a fascinating document. It was especially interesting to come across the name of Tokyo Rose in

your story. Wasn't she an American citizen who was eventually brought to trial and is still in prison? What's her story?

Roger Tilghman  
Lexington, KY

*Tokyo Rose's real name is Mrs. Iva Ikuko Toguri D'Aquino and she used her low, sweet voice over Radio Tokyo to tantalize GI troops in the Pacific war theatre. She was a native born American citizen and had been visiting in Japan when the war broke out. During her stay in Japan she married Filipe D'Aquino, a Portuguese citizen living in that country. Although he remained in Japan after the war, Mrs. D'Aquino was returned to San Francisco in 1948 to stand trial as a wartime traitor to the United States. She was convicted and fined \$10,000 and sentenced to 10 years in the Federal Reformatory at Alderson, West Virginia, but was released after 6½ years for good behavior. She then moved to Chicago with her father, brother, and sister. In 1971 she was subpoenaed for failing to pay the government half of her fine. When last heard from (1978) she was on a visit to Tokyo.—Editor.*

### Communications: The Name Of The Game!

I have two questions. First, I'd like to contribute listings to several POP'COMM columns and also write to the authors of some of the feature stores you've run. On occasion there have been addresses published for those who wish to write-in, but this isn't always the case. Please let me know about how to write to these authors and columns.

Secondly, I have some ideas for a couple of features I'd like to write for POP'COMM. Do you accept articles from readers? How do I find out about this?

Michael Blanchard  
Olympia, WA

*Any columnists or authors can be contacted by writing to them in care of Popular Communications (76 North Broadway, Hicksville, NY 11801) in the event no other address is shown in our pages. We will forward all mail to them. If a reply is required, we suggest enclosing a self-addressed and stamped return envelope.*

*We welcome ideas for stories from our readers, whether they be suggestions for ones to be written by specific authors or by those who are suggesting the topics. It's always best to check in advance before submitting a manuscript so that we can determine if another author is already working on the same topic, and also so we can offer thoughts on handling the topic for maximum reader interest. Furthermore, we welcome shack photos showing scanner and receiver installations. These can be either color or black and white.—Editor.*

## May We Recommend . . . .

**The American SWL Club, 16182 Ballard Lane, Huntington Beach, CA 92649.** This club has been operating since 1959. It publishes an excellent 60 page monthly DX publication covering shortwave and broadcast band DX, utility stations, QSL reports, and more. The club co-sponsors three annual DX meetings per year held in southern California. Dues in North America are \$16 per year (includes First Class Mailing of monthly publication). Students (located in North America and 16 years old or younger) can join for \$13 per year. A sample bulletin is available from the club for \$1 (in North America).

**SPEEDX, P.O. Box E, Lake Elsinore, CA 92530.** This group offers several grades of membership based upon the amount of participation in the organization's publication which, coincidentally, is called SPEEDX! The publication runs 60 pages per month and is chock full of news and information, frequency listings, skeds, and other information on shortwave stations, including utilities. The publication even includes a technical section. The group also offers a number of excellent reference publications and DX'ing aids. Annual membership in North America is \$16 (includes First Class Mailing of publication). A sample copy of SPEEDX is available from the group at \$1 (to anywhere in North America).

**The Longwave Club of America, 45 Wildflower Rd., Levittown, PA 19057.** Here's a club for those rugged enthusiasts interested in knowing what's happening below 540 kHz! Their monthly publication, The Lowdown, not only covers listings of stations operating between 10 and 540 kHz, but also has interesting coverage of the 1750 Meter (no license) low power communications band as conducted by Ken Cornell (W2IMB—well known "Lowfer" authority). Membership includes mailing of the publication by First Class Mail and costs \$10 per year (anywhere in the world).

### Beaming In (from page 6)

them. It's the same old story—radio hobbyists being likened to criminals!

A couple of fainthearted readers have also gotten a bit het up about seeing some of the frequency information we've run. Makes you sort of wonder why they bothered getting into monitoring in the first place. What did they expect to hear on their scanners outside of the NOAA weather broadcasts? These people probably would have been better off getting no deeper into monitoring than their TV sets and transistor portables and leave it at that!

For the most part, however, POP'COMM's frequency listings have proven to be interesting and useful to our readers. Many have sent in additional information or their own privately compiled listings. We have also received many requests for us to publish specific listings of interest to our readers. I can tell you that we've lined up some dillies and those of you who have been finding those published thus far to be of value will continue to be more than satisfied. If you've got some listings you'd like to see published, why not drop me a card or letter and itemize them; or, if you've got some interesting listings you'd like to share with other monitors, send them to POP'COMM!

As we stated in our very first issue of POP'COMM, the magazine is intended "for those of us who want to perfect the ability to tune in on whatever it is that so many others want (or don't want) us to hear." Maybe I should have expanded that with the statement, "others need not apply."

Anyway, I thought you'd be interested in learning about some of the ramifications which that seemingly innocent statement in our first issue has brought about. It's our intention to continue working towards that on-going goal.

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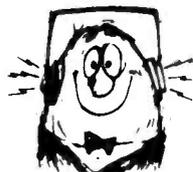
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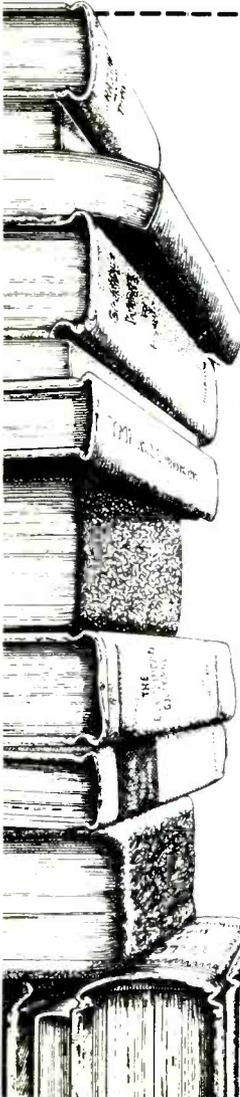
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