

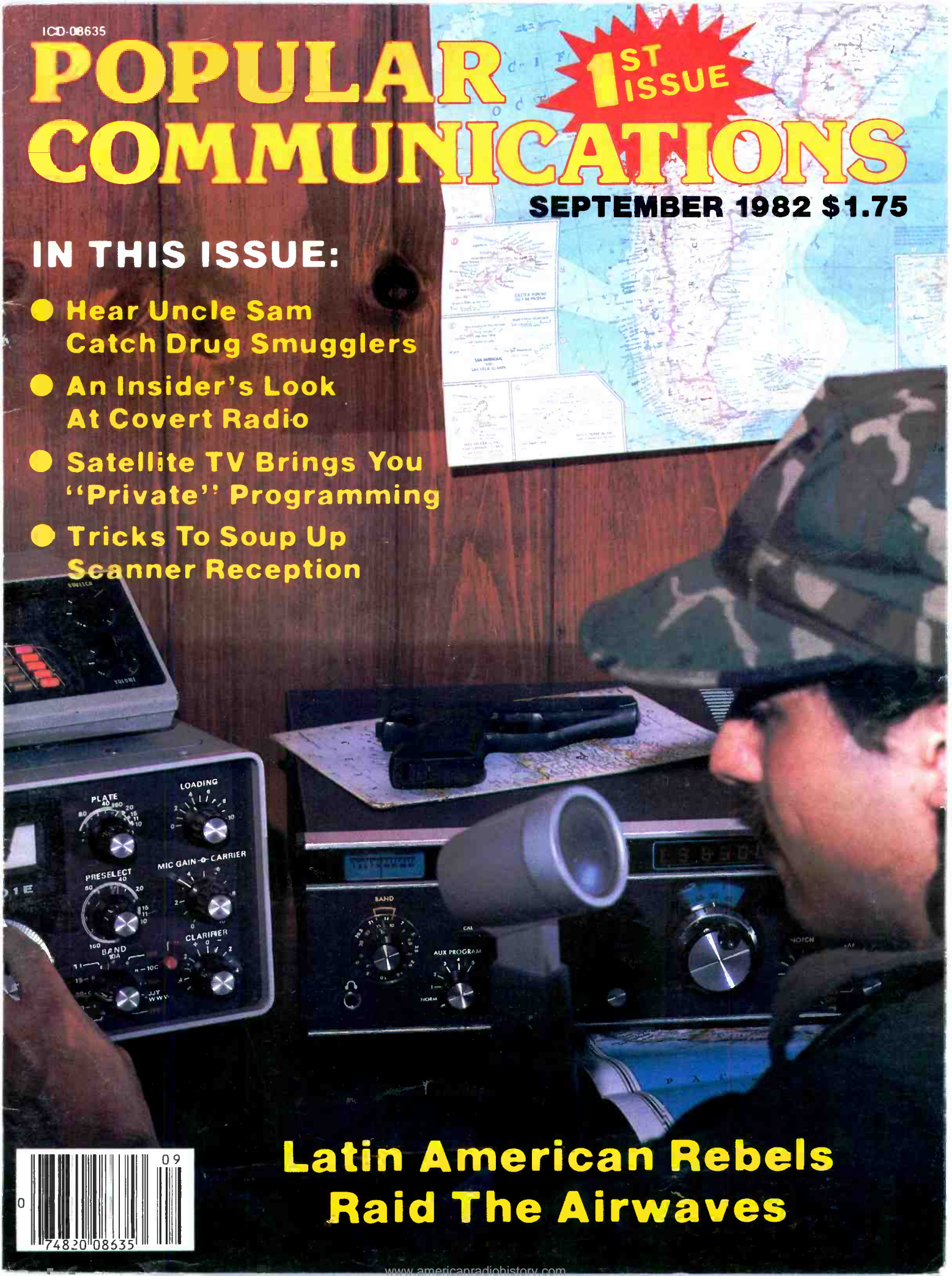
POPULAR COMMUNICATIONS

1ST ISSUE

SEPTEMBER 1982 \$1.75

IN THIS ISSUE:

- Hear Uncle Sam Catch Drug Smugglers
- An Insider's Look At Covert Radio
- Satellite TV Brings You "Private" Programming
- Tricks To Soup Up Scanner Reception



Latin American Rebels Raid The Airwaves



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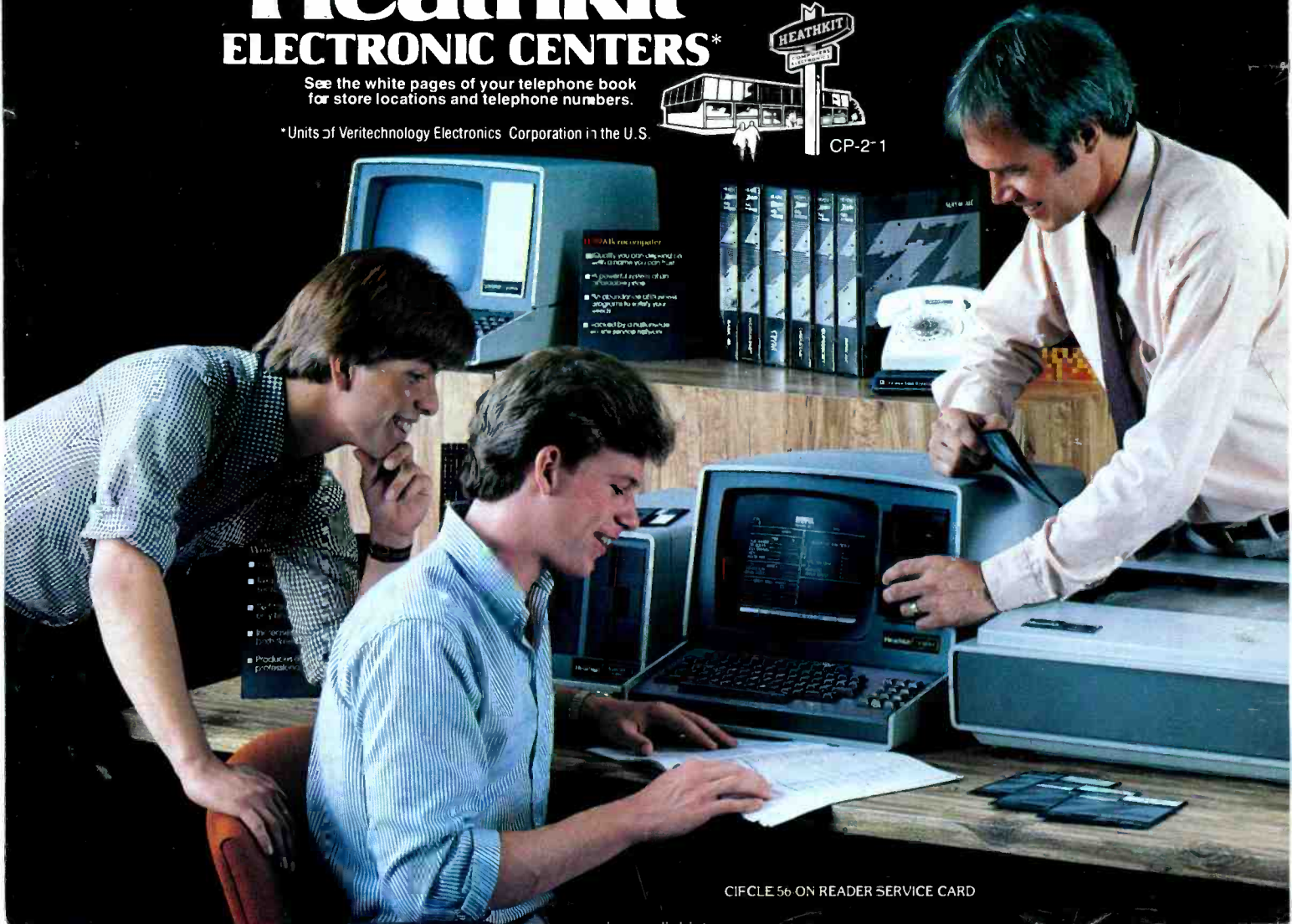
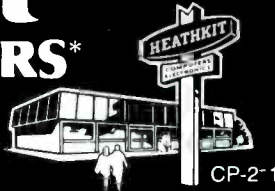
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CIRCLE 78 ON READER SERVICE CARD

ZX81



Introducing the Sinclair ZX81.

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The Sinclair ZX81 is the most powerful, yet easy-to-use computer ever offered for anywhere near the price: only \$99.95* completely assembled.

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- Mathematical and scientific functions accurate to 8 decimal places
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- Automatic syntax error detection and easy editing
- Randomize function

useful for both games and serious applications

- 1K of memory expandable to 16K
- A comprehensive programming guide and operating manual

The ZX81 is also very convenient to use. It hooks up to any television set to produce a clear 32-column by 24-line display. It comes with a comprehensive programming guide and operating manual designed for both beginners and experienced computer users. And you can use a regular cassette recorder to store and recall programs by name.

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We'll give you 10 days to try out the ZX81. If you're not completely satisfied, just return it to Sinclair Research and we'll give you a full refund.

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To order.

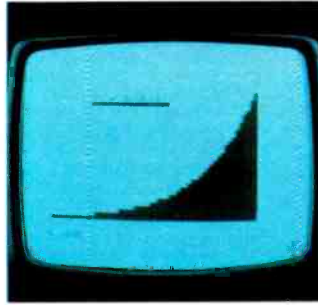
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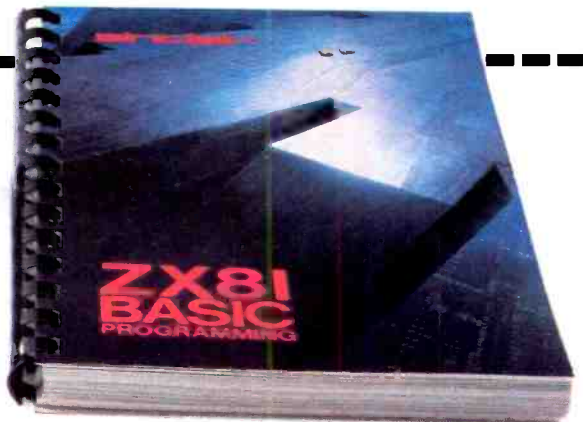
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NEW! Bearcat® 350

The Ultimate Synthesized Scanner!

List price \$599.95/CE price \$384.00

7-Band, 50 Channel • Alpha-Numeric • Non-crystal scanner • AM Aircraft and Public Service bands • Priority Channel • AC/DC Bands: 30-50, 118-136 AM, 144-174, 421-512 MHz. The new Bearcat 350 introduces an incredible breakthrough in synthesized scanning: Alpha-Numeric Display. Push a button—and the Vacuum Fluorescent Display switches from "numeric" to word descriptions of what's being monitored. 50 channels in 5 banks. Plus, Auto & Manual Search, Search Direction, Limit & Count. Direct Channel Access. Selective Scan Delay. Dual Scan Speeds. Automatic Lockout. Automatic Squelch. Non-Volatile Memory. Order your Bearcat 350 today!

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7-Band, 50 Channel • Service Search • Non-crystal scanner • AM Aircraft and Public Service bands • Priority Channel • AC/DC Bands: 32-50, 118-136 AM, 144-174, 421-512 MHz. The Bearcat 300 is the most advanced automatic scanning radio that has ever been offered to the public. The Bearcat 300 uses a bright green fluorescent digital display, so it's ideal for mobile applications. The Bearcat 300 now has these added features: Service Search, Display Intensity Control, Hold Search and Resume Search keys, Separate Band keys to permit lock-in/lock-out of any band for more efficient service search.



NEW! Bearcat® 350

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

Bearcat® 210XL

List price \$349.95/CE price \$229.00

6-Band, 18 Channel • Crystalless • AC/DC Frequency range 32-50, 144-174, 421-512 MHz. The Bearcat 210XL scanning radio is the second generation scanner that replaces the popular Bearcat 210 and 211. It has almost twice the scanning capacity of the Bearcat 210 with 18 channels plus dual scanning speeds and a bright green fluorescent display. Automatic search finds new frequencies: Features scan delay, single antenna, patented track tuning and more. When you purchase the Bearcat 210XL between September 1, and October 15, 1982, you'll also get a factory rebate coupon good for \$15.00.

NEW! Bearcat® 20/20

List price \$449.95/CE price \$276.00

7-Band, 40 Channel • Crystalless • Searches AM Aircraft and Public Service bands • AC/DC Priority Channel • Direct Channel Access • Delay Frequency range 32-50, 118-136 AM, 144-174, 420-512 MHz. The Bearcat 20/20 automatic scanning radio replaces the Bearcat 220 and monitors 40 frequencies from 7 bands, including aircraft. A two-position switch, located on the front panel, allows monitoring of 20 channels at a time.

NEW! Bearcat® 200

List price \$269.95/CE price \$179.00

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

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List price \$449.95/CE price \$284.00

8-Band, 16 Channel • Liquid Crystal Display Search • Limit • Hold • Lockout • AC/DC Frequency range: 30-50, 138-174, 406-512 MHz. The world's first no-crystal handheld scanner has compressed into a 3" x 7" x 1 1/4" case more scanning power than is found in many base or mobile scanners. The Bearcat 100 has a full 16 channels with frequency coverage that includes all public service bands (Low, High, UHF and "T" bands), the 2-Meter and 70 cm. Amateur bands, plus Military and Federal Government frequencies. It has chrome-plated keys for functions that are user controlled, such as lockout, manual and automatic scan. Even search is provided, both manual and automatic. Wow...what a scanner!

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

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

NEW! Fanon FCT-200 Cordless Telephone

CE price \$149.00

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

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CIRCLE 73 ON READER SERVICE CARD

Bearcat® Four-Six ThinScan™

List price \$189.95/CE price \$118.00

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

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NEW! Regency† D100 Scanner	\$159.00
Regency† M400 Scanner	\$229.00
Regency† M100 Scanner	\$195.00
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CAT-6 Fanon carrying case with belt clip	\$15.00
AUC-3 Fanon auto lighter adapter/Battery Charger	\$15.00
PSK-6 Base Power Supply/Bracket for SCMA-6	\$20.00
SP50 Bearcat AC Adapter	\$9.00
SP51 Bearcat Battery Charger	\$9.00
SP58 Bearcat 4-6 ThinScan™ carrying case	\$12.00
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FB-W Frequency Directory for Western U.S.A.	\$12.00
FFD Federal Frequency Directory for U.S.A.	\$12.00
TSG "Top Secret" Registry of U.S. Government Freq.	\$10.00
ASD Frequency Directory for Aircraft Band	\$10.00
TIC Techniques for Intercepting Comm. Manual	\$12.00
CIE Covert Intelligence, Elect. Eavesdropping Man.	\$12.00
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A-135cc Crystal certificate	\$3.00

Add \$3.00 shipping for all accessories ordered at the same time.

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If you want the utmost in performance from your scanner, it is essential that you use an external antenna. We have a base and a mobile antenna specifically designed for receiving all bands. Order #A60 is a magnet mount mobile antenna and order #A70 is an all band base station antenna. Price is \$35.00 each plus \$3.00 for UPS shipping in the continental United States.

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POPULAR COMMUNICATIONS

SEPTEMBER 1982

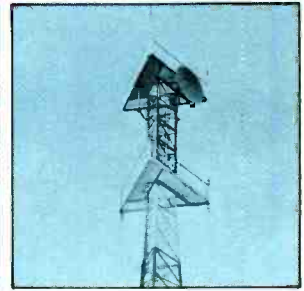
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BEAMING IN

BY TOM KNEITEL, K2AES

AN EDITORIAL

And Now For Something Completely Different

What a time it is to own some choice pieces of electronics gear! Your communications receiver lets you tune in on revolutions, military communications, smugglers (and those trying desperately to catch them), political harangues from all points along the ideological spectrum, guerrillas, diplomats and spies, press transmissions, scientific expeditions and—well, you name it. A scanner allows you to get on the inside of what's happening in your own community—surveillance operations, fireground communications, airline flights, maritime emergencies, military maneuvers, disaster communications, detectives, armored trucks, federal agencies, and more!

With a little effort, you can turn your home TV receiver into a window on programming beaming down from satellites high above the Earth. Fact is, we are in the midst of a communications explosion and it seems that just about everybody who has something to say or show, or a tough job to do, has gone out and gotten themselves a communications system of one sort or another. Some are anxious to let you know what they are up to, others have gone to considerable effort to prevent you from knowing. Nevertheless, the airwaves are wall to wall with electromagnetic energy sent out via SSB, AM, FM, TV, CW, RTTY, and other modes—scrambled and unscrambled, high power and low power, on frequencies as low as 10 kHz and all the way into the microwave spectrum! A spectacular, multicolored smorgasbord of signals there for you to savor.

It has long been my hope to see a quality national magazine which would be the focal point of information on all of this—a forum for the free exchange of data by and 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. Tuning in on the best of these things certainly requires more than a receiver or scanner and a little luck. It is a skill, and as some say, an art. There are hints, tips, techniques, methods, hidden and newly discovered frequencies, and all sorts of other things you really need to know to help make the most of the potentials of your equipment. It's not that it is difficult to do; it is really a matter of exchanging information with others who share your interests. Frankly, it's a lot of fun and extremely rewarding.

I cut my "radio teeth" when I was a teenager right after World War II and found the whole communications scene so captivating that I've been part of it ever since—on the Amateur bands, monitoring the SW and scanner bands, and as a part of the industry which burgeoned around the concept of communications. And yet, the hope that I held so long for a magazine primarily devoted to the listener and monitor never came to pass. Sure, listeners and monitors have been able to lay claim to a few precious pages in a number of magazines, but never to the extent which was fully satisfying to a dyed-in-the-wool scanner and DX'ing enthusiast. Apparently I haven't been alone in this feeling. For quite some time now I've received letters and calls from other monitoring and scanner enthusiasts asking when and if there will ever come a time when we can have "our own" magazine—a no-holds-barred, full-sized, high-quality, professionally done publication devoted to serious monitoring in all of its many glories.

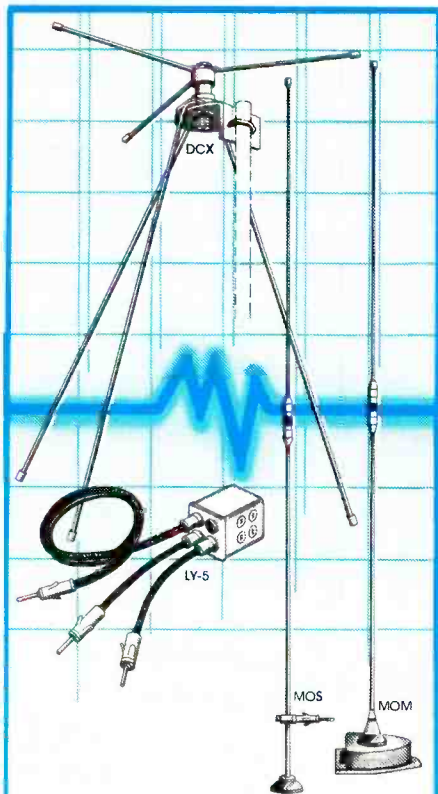
As the Fates would have it, I had long been suggesting to my friends at CQ Magazine that their Amateur Radio publication would be enhanced by a couple of pages devoted to DX'ing and scanners. They thought about it but eventually countered with an even better idea—they suggested that I might round up some experts in various aspects of DX'ing and scanners and head up an entire magazine about these things. Why didn't I think of that?

So here we are with the first issue of **POP'COMM!**

And we certainly aren't sitting here in an ivory tower. We eagerly seek editorial input from readers; all of our columnists hope that you will send in information which they can use in their columns—and, in addition to receiving comments and general suggestions about **POP'COMM** from readers, I hope that readers will send in stories, feature articles, and photos which we can use in these pages. We'll accept shack photos, QSL cards, and anything you'd like to share with others!

We want you to be an active participant in **POP'COMM**, we are here to serve your needs and interests. That is to say, we are interested in you and we need you. Hopefully you will be interested in us and will find that **POP'COMM** meets your needs.

Welcome to **POP'COMM**.



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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.

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- RTTY speeds of 45, 50, 74, 100, 110, 300, 600, and 1200 baud – ASCII or Baudot
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- Crystal-synthesized transmit tones
- Send and receive Morse code at 1 to 100 wpm
- Characters displayed on 24 line screen
- Choose either 36 or 72 characters per line
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MAILBAG

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.

Unable On The Cable!

Because I live in an apartment house and can't put an antenna on the roof, I tried hooking the antenna input of my FM stereo receiver to the cable TV (CATV) input used for my TV set. It works just fine. The problem resulted when I tried to do this same trick with my scanner. While I do get some reception of the low band on the scanner, when it comes to the VHF aero band and the regular VHF high band it's pretty much of a bad scene. There is a lot of noise and TV audio comes through. If it works for my FM stereo, what do I have to do to get it to work for my scanner?

R.B. Purdom, Sr.
Chicago, IL

The problem is simple. CATV channels are established on the same frequencies you're trying to hear on the VHF aero band

(108 to 136 MHz) and also on the VHF high band (144 to 174 MHz). That's the space occupied by 11 so-called CATV "mid-band" channels known as Channels A-1 through I, and each occupies a 6 MHz-wide swath of spectrum. The CATV channels aren't established in the FM broadcasting band (88 to 108 MHz) and that's why your stereo receiver will work from the CATV system. It seemed like a good idea, I'll admit! Actually, there are instances when these mid-band CATV signals have leaked from their confined cables and caused interference to two-way communications operations on the VHF high band. Of course, going out of your way to plug your antenna directly into them seems to be looking for problems!—Editor

Cold Comfort

Ever since the word started getting around that POP'COMM was in the works I've been eagerly awaiting your first issue. I hope I'm not going to become too much of a nuisance but I have lots of questions I need answered about electronics and I just can't wait for your first issue to start asking some. For starters, I've got a problem. I've got a Bearcat Thinscan hand-held unit. I don't

have occasion to use it constantly but it does get pressed into service from time to time. Sometimes the batteries are so weak that they are practically useless, and that's after spending most of their existence with the scanner put away in a drawer. Would you be able to suggest anything which would give me more reliability in respect to the batteries being "alive" when I need them? And good luck with POP'COMM!

Leonard Wrigley
Pasco, WA

Don't think that you're the only one with questions, Len—they've been arriving here right from the time we announced that POP'COMM was going into production. We took it as a good omen!

Three approaches to your battery situation immediately come to mind. The most obvious one is to get a battery charger and then replace the Thinscan's batteries with rechargeable batteries. Next suggestion would be to use alkaline-type batteries which have a long shelf-life and will undoubtedly be an improvement in the situation. The cheap and dirty approach would be removing the batteries from the scanner when not in use and storing them in the refrigerator. That

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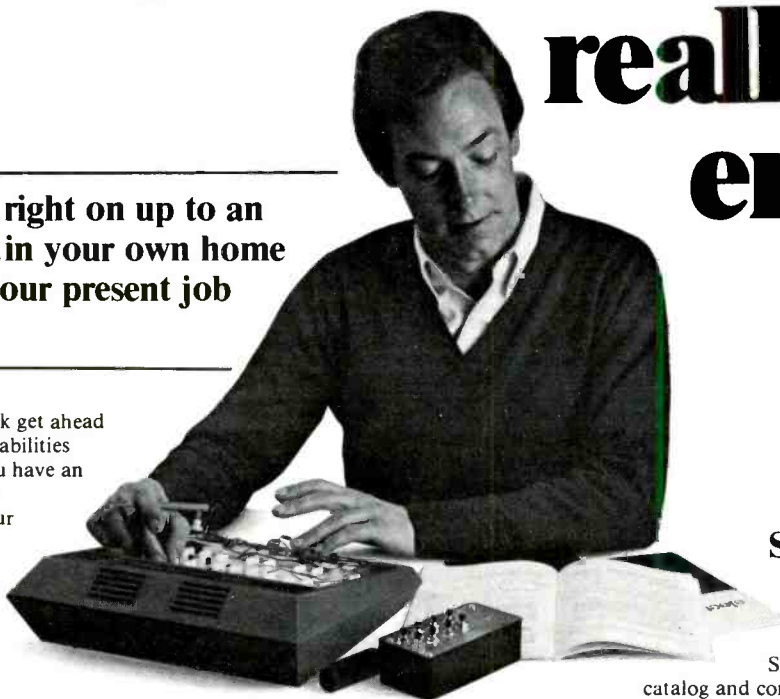
CIRCLE 16 ON READER SERVICE CARD

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Opportunity.

The field of electronics simply offers more career opportunities — and more job security — than most other fields today. Take digital technology, for example. Much of the new telecommunications, data processing, and production equipment depends upon sophisticated microprocessors to receive, sort, and send digital signals in microseconds. Two of CIE's newest home study courses combine digital electronics theory with actual experience on digital equipment. Successful completion of either one of those courses is creditable toward CIE's Associate Degree program. That's right...you can earn an Associate Degree without attending a single class session.

MAKING THINGS WORK

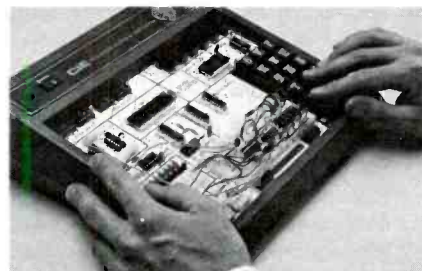
Many of CIE's Career Courses stress "hands-on" training. We believe textbook knowledge is important — but it's just as important to know to apply your book learning in practical situations. From basic circuitry in CIE's Personal Training Laboratory in several Career Courses, through the Microprocessor Training Laboratory, CIE helps channel your desire to "make things work" into skills you can sell.

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CIE's Microprocessor Training Laboratory, an integral part of the Associate Degree program, lets the advanced student apply digital technology in many of the same ways electronics professionals do.

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trick extends the shelf-life of C, D, AA, and 6-volt size batteries. The three things to remember with this stunt: wrap them in plastic to keep moisture off them, don't put them in the freezer, and let them warm up at room temperature before using them. The refrigerator idea works so well that I've even used it to get a little extra life out of batteries which were otherwise "dead." You can also extend the shelf-life of film by storing it in the refrigerator. — Editor

Too Much Jam

I noticed that shortwave broadcast frequency 15.130 MHz is the victim of deliberate jamming in the evenings around 0300 GMT. It's a buzzsaw sound which completely wipes out the frequency. Oddly enough, the jamming station identifies itself with the letters "BR" transmitted in CW twice each minute. If all they want to do is generate noise on the frequency, what's the point of having the station identify itself?

Joe Mendez
Anaheim, CA

While at first glance it may seem to you that jamming is a simple matter of one government tuning up a noise generator on some other government's propaganda broadcasts, actually it's quite an advanced and complex technique if it's to be done effectively. Things such as transmitter power and location, antenna orientation, propagation factors, and type of jamming "sound" all come into play, and usually in direct relationship to the power, location, etc., of the station to be jammed, most especially in respect to the jamming being effective in several specific areas where the station-to-be-jammed has listeners. Very often this requires the use of several jamming transmitters at different locations used simultaneously on the same frequency in order to do the job.

The use of an identifier is a simple way of having the jammed frequency monitored from within the "target" areas to see which jamming transmitters are being heard overriding the broadcasts. In actuality, depending upon where you are located, you might well hear several different jamming identifiers on the same frequency at the same time. For instance, in the evening the entire band of frequencies running from 9.502 through 9.510 MHz is jammed by a whole network of transmitters from which one can easily discern identifiers such as R7, F2, and K3, with a few others also heard off in the background. Yet on 9.680 MHz, the only jammer which can be identified calls itself MP, and it's fully effective.

The game of jamming and getting around jamming is quite sophisticated and operates on many levels, not all as blatant as the noise generating techniques described here. One way governments avoid jamming is to establish their broadcast transmitters on frequencies adjacent to those used by the governments doing the jamming. At that point a noise jamming operation may achieve destruction of their own broadcasts too! On the

other hand, the use of actual broadcasts set close enough to another station's frequency to either heterodyne or splatter modulation products over it is yet another jamming technique in itself, and far more subtle than a noise generator. — Editor

Don't Know Weather It's A Good Idea

I recently acquired a small weather monitor receiver at a swap meet. The set works fine except I don't really need to know much more about the weather than I can hear on the local AM station I like to listen to. Mainly I wanted to get rid of an old SWR meter I had, but now I may have acquired something equally useless to me. I'd like to know if I can change the crystal in this receiver to let it pick up a police station in my area which operates in the 155 MHz band?

Arno Pederson
Kokomo, IN

Chances are your little weather receiver isn't crystal controlled but has a local oscillator which has a front panel control to permit varying the frequency slightly for bringing in any of the several frequencies used for weather in the 162 MHz region. Taking into account that these sets aren't very sophisticated and aren't endowed with much in the way of sensitivity, you can tinker with the circuit to bring down the frequency and use it to monitor other stations which are within (very) close proximity of your location (a few miles at the most). The trick is to grope around inside the case and locate the oscillator tuning capacitor (that's the front panel control which permits you to vary the frequency slightly). By connecting a capacitor with a maximum value of 7 pF you should be able to retune the unit to 155 MHz, but sensitivity will drop off sharply below 160 MHz. A 60 pF (maximum) trimmer will bring the set's frequency coverage right down to the low frequency edge of the VHF aero band but it's doubtful that you'd hear anything unless you were right at an airport with it. If you got the set for practically no cost and don't have any real use for it, it's well worth tinkering around with it in this manner but I certainly wouldn't dig into a new set to achieve this minimal performance. — Editor

Don't Make It A Hobbit

What are "Elfin waves?" I think they're a type of radio signal.

Gwydion Foulkes
Cambridge, MA

You didn't give me much to go on, but I suspect that my first guess that they are the frequencies used in Middle Earth by Frodo and his hobbit friends isn't what you're asking about. My second guess is that you mean "Alfven waves," which are radio frequencies below 10 MHz used for the purpose of injecting energy into thermonuclear plasmas so that they can be heated to extremely high temperatures. If the temperatures re-

sulting from the process can be made to get to 100-million degrees, then nuclear engineers can construct something called a steady-state fusion reactor, a source of continuous energy. Other frequency ranges used in those experiments include 20 to 200 MHz (ion cyclotron resonance waves), 600 to 5,000 MHz (lower hybrid heating waves), and above 28,000 GHz (electron cyclotron resonance waves). When they finally figure out how to get the temperatures up to the 100-million degree mark we could all end up communicating by "Elfin waves" after all. — Editor

Undercover Special

Can a URC-68 transceiver be licensed for two-way systems? I purchased one at a coffee break but the chap who sold it to me couldn't tell me anything about it except to say that it had a lot of channels in it—he didn't know in what frequency band. The set cost me \$50 and it looks almost new.

Harry Morris
San Antonio, TX

At \$50 you got yourself a pretty good deal although I doubt that the FCC will license it for anything. The AN/URC-68 is a military surplus combination UHF-AM/VHF-FM transceiver with a capability of voice or CW operation on 3 crystal controlled channels in each band. There's an emergency frequency in each band and a beacon mode on each emergency channel which permits automatic swept tone continuous transmission on either or both channels. The battery operated unit can operate AM between 230 and 250 MHz and FM from 38 to 42 MHz with 1/5 watt on AM, 1/2 watt on FM. The whole thing can fit into a person's pocket and yet has a 20 mile operating range. This set was used in Vietnam, most especially by the CIA and related agencies. The going value for the URC-68s in good operating condition is about \$150 and they are still in demand for use by all manner of paramilitary groups, few of which are particularly concerned with being licensed by the FCC. — Editor

Band Blasters

How come two American broadcast stations have call signs starting with the letters XE, which is a Mexican prefix? I'm referring to XEG in Dallas, TX and XERF in Del Rio, TX. These stations are easily heard at my location.

Danny Jensen
Hopkinsville, KY

They ought to be easily heard; the stations are each running 150 kilowatts, which is 3 times the power permitted to "regular" American broadcasters. These American broadcasters are special in that they have their transmitters and antennas right at the shores of the Rio Grande River on the Mexican side. It's a ploy to evade the U.S. 50 kilowatt power limits, but Mexico doesn't seem to be fussy about the matter. — Editor

Introducing incredible tuning accuracy at an incredibly affordable price: The Command Series RF-3100 3-band AM/FM/SW receiver.* No other shortwave receiver brings in PLL quartz synthesized tuning and all-band digital readout for as low a price.† The tuner tracks and "locks" onto your signal, and the 5-digit display shows exactly what frequency you're on.

There are other ways the RF-3100 commands the airways: It can travel the full length of the shortwave band (that's 1.6 to 30 MHz). It eliminates interference when stations overlap by narrowing the broadcast band. It improves reception in strong signal areas with RF Gain Control. And the RF-3100 catches Morse

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Want to bring in your favorite programs without lifting a finger? Then consider the Panasonic RF-6300 8-band AM/FM/SW receiver (1.6 to 30 MHz) has microcomputerized preset pushbutton tuning, for programming 12 different broadcasts, or the same broadcast 12 days in a row. Automatically. It even has a quartz alarm clock that turns the radio on and off to play your favorite broadcasts.



RF-6300 8-band AM/FM/SW

The Command Series RF-3100 and RF-6300. Two more ways to roam the globe at the speed of sound. Only from Panasonic.

*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.

This Panasonic Command Series™ shortwave receiver brings the state of the art closer to the state of your pocketbook.



With PLL Quartz Synthesized Tuning and Digital Frequency Readout.

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CIRCLE #9 ON READER SERVICE CARD

**From All Corners Of The World—
Undercover Radio Stations Are On The Rise!**

Mission: Undercover Radio Part I

BY HARRY CAUL



Chances are that if you've got a communications receiver (or even a scanner) you've come upon the results of the rather unusual work I do. At the least, you've probably noted the efforts of others who compete with me in my endeavors.

To put it in its simplest and bluntest terms, I supply information, training, and various other services for persons and groups interested in establishing long and short distance radio communications without benefit of licenses from the host governments involved. I'm not at all talking about the bootleg pseudo-Hams and quasi-CB'ers who populate the airwaves; those guys are horsing around while my clients are deadly serious. Nevertheless, it is a pursuit which keeps me very busy. It is impossible to imagine the large number of folks who have come to feel that they want to have as much communications security, privacy, and secrecy as possible—even to the point of not appearing in anyone's computer as the licensee of a radio transmitter (assuming they could become licensed in the first place).

Who might be such a client? Maybe the operators of a diamond mine in Africa wishing to discretely exchange market and production information with their people in Europe. Or, it could be an office of a multinational corporation wanting to exchange certain delicate information with other offices elsewhere in the world. You name it and there are those who want to exchange messages in total privacy; information on

strategic metals, technologies, industrial data, information on financial matters such as stocks and bonds, bank accounts, currency exchanges, energy resources, and a couple of dozen other topics—and they want to do it via the back door without passing the data through the closely scrutinized facilities of the world's commercial Telex, cable, and overseas telephone services.

Then there are mercenary forces who want to have short and long range communications systems at their disposal. Who would grant them licenses to operate? What about guerrilla forces? Licenses? Don't make me laugh! What about all of the underground rebel broadcasters?

The fact is, there are embassies who have become wary of sending all but low and medium priority messages over commercial circuits. High priority messages cannot be trusted to their own authorized (and well monitored) international radio circuits, either.

Transmissions such as these, and others, are rife on frequencies throughout the shortwave spectrum and even into the UHF bands. A mini-industry has sprung up to tend to the needs of those who want to establish such systems, and although it has been going on quietly for at least twenty years, these days it has been starting to come out into the open. Within the past year, one of my competitors openly placed an ad for his services in *Soldier of Fortune Magazine*, offering to establish complete international undercover radio systems and even to act as

the U.S. base station within those systems!

So when I stated that if you've got a communications receiver or a scanner you've probably noted some of these efforts, I wasn't whistling *Dixie*. Have you ever heard those shortwave stations which transmit 5-digit number code groups and nothing else? Do you really think those are licensed by any government? Hardly!

A Typical Example

Here is a typical (but totally hypothetical) example of the services which might come into play.

Let's say that a mercenary force is being formed—soldiers of fortune, or *dogs of war*, so to speak—for operations inside a particular nation. It could be in Africa, Central America, or possibly even an island group in the Indian Ocean. They have outfitted themselves with the necessary garments, obtained ordnance items, vehicles, foodstuffs, and whatever else it takes to commence their operation. When it comes to communications items, their needs have to be analyzed and met by a specialist. Perhaps someone such as myself.

They will need short range tactical facilities, and that may also include scanners to listen in on the communications of "the other side." Chances are they will need medium range communications with other units deployed in their operation, as well as long range communications for keeping in contact with a headquarters unit.

Frequencies for all of this would have to be chosen, along with the designs of all of the systems and antennas to be used, modes of operation (AM, SSB, FM, CW, RTTY, or other non-voice modes), and the specific equipment to be employed. The equipment, in addition to scanners, would typically be comprised of transmitters, receivers, direction finders, power supplies, hand-helds or backpack units, mobile/base units, radar, and even countermeasure devices (radio jamming gear).

Schedules, based upon propagation factors, have to be established for long range communications. Codes and cyphers would probably be required. Instruction in equipment operation and communications security techniques are a must. Information on antenna orientation and even data on standard time and frequency stations must be included in the material provided.

And, of course, the equipment itself would have to be obtained, modified (if necessary), tested, and checked out for proper operation, calibration, and spare parts. It is then packed safely along with basic troubleshooting data.

Equipment

The hardware for such an operation would generally consist of a mix of commercial and military surplus items—the same as most of the other items which will be used on

the mission. All are suited to the exacting needs of the operation and within the budget allocated for the purpose.

Some of the military surplus equipment which is popularly sent into the field with considerable success includes the URC-68, AN/GRC-84, '87, '109, and the AN/VRC-34 (all of which should be well-known to those who worked with communications in Viet Nam). Other popular units are low power backpack rigs such as the PRC-10s, low band mobile units like the RT-70, and hand-held PRC-6s.

Frequency Selection

Selecting the array of frequencies is no mean trick. Some frequencies are for monitoring only, and others are used for two-way. Some are for short range, others for varying distances which could reach half way around the world—depending upon the client and the purpose of the communication. Many problems and influences come into play, especially in determining transmission frequencies. These include propagation factors combined with the transmission modes, antenna types, and amount of security required. Security is a problem in selecting any type of communications system which is intended to be operational over a reasonable period of time without creating more problems than anyone really wants.

If the transmissions are to be for long



Military surplus and commercial (including ham radio) equipment is generally the mix suggested for these systems since one can pick and choose for maximum versatility, physical stability, best price. This small UHF transceiver is typical of one used for short range mobile communications.

range work, then they will have to lie between 2 and about 25 MHz; that's the rub! These frequencies are already crowded with broadcasters and a myriad of other users who jealously guard them from appropriation by outsiders. Doing it without creating interference to some other (authorized) communications or broadcasting system is one of the most important things to keep in mind. There is, of course, the option to camouflage the communications operations to

Hank Lark
Rt. 2 Box 49D
Perry, FL 32347

Dear Sir:

Please excuse the delay in responding to your inquiry. To speed further correspondence you may reach me by using the above address.

The overall response was much greater than I had anticipated and I found that some people don't have plan, commo gear, or are playing their cards so close I really can't be of much help to them.

Briefly, I supply S-2/G-2 type intell on foreign commo capabilities; and assistance, information and a CONUS link for you or your "out" stations.

I can help with:

1. Frequency selection.
2. Antenna design and orientation.
3. Mode selection (Voice, CW, FSTV, SSTV, RTTY, ASCII).
4. Equipment selection advice.
5. Commo equipment modification advice.
6. Phone patch.
7. RDF equipment and how to avoid RDF.
8. Code and cypher advice.
9. Burst capabilities - in and out.
10. Frequency monitoring.
11. Great circle bearings.

When you know or can estimate the following then I can work up an estimate for you:

1. Out station location. At least give me a country or a near-by large city that is on a map. For example, "western Cuba" or "30 miles SE of Tombouctou, Mali." This information is critical to figuring antenna orientation. If you will have more than one out station and these different stations are more than a few hundred miles apart, then I can provide great circle bearings for both stations.
2. Mode of commo. This is helpful when selecting antennas.
3. Terrain that the stations will be operating in - if this is not obvious from 1, above.

4. Purpose of the link and a time frame of operation. If it is a bail-out net that is to be used only to request an exfill then you may want a freq monitored once a day or once a week. For sit-reps you may only require monitoring once a month. If it is to be a command net then you will desire complete frequency assignments with increased monitoring.

5. Request for assistance in the choice of codes/cyphers. I will need to know how many times you will be using the code. The average length of each message or if you simply want "go/no go" type codes.

6. Equipment evaluation and modifications can be made if you supply the following information: schematic or wiring diagrams, and most importantly - the desired results!

Estimates will be worked up based on the following:

One out station.....	\$35.00
Two or more out stations.....	30.00 ea.
Equip assessment/modification.....	POA
Crypto assistance.....	POA
Monitor voice or CW - per hour.....	5.00
SSTV, RTTY, FSTV, ASCII.....	POA
Personal instructions and requests.....	POA

This would include such things as: message format, operating instructions, remote control, deceptive imitation, foreign CW, Time-station locations and information, etc.

Due to the flashing service rendered by the Post Office, I need at least a month lead time for frequency requests.

BEAR IN MIND

Radio is adaptable to rapid changing situations.
Radio may be operated by remote control.
Radio is subject to breakdown.
Radio is subject to interference.
Radio is easy to jam.
RADIO IS THE LEAST SECURE FORM OF COMMUNICATIONS. It must be assumed that interception occurs every time a transmitter is placed in operation.

It is like the football coach told his quarterback - "Three things can happen when you put the ball in the air and two of them are bad." But it sure as hell can win the ball game!

Respectfully submitted,

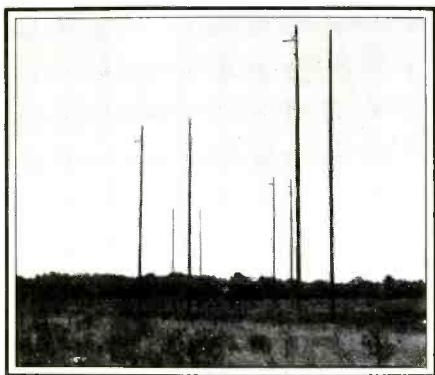
This response was received by those who responded to an ad in a recent issue of Soldier of Fortune Magazine. Acting as the U.S. base station in the undercover international network is often necessary.

make them *appear* to belong on whatever frequencies have been selected. It's tricky, but it is commonplace. Actually, there are many frequencies which have been used (and are now being used) for such operations without bothering anyone or calling undue attention to those who operate the systems.

On the other hand, unlicensed "numbers" stations have been around for years now and pass their traffic right out where everybody can hear them. Obviously, they don't cause interference and haven't had much to worry about. There are certain frequencies within the HF, VHF, and UHF bands which are somewhat out-of-the-way, as it were, and upon which some have operated without being detected (or at least without being hassled) on a regular basis.

For instance, 13.560 MHz has been selected throughout the world as a junk frequency, relegated for authorized use for non-communications devices within the industrial, scientific, and medical communities, like arc welding machines. Since those who are authorized to use the frequency do so on an "interference expected" basis, nobody of any consequence monitors the frequency, and nobody complains about what goes on there! As a result, it has been long used for tactical and surreptitious voice and non-voice long-range communications systems. Other junk frequencies set aside for similar purposes include 27.120 MHz (lying between CB channels 13 and 14), and 40.68 MHz (the FCC recently gave the go-ahead for alarm and control devices to operate on this latter frequency, which units can be operated minus a license and meet certain technical specifications.

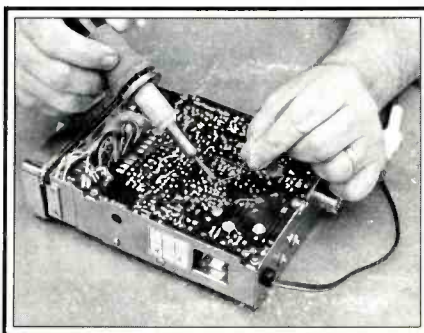
There are all sorts of nooks and crannies tucked away around the communications spectrum which have been pressed into service at one time or another by those who wish to operate without licenses and hassles



"Numbers" stations have been on the underground radio scene for more than 20 years now. These stations transmit coded messages on a myriad of frequencies and operate from more-or-less permanent or "fixed" locations. This is the antenna system used by one such station, known as "434," and used for the passage of financial data between South America and European banks. Operates on 5.810 MHz.



This is a typical long range "headquarters" station capable of operating on any number of frequencies. The major difference between such a station and a well-equipped Amateur station is its purpose, operating frequencies, and a conspicuous lack of QSL cards adorning the walls. This particular station is located in England and at times identifies as "12 OSCAR." Have you ever heard it working "NATIVE ECHO" on 8.294 MHz—a maritime frequency? Not long ago it was even reported to a DX club bulletin! These are very active tactical stations connected with a mercenary military operation.



Some modification is generally required in order to utilize commercial communications equipment. Primarily these modifications are concerned with power supply or frequency changes.

and for reasons known best to themselves. You can hear loads of them on any scanner—33.12 MHz, 49.83 MHz, 154.456 MHz, 173.396 MHz. The listing is lengthy and there are also many places below 25 MHz which have traditionally provided a safe haven for undercover communicators—2.065 MHz, 4.125 MHz, 6.522 MHz, 22.124 MHz, and the rest.

The selection of operating frequencies for this purpose is a study within itself, and it deserves an in-depth analysis; a story of its own discussing how frequencies allocated to various radio services (including Amateur) have been used. In the next issue of POP'COMM, I'll explore this with you and tell you about 90 to 100 specific "back roads" hidden frequencies and also "mainstream" frequencies (where things are hidden while out in the open). I'll explain the whys and wherefores of selecting various frequencies between 2 and 470 MHz. In the



Equipment used "in the field" must be rugged and able to be bounced around with minimum servicing problems. There aren't too many local communications service shops you can bring it to for a repair during a guerrilla operation.

meantime, check out the frequencies I've listed in this issue and while you hear legit stations, you might well hear some known only to their makers!

Problems

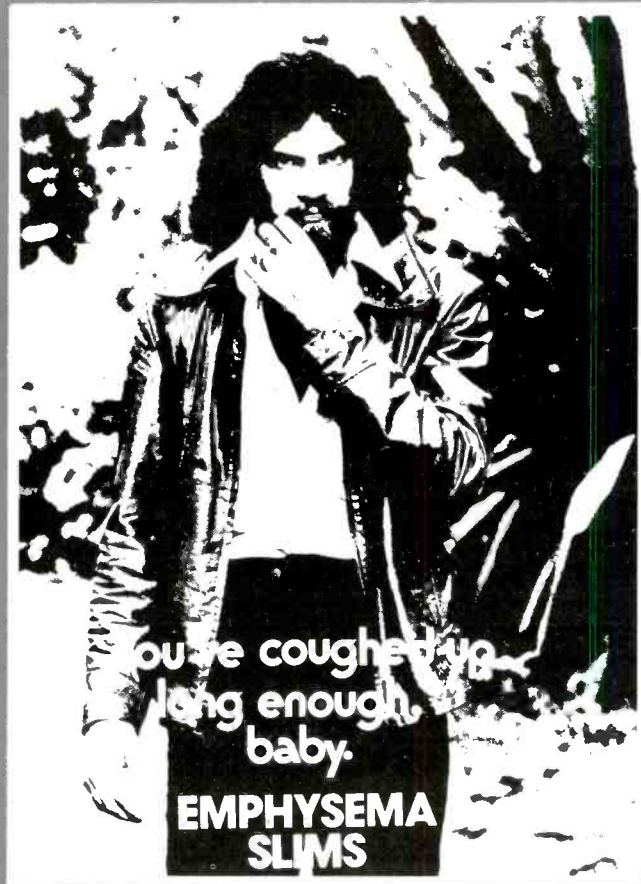
Interestingly, one of the trickiest problems encountered by those in my line of work is extracting a sufficient amount of information from the client in order to advise him of what he requires. Without lots of information, it is almost impossible to do a good job. By the very nature of their operations, they are a bit on the paranoid and tight-lipped side and, as such, getting the data required can be a spectacular chore. It's a common problem and one which must be faced regularly.

Needless to say, there are few governments (indeed) which appreciate unauthorized communications taking place within their borders, regardless of their purpose. Some are downright hostile. Within the United States, for instance, the FCC becomes extremely hostile when it comes face to face with the practice and if it wishes to (within its motivation and budget limitations) could mount a rather potent array of fines and even prison sentences upon those who are caught. And depending upon the purposes of the communications, other agencies can also get in on the act.

But there isn't any restriction on using a communications receiver or scanner to listen to the goings-on. Frankly, at this point, it's hard *not* to hear these stations, there are so many of them. If you listen on frequencies such as 4.670, 5.810, 7.764, 9.267, 9.445, 14.419, 14.968, 16.310 MHz, and many others, you can often hear the mysterious so-called "spy numbers" stations with their coded messages. Or, take a listen to the Latin American two-way networks on 6.600 and 6.955 MHz some evening—all part of the growing network of undercover radio operations throughout the world.

Check them out sometime. You might just find yourself tuned to something you definitely aren't supposed to hear!

More next issue!



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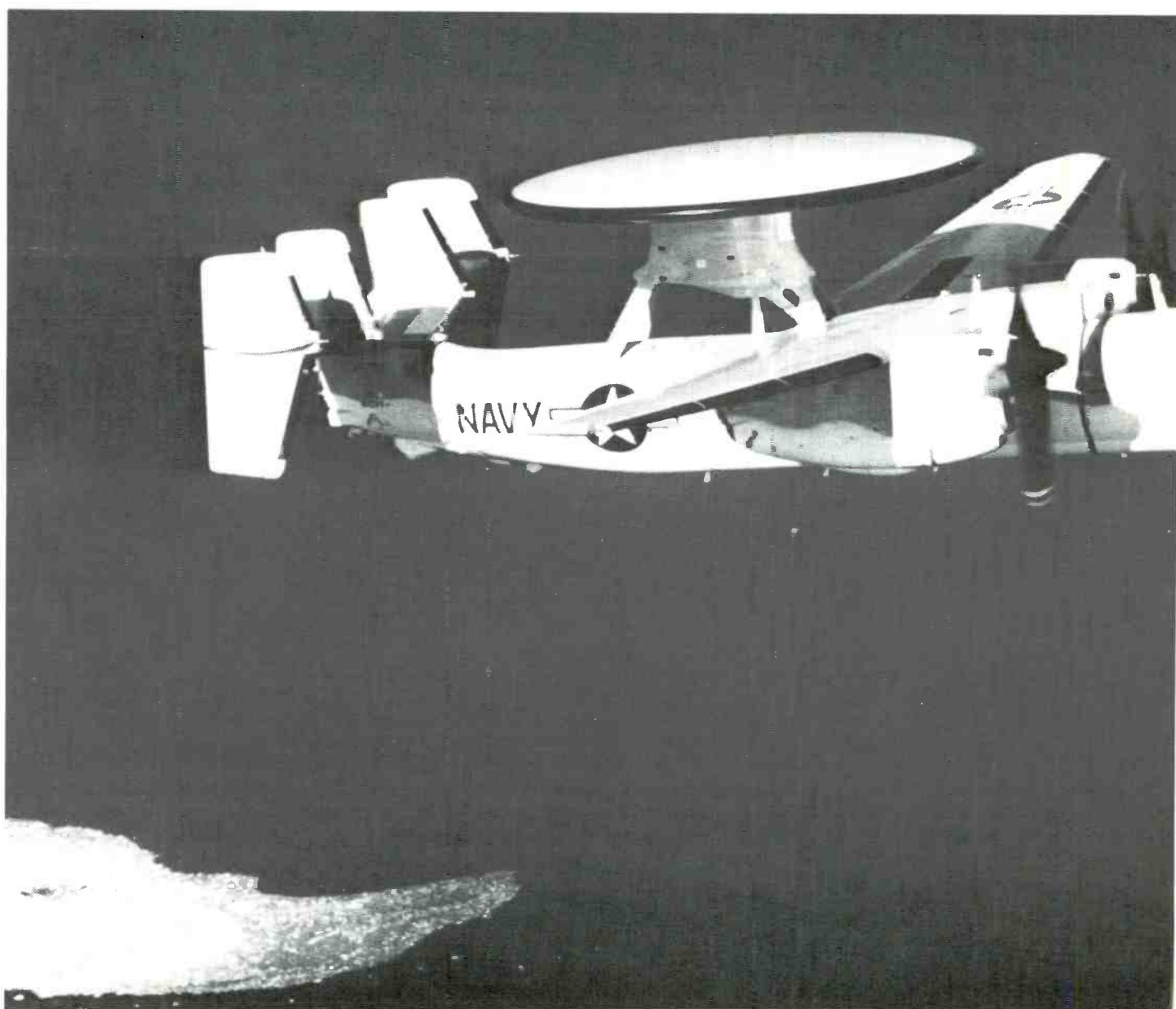
Give up smoking for the same reason you started – To Be Grown Up.

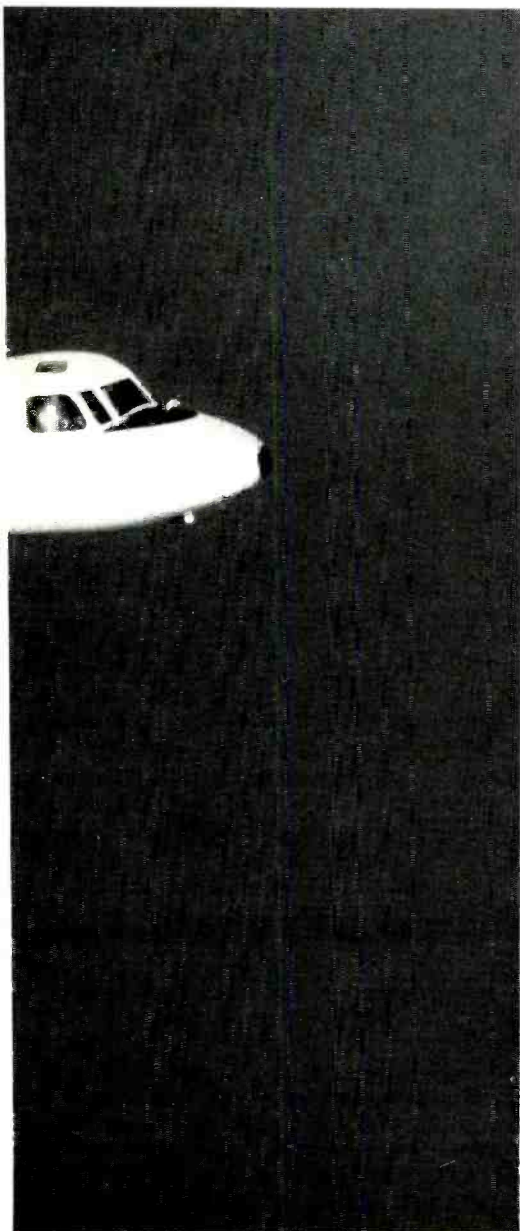
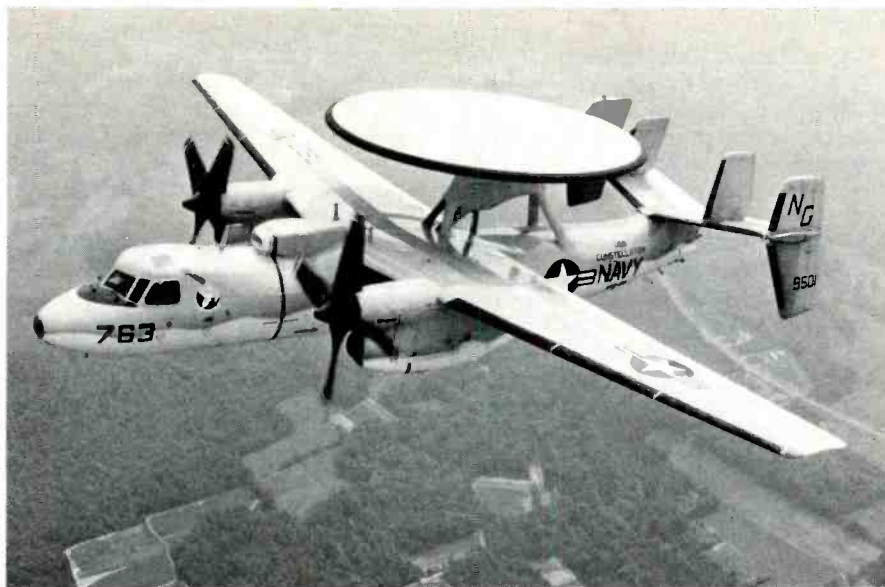
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Hear Them Chase Drug Smugglers: Dozens Of Ships, Aircraft & Ground Stations Now Participating

BY TOM KNEITEL, K2AES, EDITOR





During a secret 10-week experiment conducted by the Customs Service, two highly sophisticated military aircraft flew patrols over the Caribbean waters southwest of Florida. These aircraft were each packed with 12,000 pounds of electronics gear and were designed to detect aircraft, ships, and even land vehicles at ranges of more than 200 miles.

The experiment was a success. A total of 28 pilots and 34 other persons were arrested during the operation, and 25 aircraft, 26,000 pounds of marijuana, 1,000 pounds of cocaine and 50 pounds of hashish were seized, according to J. Robert Grimes, director of the Customs patrols. The government's cost was \$800,000!

This was a quantum leap in the apprehension of smugglers—a notoriously crafty and resourceful lot who have been accutely successful in bringing into this country vast amounts of illegal substances. Of course, a lot of smugglers were successful during the 10-week test, but the number who didn't quite make it was decidedly improved. Persons having communications receivers tuned in on the frequencies used by the Customs and other federal agents and got a startling picture of the deadly serious business of the government detecting and apprehending smugglers.

Since that experiment, the government has continued to use radar aircraft in their anti-smuggling patrols since they seem to be the best way of zeroing in on the movement of contraband. The Drug Enforcement Administration says that about half the illegal cocaine entering the country—an estimated 40 to 48 tons last year worth between \$26.8 billion and 32.2 billion—arrives by air, along with about 60 percent of the marijuana.

If you've got a communications receiver, you'll have little trouble hearing much of the communications which take place in conjunction with chasing those suspected of

smuggling—learning where they land their aircraft and where they unload their vessels. These communications take place using Upper Sideband (USB) and without the use of scramblers, although some messages contain encoded references. The signals are strong and can be easily monitored in almost all areas.

Here's how the networks are established and used.

Frequencies

Although stations have VHF and UHF communications facilities, long-range operations appear to be primarily conducted on 7.527 and 18.666 MHz, and also (rarely) on 11.075, 14.686, and 23.403 MHz. Frequency "Hotel" is the code name for 18.666 MHz, and although other frequencies are referred to as "Echo," "Papa," and "Romeo," it isn't certain at this time of the exact correlation of these code words to specific frequencies.

Daylight operations predominate on 18.666 MHz, with the detection of yachts and ships the dominant preoccupation of the stations heard. Operations start at about 1330 UT (0830 EST) daily and have been heard as late as 0400 UT (2300 EST).

After dark, the major portion of the operations appear to be on 7.527 MHz and are concerned with spotting suspicious aircraft, tailing them, and identifying their destinations. Unfortunately, 7.527 MHz is a frequency used by several different stations and networks which are totally unrelated to the Customs patrols and there are times when there is a battle for listening fare. For instance, there's an Air Force MARS network there, as well as a so-called "spy numbers" station. On the lower sideband of the same frequency there is a Spanish language two-way network.

Stations

The dominant base station on 18.666 MHz is called *Atlas*, thought to be located at Washington DC and Ft. Collins CO. *Atlas* is a powerful station through which many other ground facilities communicate with patrol ships and aircraft by means of a phone patch, although it is believed that some of these phone patched ground stations can also communicate directly if desired.

One of the most often heard stations noted communicating via *Atlas*' facilities is *Marlin 395* which is the El Paso Information Center (EPIC) in Texas. This station is often called upon to check through its extensive computer facilities to offer advice on ships which have been spotted and have been previously apprehended with contraband.

There are many other ground stations noted for communicating through *Atlas* via phone patch. These include *Flint Base*, *In-*

dex, *Spencer*, *Roadrunner Base*, *Tiburon*, *Tropic Air*, and *Desert Base*.

Rampart is the dominant base station in the 7.527 MHz network. The station is operated by American agents and is located in the Bahamas Islands. Its primary mission is to provide patrol aircraft with radar sightings of various aircraft.

Stations identifying with the word *Omaha* followed by numbers are radar spotting aircraft operated by military personnel. These are U.S. Navy type E-2C Hawkeye aircraft made by Grumman. The E-2C is a \$28-million (not including ground support and spare parts) surveillance craft—an unusual looking propeller driven plane with a rotating 24-foot radar dome. It is not to be confused with the similar E-3A radar sentry AWACS aircraft used by the U.S. Air Force and recently supplied to Saudi Arabia.

During the original 10-week experiment,

the Hawkeye aircraft used for anti-drug patrols were based at Patrick Air Force Base in Florida and were sent on 5 to 6 hour patrols along the corridors used by drug traffickers. These corridors are known by code names such as "Alpha," "X-Ray 1," etc. Each Hawkeye is manned by a pilot, co-pilot, and three radar operators. The function of the aircraft is to spot suspicious aircraft (especially those flying at low altitudes to avoid detection by ground radar) and then alert Customs chase aircraft, including (at times) an unarmed Army helicopter borrowed for the program, which follow suspicious aircraft to their destinations.

Stations identifying as *Flint* followed by numbers are aboard the Customs Service chase aircraft. Each *Flint* number represents a specific Customs agent aboard a chase aircraft. One such aircraft is a Piper with registration numbers N-6422Y.

Stations identifying as *Shark* followed by numbers are patrol vessels, most likely operated by the U.S. Coast Guard. Many other coded identifiers are also noted in use and it appears that some are ground and patrol stations while others refer to specific agents.

Here is a general roster of identifications noted on the various frequencies:

7.527 MHz: 4-*Alfa 807*, *Arapahoe*, *Desert Base*, *Desert 45*, *High Tide*, *Home Plate*, *Jackpot*, *John John*, *Laser*, *Lima 710*, *Lima 205*, *Lookout*, *Mike 722*, *Omaha 17*, *Omaha 25*, *Omaha 40-Tango*, *Omaha 40-Uniform*, *Omaha 44*, *Omaha 45*, *Omaha 52*, *Omaha 53*, *Omaha 60*, *Omaha 92*, *Omaha 95*, *Rampart*, *Roadrunner Base*, *Roadrunner 4*, *Roadrunner 7*, *Roadrunner 10*, *Slingshot*, *Sunshine*.

11.076 MHz: *Amatequeila*, *Atlas*, *Flint 258*, *Flint 262*, *Flint 355*.

14.686 MHz: *Atlas*, *Flint 351*, *Flint 357*.

18.666 MHz: 89-*Catalina*, *Arapahoe*, *Atlas*, *Bronco 03*, *Coast Guard 02*, *Condor 700*, *Condor 800*, *Epic*, *Express Adult*, *Flint Base*, *Flint 057*, *Flint 101*, *Flint 102*, *Flint 105*, *Flint 253*, *Flint 255*, *Flint 257*, *Flint 258*, *Flint 259*, *Flint 260*, *Flint 262*, *Flint 281*, *Flint 351*, *Flint 352*, *Flint 353*, *Flint 355*, *Flint 356*, *Flint 357*, *Flint 359*, *Flint 360*, *Flint 386*, *Flint 455*, *Flint 457*, *Flint 458*, *Flint 460*, *Fortunate*, *Home Plate*, *Index*, *Index 101*, *Lima 713*, *Marlin 395*, *Rampart*, *Roadrunner 10*, *Sampson*, *Sea Breeze 100*, *Shark 6*, *Shark 35*, *Shark 85*, *Shark 165*, *Shark 167*, *Shark 281*, *Shark 616*, *Shark 622*, *Shark 623*, *Shark 627*, *Shark 629*, *Shark 721*, *Spencer*, *Sundance*, *Sundance 10*, *Swordfish 1*, *Swordfish 2*, *Tiburon*, *Tropic Air*, *Tropic 1400*.

23.403 MHz: *Atlas*, *Flint 104*, *Flint 255*, *Flint 258*, *Flint 355*, *Omaha 40-Uniform*.

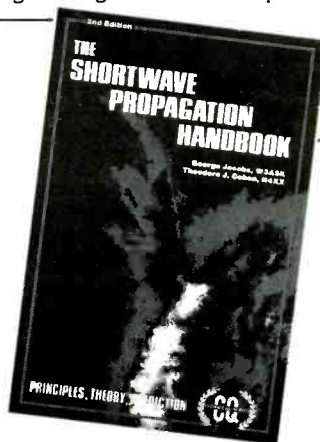
Conclusion

You've got enough of the basics now to tune your receiver to these frequencies and listen to the 1980s version of the posse chasing the cattle rustlers or the G-men patrolling the coasts in search of Prohibition rum runners. You missed out on those—don't miss out on this!

THE SHORTWAVE PROPAGATION HANDBOOK

Second Edition

George Jacobs, W3ASK
and
Theodore J. Cohen, N4XX



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"10" Code

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|--|---|
| 10-0—Caution | 10-48—Traffic standard needs repairs |
| 10-1—Unable copy—change location | 10-49—Traffic light out at . . . |
| 10-2—Signal good | 10-50—Accident (F, PI, PD) |
| 10-3—Stop transmitting | 10-51—Wrecker needed |
| 10-4—Acknowledgement (OK) | 10-52—Ambulance needed |
| 10-5—Relay | 10-53—Road blocked at . . . |
| 10-6—Busy—stand by unless urgent | 10-54—Livestock on highway |
| 10-7—Out of service | 10-55—Intoxicated driver |
| 10-8—In service | 10-56—Intoxicated pedestrian |
| 10-9—Repeat | 10-57—Hit and run (F, PI, PD) |
| 10-10—Fight in progress | 10-58—Direct traffic |
| 10-11—Dog case | 10-59—Convoy or escort |
| 10-12—Stand by (Stop) | 10-60—Squad in vicinity |
| 10-13—Weather—road report | 10-61—Personnel in area |
| 10-14—Prowler report | 10-62—Reply to message |
| 10-15—Civil disturbance | 10-63—Prepare make written copy |
| 10-16—Domestic problem | 10-64—Message for local delivery |
| 10-17—Meet complainant | 10-65—Net message assignment |
| 10-18—Complete assignment quickly | 10-66—Message cancellation |
| 10-19—Return to . . . | 10-67—Clear for net message |
| 10-20—Location | 10-68—Dispatch information |
| 10-21—Call . . . by telephone | 10-69—Message received |
| 10-22—Disregard | 10-70—Fire alarm |
| 10-23—Arrived at scene | 10-71—Advise nature of fire |
| 10-24—Assignment completed | 10-72—Report progress on fire |
| 10-25—Report in person (meet) . . . | 10-73—Smoke report |
| 10-26—Detaining subject, expedite | 10-74—Negative |
| 10-27—(Drivers) license information | 10-75—In contact with |
| 10-28—Vehicle registration information | 10-76—En route |
| 10-29—Check record for wanted | 10-77—ETA (Estimated Time Arrival) |
| 10-30—Illegal use of radio | 10-78—Need assistance |
| 10-31—Crime in progress | 10-79—Notify coroner |
| 10-32—Man with gun | 10-80—Chase in progress |
| 10-33—EMERGENCY | 10-81—Breathalyzer report |
| 10-34—Riot | 10-82—Reserve lodging |
| 10-35—Major crime alert | 10-83—Work school xing at . . . |
| 10-36—Correct time | 10-84—If meeting . . . advice T |
| 10-37—(Investigate) suspicious vehicle | 10-85—Delayed due to . . . |
| 10-38—Stopping suspicious vehicle | 10-86—Officer/operator on duty |
| 10-39—Urgent—use light, siren | 10-87—Pickup/distribute checks |
| 10-40—Silent run—no light, siren | 10-88—Advise present telephone # of . . . |
| 10-41—Beginning tour of duty | 10-89—Bomb threat |
| 10-42—Ending tour of duty | 10-90—Bank alarm at . . . |
| 10-43—Information | 10-91—Pick up prisoner/subject |
| 10-44—Request permission to leave patrol . . . for . . . | 10-92—Improperly parked vehicle |
| 10-45—Animal carcass in . . . lane at . . . | 10-93—Blockade |
| 10-46—Assist motorist | 10-94—Drag racing |
| 10-47—Emergency road repairs needed | 10-95—Prisoner/subject in custody |
| | 10-96—Mental subject |
| | 10-97—Check (test) signal |
| | 10-98—Prison/jail break |
| | 10-99—Records indicate wanted or stolen |

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Revolutionary Radio In Latin America

BY GERRY L. DEXTER

It began with Cuba more than 20 years ago. More recently it has spread to encompass Nicaragua and El Salvador. Revolution? Yes. But more specifically, the radio war that accompanies a revolution. The “outs” attempting to get “in” and the former “ins” attempting to regain their former status. It almost seems that a revolutionary or guerrilla group isn’t worth the name if it hasn’t its own voice somewhere on the shortwave bands!

For the past few years, shortwave listeners have been able to tune in on an ever-increasing level of such activity. If the listener is fortunate enough to speak Spanish, he’s in for especially fascinating listening.

Cuba

Cuban clandestine radio activity dates all the way back to 1957 when Castro’s people briefly took control of Radio Rebelde in Havana to falsely announce the fall of the Batista government. Later, Castro’s own Radio Rebelde went on the air from “Free Territory, Cuba” and developed into a network of both fixed and mobile transmitters called “La Gran Cadena de Libertad” (The Great Network of Liberty).

Once Castro took power and the United States realized it had a communist government at its doorstep, the Central Intelligence Agency put Radio Swan on the air from Swan Island off the coast of Honduras. The station was used to beam anti-Castro programming to Cuba, all under the guise of a commercial broadcasting venture operated by the Gibraltar Steamship Company, a CIA front which never owned a single

steamship or any other kind of nautical vessel. Radio Swan was to play a communicative role in the ill-fated Bay of Pigs invasion years later, making such cryptic statements as “The fish will rise tonight.”

Anti-Castro programming was also carried by a number of United States broadcast band stations—programs produced by various Cuban exile groups. On shortwave, the Cuban Freedom Committee operated Radio Cuba Libre and several other anti-Castro organizations either produced programs or operated their own clandestine stations. As the Bay of Pigs approached, the number of these stations grew.

There was one other major anti-Castro broadcast, Radio Libertad, “La Voz de Anti-Comunista de America” which operated from a Venezuelan location until early 1969. It was never established for certain who was behind this particular broadcast.

Sometime after the Bay of Pigs, Radio Swan changed its name and became Radio Americas. It eventually left the airwaves forever in mid-May of 1968, even announcing its own end in advance.

After the resolution of the Cuban Missile Crisis and the Bay of Pigs affair, the United States seemed more amenable to taking a live and let live approach to Cuba and radio activity against Castro slowed down. The departure of Radio Americas and Radio Libertad and the slow down in “unofficial” radio activity brought things to a low point by the very early 1970s.

But from the mid 1970s onward, activity increased again like a broadcasting phoenix. Anti-Castro groups in the Miami area began firing up transmitters to go on the air

vilifying Castro and once again calling for freedom for Cuba.

Some sources in the Miami-Cuban exile community say there are up to twenty transmitters involved in the various anti-Castro radio efforts. Most or all of them are using amateur radio equipment. The transmitters are located largely in Miami, Palm Beach County and the Upper Florida Keys. Well over a dozen of this type of station have been on the air at one time or another. Usually, there are three or four operating at any one period of time.

Some of these stations have been in fairly regular operation for a number of years, while others last only a few days and then vanish. Some, like Radio Abdala, La Voz de Alpha 66, and Radio Libertad Cubana are operated relatively openly; that is, they make no secret of which organization is behind them. Others remain a mystery and have yet to have their backers identified. Most of the Cuban clandestine stations operate in the lower end of the 7 MHz band, generally 7.000 to 7.100, although one was heard for a time as high as 7.400 and another in the 6.900 range.

Despite their published or announced schedules, reception of these broadcasters is more often than not on a hit and miss basis since transmission hours change frequently and/or not closely followed by the operators themselves. Any listening session may turn up some of these, or none at all, or something entirely new! Broadcasts are usually in local evenings, often between 0100 and 0300 GMT and generally last about half an hour although this, again, is a general rule. Some have been heard to run well



FREEDOM

A JOURNAL OF THE FREE CUBAN

NOVEMBER 1979



C.U.B.A.
CUBANS UNITED FOR BASIC ACTION

Editorial

A LUNATIC ENDANGES PEACE

The insolence of the government of Iran headed by a madman who has broken the universal principle of respect of an Embassy, considered sacred through the ages, has created a very dangerous world tension. The United States government is using all the serenity necessary to avoid a confrontation that would endanger the lives of the hostages taken by the Iranians in the United States embassy.

President Carter has received the full support of the American people in an exemplary way. The Cuban exile community has expressed our respect and support to this great nation and its government in these moments of public crisis.

THE ON GOING TRAGEDY

The Cuban regime has proclaimed that all political prisoners that were going to be freed are already out of jail.

The truth is that hundreds, perhaps thousands of political prisoners are still suffering the bestiality of their oppressors. Included in this list are the large numbers of "plantados" (to stand firm on principles) who were transferred to Boniato Prison in Oriente Province. This special group of prisoners have been subjected to extreme maltreatment and their protests have been heard again and again.

Among these prisoners are: Andres Vargas Gomez, an intellectual, a poet, and grandson of the Dominican Patriot, General Maximo Gomez, hero of the Cuban Independence War.

Jorge Vals Arango, poet and author of the book, "From my Wheelchair" published in France.

Ernesto Diaz Rodriguez, author of the book, "An Urgent Test" published in Miami.

Radio Libertad Cubana and its Commandant David were the subject of much local press when the Federal Communications Commission made two raids, closing the station down twice and finally arresting the Commandant. For reasons never fully explained, the charges against him were later dropped and some listeners have reported the Commandant back on the air occasionally, still going strong.

Nicaragua

For some two decades, Cuba was the only target in the war of the airwaves in Central America and the Caribbean. Then came revolution in Nicaragua and shortwave buffs had an interesting new spot on the dial to monitor, a spot occupied by Radio Sandino, operated by the Sandinistas.

Radio Sandino was well heard on 7.588 in 1979 but, once the Sandinistas achieved victory, Radio Sandino disappeared. The name lives on, however, in the form of a medium wave outlet in Managua.

But now, the "outs" were "in" and the former "ins" wanted back in! Enter Radio Quince de Septiembre (Radio 15th of September), apparently an effort of former members of the Samoja Guardia Nacional, which can be heard on 5.565 variable around 1100 and 0300 or 0400 GMT, at-

They're into publishing too! This is Freedom, published by Alpha 66, the organization which operates La Voz de Alpha 66.

over an hour, others are on the air for just a few minutes. Sometimes one transmission will end only to be followed within minutes by another, different station on the same frequency leading to speculation that transmitter use may sometimes be shared.

What will you hear when you tune in one of these stations? Brief versions of the Cuban National Anthem, or just the first few notes of the anthem used as an interval signal. Short bits of Cuban or martial music

(The Colonel Bogey March and Theme from 2001 are popular) and even college fight songs. These musical segments are used as "separators" between the talk on news, anti-Castro speeches, and appeals for sabotage on the island, sometimes complete with instructions.

Pro-Castro groups in Miami claim to have put Radio Abdala off the air a few years ago. The station was indeed silent for sometime, but it is active again.

Prepared card QSL from Radio Venceremos, the voice of the Farabundo Marti Liberation Front, claiming to operate from El Salvador.

LA VOZ DE ALPHA
66

Thank you for your report on our signals. We are happy to confirm that you were listening to the Voice of Alpha 66 on 6 February, 1980 at 8:15pm EST, 7.055 MHz.

Sincerely yours,

Andrés Vargas Gómez
La Voz de Alpha 66

TARJETA POSTAL
POST CARD

RADIO VENCERAMOS

Confirmamos su recepción de fecha 2 de Setiembre, 1981 en la frecuencia 6905 MHz la que esta correcta.

G.L. Dexter
~~XXXXXXXXXX~~
~~XXXXXXXXXX~~
~~XXXX~~

RADIO VENCERAMOS
EL SALVADOR
C.A.
Voz Oficial del FMLN

LA VOZ DEL COMERCIO EL SALVADOR

CORREO AEREO
INSTITUTO SALVADOREÑO DE TURISMO

Thank you for listening to

RADIO ABDALA

7.083 MHz - 41 meter band
9:04 - 9:31pm EST
2 December - 1977

Manuel Santana
Manuel Santana
First sec of International Affairs

CERTIFICADO DE RECEPCION

La Voz de la Junta Patriótica
Cubana

Frecuencia - 7.400 MHz
Hora - 0304 - 0327 GMT
Fecha - 11 de Junio, 1980

Dr. Andrés José Álvarez
Director

A sampling of self-prepared verifications received from Cuban clandestines.



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MOVIMIENTO DEMÓCRATA CRISTIANO DE CUBA

DECLARACIÓN DEL XXII CONGRESO

El movimiento Demócrata Cristiano de Cuba reunido en su XXII Congreso en la ciudad de Miami, los días 3, 4 y 5 de Julio de 1981, luego de realizado un profundo análisis en comisiones de trabajo, anunció las siguientes conclusiones:

especial a los que ofrendaron sus vidas ante el altar de la Patria en esta lucha contra el régimen marxista-leninista.

Denunciamos el aumento de la represión del régimen, que se está realizando en el altar en

Movimiento Democrata-Cristiano de Cuba

** RADIO CUBA LIBRE **

Thank you for your report of reception of our station broadcasting on 6,990 kilohertz, 0303 - 0331 GMT, 19 June, 1981 which is entirely correct.

MOVIMIENTO DEMOCRATA CRISTIANO

signature/seal

QSL card and "position paper" from Movimiento Democrata Cristiano, operators of Radio Cuba Libre.

tacking the Sandinista government. The station claims to be broadcasting from San Marcos de Colon in Honduras, near the Nicaraguan border and to be operated by the 15th of September Union (the date is Nicaraguan Independence Day) and/or the Nicaraguan Democratic Revolutionary Alliance. Reportedly the station broadcasts some segments in the Miskito Indian language, coded numbers to supposed guerrillas in Nicaragua and messages in code (CW). It is occasionally jammed.

El Salvador

While the campaign for Nicaragua saw relatively little radio activity, El Salvador is providing more action on shortwaves. Late in 1980, Radio Liberacion took to the air with an anti-government line, claiming to be in the Morazan Province of El Salvador and to be run by the Farabundo Marti Liberation Front (FMLN).

The station was on the air for only a few months, starting out on 7.900 briefly and soon switching to 8.243 where it put out a consistently strong signal. Farabundo Marti, incidently, founded the Communist Party of El Salvador and was eventually executed by the government.

The Farabundo Marti Liberation Front put Radio Venceremos ("we will conquer") on the air in early 1981. The station claims to be operating from the Francisco Sanchez Eastern Front in Morazan Province, El Salvador. The government claimed on at least two occasions to have destroyed the station, later admitting failure after the station resumed broadcasting. The station has gone through some periods of silence but at present is operating regularly on 6.905 variable.

Radio Venceremos claims that some 100 persons are involved in the operation of the station, scattered through several huts in a small village in Morazan province. Their responsibilities range from announcing to support work. You can listen for this one at

1200, 2300, or 0000 and again at 0300 or 0400 GMT. You may hear Commandant Venceremos, also known as Santiago, Maravilla, Mariposa, or Apolo One, doing the announcing.

Radio Venceremos also maintains a "guerrilla channel" on 14.500. It invites listeners or groups with access to amateur equipment to pass messages to the station on Sundays at 1530 GMT.

Another FMLN station is Radio Farabundo Marti, a more recent addition which, in fact, may actually be a new name for the former Radio Liberacion. Radio Farabundo Marti came on the air in January of this year and can be heard on 6895 variable from 1100-1200 and 0130-0200, occasionally later. It too puts out a strong signal and, when on, is easily logged.

Still another El Salvadoran clandestine is Radio Unidad. This one has not been widely heard although it is said to operate on 7.000 at 0100 on Saturdays and Sundays.

It is likely that all three of these stations are closely tied together. In fact, all three may actually be operating from Nicaragua rather than from El Salvador.

While many of these stations are fairly easy to hear, verifying them is an entirely different game, and more often than not, unsuccessful. Addresses are hard to come by (see our list). If you do wish to attempt to get a reply, it is advisable to make up your own "prepared card" QSL for the station's use. Don't put any stamps on the card itself since the stations often prefer to insert the card in an envelope.

Cuba. Nicaragua. El Salvador. The three hot spots of the Latin American radio war on shortwave. And tomorrow? Next month? Who knows? Perhaps we'll be hearing rebel voices aimed at Guatemala or Honduras. Or somewhere else. But it seems safe to say that the radio war will go on, providing shortwave listeners with interesting targets and fascinating listening.

Recently Active Latin Clandestines

Station	Operating Group	Frequency
La Juventud Progresia Cubana	unknown	7.037
La Voz de Alpha 66	Alpha 66	7.040
La Voz de Cuba Independiente y Democratica	Cuban Independiente y Democratica	7.350
Radio Abdala	Agrupacion Abdala	7.080
Radio Antorcha Martiana	Movimiento Insurreccionario Martiano	7.070
Radio Cuba Libre	Movimiento Democratica de Cuba	6.990
Radio Libertad Cubana	unknown	7.088
Radio Mambi	Junta Patriotica Cubana (Cuban Patriotic Board)	7.080
Radio Quince de Septiembre	Legion of 15th of September and/or Fuerzas Democratica Nicaraguense	5.565
Radio Farabundo Marti	Farabundo Marti Liberation Front (FMLN)	6.895
Radio Unidad	FMLN (see above)	7.000
Radio Venceremos	FMLN	6.905

NOTE: All listed frequencies are given as a starting point and may vary considerably.

Clandestine Addresses

La Voz de Alpha 66
Alpha 66
1530 NW 36th St.
Miami, FL 33142

La Voz de Cuba Independiente y
Democratica
Cuba Independiente y Democratica
Apt. 76633, El Marques, Caracas,
Venezuela
or/ 10000 SW 37th Terrace,
Miami, FL 33165

Radio Abdala
Agrupacion Abdala
P.O. Box 341005
Coral Gables, FL

Radio Antorcha Martina
Movimiento Insurreccionario Martiano
Box 440491
Miami, FL 33144

Radio Cuba Libre
Movimiento Democratica Cristiano de
Cuba (MDC)
Box 557759
Miami, FL 36155

Radio Mambi
La Voz de la Junta Patriotica Cubana
Cuban Patriotic Board
P.O. Box 68045
Caracas, Venezuela

Radio Venceremos
Apt. Postal 70907
Mexico DF
Mexico

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TELOR LOS ESCOMBROS
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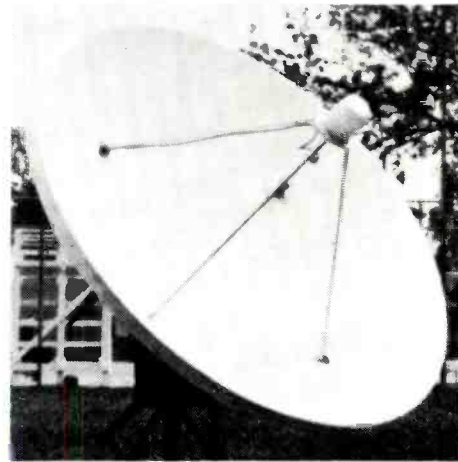


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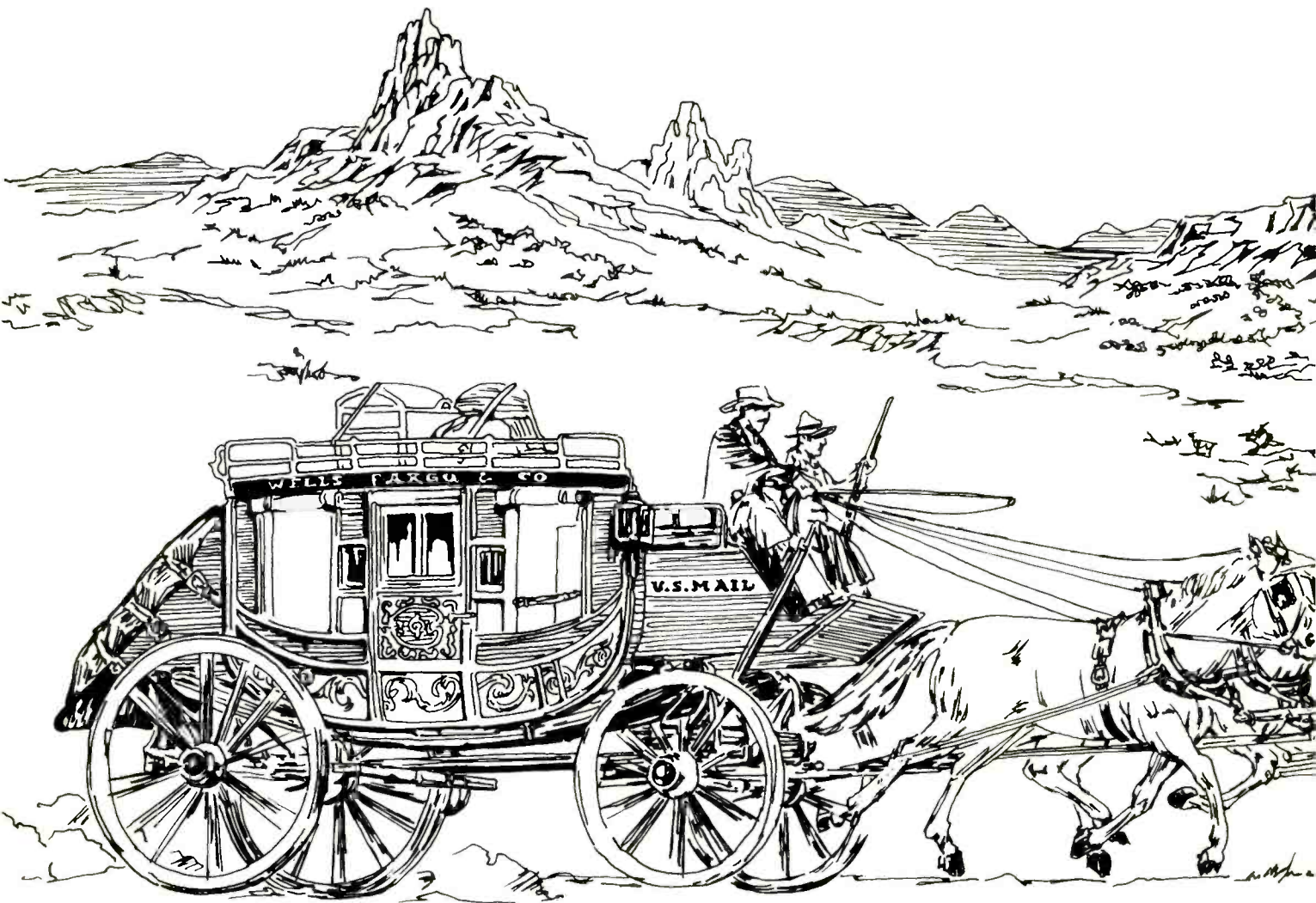
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CIRCLE 53 ON READER SERVICE CARD



Wells Fargo Sets The Stage Whoa Podner! Use Your Scanner To Listen In On Wells Fargo!

BY RICK MASLAU, KNY2GL

Back in 1852, Henry Wells and Bill Fargo had an idea. They decided to operate an express service which would link New York to San Francisco—carrying passengers, mail, freight, and specializing in bringing gold and silver from the western mines.

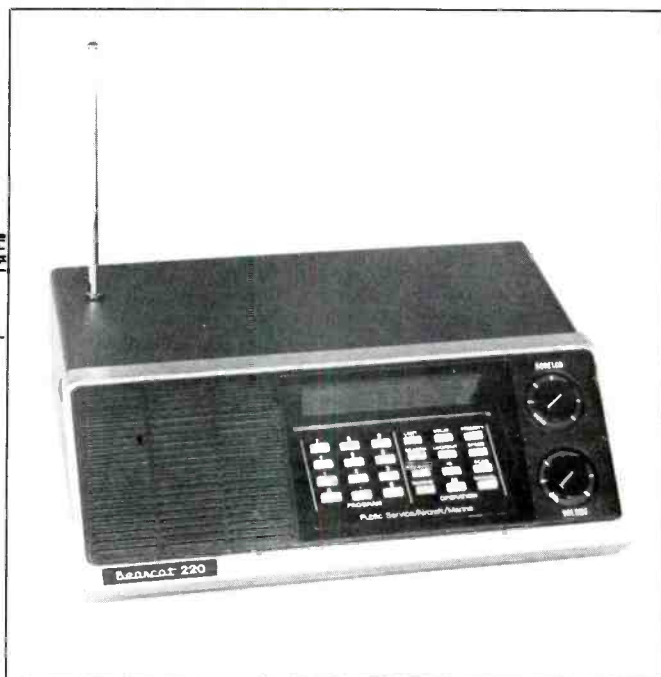
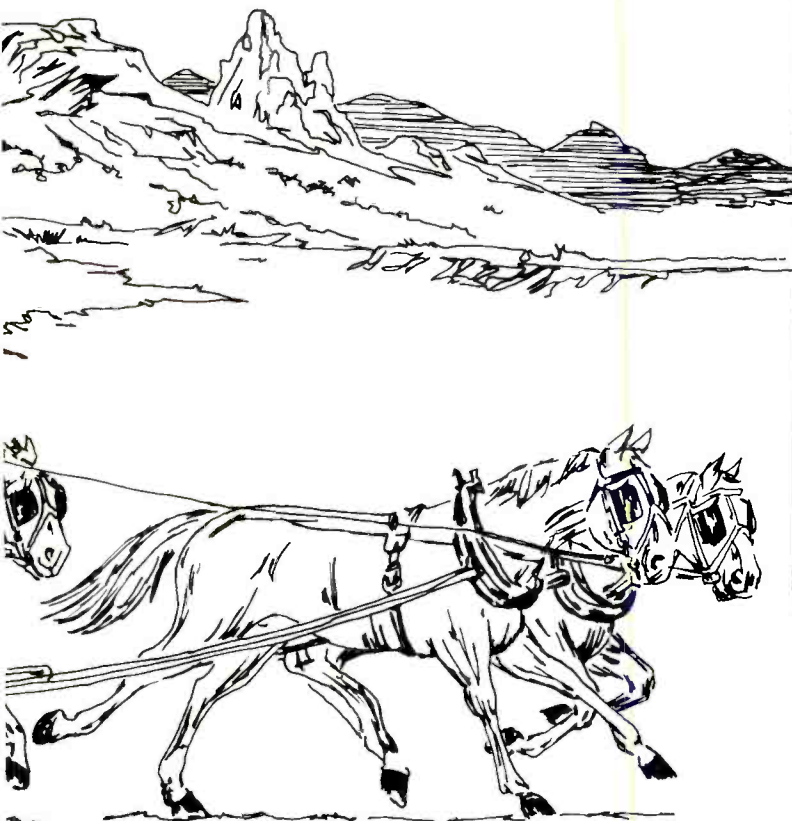
It wasn't long before the Wells Fargo & Co. Express became one of the most powerful firms in the old west, even entering the banking business on the West Coast. To this day, one of the strongest images of the old west which most Americans retain is that of the Wells Fargo stagecoach carrying strongboxes filled with gold and silver bullion.

Things have changed—at least a little! Those old Wells Fargo all steel strongboxes now command more than \$500 on the antiques market, while the wooden strongboxes with the steel straps are valued at three times as much! An old J.N. Scott 10 gauge damascus barrel shotgun, once carried for protecting the strongboxes, is

worth upwards of \$600 to a modern collector.

But Wells Fargo & Co., itself, is hardly an antique relic. The company is still most active in the banking, central alarm, and security transportation business, operating a large fleet of vehicles for transporting valuables—including cash, gold, and silver—between banks and vaults. The wooden stagecoaches have been replaced by steel walled trucks. The damascus barrelled shotguns have been replaced by pump-action riot guns and .38 special handguns. And today, driving around in one of those armored trucks generally means having at hand a two-way radio for dispatch and emergency communications purposes.

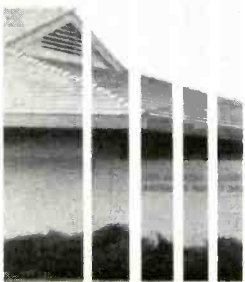
You can unofficially “ride shotgun” with modern day Wells Fargo express riders. All it takes is a scanner and the information on where to listen. You've got the scanner and now, thanks to *Popular Communications*, you've got the frequencies!



WELLS FARGO COMMUNICATIONS FREQUENCIES

CA San Francisco	KVP842 490.2625 (Bank) KA-68215 154.57 (Hand Held Units)
CO Colorado Springs	KJY253 464.25 (Armored Vehicles)
CO Evergreen	KFE686 464.25 (Armored Vehicles)
CT Glastonbury	WRU961 460.90 (Alarm System)
CT Trumbull	WSL929 460.90 (Alarm System)
FL Jacksonville	WZU384 159.78 (Armored Vehicles)
FL Miami	KBE875 159.60 (Armored Vehicles) KNS936 472.4875 (Armed Guards) KNR251-2 471.6125 (Armed Guards)
FL Miami Beach	KZF296 460.975 (Alarm System)
FL North Miami	KB-5195 471.6125 474.6125 (Hand Held Units)
FL Orlando	WSZ266 461.475 (Armored Vehicles)
FL Statewide	KA-53213 154.57 (Hand Held Units)
FL West Palm Beach	KSI268 159.60 (Armored Vehicles)
GA Atlanta	WQE960 452.70 (Armored Vehicles)
IL Statewide	KA-66316 154.515 (Hand Held Units)
KS Kansas City	WQD962 464.225 (Guard Service)

LA New Orleans	WSZ265 461.10 (Armored Vehicles)
LA Shreveport	KQX563 460.926 (Alarm System)
MA Boston	WQE962 452.80 (Armored Vehicles)
MA Taunton	WQE961 159.63 (Armored Vehicles)
MA Waltham	KQQ245 464.625 (Alarm System)
MO Kansas City	KAC5654 467.575 KAC5655 462.575 467.575 KAC1398 462.575 467.575
MO Parkville	KIZ401 159.60 (Armored Vehicles)
NE Omaha	WSZ267 462.175 (Armored Vehicles)
NY Buffalo	KL7906 460.90 (Alarm System)
NY New York	KA-49776 465.90 (Hand Held Units) KA-64322 816.9375 817.9375 818.9375 819.9375 820.9375 KT-8093 464.00 (Hand Held Units)
NY Rochester	KJK593 160.095 (Armored Vehicles)
NY Yonkers	WSL728 460.90 (Alarm System)
NC Statewide	KA-49777 151.925 (Hand Held Units)
NC Charlotte	WQG735 160.08 (Armored Vehicles) WRU958 151.805 (Alarm System) KWU760 460.90 (Alarm System) WQU972 461.90 (Armored Vehicles)
OH Cleveland	KUQ265 460.90 (Alarm System)
OH Copley	KQN870 460.925 (Alarm System)
OH Jefferson Township	KXJ294 159.69 (Armored Vehicles)
PR Rio Piedras	WSY945 463.625 (Armored Vehicles)
SC Columbia	WGA523 464.85 (Armored Vehicles)
TX El Paso	WRU959 151.955 (Alarm System) WXD705 463.85 (Armored Vehicles)
UT Salt Lake City	KQJ523 464.65 (Armored Vehicles)
VA Arlington	WRU960 151.925 (Alarm System)
VA Richmond	



Grounding That Tower! Common Sense Or Waste Of Time?

BY BILL CHEEK



Probably most people using towers to support their antennas (scanner, TV, Ham, CB, SWL, or whatever) haven't bothered to ground those towers. But from time to time small voices are raised which can be heard off in the distance shouting "ground . . . ground . . . ground." The question is, is it of any value to go to the bother, and if so, exactly what is the amount of bother involved?

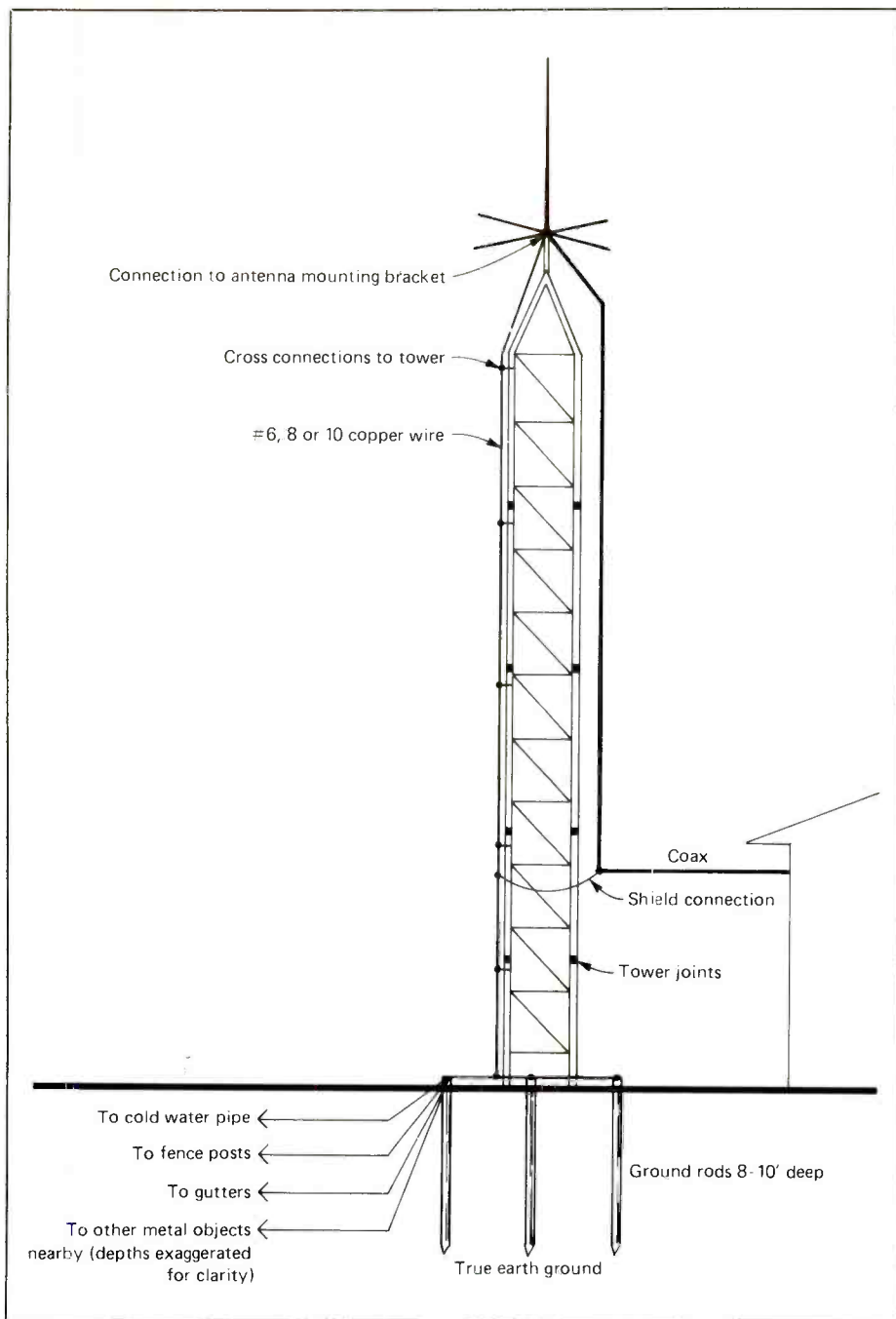
Well, in a word, yes—all electronic equipment, and especially radio gear, should be well grounded to obtain the utmost in performance and safety. Grounding for radio equipment must begin with the antenna and its supporting structure. The mounting bracket and hardware of all commercially made antennas is designed to be grounded.

Normally, the antenna mounting bracket is attached to a metal pole, mast, or tower which supports the antenna. Even when the base of the supporting structure is grounded, it is unlikely that the antenna is well grounded due to the one or more slip-surfaces that exist in telescoping poles, stackable tower sections, etc. Slip-surfaces may make good contact initially, but after a few weeks of moisture, air pollution, and surface corrosion, the metal-to-metal contact efficiency is reduced.

The first principle of proper grounding, then, is to ensure that the metal mounting bracket of the antenna is permanently connected to True Earth Ground. This is done by any of several methods similar to the following: obtain a length of copper wire, single strand, of gauge #6, #8, or #10, the largest being most preferable. This wire must be as long as the height of the tower, mast, or pole. So if the base of the antenna is 40 ft. high (above ground), then the length of copper wire needed is at least 45 ft., allowing for some slack and excess.

Using a compression clamp, split-bolt, stainless steel hose clamp, large solder lug, or other effective means of terminating a wire of this size, firmly attach one end of the #6, #8, or #10 to the antenna mounting bracket. One of the best methods of doing this is to use a large solder lug, well soldered to the end of the wire. Place the lug over the end of one of the mounting bracket bolts. Slip on a nut and tighten securely. Now stretch out the length of copper wire along the tower or supporting structure and secure it to the structure every few feet by means of stainless steel hose clamps or similar means. There will be a few feet of this wire hanging loose near the base. This extra wire will later be connected to True Earth Ground.

Next, the copper wire running the length of the supporting structure must be connected to each and every section of tower, telescoping pipe, or any other potentially ungrounded metal parts of the structure. In the instance of telescoping pipe or tubing as the supporting structure, a small hole is drilled into each section and an appropriate sized self-tapping screw loosely inserted. Near this hole, and on the copper wire, solder a short piece of #12 copper wire. Attach the loose end to the self-tapping screw either by



wrapping the wire around the screw, or by means of a solder lug soldered to the end of the #12 wire. Tighten the screw. Do this procedure for each and every section of tower, mast, or pipe used to form the supporting structure.

In the case of stacking tower sections, the lugs or bolts that tighten one section of tower into another may be used as anchor points for the interconnecting #12 wires instead of drilling holes. Your objective at this point is to connect each slip joint section of tower, mast, or pipe to the continuous length of #6, #8, or #10 copper wire. This will ensure that the supporting structure is electrically conductive from the antenna mounting bracket to the bottom of the structure and ultimately, True Earth Ground.

Where a beam antenna and rotor is used, the rotating mast and rotor housing must

also be grounded to the heavy copper wire previously discussed. The idea is to connect any piece of metal in or on the supporting structure to the heavy copper wire so that the entire metal supporting structure is bonded to ground. It is our intent to ensure a complete and total metallic conductivity from the antenna mount down to ground level. **Do not rely upon sliding metal to metal surfaces to maintain this conductivity for any length of time.**

Now we will prepare the True Earth Ground for the antenna and its supporting structure. Procure at least two, and preferably more, 8 to 10 ft. copper bonded ground rods; three is an excellent number. Of the three, at least one must be a copper sheathed rod. The other two (or more) can be any 8 to 10 ft. lengths of electrical conduit, aluminum tubing, metal pipe, concrete

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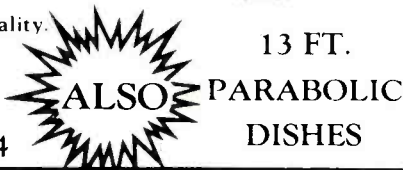
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rebar, etc. The rods should be driven into the ground in a circular pattern around the base of the tower or supporting structure. If three rods are used, space them 120° apart and about 12 to 24 inches out from the structure base.

Next, cut a piece of #6 to #10 copper wire of a length that will form a circle around the ground rods previously driven into the ground. Solder, clamp, or bolt this wire to each of the ground rods near the top of the rods where they protrude from the ground. Thus all the ground rods are to be connected together by means of this "jumper" wire. Just be absolutely sure that you have made a metal-to-metal, permanent connection to each of the three or more ground rods.

Now, connect the free end of the #6, #8, or #10 that runs down from the supporting structure to any place on the loop that interconnects the ground rods. Solder the connection if at all possible, otherwise use a split bolt or compression clamp to make the connection. This completes grounding of the antenna and the supporting structure.

The last thing to do is remove a bit of insulation from the coax where it meets the tower and before it goes up very high. Solder a #12 copper wire to the exposed shield of the coax. Solder the free end of this #12 wire to the heavy copper wire running the length of the structure. When soldering to the shield of the coax, use as little heat as possible to do the job right. Tape the connection or use silicone rubber to weatherize the connection. For best results, ground the shield of the coax to the heavy copper wire every 10 to 20 ft. of tower height.

Remember that two or more ground rods driven into the earth at least 8 ft. are needed to form a True Earth Ground. The more ground rods you are able to drive into the ground near the base of the supporting structure, the better. **Do not rely upon a connection to your cold water pipes, metal fence posts, well casings, and other supposedly grounded objects.** It is okay and advisable to add these to your grounding system by interconnecting any such object to the base of the tower by a heavy wire such as #6, #8, or #10.

Any metal object of any size near the tower or supporting structure should be connected to the ground rods by means of wire routed under the surface of the ground. This would include metal clothesline poles, fence posts, well casings, chain-link fences, and nearby cold water faucets. Grounding all nearby metal objects to the ground rods or base of the tower will enhance the True Earth Ground effect. Now refer to Figure 1 for a pictorial summary of this month's grounding applications.

By the way, any time you are going to erect or work on a tower or antenna system, please don't do it anywhere near electric lines. Electric lines constitute a severe safety hazard and each year several radio people manage to accidentally become electrocuted by having an antenna or tower come into contact with power lines.

EQUIPMENT REVIEW:

The MFJ Model 1040 Deluxe RF Preselector II

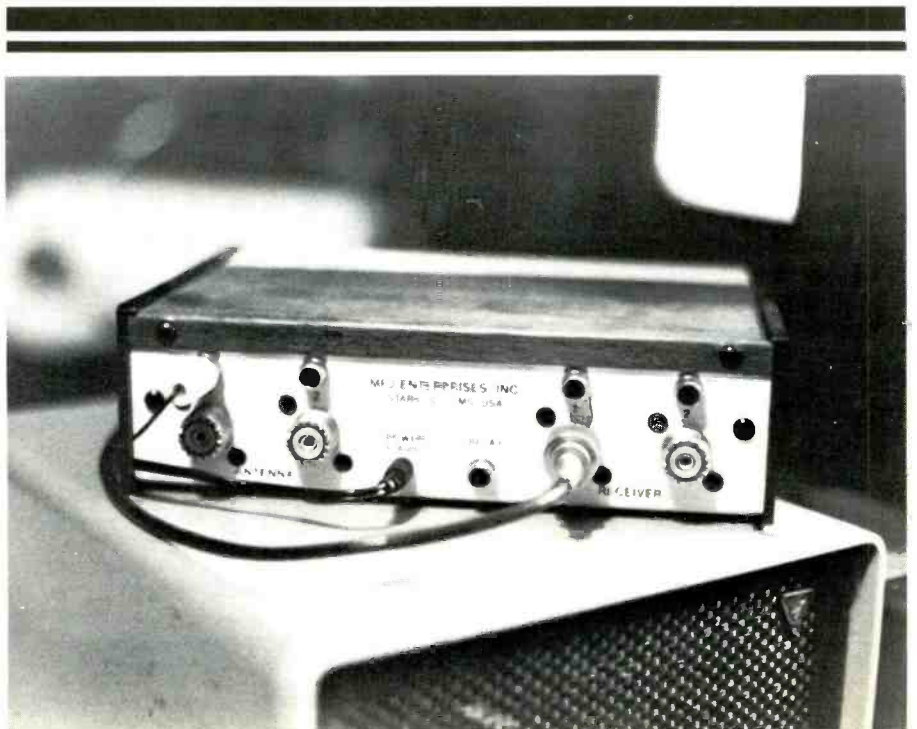


Here's the MFJ-1040 head-on.

The rear deck is simple, uncluttered, and everything is clearly marked.

A rather large and impressive array of clever, well-designed, well-built, and useful communications accessories are available from MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762. If it is something that will enhance the operation of a scanner, a communications receiver, or even a transmitter, then MFJ most certainly has it in their product roster; and most likely, there is more than one product which addresses itself to the task to be performed.

We checked through MFJ's product listing to find a product for review and came up with their Model 1040 Deluxe RF Preselector II. The intention on the Model 1040 is to soup up those puny and weak background signals and pump them into your receiver with lots of hair on their chest while simultaneously filtering out unwanted image response and out-of-band signals. The specs state that the Model 1040 provides variable gain up to 20 dB on frequencies between 1 and 54 MHz — which means from the center of the standard broadcast band straight through the entire VHF low band — giving it applications for scanners as



well as communications receivers. It can even be used with transceivers running up to 350 watts PEP, although it will only enrich the incoming signals, not those outward bound from the transceiver. That's a general overview of the Model 1040.

Specifics

Digging a little deeper into the Model 1040 we find the circuit consists of five semi-conductors utilizing low noise MOFSET techniques. The unit is housed in an attractive 5" x 2" x 6" case with a metal faceplate which is white with black lettering. The top and sides are wood grain design overlay. The preselector is designed to operate from 9 to 18 VDC and an inexpensive optional 117 VAC to 9 VDC adapter is available from MFJ if you don't have this voltage on hand and/or don't want to use a 9 volt battery.

The way the 1040 is designed, you can operate 2 different receivers and 2 different antennas through the set, switching the combinations around by means of front panel pushbuttons. Other pushbutton switches turn the unit on and off (there's a pilot light to keep you posted of this status) and also a switch to give you a 20 dB signal attenuation to be used for sudden killing of very strong interfering signals.

Various front panel controls switch the coverage through the set's 4 different bands. The controls can fine tune the coverage for optimum response, vary the gain from nil to full, and adjust the delay if you're using the unit with an SSB transceiver.

The rear panel has the connections for the inputs from 2 antennas and the unit's outputs to 2 receivers (of course you don't have to run it with more than 1 antenna or receiver if you don't wish to). A nifty feature here is that with each of the antenna inputs there are two terminal connections which give you the opportunity to select between the use of either a standard coaxial type PL-259/SO-239 arrangement or a phono connector (such as might be used with a long wire antenna).

When the Model 1040 is under power, all of this comes into play. However, when the power is off, the whole unit is automatically bypassed and the receiver is connected straight through to the antenna without going through any of the 1040's circuits.

On The Line

Here are the results we obtained testing the unit in action. The tests were made using a 75 foot long wire antenna connected to a Yaesu 7000 communications receiver with the MFJ Model 1040 running at full gain.

For starters, even though the specs say the unit starts working at 1 MHz, we found that it would give small improvement to signals as low as 650 kHz—an S9 signal was improved to S9 + 10, not much I'll admit but this was 350 kHz outside of the unit's design parameters. On 900 kHz, still 100 kHz below its specified operational frequency, it

ran an S6 signal up to 10 dB over S9—a definite aid. At 1 MHz an S3 signal could be improved to S9 + 20 dB—formidable!

Running up to 3.5 MHz, an S5 signal was souped-up to read S9 + 30; at 6.5 MHz, a healthy S9 + 10 signal was further enhanced to S9 + 50, which almost pinned the meter needle. The unit was being checked at a time of day when WWV on 10 and 15 MHz was barely registering anything on the meter but could be heard with a very anemic signal off in the background noise. With the MFJ-1040, we picked the 10 MHz signal up to the point where the meter was reading an S9, while on 15 MHz we could coax it to S5. At 21.5 MHz, an S3 signal was beefed up to a tad more than S9, while at 28 MHz another signal so weak that it was hardly moving the meter needle was picked up to an S5.

Scanner manufacturers have long been under the impression that S-meters are definitely a feature with less consumer interest as, for instance, a built-in digital clock. Therefore, there was no way of showing comparative performance readings with and without the MFJ-1040. However, there was an easily noticeable increase in the stations which could be monitored when the scanner was tuned to the fire channel of a county located about 60 miles away. That channel's mobile stations had never been monitored at my location. With the MFJ-1040, I detected some of them.

General

All in all I was pleased with the results obtained from the MFJ-1040. I was especially impressed that the product was designed to connect easily to the receiver (2 minutes without tools, cutting, or soldering), and operation was convenient and uncomplicated (and a well prepared instruction sheet was provided). No problems were encountered with the installation or operation of the MFJ-1040, and the general quality of the unit appears excellent.

There was an easily discernable increase of incoming stations monitored on all bands upon which the preselector was used. Fortunately, there was no increase in images and spurious responses as has been noted in the past with some weak-signal amplification devices. That unhappy response, has been noticed more in broadband amplification devices than in ones like the MFJ-1040, which has the ability to be peaked up on a specific frequency being monitored.

The unit we tested was purchased from stock and was unmodified from the MFJ units normally supplied to all customers. MFJ products are obtainable directly from the company and also from many local dealers. The price of the MFJ-1040 Deluxe RF Preselector II is \$99.95; the optional power adapter is \$9.95. We felt it was a worthwhile addition to our station.

Reviewed by

**Col. W.R. Martin, USAF Retired,
Registered Monitor KNV7AE**



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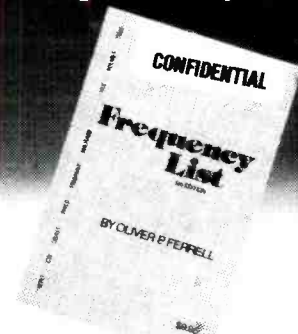
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CIRCLE 48 ON READER SERVICE CARD

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CIRCLE 21 ON READER SERVICE CARD

PRODUCT SPOTLIGHT

Japan Radio Company's NCM-515™ Frequency Controller



Japan Radio Company (JRC) has been a well-known name in marine communications for several decades. Recently, they have also been involved in radar, satellite navigation systems, commercial communications, and industrial/medical electronics. This company has become increasingly involved in the amateur and shortwave listener market as well.

Just over a year and a half ago, they introduced a general coverage receiver called the NRD-515™. It has become a popular radio with serious shortwave DXers worldwide. I have been using the NRD-515™ for one year and have been pleased with its performance. Being primarily a "utility" DXer, I was especially attracted to its excellent stability, which is so important when listening to CW, RTTY, or FAX.

Most NRD-515™ owners would agree that one of the key benefits to using the NRD-515™ is its ease of operation. Tuning is simple, fast, and absolutely accurate. Additionally, there are 24 or 96 channel memories available. With all this tuning convenience I was surprised to learn of something new to make tuning and frequency entry even better and faster!

This year JRC introduced a new product of special interest to the shortwave enthusiast. The item is called the NCM-515™ frequency controller. The NCM-515™ is a hand-held keyboard entry/display device to facilitate frequency entry and tuning into the NRD-515™. This controller resembles a large hand-held calculator. The cord connecting the NCM-515™ to the NRD-515™

is 6 feet long and attaches via an adapter to the memory part of the NRD-515™.

You may attach the NCM-515™ at the same time your 24 or 96 channel memory is attached. Installation takes about three minutes and requires only a screwdriver. You do not have to go inside the NRD-515™ to install this device. The controller derives its power (+10 VDC @ 100 ma) from the receiver. It has a standard calculator keyboard with an audio response tone as well as a six digit LCD display. The unit measures 3¼" × 5½" × 1¼".

The NCM-515™ has several modes of operation. For keyboard entry of a given frequency, simply turn the unit on, press the P/MA key once (display will show 0.0), and type in the desired frequency in kHz; then press the = key. Sample legal entries will be: 15070.0 = , 15070. = , or 15070 = . Illegal entries will show "E" on the NCM-515™ display.

In the remote mode you have taken control from the NRD-515™ and its MHz and tuning knob are now inoperative (RIT is still functional). All frequencies on the keypad will also be displayed on the NRD-515™. To enter a new frequency, simply key it in and press = . There is also an add and subtract function. If you are at 15300.0 kHz and want to move to 18350.0 kHz, simply type + 3050.0 = .

Whether or not you have the NRD-515™'s 24 or 96 channel memory unit you will now have the ability to store four frequencies in the controller itself! To store the frequency you are presently on, press M

and either M1, M2, M3, or M4. To recall any of the four memorized frequencies in the future, press MR followed by M1, M2, M3, or M4. Note that when you turn the NCM-515™ off you will not lose the memories, but turning the power off on the NRD-515™ receiver will erase the four memories.

There is a LOCK key on the NCM-515™ which works exactly the same as the NRD-515™'s. Press once to lock, again to unlock. The status of the lock is also shown on the LCD display of the controller.

The most interesting and unexpected feature of the NCM-515™ is its ability to automatically tune up or down (slew) at different rates. I found myself enjoying this feature as much as standard keyboard entry! You can slew by 1 kHz or 100 Hz increments in either FAST or SLOW mode. The resulting rates of tuning are:

	1000 kHz (1 MHz) in	
FAST	STEP 1 16 secs.	STEP 0.1 160 secs.
SLOW	66 secs.	660 secs.

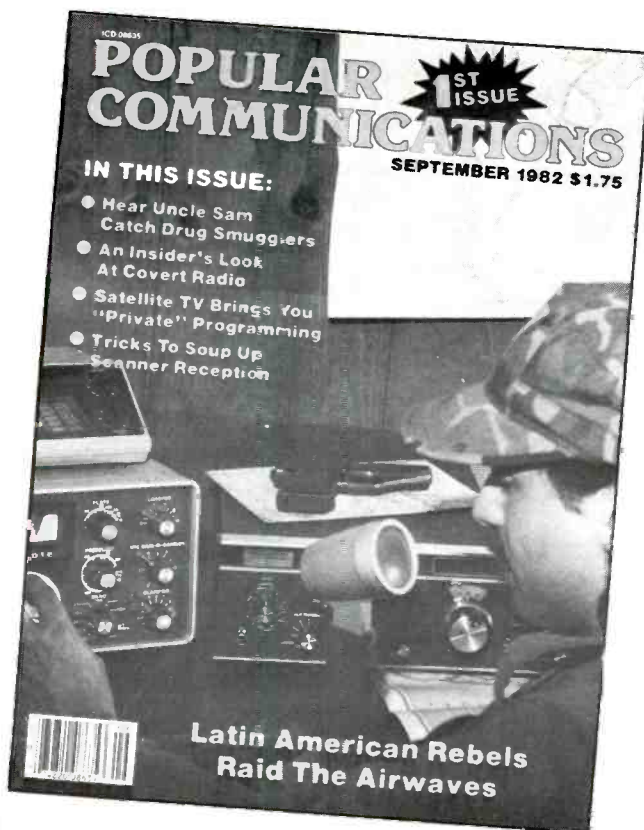
The SLOW STEP 0.1 is nice for just scanning across the band. The keyboard input combined with the 4 tuning rates essentially eliminates any need to tune manually.

The NCM-515™ also provides a very fast and efficient means to program your 24 or 96 channel onboard memories! In summary, I am sure every NRD-515™ owner (present and future) will want to add this convenience to their listening post.

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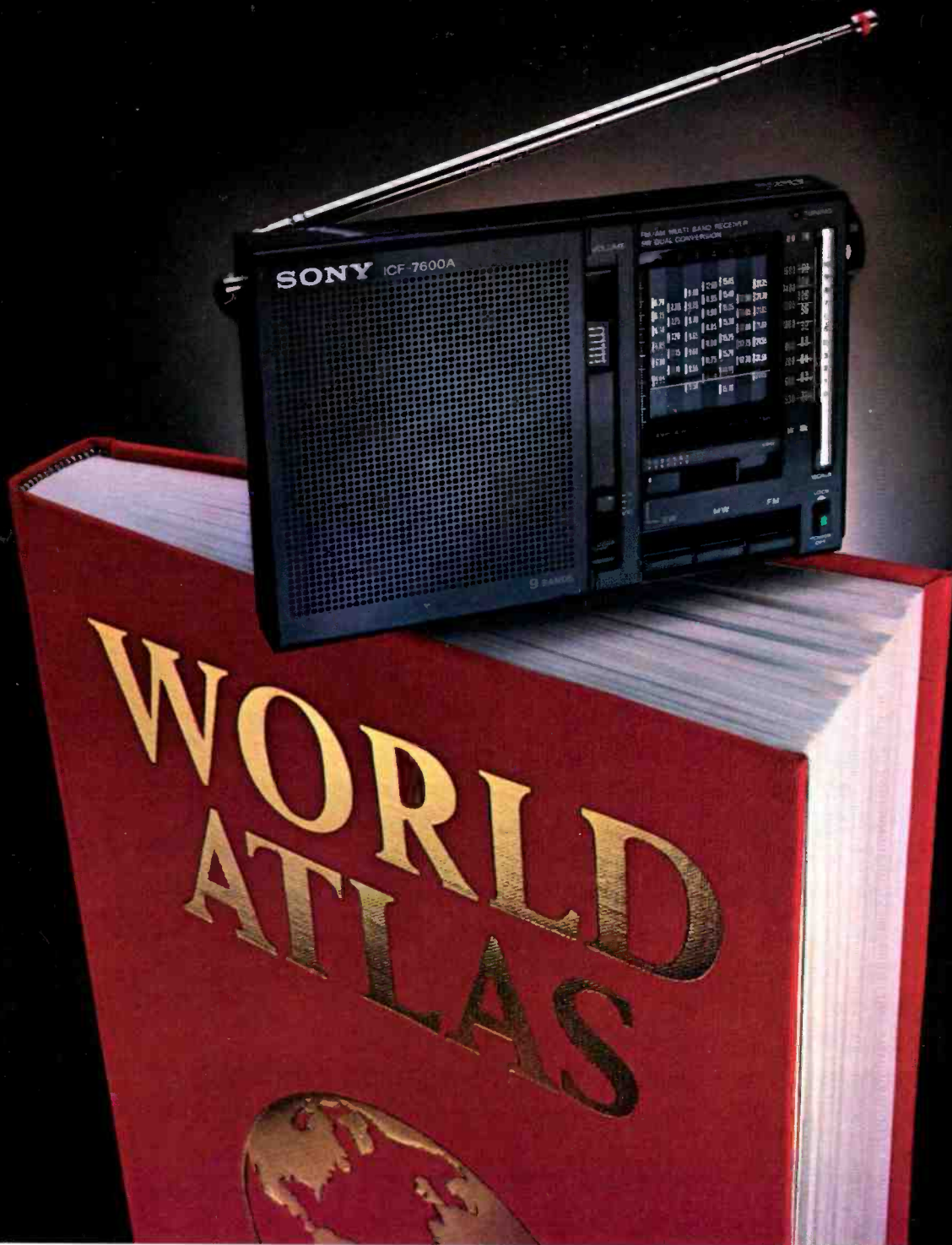
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LISTENING POST

WHAT'S HAPPENING: INTERNATIONAL SHORTWAVE BROADCASTING BANDS

Hello! Welcome to The Listening Post. Come in! Sit down, have a cup of coffee and let's talk shortwave.

That's what we're going to be doing each month. We'll bring you a listing of some of the things that are being heard on the shortwave bands. However, it's important to remember the time delay between the writing and the reading because no two days are ever exactly alike on shortwave. Frequencies and times change often, and stations come and go thanks to the propagation gods and sometimes individual station fortunes.

In addition, we'll have features on stations, countries, certain areas of the world, news events, a dash of utility action, technique tips, QSL information, words about DX clubs and publications, questions from you, the readers, and more. We hope you'll join us each month in The Listening Post.

For the past few months, a lot of shortwave news has been generated in a most unlikely country—The United States. Normally, little seems to happen in this country relative to shortwave broadcasting.

The Voice of America was much in the general news as a result of the Reagan Administration's desire to make the Voice more of a propaganda vehicle than it has been in the past. This caused a great deal of discussion and may have been the cause of at least one VOA official's resignation. The dust has not completely settled on this question of whether the VOA should emphasize more of the positive and devote less time to the negative side of things in this country.

The Administration announced plans sometime ago to build a new station in Florida, tentatively called "Radio Marti," which would beam anti-Castro programming to Cuba. Again, this was a controversial move and there is still much opposition to it. Although proposed for the medium wave band, the action does have ramifications for shortwave since it could affect Radio Havana's actions as well as those of the several anti-Castro groups in the Miami area which run clandestine broadcasts to Cuba on shortwave.

WYFR, the religious US shortwave broadcaster with headquarters in California and transmitters in Florida, made a sudden, surprising, and unique move. It now trades airtime with the Voice of Free China in Taiwan. WYFR programs are carried over VOFC to China from 1205 to 1605 GMT on 15370 and to India from 1400-1700 GMT on 9600. In exchange, VOFC is aired over WYFR from 0000-0400 on 5985, 0200-0500 GMT on 11740, 0400-0600 on 11855, and 2100-2300 on 15130.

In addition, the first totally new shortwave station in the United States in many years came on the air early this year—WRNO World Wide, broadcasting from New Or-

	* GMT Conversion Chart				
GMT	EST	CST	MST	PST	
0000	7:00pm	6:00pm	5:00pm	4:00pm	
0100	8:00pm	7:00pm	6:00pm	5:00pm	
0200	9:00pm	8:00pm	7:00pm	6:00pm	
0300	10:00pm	9:00pm	8:00pm	7:00pm	
0400	11:00pm	10:00pm	9:00pm	8:00pm	
0500	12:00M	11:00pm	10:00pm	9:00pm	
0600	1:00am	12:00M	11:00pm	10:00pm	
0700	2:00am	1:00am	12:00M	11:00pm	
0800	3:00am	2:00am	1:00am	12:00M	
0900	4:00am	3:00am	2:00am	1:00am	
1000	5:00am	4:00am	3:00am	2:00am	
1100	6:00am	5:00am	4:00am	3:00am	
1200	7:00am	6:00am	5:00am	4:00am	
1300	8:00am	7:00am	6:00am	5:00am	
1400	9:00am	8:00am	7:00am	6:00am	
1500	10:00am	9:00am	8:00am	7:00am	
1600	11:00am	10:00am	9:00am	8:00am	
1700	12:00N	11:00am	10:00am	9:00am	
1800	1:00pm	12:00N	11:00am	10:00am	
1900	2:00pm	1:00pm	12:00N	11:00am	
2000	3:00pm	2:00pm	1:00pm	12:00N	
2100	4:00pm	3:00pm	2:00pm	1:00pm	
2200	5:00pm	4:00pm	3:00pm	2:00pm	
2300	6:00pm	5:00pm	4:00pm	3:00pm	

leans. So far, the programs have just been a relay of their local services, with the exception of commercials and other inserts. The station, calling itself the Rock of New Orleans, is scheduled from 1800-2200 GMT on 15420, 2200-2400 on 11915, 0000-0200 on 9725, 0200-0600 on 6155, and on Sundays 0600-1000 on 6115 and 1000-1100 on 9715.

Finally, the Federal Communications Commission received an application for a commercial shortwave station to operate from Florida. An application was also received from a religious broadcaster for an outlet in Alaska.

Normally, very little happens in this country relative to shortwave. But, with all the aforementioned, the United States has seen a flurry of news and activity over the past several months!

DX Library

The rudiments of a shortwave listening post require three things: a receiver, an antenna, and a copy of the current edition of the *World Radio TV Handbook*. The 1982 version runs nearly 600 pages and includes listings of the world's shortwave and medium wave stations, along with schedules, frequencies, addresses and so on.

Again this year, the book features a lengthy review of receivers by Larry Magne. While it has become a bit expensive over the years, now at \$16.50, it is still the basic book for the shortwave listener and DXer. It is available from Gilfer Associates, P.O. Box 239, Park Ridge, NJ 07656. It can also be found in some larger bookstores or ham radio outlets.

Club Focus

One of the major shortwave clubs in the

United States is SPEEDX, which issues 12 monthly bulletins per year covering listings of stations heard by continent, schedules, QSLs, utility loggings, and brief feature articles. Full membership is something which must be earned by regular reporting to the bulletin or other club work through which points towards full membership are awarded. When you start out, you are considered an associate member. Dues are \$16 per year, first class mail in North America. Sample copies may be obtained by writing SPEEDX, P.O. Box E, Lake Elsinore, CA 92530. Please include \$1 to cover costs.

The Grand Tour

* All times and days are Greenwich Mean Time

Afghanistan Although not one of the world's powerhouses, it is certainly possible to tune in broadcasts from this much-in-the-news country. Radio Afghanistan is scheduled in English from 1530-1600 on 9550 and 6230. Other frequencies used are 15077, 9665, and 7290. The local languages you'll hear are Pashto and Dari. Some of the transmitters used are actually in the Soviet Union.

Antarctica Radio Nacional Arcangel San Gabriel (RNASG for the lazy) has been providing good reception on 15476 in Spanish up to around 0100 sign off. It is easily identifiable by the use of a howling wind sound effect near sign-off time.

Argentina 11710 is a much-used frequency for Radio Argentina (Radiodifusion Argentina al Exterior) in a variety of languages including English, Spanish, Portuguese, Japanese, French, German, Italian, and so on, mostly in half hour blocks. From 2300 on, the station also operates on 9690. Occasionally, it relays other Argentine stations

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and services, such as Radio Belgrano, so don't be fooled.

Albania Radio Tirana supplies some fascinating listening from this sealed-off nation. 7065, 7090, 7120, and 7310 are 40 meter band outlets used, along with 9480. Try in local evenings.

Australia Early mornings local time are the best hours for catching the "down under" action from Radio Australia. Try 5995, 6060, 7260, 9505, 9580, 9640, and other frequencies in the 25, 19, 16, and 13 meter bands for some nice breakfast-time listening.

Brazil Radio Nacional (RadioBras) is a consistent source of delightful Brazilian rhythms. 11780 daytimes and evenings is often good, though it does suffer interference. Try also 17805 and 15290. The English segments include interesting pieces on life and events in this giant of South America.

Belgium Look for the Belgian Radio in English to North America at 1400 on 21525 and again at 2000 and 2200. It is also at 0030 on 9870.

Canada Radio Canada International (RCI) features an excellent listener's program, RCI SWL Digest, which is on the air Saturdays at 2135 on 17875, 17820, 15325, 15150, and 11945, Sundays at 1925 on 17785, 15325, 11905, and 5995, and on Mondays at 0105 on 11850 and 5960.

Cook Islands Here's one for the early birds. Radio Cook Islands signs on around 0900 on 11760, but don't expect a speaker-rattling signal.

Colombia A fairly new Colombian station is Radio Transamazonica, from the small city of San Jose del Guaviare on 6035 with generally good strength. Early morning will provide a better chance of interference-free reception. The broadcast is in Spanish only.

El Salvador The government station Radio Nacional El Salvador uses 9553 to sign off at about 0500. This country is currently the site and/or target of considerable clandestine station activity. Radio Venceremos can often be heard quite well on 6905 variable at 1200 and again at 0000, but the schedule often varies and you're just as likely to hear it at other hours too. Another station, Radio Farabundo Marti, is being heard on 6895, again variable, around 0100. Both say they are operated by the Farabundo Marti Liberation Front. Still a third clandestine, Radio Unidad, is reported to use 7000 at 0100 on Saturdays and Sundays but there have been few, if any, loggings of this one so far.

France Radio France International's daily program, "Paris Calling Africa," makes timely and informative listening, especially if you're interested in the dark continent. Try 1700-1800 on 6175, 11705, 15200, 15360, 15425, 17720, 17860, 21515, 21580, and 21620.

Grenada Radio Free Grenada in the West Indies will treat you to everything from local obituaries to swing music to Marxist propaganda. The signal strength has been much improved of late so perhaps they are now using the new Cuban-installed 75 kilowatt transmitter on 15045. Late afternoon and early evening checks will bring this one in.

Haiti The only shortwave activity from this impoverished nation is the religious broadcaster 4VEH. Try 11835 around 1900 for an English program.

Hungary Radio Budapest broadcasts in English to North America from 0200-0230 on 6000, 9585, 9835, 11910, 15220, and 17710. It can be heard again at 0300-0330 and 0400-0415 on the same frequencies.

Iran The Voice of the Islamic Republic of Iran uses two main frequencies, 15084 and 9022. Mostly in Farsi, but there are some English segments including 1930-0230.

Japan The general service of Radio Japan is scheduled on 17755 at the beginning of each hour from 0400; 0500 on 15325, as well as 0600 and 0700; at 0800, 0900, 1000, 1100, continuing on the hour through to 1800 on 9505; at 2000 and 2100, it is back on 15325; and for 2200 and 2300, it is back on 17755.

Libya Radio Jamahiriya, the Socialist People's Arab Jamahiriya Broadcasting Corporation, introduced an English program earlier this year. Signal strengths on 11815 at 2300 are good. Don't expect to hear much in the way of complimentary talk directed at the USA though! At one time the station was mailing complimentary copies of the Colonel's "little green book" and you might get one if you ask. Write the station at P.O. Box 333, Tripoli.

Luxembourg Radio Luxembourg is a favorite of pop music fans, especially in Europe. Some religious programs are carried on weekends. Try 15350 or 6090.

Mauritius The Mauritius Broadcasting Corporation is a fairly rare reception, but lately has been noted on 9710. Try around 0200 or later for this Indian Ocean station.

Mexico 11770 and 15430 are two frequencies employed by XERMX, Radio Mexico. Try from 0100 to 0300. It is mostly in Spanish, but they do air short, one-minute segments of English features from time to time.

Mongolia Ulan Bator Radio uses 6383, 7230, and 12070 at 1130-1215, 1400-1445, and 1445-1520 for English transmissions. Even with a few 250 kilowatt transmitters, this "top o' the world" station is difficult to receive with consistent clarity and strength.

Madagascar Radio Madagascar is reported to have opened a new 100 kilowatt transmitter on 7105. The frequency has been heard for testing but not for regular operations yet.

Mozambique Radio Mozambique can be found in Portuguese around 0300 on 9619. It offers fine African rhythms.

Nambia The Southwest Africa Broadcasting Corporation can be heard with some careful tuning when good African conditions exist. Try 4965 in mid to late afternoons in the east as well as late evening. More often than not Radio Santa Fe in Colombia will be an interference problem since it is on the same frequency.

Netherlands Radio Netherlands is another station that can lay claim to one of the best shortwave listener's programs around. Radio Netherlands Media Network is aired Thursdays at 0751 on 9770 and 9715; 0851 on 9715; 0949 on 15560, 11930,

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9895, 6045, and 5955; at 1349 on 17605, 11930, 9895, 6045, and 5955; at 1449 on 21480, 15560, and 11740; at 1849 on 15220 and 6020; Fridays at 0251 on 9590 and 6165 and at 0551 on 9590 and 6165.

New Zealand Try Radio New Zealand on 17705 after 0300. You can check alternate frequencies 15155 and 15485. The programs are relays of the domestic network service.

New Caledonia Radio Noumea is another "in the dead of the night" logging. Listen on 7170 after 0800, all in French.

Nicaragua The frequency for the official government station, La Voz de Nicaragua from Managua, is 5950. If your Spanish is good you should enjoy some revealing listening. The other side of the story comes from the anti-Sandinista clandestine station, Radio Quince de Septiembre which operates on 5565 up to about 0500.

Oman Radio Oman is providing good recep-

tion on 11890, 15105, and 9510 around 1500 onwards. It is nearly all in Arabic.

Papua/New Guinea One of the favorite countries of many listeners and DXers, the several shortwave stations of Papua/New Guinea make for fascinating listening. The best reception is generally from the National Broadcasting Commission's outlet at Port Moresby on 4890 from around 0800 or 0900 fade-in to an hour or so after local sunrise. A new one scheduled to have gone on the air around the first of the year is Radio Enga on 2410.

Peru There are numerous Peruvian targets to aim for, ranging from easy to extremely difficult. For starters, try Radio Victoria on 6020, Radio El Sol on 5970, and Radio Rioja on 5045. Best times are from sign on, usually around 1000 or 1030, with reception lasting an hour or so. Warning: too much Peruvian listening may turn you into a huayno music freak!

Poland Radio Warsaw was off the air for a period when martial law was imposed but has since returned. Scheduled in English at 1230, 1430, 1630, 1830, and 2030 on 11840, 9540, 9525, 7285, 7125, 6135, 6095, and 5995, and again at 2230 on 11840, 9540, 7285, 7125, 6135, and 5995. Each English transmission runs half an hour.

Qatar This brings us back to the Arab World for broadcasts from Doha on 15505 to about 2100 and then again around 0300.

Scotland About the only way to hear this country on shortwave broadcast is via the pirate station Weekend Music Radio on 6260 Sundays. For the past two DX seasons, the station has aired a series of tests for North America beginning at 0500. Regular scheduled sign on is not until 0800 or 0900.

South Africa Radio RSA is scheduled to North America from 0200-0257 on 9580, 11900, and 15325. It almost always puts in

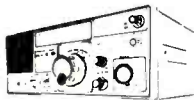
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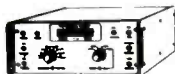
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CIRCLE 25 ON READER SERVICE CARD

May We Recommend

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).

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

CIRCLE 8 ON READER SERVICE CARD

International Broadcasting Bands

Frequency Range (kHz)	Meters	Notes
2,300 - 2,500	120	Tropical
3,200 - 3,400	90	Tropical
3,950 - 4,000	75	
4,750 - 5,060	60	Tropical
5,950 - 6,200	49	
7,100 - 7,300	41	
9,500 - 9,775	31	
11,700 - 11,975	25	
15,100 - 15,450	19	
17,700 - 17,900	16	
21,450 - 21,750	13	
25,600 - 26,100	11	

Note: A large number of stations operate on frequencies outside of the above ranges. Such operations are termed "out-of-band" or "oob." In addition, some stations are already beginning to occupy those frequency ranges designated for use beginning in the late 1980s by the World Administrative Radio Conference held in 1979. These ranges include: 9,775-9,900; 11,650-11,700; 11,975-12,050; 13,600-13,800; 15,450-15,600; 17,550-17,700; 21,750-21,850.

a strong signal so little digging is needed.

Switzerland Swiss Radio International can be heard in English to North America at 0145-0215 on 6135, 9725, 11715, and 15305, and again at 0430-0500 on 9725 and 11715.

Uganda The on-again, off-again, on-again Radio Uganda External Service may be on again. Try this one around 1430 on 9730 or around 0300 on 15325.

USSR Radio Moscow is everywhere. The Radio Moscow World Service operates on enough frequencies to make a listing impossible here. But you'll find them in every meter band from 49 on up. In addition, Radio Moscow's North American Service is on the air on a dozen or so frequencies from 2300 onwards.

Venezuela Another source for toe-tapping Latin rhythms. Try Radio Barquisimeto on 4990, Radio Juventud on 4900 or Radio Rumbos on 4970 local evenings and also from 1000 when most sign on. These are three of the most regular and strongest.

Closedown

Like the fellow who goes out and puts up his antenna while waiting for the truck to deliver his first shortwave receiver, these first couple of columns have been put together without your input. We hope you'll support *The Listening Post* with your notes on what you're hearing, schedules you receive from stations, photos of you and your "shack," copies of your best QSLs, your questions and comments. We can't promise to print everything, of course, but we nonetheless look forward to hearing from you.

Meantime, we've had to crib, and in so doing extend thanks and indebtedness to the following: The Listener's Notebook section of *Frendx*, which is the publication of the North American Shortwave Association, *SPEEDX*, Glenn Hauser's *Review of International Broadcasting*, *The World Radio TV Handbook*, and *Contact*, the monthly bulletin of the World DX Club, Great Britain.

Thanks for dropping by. See you next month!

FREE RADIO FOCUS

BY AL MUICK

ACTIVITIES OF UNDERGROUND BROADCASTERS

Welcome to the first edition of Free Radio Focus in Popular Communications Magazine. Allow me to introduce myself. I am Al Muick, your editor for this column. I have been involved with Free Radio (a/k/a "pirate" radio or unlicensed broadcasting) for about six years and I am also the President of the Free Radio Campaign—USA (more about that later).

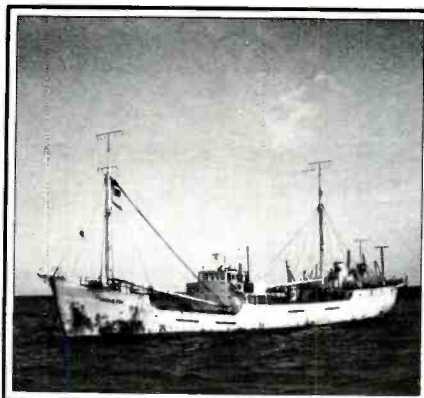
That is enough of an introduction; let's get right into the meat of the matter. Radio Confusion, who had achieved near worldwide fame during their widely heard, high-frequency broadcasts, has closed down operation due to their transmitter blowing up. They would like to purchase a new solid-state transmitter with high power. If anyone can help, please contact them through the FRC address at the end of this column.

I just got a blurb sheet in from CBN, the Clandestine Broadcasting Network, of Australia! They claim to be Australia's only pirate station and they operate on 7350 and 13995 kHz and soon plan to serve Melbourne and Sydney on high power FM. They broadcast every Sunday morning, and should you hear them, the address to write to is: CBN, 1 Browns Lane, North Sydney, New South Wales 2060, Australia.

Jolly Roger Radio was a US pirate that had operated on 6210 kHz as well as FM and BCB for 10 years before they got busted. They were offered a chance to apply for an FCC license, but because of federal regulations (in which only the very rich are granted a license) they could not achieve their goal. Now they have their sights set on Ireland. Ireland, due to a legal loophole in their constitution, allows the operation of such stations. Jolly Roger Radio is looking for backers to set up high-power BCB, FM and shortwave transmissions from Ireland. Interested backers should contact Bruce Quinn, Jolly Roger Radio, 1812 Crescent Drive, Springfield, OH 45504.

Radio Free Wave is being widely heard on or around 7425 kHz between 0100 and 0500 GMT on the weekends. Their audio quality is very good and their programming is well thought out and entertaining. Reports can be sent through the FRC-USA.

Radio North Star International tests on Saturdays and Sundays on 13787 kHz between 1900 and 0200 GMT. This is one of the best North American pirate stations with excellent programming and super audio quality. They can be reached via Scott McClellan, P.O. Box 982, Battle Creek, MI 49016. Another station (quite obviously run by hams) pops up occasionally in the 80 metre amateur band or on 6140 kHz. This is Radio Clandestine with DJ R.F. Burns who presents a British-accented programme that



The pirate ship M/V Magdalena (which has since sunk) of radio Mi-Amigo.



The old transmitter!

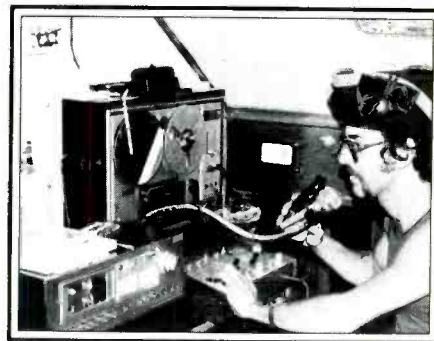


A candid shot of Crazy Roger at the controls of Radio Confusion.

is simply wild . . . if you can ever catch it. No address at present time.

KUTE has a broadcast scheduled sometime this summer (on a weekend—they didn't tell us which one) on 7400 kHz at 0600 GMT. The DJs Tom Stockcar and Gary Green have a moderate programme. No address yet.

On BCB we have Free Radio 1615 who are sporadically active on (you guessed it) 1615 kHz around 0500 GMT weekends. WGUT is on 1630 kHz with very slick production; they take phone calls. Their power is well under 100 watts output into a dipole



Another Radio Confusion staff member is Crazy Charlie. Here he is hard at work.

antenna. Pirate Radio New England is testing again on 1620 kHz on weekends around 0400 GMT. This station caused a lot of excitement last year when it reached halfway across the US during one of its broadcasts. Mr. Electricity, a PRN DJ, said it would return soon with regular transmissions.

Radio North, or Pirate Radio Central (they use both) is heard occasionally on 1617 kHz around 0500 Saturdays and Sundays with an oldies and phone-in format. Don't be too disappointed if you don't hear these BCB stations right away. Their coverage is usually limited to the northern east-coast areas, but with a good antenna and a good night, you may be able to hear them.

There is a special club for pirate radio listeners. It is called the Free Radio Campaign-USA. It acts as a mail drop for certain pirate stations and the FRC-USA publishes a newsletter every two months called *The Wavelength*, with up-to-the-minute schedules and in-depth discussions of Free Radio, including schematics for those technically-minded people. The cost for a sample copy of *The Wavelength* is \$2 and a one year subscription (6 issues) costs only \$7.50. All checks or money orders should be payable to Al Muick at this address: FRC-USA, 3rd Opns Bn USAFSA, CMR Box 1912, APO New York 09458.

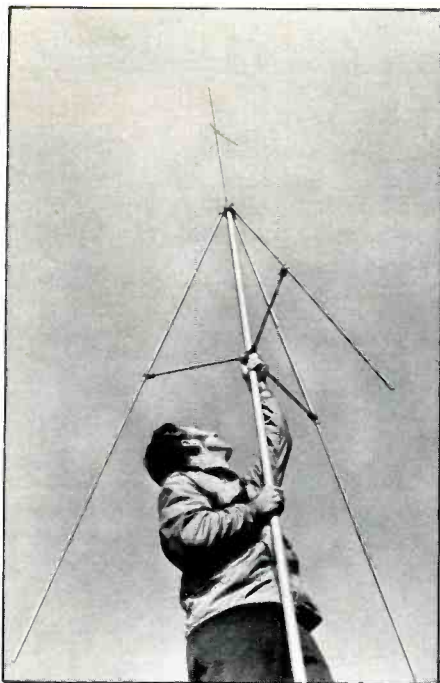
I hope you've enjoyed this first column of Free Radio Focus. In the next few columns I hope to run a few schematics and give some helpful hints on how to set up and successfully operate a pirate station.

Popular Communications Magazine does not necessarily support the ideas behind pirate radio, but, as a service to the reader, they include it because it is out there and you just might like it. I would like to thank POP'COMM for this opportunity to share with you the pleasure of pirate radio and most of all to you, the reader, for picking up this issue of POP'COMM and reading what I have to say. Until next time around, 73s and Fight For Free Radio!

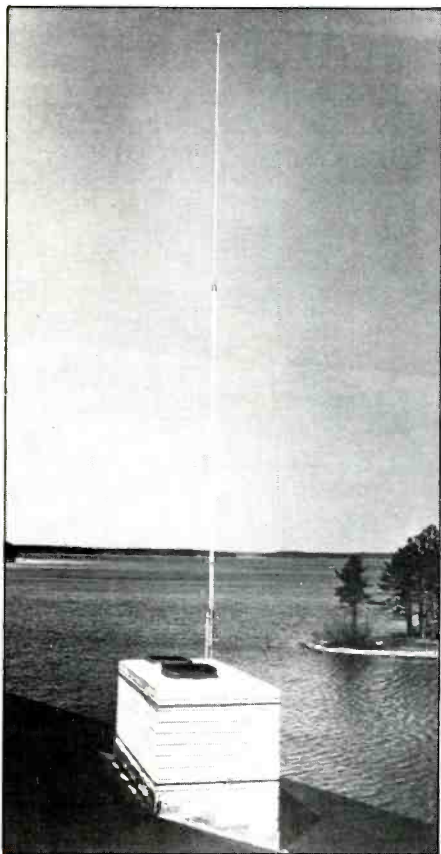
Low Band Scanner Antennas That Produce!

BY ALEX McCHORD, KWA7HX

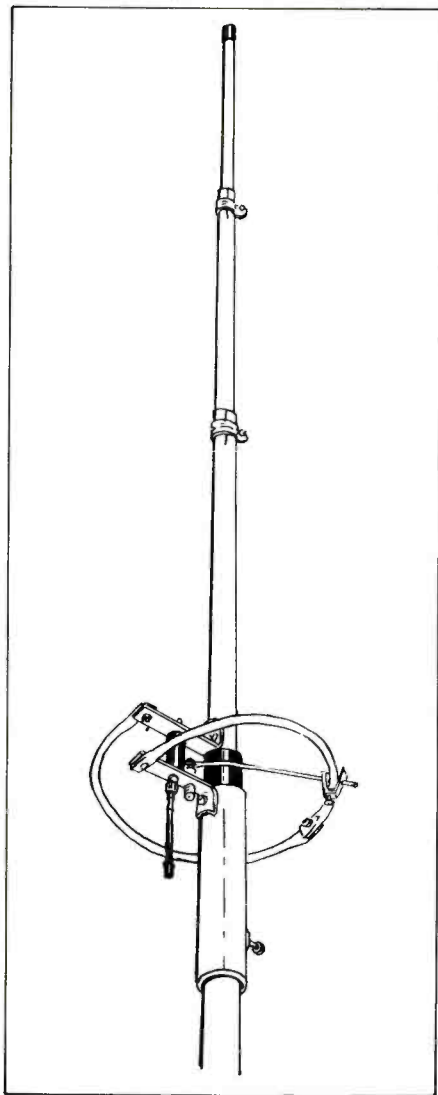




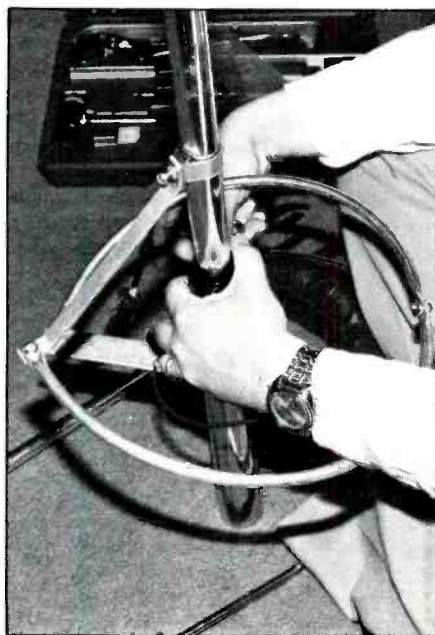
This type of 27 MHz omni-directional antenna is commonly known as a "Starduster," although it is produced under several model names by various manufacturers. If you already have one on your roof, you've probably never tried it on your scanner. On low band frequencies it's a real winner!



The famous Shakespeare "Big Stick," another 27 MHz omni-directional antenna, produces **big** incoming signals on low band frequencies when operated with a good scanner.



The 6 Meter Cushcraft AR-6 Ringo antenna which is designed for operation at 50 to 54 MHz. Does a fine job on the low band too!



Putting a Cushcraft Ringo together is jiffy work.

No doubt about it. One of my favorite bands is the 30 to 50 MHz scanner low band. It is absolutely unbelievable what you can hear on that band besides lots of local action. It buzzes away with skip from all over the world, with never a dull moment.

One of the problems with listening effectively to the low band is that most scanner antennas appear to be designed to offer maximum performance on the VHF high band (150 to 174 MHz) and the UHF bands (above 450 MHz). Low band reception on these antennas, while adequate for local reception, just doesn't do as well as you might otherwise expect to get with an antenna designed with these specific frequencies.

Of course, you could go out and purchase a commercial two-way antenna cut for about 40 MHz. It's a bit expensive, but will do a fine job for you.

Alternative Ideas

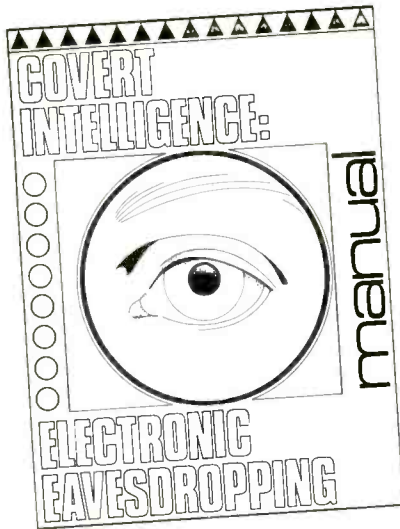
It is possible to achieve excellent reception with any of several low band antenna stunts I've come up with in my travels. More important, though, is that they are not only low band, but low cost.

Stunt #1. I have decided that since the 6 Meter Ham band is at the high frequency end of the low band, it might be worth a try to run a 6 Meter Ham antenna into the ol' scanner. Most of the antennas around for this band are yagi (or beam) types, but I wanted an omni-directional type. One designed for omni use is the Cushcraft AR-6 Ringo, an antenna that sells in the \$45 price range. This antenna was tried and I was quite satisfied with the results. In all instances, it outperformed all band scanner antennas when compared with their low band performance. The AR-6 goes together in about 45 minutes and erecting it is a snap—it just sits atop a couple of sections of TV masting nailed to the side of the garage.

Stunt #2. When I found that I was getting more use and enjoyment from my scanner than I was from my CB, I decided to see if my 27 MHz base station antenna would live life anew as a low-band scanner antenna. What-ho! It does a fine job, especially in the segment of the band below 40 MHz. Again, I was looking for omni-directional coverage rather than a beam's type of signal pattern. Luckily for me I'd already had an omni-directional type antenna installed. While not doing as well as the 6 Meter Ringo, had I tried this antenna on the scanner first I might have stuck with it since it has done such a nice job.

Stunt #3. This is the limited finances cheapie version on Stunt #2 and is suggested for those who don't have an existing CB antenna lying dormant. The idea has been

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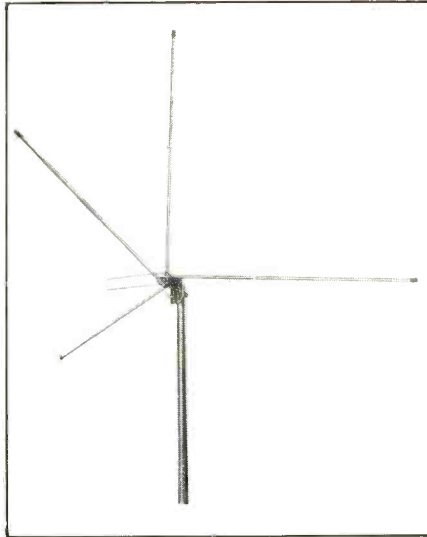
We also offer a wide range of professional publications on bugging, wiretapping, electronics surveillance, covert operations, espionage, and other tactical topics. Fact is, we're adding new titles all the time, so even if you saw our last exciting catalog, chances are you may not yet be aware of some of our newest available publications.

Our catalog is available at no cost—we know that you'll find it fascinating. We've been in the communications data business since 1967, and we know just what you like. You'll see!

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CIRCLE 66 ON READER SERVICE CARD



Here is a typical 27 MHz aluminum or steel ground plane antenna, although some have 4 radials and some have drooping radials. Despite its variations, it can be trimmed down into a fine low band scanner antenna.

tried and is recommended. The trick is to shop around for a low-cost economy aluminum 27 MHz CB ground plane antenna. These can be found at most electronics shops without much difficulty. I hesitate to suggest a specific price since I have seen them for as little as \$10, but they usually go for a bit more in stores. Anyway, buy a cheap one, and make sure it is a 1/4-wave ground plane, the old reliable kind, and not the fancy 3/8-wave or collinear types.

The trick is to cut the elements down a bit to make it more resonant on the low band than it was when it was designed for 27 MHz use. By taking a hacksaw to the antenna and chopping the vertical radiator down to 72 inches, and each of the 4 radials down to 84 1/2 inches, you're going to have one really prime low band omni-directional ground plane! If the antenna you get has hollow tubing as its elements, be sure to pinch the open ends securely shut with pliers or a crimping tool (a good blow with a hammer while the tubing is lying on a hard surface will also do the job).

The antenna is quite broadband and will perform well from 30 to 50 MHz. However, if you have a specific frequency which you want to concentrate upon you might wish to try cutting the antenna for top resonance on a specific segment of the band. This will in no way ruin it for coverage of the entire band, but it could offer maximum reception on the segment of frequencies for

which it has been tweaked. Here is a table of suggested "cuts" for doing this:

Freq. (MHz)	Whip	Radials
30 to 31.5	96"	96"
31.5 to 34	90"	96"
34 to 36.5	84 1/2"	84 1/2"
36.5 to 39	79"	84 1/2"
39 to 42	72"	84 1/2"
42 to 44	68"	84 1/2"
44 to 48	62"	84 1/2"
48 to 50	57"	84 1/2"

I can't think of a less expensive way of buying an antenna for this band and achieving really excellent results. No matching is needed as the antenna is designed for 52-ohm coaxial cable and it hooks directly to any scanner—no fuss, no muss. For those of you into the 49 MHz no-license hobby band (FCC Part 15), I might suggest this as a good receiving antenna. It can really pull 'em in on 49.86 MHz.

Try it, you'll like it!



The carry-around portion of a cordless telephone installation usually operates around 49.86 MHz. With a good low band receiving antenna on your scanner you'll have the ability to (heh heh) listen in on any of the neighbors' telephone calls if they use a cordless phone.

The Satellite Picture

Inside The World of TVRO Earth Stations

BY DAVE FEDRIC, NATIONAL MICROTECH, INC.

Background

Since man erected the first TV antenna, he has been confronted with the problem of broadcasting TV signals over the horizon. Due to the earth's curvature, "line of sight" transmission over 50 miles deteriorates rapidly. This prompted the free thinkers to say, "Why not put a big antenna in the sky?" In 1958, with Russia's Sputnik paving the way and Eisenhower's voice heard round the world on *Score*, communication satellites became a reality.

Since the mid 1960s, INTELSAT I and MOINIYA I have been used for international communications. Commercial application in America was clogged with FCC regulations requiring mandatory licenses, pushing the cost of the systems sky-high. Due to 1976 relaxation on the antenna size requirements for receive only units, the cost has changed drastically. The 1976 system's cost of \$80,000 dropped to \$30,000 by 1977, and plunged to \$15,000 by 1979.

With the oncome of the 1980s, earth stations have been reduced even further, dropping to less than \$12,000 in some instances.

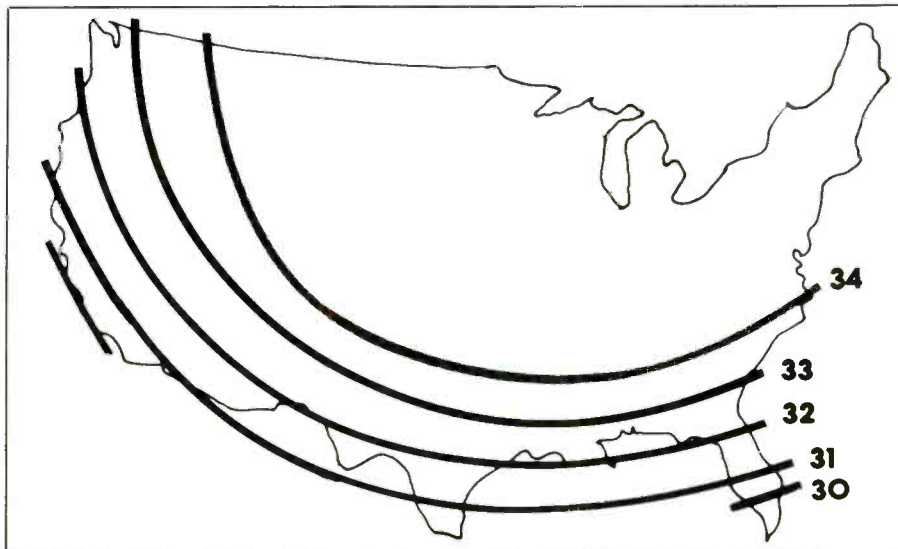
How The System Works

A large transmitter, called an uplink, sends a signal that is received by the intended satellite and converts it to the 3.7 to 4.2 GHz range. The signals are transmitted using five watts of power to a broad area covering most of North America. Some areas receive stronger signals than others. You can find the signal strength in your area by referring to the map. The higher the number, the stronger the reception in your area. This map is for SatCom I, the weakest of the communication satellites.

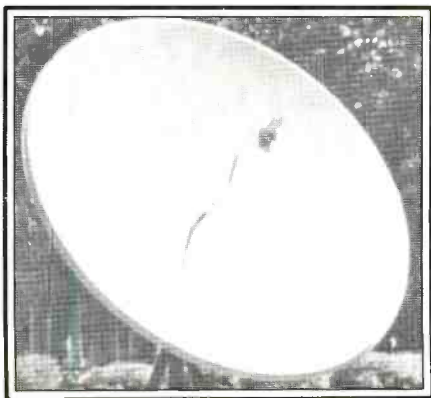
Downlink, Satellite receiving station, Earth Station, and TVRO are common names used to describe the systems used to receive these signals. They consist of three main building blocks. We will examine each of these components, and the additional accessories that are needed to operate the downlink.

The Antenna

The antenna simply acts as a reflective surface to focus microwaves at a central point (focal point) for collection by a feed-horn. The antenna is often referred to as a dish, since it does look very much like a giant soup bowl. Sizes often range from 10 to 20 feet in diameter. A quality 10 foot antenna



The Apollo™ X9 antenna can be purchased through a National Microtech distributor or dealer. The X9 has proven to produce excellent pictures in areas that usually require at least a 10' round dish.



usually will produce excellent pictures in most of the United States.

There are three general types of antennas in use. The cheapest is the wire mesh spherical antenna. These antennas are suitable for the hobbyist but the focal point is usually 12 to 15 feet from the dish and offers little versatility in changing from a Western satellite to an Eastern satellite. Another drawback is the necessity of constantly adjusting the feed assembly since it stands alone and is not attached to the dish. These antennas were popular almost a year ago, but since are all but obsolete.

The most prevalent antennas in the market are parabolic dishes. These usually consist of either solid aluminum panels or fiberglass with an inner aluminum surface. The LNA assembly supporting the feed horn mounts similarly to a tripod on the face of the dish. This is pictured below. These parabolic antennas, with some exceptions, operate easily and give a high quality picture.

The Low Noise Amplifier

Referred to as LNA, this is your "outside electronics." On a parabolic antenna this is located at the focal point, around 4 feet from the face of the dish. Attached to a feed horn, the LNA picks up the weak microwave signal and amplifies it to a signal strong enough to be utilized by the receiver. LNAs, varying in noise ratio, usually are rated 80°, 100°, 120°, and 150°. The 80° run as high as \$5,000, and the price drops as the number increases. We recommend 120° LNAs in most of the United States. Since the LNA is mounted outside, the electronics inside must be carefully sealed to avoid moisture

entering the system. This is no place to try to save money on your system, since high quality and good workmanship can prevent problems developing in your system over the years.

One LNA can power your earth station if you use it in conjunction with a rotor assembly. Vertical and horizontal polarities are used on the satellite transponder to prevent neighboring stations' interference. To avoid using 2 LNAs, you must be able to turn your LNA from a vertical to a horizontal position. The rotor assembly is usually provided as part of the antenna, and is certainly an economical way to provide access to all the different channels.

The Receiver

The receiver downconverts the 3.7 to 4.2 GHz signals to a lower frequency and enables the user to tune it, either by a local control on the receiver, or by remote control. Numerous types of receivers are found on the market, and this will make or break your system. The "inside electronics" can come in more sizes and types than any other part of your system.

The public has been taken advantage of many times here, with junk receivers that simply don't work, or that will work very poorly. The receiver, more than any other part of your system, will determine the quality of your picture. A good quality receiver will produce excellent pictures over the years, and is very simple for anyone to operate. Remote capability is an important consideration, since ease of operation will become more and more important to the consumer as more programs go on the satellites. A tuner on the receiver enables you to change from one transponder, or channel, to another while your TV channel selector is locked in on channel 3 or channel 4. This is accomplished by either connecting your receiver to a VCR or to a modulator.

The Modulator

Usually, the home user will connect his receiver to a VCR. The video feed from the receiver results in excellent quality video tapes. If no VCR is available, a modulator is connected to the receiver and either channel 3 or channel 4 is used to feed your television. An RF converter in the modulator simply changes the video and audio feed to a signal your television will accept. Modulators are usually available for less than \$200.

The Cable And Connectors

Obviously you must get your microwave signal from your antenna to your receiver. This is accomplished using a 4 GHz cable.

Connectors for 4 GHz cable are hard to find and usually expensive. This is a topic you should thoroughly discuss with your supplier, since acquiring the 4 GHz cable and connectors from an independent source could prove to be a problem.

Most systems require simple cable for the LNA power supply as well as the rotor assembly. However, new type receivers and

LNAs use through-the-line power supply with a built in DC converter. This will make for much easier installation and hookup.

The Feedhorn

Feedhorns come in square, rectangular, or round shapes, and are a very crucial part of your Earth Station. The new scaler feedhorns, though, seem to produce the best quality picture.

The feedhorn mounts to your LNA, and looks directly at the reflective dish, picking up the focused microwave signals. When you have your Earth Station in place and working, your feedhorn can be moved in or out to fine-tune the picture.

The Installation

Once all your components are on hand, you are ready to begin your installation. Your antenna and mount should be assembled first, and placed where you want it located. Most parts of the United States require mounting on the South or West side of the house, since you can't shoot the satellite with the face of your dish obstructed. Power lines are no problem, but large trees can tend to block the face of the dish and should be avoided.

Once the polar mount is placed at true North-South alignment with the highest part on the pole facing north, you should be ready to go. Place the feedhorn on the LNA, connect the cables to your receiver, and hook the receiver up to the VCR attached to the TV. When the power is on, tune your VCR to camera input and make sure your TV is on channel 3 or 4. By simply adjusting the face of the dish, you should hit a satellite immediately. When you start hitting satellites, an adjustment may have to be made to access the entire band. Move your base legs an inch or so at a time until the dish goes through the entire band, with signals received on all the satellites.

Once this is accomplished, I recommend a concrete pad 5 feet by 5 feet, that is 4 inches thick, to mount the dish on. This gives you a permanent installation over the years that should provide ease in navigation, and your satellites can be marked off and aligned.

Program Availability

A. SATCOM I (Basic Cable Satellite)

1. NICKELODEON—Children's programming running all day and into the night. ARTS, MTV.
2. PTL—24 hour a day Christian programming. Talk shows and specials from all over the world.
3. WGN—Chicago's independent television station. Cubs' baseball, Bulls' basketball, and one of the world's greatest old movie libraries are featured.
5. THE MOVIE CHANNEL—24 hour a day uncut movies with no commercials.
6. WTBS—Atlanta's superstation featuring Braves' baseball, Hawks' basketball, and a variety of movies and golden oldies.

7. ESPN—24 hour a day sports network, with taped replays during the late night and early morning.

8. CBN—Christian programming from over 60 sources presented 24 hours a day.

9. USA NETWORK—Madison Square Garden sports, Thursday night baseball double-header, Monday NHL, NCAA Basketball. BLACK ENTERTAINMENT NETWORK—Quality Black programming. C-SPAN—Daily House of Representatives.

10. SHOWTIME(W)—Movies, Broadway plays, specials, night club acts, and a variety of special programs.

11. MTV—Music Channel.

12. SHOWTIME(E)—3 hours ahead of channel 10.

13. HBO(W)—Home Box Office, the pioneer in pay TV, offers movies and other special programming.

14. CNN—Cable News Network, 24 hour a day news broadcasts from around the world. Includes sports, weather, world news, and special interviews.

16. Showtime spare, ACSN/Compact Video.

17. WOR—Mets' baseball, NY sports events, movies, and golden era TV shows high-light New York's independent superstation.

18. GALAVISION—Spanish programming featuring sports and movies from Mexico and Latin America.

19. SPOTLIGHT—Movies.

20. CINEMAX(E)—All movies with no commercials.

21. HTN—Home Theatre Network featuring family movies.

22. MSN—Modern Satellite Network featuring consumer oriented programs. HBO(W) spare.

23. CINEMAX(W)—Movies 3 hours later than channel 20.

24. HBO(E)—Movies.

B. COMSTAR 4

Occasional sports feed.

C. WESTAR II

Sports and news feeds.

D. SATCOM II

Network programming.

E. ANIK II & III

Co-located Canadian satellites offering many channels of American and Canadian programming.

F. ANIK B

Canadian satellite.

G. WESTAR I

Network programming, Public Broadcasting, movies, and sporting events.

H. COMSTAR I & II

Full spectrum of programming from cultural programming on Bravo; Network programming; adult oriented material on Escapade; Christian programming on NCN & TBN.

I. WESTAR III

Network programming; Private Screenings (adult oriented), Cable News Network, and a large number of sporting events.

J. COMSTAR III

Telephone and Messages, Business Communications.

Coming Soon!

CINEMERICA
BBC IN AMERICA
VIDEO SPORTS NETWORK
TELEFRANCE
BRAVO
AND MANY MORE!

Legality

Since the FCC de-regulated the mandatory license requirement in October of 1979, the hardware is no longer the legal issue. Programming, however, is intended for either direct communication or for cable use in most cases. Even though you will be able to get permission to watch some of the programming at no charge, other programs will grant permission only if a fee is paid. Even if you are willing to pay, other programmers will not accept payment, and will not grant you permission to watch their signals. This is an area of the law that can be interpreted many different ways. Enforcing what the individual watches is almost impossible, and hopefully will be resolved in the near future with payment being accepted by all programmers. Just as legal controversy surrounds the use of VCR recording, the same controversy will continue to haunt the Earth station owners until clear interpretations are in effect.

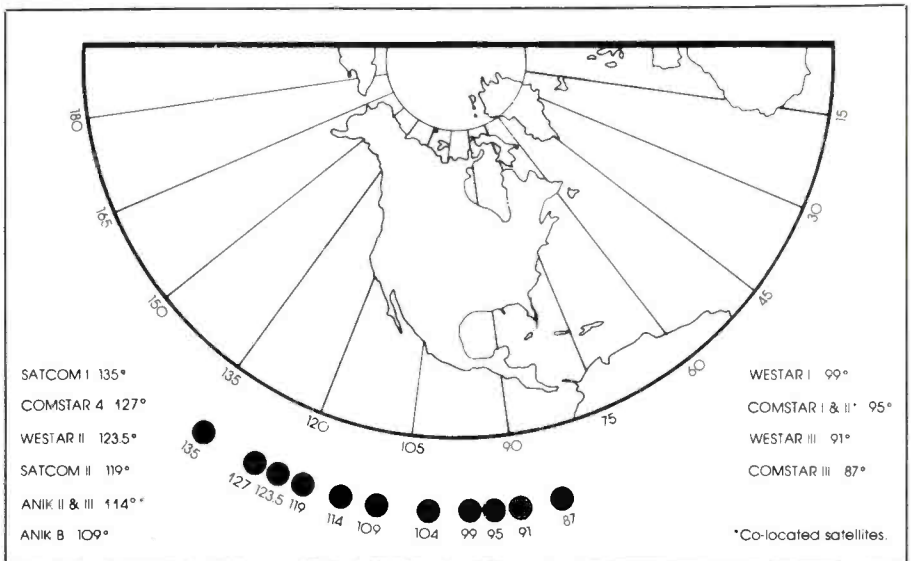
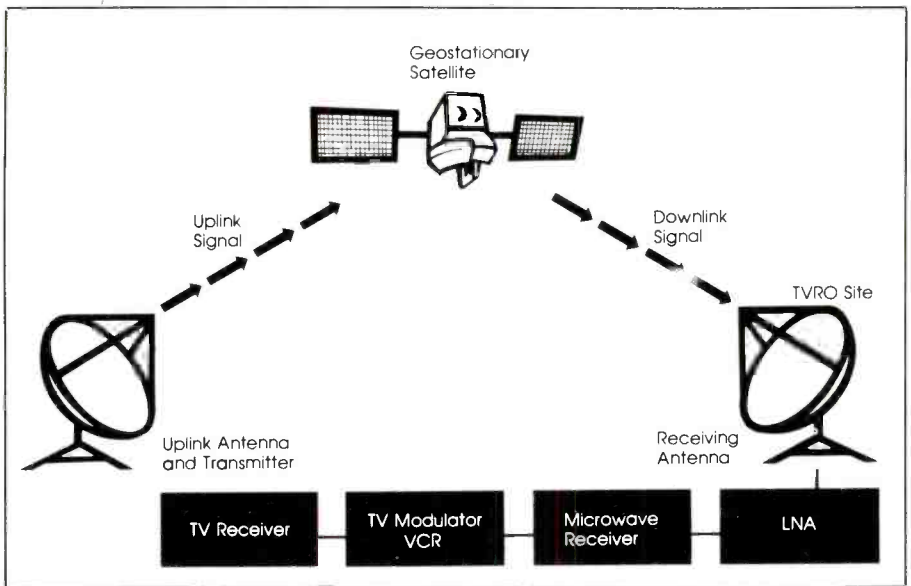
In the case of motels, apartments, and hospitals, I feel there is no doubt that programming fees should be paid. When programming is sold to individuals for a profit, the programmer has solid grounds for civil litigation if he does not receive payment.

Future Communication Satellites

Probably by 1987 to 1990, we will see a new generation of communication satellites. Operating in the 12 GHz range, these satellites will be more powerful, and direct broadcast satellites will be a reality. These satellites, which will require only a 2 foot dish, will enable people nationwide to receive several stations on a system costing less than \$500. One problem with this system will probably be that the programming will be limited to 3 or 4 channels.

Technical and legal process should result in a new era of communication. However, the commercial band of satellites will continue to be used by cable operators and television networks to transmit signals requiring at least 9 foot antennas for reception. We could very probably have over 150 channels available on the 4-GHz commercial satellites by this time next year. New programming is going up on the birds every month, and I foresee hundreds of programmers using the satellites in the years to come.

Excerpted from Dave Fedric's booklet "The Ultimate Satellite TV Handbook."



Common Questions

Q. Can my neighbor and I share an earth station?

A. You could run a small RG 59 cable from your TV to his, but he would have to watch whatever station you selected.

Q. Can I use a smaller antenna?

A. Anything less than 10 feet simply does not give a watchable picture, with few exceptions. A more expensive LNA and a top line receiver can produce good pictures at 8 feet, but the system is more expensive as a whole. In most cases you either have a good picture, or you don't have a picture at all.

Q. Can I use an earth station to tape on a VCR?

A. The picture quality is excellent, and produces a good quality copy.

Q. Do trees and houses block the signals?

A. Yes, even though in most cases a few branches won't matter.

Q. Are the systems hard to install?

A. No, they simply require some heavy work, and a lot of assembly.

Q. What traps can I fall into?

A. The worst is buying products from a firm

that simply cannot deliver. Always check with the company's bank and the local Chamber of Commerce or Better Business Bureau before buying.

Q. I have 5 TVs in my home. Can I hook them all up?

A. Yes. You can do this very inexpensively, usually for less than 20¢ a foot for RG 59 cable.

Q. If I move, can I move my earth station?

A. Sure, by simply taking it down and reassembling it in your new location.

Q. How will I know what's on and when?

A. There is at least one publication that lists all 19 channels of Satcom I programs in a monthly edition.

Q. What kind of reception can I expect?

A. Most channels are better than off-air broadcasts in your home town.

Q. I live in southern Florida. How big an antenna do I need?

A. I recommend a 16 foot antenna for extreme regions of the country.

Q. How many channels can you pick up?

A. Between 40 and 60 on a given day, depending on how many live sporting events are being played. Usually there are over 50 movies on during a 24 hour period, and most of your live professional sports are available.

Q. Why is a single piece antenna more efficient than a sectionalized antenna?

A. The single piece antenna can be engineered to a closer surface tolerance than a sectionalized antenna because it requires no seams.

Q. What are the export possibilities in the earth station market?

A. I feel there is an excellent potential in the export market, and will be glad to discuss it with prospective clients.

Q. What about local microwave interference?

A. All of the larger cities have some microwave interference from terrestrial microwave stations. This is something your supplier will advise you on.

Q. Can you ship these systems easily?

A. Most companies have systems that are knock-down and easy to ship and assemble.

Q. What kind of warranty can I expect?

A. 1 year is standard.

Q. What if something goes wrong with my system?

A. Most manufacturers will give you one or

two days turnaround on repair. Since there are only 2 pieces of electronics, you need simply disconnect them, and return them to your dealer.

Q. How hard is it to find the satellites?

A. If instructions are good, there should be no problem. Simply call your supplier if problems arise.

Q. Are there any problems with the sound?

A. You should buy a receiver that has both 6.2 and 6.8 audio sub-carriers. This enables you to have good audio on almost all channels. National Microtech now incorporates tunable audio into our receivers.

Q. Can the antenna go on the roof?

A. Yes, but a ground mount is much easier to install.

Q. Do you think they will scramble the signals?

A. The technology is there, but economically it is not a practical deterrent because of all of the small cable systems. Even if a few channels are scrambled, so what? You'll never starve for programming with an Earth Station!

Q. How much space is required?

A. Only about a 12 foot by 12 foot area with a view of the southern sky.

Q. Does the weather affect my reception?

A. Weather affects it very little.

Q. What about further legislation?

A. This could really hurt, so make your feelings known to your Congressman at once.

Q. Can I build my own system inexpensively?

A. We have a lot of electronics buffs call us that have built their own systems. They have spent a great deal of money and still are not satisfied with their reception and their system's reliability.

Q. How close should the antenna be to the TV?

A. 100 feet of Microtech cable is acceptable in almost all cases, however longer distances can be engineered at extra cost.

Q. Does lightning pose a problem?

A. Your antenna will probably only sit about 12 feet high, and this is not a real problem. We have received no reports on damages by lightning.

Q. Should I buy a spherical or a parabolic antenna?

A. The spherical is fine for Satcom I, but if you want the whole band of satellites, the parabolic is much more convenient to operate. Remember, there will be hundreds of channels available to the parabolic owner within a short time.

Q. What if I don't have a VCR?

A. You can buy a modulator for less than \$100.

Q. Can I still watch regular TV if I get an earth station?

A. Of course.

Q. Can I get a remote for the antenna?

A. Remote control antenna positioners are available for less than \$1000.

Twelve times each year 64,128 active Amateurs get a taste of a different kind of Amateur Radio magazine . . . one that they read cover to cover . . . and they enjoy. It's more than just a magazine. It's an institution.



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PRODUCTS

REVIEW OF NEW AND INTERESTING PRODUCTS



Headset For High-Noise Environments

Controlonics Corporation has announced a new Unex radio headset to be used 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 it rejects various 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. All are designed to deliver superior communications in maximum user comfort.

For more information on the Unex RHS-8A dual muff radio headset, contact UNEX, Division of Controlonics Corporation, Five Liberty Way, Westford, MA 01886, or circle number 103 on the reader service card.

Full-Line Professional Catalog

The Antenna Specialists Co. has just released a new, full-line professional catalog of base and mobile antennas and accessories for the land mobile industry. More than 300 products are described, covering

the entire spectrum from low band to 800 MHz, by far the broadest antenna selection available, according to Bob Treanor, Director of Marketing. Some major new products include the company's revolutionary DURA-FLEX™ elastomer shock mount antenna line and the newly acquired line of Avanti no-ground plane, on-glass antennas.

A wealth of special technical data and charts make this an invaluable tool for anyone serving the land mobile market. The catalog is written in an easy-to-follow cross-reference format to simplify selection for precise applications.

Individuals, dealers, and distributors can obtain this catalog by contacting Marketing Department, The Antenna Specialists Co., 12435 Euclid Avenue, Cleveland, OH 44106, or by circling number 106 on the reader service card.



New Communications Transceiver

Trio-Kenwood has announced a new top-of-the-line model TS-930S all solid-state high-frequency transceiver. Designed to cover all amateur bands from 160 through 10 meters, the TS-930S also incorporates a 150 kHz to 30 MHz general-coverage receiver with an excellent dynamic range.

Among the more interesting features to be found on this model are an automatic antenna tuner (built-in), dual digital VFO's 8 memory channels, dual-mode noise blanker, IF notch filter, fluorescent tube display, RF-type speech processor, RF step attenuator, 100 kHz marker, and voice controlled



operation. Also incorporated is special circuitry that allows operator adjustment of the IF passband characteristics for best rejection of interfering signals, as well as a tunable audio filter for CW reception. Power input is 250W PEP SSB, 250W DC on CW, 140W DC on FSK, and 80W DC on AM. The built-in power supply operates on 120, 220, or 240 VAC only.

For further information, contact Trio-Kenwood Communications, P.O. Box 7065, Compton, CA 90224, or circle number 108 on the reader service card.



Road Patrol XK Radar Detector

Radio Shack offers a full-feature dual-band XK radar detector at a remarkably low price. The new Micronta® Road Patrol XK Radar Detector (22-1605) is available at Radio Shack stores and participating dealers.

The Micronta Road Patrol XK Radar Detector responds to all types of X- and K-band radar (the only bands at which traffic speed surveillance equipment is authorized to operate), moving and stationary, continuous wave (CW), and pulse. Both an audible warning signal and a visual warning light alert the motorist when a radar signal is detected. A range-finder circuit increases the flashing rate of the unit's "Caution" light and warning buzzer as the radar signal becomes stronger. Sensitivity is electronically controlled to maintain peak performance and eliminate tricky manual adjustments.

The Micronta Road Patrol XK Radar Detector plugs into a 12 volt cigarette lighter outlet, and can easily be mounted on the dashboard or windshield; a mounting stand, instructions, and adhesive pads are included. The unit is enclosed in a non-glare, plastic housing measuring $4\frac{3}{8}'' \times 3\frac{3}{32}'' \times 1\frac{13}{16}''$. A green LED power-on indicator light confirms a valid power connection. For more information, contact Tandy Corp./Radio Shack, 1800 One Tandy Center, Fort Worth, TX 76102, or circle number 101 on the reader service card.



Mobile Amplifier/Charger

Regency Communications has announced the MA-357 mobile amplifier/charger. Available for both VHF and UHF, the MA-357 fits easily into a car to turn a hand-held radio into a mobile radio. The unit is capable of boosting the power output of a hand-held radio and recharging its battery. The MA-357 features fast or trickle charge rate, transmit indicator light, external antenna jack, and a battery elimination mode.

For more information, contact Regency Communications, 1227 South Patrick Drive, Satellite Beach, FL 32937, or circle number 104 on the reader service card.

New Land Mobile Radios

Standard Communications has announced four new radios. The Model 768L is a low-cost, high-performance UHF transceiver designed specifically for operation in the frequency range of 406-420 MHz and 450-512 MHz. The 768L features dual channel flexibility, rugged steel chassis, and variable RF power output ranging from a guaranteed maximum of 15 watts, down to 2 watts for low-power industrial applications. Several options are available, including external speakers, continuous-tone coded squelch, and digital private-channel tone devices.

Extremely compact, the 768L is suitable for land mobile or base applications. The unit measures $2\frac{5}{8}'' \times 7'' \times 11\frac{1}{4}''$ and weighs $4\frac{1}{2}$ pounds. It is expected to appeal to market segments which could not previously afford a two-way business radio system, according to Standard.

Standard has announced two entries—VHF and UHF frequency band models—designed for mobile telephone operation in the Radio Common Carrier (RCC) and Bell system frequency bands. The units, Model 766R VHF and 866R UHF, feature a compact transceiver and remote cradle-mount telephone handset.

To assure immediate access to mobile telephone frequencies, especially in major metropolitan areas, the 766R and 866R offer 16-channel capability. Frequencies may be programmed in the field through use of advanced synthesized circuitry developed by Standard. The high RF power output of both models—35 watts for the 766R, 40 watts for the 866R—provide excellent coverage throughout projected operating areas.

The cradle-mount telephone control head offers the convenience of a standard telephone. Features include lighted touchpad, cancel call and last number recall functions, internal ringer and vehicle horn output, and an electronic lock accessible only through use of a confidential subscriber code.

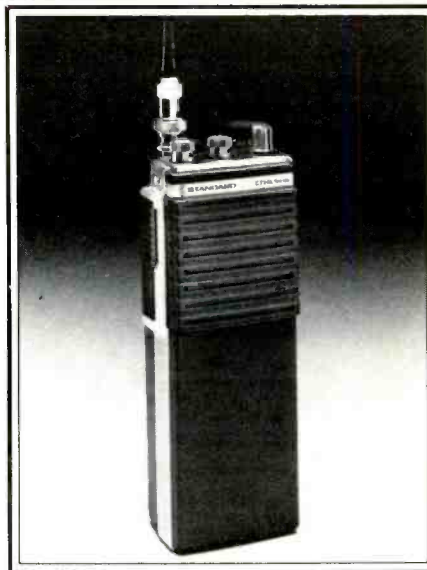
There are various options available for the 766R/866R. These include external speakers, time-out timer for limiting transmission time, and tone devices such as code squelch, two-tone sequential decoder, and telephone ringer.

The 766R/866R transceiver measures $2\frac{3}{4}'' \times 7\frac{1}{4}'' \times 10\frac{5}{8}''$ and weighs 8 $\frac{3}{8}$ pounds. The units may be mounted in any vehicle, including new compacts, by using the Universal Mounting Kit option.

Two new models of Standard's popular 734L UHF handheld also were introduced. The 734L is now offered in two power options: 5 watts for longer range applications, and 2 watts for low-power industrial use.

The 734L features a special design hybrid microcircuit, diecast aluminum frame with weather resistant Lexan[®] case. At 24 oz., the 734L offers advanced features and performance previously available only on larger, heavier handhelds. The 734L offers up to 6-channel capability, and options including chargers for the unit's internal rapid-charge battery pack, continuous-tone coded squelch, external speaker/microphone, and several carrying cases and antennas.

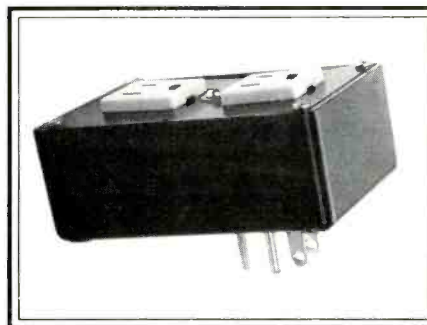
Suggested list prices for the 734L, according to Standard, are \$629 for the 2-watt model and \$699 for the 5-watt model. The



734L measures $6\frac{1}{2}'' \times 2\frac{1}{2}'' \times 1\frac{3}{4}''$ and weighs 24 ounces.

Standard's land mobile products carry a one-year limited warranty for parts, six months for labor from date of purchase. The warranty is honored by Standard's worldwide network of authorized sales and service centers.

More information on Standard Communications two-way business radio systems may be obtained from authorized sales and service centers, or by contacting Standard Communications, P.O. Box 92151, Los Angeles, CA 90009, or circle number 102 on the reader service card.



Wall Socket Pollution Control

Electrical pollution drives communications equipment bananas! Power-line electrical noise, hash, and spikes are often the cause of erratic transmission or poor reception. In addition, severe spikes from lightning or heavy machinery may damage expensive hardware.

Electronic Specialists' recently announced Direct Plug Super Filter and Suppressor, featuring a dual-pi filter to control electrical pollution. A 6500 ampere spike/surge suppressor protects equipment from damage caused by lightning or heavy machinery spikes.

For more information, contact Electronic Specialists, Inc., 171 S. Main St., Box 389, Natick, MA 01760, or circle number 115 on the reader service card.



Frequency Data

If you're a scanner or communications receiver user, you know how important it is to have comprehensive and easy-to-use frequency data available to meet the many challenges you come upon while you are pursuing this exciting endeavor. One of the best sources we know of for all sorts of unique, interesting and exciting frequency information is CRB Research.

Long well-known publishers of their own frequency directories (including *The Top Secret Registry of U.S. Government Radio Frequencies* and *Air-Scan Directory of Aeronautical Radio Frequencies*, both by Tom Kneitel, K2AES), CRB Research now offers a great many communications-related books and frequency registries from other publishers, all at popular prices. CRB Research has also considerably expanded their own publishing efforts and now offers a well-rounded assortment of unusual books covering various aspects of bugging, wire-tapping, undercover communications, and surveillance. Frequency registries now offered by CRB Research cover all bands from low frequencies through UHF—in other words, the works!

CRB Research will be happy to send you information on their available (and most unusual) communications registries and publications. Their catalog is sent upon request and at no cost. A catalog may be requested from CRB Research, P.O. Box 56-PC, Commack, NY 11725. If you're into scanners or communications receivers, CRB Research has the information you need to have to get the most from your equipment. And if you're into undercover and security communications, their selection of publications on these topics is unmatched!

Onan Corporation Diesel Generator Set

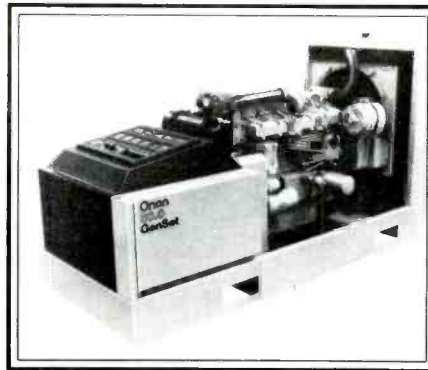
Onan Corporation has introduced the new L Series of Diesel Generator Sets. Designed to generate prime or standby power, Onan L generator sets feature the newly developed Onan L Series Engines. The engines are the result of Onan's \$100 million commitment in engineering, high-technology equipment, and technical research facilities. Designed for industrial use, the engines feature fuel efficiency, low emissions, light weight, and compact size.

Designed and manufactured in the

United States, the Onan generator sets have one side serviceability. They are available at 20 and 30 kW (60 Hz) as well as 16 and 25 kW (50 Hz).

The Onan engines are "Torque Matched" with state-of-the-art revolving-field, brushless alternators. Onan's unique "Torque Matched" system prevents engine stall during momentary overloads.

To ensure reliability and superior performance, the voltage regulation system is completely solid state. Heavy-duty cooling systems (50C/122 F) allow the generator sets to operate in severe environments.



Standard on the generator sets is a skid support chassis with three-point mounting and vibration isolators between engine-alternator and skid. For added convenience, the mounted control panel is adjustable and can face the rear of the unit or either side.

The generator sets are equipped with a solid-state engine monitor having a fault light and common alarm contact. They indicate engine shutdown for overcrank, overspeed, high coolant temperature, or low oil pressure.

Alternators available on the sets include a single-phase or a reconnectable 12-Lead, three-phase unit. Both are revolving-field, brushless units with drip-proof construction.

To ensure reliability, the complete generator sets are covered by Onan's unique Prototype Test Supported (PTS) program. Through the program, prototypes were tested to potentially destructive limits beyond those to which production models would normally be tested. The Onan L Generator Sets were allowed to go into production only after the prototypes survived without damage endurance testing, as well as potentially destructive tests such as short circuits, surge loads up to three or four times rated, nonlinear, and commutating loads.

Optional accessories include an expanded monitoring system, AC ammeter and frequency meter, tachometer, wattmeter, power factor meter, cycle crank, time delay start/stop, oil temperature gauge, and low coolant level shutdown indicator. Also available are weather-resistant housings.

The Onan generator sets are sold and serviced through more than 1,400 parts and service centers in the United States, Canada, and 74 other countries. Related products from Onan include automatic transfer switches, remote alarm annunciators, and area protection monitors.

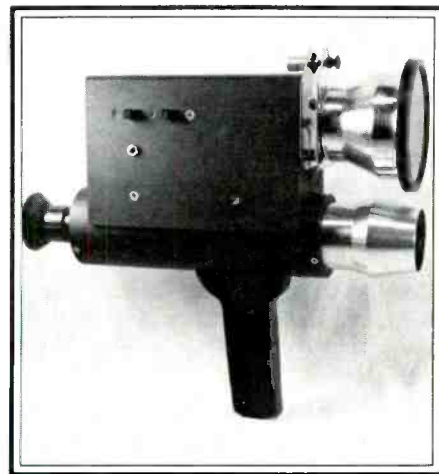
For more information on the Onan L Generator Sets, contact Onan Corporation, 1400 73rd Avenue N.E., Minneapolis, MN 55432, or circle number 109 on the reader service card.

ETCO Infrared Viewer

The infrared viewing device used to be the privileged domain of the military. Its high cost, super complexity, and varied applications kept it out of civilian hands for many years.

ETCO Electronics is now marketing a low-cost, highly portable and versatile instrument. It is an IREYE which lets you view the interesting world of infrared. Infrared science and hobbies can also be taken into the fields of business and nature.

Two models of the IR viewer are available. They can be used for a variety of interesting see-in-the-dark applications such as night surveillance, infrared photography, animal observation, eye examination, sleep monitoring, etc. They are also an indispensable aid in the detection of counterfeit currency, examinations of objects d'art, stamps, welds and joints, rocks and minerals, vegetation disease, and faded or worn documents. Other uses for these viewers include viewing the infrared emissions from lasers, alarm systems, tracking systems, LEDs, and furnaces and heaters. High-temperature (above 600°F) leakage is easily visible with an IR EYE.



Both models of the viewer are extremely lightweight (under 4 pounds), and are powered by four "D" cell batteries. The deluxe model features interchangeable lens capability, plus a list of accessories designed to add flexibility. Even with all these capabilities, the cost of a complete IR viewing system has been kept under \$300, much lower than other systems presently available.

Both these IR viewers are shown in the latest catalog from ETCO which features other exciting products from the worlds of science, electronics, mechanics, and communications. For more information, contact Ted Duskes, ETCO Electronics Corp., Plattsburgh, NY 12901, or circle number 116 on the reader service card.



R. L. Drake Surge Shunt

The R.L. Drake Company has announced its new model 1549 Surge Shunt. The Surge Shunt protects solid state communications equipment from damage caused by voltage transients entering the antenna system. These transients usually are caused by atmospheric static discharges or nearby lightning strikes.

The Surge Shunt can be used with both receivers and transceivers with up to 200 watts output. Convenient UHF-type coaxial connections are used. This permits use well into the UHF range.

R.L. Drake is recognized for high-technology amateur radio, commercial, and maritime communications equipment. For more information, contact R.L. Drake Company, 540 Richard Street, Miamisburg, OH 45342, or circle number 114 on the reader service card.

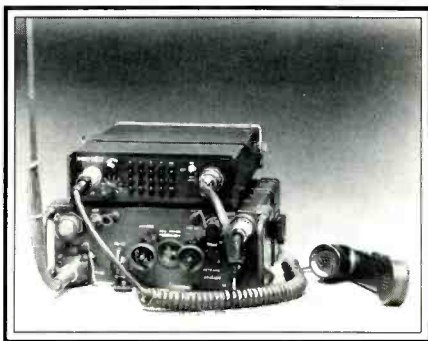
Tactical Voice Security Unit For Manpack/Mobile Radio

Datotek's new DNV-630 voice scrambler provides a high level of tactical security for field applications over all narrowband radio channels including HF, SSB, VHF, and UHF. The unit interfaces easily to all standard manpack radios and draws power either from the host radio or from an optional battery pack. Designed to rigid military specifications, the DNV-630 is so simple to use that it virtually eliminates the need for operator training.

The voice scrambler's cryptographic strength is derived from both time and frequency processing techniques controlled by a Datotek proprietary key generator which provides over 10²⁰ user selectable codes. Up to eight separate codes may be loaded via the DNV-630's front-panel keypad.

The DNV-630's memory is internally powered for 30-day retention of codes, and is also equipped for automatic erasure in the event the case is tampered with. Inadvertent clear transmissions are impossible with the DNV-630, as the unit shuts down and sounds an alert tone in the operator's ear-piece rather than transmit an uncoded signal. However, a special clear voice override feature in the DNV-630 allows emergency clear transmissions to pass through to the handset, regardless of code setting. With this special "foolproof circuitry," Datotek has reinforced tactical security at its most strategic points.

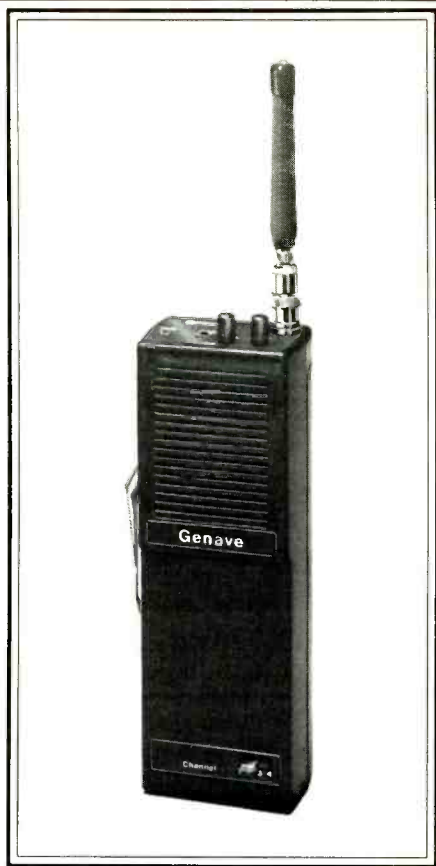
For more information, contact Bob Rycroft at Datotek, Inc., 13740 Midway Road, Dallas, TX 75234, or circle number 110 on the reader service card.



Low Band Antenna

The new BBL-2550 Low Band Mobile Antenna series offers superior mechanical and electrical performance and is manufactured to rigid commercial two-way specifications. The series features a moisture-resistant, shunt-fed, base-loaded coil assembly conservatively rated at 200 watts with VSWR typically 1.2:1 at resonance. A heavy-duty stainless-steel impact spring and tapered 17-7ph stainless-steel tip rod assure flutter-free performance at high-way speeds. The antennas are supplied in four frequency ranges complete with 3/4-inch hole roof or deck mount, 17-foot top-quality RG-58/U coaxial cable, and factory-installed connectors.

For additional information regarding the entire Hustler line of commercial antennas, contact Sales Department, Hustler, Inc., 3275 North B Avenue, Kissimmee, FL 32741, or circle number 113 on the reader service card.



VHF Hand-Held

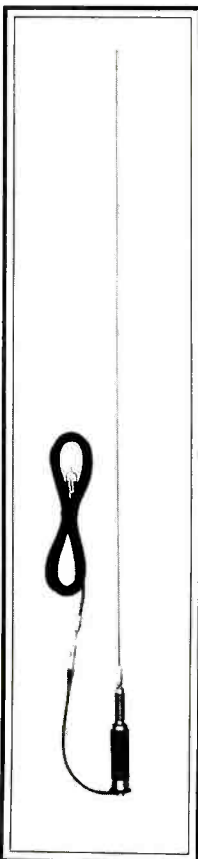
The ECOM 40H, a lightweight and rugged VHF-FM hand-held transceiver, has been introduced by Genave, Inc., Indianapolis, Indiana, for business, industrial, and public safety applications. It offers an economical answer to communications needs. Battery, antenna, and charger are included with the price of the unit.

Featuring 4-channel capability, the ECOM 40H operates on the 143.9-173.4 MHz frequency range and provides a minimum of 1.5 watts output power. The base price of the ECOM 40H includes one frequency of your choice (additional frequencies—up to a total of four—are \$42.95 each). Subaudible tone can be provided by the optional SA-44.

Housed in a rugged Lexan case, the ECOM 40H is designed to withstand years of rough handling and abuse. The unit's low price is especially appealing to construction workers, survey crews, or material handlers—wherever the wear and tear on a hand-held is especially great. Low cost enables the user to replace a lost or severely damaged ECOM 40H and still save money.

Ready access to both sides of the printed circuit board makes the ECOM 40H especially easy to service. Troubleshooting and replacement of components are easy.

Genave is a multi-line manufacturer of landmobile and airport communications equipment. All Genave products are manufactured in the U.S.A. For more information, contact Genave, Inc., 4141 Kingman Dr., Indianapolis, IN 46226, or circle number 111 on the reader service card.

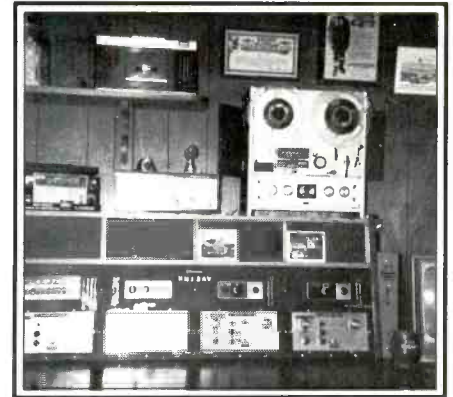


POP'COMM FOTO FILE

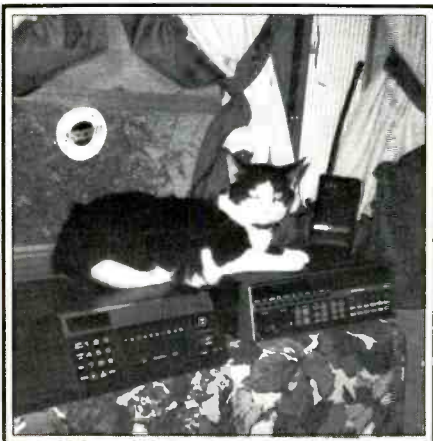
Readers are invited to send in photos of their own monitoring post or (in fact) anything else concerning communications. Black and white photos are preferred but color can also (secondarily) be used.



Medics communicate many urgent messages relating to patient status via two way radio. Any scanner covering the UHF band should easily be able to permit listening to these exciting communications. Set your scanner in search mode between 463.000 and 463.175 MHz and you'll hear anything which takes place in your area on the eight biomedical frequencies used by paramedics.



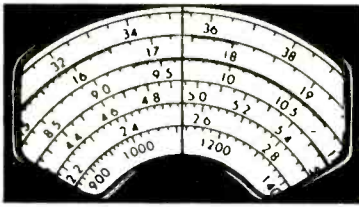
Bob Kemmler, Registered Monitor KNJ2AV, of New Jersey has an interesting bank of receiving gear lined up. Scanners cover the high, low, and UHF bands and a Plectron single channel unit is tuned to 45.16 MHz, which is used by the Herbertsville Fire Co.



Jerry Callam of Mt. Vernon, Ohio, says this is his cat (who uses the tactical ID of "Bandit") relaxing with the scanners. Seems to be having difficulty in choosing between the Regency K-100, the Bearcat 300, and the Rus-Scan hand-held. Such problems!



The Los Angeles City Fire Dept. has one of the most complex communications systems in the country, using more than 25 Fire Radio Service frequencies in the low, high, and UHF bands. When reader Mitchell Fleming snapped this photo of the agency's chopper #1 he had just logged it on 123.05 MHz—a frequency not within the many Fire Radio Service channels available to the unit but, instead, a channel used exclusively by choppers taking off and landing!



COMMUNICATIONS CONFIDENTIAL

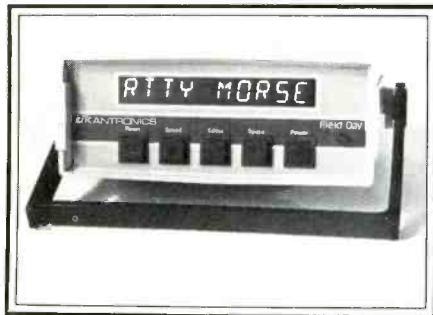
YOUR GUIDE TO SHORTWAVE "UTILITY" STATIONS

Heard: 82 "New" Stations - Easy!

We wanted to see just how easy it would be for someone totally unfamiliar with CW, and with zip experience in tuning RTTY (radioteletype), to monitor these stations with the aid of some of the CW and RTTY "reader" type devices now available. Using such devices borrowed from a few of the leading manufacturers, we took them to the monitoring stations used by some folks who said they'd volunteer for the experiment.

Hooking up the devices was a cinch; they simply attach to the speaker leads of a communications receiver. It can be done by one in seconds using alligator clips. The devices in place, we issued the orders to log whatever was heard within a two-day period. Here are the results of what three rather inexperienced people using average communications receivers were able to log right from the "top layer" of CW and RTTY chatter popping through. These are *all* stations which were totally new to these operators and which might have otherwise never have been logged without the aid of these miracles of modern technology!

If you're seeking new worlds to conquer on the DX bands, you might seriously consider adding a CW and/or RTTY "reader" to your station equipment.



Even if you don't know a "di" from a "dah" you can hook a code reading machine to your receiver and start copying CW stations instantly! Hook-up time is about one minute with no special tools or skills. The units are relatively inexpensive, and some (like the one in the photo) can copy RTTY (radioteletype) signals too!

MHz	Callsign	Location	GMT	Mode	Remarks
4.232	HWN	Paris, France (Navy)	0436	CW	V's
4.285	VCS	Halifax, N.S. (CG)	0440	CW	V's
4.307	CTV/CTU3/ CTU28	Monsanto, Portugal (Navy)	0443	CW	Callsign tape
4.615	IDR2	Rome, Italy (Navy)	0447	CW	V's
5.097	CFH	Halifax, N.S. (Navy)	0434	CW	Traffic
5.758	?	?	0442	CW	Repeating "8/14 8/T9 3/12 A"
6.352	FUG	La Regine, France	0440	CW	V's
6.366	KFS	San Francisco CA	0401	CW	CQ
6.379	GKB	Portishead, England	0402	CW	Callsign tape
6.388	FUF	Ft. de France, Martinique	0403	CW	Callsign tape
8.148	OVG8/12	Frederikshavn, Denmark	0307	CW	V's (listening 5.611)
8.440	VCS	Halifax, N.S. (CG)	0312	CW	CQ
8.452	EBA	Madrid, Spain	0314	CW	CQ
8.453	HWN	Paris, France (Navy)	0353	CW	V's
8.471	NMR	San Juan, PR (CG)	0510	CW	Callsign tape
8.474	WLO	Mobile AL	0232	CW	Traffic
8.483	DAN	Norddeich, W. Germany	0233	CW	V's
8.519	4XZ	Haifa, Israel (Navy)	0316	CW	V's
8.522	FFL4	St. Lys, France	0355	CW	CQ
	PPO	Olinda, Brazil	0511	CW	Callsign tape
8.558	KFS	San Francisco CA	0135	CW	CQ
8.570	WNU43	Slidell LA	0513	CW	CQ
8.582	KLB	Seattle WA	0515	CW	CQ
8.599	ZLO4	Irirangi, N.Z. (Navy)	0518	CW	CQ
	OXZ4	Lyngby, Norway	0518	CW	V's
8.612	TAH	Istanbul, Turkey	0319	CW	CQ
8.650	ICB	Genoa, Italy	0523	CW	V's
	NMO	Honolulu HI (CG)	0523	CW	CQ
8.652	OST42	Oostende, Belgium	0332	CW	CQ
8.670	YUR	Malinska, Yugoslavia	0528	CW	CQ
8.672	DAF	Norddeich, W. Germany	0239	CW	V's
8.681	EAD3/EDZ4	Aranjuez, Spain	0240	CW	CQ
8.684	LGU/LFU/ LGB/LFN	Rogaland, Norway	0411	CW	CQ
8.687	SVA	Athens, Greece	0241	CW	Callsign tape
8.703	SVB7	Athens, Greece	0242	CW	Callsign tape
	GKE	Portishead, England	0242	CW	Callsign tape
	CTV/CTU4/ CTU28	Monsanto, Portugal (Navy)	0412	CW	V's
8.711	WLO	Mobile AL	0243	CW	Callsign tape
10.408	6VU	Dakar, Senegal	0203	RTTY	67/425N "RY" tape
11.526	6VU	Dakar, Senegal	0155	RTTY	67/425N "RY" tape
12.933	EAD4	Aranjuez, Spain	0135	CW	CQ
12.939	LZW	Varna, Bulgaria	0138	CW	Callsign tape
12.993	KOK	Los Angeles CA	1400	CW	CQ
13.020	GKC	Portishead, England	1719	CW	Callsign tape
13.815	KRH50	?	1728	CW	Callsign tape
13.945	WQB23	Akron OH	1352	CW	Callsign tape
14.855	WBC277	?	1426	RTTY	100/800N "ZCZC" tape
15.908	WEY35	New York NY	1736	RTTY	67/425N Spanish news
16.004	IDR6	Rome, Italy	2124	CW	V's
16.212	?	?	1326	CW	"ITT Comny" tape

MHz	Callsign	Location	GMT	Mode	Remarks
16.338	?	?	1325	RTTY	67/425N Span. news
16.519	?	?	1330	RTTY	67/425N Span. news
16.861	WNU35	Slidell LA	2139	CW	CQ
16.880	NMC	San Francisco CA (CG)	2140	CW	CQ
16.902	PCH60	Scheveningen, Netherlands	2141	CW	CQ
16.920	CLS	Havana, Cuba	2142	CW	CQ
16.950	6WW	Dakar, Senegal (Navy)	1748	CW	V's
16.956	GKC	Portishead, England	1235	CW	Callsign tape
16.961	FUF	Ft. de France, Martinique	2144	CW	V's
16.972	WCC	Chatham MA	2145	CW	CQ
16.982	DAM	Norddeich, W. Germany	1750	CW	V's
17.048	DAF	Norddeich, W. Germany	2000	CW	V's
17.064	KOK	Los Angeles CA	2114	CW	CQ
	EAD5/6	Aranjuez, Spain	2114	CW	CQ
17.100	GKA	Portishead, England	1337	CW	CQ
17.105	IRM	Rome, Italy (Medical)	2116	CW	V's
	PCH62	Scheveningen, Netherlands	1910	CW	Callsign tape
17.158	WOE	Lantana FL	2117	CW	CQ
17.178	DAL	Norddeich, W. Germany	1340	CW	Callsign tape
	HWN	Paris, France (Navy)	1341	CW	Callsign tape
17.208	WLO	Mobile AL	2120	CW	CQ
17.426	KKN44	Monrovia, Liberia (U.S. Embassy)	2018	CW	Callsign tape
18.543	WFK48	New York NY	2109	RTTY	100/425N "Fox" tape
19.173	?	?	1240	RTTY	67/425R Engl. news
20.140	?	?	1255	RTTY	67/425R Engl. news
20.319	WFG83	New York NY	1257	RTTY	67/425N Span. news
20.351	NBA	Balboa, Panama	1300	RTTY	100/800R Testing
22.067	CLN	Manzanillo, Cuba	1307	CW	CQ
22.417	SVA	Athens, Greece	1311	CW	CQ
22.588	WLO	Mobile AL	1313	CW	Callsign tape
23.718	WFG83	New York NY	1317	RTTY	67/425N Span. news

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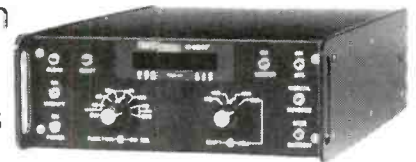
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CIRCLE 75 ON READER SERVICE CARD

SCANNER SCENE

BY LOUIS A. SMITH, II

MONITORING THE 30 TO 512 MHz "ACTION" BANDS

This month we'll look at one of the more interesting radio services to become popular with listeners in recent years thanks to advancing scanner technology. I am talking about the Domestic Public Radio Service, also known as the "mobile phone" service.

While mobile telephones have been around for several years, it is only recently that some scanner manufacturers have included a "mobile tone filter," opening up this interesting world of two-way intrigue. Why is a mobile tone filter so important? Isn't it possible to monitor mobile telephone channels just like police or fire frequencies? To answer these questions, it is necessary to have a basic understanding of how one of these radio systems works.

Today, there are two standard types of mobile phone systems. Both of these systems are commonly used on frequencies below 800 MHz (those operating on the 800 MHz band, known as cellular mobile systems, will be discussed in a later column).

The first system, which for years was the only type used, is essentially a repeater controlled by a land-based operator. Mobile stations wishing to place a call must first locate an available channel in their area by manually switching from one channel to another. After finding an unoccupied channel, the mobile station contacts the land-based operator by transmitting on the repeater input frequency. The operator answers and activates the repeater. From this point on, all communications may be heard by listening to the repeater output channel listed in Table 1. The mobile operator periodically monitors the channel and deactivates the repeater when the call is finished.

When a land-based caller wishes to contact a mobile phone station under this system, the operator transmits a pulse-coded signal on the repeater output frequency in an effort to selectively "ring" the desired station receiver. This is known as the "manual" system due to the fact that users must rely on the operator to manually place calls.

The other type of mobile phone system is fully automated. It also operates in the repeater mode, but dialing, call routing, and other functions are controlled automatically without operator assistance. To the mobile phone user, placing and receiving calls is no different than when using a conventional telephone. All this automation is made possible through the use of microcomputers and a sophisticated tone signalling arrangement. Various tones and tone combinations are transmitted to indicate the status of equipment and various channels.

A complete explanation of the automatic system and associated tone signals could fill



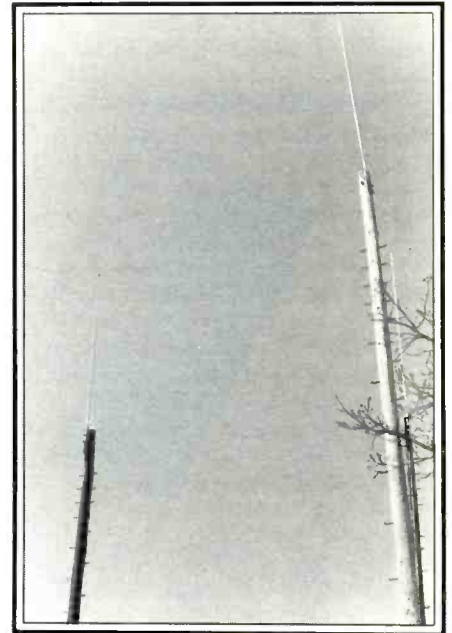
The latest mobile phones have touch-tone calling and also automatic ringing. Each unit can operate on several different channels.

a book. But for our purposes, only one of these signals, "idle tone," is important.

Idle tone is a 2,000 Hertz audio tone transmitted continuously on all active repeater output channels when they are not being used for a call. The computer circuitry in the mobile phone control unit sees this tone as indicative of an available channel on which it may initiate a call. The unit selects this channel and transmits the appropriate coded signal on the paired input frequency to terminate the tone and initiate the call.

This system may be fine for the person using the mobile phone, but it certainly wreaks havoc for those who try to monitor these frequencies with a conventional scanner. If you were monitoring one of these automatic system channels you wouldn't hear much on your scanner between calls except an annoying high-pitched idle tone. The scanner would remain on the mobile phone frequency because a radio signal is constantly present (either tone or voice conversation). This wouldn't provide for very interesting listening as the idle tone becomes very irritating after a short time. Consequently, most people didn't monitor automatic mobile phone systems due to this bothersome fact. Since most mobile phone systems are of the automatic variety, this meant that monitoring this radio service wasn't very popular with the scanner crowd.

With the advent of synthesized scanners in the mid-1970s, manufacturers attacked the task of eliminating the idle tone and opening up these interesting conversations to the monitoring public. This was done by the development of a special audio filtering circuit which is designed to sense the pres-



One of Ma Bell's UHF mobile operator antenna sites, it is located on a hill for increased range.

ence of the 2,000 Hz tone and immediately order the scanner to resume scanning as if no signal were present on the idle mobile phone frequency.

When the idle tone is removed (as it is when the channel is ready to be used for a conversation), the scanner will stop on this frequency until the idle tone is again transmitted after the call is terminated. In order to prevent the unit from skipping from channel

to channel when the 2,000 Hz tone occurs in the human voice, the mobile tone filter circuit has a built-in time delay of several milliseconds before it skips over the channel.

While the tone filter circuitry is relatively simple to include in the microprocessor unit of a scanner, it is surprising that it isn't found on all scanners. A quick check of your scanner's owners manual will tell you if your particular model has this feature.

Mobile phone channels can be found in both VHF and UHF bands and are clustered together at various points in the spectrum (see Table 1). Each channel consists of two paired frequencies. One is the input frequency used for transmissions from the mobile station to the repeater and the other is used as the output (base) frequency of the repeater. With any repeater system, it is only necessary to monitor the output frequency to hear both sides of a conversation.

All channels have standard identifiers assigned to them. As a general rule of thumb, on the VHF-low band, channels are assigned alphabetical identifiers and are used almost exclusively in manual type systems. In recent years, these VHF-low band channels are becoming less popular among subscribers because of severe skip interference, which also has a tendency to limit them to manual usage.

Channels in the VHF-high band which are assigned numerical designators are generally used by manual systems. Those channels with alphabetic identifiers are usually operated in the automatic system mode.

On the UHF band we find a slightly different configuration. Channels numbered 1-12 are reserved exclusively for use by airborne stations such as those installed aboard commercial jetliners or private aircraft. Also, a designated "calling" channel is used for establishing contact with aeronautical phones. Channels 21-34 are used for conventional manual systems. Alphabetically designated UHF channels are predominantly used by automatic systems.

If your scanner has a mobile tone filter, you will be able to listen to both automatic and manual systems. To locate active automatic systems, use your scanner's search function. When doing this you may notice that 5 kHz above or below the channels listed in Table 1 the searching will stop and a continuous tone signal will be heard. This is normal and simply indicates that the adjacent phone channel is active and in the idle mode at that moment. This searching will not stop directly on the listed channels unless they are actually being used for a conversation, due to the eliminating action of the tone filter.

Locating active manual systems is accomplished the same way as finding police or fire channels. The upper and lower search limits must be programmed on the highest and lowest output channels in a band and you should search until activity is found.

Today, nearly every part of the country is covered by at least one mobile phone system. Most heavily populated regions and metropolitan areas have several active



With a mobile telephone you can place a call to (or receive one from) any other telephone in the world—even phones aboard ships or in other vehicles. Your scanner gives you a ringside seat on these conversations.

channels you can monitor. With the exception of the low band (which usually has only a few channels operating in one area due to the long-distance transmission characteristics of that band), most VHF systems are comprised of a network of three or more channels. This is done in order to accommodate a larger number of users on the system and permits simultaneous use of the system by more than one mobile station at a time. In fact, in many cities, it will be found that nearly all VHF are active as part of coordinated manual or automatic networks. UHF systems are found less often than VHF, and are often concentrated in larger metropolitan areas. Their range is less than those on VHF due to band characteristics, and if you live more than 20 miles from the transmitter site you may have difficulty receiving them.

Those are the facts on the fascinating world of mobile telephone monitoring. In the months ahead we will be covering other radio services which operate on frequencies you can monitor with a scanner. Also, each month we would like to feature reader-oriented material, including photos of scanner installations, dispatching points, etc. The focal point of this column is you, the reader. Whatever you want to see covered in this column, just write and ask. If you want to share photos of your scanner installation, local police/fire/EMS dispatching points, and QSL's from stations in the VHF/UHF bands, or suggestions for future editions of Scanner Scene, just send them to this column c/o POP' COMM, 76 N. Broadway, Hicksville, NY 11801. Each issue will include as many as space permits.

VHF-Low Band

Channel Identifier	Output (MHz)	Input (MHz)
ZO	35.26	43.26
ZF	35.30	43.30
ZH	35.34	43.34
ZM	35.38	43.38
ZA	35.42	43.42
ZY	35.46	43.46
ZR	35.50	43.50
ZB	35.54	43.54
ZW	35.62	43.62
ZL	35.66	43.66

VHF-High Band

1	152.030	158.490
3	152.060	158.520
5	152.090	158.550
7	152.120	158.850
9	152.150	158.610
11	152.180	158.640
JL	152.510	157.770
YL	152.540	157.800
JP	152.570	157.830
YP	152.600	157.860
YJ	152.630	157.890
YK	152.660	157.920
JS	152.690	157.950
YS	152.720	157.980
YR	152.750	158.010
JK	152.780	158.040
JR	152.810	158.070

UHF Band Calling

1	454.675	459.675
2	454.950	459.950
3	454.900	459.900
4	454.850	459.850
5	454.800	459.800
6	454.750	459.750
7	454.700	459.700
8	454.725	459.725
9	454.775	459.775
10	454.825	459.825
11	454.875	459.875
12	454.925	459.925
21	454.975	459.975
22	454.025	459.025
23	454.050	459.050
24	454.075	459.075
25	454.100	459.100
26	454.125	459.125

UHF Band Channel Identifier

Channel Identifier	Output (MHz)	Input (MHz)
26	454.150	459.150
27	454.175	459.175
28	454.200	459.200
29	454.225	459.225
30	454.250	459.250
31	454.275	459.275
32	454.300	459.300
33	454.325	459.325
34	454.350	459.350
QC	454.375	459.375
QJ	454.400	459.400
QD	454.425	459.425
QA	454.450	459.450
QE	454.475	459.475
QP	454.500	459.500
QK	454.525	459.525
QB	454.550	459.550
QO	454.575	459.575
QR	454.600	459.600
QY	454.625	459.625
QF	454.650	459.650

Table 1. VHF/UHF Mobile Telephone Channel Assignments.

ESTABLISHING SURVIVALIST COMMUNICATIONS SYSTEMS

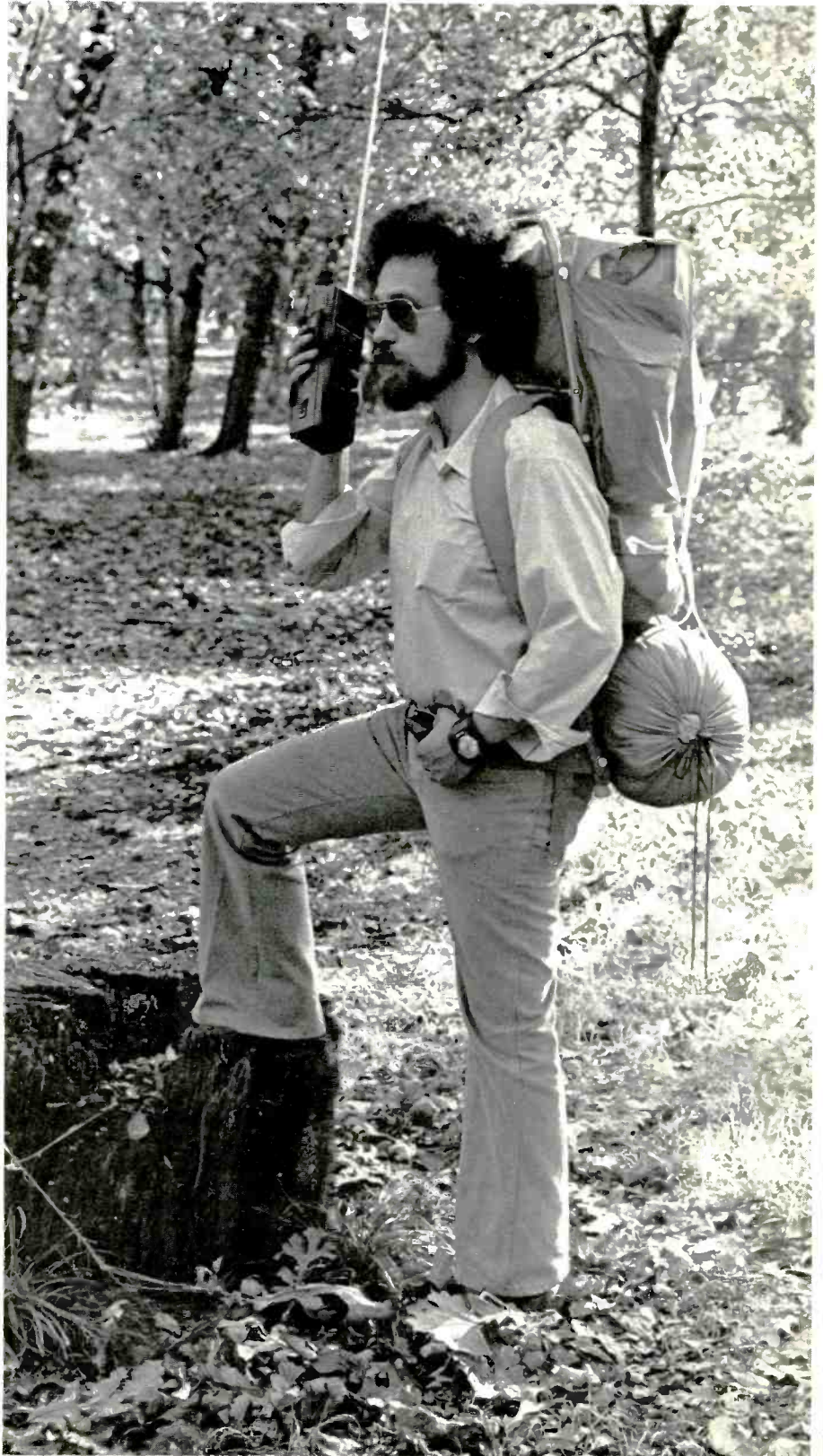
Do you think that someday you are going to be put to the test of surviving? Will this be a direct result of nuclear war, overpopulation and famine, radioactive accident, global pollution and epidemic triggered by leaks from viral or bacterial weapons, collapse of our financial systems, natural disasters, breakdown in law and order, or any of the many other monsters which appear to be hovering on the horizon and planning to come to pass as soon as possible? Most likely, you rather hope you can exist after the fact with safety and self-sufficiency. Perhaps you feel that such efforts can in some way be substantially aided by having your regular base/mobile CB radio installation as your primary communications tool. Finding out that you were wrong could very well be one of the biggest surprises of your life, and also one of the last!

Amidst all of the hullabaloo taking place in respect to survivalists, we have been treated to endless reams of reports and opinions on topics ranging from food storage to cartridge reloading. Quietly missing from this barrage of information is any substantive information covering the area of communications—certainly a vital link in any survivalist efforts.

For a while I thought that nobody realized the relative importance of communications in this field. Then I changed my mind and came to the conclusion that a lot of folks had gotten to the point where they had enough smarts to figure out that communications were certainly required, but that they were approaching the whole thing on the most superficially basic and ineffectual level.

Many existing systems are only marginally effective under present conditions and would be less than useless (even a distinct disadvantage) when pressed to the wall. And yet, still there is a wall of silence on the topic, and while you are sitting there reloading your cartridges and munching away on your beef jerky, you will also be existing in a dangerous communications vacuum—your communications system either being totally ineffective or else having failed due to equipment which is too fragile to meet your needs, or which was not installed properly, or any one of a dozen or so calamities.

It is our intention to explore, on a practical and useful level, all aspects of communications for survivalist operations. In these columns, we will examine the various uses for your communications system (including some you may not have thought about), emergency power, tuning in on the outside world—and the outside world tuning in on you, buying and installing equipment,



emergency antennas, frequency selection, licensing considerations, networks, operating techniques, station security, emergency equipment repairs, and lots more. We will also answer your questions here in the column and, basically, provide you with all the help and information we can in giving you a leg up on having a communications system upon which you and your family can rely at such times as your options might become suddenly and severely limited.

At this point, you are wondering why I have given CB a bad rap—sorry if I've taken your dream station down a few pegs. I realize that you are able to talk to Belgium and Australia from your base station, and your mobile rig has brought you enough "Smok-ey" reports to save you a wallet full of money not paid to the traffic judge. Neither of these functions have high priority in a survival situation. For hobby or highway use, and even for certain emergency applications, CB is a sure winner. It is even a worthwhile backup communications system for a survivalist to have handy, but it has distinct disadvantages as a primary system.

Amongst the disadvantages of AM CB as a primary system is the very fact that you are able to talk to Belgium and Australia on the units. You will be using communications between your base location and hand-held or mobile units located within a few miles of the base—scouting, hunting, or perimeter security units in the field. Distant stations piling in on your frequency, as they are prone to doing due to signal propagation on CB frequencies, will be far more annoying than amusing while you are trying to get a message through to a field unit.

Interference from local stations will be severe—you may not be able to find a clear channel; you will be battling 250 to 1,000 watt linear amplifiers which will let their owners control any frequencies they deem "theirs." Moreover, anything you say over a CB frequency will be instantly monitored by all within range of your station; you may wish to consider if that is a fully desirable situation. However, a feature of having a CB handy is that you can listen to the channels and perhaps hear what other people are up to, and you can use a direction finding loop to figure out in which direction they are located. Best bet is not to use it for anything more than that unless it is absolutely necessary to do so as a last resort.

So while 99 percent of the other people in your area are running around hysterically shouting for a "break" on a CB channel, you will be doing something better. You will be set up to operate where there is no problem with distant skip stations stepping on your communications, where there is a greatly reduced chance that you will be jammed or monitored by others in your area.

This can be done especially well on frequencies in the VHF and UHF bands, and if necessary (with a little planning) even on the "low band" (30 to 50 MHz) which is normally prone to skip propagation. You have at your disposal a wide range of radio equip-

ment coupled with your own resourcefulness and ingenuity.

You can put into use new, used, and surplus radio communications gear—things originally intended for industrial, maritime, public service, ham, and military uses. You may be able to get a license from the FCC to operate it, or you may opt to avoid being "on record" as having the station. Perhaps the frequency you'll be using isn't even one on which they would issue a license. The combinations are almost without limit.

So, with all of these options available, where do you go from here? Surviving in urban, suburban, and rural areas calls for individual considerations.

In The Mailbag

J. Y., who is located in Benewah County, Idaho, says that he has a modified CB rig which can operate on frequencies not authorized for CB operation. These frequencies are above CB Channel 40 (which is at 27.405 MHz) and they also lie between certain CB channels. He wonders about the possible usefulness of these frequencies for survival communications, as opposed to the regular authorized CB channels.

Operating on unauthorized frequencies within, above, and below the CB band is nothing either new or novel. Frankly, it is so commonly done that the FCC has been having fits over the practice for many years now, and hobby stations throughout the nation and the world are heavily using all of these frequencies. As a result, while the skip and local interference may not be as heavy on those frequencies as on the authorized CB channels, it will nevertheless exist and therefore (even though you may be in a rural area) the scheme seems somewhat less than appealing if this is intended to be your only or primary communications system.

I would also like to let you in on the fact that the frequency bands 26.480 to 26.950 MHz and 27.540 to 28.000 MHz are set aside for use by the federal government, and while the frequencies aren't in much federal use at this time, it is reasonable to assume that they might well be in heavy use during a national emergency. That being the case, your communications could possibly interfere with some vital service or military function.

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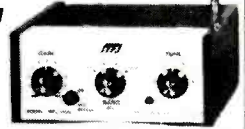
CIRCLE 24 ON READER SERVICE CARD

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NEW Indoor Tuned Active Antenna. Rivals, can even exceed reception of outside long wire.

Rivals long wires

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MFJ-1020 NEW INDOOR ACTIVE ANTENNA sits on your desk ready to listen to the world. Rivals, can often exceed, reception of outside long wire. Unique Tuned Active Antenna minimizes intermod, provides RF selectivity, reduces noise outside tuned band. Also use as preselector for external antenna. Covers 300 KHz to 30 MHz in five bands. Adjustable telescoping antenna. Controls: Tune, Band Selector, Gain, On-Off/Bypass. LED. FET, bipolar circuitry. Phono jack for external ant. 6x2x6 inches. 9-12 VDC or 9 V battery for portable use. 110 VAC with optional AC adapter, \$9.95.



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CIRCLE 15 ON READER SERVICE CARD

ON THE LINE

NEW AND EXCITING TELEPHONE TECHNOLOGY

Two New Pocket-Size Cordless Telephones

Electra Company has announced two new pocket-size cordless extension telephones, "Freedom Phone[®] 2500" and "Freedom Phone[®] 2000." Measuring less than 1 inch thick by 2½ inches wide, they fit easily into a pocket or purse. In addition, their sculptured styling and almond coloring bring a new look and feel to compact cordless telephones.

The new Freedom Phone 2500 features a convenient built-in intercom. A speaker and microphone are built into the base, so there's no need for additional equipment. The Freedom Phone 2500 can be used as an intercom to keep in touch with people around the home or office, or it can be used just like an ordinary telephone. Since it's cordless, calls can be made inside and outside the home, up to 600 feet from the base.

Electra's second new pocket-size cordless phone, the Freedom Phone 2000, is a lower-priced version of the Freedom Phone 2500. It has all of the same features, except for the intercom.

Each model includes one button redial for busy or unanswered numbers. Also, an LED light flashes for dialing confirmation, and audible key tones sound each time one of the pushbuttons is dialed.

For incoming calls, the new phones ring with a pleasant electronic tone. The phones also feature a three-position volume control which allows users to select louder than normal volume for use outdoors or in other noisy areas so that conversations can be heard with ease.

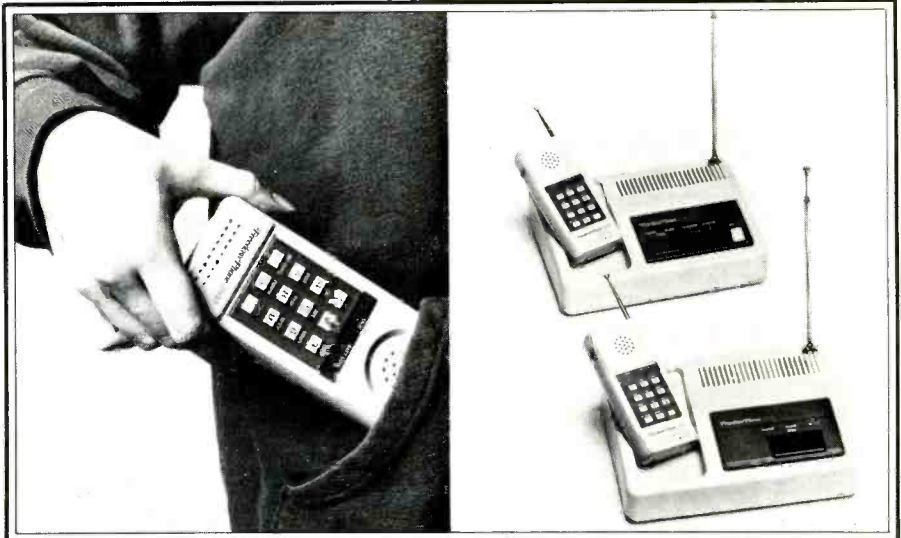
The base of each phone includes a call button. This allows paging by signaling the person carrying the phone.

The new Freedom Phone 2500 and Freedom Phone 2000 telephones can be easily installed by plugging the base into a phone jack and standard A.C. outlet. When not in use, the handsets fit into the base units to automatically recharge the batteries. A battery low light on the handsets indicates when batteries need recharging.

The Freedom Phone 2500 cordless telephone has a suggested retail price of \$329.95; the Freedom Phone 2000, \$299.95. Complete details are available from Freedom Phone suppliers or by writing directly to Electra Company, 300 East County Line Road, Cumberland, IN 46229.

Unique Two-Line Telephone

U.S. Tron has done it again with the introduction of the DJ-2H. The DJ-2H uniquely offers those people who have two telephone



The slim, new pocket Freedom Phone[®] 2500 and Freedom Phone[®] 2000 cordless telephones.

lines in their homes or apartments a special two-line system which allows three-way conversations and conference calling capability. Retailing for only \$99.95, the DJ-2H is a perfect alternative to renting expensive telephone systems for two lines in the home.

This is the first time any company has introduced a telephone that incorporates as many features as the DJ-2H and yet retails at an extremely reasonable price, according to U.S. Tron. It is easy to operate and allows

the user the convenience of using two telephone lines without having to walk to another location. The DJ-2H is a space-saver because you now don't need the room for two bulky standard telephones.

The U.S. Tron DJ-2H is packed with other unique features: Melody-On-Hold keeps your calling party on hold with a continuous melody until you terminate the whole function by picking up your DiaLog phone or any other extension on the same telephone line. There is no external music or power source required, it hangs up whenever you put it down, has re-dial memory to repeat last number, the ringer can be turned off, has distortion-free sound, is easily installed—just plug it in—and has a 12 foot long cord.

U.S. Tron is located at 125 Wilbur Place, Bohemia, NY 11716. They can be contacted for additional information.

New Remote Telephone Answering Machine

Sony Consumer Products Company now offers a new remote telephone answering machine that will retrieve messages, even when the user forgets to turn the machine on! The new unit combines convenience, simple operation, and remote control. The pocket-size, gold-finish Remote Commander™ provides call retrieval, call review, and reset capabilities at the touch of a single button. Highlighting the list of features is a unique "forget to set" function, which enables the user to activate the answering machine simply by calling his own number and letting the phone ring 10 times.



Dialog DJ-2H provides a unique 2-line system, conference calling, last number redial and Melody on Hold™ for both lines. Mute button to let you speak privately to someone else in the room.



The Sony RS-30 telephone answering machine boasts its ability to record messages even when the user forgets to turn it on.

The RS-30 also has a private message channel, enabling one to record an outgoing private message which can be accessed and heard only via the remote control. This is particularly useful for the husband and wife who can leave messages for each other via the answering machine.

Two forms of message recording, variable and fixed, are available to the user. In its variable record mode, the unit can record messages of up to 10 minutes via voice actuation (VOX) and Calling Party Control (CPC). With this method, the machine will stop recording when the caller finishes a message or when the phone is hung up. With fixed recording, the telephone answering machine will record calls via fixed 30-second timed intervals.

The RS-30 also features individualized security coding of the remote tone. Conventional remote answering machines are sold in matched pairs of four or five different versions. With Sony's individual coding, the user can change the code at will to keep messages secure, should the remote control become lost or fall into the wrong hands.

Additional features on the Sony RS-30 include call screening, an optional back-up battery which maintains operating instructions during a power failure, and single-cassette operation. The unit itself is compact and features an attractive ivory-colored finish, and is available at a suggested retail price of \$249.95.

Microcomputer Voice Synthesized Telephone System

Mura Corporation, of Westbury, NY, announced the market introduction of its microcomputerized Sage Phone SA-50. The new system features a compact portable radio transmitter which sends a coded signal to

the telephone. The signal automatically dials up to four numbers and, by a microcomputer voice synthesizer, delivers a custom emergency message for sixty seconds.

The Mura Sage Phone eliminates the need for emergency voice tape cassette systems that are often subject to electro-mechanical failures. In an emergency, a mother, an elderly person, or a disabled individual can't afford to have a mechanical failure in a tape system. The Sage Phone's computer voice synthesizer eliminates this problem, providing the consumer maximum assurance of a quick response in an emergency.

The emergency operation of the Sage Phone is activated by a small, easily carried, battery operated transmitter. By pressing

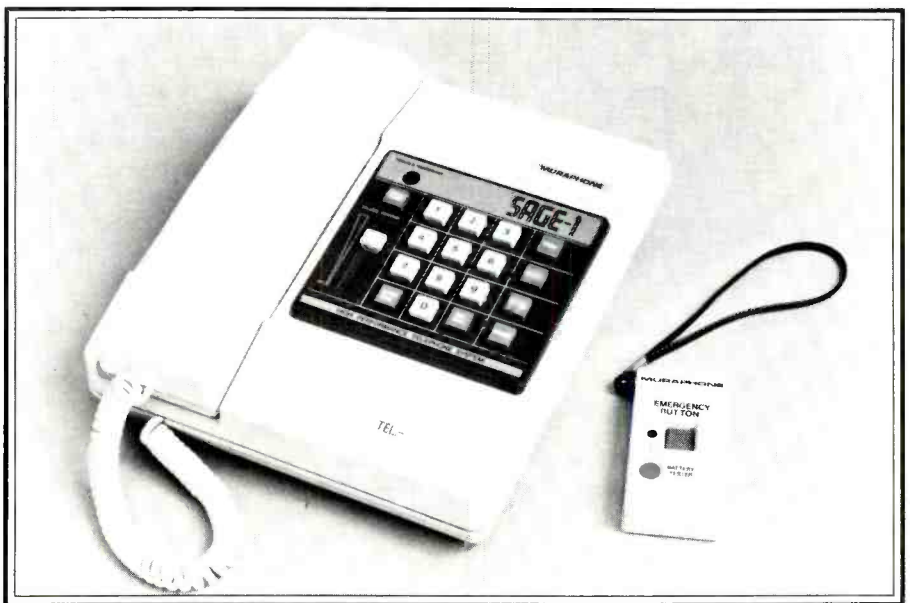
the emergency button, a coded signal is immediately transmitted to the Sage system. Sage will automatically dial up to four pre-programmed numbers and repeat its message for sixty seconds to the parties on the other end: "Emergency, help needed at (your phone number)." Should the emergency button be accidentally activated, the consumer simply lifts the receiver to disengage the emergency sequence.

A true emergency system in every respect, Sage also incorporates its own short-term stand-by power supply. Therefore, momentary power interruptions will not affect its operation.

In addition to its emergency capabilities, Sage is also a system designed to meet the needs of the computer age. The system incorporates a 31-number memory dialer, and can dial either DTMF (tone) or outpulse (rotary dial capability). Because the system can store telephone numbers of up to sixteen digits each, it is ideally suited for use with long distance networks, such as Sprint or MCI, which require initial dialing of their own access numbers.

The voice synthesizer also aids in the programming of numbers into the memory unit. The voice will inform the consumer of the location of any number in the system and advise him on which locations are empty and available for programming. Errors are virtually eliminated because the voice will correct the consumer if he tries to use an empty or invalid location. Sage is designed to work with all private phone systems and can dial "9" and pause before proceeding with the rest of the number.

The Mura Sage Phone is a system that thinks, talks, helps in an emergency, and brings the consumer into the age of the computer with its DTMF capability. The Sage Phone SA-50 is available for immediate dealer delivery and carries a suggested list price of \$249.95.



The revolutionary Mura Sage™ Phone SA-50 is a complete microcomputer telephone system. It has all the features of an emergency, voice synthesized dialer and automatically repeats its custom emergency message for 60-seconds to four preprogrammed numbers.

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Look what you get with the Bearcat 210XL. Exciting, new spaceage styling. No-crystal, pushbutton tuning. New, 18 channel, 6-band coverage of over 6000 frequencies. And features like 2 scan speeds. Automatic Squelch, Search, and Lockout. Direct Channel Access. Selective Scan Delay. And much more. There's never been a Scanner like the Bearcat 210XL.



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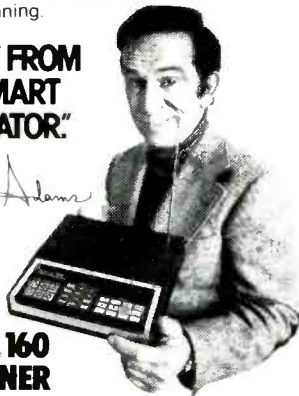
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CIRCLE 13 ON READER SERVICE CARD



Better than an unlisted number, the Fox-Fone™ Interceptor can screen out all unwanted calls.

Stop Unwanted Calls

A telephone call interceptor, the Fox-Fone™, is being introduced by Fox Marketing of Dayton, OH. The Fox-Fone enables one to choose those calls to accept. It eliminates the obscene and crank calls, unwanted sales pitches, wrong numbers, ill-timed, and annoying calls.

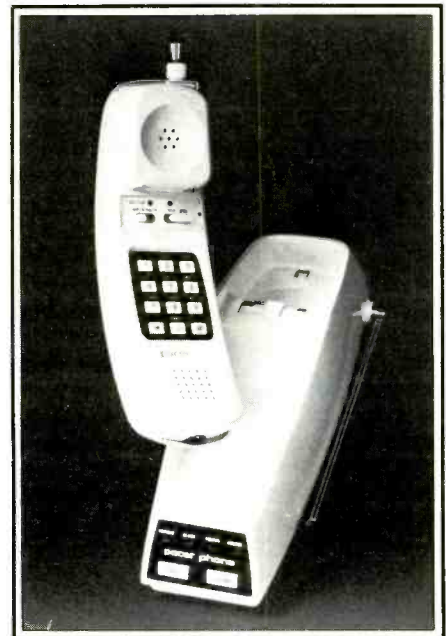
When a phone is in the intercept mode, only calls from authorized people will get through. The owner sets his own three-digit code and communicates that number to important callers.

When a call is received, the Fox-Fone automatically answers. The caller hears either a tone or a voice which is his signal to enter one's three digit "code" by touchtone dialing. If the Fox-Fone receives the correct code, it generates its own distinctive ring to signal that the call has been screened and is cleared. If the Fox-Fone receives the wrong code or no code at all, it will promptly disconnect the call!

A Fox-Fone is three times better than an unlisted number. You pay only once—no monthly service charges; there's no risk of a wrong number—as with an unlisted number; and you can turn off the Fox-Fone with the flick of a switch and an "unlisted" number becomes "listed" again.

The Fox-Fone Interceptor is available in two versions. Model "T" is operated entirely by signal tone and carries a suggested retail price of \$129.95. Model "V" has its own computer voice that says, upon answering the phone: "Please send my Fox code." If the proper code is entered, the computer responds: "Thank you, I am ringing." Model "V's" suggested retail is \$159.95.

Easily installed in minutes, the Fox-Fone has only two connections to make with modular-type plugs. The Fox-Fone cable plugs into the telephone wall socket and the telephone plugs into the Fox-Fone. Complete instructions come with each unit.



One of the new Pacer cordless telephones which has a variety of features.

Compact Cordless Telephone

Pathcom Inc., manufacturers of Pacer Telephones, has introduced two new cordless telephones. Both models feature a new compact base unit measuring only 3 1/2 x 3 1/2 x 10 1/4 inches. The model 7800T features "true" touchtone dialing, paging from base to handset, automatic security, a plug for export antenna, and 110/220 volt operation. The model 7800 features outpulse dialing, last number re-dial, paging from base to handset, automatic security, a plug for export antenna, and 110/220 volt operation. Pace is located at 24105 South Frampton Ave., Harbor City, CA 90710.

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The code reader that puts the world in the palm of your hand. The MINI-READER copies MORSE/RTTY/ASCII and includes power adapter. Who says great things don't come in small packages.

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You send CW with your key or keyboard, and the **Mini-Terminaltm** converts to RTTY or ASCII. **Mini-Terminaltm** also reads all incoming CW, RTTY, and ASCII messages and reads out on a bright green 10-digit display. For hard copy simply attach any Centronix compatible printer, such as the Epson MX-80 or the Paper Tiger, and watch the **Mini-Terminaltm** do the rest.

THE INTERFACEtm \$189.95

Kantronics, the innovator in code readers and RTTY terminals, leads the pack again with **The Interfacetm**.

Your personal computer becomes a complete CW and RTTY terminal with **The Interfacetm** linking it to your transceiver.

The Interfacetm receives any shift of RTTY, ASCII or CW and transmits all the necessary AF-SK tones for RTTY, ASCII, and RTTY CW-ID. The manual includes a complete software example



for the Apple II Plus, featuring split screen display, buffered keyboard, status display, and much more. Software is also available on diskette for Apple and cartridge for Atari.

TRS-80 Color Computer and VIC-20 software is also available.

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CIRCLE 112 ON READER SERVICE CARD

RADAR REFLECTIONS

RADAR DETECTORS AND THEIR USE

Just Looking?

It seems that the Connecticut State Police has set up little black boxes across the state to record speeds and the number of vehicles traveling past per hour. Milford police Traffic Division Sgt. Bill Brown commented that the box has no camera and has no idea if it is recording a tractor-trailer or a little bug.

Brown said that there have been rumors that the state would take pictures of speeding vehicles and then mail tickets to the vehicle's owners. This is simply not true.

The purpose of the Department of Transportation's highway unit is to meet federal requirements for hard evidence of compliance by drivers to the 55 mile per hour speed limit. Wonder if these units (21 total) are licensed by the FCC?

Police Commissioner Refuses to Remove Device From Car

Refusing to remove his radar detector from his car is in keeping with his promise not to change his life-style, a Kansas City Police Board Commissioner said. Dr. C.E. Kavanaugh, an orthodontist, said that the black box was on his dash more as a safety device than to warn him that police radar was recording the speed of his car.

"It's a safety factor, same as brakes or anything else," said Kavanaugh, who has no intention of removing the radar detector. "It was there before I was a commissioner and I stated I would not change my lifestyle.

Another Use For Speed Radar

A Milwaukee Road official recently promised the Village Board that the railroad would monitor train speeds to determine whether they were exceeding the 30 mph speed limit when they traveled through the Village of Brown Deer. The action came after residents complained that the trains were passing their homes too rapidly.

Robert Shive, a Milwaukee Road Assistant Superintendent, said the railroad did not want engineers exceeding speed limits. Therefore, radar checks would be made of all the runs.

Radar Ruling in Hawaii

Police on Maui have gotten the green light for continued use of radar guns to detect speeders. District Judge John Vail ruled that the guns are "accurate, valid, and scientifically sound," though he acknowledged the possibility of misuse. About 96 ticketed drivers were involved in the case challenging the accuracy of the radar guns.

After Vail's ruling, most people appeared willing to pay their fines. The Maui prosecutor suggested suspended fines and no point penalties except for those with prior traffic convictions or excessive speed violations.

More ESP Speeding Tickets Dismissed

Allegheny County Common Pleas Judge Nicholas Papadakos ruled that 10 motorists were innocent because police in various

Pennsylvania cities used speed-timing devices which had no authorization from local officials. The ruling came on appeals to guilty verdicts by district magistrates. Papadakos also said the municipalities have to post "approved signs in appropriate places" saying the devices are being used prior to writing any tickets.

"No evidence was presented showing that an ordinance was adopted approving the use of either the ESP or Vascar devices," Papadakos wrote in his opinion. "Accordingly, any evidence obtained through the use of such a device is incompetent and cannot form the basis of a conviction."

Interesting North Carolina Weather Advisory

High winds at Grandfather Mountain included "puffs" measured at more than 100 miles an hour that blew the wind-measuring instruments off the top of a building. How did they measure the winds without instruments? Blowing Rock's weekly newspaper explains: "Highway patrol radar picked up the instruments as they passed Hickory, NC, in excess of 100 mph!"

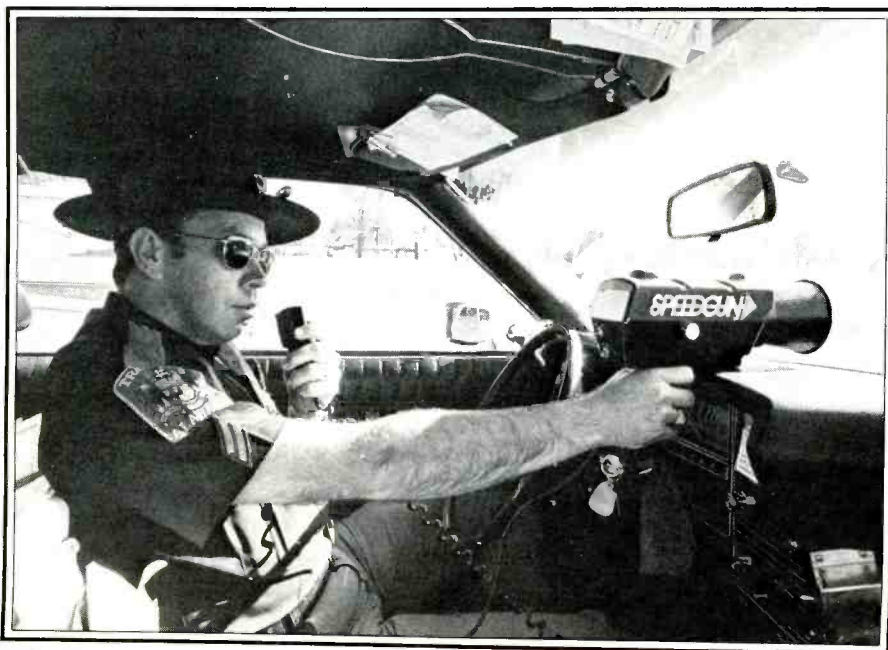
New Organization Objects To Speed Limit

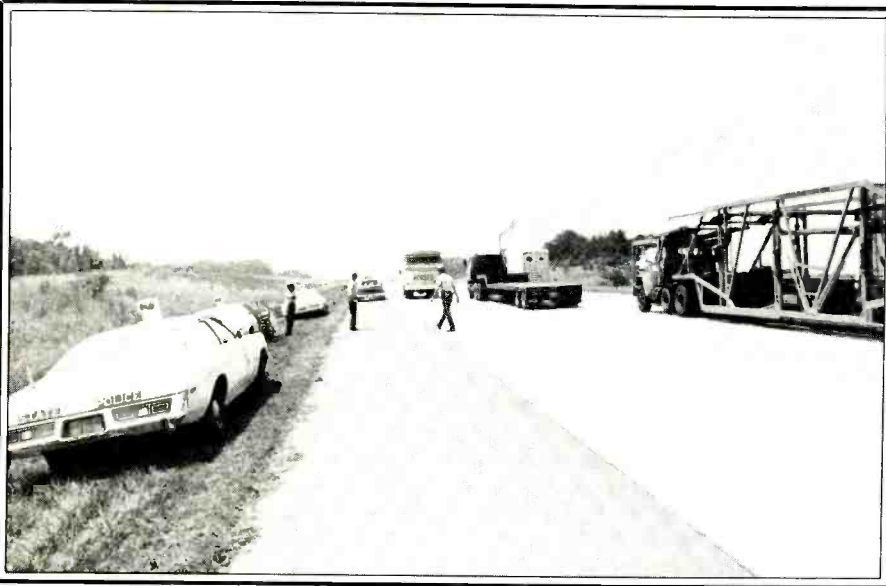
A newly formed organization, "The Citizens' Coalition for Rational Traffic Laws," is busy planning to take on the federal government. This is to contest the mandated 55 mph speed limit.

Located in Madison, WI, the "Coalition" is solely supported through individual membership dues. James Baxter, president of the organization, feels there is tremendous grass roots citizen support for repeal of the federal speed limit. "If this support is organized, mobilized, and focused on key policy makers, we can return control of our highways to their respective states, where the control belongs," Baxter further states. "We are not promoting an automatic return to former speed limits. It is our intent that speed limits be based on highway design, traffic volume, and other relevant safety factors."

New Bill Concerning Radar In California

Police in local jurisdictions may have a more difficult time using radar to enforce speeding laws if a bill by Assemblyman Pat Johnston does not pass, according to Johnston and city of Modesto traffic control personnel. Johnston, a Stockton Democrat, introduced AB2335 in an attempt to exempt local residential roadways from "speed trap"





laws which make it difficult for local police to use radar to catch speeders.

Since January 1, local roadways have been under the same laws concerning use of radar as other highways and roadways. Thus, if police want to use radar, they must conduct a study of the roadway on which the radar will be used. Technically, drivers who are ticketed for speeding by officers who use radar in local areas can fight the tickets if the local officials have not completed a speed survey of the road on which the radar is being used.

Although Johnston is carrying AB2335 specifically for the city of Modesto, the bill would extend the exemption to residential roadways statewide. As a new bill the legislation will not be heard or voted on until later this year.

Speed Trap— American Tradition

Bauxite, AR, a one-time boomtown that fell on hard times, is described by Mayor Brenda Cockrell as "433 people and not even a mile across" and is about 20 miles southwest of Little Rock in central Arkansas.

For five years it supported itself partly on traffic fines. Lots of them.

Last year a local teenager, Eddie Jones, was ticketed for going 36 mph in a 25 mph zone. "A heinous crime," joked his attorney George Ellis. Ellis filed suit in federal court on behalf of Jones and his father, Harold, saying the town's "kangaroo court" was created only to generate revenue.

On January 19, 1982, U.S. District Judge George Howard, Jr. signed a federal court consent decree closing the town's Municipal Court and abolishing its Police Department. Ellis said it "ended an American tradition."

The consent decree did not assess any damages against the town, and Bauxite did not admit to any of the allegations. It will, however, have to pay court costs of about \$6,700 and attorney fees of about \$3,000 under the settlement. Also, the city will have to refund any fines. Both the City Attorney

and the Mayor said they do not expect the refunds to bankrupt the city.

\$10,000 Fine For Two Unpaid Traffic Tickets?

Two unpaid traffic tickets and a computer mistake combined to put a Los Angeles truck driver in jail for a weekend. Twenty-three-year-old Ronald Hamilton had two traffic violations that went to warrant. When he tried to pay them, the computer showed a bail of \$10,000. When he couldn't pay the bail, the police put him in jail.

No one, including Deputy City Attorney Annette Keller, could explain why the computer said Hamilton owed almost \$10,000 for his violations. When Hamilton finally appeared in court, the commissioner dismissed one ticket and suspended the second because of his time spent in jail.

Eat A Ticket—Go To Jail

A Japanese motorist had a new way to dispose of a speeding ticket—he ate it! It didn't help. The unnamed driver, tagged for speeding in the town of Morioka, has been charged with the destruction of a public document. The man was quoted as telling police he was inspired by the book, *How to Handle Unlawful Traffic Cops*. Kenji Chig-yomaru, author of the bestseller, advises many ways of coping with tickets—but eating isn't one of them!

Class Action Suit Dismissed

A King's County Superior Court judge dismissed an Auburn man's class action lawsuit contesting the reliability of Seattle police radar operations, saying the matter should be settled in Seattle Municipal Court. Judge Frank Eberharter dismissed the case strictly on jurisdictional grounds and did not rule on issues raised by the lawsuit over radar equipment reliability and training of radar officers. The suit was originally filed by John Orwick (Radar Defense Fund) and two other plaintiffs who had contested traffic violation cases.

Traffic Fines Increased By Illinois Statute

Illinois legislators passed several new laws which will result in fines and costs paid by many traffic violators being increased from the present \$35 to \$50.

Chief Circuit Judge John T. McCullough said that driver's licenses may be posted in some cases. The 11th Circuit Judge said there was another traffic ticket change of which many people might not be aware. "When a person is arrested for a minor traffic violation, he has to sign the ticket. Now all the officer has to do is to tell the defendant that if he does not appear in court, judgment will be made." The jurist explained this applied to the non "must appear" offenses.

Driving under the influence bail has been increased to \$3,000. However, the accused may continue to deposit his license and a \$1,000 bail. Bail of \$2,000 has been set for eluding police; leaving the scene of a death or injury accident; reckless driving and drag racing. Bail for speeding 21 to 30 mph over the limit has been increased to \$70; while more than 31 mph remains at \$1,000.

Judge McCullough further explained that the legislature has also approved a \$5 court improvement fee and a surcharge scale ranging from \$2 to 10 percent of the fine. As of July 1, an additional \$5 fee is being imposed which will be used for driver education. Four-fifths will go to the state and one-fifth will remain with the county.

Coming In The October Issue Of

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- Frequencies For Underground Radio
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- Scanning The Brinks Armored Trucks
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FCC ACTIONS AFFECTING COMMUNICATIONS

Proposal For Secondary Special Emergency Use Of 152.0075 MHz Withdrawn

The Commission has withdrawn a proposed rulemaking which would have authorized future use of VHF frequency 152.0075 MHz by the Special Emergency Radio Service only on a basis secondary to radio common carriers operating on an adjacent channel. The FCC said only minimal instances have been recorded of interference by authorized Special Emergency users—such as hospitals, ambulance and rescue services, disaster relief networks, and wire communications emergency facilities—to authorized radio common carrier users of 152.03 MHz (RCC Channel 1).

Growth of hospital paging systems would be hampered by the loss of one of only two high-power VHF paging frequencies. Congestion on the remaining channel would inevitably result, the Commission said.

The FCC said the proposed action is not needed to assure compatible operation of the two services, which generally operate side-by-side without interference, and would be an unnecessarily stringent remedy for potential interference between operations on the channels at issue. Under FCC rules, operations authorized on a secondary basis must not cause interference to and must accept interference from primary users.

Since a potential for interference exists, the FCC said, applicants for the 152.0075 MHz frequency should be aware that adjacent channels are used by other services (151.985 MHz is allocated for the Telephone Maintenance Radio Service, for example). It added a footnote to the Special Emergency Radio Service Table of Frequencies urging future applicants to contact adjacent channel users and resolve potential interference problems before the applicants begin operation.

Instances of reported interference will be handled as they occur, under the existing rules, on a case-by-case basis, the Commission said. Some circumstances, it said, may require use of state-of-the-art equipment, such as receivers with greater-than-usual adjacent channel rejection characteristics.

The rulemaking was proposed in response to a request by Telocator Network of America to eliminate future Special Emergency use of 152.0075 MHz. The Commission denied Telocator's request at that time.

Additional Frequencies In The Aviation Services

The Commission has proposed amending Parts 2 and 87 of the rules to remove station log requirements. This would provide

for additional use of 122.050, 122.775, and 122.850 MHz in the Aviation Services.

Currently, all fixed stations in the Aviation Services, except for radio-navigation test and aeronautical enroute stations, are required to maintain logs showing hours of operation, frequencies used, and duty hours, bearing the signature of the operator, as well as information concerning distress and emergency situations and antenna illumination. The Commission said it knew of no instance in which these logs have been used for any purpose.

In response to a request by the Federal Aviation Administration (FAA), the FCC proposed making 122.050 MHz available on a primary basis for use by both commercial and private aircraft in order to relieve congestion on 122.0 MHz presently being used by the FAA's enroute flight advisory service. At present, 122.050 MHz is available only to private aircraft.

The Commission said that since a frequency for direct communications between aircraft on the ground and various aviation service entities, such as fuel trucks and maintenance personnel, would contribute to more efficient aircraft operations, it proposed to designate 122.775 MHz for such operations. In addition, because many aircraft still use older radio equipment having only 360 channels, as opposed to the newer equipment having 720 channels, the Commission proposed making 122.850 MHz available on a secondary non-interference basis for ground communications.

FCC Proposes Allocating Additional Spectrum To Radio Control Radio Service

The Commission has proposed allocating additional spectrum in the 72-76 MHz band for radio control of model airplanes, boats, and cars. This also permits amplitude and frequency (or phase) modulation for model-radio-control operations.

The action came as a result of a petition by the Academy of Model Aeronautics for amendment of Parts 2, 21, 22, 81, 87, 90, and 95 of the rules for additional spectrum (20-25 channels) needed to cope with anticipated expansion of model activities over the next 10 years and to compensate for diminished use of the existing 13 frequencies in the 26-27 and 72-76 MHz bands due to interference from other operations in those bands. In addition, it requested that operations in the 72-76 MHz band not be restricted only to using amplitude modulation, but that frequency (or phase) modulation be permitted. (Radio Control Radio Service licensees presently have access to 13 8 kHz channels, 6 in the 26-27 MHz band, and 7 in

the 72-76 MHz band. Of the 13, only 4 are restricted to the control of model aircraft.)

The Academy claimed that because of the sheer number of licensees and high-power operations on the 40 Citizens Band Radio Service channels at 27 MHz, the 6 interleaved radio control channels are nearly useless for radio control operation, particularly for model aircraft control in suburban and urban areas. In addition, it said the signal level of fixed stations in the 72-76 MHz band precludes the use of some of the 72-76 MHz radio control channels. Moreover, it noted that because of the growth of the Land Mobile Radio Service with which these fixed operations are associated, the number of radio control channels precluded from use because of interference from those facilities supporting land mobile operations will increase drastically, increasing the need for relief.

The Commission noted that the potential of harmful interference being caused by mobile radio model control transmitters to fixed land mobile control stations is slight. This is due to the 10 kHz separation between the model transmitter frequency and that of the control station receiver and also because of the lower power of the model transmitter (about 0.5 watts) as compared with the higher output (50-100 watts) and directional antenna use of fixed land mobile stations.

FCC Authorizes Automatic Aviation Weather Observation Systems At Certain Airports

The Commission has authorized the use of automatic aviation observation systems at airports having neither a full-time air traffic control tower nor a full-time flight service station. In amending Part 87 of the rules to allow the use of the automatic equipment, the Commission noted that the Federal Aviation Administration (FAA) does not provide air traffic control service or local air terminal information at many smaller airports. This lack of local weather information may be a handicap at airports using an instrument approach capability.

For example, the Commission pointed out, without a local altimeter setting, the minimum height above the ground to which an aircraft may descend in low visibility conditions varies. It increases in proportion to the distance from the airport the altimeter setting is measured.

The FAA intends to purchase and/or install automatic weather observation systems at several airports. This will enhance the accuracy and timeliness of information available to pilots and save resources for the

FAA, since manual observation and reporting facilities will not be required.

At airports where the FAA will be unable to install these systems, the FAA indicated it would make available and coordinate assignments on air traffic control frequencies in the 118-136 MHz band for non-government applicants seeking to operate automatic weather observation systems. This would alleviate two of the overriding concerns in authorizing any new service—the availability of suitable spectrum and potential for interference with existing systems, the Commission said.

Speed-Check Radar Authority Proposed To Be Included With Police Radio Licenses

The Commission has proposed to include authorization for speed-detection radar units as part of the mobile radio station authorization issued to police licensees in the Police and Local Government Radio Services. The rule change, proposed on the FCC's volition, would authorize operation of any number of radar units by police agencies and eliminate the current requirement for separate authorization in the Radiolocation Service. Police agencies would no longer need to apply for new radar authorizations or to modify or renew existing licenses for radar units.

Use of type-accepted or type-approved equipment still would be required, and the licensees would have to comply with all other applicable FCC rules. The radar units would be authorized to operate on any frequency in the 2,450-2,500, 10,500-10,550, and 24,050-24,250 MHz bands.

The Commission said the proposal is consistent with its ongoing program of review of the rules to facilitate administration of the private land mobile radio services and eliminate unnecessary burdens on licensees. It would reduce the paperwork burdens on police licensees, and free FCC resources for other uses. Some 200 radar unit applications are received monthly.

The FCC noted that, with the change, it would no longer have the information contained in its license files and would not know how heavily the radar bands were being used. The bands are shared with federal government agencies. The Commission said that specific frequencies are not always assigned to licensees and that detailed license records are not needed in this instance for frequency assignment. On balance, the change would be in the public interest.

FCC Simplifies Certain Radio Operator License Examination Procedures

The Commission has amended its rules to combine the three examinations for those seeking General Radiotelephone Operator Licenses into a single examination. Previously, applicants seeking those licenses

were required to pass three separate examinations, the first ("Element 3") and most difficult covering technical, legal, and other matters, and the second and third ("Elements 1 and 2") covering more simple, non-technical matters.

The FCC said combining the three examinations would result in more efficient and expeditious service to the public, since 99 percent of those who pass the first examination also pass the subsequent tests. In addition, the change in the rules will allow the holder of any valid commercial radiotelephone operator license, except for the Restricted Radiotelephone Operator Permit, credit for Element 1 and 2 examinations when applying for any commercial radiotelegraph operator license. Previously, the holder of Marine Radio Operator Permits were not allowed this credit.

The Commission added that the simplification of the procedures will not affect the qualifications requirements for radio operators and will eliminate administration of over 100,000 examinations per year, resulting in some saving of FCC resources.

Unlicensed Station Pays \$750 Fine

The Santa Juanita Gas Service, Santa Juanita, Bayamon, Puerto Rico, has had to pay a \$750 fine. This was for their unlicensed operation of a radio station.

The Field Operations Bureau's San Juan/Sabana Seca Office conducted an investigation after discovery of an unidentified station operating on 159.355 MHz for which no license record existed. Both verbal and written warnings were issued during the first inspection on December 11, 1981. But unlicensed operation continued, and on December 15, the station was again inspected and warned to immediately cease operation. Since the station continued to operate, the Commission issued a Notice of Apparent Liability for \$750.

Revocation Of Mount Vernon, WA, Firm's Business Radio Licenses Affirmed

The FCC Review Board has revoked the Business Radio Service licenses of Barnett Implement Company, Inc., Mount Vernon, WA. This affirms an Initial Decision made by FCC Chief Administrative Law Judge Lenore G. Ehrig.

The Board adopted the ALJ's findings of fact and conclusions, finding that they accurately and fairly reflected the record of the case. They fully supported the judge's ultimate conclusion that the licenses should be revoked. Barnett's appeal did not raise any decisionally significant matters that the ALJ did not consider adequately. It rejected Barnett's arguments in mitigation of the conduct established in the record.

In an Initial Decision released October 5, 1981, Judge Ehrig found that the Barnett

stations, KDY-897 and WXW-541, willfully and repeatedly violated FCC rules. This was done by transmitting base-to-base communications which were not of immediate importance to the mobile units and could have been communicated by telephone.

The judge found that an unauthorized identification, "Unit 6," was used on the systems in an apparent attempt to mask those transmissions. The ALJ also found that Barnett's owner, Jerald Rindal, was less than candid and deliberately tried to mislead the FCC in letters about the violations.

FCC Judge Refuses To Grant Renewal Of Dial Electric's Business Radio Licenses

FCC Administrative Law Judge Byron E. Harrison has refused to renew the licenses of Dial Electric & Engineering, Inc., Westminster, CO, for stations KN-2705, KII-93, and KRK-603 in the Business Radio Service for continued violations of the rules. Dial Electric's renewal applications had been designated for a hearing March 12, 1981, to determine:

- Whether its mobile radio relay station KRK-603 interfered with other users of 463.425 and 468.425 MHz, and whether Dial Electric had failed to install tone-control equipment as required by the Commission;
- Whether Dial Electric had refused to allow FCC inspection of its stations in violation of the Private Land Mobile Radio Service (PLMRS) rules;
- Whether it had established an unauthorized mobile relay station in violation of the PLMRS rules; and
- Whether a grant of its renewal applications would serve the public interest, convenience, and necessity.

On March 21, 1979, Syntonic Technology informed Dial Electric it intended to set up a tone-controlled community or shared mobile relay station on 463.425 MHz. They requested that Dial Electric convert its radio equipment to tone control to prevent interference to Syntonic's equipment.

The following April 11, Kenneth Schoenecke, president and owner of Dial Electric, told Syntonic it would take some time to convert his 40-plus mobiles, 12 portables, and 3 repeaters to tone control, and he suggested that Syntonic could serve its customers better by using a different mobile relay station. Syntonic's station subsequently went on the air and almost immediately began to experience interference from Dial Electric's stations.

On August 16, 1979, the FCC's Denver office wrote to Schoenecke requesting all available information on the interference problem and giving him 90 days in which to install tone-control equipment. While Schoenecke maintained that he had installed tone-control equipment in KRK-603 and 3 mobile stations, Judge Harrison noted that the evidence showed clearly that he had not met the 90-day requirement and his stations

continued to interfere with Syntonic's community mobile relay station for a period of 2 years.

In addition, Judge Harrison said, not only had Schoenecke refused to permit FCC personnel to inspect his stations to verify whether they were the cause of interference to Syntonic, he also had established an unauthorized mobile relay station in Westminster in willful violation of the PLMRS rules.

Therefore, Judge Harrison concluded that Schoenecke's continued disregard for the Commission's PLMRS rules showed there was no basis for concluding that Dial Electric's continued operation would serve the public interest. He added that retention of Dial Electric's licenses would continue to render Syntonic's communications systems, which are in compliance with the rules, ineffective.

Automobile Emergency Services Use Of 72-76 MHz Band Proposed

In response to a rulemaking petition by the American Automobile Association, the FCC has proposed amending Part 90 of its rules by making the 72-76 MHz band available to eligibles in the Automobile Emergency Radio Service for operational-fixed use, subject to certain technical restrictions on location, operation, and interference protection criteria to TV channels 4 and 5.

The 6,700-plus stations licensed in the AERS are used for dispatching repair/tow trucks or other road-service equipment to disabled vehicles. Citing the need for reliable and not prohibitively expensive com-

munications links between dispatchers and their mobile units, the AAA said the AERS, as a Land Transportation Radio Service, should share the 72-76 MHz band for operational-fixed use with other eligible users in the Aviation, Industrial, Marine, Public Safety, Land Transportation, and Domestic Public Radio Services subject to the TV channels 4 and 5 protection criteria.

Noting it is exploring ways to maximize user options and provide lower cost, higher quality service, the Commission asked for comments on the proposal to extend use of the 72-76 MHz band to AERS licensees, and also asked whether the Manufacturers, Telephone Maintenance, and Taxicab Radio Services should be included.

Eliminating Portable To Vehicular Mobile Ratio In Loading Criteria For Private Land Mobile Systems Above 470 MHz

The Commission has proposed eliminating the portable to vehicular mobile ratio in loading criteria for Private Land Mobile Radio Services systems operating above 470 MHz. The proposal resulted from a petition by the Associated Public Safety Communications Officers, Inc. (APCO) for amendment of Part 90 of the rules to eliminate the existing 2:1 ratio in loading criteria for public safety land mobile licensees operating in the 470-512 MHz and 800 MHz bands.

APCO contended that higher technology and popularity of portable units justified treating them as the equivalent of vehicular

mobile units for channel-loading purposes. It added that because the portable is as efficient as the vehicular mobile unit, there is no basis for assuming that the hand-held unit generates less traffic than its vehicular counterpart, but may generate more due to the user's ability to communicate after leaving the vehicle.

The Commission agreed, but stated that APCO's arguments would be equally applicable to portable use by all other groups of eligible licenses under Part 90 of the rules. Therefore, it asked for comments on whether application of the proposed revision to all groups of eligibles is appropriate; whether the need to save channel space, which led in part to adoption of the present distinction, still exists; and if this is the case, whether the portable/vehicular mobile ratio is an effective method of doing so.

Revision And Codification Proposed For General Mobile Radio Service Rules

The Commission has proposed a thorough revision of the General Mobile Radio Service rules. The revision is meant to update, codify, and simplify them as much as possible.

The General Mobile Radio Service is a fairly sophisticated, private, two-way voice communication service used by individuals, businesses, and organizations for personal and business purposes. It provides higher quality communication than the Citizens Band Radio Service through the use of frequency modulation, higher power, repeater station capability, and more sophisticated equipment.

The proposed rules are divided into five major segments, each addressed to the particular interest of persons needing to know them. The divisions are:

- General provisions (for all interested parties);
- Considerations when planning a system (for system designers);
- Applying for a license in the service (for applicants);
- Managing a system (for licensees); and
- Operating a station (for station operators).

The Commission said the rules governing the service are out of date, since they are virtually unchanged from the form in which they were originally adopted in 1958, despite advances in land mobile radio technology and a substantial increase in the number of licensees. Many policy decisions, rule interpretations, and definitions have been incorporated into the proposed revision.

Among revisions the Commission requested comment is a provision to limit a licensee to one system within a 40-mile-diameter circular area. Present rules do not define the area, but limit an applicant to one frequency in "a given area" unless a need for a second frequency can be demonstrated.

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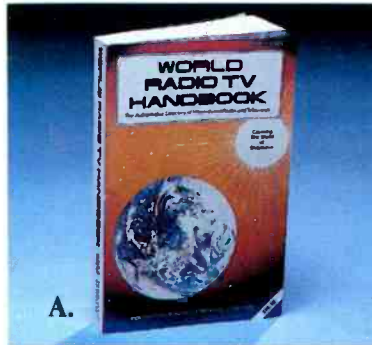
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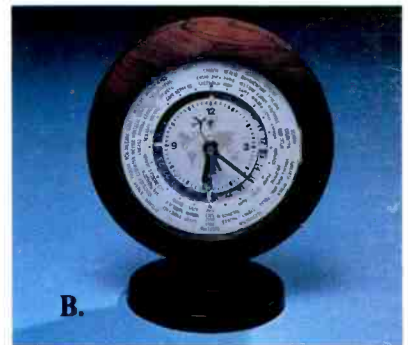
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B.



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